2.6.1 - Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website

COURSE OUTCOME				
S.NO.	**PROGRAMME**	**2021 REGULATION LINK**	**2017 REGULATION LINK**	**2013 REGULATION LINK**
1	B.E. Computer Science and Engineering	VIEW	VIEW	VIEW
2	B.E. Electrical and Electronics Engineering	VIEW	VIEW	VIEW
3	B.E. Electronics and Communication Engineering	VIEW	VIEW	VIEW
4	B.E. Mechanical Engineering	VIEW	VIEW	VIEW
5	B.Tech. Information Technology	VIEW	VIEW	VIEW
6	B.E. Biomedical Engineering	VIEW	VIEW	VIEW
7	B.Tech. Artificial Intelligence and Data Science	VIEW	NA	NA
8	B.E. Civil Engineering	NA	VIEW	VIEW
9	B.E. Mechatronics Engineering	NA	VIEW	VIEW

Mahendra College of Engineering SALEM 636 106 Mahendra Salem Campus

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Minnampalli, SALEM 636 106
TAMILNADU

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

2021 REGULATION

HOME

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

2021 REGULATION

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1	Apply their technical competence in computer science to solve real world problems, withtechnical and people leadership.
PEO 2	Conduct cutting edge research and develop solutions on problems of social relevance.
PEO 3	Work in a business environment, exhibiting team skills, work ethics, adaptability and lifelonglearning.

PROGRAM OUTCOMES (POs)

PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

The students will demonstrate the abilities
PSO1: Exhibit design and programming skills to build and automate business solutions using cutting edge technologies.
PSO2: Strong theoretical foundation leading to excellence and excitement towards research, to provide elegant solutions to complex problems.
PSO3: Ability to work effectively with various engineering fields as a team to design, build and develop system applications.

LIST OF COURSES

REGULATION 2021

COMPUTER SCIENCE AND ENGINEERING		
SEMESTER I		
S. NO.	**COURSE CODE**	**COURSE TITLE**
1	IP3151	Induction Programme
THEORY		
2	HS3152	Professional English - I
3	MA3151	Matrices and Calculus
4	PH3151	Engineering Physics
5	CY3151	Engineering Chemistry
6	GE3151	Problem Solving and Python Programming
7	GE3152	Heritage of Tamils
PRACTICALS		
8	GE3171	Problem Solving and Python Programming Laboratory
9	BS3171	Physics and Chemistry Laboratory
10	GE3172	English Laboratory
SEMESTER II		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	HS3252	Professional English - II
2	MA3251	Statistics and Numerical Methods
3	PH3256	Physics for Information Science
4	BE3251	Basic Electrical and Electronics Engineering
5	GE3251	Engineering Graphics
6	CS3251	Programming in C
7	GE3252	Tamils and Technology
8	NCC Credit Course Level 1[#]	
PRACTICALS		
9	GE3271	Engineering Practices Laboratory
10	CS3271	Programming in C Laboratory
11	GE3272	Communication Laboratory / Foreign Language
SEMESTER III		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	MA3354	Discrete Mathematics
2	CS3351	Digital Principles and Computer Organization
3	CS3352	Foundations of Data Science
4	CS3301	Data Structures

HOME

5	CS3391	Object Oriented Programming
PRACTICALS		
6	CS3311	Data Structures Laboratory
7	CS3381	Object Oriented Programming Laboratory
8	CS3361	Data Science Laboratory
9	GE3361	Professional Development
SEMESTER IV		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	CS3452	Theory of Computation
2	CS3491	Artificial Intelligence and Machine Learning
3	CS3492	Database Management Systems
4	CS3401	Algorithms
5	CS3451	Introduction to Operating Systems
6	GE3451	Environmental Sciences and Sustainability
7		NCC Credit Course Level 2#
PRACTICALS		
8	CS3461	Operating Systems Laboratory
9	CS3481	Database Management Systems Laboratory
SEMESTER V		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	CS3591	Computer Networks
2	CS3501	Compiler Design
3	CB3491	Cryptography and Cyber Security
4	CS3551	Distributed Computing
5	CCW331	Business Analytics
6	CCS375	Web Technologies
7	MX3084	Disaster Risk Reduction and Management
SEMESTER VI		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	CCS356	Object Oriented Software Engineering
2	CS3691	Embedded Systems and IoT
3	OEI351	Introduction to Industrial Instrumentation and Control
4	CCS336	Cloud Services Management
5	CCS343	Digital and Mobile Forensics
6	CCW332	Digital marketing
7	CCS359	Quantum Computing
8	MX3089	Industrial Safety
9	NCC Credit Course Level 3#	
SEMESTER VII		
S. NO.	**COURSE CODE**	**COURSE TITLE**

THEORY		
1	GE3791	Human Values and Ethics
2	GE3755	Knowledge Management
3	OIE352	Resource Management Techniques
4	ORA351	Foundation of Robotics
5	OHS352	Project Report Writing
PRACTICALS		
6	CS3711	Summer internship
SEMESTER VIII		
S. NO.	**COURSE CODE**	**COURSE TITLE**
PRACTICALS		
1	CS3811	Project Work/Internship

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Mahendra College of Engineering
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TAMILNADU

COURSE OUTCOME FOR COMPUTER SCIENCE AND ENGINEERING

DEGREE	**U.G**
PROGRAMME	**B.E - COMPUTER SCIENCE AND ENGINEERING**
ACADEMIC YEAR	**2021-22**
REGULATION	**2021**

SEMESTER 01		
1.Course Code and Name : HS3151 PROFESSIONAL ENGLISH - I		
	CO Statements	**Knowledge Level**
At the end of the course, learners will be able		
1	To listen and comprehend complex academic texts	K2
2	To read and infer the denotative and connotative meanings of technical texts	K2
3	To write definitions, descriptions, narrations and essays on various topics	K2
4	To speak fluently and accurately in formal and informal communicative contexts	K3
5	To express their opinions effectively in both oral and written medium of communication	K4
2.Course Code and Name : MA3151 MATRICES AND CALCULUS		
	CO Statements	**Knowledge Level**
At the end of the course the students will be able to		
1	Use the matrix algebra methods for solving practical problems.	K3
2	Apply differential calculus tools in solving various application problems.	K3
3	Able to use differential calculus ideas on several variable functions.	K3
4	Apply different methods of integration in solving practical problems.	K3
5	Apply multiple integral ideas in solving areas, volumes and other practical problems.	K3
3.Course Code and Name : PH3151 ENGINEERING PHYSICS		
	CO Statements	**Knowledge Level**
After completion of this course, the students should be able to		
1	Understand the importance of mechanics.	K1
2	Express their knowledge in electromagnetic waves.	K2
3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.	K3
4	Understand the importance of quantum physics.	K3
5	Comprehend and apply quantum mechanical principles towards the formation of energy bands	K4
4.Course Code and Name : CY3151 ENGINEERING CHEMISTRY		
	CO Statements	**Knowledge Level**
At the end of the course, the students will be able:		
1	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.	K3

HOME

2	To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.	K4
3	To apply the knowledge of phase rule and composites for material selection requirements.	K2
4	To recommend suitable fuels for engineering processes and applications.	K2
5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.	K3

5.Course Code and Name : GE3151 PROBLEM SOLVING AND PYTHON PROGRAMMING		
	CO Statements	**Knowledge Level**
Upon completion of the course, students will be able to		
1	Develop algorithmic solutions to simple computational problems.	K3
2	Develop and execute simple Python programs.	K3
3	Write simple Python programs using conditionals and loops for solving problems.	K4
4	Decompose a Python program into functions.	K4
5	Represent compound data using Python lists, tuples, dictionaries etc.	K4
6	Read and write data from/to files in Python programs.	K4

7.Course Code and Name : GE3171 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY		
	CO Statements	**Knowledge Level**
On completion of the course, students will be able to:		
1	Develop algorithmic solutions to simple computational problems	K3
2	Develop and execute simple Python programs.	K4
3	Implement programs in Python using conditionals and loops for solving problems.	K2
4	Deploy functions to decompose a Python program.	K3
5	Process compound data using Python data structures.	K4
6	Utilize Python packages in developing software applications.	K2

8.Course Code and Name : BS3171 PHYSICS AND CHEMISTRY LABORATORY		
	CO Statements	**Knowledge Level**
Upon completion of the course, the students will be able to		
PHYSICS LABORATORY :		
1	Understand the functioning of various physics laboratory equipment.	K3
2	Use graphical models to analyze laboratory data.	K2
3	Use mathematical models as a medium for quantitative reasoning and describing physical reality.	K1
4	Access, process and analyze scientific information.	K1
5	Solve problems individually and collaboratively.	K1
CHEMISTRY LABORATORY:		
1	To analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO.	K2
2	To determine the amount of metal ions through volumetric and spectroscopic techniques	K1
3	To analyse and determine the composition of alloys.	K1
4	To learn simple method of synthesis of nanoparticles	K2

5	To quantitatively analyse the impurities in solution by electroanalytical techniques	K3
SEMESTER 02		
1.Course Code and Name : HS3251 PROFESSIONAL ENGLISH - II		
	CO Statements	**Knowledge Level**
At the end of the course learners will be able to:		
1	To compare and contrast products and ideas in technical texts.	K2
2	To identify cause and effects in events, industrial processes through technical texts	K2
3	To analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format.	K2
4	To report events and the processes of technical and industrial nature.	K3
5	To present their opinions in a planned and logical manner, and draft effective resumes in context of job search.	K4
2.Course Code and Name : MA3251 STATISTICS AND NUMERICAL METHODS		
	CO Statements	**Knowledge Level**
Upon successful completion of the course, students will be able to:		
1	Apply the concept of testing of hypothesis for small and large samples in real life problems.	K3
2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.	K3
3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.	K3
4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.	K3
5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	K3
3.Course Code and Name : PH3256 PHYSICS FOR INFORMATION SCIENCE		
	CO Statements	**Knowledge Level**
At the end of the course, the students should be able to		
1	Gain knowledge on classical and quantum electron theories, and energy band structures	K2
2	Acquire knowledge on basics of semiconductor physics and its applications in various devices.	K3
3	Get knowledge on magnetic properties of materials and their applications in data storage.	K3
4	Have the necessary understanding on the functioning of optical materials for optoelectronics.	K2
5	Understand the basics of quantum structures and their applications in carbon electronicsand basics of quantum computing.	K2
4.Course Code and Name : BE3251 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING		
	CO Statements	**Knowledge Level**
At the end of the course, the students should be able to		

1	Compute the electric circuit parameters for simple problems	K3
2	Explain the working principle and applications of electrical machines	K2
3	Analyze the characteristics of analog electronic devices	K4
4	Explain the basic concepts of digital electronics	K2
5	Explain the operating principles of measuring instruments	K2
5.Course Code and Name : GE3251 ENGINEERING GRAPHICS		
	CO Statements	**Knowledge Level**
At the end of the course, the students should be able to		
1	Use BIS conventions and specifications for engineering drawing.	K3
2	Construct the conic curves, involutes and cycloid.	K3
3	Solve practical problems involving projection of lines.	K3
4	Draw the orthographic, isometric and perspective projections of simple solids.	K5
5	Draw the development of simple solids.	K5
6.Course Code and Name : CS3251 PROGRAMMING IN C		
	CO Statements	**Knowledge Level**
Upon completion of the course, the students will be able to		
1	Demonstrate knowledge on C Programming constructs	K2
2	Develop simple applications in C using basic constructs	K5
3	Design and implement applications using arrays and strings	K5
4	Develop and implement modular applications in C using functions.	K5
5	Develop applications in C using structures and pointers.	K5
6	Design applications using sequential and random access file processing.	K5
7.Course Code and Name : GE3271 ENGINEERING PRACTICES LABORATORY		
	CO Statements	**Knowledge Level**
Upon completion of this course, the students will be able to:		
1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.	K5
2	Wire various electrical joints in common household electrical wire work.	K6
3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.	K2
4	Solder and test simple electronic circuits;	K6
5	Assemble and test simple electronic components on PCB.	K6

8.Course Code and Name : CS3271 PROGRAMMING IN C LABORATORY		
	CO Statements	**Knowledge Level**
1	Demonstrate knowledge on C programming constructs.	K2
2	Develop programs in C using basic constructs.	K5
3	Develop programs in C using arrays.	K5

4	Develop applications in C using strings, pointers, functions.	K5
5	Develop applications in C using structures.Develop applications in C using file processing.	K5
SEMESTER 03		
1.Course Code and Name : MA3354 DISCRETE MATHEMATICS		
	CO Statements	**Knowledge Level**
At the end of the course, students would :		
1	Have knowledge of the concepts needed to test the logic of a program.	K1
2	Have an understanding in identifying structures on many levels.	K1
3	Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.	K2
4	Be aware of the counting principles.	K2
5	Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.	K2
2.Course Code and Name : CS3351 DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION		
	CO Statements	**Knowledge Level**
At the end of the course, students would :		
1	Design various combinational digital circuits using logic gates	K5
2	Design sequential circuits and analyze the design procedures	K5
3	State the fundamentals of computer systems and analyze the execution of an instruction	K1
4	Analyze different types of control design and identify hazards	K4
5	Identify the characteristics of various memory systems and I/O communication	K1
3.Course Code and Name : CS3352 FOUNDATIONS OF DATA SCIENCE		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Define the data science process	K1
2	Understand different types of data description for data science process	K1
3	Gain knowledge on relationships between data	K1
4	Use the Python Libraries for Data Wrangling	K3
5	Apply visualization Libraries in Python to interpret and explore data	K3
4.Course Code and Name : CS3301 DATA STRUCTURES		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Define linear and non-linear data structures.	K1
2	Implement linear and non–linear data structure operations.	K3
3	Use appropriate linear/non–linear data structure operations for solving a given problem.	K3
4	Apply appropriate graph algorithms for graph applications.	K3
5	Analyze the various searching and sorting algorithms.	K4

5.Course Code and Name : CS3391 OBJECT ORIENTED PROGRAMMING		
	CO Statements	**Knowledge Level**
On completion of this course, the students will be able to		
1	Apply the concepts of classes and objects to solve simple problems	K3
2	Develop programs using inheritance, packages and interfaces	K5
3	Make use of exception handling mechanisms and multithreaded model to solve real world problems	K3
4	Build Java applications with I/O packages, string classes, Collections and generics concepts	K5
5	Integrate the concepts of event handling and JavaFX components and controls for developing GUI based applications	K5

6.Course Code and Name : CS3311 DATA STRUCTURES LABORATORY		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Implement Linear data structure algorithms.	K5
2	Implement applications using Stacks and Linked lists.	K5
3	Implement Binary Search tree and AVL tree operations.	K5
4	Implement graph algorithms.l	K5
5	Analyze the various searching and sorting algorithms.	K4

7.Course Code and Name : CS3381 OBJECT ORIENTED PROGRAMMING LABORATORY		
	CO Statements	**Knowledge Level**
On completion of this course, the students will be able to		
1	Design and develop java programs using object oriented programming concepts	K5
2	Develop simple applications using object oriented concepts such as package, exceptions	K5
3	Implement multithreading, and generics concepts	K5
4	Create GUIs and event driven programming applications for real world problems	K5
5	Implement and deploy web applications using Java	K5

8.Course Code and Name :CS3361 DATA SCIENCE LABORATORY		
	CO Statements	**Knowledge Level**
On completion of this course, the students will be able to		
1	Make use of the python libraries for data science	K3
2	Make use of the basic Statistical and Probability measures for data science.	K3
3	Perform descriptive analytics on the benchmark data sets.	K3
4	Perform correlation and regression analytics on standard data sets	K3
5	Present and interpret data using visualization packages in Python.	K4

9.Course Code and Name :GE3361 PROFESSIONAL DEVELOPMENT		
	CO Statements	**Knowledge Level**
On completion of this course, the students will be able to		

1	Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements	K3
2	Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding	K3
3	Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media objects.	K3
4	Perform document statistical report using MS Word, Excel and PPT.	K3
5	Present and interpret data document using MS Word, Excel and PPT	K4
SEMESTER 04		
1.Course Code and Name : CS3452 THEORY OF COMPUTATION		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Construct automata theory using Finite Automata	K5
2	Write regular expressions for any pattern	K5
3	Design context free grammar and Pushdown Automata	K5
4	Design Turing machine for computational functions	K5
5	Differentiate between decidable and undecidable problems	K2
2.Course Code and Name : CS3491 ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Use appropriate search algorithms for problem solving	K3
2	Apply reasoning under uncertainty	K3
3	Build supervised learning models	K5
4	Build ensembling and unsupervised models	K5
5	Build deep learning neural network models	K5
3.Course Code and Name : CS3492 DATABASE MANAGEMENT SYSTEMS		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Construct SQL Queries using relational algebra	K5
2	Design database using ER model and normalize the database	K5
3	Construct queries to handle transaction processing and maintain consistency of the database	K5
4	Compare and contrast various indexing strategies and apply the knowledge to tune the performance of the database	K2
5	Appraise how advanced databases differ from Relational Databases and find a suitable database for the given requirement.	K2
4.Course Code and Name : CS3401 ALGORITHMS		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Analyze the efficiency of algorithms using various frameworks	K4

2	Apply graph algorithms to solve problems and analyze their efficiency.	K3
3	Make use of algorithm design techniques like divide and conquer, dynamic programming and greedy techniques to solve problems	K3
4	Use the state space tree method for solving problems.	K3
5	Use the state space tree method for solving problems.Appraise how advanced databases differ from Relational Databases and find a suitable database for the given requirement.	K3
5.Course Code and Name : CS3451 INTRODUCTION TO OPERATING SYSTEMS		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Analyze various scheduling algorithms and process synchronization.	K4
2	Explain deadlock prevention and avoidance algorithms.	K2
3	Compare and contrast various memory management schemes.	K2
4	Explain the functionality of file systems, I/O systems, and Virtualization	K2
5	Compare iOS and Android Operating Systems.	K2
6.Course Code and Name : GE3451 ENVIRONMENTAL SCIENCES AND SUSTAINABILITY		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.	K2
2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.	K2
3	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.	K2
4	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.	K2
5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.	K2
7.Course Code and Name : CS3461 OPERATING SYSTEMS LABORATORY		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Define and implement UNIX Commands.	K2
2	Compare the performance of various CPU Scheduling Algorithms.	K2
3	Compare and contrast various Memory Allocation Methods.	K2
4	Define File Organization and File Allocation Strategies.	K2
5	Implement various Disk Scheduling Algorithms.	K2
8.Course Code and Name : CS3481 DATABASE MANAGEMENT SYSTEMS LABORATORY		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		

1	Create databases with different types of key constraints.	K5
2	Construct simple and complex SQL queries using DML and DCL commands.	K5
3	Use advanced features such as stored procedures and triggers and incorporate in GUI based application development	K3
4	Create an XML database and validate with meta-data (XML schema).	K5
5	Create and manipulate data using NOSQL database.	K5
SEMESTER 05		
1.Course Code and Name : CS3591 COMPUTER NETWORKS		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Explain the basic layers and its functions in computer networks.	K2
2	Understand the basics of how data flows from one node to another.	K2
3	Analyze routing algorithms.	K4
4	Describe protocols for various functions in the network.	K2
5	Analyze the working of various application layer protocols.	K4
2.Course Code and Name : CS3501 COMPILER DESIGN		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Understand the techniques in different phases of a compiler.	K2
2	Design a lexical analyser for a sample language and learn to use the LEX tool.	K2
3	Apply different parsing algorithms to develop a parser and learn to use YACC tool	K3
4	Understand semantics rules (SDT), intermediate code generation and run-time environment.	K2
5	Implement code generation and apply code optimization techniques.	K5
3.Course Code and Name : CB3491 CRYPTOGRAPHY AND CYBER SECURITY		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Understand the fundamentals of networks security, security architecture, threats and vulnerabilities	K2
2	Apply the different cryptographic operations of symmetric cryptographic algorithms	K3
3	Apply the different cryptographic operations of public key cryptography	K3
4	Apply the various Authentication schemes to simulate different applications.	K3
5	Understand various cyber crimes and cyber security.	K2
4.Course Code and Name : CS3551 DISTRIBUTED COMPUTING		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Explain the foundations of distributed systems	K2
2	Solve synchronization and state consistency problems	K5
3	Use resource sharing techniques in distributed systems	K3
4	Apply working model of consensus and reliability of distributed systems	K3
5	Explain the fundamentals of cloud computing	K2
5.Course Code and Name : CCW331 BUSINESS ANALYTICS		
	CO Statements	**Knowledge**

		Level
At the end of this course, the students will be able to:		
1	Explain the real world business problems and model with analytical solutions.	K2
2	Identify the business processes for extracting Business Intelligence	K1
3	Apply predictive analytics for business fore-casting	K3
4	Apply analytics for supply chain and logistics management	K3
5	Use analytics for marketing and sales.	K3
6.Course Code and Name : CCS375 WEB TECHNOLOGIES		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Construct a basic website using HTML and Cascading Style Sheets	K5
2	Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms.	K5
3	Develop server side programs using Servlets and JSP.	K5
4	Construct simple web pages in PHP and to represent data in XML format.	K5
5	Develop interactive web applications.	K5
7.Course Code and Name : MX3084 DISASTER RISK REDUCTION AND MANAGEMENT		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	To impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR)	K5
2	To enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction	K3
3	To develop disaster response skills by adopting relevant tools and technology	K5
4	Enhance awareness of institutional processes for Disaster response in the country and	K3
5	Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity	K5
SEMESTER 06		
1.Course Code and Name : CCS356 OBJECT ORIENTED SOFTWARE ENGINEERING		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Compare various Software Development Lifecycle Models	K2
2	Evaluate project management approaches as well as cost and schedule estimation strategies.	K6
3	Perform formal analysis on specifications.	K4
4	Use UML diagrams for analysis and design.	K3
5	Architect and design using architectural styles and design patterns, and test the system	K5
2.Course Code and Name : CS3691 EMBEDDED SYSTEMS AND IOT		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Explain the architecture of embedded processors.	K2
2	Write embedded C programs.	K2
3	Design simple embedded applications.	K5
4	Compare the communication models in IOT	K2

5	Design IoT applications using Arduino/Raspberry Pi /open platform.	K5
3.Course Code and Name : OEI351 INTRODUCTION TO INDUSTRIAL INSTRUMENTATION AND CONTROL		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Understand common unit operations in process industries	K2
2	Identify the dynamics of important unit operations in petro chemical industry.	K1
3	Develop understanding of important processes taking place selected case studies namely petrochemical industry, power plant industry and paper & pulp industry.	K5
4	Select appropriate measurement techniques for selective processes.	K5
5	Develop controller structure based on the process knowledge.	K5
4.Course Code and Name : CCS336 CLOUD SERVICES MANAGEMENT		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Exhibit cloud-design skills to build and automate business solutions using cloud technologies.	K3
2	Possess Strong theoretical foundation leading to excellence and excitement towards adoption of cloud-based services	K2
3	Solve the real world problems using Cloud services and technologies	K5
4	Select appropriate structures for designing, deploying and running cloud-based services in a business environment	K5
5	Illustrate the benefits and drive the adoption of cloud-based services to solve real world problems	K5
5.Course Code and Name : CCS343 DIGITAL AND MOBILE FORENSICS		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Have knowledge on digital forensics.	K1
2	Know about digital crime and investigations.	K2
3	Be forensic ready.	K5
4	Investigate, identify and extract digital evidence from iOS devices.	K1
5	Investigate, identify and extract digital evidence from Android devices.	K1
6.Course Code and Name : CCW332 DIGITAL MARKETING		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	To examine and explore the role and importance of digital marketing in today's rapidly changing business environment.	K2
2	To focuses on how digital marketing can be utilized by organizations and how its effectiveness can be measured.	K2
3	To know the key elements of a digital marketing strategy.	K5
4	To study how the effectiveness of a digital marketing campaign can be measured	K5
5	To demonstrate advanced practical skills in common digital marketing tools such as SEO, SEM, Social media and Blogs.	K5
7.Course Code and Name : CCS359 QUANTUM COMPUTING		
	CO Statements	**Knowledge Level**

At the end of this course, the students will be able to:		
1	Understand the basics of quantum computing.	K3
2	Understand the background of Quantum Mechanics.	K2
3	Analyze the computation models.	K4
4	Model the circuits using quantum computation. environments and frameworks	K5
5	Understand the quantum operations such as noise and error–correction.	K2
8.Course Code and Name : MX3089 INDUSTRIAL SAFETY		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Understand the basic concept of safety.	K2
2	Obtain knowledge of Statutory Regulations and standards.	K2
3	Know about the safety Activities of the Working Place.	K2
4	Analyze on the impact of Occupational Exposures and their Remedies	K4
5	Obtain knowledge of Risk Assessment Techniques.	K4
SEMESTER 07		
1.Course Code and Name : GE3754 HUMAN RESOURCE MANAGEMENT		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field	K1
2	Identify the multiple ethical interests at stake in a real-world situation or practice	K1
3	Articulate what makes a particular course of action ethically defensible	K2
4	Assess their own ethical values and the social context of problem	K4
5	Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human	K1
2.Course Code and Name :GE3755 KNOWLEDGE MANAGEMENT		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Understand the process of acquiry knowledge from experts	K2
2	Understand the learning organization.	K2
3	Use the knowledge management tools.	K3
4	Develop knowledge management Applications.	K5
5	Design and develop enterprise applications.	K5
3.Course Code and Name : OIE352 RESOURCE MANAGEMENT TECHNIQUES		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Understand to formulate linear programming problems and solve LPP using simple algorithm	K2
2	Understand to solve networking problems	K2
3	Understand to formulate and solve integer programming problems	K2
4	Understand to solve Non Linear programming problems	K2
5	Understand to understand and solve project management problems	K2

4.Course Code and Name : ORA351 FOUNDATION OF ROBOTICS		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Interpret the features of robots and technology involved in the control.	K2
2	Apply the basic engineering knowledge and laws for the design of robotics.	K5
3	Explain the basic concepts like various configurations, classification and parts of end effectors compare various end effectors and grippers and tools and sensors used in robots.	K2
4	Explain the concept of kinematics, degeneracy, dexterity and trajectory planning.	K2
5	Demonstrate the image processing and image analysis techniques by machine vision system.	K5
5.Course Code and Name : OHS352 PROJECT REPORT WRITING		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Write effective project reports.	K2
2	Use statistical tools with confidence.	K3
3	Explain the purpose and intension of the proposed project coherently and with clarity.	K2
4	Create writing texts to suit achieve the intended purpose.	K2
5	Master the art of writing winning proposals and projects.	K2
6.Course Code and Name : CS3711 SUMMER INTERNSHIP		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Industry Practices, Processes,Techniques, technology, automation and other core aspects of software industry	K2
2	Analyze, Design solutions to complex business problems	K4
3	Build and deploy solutions for target platform	K4
4	Preparation of Technical reports and presentation.	K5
5	Creating working model in the related work	K5
SEMESTER 08		
1.Course Code and Name : CS3811 PROJECT WORK/ INTERNSHIP		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Gain Domain knowledge and technical skill set required for solving industry / research problems	K5
2	Provide solution architecture, module level designs, algorithms	K5
3	Implement, test and deploy the solution for the target platform	K5
4	Prepare detailed technical report, demonstrate and present the work	K3
5	Creating working model in the related work	K5

2017 REGULATION

HOME

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

2017 REGULATION

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1	To enable graduates to pursue higher education and research, or have a successful career in industries associated with Computer Science and Engineering, or as entrepreneurs. To ensure that graduates will have the ability and attitude to adapt to emerging technological changes.

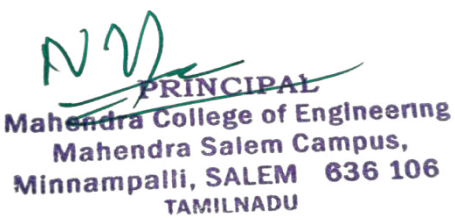
PROGRAM OUTCOMES (POs)

PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

The students will demonstrate the abilities
PSO1: Professional Skills: To analyze, design and develop computing solutions by applying foundational concepts of Computer Science and Engineering.
PSO2: Problem-Solving Skills: To apply software engineering principles and practices for developing quality software for scientific and business applications.
PSO3: Successful Career and Entrepreneurship: To adapt to emerging Information and Communication Technologies (ICT) to innovate ideas and solutions to existing/novel problems



LIST OF COURSES

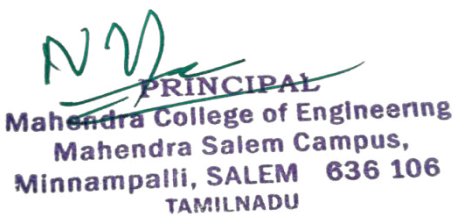
REGULATION 2017

COMPUTER SCIENCE AND ENGINEERING REGULATION 2017		
SEMESTER I		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	HS8151	Communicative English
2	MA8151	Engineering Mathematics - I
3	PH8151	Engineering Physics
4	CY8151	Engineering Chemistry
5	GE8151	Problem Solving and Python Programming
6	GE8152	Engineering Graphics
PRACTICALS		
7	GE8161	Problem Solving and Python Programming Laboratory
8	BS8161	Physics and Chemistry Laboratory
SEMESTER II		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	HS8251	Technical English
2	MA8251	Engineering Mathematics - II
3	PH8252	Physics for Information Science
4	BE8255	Basic Electrical, Electronics and Measurement
5	GE8291	Engineering
6	CS8251	Environmental Science and Engineering
PRACTICALS		
9	GE8261	Engineering Practices Laboratory
10	CS8261	C Programming Laboratory
SEMESTER III		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	MA8351	Discrete Mathematics
2	CS8351	Digital Principles and System Design
3	CS8391	Data Structures
4	CS8392	Object Oriented Programming
5	EC8395	Communication Engineering
PRACTICALS		
6	CS8381	Data Structures Laboratory
7	CS8383	Object Oriented Programming Laboratory
8	CS8382	Digital Systems Laboratory
9	**HS8381**	Interpersonal Skills/Listening &Speaking
SEMESTER IV		

HOME

S. NO.	COURSE CODE	COURSE TITLE
THEORY		
1	MA8402	Probability and Queueing Theory
2	CS8491	Computer Architecture
3	CS8492	Database Management Systems
4	CS8451	Design and Analysis of Algorithms
5	CS8493	Operating Systems
6	CS8494	Software Engineering
PRACTICALS		
7	CS8481	Database Management Systems Laboratory
8	CS8461	Operating Systems Laboratory
9	HS8461	Advanced Reading and Writing
SEMESTER V		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	MA8551	Algebra and Number Theory
2	CS8591	Computer Networks
3	EC8691	Microprocessors and Microcontrollers
4	CS8501	Theory of Computation
5	CS8592	Object Oriented Analysis and Design
6	OTL553	Telecommunication Network Management
PRACTICALS		
7	EC8681	Microprocessors and Microcontrollers Laboratory
8	CS8582	Object Oriented Analysis and Design Laboratory
9	CS8581	Networks Laboratory
SEMESTER VI		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	CS8651	Internet Programming
2	CS8691	Artificial Intelligence
3	CS8601	Mobile Computing
4	CS8602	Compiler Design
5	CS8603	Distributed Systems
6	GE8075	Intellectual Property Rights
PRACTICALS		
7	CS8661	Internet Programming Laboratory
8	CS8662	Mobile Application Development Laboratory
9	CS8611	Mini Project
SEMESTER VII		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	MG8591	Principles of Management

2	CS8792	Cryptography and Network Security
3	CS8791	Cloud Computing
4	IT8075	Software Project Management
5	GE8071	Disaster Management
6	OME752	SUPPLY CHAIN MANAGEMENT
PRACTICALS		
7	CS8711	Cloud Computing Laboratory
8	IT8761	Security Laboratory
SEMESTER VIII		
S. NO.	**COURSE CODE**	**COURSE TITLE**
PRACTICALS		
1	CS8074	Cyber Forensics
2	CS8080	Information Retrieval Techniques
PRACTICALS		
3	CS8811	Project Work



COURSE OUTCOME FOR COMPUTER SCIENCE AND ENGINEERING

DEGREE	**U.G**
PROGRAMME	**B.E - COMPUTER SCIENCE AND ENGINEERING**
ACADEMIC YEAR	**2017-18**
REGULATION	**2017**

SEMESTER 01		
1.Course Code and Name : HS8151 - Communicative English		
	CO Statements	**Knowledge Level**
AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:		
1	Read articles of a general kind in magazines and newspapers.	K2
2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.	K2
3	Comprehend conversations and short talks delivered in English	K2
4	Write short essays of a general kind and personal letters and emails in English	K3
5	Demonstrate positive group communication exchanges	K2
2.Course Code and Name : MA8151 ENGINEERING MATHEMATICS – I		
	CO Statements	**Knowledge Level**
After completing this course, students should demonstrate competency in the following skills:		
1	Use both the limit definition and rules of differentiation to differentiate functions.	K2
2	Apply differentiation to solve maxima and minima problems.	K3
3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.	K5
4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.	K3
5	Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.	K5
3.Course Code and Name : PH8151 ENGINEERING PHYSICS		
	CO Statements	**Knowledge Level**
Upon completion of this course,		
1	The students will gain knowledge on the basics of properties of matter and its applications,	K3
2	The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,	K3
3	The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers,	K3
4	The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and	K3
5	The students will understand the basics of crystals, their structures and different crystal growth techniques.	K4

HOME

4.Course Code and Name : CY8151 ENGINEERING CHEMISTRY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.	K3
2	Relate various thermodynamic functions such as enthalpy, entropy, free energy and their importance	K4
3	Explain the photo physical processes such as fluorescence and phosphorescence and various components of UV and IR spectrophotometer	K2
4	Illustrate the phase transitions of one component and two component systems and the types of alloys and their application in industries	K2
5	Outline the synthesis, characteristics and the applications of nano materials	K3

5.Course Code and Name : GE8151 PROBLEM SOLVING AND PYTHON PROGRAMMING		
	CO Statements	**Knowledge Level**
Upon completion of the course, students will be able to		
1	Develop algorithmic solutions to simple computational problems	K3
2	Read, write, execute by hand simple Python programs.	K3
3	Structure simple Python programs for solving problems.	K4
4	Decompose a Python program into functions.	K4
5	Represent compound data using Python lists, tuples, dictionaries, Read and write data from/to files in Python Programs	K4

6.Course Code and Name : GE8152 ENGINEERING GRAPHICS		
	CO Statements	**Knowledge Level**
On successful completion of this course, the student will be able to:		
1	Familiarize with the fundamentals and standards of Engineering graphics	K2
2	Perform freehand sketching of basic geometrical constructions and multiple views of objects	K3
3	Project orthographic projections of lines and plane surfaces.	K2
4	Draw projections and solids and development of surfaces.	K3
5	Visualize and to project isometric and perspective sections of simple solids.	K2

7.Course Code and Name : GE8161 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY		
	CO Statements	**Knowledge Level**
Upon completion of the course, students will be able to:		
1	Write, test, and debug simple Python programs.	K6
2	Implement Python programs with conditionals and loops.	K6
3	Develop Python programs step-wise by defining functions and calling them.	K6
4	Use Python lists, tuples, dictionaries for representing compound data.	K3
5	Read and write data from/to files in Python.	K2

8.Course Code and Name : BS8161 PHYSICS AND CHEMISTRY LABORATORY		
	CO Statements	**Knowledge Level**
Upon completion of the course, the students will be able to		
1	Apply principles of elasticity, optics and thermal properties for engineering applications	K3
2	The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.	K2
3	Experiment with the strength of an acid using pH meter and conductometer	K3
4	Student will understand the working of spectrometer.	K2
5	Student will able practically understand the chemical reactions.	K2

SEMESTER 02		
1.Course Code and Name : HS8251 TECHNICAL ENGLISH		
	CO Statements	**Knowledge Level**
At the end of the course learners will be able to:		
1	Read technical texts and write area- specific texts effortlessly.	K2
2	Listen and comprehend lectures and talks in their area of specialisation successfully.	K2
3	Speak appropriately and effectively in varied formal and informal contexts.	K2
4	Write reports and winning job applications.	K3
5	Describe processes, participate in formal and informal conversations, Group Discussions and make technical presentations effectively.	K2

2.Course Code and Name : MA8251 ENGINEERING MATHEMATICS – II		
	CO Statements	**Knowledge Level**
1	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.	K3
2	Gradient, divergence and curl of a vector point function and related identities	K3
3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green‘s theorems and their verification.	K3
4	Analytic functions, conformal mapping and complex integration.	K3
5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.	K3

3.Course Code and Name : PH8252 - PHYSICS FOR INFORMATION SCIENCE		
	CO Statements	**Knowledge Level**
1	Gain knowledge on classical and quantum electron theories, and energy band structuues,	K2
2	Acquire knowledge on basics of semiconductor physics and its applications in various devices,	K3
3	Get knowledge on magnetic properties of materials and their applications in data storage,	K3
4	Have the necessary understanding on the functioning of optical materials for optoelectronics,	K2
5	Understand the basics of quantum structures and their applications in carbon electronics.	K2

4.Course Code and Name : BE8255 BASIC ELECTRICAL, ELECTRONICS AND MEASUREMENT		
	CO Statements	**Knowledge Level**
1	Discuss the essentials of electric circuits and analysis.	K2
2	Discuss the basic operation of electric machines and transformers	K2
3	Introduction of renewable sources and common domestic loads.	K2
4	Introduction to measurement and metering for electric circuits.	K2
5	To understand about digital gates and construct digital gates	K2

5.Course Code and Name : GE8291 ENVIRONMENTAL SCIENCE AND ENGINEERING		
	CO Statements	**Knowledge Level**
1	Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.	K2
2	Public awareness of environmental is at infant stage.	K2
3	Ignorance and incomplete knowledge has lead to misconceptions	K2
4	Development and improvement in std. of living has lead to serious environmental disasters	K2
5	To acquire analytical skills in assessing environmental impacts through a multidisciplinary approach	K2

6.Course Code and Name : CS8251 PROGRAMMING IN C		
	CO Statements	**Knowledge Level**
1	Develop simple applications in C using basic constructs	K3
2	Design and implement applications using arrays and strings	K3
3	Develop and implement applications in C using functions and pointers.	K3
4	Develop applications in C using structures.	K3
5	Design applications using sequential and random access file processing.	K3

7.Course Code and Name : GE8261 ENGINEERING PRACTICES LABORATORY		
	CO Statements	**Knowledge Level**
1	Fabricate carpentry components and pipe connections including plumbing works.	K2
2	Use welding equipments to join the structures.	K2
3	Carry out the basic machining operations	K2
4	Make the models using sheet metal works	K6
5	Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings	K2

8.Course Code and Name : CS8261 C PROGRAMMING LABORATORY		
	CO Statements	**Knowledge Level**
1	Develop C programs for simple applications making use of basic constructs, arrays and strings.	K3
2	Develop C programs involving functions, recursion, pointers, and structures.	K3
3	Design applications using sequential and random access file processing.	K3
4	Manage I/O operations in your C program.	K2

HOME

5	Implement strings in your C program	K2
SEMESTER 03		
1.Course Code and Name : MA8351 DISCRETE MATHEMATICS		
	CO Statements	**Knowledge Level**
At the end of the course, students would:		
1	Have knowledge of the concepts needed to test the logic of a program.	K2
2	Have an understanding in identifying structures on many levels.	K2
3	Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.	K2
4	Be aware of the counting principles.	K2
5	Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.	K2
2.Course Code and Name : CS8351 DIGITAL PRINCIPLES AND SYSTEM DESIGN		
	CO Statements	**Knowledge Level**
1	Simplify Boolean functions using KMap	K3
2	Design and Analyze Combinational and Sequential Circuits	K6
3	Implement designs using Programmable Logic Devices	K3
4	Write HDL code for combinational and Sequential Circuits	K2
5	Classify different logic families, semiconductor memories and PLD devices.	K2
3.Course Code and Name : CS8391 DATA STRUCTURES		
	CO Statements	**Knowledge Level**
1	Implement abstract data types for linear data structures.	K3
2	Apply the different linear and non-linear data structures to problem solutions.	K3
3	Critically analyze the various sorting algorithms.	K4
4	Solve problem involving graphs, trees and heaps	K2
5	Describe the hash function and concepts of collision and its resolution methods	K2
4.Course Code and Name : CS8392 OBJECT ORIENTED PROGRAMMING		
	CO Statements	**Knowledge Level**
1	Develop Java programs using OOP principles	K6
2	Develop Java programs with the concepts inheritance and interfaces	K6
3	Build Java applications using exceptions and I/O streams	K3
4	Develop Java applications with threads and generics classes	K3
5	Develop interactive Java programs using swings	K6
5.Course Code and Name : EC8395 COMMUNICATION ENGINEERING		
	CO Statements	**Knowledge Level**
1	Ability to comprehend and appreciate the significance and role of this course in the present contemporary world	K2
2	Apply analog and digital communication techniques.	K3

3	Use data and pulse communication techniques.	K2
4	Analyze Source and Error control coding.	K4
5	Analyze various parameters such as modulation index, channel capacity, transmission efficiency, S/N ratio etc. used in communication systems.	K2

6.Course Code and Name : CS8381 DATA STRUCTURES LABORATORY		
	CO Statements	**Knowledge Level**
1	Write functions to implement linear and non-linear data structure operations	K2
2	Suggest appropriate linear / non-linear data structure operations for solving a given problem	K2
3	Appropriately use the linear / non-linear data structure operations for a given problem	K2
4	Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval	K3
5	Be able to design and analyze the time and space efficiency of the data structure	K2

7.Course Code and Name : CS8383 OBJECT ORIENTED PROGRAMMING LABORATORY		
	CO Statements	**Knowledge Level**
1	Develop and implement Java programs for simple applications that make use of classes, packages and interfaces.	K3
2	Develop and implement Java programs with arraylist, exception handling and multithreading .	K3
3	Design applications using file processing, generic programming and event handling.	K3
4	Analyse and Apply the generic classes concepts in programming problem	K2
5	Illustrate and evaluate the file Input Output mechanisms	K2

8.Course Code and Name :CS8382 DIGITAL SYSTEMS LABORATORY		
	CO Statements	**Knowledge Level**
1	Implement simplified combinational circuits using basic logic gates	K3
2	Implement combinational circuits using MSI devices	K3
3	Implement sequential circuits like registers and counters	K3
4	Simulate combinational and sequential circuits using HDL	K3
5	Evalute combinational and sequential logic designs using various metrics: switching speed, throughput/latency, gate count and area, energy dissipation and power.	K2

9.Course Code and Name : HS8381 INTERPERSONAL SKILLS/LISTENING&SPEAKING		
	CO Statements	**Knowledge Level**
1	Listen and respond appropriately.	K1
2	Participate in group discussions	K6
3	Make effective presentations	K6
4	Participate confidently and appropriately in conversations both formal and informal	K6
5	Evaluates the characteristics of time management.	K2

SEMESTER 04		
1.Course Code and Name : MA8402 PROBABILITY AND QUEUING THEORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.	K2
2	Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.	K2
3	Apply the concept of random processes in engineering disciplines.	K3
4	Acquire skills in analyzing queueing models.	K2
5	Understand and characterize phenomenon which evolve with respect to time in a probabilistic manner	K2
2.Course Code and Name : CS8491 COMPUTER ARCHITECTURE		
	CO Statements	**Knowledge Level**
1	Understand the basics structure of computers, operations and instructions.	K2
2	Design arithmetic and logic unit.	K3
3	Understand pipelined execution and design control unit.	K2
4	Understand parallel processing architectures.	K2
5	Understand the various memory systems and I/O communication.	K2
3.Course Code and Name : CS8492 DATABASE MANAGEMENT SYSTEMS		
	CO Statements	**Knowledge Level**
1	Classify the modern and futuristic database applications based on size and complexity	K2
2	Map ER model to Relational model to perform database design effectively	K2
3	Write queries using normalization criteria and optimize queries	K2
4	Compare and contrast various indexing strategies in different database systems	K4
5	Appraise how advanced databases differ from traditional databases.	K2
4.Course Code and Name : CS8451 DESIGN AND ANALYSIS OF ALGORITHMS		
	CO Statements	**Knowledge Level**
1	Design algorithms for various computing problems.	K3
2	Analyze the time and space complexity of algorithms.	K4
3	Critically analyze the different algorithm design techniques for a given problem.	K4
4	Modify existing algorithms to improve efficiency.	K2
5	Able to Describe the classes P, NP, and NPComplete and be able to prove that a certain problem is NP-Complete.	K2
5.Course Code and Name : CS8493 OPERATING SYSTEMS		
	CO Statements	**Knowledge Level**
1	Analyze various scheduling algorithms.	K4
2	Understand deadlock, prevention and avoidance algorithms.	K2
3	Compare and contrast various memory management schemes.	K2
4	Understand the functionality of file systems.	K2

HOME

5	Perform administrative tasks on Linux Servers. Compare iOS and Android Operating Systems.	K2

6.Course Code and Name : CS8494 SOFTWARE ENGINEERING		
	CO Statements	**Knowledge Level**
1	Identify the key activities in managing a software project.	K2
2	Compare different process models.	K2
3	Concepts of requirements engineering and Analysis Modeling.	K4
4	Apply systematic procedure for software design and deployment.	K3
5	Compare and contrast the various testing and maintenance. Manage project schedule, estimate project cost and effort required.	K2

7.Course Code and Name : CS8481 DATABASE MANAGEMENT SYSTEMS LABORATORY		
	CO Statements	**Knowledge Level**
1	Use typical data definitions and manipulation commands.	K2
2	Design applications to test Nested and Join Queries	K3
3	Implement simple applications that use Views	K3
4	Implement applications that require a Front-end Tool	K3
5	Critically analyze the use of Tables, Views, Functions and Procedures	K4

8.Course Code and Name : CS8461 OPERATING SYSTEMS LABORATORY		
	CO Statements	**Knowledge Level**
1	Compare the performance of various CPU Scheduling Algorithms	K2
2	Implement Deadlock avoidance and Detection Algorithms	K3
3	Implement Semaphores	K3
4	Create processes and implement IPC	K6
5	Analyze the performance of the various Page Replacement Algorithms	K4

9.Course Code and Name : HS8461 ADVANCED READING AND WRITING		
	CO Statements	**Knowledge Level**
1	Write different types of essays.	K2
2	Write winning job applications.	K2
3	Read and evaluate texts critically.	K2
4	Display critical thinking in various professional contexts.	K2
5	Read to interpret a text and thus relate it to their world	K2

SEMESTER 05

1.Course Code and Name : MA8551 ALGEBRA AND NUMBER THEORY		
	CO Statements	**Knowledge Level**
Upon successful completion of the course, students should be able to:		
1	Apply the basic notions of groups, rings, fields which will then be used to solve related problems.	K3
2	Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.	K2

3	Demonstrate accurate and efficient use of advanced algebraic techniques.	K3
4	Demonstrate their mastery by solving non - trivial problems related to the concepts, and by proving simple theorems about the, statements proven by the text.	K3
5	Apply integrated approach to number theory and abstract algebra, and provide a firm basis for further reading and study in the subject.	K3

2.Course Code and Name : CS8591 COMPUTER NETWORKS		
	CO Statements	**Knowledge Level**
1	Understand the basic layers and its functions in computer networks.	K2
2	Evaluate the performance of a network.	K5
3	Understand the basics of how data flows from one node to another.	K2
4	Analyze and design routing algorithms.	K4
5	Design protocols for various functions in the network. Understand the working of various application layer protocols.	K3

3.Course Code and Name : EC8691 MICROPROCESSORS AND MICROCONTROLLERS		
	CO Statements	**Knowledge Level**
1	Understand and execute programs based on 8086 microprocessor.	K2
2	Design Memory Interfacing circuits.	K3
3	Design and interface I/O circuits.	K3
4	Design and implement 8051 microcontroller based systems.	K3
5	Evaluate assembly language programs and download the machine code that will provide solutions real-world control problems.	K3

4.Course Code and Name : CS8501 THEORY OF COMPUTATION		
	CO Statements	**Knowledge Level**
1	Construct automata, regular expression for any pattern.	K2
2	Write Context free grammar for any construct.	K2
3	Design Turing machines for any language.	K3
4	Propose computation solutions using Turing machines.	K2
5	Derive whether a problem is decidable or not.	K5

5.Course Code and Name : CS8592 OBJECT ORIENTED ANALYSIS AND DESIGN		
	CO Statements	**Knowledge Level**
1	Express software design with UML diagrams	K1
2	Design software applications using OO concepts.	K3
3	Identify various scenarios based on software requirements	K1
4	Transform UML based software design into pattern based design using design patterns	K2
5	Understand the various testing methodologies for OO software	K2

6.Course Code and Name : EC8681 MICROPROCESSORS AND MICROCONTROLLERS LABORATORY		
	CO Statements	**Knowledge Level**
1	Write ALP Programmes for fixed and Floating Point and Arithmetic operations	K2

2	Interface different I/Os with processor	K4
3	Generate waveforms using Microprocessors	K3
4	Execute Programs in 8051	K3
5	Explain the difference between simulator and Emulator	K4

7.Course Code and Name : CS8582 OBJECT ORIENTED ANALYSIS AND DESIGN LABORATORY		
	CO Statements	**Knowledge Level**
1	Perform OO analysis and design for a given problem specification.	K2
2	Identify and map basic software requirements in UML mapping.	K2
3	Improve the software quality using design patterns and to explain the rationale behind applying specific design patterns	K2
4	Test the compliance of the software with the SRS.	K3
5	Ability to abstract object-based views for generic software systems.	K2

8.Course Code and Name : CS8581 NETWORKS LABORATORY		
	CO Statements	**Knowledge Level**
1	Implement various protocols using TCP and UDP.	K4
2	Compare the performance of different transport layer protocols.	K2
3	Use simulation tools to analyze the performance of various network protocols.	K3
4	Analyze various routing algorithms.	K4
5	Implement error correction codes.	K3

SEMESTER 06

1.Course Code and Name : CS8651 INTERNET PROGRAMMING		
	CO Statements	**Knowledge Level**
At the end of the course, the students should be able to:		
1	Construct a basic website using HTML and Cascading Style Sheets.	K3
2	Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms.	K3
3	Develop server side programs using Servlets and JSP.	K3
4	Construct simple web pages in PHP and to represent data in XML format.	K3
5	Use AJAX and web services to develop interactive web applications	K3

2.Course Code and Name : CS8691 ARTIFICIAL INTELLIGENCE		
	CO Statements	**Knowledge Level**
1	Use appropriate search algorithms for any AI problem	K2
2	Represent a problem using first order and predicate logic	K2
3	Provide the apt agent strategy to solve a given problem	K2
4	Design software agents to solve a problem	K3
5	Design applications for NLP that use Artificial Intelligence.	K3

3.Course Code and Name : CS8601 MOBILE COMPUTING		
	CO Statements	**Knowledge Level**

1	Explain the basics of mobile telecommunication systems	K2
2	Illustrate the generations of telecommunication systems in wireless networks	K2
3	Determine the functionality of MAC, network layer and Identify a routing protocol for a given Ad hoc network	K2
4	Explain the functionality of Transport and Application layers	K2
5	Develop a mobile application using android/blackberry/ios/Windows SDK	K3

4.Course Code and Name : CS8602 COMPILER DESIGN		
	CO Statements	**Knowledge Level**
1	Understand the different phases of compiler.	K2
2	Design a lexical analyzer for a sample language.	K3
3	Apply different parsing algorithms to develop the parsers for a given grammar.	K3
4	Understand syntax-directed translation and run-time environment.	K2
5	Learn to implement code optimization techniques and a simple code generator. Design and implement a scanner and a parser using LEX and YACC tools.	K2

5.Course Code and Name : CS8603 DISTRIBUTED SYSTEMS		
	CO Statements	**Knowledge Level**
1	Elucidate the foundations and issues of distributed systems	K5
2	Understand the various synchronization issues and global state for distributed systems.	K2
3	Understand the Mutual Exclusion and Deadlock detection algorithms in distributed systems	K2
4	Describe the agreement protocols and fault tolerance mechanisms in distributed systems.	K2
5	Describe the features of peer-to-peer and distributed shared memory systems	K2

6.Course Code and Name : GE8075 INTELLECTUAL PROPERTY RIGHTS		
	CO Statements	**Knowledge Level**
1	Ability to manage Intellectual Property portfolio to enhance the value of the firm.	K5
2	Ability to give an idea about IPR, registration and its enforcement.	K5
3	Trade Secrets and Industrial Design registration in India and Abroad	K2
4	Analyse rights and responsibilities of holder of Patent, Copyright, Trademark, Industrial Designetc.	K2
5	Apply statutory provisions to protect particular form of IPRs.	K2

7.Course Code and Name : CS8661 INTERNET PROGRAMMING LABORATORY		
	CO Statements	**Knowledge Level**
1	Construct Web pages using HTML/XML and style sheets.	K3
2	Build dynamic web pages with validation using Java Script objects and by applying different event handling mechanisms.	K6
3	Develop dynamic web pages using server side scripting.	K6
4	Use PHP programming to develop web applications.	K3
5	Construct web applications using AJAX and web services.	K3

8.Course Code and Name : CS8662 MOBILE APPLICATION DEVELOPMENT LABORATORY

	CO Statements	Knowledge Level
1	Develop mobile applications using GUI and Layouts.	K3
2	Develop mobile applications using Event Listener.	K3
3	Develop mobile applications using Databases.	K3
4	Develop mobile applications using RSS Feed, Internal/External Storage, SMS, Multi-threading and GPS.	K3
5	Analyze and discover own mobile app for simple needs.	K4

9.Course Code and Name : HS8581 PROFESSIONAL COMMUNICATION

	CO Statements	Knowledge Level
1	Make effective presentations	K2
2	Participate confidently in Group Discussions.	K2
3	Attend job interviews and be successful in them.	K2
4	Develop adequate Soft Skills required for the workplace	K2
5	Ability to handle the interview process confidently	K2

SEMESTER 07

1.Course Code and Name : MG8591 PRINCIPLES OF MANAGEMENT

	CO Statements	Knowledge Level
The students should be able to		
1	Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling.	K2
2	Ability to enable the students to study the evolution of Management, to study the functions and principles of management	K2
3	Ability to enableHR Planning, Recruitment, selection, Training and Development, Performance Management , Career planning and management	K2
4	Have same basic knowledge on international aspect of management	K2
5	To learn the application of the principles in an organization .	K2

2.Course Code and Name : CS8792 CRYPTOGRAPHY AND NETWORK SECURITY

	CO Statements	Knowledge Level
1	Understand the fundamentals of networks security, security architecture, threats and vulnerabilities	K2
2	Apply the different cryptographic operations of symmetric cryptographic algorithms	K3
3	Apply the different cryptographic operations of public key cryptography	K3
4	Apply the various Authentication schemes to simulate different applications.	K3
5	Understand various Security practices and System security standards	K2

3.Course Code and Name : CS8791 CLOUD COMPUTING

	CO Statements	Knowledge Level

1	Articulate the main concepts, key technologies, strengths and limitations of cloud computing.	K2
2	Learn the key and enabling technologies that help in the development of cloud.	K1
3	Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.	K3
4	Explain the core issues of cloud computing such as resource management and security.	K2
5	Be able to install and use current cloud technologies. Evaluate and choose the appropriate technologies, algorithms and approaches for implementation and use of cloud.	K3

4.Course Code and Name : IT8075 SOFTWARE PROJECT MANAGEMENT		
	CO Statements	**Knowledge Level**
1	Understand Project Management principles while developing software.	K2
2	Gain extensive knowledge about the basic project management concepts, framework and the process models.	K2
3	Obtain adequate knowledge about software process models and software effort estimation techniques.	K2
4	Estimate the risks involved in various project activities. Learn staff selection process and the issues related to people management	K2
5	Define the checkpoints, project reporting structure, project progress and tracking mechanisms using project management principles.	K1

5.Course Code and Name : GE8071 DISASTER MANAGEMENT		
	CO Statements	**Knowledge Level**
1	Differentiate the types of disasters, causes and their impact on environment and society	K2
2	Assess vulnerability and various methods of risk reduction measures as well as mitigation.	K2
3	Draw the hazard and vulnerability profile of India, Scenarious in the Indian context, Disaster damage assessment and management.	K2
4	Students will be equipped with various methods of risk reduction measures and risk mitigation.	K2
5	Understand the role of Information Technology in Disaster Management.	K2

6.Course Code and Name : OME752 SUPPLY CHAIN MANAGEMENT		
	CO Statements	**Knowledge Level**
1	The student would understand the framework and scope of supply chain networks and functions	K2
2	To provide an insight on the fundamentals of supply chain networks, tools and techniques.	K2
3	The supply chain IT frame work Customer Relationship Management	K2
4	Understand the foundational role of logistics as it relates to transportation and warehousing.	K2
5	Apply knowledge to evaluate and manage an effective supply chain.	K3

7.Course Code and Name : CS8711 CLOUD COMPUTING LABORATORY

	CO Statements	Knowledge Level
1	Configure various virtualization tools such as Virtual Box, VMware workstation.	K3
2	Design and deploy a web application in a PaaS environment.	K3
3	Learn how to simulate a cloud environment to implement new schedulers.	K2
4	Install and use a generic cloud environment that can be used as a private cloud.	K3
5	Manipulate large data sets in a parallel environment.	K3

8.Course Code and Name : IT8761 SECURITY LABORATORY

	CO Statements	Knowledge Level
1	Develop code for classical Encryption Techniques to solve the problems.	K3
2	Build cryptosystems by applying symmetric and public key encryption algorithms.	K3
3	Construct code for authentication algorithms.	K3
4	Develop a signature scheme using Digital signature standard.	K3
5	Demonstrate the network security system using open source tools	K2

SEMESTER 08

1.Course Code and Name : CS8074 CYBER FORENSICS

	CO Statements	Knowledge Level
The students should be able to		
1	Understand the basics of computer forensics	K2
2	Apply a number of different computer forensic tools to a given scenario	K3
3	Analyze and validate forensics data	K4
4	Identify the vulnerabilities in a given network infrastructure	K2
5	Implement real-world hacking techniques to test system security	K3

2.Course Code and Name : CS8080 INFORMATION RETRIEVAL TECHNIQUES

	CO Statements	Knowledge Level
1	Use an open source search engine framework and explore its capabilities	K2
2	Apply appropriate method of classification or clustering.	K3
3	Design and implement innovative features in a search engine.	K3
4	Design and implement a recommender system.	K3
5	Understand relevance feedback in vector space model and probabilistic model.	K2

3.Course Code and Name : CS8811 and Project Work

	CO Statements	Knowledge Level
1	Analyze Problems in various domains and formulate methodology	K4
2	Develop different solutions and select the optimum solution	K4
3	Conclude using proper evidence to support them	K2
4	Enable the students to implement project planning in their Industrial In-Plant training work	K2
5	Apply the theoretical concepts to solve industrial problems with teamwork and multidisciplinary approach	K4

2013 REGULATION

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

2013 REGULATION

PROGRAM OUTCOMES (POs)

PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being

	able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

The students will demonstrate the abilities
PSO1: Professional Skills: The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying complexity.
PSO2: Problem-Solving Skills: The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.
PSO3: Successful Career and Entrepreneurship: The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, and a zest for higher studies.

Mahendra College of Engineering SALEM 636 106 Mahendra Salem Campus

PRINCIPAL
Mahendra College of Engineering
Mahendra Salem Campus,
Minnampalli, SALEM 636 106
TAMILNADU

LIST OF COURSES

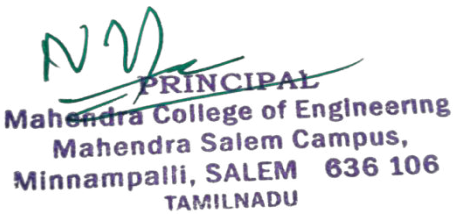
REGULATION 2013

REGULATION 2013		
SEMESTER I		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	HS6151	Technical English – I
2	MA6151	Mathematics – I
3	PH6151	Engineering Physics – I
4	CY6151	Engineering Chemistry – I
5	GE6151	Computer Programming
6	GE6152	Engineering Graphics
PRACTICALS		
7	GE6161	Computer Practices Laboratory
8	GE6162	Engineering Practices Laboratory
9	GE6163	Physics and Chemistry Laboratory - I
SEMESTER II		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	HS6251	Technical English – II
2	MA6251	Mathematics – II
3	PH6251	Engineering Physics – II
4	CY6251	Engineering Chemistry – II
5	CS6201	Digital Principles and System Design
6	CS6202	Programming and Data Structures I
PRACTICALS		
7	GE6262	Physics and Chemistry Laboratory - II
8	CS6211	Digital Laboratory
9	CS6212	Programming and Data Structures Laboratory I
SEMESTER III		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	MA6351	Transforms and Partial Differential Equations
2	CS6301	Programming and Data Structure II
3	CS6302	Database Management Systems

HOME

4	CS6303	Computer Architecture
5	CS6304	Analog and Digital Communication
6	GE6351	Environmental Science and Engineering
PRACTICALS		
7	CS6311	Programming and Data Structure Laboratory II
8	CS6312	Database Management Systems Laboratory
SEMESTER IV		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	MA6453	Probability and Queueing Theory
2	CS6551	Computer Networks
3	CS6401	Operating Systems
4	CS6402	Design and Analysis of Algorithms
5	EC6504	Microprocessor and Microcontroller
6	CS6403	Software Engineering
PRACTICALS		
7	CS6411	Networks Laboratory
8	CS6412	Microprocessor and Microcontroller Laboratory
9	CS6413	Operating Systems Laboratory
SEMESTER V		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	MA6566	Discrete Mathematics
2	CS6501	Internet Programming
3	CS6502	Object Oriented Analysis and Design
4	CS6503	Theory of Computation
5	CS6504	Computer Graphics
PRACTICALS		
6	CS6511	Case Tools Laboratory
7	CS6512	Internet Programming Laboratory
8	CS6513	Computer Graphics Laboratory
SEMESTER VI		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	CS6601	Distributed Systems
2	IT6601	Mobile Computing
3	CS6660	Compiler Design

4	IT6502	Digital Signal Processing
5	CS6659	Artificial Intelligence
6	IT6702	Data Warehousing and Data Mining
PRACTICALS		
7	CS6611	Mobile Application Development Laboratory
8	CS6612	Compiler Laboratory
9	GE6674	Communication and Soft Skills - Laboratory Based
SEMESTER VII		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	CS6701	Cryptography and Network Security
2	CS6702	Graph Theory and Applications
3	CS6703	Grid and Cloud Computing
4	CS6704	Resource Management Techniques
5	CS6003	Ad hoc and Sensor Networks
6	IT6005	Digital Image Processing
PRACTICALS		
7	CS6711	Security Laboratory
8	CS6712	Grid and Cloud Computing Laboratory
SEMESTER VIII		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	CS6801	Multi – Core Architectures and Programming
2	CS6008	Human Computer Interaction
3	MG6088	Software Project Management
PRACTICALS		
4	CS6811	Project Work



COURSE OUTCOME FOR COMPUTER SCIENCE AND ENGINEERING

DEGREE	**U.G**
PROGRAMME	**B.E - COMPUTER SCIENCE AND ENGINEERING**
ACADEMIC YEAR	**2013-14**
REGULATION	**2013**

SEMESTER 01

1.Course Code and Name : HS6151 - TECHNICAL ENGLISH I

	CO Statements	Knowledge Level
The students should be able to		
1	Classify the types of listening and writing skills with acquired knowledge	K2
2	Demonstrate speaking skills in various occasions	K2
3	Compare the formal and informal writing skills by using the mail and blocks	K2
4	Apply the speaking etiquitte to build up communication proficiency	K3
5	Develop presentations with the use of LSRW skills	K3

2.Course Code and Name : MA6151 - MATHEMATICS I

	CO Statements	Knowledge Level
The students should be able to		
1	Solve the Eigen values and Eigen vectors to diagonalise and reduce a matrix to quadratic form	K3
2	Identify the convergences, divergences of infinite series	K3
3	Solve evolutes and envelopes of a given curve by using radius of curvature and center of curvature	K3
4	Identify the maxima and minima value functions of two variables	K3
5	Solve area of plain curves and volume of solid using double and triple integrals	K3

3.Course Code and Name : PH6151 - ENGINEERING PHYSICS I

	CO Statements	Knowledge Level
The students should be able to		
1	Explain the basics of properties of matter and its applications	K2
2	Summarize the concepts of waves and optical devices and their applications in fiber optics	K2
3	Demonstrate the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers	K2
4	Outline the concepts of advanced physics quantum theory and its applications in tunneling microscopes	K2
5	Explain the basics of crystals, their structures and different crystal growth techniques	K2

4.Course Code and Name : CY6151 - ENGINEERING CHEMISTRY I

	CO Statements	Knowledge Level
The students should be able to		

HOME

1	Classify the polymers and their utility in the industries and explain the techniques of polymerization and properties of polymers	K2
2	Relate various thermodynamic functions such as enthalpy, entropy, free energy and their importance	K2
3	Explain the photo physical processes such as fluorescence and phosphorescence and various components of UV and IR spectrophotometer	K2
4	Illustrate the phase transitions of one component and two component systems and the types of alloys and their application in industries	K2
5	Outline the synthesis, characteristics and the applications of nano materials	K2

5.Course Code and Name : GE6151- COMPUTER PROGRAMMING		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Describe the function of a Computer and problem solving techniques.	K2
2	Write simple C programs using basic constructs	K3
3	Implement applications to manage data using arrays and strings	K3
4	Apply functions and pointers for solving problems	K3
5	Develop simple applications using structure and union	K3

6.Course Code and Name : GE6152- ENGINEERING GRAPHICS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Demonstrate freehand sketching of basic geometrical constructions and multiple views of objects	K2
2	Develop orthographic projections of points, lines and plane surfaces	K3
3	Construct projections of simple solids and truncated solids	K3
4	Develop projection of sectioned solids and utilize development of surfaces	K3
5	Construct isometric and perspective projections of simple solids	K3

7.Course Code and Name : GE6161- COMPUTER PRACTICES LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply the usage of office automation tools.	K2
2	Apply good programming design methods for program development.	K3
3	Design and implement C programs for simple applications.	K3
4	Develop recursive programs.	K3
5	Use Arrays, Structures & Unions in problem solving.	K2

8.Course Code and Name : GE6162 - ENGINEERING PRACTICES LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Construct carpentry components and pipe connections including plumbing works	K2
2	Make use of welding equipments to join the structures	K3
3	Develop models using sheet metal work	K3

4	Illustrate the working of centrifugal pump and air conditioner	K3
5	Demonstrate basic home electrical works, measurement of the electrical quantities and soldering practices	K3

9.Course Code and Name : GE6163 - PHYSICS AND CHEMISTRY LABORATORY - I		
	CO Statements	**Knowledge Level**
The students should be able to		
		K3
1	Make use of spectrometer to find the wavelength of spectral lines, and laser	
2	Make use of ultrasonic interferometer and Lee's disc apparatus to find the velocity of sound,compressibility of the liquid and thermal conductivity	K3
3	Demonstrate the estimation of DO content in water sample by Winkler's method and molecular weight of polymer by Ostwald viscometer	K2
4	Experiment with the strength of an acid using pH meter and conductometer	K3
5	Demonstrate the estimation of weak and strong acids in a mixture by conductometer	K2

SEMESTER 02

1.Course Code and Name : HS6251 - TECHNICAL ENGLISH II		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop the communication skills with proper grammar usage	K2
2	Summarize the various advanced technical and non-technical english tools	K2
3	Classify the speaking skills and expression through professional english	K2
4	Apply the interview techniques for career development	K3
5	Outline the use of writing skills to express innovatiove ideas	K3

2.Course Code and Name : MA6251 - MATHEMATICS II		
	CO Statements	**Knowledge Level**
1	Apply solenoidal, irrotational vectors and make use of the concepts of Green's, Gauss divergence, Stokes theorem to evaluate single, double and triple integrals	K3
2	Solve simultaneous linear equations and P.I. of Cauchy and Legendre Equation	K3
3	Solve Laplace Transforms of periodic functions and ODE using Inverse Laplace Transform	K3
4	Make use of the properties of analytic functions for verifying C-R equations for determination of Bilinear Transformation	K3
5	Develop the functions of two variables as Taylor's and Laurent's series and Contour integrals by using Cauchy's Integral formula	K3

3.Course Code and Name : PH6251 - ENGINEERING PHYSICS II		
	CO Statements	**Knowledge Level**
1	Explain the basics, properties and applications of conducting materials	K2
2	Summarize the properties of semiconducting materials and semiconductor devices.	K2
3	Explain the basics, properties and applications of the magnetic materials and super conducting material	K2
4	Illustrate the concepts, mechanisms and applications of dielectric materials	K2

5	Outline the method of synthesis and explain the properties of Nano materials, SMA, Metallic glasses and Ceramics	K2

4.Course Code and Name : CY6251 - ENGINEERING CHEMISTRY I		
	CO Statements	**Knowledge Level**
1	Explain the problems of using hard water in boilers and methods of treatment of water for boiler use	K2
2	Apply the design principles to electro chemical cell. Identify the types of corrosion and the methods of prevention	K3
3	Illustrate the methods of harnessing energy from non-conventional energy sources	K2
4	Classify various engineering materials and explain their importance	K2
5	Relate the significance of solid, liquid and gaseous fuels. Explain the calorific values of fuels and air requirement for combustion in furnaces	K2

5.Course Code and Name : CS6201 Digital Principles and System Design		
	CO Statements	**Knowledge Level**
1	Demonstrate the concept of Boolean algebra and show the correlation between Boolean expressions	K2
2	Simplify Boolean functions using KMap	K4
3	Design and Analyze Combinational and Sequential Circuits	K6
4	Implement designs using Programmable Logic Devices	K6
5	Build HDL code for combinational and Sequential Circuits	K3

6.Course Code and Name : CS6202 and Programming and Data Structures I		
	CO Statements	**Knowledge Level**
1	Design programs using control structures, functions,pointers and files.	K2
2	Implement applications using structures, union and files.	K3
3	Implement abstract data type (ADT) for Linear data structures.	K3
4	Apply the different Linear data structures for solving problems.	K3
5	Analyze the various searching and sorting algorithms.	K3

7.Course Code and Name :GE6262- PHYSICS AND CHEMISTRY LABORATORY - II		
	CO Statements	**Knowledge Level**
1	Illustrate the determination of Young's modulus of the beam and moment of inertia and rigidity modules of thin wire Torsion pendulum	K2
2	Make use of Poiseuille's method to determine the coefficient of viscosity of the liquid	K3
3	Illustrate the determination of dispersive power of a prism and the thickness of a thin wire through interference fringes using Air wedge apparatus	K2
4	Experiment with the type, amount of alkalinity, hardness in a given water sample and evaluate the Amount of copper using EDTA method	K3
5	Demonstrate titration by potentiometric redox and conductometric precipitation methods	K2

8.Course Code and Name : CS6211 - Digital Laboratory		
	CO Statements	**Knowledge Level**

1	Summarize simplified combinational circuits using basic logic gates	K2
2	Explain combinational circuits using MSI devices	K2
3	Build sequential circuits like registers and counters	K3
4	Construct combinational and sequential circuits using HDL	K3
5	Design and implement simple digital system	K6

9.Course Code and Name : CS6212 and Programming and Data Structures		
	CO Statements	**Knowledge Level**
1	Apply good programming design methods for program development.	K3
2	Design and implement C programs for Linear data structures	K3
3	Develop applications using different data structures	K3
4	Implement searching and sorting algorithms	K3
5	Describe the hash function and concepts of collision and its resolution methods	K2

SEMESTER 03

1.Course Code and Name :MA6351- TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Solve differential equations using Fourier series analysis for engineering applications.	K3
2	Utilize Dirichlet's condition for finding the Fourier series of a given function	K3
3	Apply Fourier series to solve one dimensional way, one and two dimensional heat equations.	K3
4	Solve Fourier transform for a given function and make use of them to evaluate certain definite Integrals	K3
5	Solve z transforms of standard functions and make use of use them to solve difference equations	K3

2.Course Code and Name : CS6301 and Programming and Data Structures II		
	CO Statements	**Knowledge Level**
1	Describe various concepts of Object Oriented programming.	K2
2	Apply the concepts of data abstraction, encapsulation and inheritance for problem solutions.	K3
3	Implement exception, generic programming and file concepts for various problems.	K3
4	Apply the different Non-Linear data structures for solving problems.	K3
5	Analyze the various traversing techniques and algorithms for Non-Linear data structure.	K3

3.Course Code and Name : CS6302 and Database Management System		
	CO Statements	**Knowledge Level**
1	Explain the basic concepts of Database management system.	K2
2	Design and manipulation of database using structured Query language and optimization techniques.	K3
3	Apply concurrency control and recovery mechanisms for various Applications.	K3
4	Describe various storage structures, indexing, hashing and different types of databases.	K2
5	Apply security concepts to databases.	K3

4.Course Code and Name : CS6303 and Computer Architecture		
	CO Statements	**Knowledge Level**
1	Explain various operations, instructions and addressing modes of computer systems.	K2
2	Design Arithmetic and Logic Unit.	K3
3	Design and analysis of Control unit and pipelining.	K3
4	Describe various parallelism techniques.	K2
5	Analyse performance of Memory and I/O systems.	K4

5.Course Code and Name : CS6304 and Analog and Digital Communication		
	CO Statements	**Knowledge Level**
1	Summarize the different analog modulation techniques	K2
2	Explain analog and digital communication techniques.	K2
3	Utilize data and pulse communication techniques.	K3
4	Analyze Source and Error control coding.	K3
5	Utilize multi-user radio communication.	K3

6.Course Code and Name : GE6351 and Environmental Science and Engineering		
	CO Statements	**Knowledge Level**
1	Illustrate the concepts of an ecosystem , energy flow and conservation of biodiversity.	K2
2	Explain the causes, effects and control of various types of pollution.	K2
3	Outline the conservation of natural resources.	K2
4	Summarize the social issues of environment and legislative guidelines for disaster management.	K2
5	Relate population growth and its impact on environment and human health.	K2

7.Course Code and Name : CS6312 Database Management Systems Laboratory		
	CO Statements	**Knowledge Level**
1	Design and implement a database schema for a given problem-domain	K3
2	Write SQL query to manipulate database.	K3
3	Create and maintain tables using PL/SQL.	K3
4	Develop an application using Oracle.	K3
5	Apply the normalization techniques for development of application software to realistic problems.	K3

8.Course Code and Name : CS6311 Programming and Data Structure Laboratory II		
	CO Statements	**Knowledge Level**
1	Apply good programming design methods for program development using C++.	K3
2	Design and implement C++ programs for Linear data structures	K3
3	Design and implement C++ programs for Non-Linear data structures	K3
4	Implement recursive programs and various algorithms for graph.	K3
5	Perform basic operations on trees and graphs and determine minimum spanning tree	K2

SEMESTER 04

1.Course Code and Name : MA6453 and Probability and Queuing Theory

	CO Statements	Knowledge Level
The students should be able to		
1	The probabilityMethods techniques are used to find the solution for the partial problems in engineering.	K3
2	The graduates will be able to grow professionally in their careers throughcontinued development of technical and	K3
3	To afford students with a solid base in scientific, mathematical, and engineeringfundamentals needed to examine,	K3
4	To inculcate professionals relate to computer engineering issues with ethicalattitude, multi-disciplinary projects, social, environmental and economic considerations.	K3
5	A graduate engineer during his course of study should inbuilt social ethics andprofessionalism and should apply them in his carrier.	K3

2.Course Code and Name : CS6551 and Computer Networks		
	CO Statements	**Knowledge Level**
1	Describe the basic layers and its functions in Computer Network.	K2
2	Describe the basics of data flows in a network.	K2
3	Analyze and design various routing algorithms.	K3
4	Apply TCP and UDP protocols for various functions.	K3
5	Describe various protocols for application layer.	K2

3.Course Code and Name : CS6401 and Operating System		
	CO Statements	**Knowledge Level**
1	Describe the basic concepts and functions of Operating System.	K2
2	Design various scheduling algorithms and apply the principles of concurrency.	K3
3	Demonstrate various memory management techniques	K2
4	Design and implement prototype file systems.	K3
5	Implement administrative tasks on Linux Servers.	K3

4.Course Code and Name : CS6402 and Design and Analysis of Algorithm		
	CO Statements	**Knowledge Level**
1	Describe various methods for analyzing algorithms to solve different types of problems.	K2
2	Design and analyze algorithms for various computing problems using brute force and divide-and- conquer techniques.	K3
3	Design and analyze algorithms for various computing problem using dynamic programming and greedy techniques.	K3
4	Analyze different algorithm design techniques for a given problem using Iterative improvement.	K3
5	Describe the limitations of algorithm power for various problems.	K2

5.Course Code and Name : EC6504 and Microprocessor and Microcontroller		
	CO Statements	**Knowledge Level**
1	Design and implement programs on 8086 microprocessor.	K6
2	Design I/O circuits	K2

3	Design Memory Interfacing circuits.	K6
4	Design and implement 8051 microcontroller based systems	K6
5	Explain the architecture and instruction set of ARM microcontroller	K2

6.Course Code and Name : CS6403 and Software Engineeering		
	CO Statements	**Knowledge Level**
1	Describe the concepts of various process models.	K2
2	Describe the concepts of requirement engineering and analysis.	K2
3	Apply systematic procedure for software design and deployment.	K3
4	Compare and contrast the various testing and maintenance.	K2
5	Identify the key activities in managing a software project.	K3

7.Course Code and Name : CS6411 and Networks Laboratory		
	CO Statements	**Knowledge Level**
1	Implement the socket programming and client-server model.	K3
2	Implement the various protocols.	K3
3	Analyze various routing algorithms.	K3
4	Simulate congestion control algorithms using network simulation tool.	K3
5	Practice packet /file transmission between nodes	K2

8.Course Code and Name : CS6412 and Microprocessor and Microcontroller Laboratory		
	CO Statements	**Knowledge Level**
1	Develop an ALP for fixed and Floating Point and Arithmetic	K3
2	Develop an ALP for Interface different I/Os with processor	K3
3	Develop an ALP to Generate waveforms using Microprocessors	K3
4	Develop an ALP using 8051 microcontroller	K3
5	Explain the difference between simulator and Emulator	K2

9.Course Code and Name : CS6413 and Operating Systems Laboratory		
	CO Statements	**Knowledge Level**
1	Implement various CPU scheduling algorithms	K3
2	Implement deadlock avoidance and detection algorithms.	K3
3	Implement file system concepts and file access control.	K3
4	Implementation of threads and synchronization algorithms	K3
5	Develop algorithm for deadlock avoidance, detection and file allocation strategies	K2

SEMESTER 05

1.Course Code and Name : MA6566 and Discrete Mathematics		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the concepts needed to test the logic of a program.	K2
2	Identify structures on many levels.	K2

3	Apply class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.	K3
4	Explain the counting principles	K2
5	Outline the concepts and properties of algebraic structures such as groups, rings and fields.	K2

2.Course Code and Name : CS6501 and Internet Programming		
	CO Statements	**Knowledge Level**
1	Write Java programs.	K3
2	Develop a basic website using HTML and CSS.	K3
3	Design and implement client side programs using JavaScript and server side programs using servlets and Java Server Pages.	K3
4	Design and implement simple web page in PHP and to present data in XML format.	K3
5	Design rich client presentation using AJAX.	K3

3.Course Code and Name : Cs6502 and Object Oriented Analysis and Design		
	CO Statements	**Knowledge Level**
1	Describe the UML analysis and design diagrams.	K2
2	Interpret the GRASP design pattern and GoF design pattern.	K3
3	Design usecase modeling and domain modeling.	K3
4	Apply appropriate design patterns.	K3
5	Compare and contrast various testing techniques.	K2

4.Course Code and Name : CS6503 and Theory of Computation		
	CO Statements	**Knowledge Level**
1	Construct a minimized Finite Automata to recognize a given regular language.	K3
2	Describe formal relationships among machines, languages and grammars.	K2
3	Construct the Push down automata for all the context free languages and CFG.	K3
4	Construct turing machine using different techniques.	K3
5	Explain the decidablility and undecidability of various problems.	K2

5.Course Code and Name : CS6504 and Computer Graphics		
	CO Statements	**Knowledge Level**
1	Describe the basic concepts in computer graphics and various output primitives algorithms.	K2
2	Design and apply two dimensional transformations, Clipping algorithms and viewing functions.	K3
3	Design and apply three dimensional transformations, viewing functions, Bezier Curve, B-spline and Clipping algorithms	K3
4	Explain various color models and illumination.	K2
5	Design computer graphics realism and animation sequences.	K3

6.Course Code and Name : CS6511 and Case Tools Laboratory		
	CO Statements	**Knowledge Level**

1	Design and Implement projects using OO concepts.	K3
2	Design UML analysis and design diagrams.	K3
3	Apply appropriate design patterns.	K3
4	Create code from design.	K3
5	Applications of Computing Domain & Research: Able to use the professional, managerial, interdisciplinary skill set, and domain specific tools in development processes, identify the research gaps, and provide innovative solutions to them.	K2

7.Course Code and Name : CS6512 Internet Programming Laboratory		
	CO Statements	**Knowledge Level**
1	Design Web pages using HTML/XML and style sheets	K3
2	Implement user interfaces using Java frames and applets.	K3
3	Implement dynamic web pages using server side scripting.	K3
4	Develop Client Server applications.	K3
5	Develop simple programs using JSP Strut, Hibernate and Spring frameworks.	K3

8.Course Code and Name : CS6513 Computer Graphics Laboratory		
	CO Statements	**Knowledge Level**
1	Implement 2D Output Primitives such as Line, Circle and Elipse drawing algorithms.	K3
2	Implement 2D transformations and various clipping algorithms.	K3
3	Implement 3D transformations and projections of 3D Objects.	K3
4	Develop 2D animations.	K3
5	Implementation of illumination model for rendering 3D objects.	K2

SEMESTER 06

1.Course Code and Name : CS6601 and Distributed Systems		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Describe the basic components, concepts, foundation and challenges related to Distributed Systems	K2
2	Apply network virtualization, remote method invocation and objects.	K3
3	Demonstrate peer to peer services and distributed file system.	K2
4	Explain the concepts in synchronization and communication mechanism used in modern Distributed Systems	K2
5	Describe the resource allocation and process management techniques in Distributed operating systems	K2

2.Course Code and Name : IT6601 and Mobile Computing		
	CO Statements	**Knowledge Level**
1	Explain the basics of mobile computing system and MAC protocol.	K2
2	Choose the required functionality at each layer for given application.	K2
3	Explain the basics of mobile telecommunication system and MAC protocol.	K2
4	Design adhoc networks using simulated tools.	K3
5	Develop a mobile application.	K3

3.Course Code and Name : CS6660 and Compiler Design		
	CO Statements	**Knowledge Level**
1	Explain the basic concepts of compiler and its phases.	K2
2	Implement the functionalities of lexical analyzer and convert the given regular expression to DFA.	K3
3	Construct the parsing table using different parsing techniques and implement lexical analyser using compiler construction tools.	K3
4	Explain the translation processes and run time environment issues.	K2
5	Apply various code optimization techniques for generating machine code.	K3

4.Course Code and Name : CS6659 and Aritificial Intelligence		
	CO Statements	**Knowledge Level**
1	Describe the concept of production systems, control and search strategies.	K2
2	Explain the concept of FOL and proportional logic for representation of knowledge.	K2
3	Apply knowledge Inferences to solve problems.	K3
4	Describe various planning strategies and Machine Learning techniques for appropriate problems.	K2
5	Develop Expert Systems for various applications.	K3

5.Course Code and Name : IT6702 and Data Warehousing and Data Mining		
	CO Statements	**Knowledge Level**
1	Describe the steps in building a Data warehouse architecture and schemas for decision support.	K2
2	Explain the usage of OLAP tools to extract knowledge from data warehouse.	K2
3	Describe the data mining functionalities and data preprocessing techniques.	K2
4	Apply the association rule mining and classification algorithms for a given problem.	K3
5	Summarize various clustering methods and applications of data mining techniques in knowledge discovery.	K3

6.Course Code and Name : CS6611 Mobile Application Development Laboratory		
	CO Statements	**Knowledge Level**
1	Choose the required architecture based upon the mobile application to be developed.	K2
2	Design mobile applications using various layout and widgets	K3
3	Implement various mobile applications using emulators.	K3
4	Deploy applications to hand-held devices.	K3
5	Develop user interface for mobile Application using widgets with event handling.	K2

7.Course Code and Name : CS6612 Compiler Laboratory		
	CO Statements	**Knowledge Level**
1	Implement the symbol table and compiler writing tools for lexical analyzer.	K3
2	Design and implement different phases of compiler.	K3
3	Implement the concepts of control flow and data flow analysis.	K3
4	Apply simple optimization techniques for code generation.	K3

5	Understand and analyze the role of syntax and semantics of Programming languages in compiler construction	K2

8.Course Code and Name : GE6674- Communication and Soft Skills - Laboratory Based		
	CO Statements	**Knowledge Level**
1	Demonstrate reading and writing skills	K2
2	Develop listening and speaking skills	K3
3	Make use of acquired knowledge to take up international examination such as IELTS and TOEFL	K3
4	Apply the interview techniques for career development	K3
5	Illustrate the various aspects of soft skills	K2

SEMESTER 07

1.Course Code and Name : CS6701 and Cryptography and Network Security		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain OSI security architecture, classical encryption techniques, finite fields and number theory.	K2
2	Compare various cryptographic techniques.	K2
3	Describe the usage of hash functions and digital signatures.	K2
4	Design secure applications.	K3
5	Describe the various web security techniques.	K2

2.Course Code and Name : CS6702 and Graph Theory and Applications		
	CO Statements	**Knowledge Level**
1	Explain the basic graph and tree related concepts.	K2
2	Construct spanning tree and planar graphs using mathematical definitions.	K2
3	Apply mathematical proof's in graphs and digraphs.	K3
4	Apply the concepts of permutation, combinations and binomial theorem for solving problems.	K3
5	Solve generating functions, homogeneous and non-homogeneous recurrence relations.	K3

3.Course Code and Name : CS6703 and Grid and Cloud Computing		
	CO Statements	**Knowledge Level**
1	Explain the architecture of grid and cloud computing.	K2
2	Decribe the various Functional and Non Functional Reruirements of OGSA	K2
3	Apply the concept of virtualization.	K2
4	Develop web services using grid and cloud technologies.	K3
5	Describe the security models in grid and cloud environment.	K2

4.Course Code and Name : CS6704 and Resource Management Techniques		
	CO Statements	**Knowledge Level**
1	Apply Linear Programming Problem (LPP) concepts to solve operational problems with constraints.	K3
2	Solve LPP using dual simplex methods, transportation and assignment problems.	K3

3	Apply Integer Programming to solve real life applications.	K3
4	Solve problems in classical optimization theory.	K3
5	Apply PERT and CPM for problems in project management.	K3

5.Course Code and Name : CS6003 and Ad Hoc and Sensor Networks		
	CO Statements	**Knowledge Level**
1	Explain the concepts, network architecture and applications of ad hoc and sensor networks.	K2
2	Describe the different types of MAC protocols in ad hoc networks.	K2
3	Describe various adhoc routing protocols and TCP issues in adhoc networks.	K2
4	Explain the architecture and MAC protocols of wireless sensor networks.	K3
5	Describe the routing, localization and QOS in WSN	K3

6.Course Code and Name : IT6005 and Digital Image Processing		
	CO Statements	**Knowledge Level**
1	Describe the concepts of digital imaging.	K2
2	Explain image enhancement techniques in spatial and frequency domain.	K2
3	Apply various filters and segmentation techniques to segment digital image.	K2
4	Discuss wavelet and image compression .	K3
5	Develop applications for representation and recognition of digital image.	K3

7.Course Code and Name : CS6007 & Information Retrieval		
	CO Statements	**Knowledge Level**
1	Explain the components of information retrieval and search engine.	K2
2	Describe the various information retrieval models.	K2
3	Describe the web search engine and crawling concepts.	K2
4	Apply link analysis and specialised search techniques in web search.	K3
5	Apply various document text mining techniques in information retrieval.	K3

8.Course Code and Name : CS6004 & Cyber Forensics		
	CO Statements	**Knowledge Level**
1	Describe the security issues in network and transport layer.	K2
2	Apply security principles in application layer.	K3
3	Describe the fundamental concepts of computer forensics.	K2
4	Explain the basics concepts in forensic tools and evidence collection.	K3
5	Describe the various techniques to validate the forensic data.	K2

9.Course Code and Name : CS6711 Security Laboratory		
	CO Statements	**Knowledge Level**
1	Implement the cipher techniques	K3
2	Develop the various security algorithms	K3
3	Implement different network security and analysis using open source tools.	K3
4	Demonstrate the installation of rootkits.	K2

5	Utilize the different open source tools for network security and analysis	K2

10.Course Code and Name : CS6712 Grid and Cloud Computing Laboratory		
	CO Statements	**Knowledge Level**
1	Design and Implement the applications of Grid	K3
2	Develop the Grid Service using Apache Axis	K3
3	Design and Implement the applications of Cloud	K3
4	Implement the Hadoop Cluster using FUSE .	K2
5	Develop secured applications using basic security mechanisms available in Globus Toolkit.	K2

SEMESTER 08

1.Course Code and Name : CS6801 and Multicore Architecture &Programming		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the various concepts of multicore processor.	K2
2	Describe the various challenges in parallel programming.	K2
3	Develop shared memory programming using OpenMP.	K3
4	Develop distributed memory programming using MPI.	K3
5	Apply n-body-solvers and tree search using OpenMP and MPI in parallel programming.	K3

2.Course Code and Name : CS6008 Human Computer Interaction		
	CO Statements	**Knowledge Level**
1	Design effective dialog for HCI.	K2
2	Design effective HCI for individuals and persons with disabilities.	K2
3	Assess the importance of user feedback.	K3
4	Explain the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites.	K3
5	Develop meaningful user interface.	K3

3.Course Code and Name : MG6088 Software Project Management		
	CO Statements	**Knowledge Level**
1	students will be able to practice Project Management principles while developing a software.	K2
2	To outline the need for Software Project Management.	K2
3	To highlight different techniques for software cost estimation and activity planning.	K2
4	Summarize the concept of Safety, Responsibilities And Rights	K2
5	Explain the different Global Issues	K2

4.Course Code and Name : CS6811 and Project Work		
	CO Statements	**Knowledge Level**
1	Analyze Problems in various domains and formulate methodology	K4
2	Develop different solutions and select the optimum solution	K3
3	Conclude using proper evidence to support them	K4
4	Integrate information from multiple sources.	K2

5	Demonstrate an awareness and application of appropriate personal, societal, and professional ethical standards.	K2

PRINCIPAL
Mahendra College of Engineering
Mahendra Salem Campus,
Minnampalli, SALEM 636 106
TAMILNADU

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

HOME

2021 REGULATION

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

2021 REGULATION

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1	Find employment in Core Electrical and Electronics Engineering and service sectors.
PEO 2	Get elevated to technical lead position and lead the organization competitively.
PEO 3	Enter into higher studies leading to post-graduate and research degrees. Become consultant and provide solutions to the practical problems of core organization.
PEO 4	Become an entrepreneur and be part of electrical and electronics product and service industries.

PROGRAM OUTCOMES (POs)

PO 1	Engineering knowledge: Apply knowledge of mathematics, basic science and engineering science.
PO 2	Problem analysis: Identify, formulate and solve engineering problems.
PO 3	Design/development of solutions: Design an electrical system or process to improve its performance, satisfying its constraints.
PO 4	Conduct investigations of complex problems: Conduct experiments in electrical and electronics systems and interpret the data.
PO 5	Modern tool usage: Apply various tools and techniques to improve the efficiency of the system.
PO 6	The Engineer and society: Conduct themselves to uphold the professional and social obligations.
PO 7	Environment and sustainability: Design the system with environment consciousness and sustainable development.
PO 8	Ethics: Interacting industry, business and society in a professional and ethical manner.
PO 9	Individual and team work: Function in a multidisciplinary team.
PO 10	Communication: Proficiency in oral and written Communication.
PO 11	Project management and finance: Implement cost effective and improved system.
PO 12	Life-long learning: Continue professional development and learning as a life-long activity.

HOME

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1	Foundation of Electrical Engineering: Ability to understand the principles and working of electrical components, circuits, systems and control that are forming a part of power generation, transmission, distribution, utilization, conservation and energy saving. Students can assess the power management, auditing, crisis and energy saving aspects.
PSO 2	Foundation of Mathematical Concepts: Ability to apply mathematical methodologies to solve problems related with electrical engineering using appropriate engineering tools and algorithms.
PSO 3	Computing and Research Ability: Ability to use knowledge in various domains to identify research gaps and hence to provide solution which leads to new ideas and innovations.

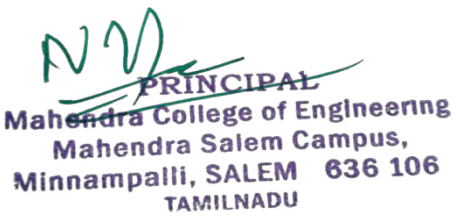
LIST OF COURSES

REGULATION 2021

SEMESTER I		
S. NO.	**COURSE CODE**	**COURSE TITLE**
1.	IP3151	Induction Programme
	THEORY	
2.	HS3152	Professional English - I
3.	MA3151	Matrices and Calculus
4.	PH3151	Engineering Physics
5.	CY3151	Engineering Chemistry
6.	GE3151	Problem Solving and Python Programming
7.	GE3152	Heritage of Tamils
	PRACTICALS	
8.	GE3171	Problem Solving and Python Programming Laboratory
9.	BS3171	Physics and Chemistry Laboratory
10.	GE3172	English Laboratory
SEMESTER II		
S. NO.	**COURSE CODE**	**COURSE TITLE**
	THEORY	
1.	HS3252	Professional English - II
2.	MA3251	Statistics and Numerical Methods
3.	PH3202	Physics for Electrical Engineering
4.	BE3255	Basic Civil and Mechanical Engineering
5.	GE3251	Engineering Graphics
6.	EE3251	Electric Circuit Analysis
7.		NCC Credit Course Level1
8.	GE3252	Tamils and Technology
	PRACTICALS	
8.	GE3271	Engineering Practices Laboratory

9.	EE3271	Electric Circuits Laboratory
	GE3272	Communication Laboratory
SEMESTER III		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1.	MA3303	Probability and Complex Functions
2.	EE3301	Electromagnetic Fields
3.	EE3302	Digital Logic Circuits
4.	EC3301	Electron Devices and Circuits
5.	EE3303	Electrical Machines - I
6.	CS3353	C Programming and Data Structures
PRACTICALS		
7.	EC3311	Electronic Devices and Circuits Laboratory
8.	EE3311	Electrical Machines Laboratory – I
9.	CS3362	C Programming and Data Structures Laboratory
10.	GE3361	Professional Development
SEMESTER IV		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1.	GE3451	Environmental Sciences and Sustainability
2.	EE3401	Transmission and Distribution
3.	EE3402	Linear Integrated Circuits
4.	EE3403	Measurements and Instrumentation
5.	EE3404	Microprocessor and Microcontroller
6.	EE3405	Electrical Machines - II
7.		NCC Credit Course Level 2
PRACTICALS		
8.	EE3411	Electrical Machines Laboratory - II
9.	EE3412	Linear and Digital Circuits Laboratory
10.	EE3413	Microprocessor and Microcontroller laboratory
SEMESTER V		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1.	EE3501	Power System Analysis
2.	EE3591	Power Electronics
3.	EE3503	Control Systems
4.	EE3006	Professional Elective I - Power Quality
5.	EE3009	Professional Elective II - Special Electrical Machines
6.	EE3016	Professional Elective III - Embedded System Design
7.	MX3084	Mandatory Course-I -Disaster Risk Reduction and Management
PRACTICALS		
8.	EE3511	Power Electronics Laboratory

9.	EE3512	Control and Instrumentation Laboratory
SEMESTER VI		
S. NO.	**COURSE CODE**	**COURSE TITLE**
1.	EE3601	Protection and Switchgear
2.	EE3602	Power System Operation and Control
3.		Open Elective – I
4.		Professional Elective IV
5.		Professional Elective V
6.		Professional Elective VI
7.		Mandatory Course-II
8.		NCC Credit Course Level 3
PRACTICALS		
9.	EE3611	Power System Laboratory
SEMESTER VII		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1.	EE3701	High Voltage Engineering
2.	GE3791	Human Values and Ethics
3.		Elective – Management
4.		Open Elective – II
5.		Open Elective – III
6.		Open Elective – IV
7		Professional Elective VII
SEMESTER VIII		
S. NO.	**COURSE CODE**	**COURSE TITLE**
1.	EE3811	Project Work / Internship



SEMESTER 01		
1.Course Code and Name : HS3151 Professional English - I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	To listen and comprehend complex academic texts	K2
2	To read and infer the denotative and connotative meanings of technical texts	K2
3	To write definitions, descriptions, narrations and essays on various topics	K2
4	To speak fluently and accurately in formal and informal communicative contexts.	K3
5	To express their opinions effectively in both oral and written medium of communication	K3
2.Course Code and Name : MA3151 Matrices and Calculus		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Use the matrix algebra methods for solving practical problems..	K2
2	Apply differential calculus tools in solving various application problems	K2
3	Able to use differential calculus ideas on several variable functions.	K2
4	Apply different methods of integration in solving practical problems.	K2
5	Apply multiple integral ideas in solving areas, volumes and other practical problems.	K2
3.Course Code and Name : PH3151 Engineering Physics		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Understand the importance of mechanics.	K2
2	Express their knowledge in electromagnetic waves	K2
3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers	K2
4	Understand the importance of quantum physics.	K2

5	Comprehend and apply quantum mechanical principles towards the formation of energy bands	K2
4.Course Code and Name : CY3151 Engineering Chemistry		
	CO Statements	**Knowledge Level**
The students should be able to		
1	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.	K2
2	To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nonmaterial's for engineering and technology applications.	K2
3	To apply the knowledge of phase rule and composites for material selection requirements.	K2
4	To recommend suitable fuels for engineering processes and applications.	K2
5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.	K2
5.Course Code and Name : GE3151 Problem Solving and Python Programming		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop algorithmic solutions to simple computational problems.	K2
2	Develop and execute simple Python programs.	K3
3	Write simple Python programs using conditionals and loops for solving problems.	K3
4	Decompose a Python program into functions	K3
5	Represent compound data using Python lists, tuples, dictionaries etc.	K3
6.Course Code and Name : GE3171 Problem Solving and Python Programming Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop algorithmic solutions to simple computational problems	K2
2	Develop and execute simple Python programs	K3
3	Implement programs in Python using conditionals and loops for solving problems..	K3
4	Deploy functions to decompose a Python program.	K3

5	Process compound data using Python data structures..	K3
6	Utilize Python packages in developing software applications.	K3
7.Course Code and Name : BS3171 Physics and Chemistry Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Understand the functioning of various physics laboratory equipment.	K2
2	Use graphical models to analyze laboratory data.	K3
3	Use mathematical models as a medium for quantitative reasoning and describing physical reality.	K3
4	Access, process and analyze scientific information.	K3
5	Solve problems individually and collaboratively.	K3
6	To analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO.	K2
7	To determine the amount of metal ions through volumetric and spectroscopic techniques	K3
8	To analyse and determine the composition of alloys.	K3
9	To learn simple method of synthesis of nanoparticles	K3
10	To quantitatively analyse the impurities in solution by electroanalytical techniques	K3
8.Course Code and Name : GE3172 English Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	To listen to and comprehend general as well as complex academic information	K2
2	To listen to and understand different points of view in a discussion	K3
3	To speak fluently and accurately in formal and informal communicative contexts	K3
4	To describe products and processes and explain their uses and purposes clearly and accurately	K3
5	To express their opinions effectively in both formal and informal discussions	K3
SEMESTER 02		

1.Course Code and Name : HS3251-Professional English – II		
	CO Statements	**Knowledge Level**
The students should be able to		
1	To compare and contrast products and ideas in technical texts.	K2
2	To identify cause and effects in events, industrial processes through technical texts	K2
3	To analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format.	K2
4	To report events and the processes of technical and industrial nature.	K3
5	To present their opinions in a planned and logical manner, and draft effective resumes in context of job search.	K3
2.Course Code and Name : MA3251 Statistics and Numerical Methods		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply the concept of testing of hypothesis for small and large samples in real life problems	K3
2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.	K3
3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems..	K3
4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.	K3
5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	K3
3.Course Code and Name : PH3202 - Physics for Electrical Engineering		
	CO Statements	**Knowledge Level**
The students should be able to		
1	know basics of dielectric materials and insulation.	K2

2	gain knowledge on the electrical and magnetic properties of materials and their applications	K2
3	understand clearly of semiconductor physics and functioning of semiconductor devices	K2
4	understand the optical properties of materials and working principles of various optical devices	K2
5	appreciate the importance of nanotechnology and nanodevices.	K2
4.Course Code and Name : BE3255- Basic Civil and Mechanical Engineering		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Understanding profession of Civil and Mechanical engineering.	K2
2	Summarise the planning of building, infrastructure and working of Machineries.	K2
3	Apply the knowledge gained in respective discipline	K3
4	Illustrate the ideas of Civil and Mechanical Engineering applications.	K2
5	Appraise the material, Structures, machines and energy.	K3
5.Course Code and Name : GE3251 Engineering Graphics		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Use BIS conventions and specifications for engineering drawing.	K2
2	Construct the conic curves, involutes and cycloid	K3
3	Solve practical problems involving projection of lines.	K5
4	Draw the orthographic, isometric and perspective projections of simple solids.	K2
5	Draw the development of simple solids.	K6
6.Course Code and Name : EE3251 Electric Circuit Analysis		
	CO Statements	**Knowledge Level**
The students should be able to		

1	Explain circuit's behavior using circuit laws.	K2
2	Apply mesh analysis/ nodal analysis / network theorems to determine behavior of the given DC and AC circuit	K2
3	Compute the transient response of first order and second order systems to step and sinusoidal input	K2
4	Compute power, line/ phase voltage and currents of the given three phase circuit	K2
5	Explain the frequency response of series and parallel RLC circuits	K2
6	Explain the behavior of magnetically coupled circuits.	K2
7.Course Code and Name :GE3271 -Engineering Practices Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.	K2
2	Wire various electrical joints in common household electrical wire work.	K2
3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.	K2
4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.	K4
8.Course Code and Name :EE3271 Electric Circuits Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Use simulation and experimental methods to verify the fundamental electrical laws for the given DC/AC circuit	K3
2	Use simulation and experimental methods to verify the various electrical theorems (Superposition, Thevenin , Norton and maximum power transfer) for the given DC/AC circuit	K3
3	Analyze transient behavior of the given RL/RC/RLC circuit using simulation and experimental	K3

	methods	
4	Analyze frequency response of the given series and parallel RLC circuit using simulation and experimentation methods	K3
5	Analyze the performance of the given three-phase circuit using simulation and experimental methods	K3
SEMESTER 03		
1.Course Code and Name : MA3303-Probability and Complex Functions		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.	K2
2	Understand the basic concepts of one and two dimensional random variables and apply in engineering applications	K2
3	To develop an understanding of the standard techniques of complex variable theory in particular analytic function and its mapping property.	K2
4	To familiarize the students with complex integration techniques and contour integration techniques which can be used in real integrals.	K2
5	To acquaint the students with Differential Equations which are significantly used in engineering problems.	K3
2.Course Code and Name : EE3301 Electromagnetic Fields		
	CO Statements	**Knowledge level**
The students are able to,		
1	Explain Gradient, Divergence, and Curl operations on electromagnetic vector fields.	K2
2	Explain electrostatic fields, electric potential, energy density and their applications.	K2
3	Calculate magneto static fields, magnetic flux density, vector potential	K3
4	Explain different methods of emf generation and Maxwell's equations	K3

5	Explain the concept of electromagnetic waves and characterizing parameters	K2
3.Course Code and Name : EE3302 Digital Logic Circuits		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Explain various number systems and characteristics of digital logic families	K2
2	Apply K-maps and Quine McCluskey methods to simplify the given Boolean expressions	K3
3	Explain the implementation of combinational circuit such as multiplexers and de multiplexers - code converters, adders, subtractors, Encoders and Decoders	K2
4	Design various synchronous and asynchronous circuits using Flip Flops	K2
5	Explain asynchronous sequential circuits and programmable logic devices	K2
6	Use VHDL for simulating and testing RTL, combinatorial and sequential circuits	K3
4.Course Code and Name : EC3301 Electron Devices and Circuits		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Explain the structure and operation of PN junction devices (diode, Zener diode, LED and Laser diode)	K2
2	Design clipper, clamper, half wave and full wave rectifier, regulator circuits using PN junction diodes	K3
3	Analyze the structure and characteristics BJT, FET, MOSFET, UJT, Thyristor and IGBT	K2
4	Analyze the performance of various configurations of BJT and MOSFET based amplifier	K3
5	Explain the characteristics of MOS based cascade and differential amplifier	K2
6	Explain the operation of various feedback amplifiers and oscillators	K3
5.Course Code and Name :EE3303 Electrical Machines - I		
	CO Statements	**Knowledge Level**
The students are able to,		

1	Apply the laws governing the electromechanical energy conversion for singly and multiple excited systems.	K3
2	Explain the construction and working principle of DC machines.	K2
3	Interpret various characteristics of DC machines.	K2
4	Compute various performance parameters of the machine, by conducting suitable tests.	K3
5	Draw the equivalent circuit of transformer and predetermine the efficiency and regulation.	K3
6	Describe the working principle of auto transformer, three phase transformer with different types of connections.	K3
6.Course Code and Name : CS3353 C Programming and Data Structures		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Develop C programs for any real world/technical application	K2
2	Apply advanced features of C in solving problems.	K3
3	Write functions to implement linear and non–linear data structure operations.	K3
4	Suggest and use appropriate linear/non–linear data structure operations for solving a given problem.	K2
5	Appropriately use sort and search algorithms for a given application.	K2
6	Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval.	K2
7.Course Code and Name : EC3311 Electronic Devices and Circuits Laboratory		
	CO Statements	**Knowledge Level**
1	Analyze the characteristics of PN, Zener diode and BJT in CE,CC,CB configurations experimentally	K2
2	Analyze the characteristics of JFET and UJT experimentally	K2
3	Analyze frequency response characteristics of a Common Emitter amplifier experimentally	K2
4	Analyze the characteristics of RC phase shift and LC oscillators experimentally	K2
5	Analyze the characteristics of half-wave and full-wave rectifier with and without filters experimentally	K2

6	Analyze the characteristics of FET based differential amplifier experimentally	K2
7	Calculate the frequency and phase angle using CRO experimentally	K2
8	Analyze the frequency response characteristics of passive filters experimentally	K2
8.Course Code and Name : EE3311 Electrical Machines Laboratory – I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Construct the circuit with appropriate connections for the given DC machine/transformer.	K3
2	Experimentally determine the characteristics of different types of DC machines.	K3
3	Demonstrate the speed control techniques for a DC motor for industrial applications.	K3
4	Identify suitable methods for testing of transformer and DC machines.	K3
5	Predetermine the performance parameters of transformers and DC motor.	K3
6	Understand DC motor starters and 3-phase transformer connections	K3
9.Course Code and Name : CS3362 C Programming and Data Structures Laboratory		
	CO Statements	**Knowledge level**
The students are able to,		
1	Use different constructs of C and develop applications	K3
2	Write functions to implement linear and non-linear data structure operations	K3
3	Suggest and use the appropriate linear / non-linear data structure operations for a given problem	K3
4	Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval	K3
5	Implement Sorting and searching algorithms for a given application	K3
SEMESTER 04		
1.Course Code and Name : GE3451 Environmental Sciences and Sustainability		

	CO Statements	**Knowledge Level**
The students are able to,		
1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.	K2
2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.	K2
3	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.	K2
4	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.	K2
5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.	K3
2.Course Code and Name : EE3401 Transmission and Distribution		
	CO Statements	**Knowledge level**
The students are able to,		
1	Understand the structure of power system, computation of transmission line parameter for different configurations and the impact of skin and proximity effects.	K2
2	Model the transmission lines to determine the line performance and to understand the impact of Ferranti effect and corona on line performance.	K2
3	Do Mechanical design of transmission lines, grounding and to understand about the insulators in transmission system.	K3
4	Design the underground cables and understand the performance analysis of underground cable.	K2
5	Understand the modelling, performance analysis and modern trends in distribution system.	K2
3.Course Code and Name : EE3402 Linear Integrated Circuits		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Explain monolithic IC fabrication process	K2
2	Explain the fabrication of diodes, capacitance, resistance, FETs and PV Cell.	K3
3	Analyze the characteristics and basic applications (inverting/non-inverting amplifier, summer, differentiator, integrator, V/I and I/V converter) of Op-Amp	K2
4	Explain circuit and applications of op-amp based instrumentation amplifier, log/antilog amplifier, analog multiplier /divider, active filters, comparators, waveform generators, A/D and D/A converters	K2

5	Explain Functional blocks, characteristics and applications of Timer, PLL, analog multiplier ICs.	K2
6	Explain the applications of ICs in Instrumentation amplifier, fixed and variable voltage regulator, SMPS and function generator	K3
4.Course Code and Name : EE3403 Measurements and Instrumentation		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Ability to understand the fundamental art of measurement in engineering.	K2
2	Ability to understand the structural elements of various instruments.	K3
3	Ability to understand the importance of bridge circuits.	K2
4	Ability to understand about various transducers and their characteristics by experiments.	K2
5	Ability to understand the concept of digital instrumentation and virtual instrumentation by experiments.	K2
5.Course Code and Name : EE3404 Microprocessor and Microcontroller		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Ability to write assembly language program for microprocessor and microcontroller	K3
2	Ability to design and implement interfacing of peripheral with microprocessor and microcontroller	K2
3	Ability to analyze, comprehend, design and simulate microprocessor based systems used for control and monitoring.	K2
4	Ability to analyze, comprehend, design and simulate microcontroller based systems used for control and monitoring.	K3
5	Ability to understand and appreciate advanced architecture evolving microprocessor field	K3
6.Course Code and Name : EE3405 Electrical Machines - II		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Ability to understand the construction and working principle of Synchronous generator	K2
2	Ability to understand the construction and working principle of Synchronous Motor	K3

3	Ability to understand the construction and working principle of Three Phase Induction Motor	K3
4	Acquire knowledge about the starting and speed control of induction motors.	K2
5	To gain knowledge about the basic principles and working of Single phase induction motors and Special Electrical Machines.	K3
7.Course Code and Name : EE3411 Electrical Machines Laboratory - II		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Ability to understand and analyze EMF and MMF methods	K2
2	Ability to analyze the characteristics of V and Inverted V curves	K2
3	Acquire hands on experience of conducting various tests on alternators and obtaining their performance indices using standard analytical as well as graphical methods. to understand the importance of Synchronous machines	K3
4	Acquire hands on experience of conducting various tests on alternators and obtaining their performance indices using standard analytical as well as graphical methods. to understand the importance of single and three phase Induction motors	K2
5	Ability to acquire knowledge on separation of losses	K2
8.Course Code and Name : EE3412 Linear and Digital Circuits Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Ability to understand and implement Boolean Functions.	K3
2	Ability to understand the importance of code conversion	K3
3	Ability to Design and implement circuits with digital ICs like decoders, multiplexers, register.	K3
4	Ability to acquire knowledge on Application of Op-Amp	K3
5	Ability to Design and implement counters using analog ICs like timers, VCOs and digital ICs like Flip-flops and counters.	K3
9.Course Code and Name :EE3413 Microprocessor and Microcontroller laboratory		
	CO Statements	**Knowledge level**

The students are able to,		
1	Ability to design and implement combinational logic circuits and to analysis simple sequential logic circuits.	K3
2	Ability to write assembly language program for microprocessor and microcontroller	K3
3	Ability to design and implement interfacing of peripheral with microprocessor and microcontroller	K3
4	Ability to analyze, comprehend, design and simulate microprocessor based systems used for control and monitoring.	K3
5	Ability to analyze, comprehend, design and simulate microcontroller based systems used for control and monitoring.	K3
SEMESTER 05		
1.Course Code and Name : EE3501 Power System Analysis		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Ability to model the power system under steady state operating condition.	K2
2	Ability to carry out power flow analysis using.	K2
3	Ability to infer the significance of short circuit studies in designing circuit breakers.	K3
4	Ability to analyze the state of the power system for various unsymmetrical faults.	K2
5	Ability to analyze the stability of power system using different methods.	K3
2.Course Code and Name : EE3591 Power Electronics		
	CO Statements	**Knowledge level**
The students are able to,		
1	Understand the operation of semiconductor devices and dynamic characteristics and to design &analyze the low power SMPS	K2
2	Analyze the various uncontrolled rectifiers and design suitable filter circuits	K2

3	Analyze the operation of the n-pulse converters and evaluate the performance parameters	K2
4	Understand various PWM techniques and apply voltage control and harmonic elimination methods to inverter circuits.	K3
5	Understand the operation of AC voltage controllers and its applications.	K2
3.Course Code and Name : EE3503 Control Systems		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Represent simple systems in transfer function and state variable forms.	K2
2	Analyze simple systems in time domain.	K2
3	Analyze simple systems in frequency domain.	K2
4	Infer the stability of systems in time and frequency domain.	K2
5	Interpret characteristics of the system and find out solution for simple control problems.	K2
4.Course Code and Name : EE3006 Power Quality		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Use various definitions of power quality for power quality issues	K2
2	Describe the concepts related with single phase / three phase, linear / nonlinear loads and single phase / three phase sinusoidal, non-sinusoidal source	K3
3	Solve problems related with mitigation of Power System Harmonics	K2
4	Use DSTATCOM for load compensation	K3
5	Demonstrate the role of DVR, SAFs UPQC in power distribution systems	K2
5.Course Code and Name : EE3009 Special Electrical Machines		
	CO Statements	**Knowledge Level**
The students are able to,		

1	Ability to model and analyze power electronic systems and equipment using computational software.	K3
2	Ability to optimally design magnetics required in special machines based drive systems using FEM based software tools.	K2
3	Ability to analyse the dynamic performance of special electrical machines	K2
4	Ability to understand the operation and characteristics of other special electrical machines.	K3
5	Ability to design and conduct experiments towards research.	K3
6.Course Code and Name : EE3016 Embedded System Design		
	CO Statements	**Knowledge Level**
The students are able to,		
1	The hardware functionals and software strategies required to develop various Embedded systems	K2
2	The basic differences between various Bus communication standards	K3
3	The incorporation of the interface as Interrupt services	K3
4	The various scheduling algorithms through a Real-time operating system.	K2
5	The various embedded concepts for developing automation applications.	K2
7.Course Code and Name : MX3084 Disaster Risk Reduction and Management		
	CO Statements	**Knowledge Level**
1	To impart knowledge on the concepts of Disaster, Vulnerability and Disaster Risk reduction (DRR)	K2
2	To enhance understanding on Hazards, Vulnerability and Disaster Risk Assessment prevention and risk reduction	K2
3	To develop disaster response skills by adopting relevant tools and technology	K2
4	Enhance awareness of institutional processes for Disaster response in the country and	K2
5	Develop rudimentary ability to respond to their surroundings with potential Disaster response in areas where they live, with due sensitivity	K2
8.Course Code and Name : EE3511 Power Electronics Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		

1	Determine the characteristics of SCR, IGBT, TRIAC, MOSFET and IGBT	K3
2	Find the transfer characteristics of full converter, semi converter, step up and step down choppers by simulation experimentation.	K3
3	Analyze the voltage waveforms for PWM inverter using various modulation techniques.	K3
4	Design and experimentally verify the performance of basic DC/DC converter topologies used for SMPS.	K3
5	Understand the performance of AC voltage controllers by simulation and experimentation	K3
9.Course Code and Name : EE3512 Control and Instrumentation Laboratory		
	CO Statements	**Knowledge level**
The students are able to,		
1	To model and analyze simple physical systems and simulate the performance in analog and digital platform.	K3
2	To design and implement simple controllers in standard forms.	K3
3	To design compensators based on time and frequency domain specifications.	K3
4	To design a complete closed control loop and evaluate its performance for simple physical systems.	K3
5	To analyze the stability of a physical system in both continuous and discrete domains.	K3
SEMESTER 06		
1.Course Code and Name : EE3601 Protection and Switchgear		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Understand and select proper protective scheme and type of earthing.	K2
2	Explain the operating principles of various relays	K2
3	Suggest suitable protective scheme for the protection of various power system apparatus.	K2
4	Analyze the importance of static relays and numerical relays in power system protection.	K2
5	Summarize the merits and demerits and application areas of various circuit breakers.	K2
2.Course Code and Name : EE3602 Power System Operation and Control		
	CO Statements	**Knowledge level**

The students are able to,		
1	Understand the day – to – day operation of power system.	K2
2	Model and analyse the control actions that are implemented to meet the minute-to minute variation of system real power demand.	K2
3	Model and analyze the compensators for reactive power control and various devices used for voltage control.	K2
4	Prepare day ahead and real time economic generation scheduling.	K3
5	Understand the necessity of computer control of power systems.	K2
3.Course Code and Name : EE3611 Power System Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Model and analyze the performance of the transmission lines.	K3
2	Perform power flow, short circuit, and stability analysis for any power system network.	K3
3	Understand, design, and analyze the load frequency control mechanism.	K3
4	Perform optimal scheduling of generators and compute the state of the power system.	K3
5	Understand, analyze, and apply the relays for power system protection.	K3
SEMESTER 07		
1.Course Code and Name : EE3701 High Voltage Engineering		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Explain various overvoltages and its effects on power systems.	K2
2	Understand the breakdown phenomena in different medium under uniform and non uniform fields.	K2
3	Explain the methods of generating and measuring High DC, AC, Impulse voltage and currents.	K2

4	Suggest and Conduct suitable HV testing of Electrical power apparatus as per Standards	K2
5	Explain the Industrial Applications of Electrostatic Fields.	K3
SEMESTER 08		
1.Course Code and Name : EE3811 Project Work / Internship		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Ability to identify, formulate, design, interprete,analyze and provide solutions to complex engineering and societal issues by applying knowledge gained on basics of science and Engineering.	K3
2	Ability to choose, conduct and demonstrate a sound technical knowledge of their selected project topics in the field of power components, protection, high voltage, electronics, process automation, power electronics and drives instrumentation and control by exploring suitable engineering and IT tools.	K3
3	Ability to understand, formulate and propose new learning algorithms to solve engineering and societal problems of moderate complexity through multidisciplinary projects understanding commitment towards sustainable development.	K3
4	Ability to demonstrate, prepare reports, communicate and work in a team as a member/leader by adhering to ethical responsibilities.	K2
5	Ability to acknowledge the value of continuing education for oneself and to stay up with technology advancements.	K3

PRINCIPAL
Mahendra College of Engineering
Mahendra Salem Campus,
Minnampalli, SALEM 636 106
TAMILNADU

2017 REGULATION

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

2017 REGULATION

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1	Have successful technical and professional careers in their chosen fields such as circuit theory, Field theory, control theory and computational platforms.
PEO 2	Engross in life long process of learning to keep themselves abreast of new developments in the field of Electronics and their applications in power engineering.

PROGRAM OUTCOMES (POs)

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design / Development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1	Apply the fundamental knowledge of mathematics, science, electrical and electronics engineering to analyze and solve the complex problems in electrical, electronics and allied interdisciplinary areas.
PSO 2	Understand and apply core domain knowledge of electrical engineering to analyze and solve complex engineering problems of machines, control systems, electronics and power systems.
PSO 3	Create conducive environment to develop professionalism, entrepreneurial skills and leadership qualities with ethics.

LIST OF COURSES

REGULATION 2017

SEMESTER I		
S. NO.	COURSE CODE	COURSE TITLE
THEORY		
1	HS8151	Communicative English
2	MA8151	Engineering Mathematics - I
3	PH8151	Engineering Physics
4	CY8151	Engineering Chemistry
5	GE8151	Problem Solving and Python Programming
6	GE8152	Engineering Graphics
PRACTICALS		
7	GE8161	Problem Solving and Python Programming Laboratory
8	BS8161	Physics and Chemistry Laboratory
SEMESTER II		
S. NO.	COURSE CODE	COURSE TITLE

HOME

THEORY		
1	HS8251	Technical English
2	MA8251	Engineering Mathematics - II
3	PH8253	Physics for Electronics Engineering
4	BE8252	Basic Civil and Mechanical Engineering
5	EE8251	Circuit Theory
6	GE8291	Environmental Science and Engineering
PRACTICALS		
7	GE8261	Engineering Practices Laboratory
8	EE8261	Electric Circuits Laboratory
	SEMESTER III	
S. NO.	COURSE CODE	COURSE TITLE
THEORY		
1	MA8353	Transforms and Partial Differential Equations
2	EE8351	Digital Logic Circuits
3	EE8391	Electromagnetic Theory
4	EE8301	Electrical Machines - I
5	EC8353	Electron Devices and Circuits
6	ME8792	Power Plant Engineering
PRACTICALS		
7	EC8311	Electronics Laboratory
8	EE8311	Electrical Machines Laboratory – I
	SEMESTER IV	
S. NO.	COURSE CODE	COURSE TITLE
THEORY		
1	MA8491	Numerical Methods
2	EE8401	Electrical Machines - II
3	EE8402	Transmission and Distribution
4	EE8403	Measurements and Instrumentation
5	EE8451	Linear Integrated Circuits and Applications

6	IC8451	Control Systems
PRACTICALS		
7	EE8411	Electrical Machines Laboratory - II
8	EE8461	Linear and Digital Integrated Circuits Laboratory
9	EE8412	Technical Seminar
SEMESTER V		
S. NO.	COURSE CODE	COURSE TITLE
THEORY		
1	EE8501	Power System Analysis
2	EE8551	Microprocessors and Microcontrollers
3	EE8552	Power Electronics
4	EE8591	Digital Signal Processing
5	CS8392	Object Oriented Programming
6	OAN 551	Open Elective I-Sensor and Transducer
PRACTICALS		
7	EE8511	Control and Instrumentation Laboratory
8	HS8581	Professional Communication
9	CS8383	Object Oriented Programming Laboratory
SEMESTER VI		
S. NO.	COURSE CODE	COURSE TITLE
THEORY		
1	EE8601	Solid State Drives
2	EE8602	Protection and Switchgear
3	EE8691	Embedded Systems
4	EE8002	Professional Elective I- Design of Electrical Apparatus
5	EE8006	Professional Elective II- Power Quality
PRACTICALS		
6	EE8661	Power Electronics and Drives Laboratory
7	EE8681	Microprocessors and Microcontrollers Laboratory
8	EE8611	Mini Project

SEMESTER VII		
S. NO.	COURSE CODE	COURSE TITLE
THEORY		
1	EE8701	High Voltage Engineering
2	EE8702	Power System Operation and Control
3	EE8703	Renewable Energy Systems
4		Open Elective II*-Naan Mudalvan
5	GE8071	Professional Elective III- Disaster Management
6	EE8010	Professional Elective IV -Power Systems Transients
PRACTICALS		
7	EE8711	Power System Simulation Laboratory
8	EE8712	Renewable Energy Systems Laboratory
SEMESTER VIII		
S. NO.	COURSE CODE	COURSE TITLE
PRACTICALS		
1	GE8076	Professional Elective V- Professional Ethics in Engineering
2	EE8018	Professional Elective VI- Microcontroller Based System Design
PRACTICALS		
3	EE8811	Project Work

Mahendra College of Engineering SALEM 636 106 Mahendra Salem Campus

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SEMESTER 01		
1.Course Code and Name :HS8151 Communicative English		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Read articles of a general kind in magazines and newspapers	K2
2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English	K2
3	Comprehend conversations and short talks delivered in English	K2
4	Write short essays of a general kind and personal letters and emails in English.	K3
2.Course Code and Name : MA8151 Engineering Mathematics - I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Use both the limit definition and rules of differentiation to differentiate functions.	K3
2	Apply differentiation to solve maxima and minima problems.	K3
3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.	K3
4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.	K3
5	Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.	K4
6	Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.	K5
7	Apply various techniques in solving differential equations.	K4
3.Course Code and Name : PH8151 Engineering Physics		
	CO Statements	**Knowledge Level**
The students should be able to		
1	the students will gain knowledge on the basics of properties of matter and its applications,	K2
2	the students will acquire knowledge on the concepts of waves and optical devices and their applications in fiber optics,	K2
3	the students will have adequate knowledge on the concepts of thermal properties of materials	K2

	and their applications in expansion joints and heat exchangers,	
4	the students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and	K2
5	The students will understand the basics of crystals, their structures and different crystal growth techniques.	K2
	4.Course Code and Name : CY8151 Engineering Chemistry	
	CO Statements	**Knowledge Level**
The students should be able to		
1	The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.	K2
	5.Course Code and Name : GE8151 Problem Solving and Python Programming	
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop algorithmic solutions to simple computational problems	K2
2	Read, write, execute by hand simple Python programs	K3
3	Structure simple Python programs for solving problems.	K3
4	Decompose a Python program into functions.	K3
5	Represent compound data using Python lists, tuples, dictionaries.	K2
6	Read and write data from/to files in Python Programs.	K3
	6.Course Code and Name : GE8152 Engineering Graphics	
	CO Statements	**Knowledge Level**
The students should be able to		
1	familiarize with the fundamentals and standards of Engineering graphics	K2
2	Perform freehand sketching of basic geometrical constructions and multiple views of objects.	K3
3	Project orthographic projections of lines and plane surfaces.	K3

4	Draw projections and solids and development of surfaces.	K3
5	Visualize and to project isometric and perspective sections of simple solids.	K3
7.Course Code and Name : GE8161 Problem Solving and Python Programming Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Write, test, and debug simple Python programs.	K2
2	Implement Python programs with conditionals and loops.	K3
3	Develop Python programs step-wise by defining functions and calling them.	K3
4	Use Python lists, tuples, dictionaries for representing compound data.	K3
5	Read and write data from/to files in Python.	K3
8.Course Code and Name : BS8161Physics and Chemistry Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply principles of elasticity, optics and thermal properties for engineering applications.	K3
2	The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.	K3
SEMESTER 02		
	CO Statements	**Knowledge Level**
1.Course Code and Name : HS8251 Technical English		
The students should be able to		
1	Read technical texts and write area- specific texts effortlessly.	K2
2	Listen and comprehend lectures and talks in their area of specialisation successfully.	K2
3	Speak appropriately and effectively in varied formal and informal contexts.	K2
4	Write reports and winning job applications.	K3
2.Course Code and Name : MA8251Engineering Mathematics - II		

	CO Statements	Knowledge Level
The students should be able to		
1	Eigenvalues and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.	K3
2	Gradient, divergence and curl of a vector point function and related identities.	K3
3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.	K3
4	Analytic functions, conformal mapping and complex integration.	K3
5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.	K3

3.Course Code and Name : PH8253 Physics for Electronics Engineering

	CO Statements	Knowledge Level
The students should be able to		
1	gain knowledge on classical and quantum electron theories, and energy band structures,	K2
2	acquire knowledge on basics of semiconductor physics and its applications in various devices,	K2
3	get knowledge on magnetic and dielectric properties of materials,	K2
4	have the necessary understanding on the functioning of optical materials for optoelectronics,	K2
5	understand the basics of quantum structures and their applications in spintronics and carbon electronics.	K2

4.Course Code and Name : BE8252Basic Civil and Mechanical Engineering

	CO Statements	Knowledge Level
The students should be able to		
1	Appreciate the Civil and Mechanical Engineering components of Projects.	K2
2	Explain the usage of construction material and proper selection of construction materials.	K3
3	measure distances and area by surveying	K2
4	Identify the components used in power plant cycle.	K2

5	Demonstrate working principles of petrol and diesel engine.	K2
6	Elaborate the components of refrigeration and Air conditioning cycle.	K2
	5.Course Code and Name : EE8251Circuit Theory	
	CO Statements	**Knowledge Level**
The students should be able to		
1	Ability to analyse electrical circuits	K1
2	Ability to apply circuit theorems	K2
3	Ability to analyse transients	K2
	6.Course Code and Name :GE8291Environmental Science and Engineering	
	CO Statements	**Knowledge Level**
The students should be able to		
1	Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.	K3
2	Public awareness of environmental is at infant stage.	K3
3	Ignorance and incomplete knowledge has lead to misconceptions	K3
4	Development and improvement in std. of living has lead to serious environmental disasters	K3
	7.Course Code and Name : GE8261Engineering Practices Laboratory	
	CO Statements	**Knowledge Level**
The students should be able to		
1	Fabricate carpentry components and pipe connections including plumbing works.	K4
2	Use welding equipments to join the structures.	K3
3	Carry out the basic machining operations	K4

4	Make the models using sheet metal works	K4
5	Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings	K3
6	Carry out basic home electrical works and appliances	K4
7	Measure the electrical quantities	K4
8	Elaborate on the components, gates, soldering practices.	K3
8.Course Code and Name : EE8261Electric Circuits Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Understand and apply circuit theorems and concepts in engineering applications.	K3
2	Simulate electric circuits.	K3
SEMESTER 03		
1.Course Code and Name :MA8353 Transforms and Partial Differential Equations		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Understand how to solve the given standard partial differential equations.	K3
2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.	K2
3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.	K3
4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.	K2
5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.	K2
2.Course Code and Name : EE8351 Digital Logic Circuits		
	CO Statements	**Knowledge level**
The students are able to,		
1	Ability to design combinational and sequential Circuits.	K2

2	Ability to simulate using software package.	K2
3	Ability to study various number systems and simplify the logical expressions using Boolean functions	K2
4	Ability to design various synchronous and asynchronous circuits.	K2
5	Ability to introduce asynchronous sequential circuits and PLDs	K2
6	Ability to introduce digital simulation for development of application oriented logic circuits.	K3
3.Course Code and Name : EE8391 Electromagnetic Theory		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Ability to understand the basic mathematical concepts related to electromagnetic vector fields.	K2
2	Ability to understand the basic concepts about electrostatic fields, electrical potential, energy density and their applications.	K2
3	Ability to acquire the knowledge in magneto static fields, magnetic flux density, vector potential and its applications.	K2
4	Ability to understand the different methods of emf generation and Maxwell's equations	K2
5	Ability to understand the basic concepts electromagnetic waves and characterizing parameters	K2
6	Ability to understand and compute Electromagnetic fields and apply them for design and analysis of electrical equipment and systems	K3
4.Course Code and Name : EE8301 Electrical Machines - I		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Ability to analyze the magnetic-circuits.	K2

2	Ability to acquire the knowledge in constructional details of transformers.	K3
3	Ability to understand the concepts of electromechanical energy conversion.	K2
4	Ability to acquire the knowledge in working principles of DC Generator.	K3
5	Ability to acquire the knowledge in working principles of DC Motor	K2
6	Ability to acquire the knowledge in various losses taking place in D.C. Machines	K3
5.Course Code and Name :EC8353 Electron Devices and Circuits		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Explain the structure and working operation of basic electronic devices.	K2
2	Able to identify and differentiate both active and passive elements	K2
3	Analyze the characteristics of different electronic devices such as diodes and transistors	K3
4	Choose and adapt the required components to construct an amplifier circuit.	K2
5	Choose and adapt the required components to construct an amplifier circuit.	K3
6.Course Code and Name : ME8792 Power Plant Engineering		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Explain the layout, construction and working of the components inside a thermal power plant.	K2
2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.	K3
3	Explain the layout, construction and working of the components inside nuclear power plants.	K3
4	Explain the layout, construction and working of the components inside Renewable energy power plants.	K2
5	Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.	K2
7.Course Code and Name :EC8311 Electronics Laboratory		

	CO Statements	Knowledge Level
The students are able to,		
1	Ability to understand and analyse electronic circuits.	K3
8.Course Code and Name EE8311 Electrical Machines Laboratory - I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Ability to understand and analyze DC Generator	K3
2	Ability to understand and analyze DC Motor	K3
3	Ability to understand and analyse Transformers.	K3
SEMESTER 04		
1.Course Code and Name : MA8491 Numerical Methods		
	CO Statements	**Knowledge level**
The students are able to,		
1	Understand the basic concepts and techniques of solving algebraic and transcendental equations.	K3
2	Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations.	K3
3	Apply the numerical techniques of differentiation and integration for engineering problems.	K3
4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.	K3
5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	K3
2.Course Code and Name : EE8401 Electrical Machines - II		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Ability to understand the construction and working principle of Synchronous Generator	K3

2	Ability to understand MMF curves and armature windings.	K3
3	Ability to acquire knowledge on Synchronous motor.	K2
4	Ability to understand the construction and working principle of Three phase Induction Motor	K2
5	Ability to understand the construction and working principle of Special Machines	K3
6	Ability to predetermine the performance characteristics of Synchronous Machines.	K4
3.Course Code and Name : EE8402 Transmission and Distribution		
	CO Statements	**Knowledge Level**
The students are able to,		K2
1	To understand the importance and the functioning of transmission line parameters.	
2	To understand the concepts of Lines and Insulators.	K3
3	To acquire knowledge on the performance of Transmission lines.	K6
4	To understand the importance of distribution of the electric power in power system.	K3
5	To acquire knowledge on Underground Cabilitys	K3
6	To become familiar with the function of different components used in Transmission and Distribution levels of power system and modelling of these components.	K4
4.Course Code and Name : EE8403 Measurements and Instrumentation		
	CO Statements	**Knowledge Level**
The students are able to,		
1	To acquire knowledge on Basic functional elements of instrumentation	K2
2	To understand the concepts of Fundamentals of electrical and electronic instruments	K3
3	Ability to compare between various measurement techniques	K2
4	To acquire knowledge on Various storage and display devices	K2
5	To understand the concepts Various transducers and the data acquisition systems	K2
6	Ability to model and analyze electrical and electronic Instruments and understand the operational features of display Devices and Data Acquisition System.	K3

5.Course Code and Name :EE8451 Linear Integrated Circuits and Applications		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Ability to acquire knowledge in IC fabrication procedure	K2
2	Ability to analyze the characteristics of Op-Amp	K3
3	To understand the importance of Signal analysis using Op-amp based circuits.	K3
4	Functional blocks and the applications of special ICs like Timers, PLL circuits, regulator Circuits.	K3
5	To understand and acquire knowledge on the Applications of Op-amp	K2
6	Ability to understand and analyse, linear integrated circuits their Fabrication and Application.	K2
6.Course Code and Name : IC8451Control Systems		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Ability to develop various representations of system based on the knowledge of Mathematics, Science and Engineering fundamentals.	K2
2	Ability to do time domain and frequency domain analysis of various models of linear system.	K2
3	Ability to interpret characteristics of the system to develop mathematical model.	K2
4	Ability to design appropriate compensator for the given specifications.	K2
5	Ability to come out with solution for complex control problem.	K2
6	Ability to understand use of PID controller in closed loop system.	K3
7.Course Code and Name :EE8411 Electrical Machines Laboratory - II		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Ability to understand and analyze EMF and MMF methods	K3
2	Ability to analyze the characteristics of V and Inverted V curves	K2

3	Ability to understand the importance of Synchronous machines	K2
4	Ability to understand the importance of Induction Machines	K2
5	Ability to acquire knowledge on separation of losses	K2
8.Course Code and Name :EE8461 Linear and Digital Integrated Circuits Laboratory		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Ability to understand and implement Boolean Functions.	K3
2	Ability to understand the importance of code conversion	K2
3	Ability to Design and implement 4-bit shift registers	K2
4	Ability to acquire knowledge on Application of Op-Amp	K2
5	Ability to Design and implement counters using specific counter IC.	K2
9.Course Code and Name :EE8412 Technical Seminar		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Ability to review, prepare and present technological developments	K3
2	Ability to face the placement interviews	K2
SEMESTER 05		
1.Course Code and Name :EE8501Power System Analysis		
	CO Statements	**Knowledge level**
The students are able to,		
1	Ability to model the power system under steady state operating condition	K2
2	Ability to understand and apply iterative techniques for power flow analysis	K3
3	Ability to model and carry out short circuit studies on power system	K3
4	Ability to model and analyze stability problems in power system	K3

5	Ability to acquire knowledge on Fault analysis	K3
6	Ability to model and understand various power system components and carry out power flow, short circuit and stability studies.	K3
2.Course Code and Name : EE8551 Microprocessors and Microcontrollers		
	CO Statements	**Knowledge level**
The students are able to,		
1	Ability to acquire knowledge in Addressing modes & instruction set of 8085 & 8051.	K2
2	Ability to need & use of Interrupt structure 8085 & 8051.	K3
3	Ability to understand the importance of Interfacing	K2
4	Ability to explain the architecture of Microprocessor and Microcontroller.	K2
5	Ability to write the assembly language programme.	K3
6	Ability to develop the Microprocessor and Microcontroller based applications.	K4
3.Course Code and Name :EE8552 Power Electronics		
	CO Statements	**Knowledge level**
The students are able to,		
1	Ability to analyse AC-AC and DC-DC and DC-AC converters.	K1
2	Ability to choose the converters for real time applications.	K2
4.Course Code and Name : EE8591Digital Signal Processing		
	CO Statements	**Knowledge level**
The students are able to,		
1	Ability to understand the importance of Fourier transform, digital filters and DS Processors.	K2
2	Ability to acquire knowledge on Signals and systems & their mathematical representation.	K2
3	Ability to understand and analyze the discrete time systems.	K2
4	Ability to analyze the transformation techniques & their computation.	K2

5	Ability to understand the types of filters and their design for digital implementation.	K2
6	Ability to acquire knowledge on programmability digital signal processor & quantization effects.	K3

5.Course Code and Name : CS8392 Object Oriented Programming		
	CO Statements	**Knowledge level**
The students are able to,		
1	Develop Java programs using OOP principles	K5
2	Develop Java programs with the concepts inheritance and interfaces	K2
3	Build Java applications using exceptions and I/O streams	K2
4	Develop Java applications with threads and generics classes	K1
5	Develop interactive Java programs using swings	K2

6.Course Code and Name : OAN 551 Sensor and Transducer		
	CO Statements	**Knowledge level**
The students are able to,		
1	. Expertise in various calibration techniques and signal types for sensors	K2
2	Apply the various sensors in the Automotive and Mechatronics applications	K4
3	Study the basic principles of various smart sensors	K4
4	Implement the DAQ systems with different sensors for real time applications	K4

7.Course Code and Name : EE8511 Control and Instrumentation Laboratory		
	CO Statements	**Knowledge level**
The students are able to,		
1	Ability to understand control theory and apply them to electrical engineering problems.	K3

2	Ability to analyze the various types of converters.	K3
3	Ability to design compensators	K2
4	Ability to understand the basic concepts of bridge networks.	K3
5	Ability to the basics of signal conditioning circuits.	K4
	Ability to study the simulation packages.	K4
8.Course Code and Name : HS8581 Professional Communication		
	CO Statements	**Knowledge level**
The students are able to,		
1	Make effective presentations	K2
2	Participate confidently in Group Discussions.	K3
3	Attend job interviews and be successful in them.	K3
4	Develop adequate Soft Skills required for the workplace	K3
9.Course Code and Name : CS8383 Object Oriented Programming Laboratory		
	CO Statements	**Knowledge level**
The students are able to,		
1	Develop and implement Java programs for simple applications that make use of classes, packages and interfaces.	K3
2	Develop and implement Java programs with array list, exception handling and multithreading .	K3
3	Design applications using file processing, generic programming and event handling.	K2
SEMESTER 06		
1.Course Code and Name : EE8601 Solid State Drives		
	CO Statements	**Knowledge level**
The students are able to,		
1	Ability to understand and suggest a converter for solid state drive.	K2

2	Ability to select suitability drive for the given application.	K2
3	Ability to study about the steady state operation and transient dynamics of a motor load system.	K2
4	Ability to analyze the operation of the converter/chopper fed dc drive.	K2
5	Ability to analyze the operation and performance of AC motor drives.	K2
6	Ability to analyze and design the current and speed controllers for a closed loop solid state DC motor drive.	K3
2.Course Code and Name :EE8602 Protection and Switchgear		
	CO Statements	**Knowledge level**
The students are able to,		
1	Ability to understand and analyze Electromagnetic and Static Relays.	K2
2	Ability to suggest suitability circuit breaker.	K4
3	Ability to find the causes of abnormal operating conditions of the apparatus and system.	K2
4	Ability to analyze the characteristics and functions of relays and protection schemes.	K2
5	Ability to study about the apparatus protection, static and numerical relays.	K4
6	Ability to acquire knowledge on functioning of circuit breaker.	K4
3.Course Code and Name : EE8691Embedded Systems		
	CO Statements	**Knowledge level**
The students are able to,		
1	Ability to understand and analyze Embedded systems.	K2
2	Ability to suggest an embedded system for a given application.	K1
3	Ability to suggest an embedded system for a given application.	K3
4	Ability to study about the bus Communication in processors.	K2
5	Ability to acquire knowledge on various processor scheduling algorithms.	K3

6	Ability to understand basics of Real time operating system.	K1
4.Course Code and Name : EE8002 Design of Electrical Apparatus		
	CO Statements	**Knowledge level**
The students are able to,		
1	Ability to understand basics of design considerations for rotating and static electrical machines	K4
2	Ability to design of field system for its application.	K1
3	Ability to design sing and three phase transformer.	K1
4	Ability to design armature and field of DC machines.	K3
5	Ability to design stator and rotor of induction motor.	K4
6	Ability to design and analyze synchronous machines.	K1
5.Course Code and Name :EE8006 Power Quality		
	CO Statements	**Knowledge level**
The students are able to,		
1	Ability to understand various sources, causes and effects of power quality issues, electrical systems and their measures and mitigation.	K2
2	Ability to analyze the causes & Mitigation techniques of various PQ events.	K5
3	Ability to study about the various Active & Passive power filters.	K6
4	Ability to understand the concepts about Voltage and current distortions, harmonics.	K6
5	Ability to analyze and design the passive filters.	K6
6	Ability to acquire knowledge on compensation techniques.	K5
7	Ability to acquire knowledge on DVR.	K6
6.Course Code and Name : EE8661 Power Electronics and Drives Laboratory		
	CO Statements	**Knowledge level**

The students are able to,		
1	Ability to practice and understand converter and inverter circuits and apply software for engineering problems.	K2
2	Ability to experiment about switching characteristics various switches.	K2
3	Ability to analyze about AC to DC converter circuits.	K2
4	Ability to analyze about DC to AC circuits.	K2
5	Ability to acquire knowledge on AC to AC converters	K3
6	Ability to acquire knowledge on simulation software.	K2
7.Course Code and Name : EE8681Microprocessors and Microcontrollers Laboratory		
	CO Statements	**Knowledge level**
The students are able to,		
1	Ability to understand and apply computing platform and software for engineering problems.	K4
2	Ability to programming logics for code conversion.	K4
3	Ability to acquire knowledge on A/D and D/A.	K4
4	Ability to understand basics of serial communication.	K4
5	Ability to understand and impart knowledge in DC and AC motor interfacing.	K3
6	Ability to understand basics of software simulators.	K4
8.Course Code and Name :EE8611 Mini Project		
	CO Statements	**Knowledge level**
The students are able to,		
1	On Completion of the mini project work students will be in a position to take up their final year project work and find solution by formulating proper methodology.	K4
SEMESTER 07		
1.Course Code and Name : EE8701High Voltage Engineering		

	CO Statements	Knowledge level
The students are able to,		
1	Ability to understand Transients in power system.	K2
2	Ability to understand Generation and measurement of high voltage.	K2
3	Ability to understand High voltage testing.	K2
4	Ability to understand various types of over voltages in power system.	K2
5	Ability to measure over voltages	K2
6	Ability to test power apparatus and insulation coordination	K3
2.Course Code and Name : EE8702 Power System Operation and Control		
	CO Statements	**Knowledge level**
The students are able to,		
1	Ability to understand the day-to-day operation of electric power system.	K2
2	Ability to analyze the control actions to be implemented on the system to meet the minute-to-minute variation of system demand.	K2
3	Ability to understand the significance of power system operation and control.	K2
4	Ability to acquire knowledge on real power-frequency interaction.	K2
5	Ability to understand the reactive power-voltage interaction.	K2
6	Ability to design SCADA and its application for real time operation.	K3
3.Course Code and Name : EE8703 Renewable Energy Systems		
	CO Statements	**Knowledge level**
The students are able to,		
1	Ability to create awareness about renewable Energy Sources and technologies.	K1

2	Ability to get adequate inputs on a variety of issues in harnessing renewable Energy.	K2
3	Ability to recognize current and possible future role of renewable energy sources.	K2
4	Ability to explain the various renewable energy resources and technologies and their applications.	K2
5	Ability to understand basics about biomass energy.	K2
6	Ability to acquire knowledge about solar energy .	K3
4.Course Code and Name : GE8071 Disaster Management		
	CO Statements	**Knowledge level**
The students are able to,		
1	Differentiate the types of disasters, causes and their impact on environment and society	K2
2	Assess vulnerability and various methods of risk reduction measures as well as mitigation.	K2
3	Draw the hazard and vulnerability profile of India, Scenarious in the Indian context, Disaster damage assessment and management.	K2
5.Course Code and Name : EE8010 Power Systems Transients		
	CO Statements	**Knowledge level**
The students are able to,		
1	Ability to understand and analyze switching and lightning transients.	K2
2	Ability to acquire knowledge on generation of switching transients and their control.	K2
3	Ability to analyze the mechanism of lighting strokes.	K2
4	Ability to understand the importance of propagation, reflection and refraction of travelling waves.	K2
5	Ability to find the voltage transients caused by faults.	K2
6	Ability to understand the concept of circuit breaker action, load rejection on integrated power system.	K3
6.Course Code and Name : EE8711 Power System Simulation Laboratory		

	CO Statements	Knowledge level
The students are able to,		
1	Ability to understand power system planning and operational studies.	K2
2	Ability to acquire knowledge on Formation of Bus Admittance and Impedance Matrices and Solution of Networks	K2
3	Ability to analyze the power flow using GS and NR method	K2
4	Ability to find Symmetric and Unsymmetrical fault	K2
5	Ability to understand the economic dispatch.	K2
6	Ability to analyze the electromagnetic transients.	K3
7.Course Code and Name :EE8712 Renewable Energy Systems Laboratory		
	CO Statements	**Knowledge level**
The students are able to,		
1	Ability to understand and analyze Renewable energy systems.	K1
2	Ability to train the students in Renewable Energy Sources and technologies.	K2
3	Ability to provide adequate inputs on a variety of issues in harnessing Renewable Energy.	K2
4	Ability to simulate the various Renewable energy sources.	K2
5	Ability to recognize current and possible future role of Renewable energy sources.	K3
6	Ability to understand basics of Intelligent Controllers.	K4
SEMESTER 08		
1.Course Code and Name : GE8076 Professional Ethics in Engineering		
	CO Statements	**Knowledge level**
The students are able to,		

1	Upon completion of the course, the student should be ability to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.	K1
	2.Course Code and Name :EE8018 Microcontroller Based System	
	CO Statements	**Knowledge level**
The students are able to,		
1	Ability to understand and apply computing platform and software for engineering problems.	K1
2	Ability to understand the concepts of Architecture of PIC microcontroller	K4
3	Ability to acquire knowledge on Interrupts and timers.	K2
4	Ability to understand the importance of Peripheral devices for data communication.	K4
5	Ability to understand the basics of sensor interfacing	K3
6	Ability to acquire knowledge in Architecture of ARM processors	K4
	3.Course Code and Name : EE8811 Project Work	
	CO Statements	**Knowledge level**
The students are able to,		
1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.	K3

Mahendra College of Engineering SALEM 636 106 Mahendra Salem Campus

PRINCIPAL
Mahendra College of Engineering
Mahendra Salem Campus,
Minnampalli, SALEM 636 106
TAMILNADU

2013 REGULATION

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

2013 REGULATION

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1	To prepare the students have successful career in industry and motivate for higher education.
PEO 2	To provide strong foundation in basic science and mathematics necessary to formulate, solve and analyze electrical and electronics problems
PEO 3	To provide strong foundation in circuit theory, field theory, control theory and signal processing concepts.
PEO 4	To provide good knowledge of Electrical power apparatus and their applications in power systems
PEO 5	To provide knowledge on basic electronics to power electronics and their applications in power engineering
PEO 6	To provide an opportunity to work in inter disciplinary groups
PEO 7	To promote student awareness for life long learning and inculcate professional ethics
PEO 8	To provide necessary foundation on computational platforms and software applications related to the respective field of engineering.

PROGRAM OUTCOMES (POs)

PO 1	Ability to understand and apply differential equations, integrals, matrix theory, probability theory and Laplace, Fourier and Z transformations for engineering problems
PO 2	Ability to understand and apply basic science, circuit theory, Electro-magnetic field theory control theory and apply them to electrical engineering problems.
PO 3	Ability to model and analyze electrical apparatus and their application to power system
PO 4	Ability to understand and analyze power system operation, stability, control and protection.
PO 5	Ability to handle the engineering aspects of electrical energy generation and utilization.
PO 6	Ability to understand and analyse, linear and digital electronic circuits.
PO 7	Ability to review, prepare and present technological developments
PO 8	Ability to form a group and develop or solve engineering hardware and problems
PO 9	To understand and apply computing platform and software for engineering problems.

HOME

PO 10	To understand ethical issues, environmental impact and acquire management skills.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1	Apply the fundamental knowledge of mathematics, science, electrical and electronics engineering to analyze and solve the complex problems in electrical, electronics and allied interdisciplinary areas.
PSO 2	Understand and apply core domain knowledge of electrical engineering to analyze and solve complex engineering problems of machines, control systems, electronics and power systems.
PSO 3	Create conducive environment to develop professionalism, entrepreneurial skills and leadership qualities with ethics.

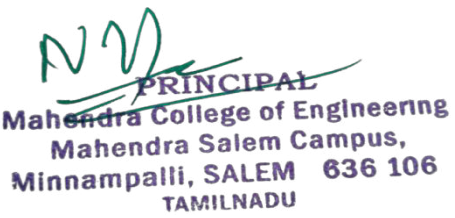
LIST OF COURSES

REGULATION 2013

SEMESTER I		
Electrical and Electronics Engineering		
S. NO.	COURSE CODE	COURSE TITLE
THEORY		
1	HS6151	Technical English - I
2	MA6151	Mathematics - I
3	PH6151	Engineering Physics - I
4	CY6151	Engineering Chemistry - I
5	GE6151	Computer Programming
6	GE6152	Engineering Graphics
PRACTICALS		
7	GE6161	Computer Practices Laboratory
8	GE6162	Engineering Practices Laboratory
9	GE6163	Physics and Chemistry Laboratory - I
SEMESTER II		
S. NO.	COURSE CODE	COURSE TITLE
THEORY		
1	HS6251	Technical English - II
2	MA6251	Mathematics - II
3	PH6251	Engineering Physics - II
4	CY6251	Engineering Chemistry - II
5	GE6251	Basic Civil and Mechanical Engineering
6	EE6201	Circuit Theory
PRACTICALS		

7	GE6262	Physics and Chemistry Laboratory - II
8	GE6263	Computer Programming Laboratory
9	EE6211	Electric Circuits Laboratory
SEMESTER III		
S. NO.	COURSE CODE	COURSE TITLE
THEORY		
1	MA6351	Transforms and Partial Differential Equations
2	EE6301	Digital Logic Circuits
3	EE6302	Electromagnetic Theory
4	GE6351	Environmental Science and Engineering
5	EC6202	Electronic Devices and Circuits
6	EE6303	Linear Integrated Circuits and Applications
PRACTICALS		
7	EC6361	Electronics Laboratory
8	EE6311	Linear and Digital Integrated Circuits Laboratory
SEMESTER IV		
S. NO.	COURSE CODE	COURSE TITLE
THEORY		
1	MA6459	Numerical Methods
2	EE6401	Electrical Machines - I
3	CS6456	Object Oriented Programming
4	EE6402	Transmission and Distribution
5	EE6403	Discrete Time Systems and Signal Processing
6	EE6404	Measurements and Instrumentation
PRACTICALS		
7	CS6461	Object Oriented Programming Laboratory
8	EE6411	Electrical Machines Laboratory - I
SEMESTER V		
S. NO.	COURSE CODE	COURSE TITLE
THEORY		
1	EE6501	Power System Analysis
2	EE6502	Microprocessors and Microcontrollers
3	ME6701	Power Plant Engineering
4	EE6503	Power Electronics
5	EE6504	Electrical Machines - II
6	IC6501	Control Systems
PRACTICALS		
7	EE6511	Control and Instrumentation Laboratory
8	GE6674	Communication and Soft Skills- Laboratory Based
9	EE6512	Electrical Machines Laboratory - II
SEMESTER VI		
S. NO.	COURSE CODE	COURSE TITLE

THEORY		
1	EC6651	Communication Engineering
2	EE6601	Solid State Drives
3	EE6602	Embedded Systems
4	EE6603	Power System Operation and Control
5	EE6604	Design of Electrical Machines
6	EE6002	Elective -I - Power System Transients
PRACTICALS		
7	EE6611	Power Electronics and Drives Laboratory
8	EE6612	Microprocessors and Microcontrollers Laboratory
9	EE6613	Presentation Skills and Technical Seminar
SEMESTER VII		
S. NO.	COURSE CODE	COURSE TITLE
THEORY		
1	EE6701	High Voltage Engineering
2	EE6702	Protection and Switchgear
3	EE6703	Special Electrical Machines
4	MG6851	Principles of Management
5	GE6081	Elective – II - Fundamentals of Nanoscience
6	EI6703	Elective – III-Fiber Optics and Laser Instrumentation
PRACTICALS		
7	EE6711	Power System Simulation Laboratory
8	EE6712	Comprehension
SEMESTER VIII		
S. NO.	COURSE CODE	COURSE TITLE
PRACTICALS		
1	EE6801	Electric Energy Generation, Utilization and Conservation
2	EE6010	Elective – IV- High Voltage Direct Current Transmission
3	GE6075	Elective – V- Professional Ethics in Engineering
PRACTICALS		
4	EE6811	Project Work



SEMESTER 01		
1.Course Code and Name : HS6151 - TECHNICAL ENGLISH I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Classify the types of listening and writing skills with acquired knowledge	K2
2	Demonstrate speaking skills in various occasions	K2
3	Compare the formal and informal writing skills by using the mail and blocks	K2
4	Apply the speaking etiquitte to build up communication proficiency	K3
5	Develop presentations with the use of LSRW skills	K3
2.Course Code and Name : MA6151 - MATHEMATICS I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Solve the Eigen values and Eigen vectors to diagonalise and reduce a matrix to quadratic form	K3
2	Identify the convergences, divergences of infinite series	K3
3	Solve evolutes and envelopes of a given curve by using radius of curvature and center of curvature	K3
4	Identify the maxima and minima value functions of two variables	K3
5	Solve area of plain curves and volume of solid using double and triple integrals	K3
3.Course Code and Name : PH6151 - ENGINEERING PHYSICS I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the basics of properties of matter and its applications	K2
2	Summarize the concepts of waves and optical devices and their applications in fiber optics	K2
3	Demonstrate the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers	K2
4	Outline the concepts of advanced physics quantum theory and its applications in tunneling microscopes	K2
5	Explain the basics of crystals, their structures and different crystal growth techniques	K2
4.Course Code and Name : CY6151 - ENGINEERING CHEMISTRY I		

	CO Statements	**Knowledge Level**
The students should be able to		
1	Classify the polymers and their utility in the industries and explain the techniques of polymerization and properties of polymers	K2
2	Relate various thermodynamic functions such as enthalpy, entropy, free energy and their importance	K2
3	Explain the photo physical processes such as fluorescence and phosphorescence and various components of UV and IR spectrophotometer	K2
4	Illustrate the phase transitions of one component and two component systems and the types of alloys and their application in industries	K2
5	Outline the synthesis, characteristics and the applications of nano materials	K2
5.Course Code and Name : GE6151- COMPUTER PROGRAMMING		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Describe the function of a Computer and problem solving techniques.	K2
2	Write simple C programs using basic constructs	K3
3	Implement applications to manage data using arrays and strings	K3
4	Apply functions and pointers for solving problems	K3
5	Develop simple applications using structure and union	K3
6.Course Code and Name : GE6152- ENGINEERING GRAPHICS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Demonstrate freehand sketching of basic geometrical constructions and multiple views of objects	K2
2	Develop orthographic projections of points, lines and plane surfaces	K3
3	Construct projections of simple solids and truncated solids	K3
4	Develop projection of sectioned solids and utilize development of surfaces	K3
5	Construct isometric and perspective projections of simple solids	K3
7.Course Code and Name : GE6161- COMPUTER PRACTICES LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply the usage of office automation tools.	K2
2	Apply good programming design methods for program development.	K3
3	Design and implement C programs for simple applications.	K3

4	Develop recursive programs.	K3
8.Course Code and Name : GE6162 - ENGINEERING PRACTICES LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Construct carpentry components and pipe connections including plumbing works	K2
2	Make use of welding equipments to join the structures	K3
3	Develop models using sheet metal work	K3
4	Illustrate the working of centrifugal pump and air conditioner	K3
5	Demonstrate basic home electrical works, measurement of the electrical quantities and soldering practices	K3
9.Course Code and Name : GE6163 - PHYSICS AND CHEMISTRY LABORATORY - I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Make use of spectrometer to find the wavelength of spectral lines, and laser	K3
2	Make use of ultrasonic interferometer and Lee's disc apparatus to find the velocity of sound, compressibility of the liquid and thermal conductivity	K3
3	Demonstrate the estimation of DO content in water sample by Winkler's method and molecular weight of polymer by Ostwald viscometer	K2
4	Experiment with the strength of an acid using pH meter and conductometer	K3
5	Demonstrate the estimation of weak and strong acids in a mixture by conductometer	K2
SEMESTER 02		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop the communication skills with proper grammar usage	K2
2	Summarize the various advanced technical and non-technical english tools	K2
3	Classify the speaking skills and expression through professional english	K2
4	Apply the interview techniques for career development	K3
5	Outline the use of writing skills to express innovatiove ideas	K3
2.Course Code and Name : MA6251 - MATHEMATICS II		
	CO Statements	**Knowledge Level**
The students should be able to		

1	Apply solenoidal, irrotational vectors and make use of the concepts of Green's, Gauss divergence , Stokes theorem to evaluate single, double and triple integrals	K3
2	Solve simultaneous linear equations and P.I. of Cauchy and Legendre Equation	K3
3	Solve Laplace Transforms of periodic functions and ODE using Inverse Laplace Transform	K3
4	Make use of the properties of analytic functions for verifying C-R equations for determination of Bilinear Transformation	K3
5	Develop the functions of two variables as Taylor's and Laurent's series and Contour integrals by using Cauchy's Integral formula	K3
3.Course Code and Name : PH6251 - ENGINEERING PHYSICS II		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the basics, properties and applications of conducting materials	K2
2	Summarize the properties of semiconducting materials and semiconductor devices.	K2
3	Explain the basics, properties and applications of the magnetic materials and super conducting material	K2
4	Illustrate the concepts, mechanisms and applications of dielectric materials	K2
5	Outline the method of synthesis and explain the properties of Nano materials, SMA, Metallic glasses and Ceramics	K2
4.Course Code and Name : CY6251 - ENGINEERING CHEMISTRY II		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the problems of using hard water in boilers and methods of treatment of water for boiler use	K2
2	Apply the design principles to electro chemical cell. Identify the types of corrosion and the methods of prevention	K3
3	Illustrate the methods of harnessing energy from non-conventional energy sources	K2
4	Classify various engineering materials and explain their importance	K2
5	Relate the significance of solid, liquid and gaseous fuels. Explain the calorific values of fuels and air requirement for combustion in furnaces	K2
5.Course Code and Name : GE6251 -Basic Civil and Mechanical Engineering		
	CO Statements	**Knowledge Level**
The students should be able to		
1	describe the Civil and Mechanical Engineering components of Projects	K1

2	explain the usage of construction material and proper selection of construction materials	K2
3	Illustrate distances and area measuring by surveying	K2
4	identify the components used in power plant cycle and to demonstrate working principles of petrol and diesel	K2
5	explain the components of refrigeration and Air conditioning cycle	K2
6.Course Code and Name : EE6201-Circuit theory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply Kirchhoff's current and voltage law to simple circuits and Solve complex circuits using Mesh & Nodal Methods.	K3
2	Apply Network theorems to solve simple and complex linear circuits.	K3
3	Solve the Series and Parallel resonance circuit, analyse the performance of single & double tuned circuits.	K3
4	Develop the Transient response of RLC circuits using Laplace Transform; explain the characteristics of two port networks.	K3
5	Explain three phase balanced and unbalanced star, delta network.	K2
7.Course Code and Name : EE6211 -Electric Circuits Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Analyse the electrical circuits using Kirchoff's law, mesh analysis and nodal analysis	K4
2	applying suitable theorems to reduce the given complex circuit to simple circuit	K3
3	Analyze transient response of RL, RC and RLC circuits.	K4
4	Simulate different forms of three phase circuits.	K4
5	Identify the type of filter and calculate the resonant frequency.	K3
8.Course Code and Name :GE6262- PHYSICS AND CHEMISTRY LABORATORY - II		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Illustrate the determination of Young’s modulus of the beam and moment of inertia and rigidity modules of thin wire Torsion pendulum	K2
2	Make use of Poiseuille's method to determine the coefficient of viscosity of	K3

	the liquid	
3	Illustrate the determination of dispersive power of a prism and the thickness of a thin wire through interference fringes using Air wedge apparatus	K2
4	Experiment with the type, amount of alkalinity, hardness in a given water sample and evaluate the Amount of copper using EDTA method	K3
5	Demonstrate titration by potentiometric redox and conduct metric precipitation methods	K2
9.Course Code and Name : GE6263 -Computer Programming Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Make use of MS office for Presentation and Visualization for preparing data	K3
2	Analyze the Problems and design using Flow-chart.	K4
3	Solve Problems using decision making and looping Statements.	K3
4	Solve problems using Arrays, Structures & Unions.	K3
5	Solve Problems using Recursive Functions	K3
SEMESTER 03		
1.Course Code and Name : EE6301-Digital Logic Circuits		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Construct combinational and sequential Circuits.	K3
2	Illustrate various number systems and simplify the logical expressions using Boolean functions	K2
3	Construct various synchronous and asynchronous circuits.	K3
4	Illustrate asynchronous sequential circuits and PLDs.	K2
5	Develop the application oriented logic circuits using digital simulation	K3
2.Course Code and Name : EE6302 ELECTROMAGNETIC THEORY		
	CO Statements	**Knowledge level**
The students are able to,		
1	Explain the basic mathematical concepts related to electromagnetic vector fields	K2
2	Explain the basic concepts about electrostatic fields, electrical potential,energy density and their applications	K2
3	Illustrate magneto static fields, magnetic flux density, vector potential and its applications	K2

4	Illustrate the different methods of emf generation and Maxwell's equations	K2
5	Explain the basic concepts electromagnetic waves and characterizing parameters	K2
3.Course Code and Name : EE6351-ENVIRONMENTAL SCIENCE AND ENGINEERING		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Illustrate the concepts of an ecosystem , energy flow and conservation of biodiversity.	K2
2	Explain the causes, effects and control of various types of pollution.	K2
3	plan for conservation of natural resources.	K2
4	Summarize the social issues of environment and legislative guidelines for disaster management.	K2
5	Relate population growth and its impact on environment and human health.	K2
4.Course Code and Name : EC6202 ELECTRONIC DEVICES AND CIRCUITS		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Explain the structure and working principle of basic electronic devices	K2
2	identify and differentiate active and passive elements	K3
3	Illustrate the characteristics of different electronic devices such as diodes and transistors	K2
4	Select the required components to construct an amplifier circuit	K3
5	Illustrate feedback amplifiers and oscillator	K2
5.Course Code and Name : EE6303-Linear Integrated Circuits and Applications		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Explain the methods of IC fabrication	K2
2	Interpret the characteristics of OP-AMP	K2
3	Identify the OP-AMP usage in electrical circuits	K3
4	Explain about special Ics	K2
5	Make use of Ics in real time application	K3
6.Course Code and Name : EC6361-Electronics Laboratory		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Demonstrate the working of linear electronic circuits.	K2

2	Apply the diode concept in rectifiers .	K3
3	Experiment with Switching devices in different configurations.	K3
4	demonstrate the working of oscillators, multi vibrator and differential amplifiers	K2
5	Illustrate the characteristics of Photo diode, phototransistor and LED.	K2
7.Course Code and Name : EE6311- Linear and Digital Integrated Circuits Laboratory		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Compare truth table for AND, OR, EXOR, NOT, NOR, NAND gates JK FF, RS FF, D Flipflop.	K2
2	demonstrate Boolean Functions, Adder/ Subtractor circuits, Code converters, Parity generator and parity ch	K2
3	demonstrate the Encoders and Decoders, Muliplexer, demultiplexer, Counters and 40bit shift registers using	K2
4	Construct the inverting and non-inverting amplifier, adder, comparator, Integrator and Differentiator using O	K3
5	Construct a timer circuit using NE555 IC.	K3
8.Course Code and Name :MA6351- TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Solve differential equations using Fourier series analysis for engineering applications.	K3
2	Utilize Dirichlet's condition for finding the Fourier series of a given function	K3
3	Apply Fourier series to solve one dimensional way, one and two dimensional heat equations.	K3
4	Solve Fourier transform for a given function and make use of them to evaluate certain definite Integrals	K3
5	Solve z transforms of standard functions and make use of use them to solve difference equations	K3
SEMESTER 04		
1.Course Code and Name : MA6459 -Numerical Methods		
	CO Statements	**Knowledge level**
The students are able to,		
1	Develop the solution of algebraic and transcentendal system of linear equations	K3
2	Make use of Newton's Formula for interpolation of the values of unknown functions	K3
3	Construct the numerical values of the derivatives and integrals of unknown function	K3

4	Solve first and second order initial value problems	K3
5	Solve Numerical boundary value problems	K3
2.Course Code and Name : EE6401-Electrical Machines - I		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Apply the basic laws in the magnetic circuits, which are the foundation for all electrical machines.	K3
2	Build the equivalent circuit of transformers at different loading condition ,thereby finding their voltage regulation and e	K3
3	Interpret the electric and magnetic field interactions in electromechanical devices and machines	K2
4	Classify the DC machines based on their type of excitation	K2
5	Identify the type of speed control of DC motor in different application	K3
3.Course Code and Name : CS6456-Object Oriented Programming		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Explain the key attributes of C++ like native types and statements and implement ADT	K2
2	Develop object oriented programs using polymorphism and data abstraction concepts.	K3
3	Design templates, construct generics and to handle exceptions	K6
4	Develop the concept of java in creating classes, objects using arrays and control statements.	K3
5	Develop packages, handle exceptions and develop multi-threaded programs.	K3
4.Course Code and Name : EE6402-Transmission and Distribution		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Explain the structure of power system and the operation of various types of power plants.	K2
2	Solve the single and double circuit to determine the transmission line parameters	K3
3	Explain the different types of insulators, cables and different distribution schemes	K2
4	Infer the voltage distribution in insulator strings and cables and methods to improve the same	K2
5	Compare the different types of distribution system.	K2
5.Course Code and Name :EE6403-Discrete Time Systems and Signal Processing		

	CO Statements	Knowledge Level
The students are able to,		
1	Classify signals and systems & their mathematical representation.	K2
2	Solve the discrete time systems, various transformation techniques & their computation	K3
3	develop different types of digital filters	K3
4	Develop programmable digital signal processor & quantization effects	K3
5	explain code optimization of high level programming language code	K2
6.Course Code and Name :EE6404-Measurements and Instrumentation		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Explain the basics of instruments and measurements	K2
2	Explain the principles of electrical and electronics instruments	K2
3	Compare the grounding techniques	K2
4	Explain the concepts of storage and display devices	K2
5	Explain about transducers and its working principles	K2
7.Course Code and Name :EE6411-Electrical Machines Laboratory - I		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Build the equivalent circuit of transformer under different loading	K3
2	Classify the DC machines based on their type of excitation	K2
3	demonstrate the speed control of DC motor using different methods	K2
4	demonstrate the load test on DC machines to determine its efficiency	K2
5	demonstrate the suitable test on static machine to predetermine its efficiency	K2
8.Course Code and Name :CS6461-object Oriented Programming Laboratory		
	CO Statements	**Knowledge Level**
The students are able to,		
1	Implement a function of symbol table in C programming language.	K3
2	Design and implement one-pass & two-pass assembler.	K2
3	Design and implement single-pass and two- pass macro processor .	K2
4	Implement and operation of linker and loader.	K2

5	Implement structure and operations of text editor.	K2
SEMESTER 05		
1.Course Code and Name : EE6501-Power System Analysis		
	CO Statements	**Knowledge level**
The students are able to,		
1	Explain various aspects of power system.	K2
2	Model the power system under steady state operating condition	K3
3	solve the power flow problem using numerical methods.	K3
4	Solve the system under faulted conditions.	K3
5	Model the transient behavior of power system when it is subjected to a fault.	K3
2.Course Code and Name : EE6502-Microprocessors and Microcontrollers		
	CO Statements	**Knowledge level**
The students are able to,		
1	Explain the architecture and the concepts of 8085 microprocessor	K2
2	develop simple assembly language programming (ALP) using 8085 microprocessor	K3
3	Explain the architecture, memory organization, data & I/O transfer and interrupt concepts of 8051 microcontroller	K2
4	compare the functions of 8085 and 8051	K2
5	apply the usage of 8051 microcontroller in real time application	K3
3.Course Code and Name :ME6701 - Power Plant Engineering		
	CO Statements	**Knowledge level**
The students are able to,		
1	Describe the layout, construction and working of the components of a thermal power plant.	K1
2	Outline the layout, construction and working of the components of a Diesel, Gas and Combined cycle power plants	K2
3	Illustrate the layout, construction and working of the components of nuclear power plants.	K2
4	Demonstrate the layout, construction and working of the components of a Renewable energy power plants	K2
5	Explain about energy, economic and environmental issuses of Power Plants	K2
4.Course Code and Name : EE6503 -Power Electronics		
	CO Statements	**Knowledge level**
The students are able to,		

1	Compare different types of power semiconductor devices and their switching characteristics.	K2
2	explain the operation, characteristics and performance parameters of controlled converters	K2
3	Explain different modulation techniques of pulse width modulated inverters.	K2
4	Explain the operation of control circuits to HVDC, UPS and tap changing transformer.	K2
5	Explain the operation, characteristics and performance parameters of DC-DC choppers	K2
5.Course Code and Name : EE6504 - Electrical Machines II		
	CO Statements	**Knowledge level**
The students are able to,		
1	Explain and Evaluate the constructional details, performance of salient and non – salient type synchronous generators and Regulation of alternator.	K5
2	Illustrate the Principle of operation and performance of synchronous motor	K2
3	Explain the construction, principle of operation and performance of induction machines.	K2
4	List the different types of starting and speed control of three phase induction motors.	K1
5	Outline the construction, principle of operation and performance of single phase induction motors and special machines.	K2
6.Course Code and Name : IC6501 - Control Systems		
	CO Statements	**Knowledge level**
The students are able to,		
1	Illustrate various modeling techniques for control system design	K2
2	Analyse the control systems using different methods	K4
3	Analyse frequency domain analysis of control systems required for stability analysis	K4
4	Analyse the compensation techniques that can be used to stabilize control systems	K4
5	analyse state variables of the system	K4
7.Course Code and Name : EE6511 - Control and Instrumentation Laboratory		
	CO Statements	**Knowledge level**
The students are able to,		
1	Apply control engineering tools using both analog and digital techniques.	K3
2	Apply Laplace transform, transfer functions, modeling RLC circuit, block diagrams for simulation and control	K3

3	Demonstrate experiments to measure system parameters	K2
4	Design a Lead, lag and lead-lag compensator.	K6
5	Analyse the signal conditioning units using MATLAB	K4
8.Course Code and Name : GE6674 - Communication and Soft Skills- Laboratory Based		
	CO Statements	**Knowledge level**
The students are able to,		
1	Demonstrate reading and writing skills	K2
2	Develop listening and speaking skills	K3
3	Make use of acquired knowledge to take up international examination such as IELTS and TOEFL	K3
4	Apply the interview techniques for career development	K3
5	Illustrate the various aspects of soft skills	K2
9.Course Code and Name : EE6512 - Electrical Machines Laboratory - II		
	CO Statements	**Knowledge level**
The students are able to,		
1	Determine the regulation of three phase alternator by EMF, MMF,ZPF and ASA methods.	K3
2	Determine the negative sequence and zero sequence impedance of alternators.	K3
3	Demonstrate the test on synchronous motor to draw V and Inverted V curves.	K2
4	demonstrate the suitable test on three phase induction motor, single phase induction motor and find the performance	K6
5	demonstrate speed control of three phase induction motor by v/f method	K4
SEMESTER 06		
	CO Statements	**Knowledge level**
The students are able to,		
1	Illustrate different methods of analog communication and their significance	K2
2	Summarize the methods of Digital Communication for high bit rate transmission	K2
3	Apply the concepts of source and line coding techniques for efficient transmission without errors	K2
4	Explain the various Multiple Access Techniques	K2
5	Outline the various media for digital communication	K2
2.Course Code and Name : EE6601 - Solid State Drives		
	CO Statements	**Knowledge**

		level
The students are able to,		
1	Classify the various types of drives and load torque characteristics and Apply the multi quadrant dynamics in	K2
2	Analyze the operation of steady state analysis of single phase and three phase fully controlled converter and	K4
3	Control of induction motor.	K2
4	Relate the operation of various modes of V/f control of synchronous motor drives and different types of per	K2
5	Motor, load and converter, closed loop control with current and speed feedback.	K6
3.Course Code and Name : EE6602 - Embedded Systems		
	CO Statements	**Knowledge level**
The students are able to,		
1	Explain building blocks of embedded systems	K2
2	describe Various Embedded Development Strategies	K1
3	Develop Bus Communication in processors, Input/output interfacing.	K3
4	Illustrate Various processor scheduling algorithms.	K2
5	describe the Basics of Real time operating system	K1
4.Course Code and Name : EE6603 - Power System Operation and Control		
	CO Statements	**Knowledge level**
The students are able to,		
1	Analyse the various load characteristics with load curve and load duration curve.	K4
2	Describe modeling of power-frequency dynamics and design power-frequency controller.	K1
3	Explain the modeling of reactive power-voltage interaction and the control actions.	K1
4	Solve economic dispatch problems and unit commitment problems in power systems.	K3
5	Explain the need of computer controls to energy management using SCADA.	K1
5.Course Code and Name : EE6604 - Design of Electrical Machines		
	CO Statements	**Knowledge level**
The students are able to,		
1	Compare Electrical Engineering materials; determine heat dissipation due to Conduction, convection and rad	K2

2	Determine the mmf for slots and teeth's, apparent flux density, main dimensions and winding details of DC ma	K5
3	Design core, yoke, winding and cooling system of transformers.	K6
4	Create the output equation of AC machines, design stator and rotor of induction machines.	K6
5	Design the stator and rotor of synchronous machines analyze their thermal behavior, design field systems for	K6
6.Course Code and Name : EE6002 - Power System Transients		
	CO Statements	**Knowledge level**
The students are able to,		
1	Explain about switching transients and its control	K2
2	Explain the lightning strokes and production of lighting surges	K2
3	Describe the propagation, reflection and refraction of travelling waves.	K1
4	Explain the concept of voltage transients caused by faults	K2
5	Illustrate the concepts of circuit breaker action, load rejection on integrated power system.	K2
7.Course Code and Name : EE6611 - Power Electronics and Drives Laboratory		
	CO Statements	**Knowledge level**
The students are able to,		
1	analyze characteristics of AC to DC fully controlled converter, half-controlled converter and choppers	K4
2	analyze characteristics of single phase and three phase IGBT PWM inverter	K4
3	Analyse characteristics of resonant converter and cycloconverter.	K4
4	Analyse characteristics of Ac voltage controller	K4
7.Course Code and Name : EE6612 - Microprocessors and Microcontrollers Laboratory		
	CO Statements	**Knowledge level**
The students are able to,		
1	develop simple assembly language programs using 8085 microprocessor.	K4
2	develop interface with 8085 with I/O and serial communication	K4
3	develop simple applications with 8051 using basic instructions, I/O programming and motor control	K4
4	analyse the integration of motors with 8085 micro controllers	K5
5	Demonstrate an experiment to interface various devices.	K4
8.Course Code and Name : EE6613 - Presentation Skills and Technical Seminar		

	CO Statements	Knowledge level
The students are able to,		
1	study advanced engineering developments	K4
2	prepare and present technical reports	K4
3	Project their ideas in smart presentation	K4
4	Develop eye contact and body language	K5
SEMESTER 07		
1.Course Code and Name : EE6701 - High Voltage Engineering		
	CO Statements	**Knowledge level**
The students are able to,		
1	explain the causes of over voltages in power systems	K2
2	infer the concept of dielectric breakdown	K2
3	explain the methods of generation of high voltage and currents	K2
4	explain the methods of measurements of high voltage and high currents	K2
5	explain about insulation coordination and high voltage testing	K2
2.Course Code and Name : EE6702 - Protection and Switchgear		
	CO Statements	**Knowledge level**
The students are able to,		
1	Describe the causes of abnormal operating conditions and the protection schemes equipped for it.	K1
2	Analyze the characteristics and functions of different types of electromagnetic relays.	K2
3	Explain the concepts of protection of apparatus used in power system.	K2
4	Illustrate the concepts of numerical protection and characteristics of static relays.	K2
5	Explain the construction and working of different types of circuit breakers.	K2
3.Course Code and Name : EE6703 - Special Electrical Machines		
	CO Statements	**Knowledge level**
The students are able to,		
1	Explain the necessity to improve the saliency of synchronous reluctance motor and its characteristics.	K2
2	Compare the various methods of excitation of different types of stepper motor and its driver circuits.	K2
3	Illustrate the operation of switched reluctance motor with and without sensors.	K2

4	Outline the electronic commutation of permanent magnet brushless D.C. motors and to determine the torque production.	K2
5	Develop the expression for emf and torque of permanent magnet synchronous motors and choose power controller for permanent magnet synchronous motors.	K3
4.Course Code and Name : EE6703 - MG6851 - Principles of Management		
	CO Statements	**Knowledge level**
The students are able to,		
1	Infer the basic of management and its types, skills, management roles, types of business organizations and current trends in business.	K2
2	Explain the nature and purpose of planning , types, objective of planning and decision process.	K2
3	Compare the different organization structures, Authorities and responsibilities, Human resource management and training and development.	K2
4	Outline the individual and group behavior, motivation, job satisfaction, types and theories of leadership, communication and IT.	K2
5	Summarize using the various System and process of controlling, budgetary and non-budgetary control techniques, use of computers and IT in	K2
5.Course Code and Name : GE6081 Fundamentals of Nano science		
	CO Statements	**Knowledge level**
The students are able to,		
1	Summarize the impacts of nanotechnology, classification and properties of nonmaterials.	K2
2	Classify the types of preparation methods of nonmaterials.	K2
3	Explain the properties, synthesis methods and applications of nano carbon and metal oxides.	K2
4	Classify the characterization techniques of nanomaterials.	K2
5	Demonstrate the applications of nanoscience and nanotechnology.	K2
6.Course Code and Name : EI6703-Fibre Optics and Laser Instrumentation		
	CO Statements	**Knowledge level**
The students are able to,		
1	Illustrate the basic concepts of optical fibres	K2
2	Summarize the industrial application of optical fibre	K2
3	Explain the basic concepts of laser	K2
4	Summarize the industrial application of laser	K2

5	Outline the industrial application of Holography and medical application of lasers	K2
7.Course Code and Name : EE6711 - Power System Simulation Laboratory		
	CO Statements	**Knowledge level**
The students are able to,		
1	Describe the Formation of Bus Admittance and Impedance Matrices and Solution of Networks	K1
2	analyze the power flow using GS and NR method	K2
3	locate Symmetric and Unsymmetrical fault	K2
4	explain the concept of economic dispatch	K2
SEMESTER 08		
1.Course Code and Name : EE6801 - Electric Energy Generation, Utilization and Conservation		
	CO Statements	**Knowledge level**
The students are able to,		
1	Name the traction motors, list the traction motor control, track equipment and collection gear.	K1
2	Summarize different light sources and design various illumination systems for the indoor lighting schemes, factory lighting, halls, outdoor lighting schemes, flood lighting, street lighting.	K2
3	Compare the different methods of electric heating and types of electric welding.	K2
4	Estimate average solar radiation and illustrate the physical principles of the conversion of solar radiation into heat.	K5
5	Analyze aerodynamic forces acting on the blade and draw basic components of a WECS.	K4
2.Course Code and Name : EE6010 - High Voltage Direct Current Transmission		
	CO Statements	**Knowledge level**
The students are able to,		
1	Describe the concept, planning of DC power transmission and comparison with AC Power transmission	K1
2	Analyze HVDC converters	K4
3	Explain about HVDC control systems	K2
4	Analyze harmonics and design of filters.	K4
5	Analyse DC system under steady state	K4
3.Course Code and Name : GE6075 Professional Ethics in Engineering		

	CO Statements	Knowledge Level
The students are able to		
1	Illustrate the principles of human values	K2
2	Demonstrate the techniques and theories of Engineering Ethics	K2
3	Explain the procedure for Engineering As Social Experimentation	K2
4	Summarize the concept of Safety, Responsibilities And Rights	K2
5	Explain the different Global Issues	K2
4.Course Code and Name : EE6811 - Project Work		
	CO Statements	**Knowledge level**
The students are able to,		
1	develop the ability to solve a specific problem right from its identification and literature review	K3
2	Solve problems by formulating proper methodology	K3
3	explain their projects and prepare the project as a reports	K2
4	design the suitable circuit model related to the project using suitable software's	K6

Mahendra College of Engineering SALEM 636 106 Mahendra Salem Campus

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TAMILNADU

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

2021 REGULATION

B.E. ELECTRONICS AND COMMUNICATION ENGINEERING – 2021 REGULATION

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)
PEO1: To provide the students with a strong foundation in the required sciences in order to pursue studies in Electronics and Communication Engineering
PEO2: To gain adequate knowledge to become good professional in electronic and communication engineering associated industries, higher education and research.
PEO3: To develop attitude in lifelong learning, applying and adapting new ideas and technologies as their field evolves.
PEO 4: To prepare students to critically analyze existing literature in an area of specialization and ethically develop innovative and research oriented methodologies to solve the problems identified.
PEO5: To inculcate in the students a professional and ethical attitude and an ability to visualize the engineering issues in a broader social context.
PROGRAM OUTCOMES (POs)
Engineering Graduates will be able to:
1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PROGRAM SPECIFIC OBJECTIVES (PSOs)
The students will demonstrate the abilities to
PEO1. To Design, develop and analyze electronic systems through application of relevant electronics, mathematics and engineering principles
PEO2. Design, develop and analyze communication systems through application of fundamentals from communication principles, signal processing, and RF
System Design & Electromagnetics.
PEO3. Adapt to emerging electronics and communication technologies and develop innovative solutions for existing and newer problems

COURSE OUTCOME STATEMENTS FOR B.E.ELECTRONICS AND COMMUNICATION ENGINEERING (2021 REGULATION)		
SEMESTER 01		
1.Course Code and Name **:HS3151 - Professional English - I**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	To listen and comprehend complex academic texts	K2
2	To read and infer the denotative and connotative meanings of technical texts	K2
3	To write definitions, descriptions, narrations and essays on various topics	K2
4	To speak fluently and accurately in formal and informal communicative contexts.	K3
5	To express their opinions effectively in both oral and written medium of communication	K3
2.Course Code and Name : **MA3151 -Matrices and Calculus**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Use the matrix algebra methods for solving practical problems..	K3
2	Apply differential calculus tools in solving various application problems	K3
3	Able to use differential calculus ideas on several variable functions.	K3
4	Apply different methods of integration in solving practical problems.	K3
5	Apply multiple integral ideas in solving areas, volumes and other practical problems.	K3
3.Course Code and Name : **PH3151 -Engineering Physics**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Understand the importance of mechanics.	K2
2	Express their knowledge in electromagnetic waves	K2
3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers	K2
4	Understand the importance of quantum physics.	K2
5	Comprehend and apply quantum mechanical principles towards the formation of energy bands	K2
4.Course Code and Name :**CY3151 -Engineering Chemistry**		
	CO Statements	**Knowledge Level**
The students should be able to		

HOME

1	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.	K2
2	To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.	K2
3	To apply the knowledge of phase rule and composites for material selection requirements.	K2
4	To recommend suitable fuels for engineering processes and applications.	K2
5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.	K2
5.Course Code and Name : **GE3151 -Problem Solving and Python Programming**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop algorithmic solutions to simple computational problems.	K2
2	Develop and execute simple Python programs.	K3
3	Write simple Python programs using conditionals and loops for solving problems.	K3
4	Decompose a Python program into functions	K3
5	Represent compound data using Python lists, tuples, dictionaries etc.	K3
6.Course Code and Name : **BS3171-PHYSICS AND CHEMISTRY LABORATORY**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Understand the functioning of various physics laboratory equipment.	K2
2	Use graphical models to analyze laboratory data.	K3
3	Use mathematical models as a medium for quantitative reasoning and describing physical reality.	K3
4	Access, process and analyze scientific information.	K3
5	Solve problems individually and collaboratively.	K3
6	To analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO.	K2
7	To determine the amount of metal ions through volumetric and spectroscopic techniques	K3
8	To analyse and determine the composition of alloys.	K3
9	To learn simple method of synthesis of nanoparticles	K3
10	To quantitatively analyse the impurities in solution by electroanalytical techniques	K3
7.Course Code and Name : **GE3171 -Problem Solving and Python Programming Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop algorithmic solutions to simple computational problems	K2
2	Develop and execute simple Python programs	K3
3	Implement programs in Python using conditionals and loops for solving problems..	K3
4	Deploy functions to decompose a Python program.	K3
5	Process compound data using Python data structures..	K3
6	Utilize Python packages in developing software applications.	K3

SEMESTER 02		
1.Course Code and Name : **HS3251-Professional English – II**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	To compare and contrast products and ideas in technical texts.	K2
2	To identify cause and effects in events, industrial processes through technical texts	K2
3	To analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format.	K2
4	To report events and the processes of technical and industrial nature.	K3
5	To present their opinions in a planned and logical manner, and draft effective resumes in context of job search.	K3
2.Course Code and Name : MA3251 -**Statistics and Numerical Methods**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply the concept of testing of hypothesis for small and large samples in real life problems	K3
2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.	K3
3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems..	K3
4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.	K3
5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	K3

3.Course Code and Name : **PH3254 -Physics for Electronics Engineering**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Know basics of crystallography and its importance for varied materials properties.	K2
2	Gain knowledge on the electrical and magnetic properties of materials and their applicationstypes of semiconductors.	K2
3	Understand clearly of semiconductor physics and functioning of semiconductor devices	K2
4	Understand the optical properties of materials and working principles of various optical devices	K2
5	Appreciate the importance of nanotechnology and nanodevices.	K2

4.Course Code and Name : **BE3254 -Electrical and Instrumentation Engineering**		
	CO Statements	**Knowledge Level**

The students should be able to		
1	Explain the working principle of electrical machines	K2
2	Analyze the output characterizes of electrical machines	K3
3	Choose the appropriate electrical machines for various applications	K2
4	Explain the types and operating principles of measuring instruments	K2
5	Explain the basic power system structure and protection schemes	K2

5.Course Code and Name :**GE3251 -Engineering Graphics**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Use BIS conventions and specifications for engineering drawing.	K2
2	Construct the conic curves, involutes and cycloid	K3
3	Solve practical problems involving projection of lines.	K5
4	Draw the orthographic, isometric and perspective projections of simple solids.	K2
5	Draw the development of simple solids.	K6

6.Course Code and Name :**EC3251-Circuit Analysis**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply the basic concepts of circuit analysis such as Kirchoff's laws, mesh current and node voltage method for analysis of DC and AC circuits	K4
2	Apply suitable network theorems and analyze AC and DC circuits	K3
3	Analyze steady state response of any R, L and C circuits	K4
4	Analyze the transient response for any RC, RL and RLC circuits and frequency response of parallel and series resonance circuits.	K4
5	Analyze the coupled circuits and network topologies	K4

7.Course Code and Name : **GE3271-Engineering Practices Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.	K2
2	Wire various electrical joints in common household electrical wire work.	K2
3	Weld various joints in steel plates using arc welding work; Machine various simple processeslike turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.	K2
4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.	K4

8.Course Code and Name: **EC3271 -Circuits Analysis Laboratory**		
1	Design RL and RC circuits.	K2
2	Verify Thevinin & Norton theorem KVL & KCL, and Super Position Theorems.	K2

SEMESTER 03		
1.Course Code and Name : **MA3355-RANDOM PROCESSES AND LINEAR ALGEBRA**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.	K3
2	Demonstrate accurate and efficient use of advanced algebraic techniques	K3
3	Apply the concept of random processes in engineering disciplines.	K3
4	Understand the fundamental concepts of probability with a thorough knowledge of standard distributions that can describe certain real-life phenomenon.	K3
5	Understand the basic concepts of one and two dimensional random variables and apply them to model engineering problems.	K3

2.Course Code and Name : **CS3353-C PROGRAMMING AND DATA STRUCTURES**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop C programs for any real world/technical application.	K2
2	Apply advanced features of C in solving problems	K2
3	Write functions to implement linear and non–linear data structure operations.	K2
4	Suggest and use appropriate linear/non–linear data structure operations for solving a given problem	K2
5	Appropriately use sort and search algorithms for a given application	K2
6	Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval.	K2

3.Course Code and Name : **EC3354-SIGNALS AND SYSTEMS**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Determine if a given system is linear/causal/stable	K2
2	Determine the frequency components present in a deterministic signal	K3
3	Characterize continuous LTI systems in the time domain and frequency domain	K6
4	Characterize continuous LTI systems in the time domain and frequency domain	K3
5	Compute the output of an LTI system in the time and frequency domains	K2

4.Course Code and Name : **EC3353-ELECTRONIC DEVICES AND CIRCUITS**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the structure and working operation of basic electronic devices	K2
2	Design and analyze amplifiers.	K3
3	Analyze frequency response of BJT and MOSFET amplifiers	K2
4	Design and analyze feedback amplifiers and oscillator principles.	K2
5	Design and analyze power amplifiers and supply circuits	K2

5.Course Code and Name **: EC3351 CONTROL SYSTEMS**		
	CO Statements	**Knowledge Level**

HOME

The students should be able to		
1	Compute the transfer function of different physical systems	K3
2	Analyse the time domain specification and calculate the steady state error	K3
3	Illustrate the frequency response characteristics of open loop and closed loop system response.	K3
4	Analyse the stability using Routh and root locus techniques.	K3
5	Illustrate the state space model of a physical system and discuss the concepts of sampled data control system.	K3

6.Course Code and Name **: EC3352-DIGITAL SYSTEMS DESIGN**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Use Boolean algebra and simplification procedures relevant to digital logic.	K3
2	Design various combinational digital circuits using logic gates	K3
3	Analyse and design synchronous sequential circuits.	K3
4	Analyse and design asynchronous sequential circuits.	K3
5	Build logic gates and use programmable devices	K3

7.Course Code and Name : **EC3361-ELECTRONIC DEVICES AND CIRCUITS LABORATORY**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Characteristics of PN Junction Diode and Zener diode.	K4
2	Design and Testing of BJT and MOSFET amplifiers.	K4
3	Operation of power amplifiers.	K4

8.Course Code and Name : **CS3362-C PROGRAMMING AND DATA STRUCTURES LABORATORY**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Use different constructs of C and develop applications	K2
2	Write functions to implement linear and non-linear data structure operations.	K2
3	Suggest and use the appropriate linear / non-linear data structure operations for a given problem.	K3
4	Apply appropriate hash functions that result in a collision free scenario for data storage and Retrieval.	K3
5	Implement Sorting and searching algorithms for a given application	K3

SEMESTER 04		
1.Course Code and Name : **EC3452-ELECTROMAGNETIC FIELDS**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Relate the fundamentals of vector, coordinate system to electromagnetic concepts.	K2
2	Analyze the characteristics of Electrostatic field	K2

HOME

3	Interpret the concepts of Electric field in material space and solve the boundary conditions	K3
4	Explain the concepts and characteristics of Magneto Static field in material space and solve boundary conditions.	K3
5	Determine the significance of time varying fields	K4

2.Course Code and Name : **EC3401-NETWORKS AND SECURITY**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the Network Models, layers and functions	K3
2	Categorize and classify the routing protocols.	K3
3	List the functions of the transport and application layer.	K4
4	Evaluate and choose the network security mechanisms.	K3
5	Discuss the hardware security attacks and countermeasures	K2

3.Course Code and Name **: EC3451-LINEAR INTEGRATED CIRCUITS**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Design linear and nonlinear applications of OP – AMPS	K2
2	Design applications using analog multiplier and PLL	K3
3	Design ADC and DAC using OP – AMPS.	K3
4	Generate waveforms using OP – AMP Circuits	K3
5	Analyze special function ICs	K2

4.Course Code and Name : **EC3492-DIGITAL SIGNAL PROCESSING**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply DFT for the analysis of digital signals and systems	K3
2	Design IIR and FIR filters.	K3
3	Characterize the effects of finite precision representation on digital filters.	K2
4	Design multirate filters	K2
5	Apply adaptive filters appropriately in communication systems	K4

5.Course Code and Name : **EC3491-COMMUNICATION SYSTEMS**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Gain knowledge in amplitude modulation techniques.	K2
2	Understand the concepts of Random Process to the design of communication systems.	K3
3	Gain knowledge in digital techniques	K3
4	Gain knowledge in sampling and quantization	K3
5	Understand the importance of demodulation techniques	K1

6.Course Code and Name : **GE3451-Environmental Science and Engineering**		
	CO Statements	**Knowledge Level**
The students should be able to		

1	Summarize the importance of environment, biodiversity, ecosystem and how to solve environmental related problems.	K2
2	Describe the causes, effect and control measures of air pollution, water pollution, soil pollution, noise pollution, radioactive pollution and thermal pollution with their relevant case studies.	K2
3	Discuss the various renewable and non-renewable resources and energy conservation processes.	K2
4	Explain the social issues and solutions for sustainable environment with relevant Acts and case studies.	K2
5	Review the impact of human population in the environment and its remedial measures.	K2

7.Course Code and Name : **EC3461 -COMMUNICATION SYSTEMS LABORATORY**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Design AM, FM & Digital Modulators for specific applications.	K2
2	Compute the sampling frequency for digital modulation.	K2
3	Simulate & validate the various functional modules of Communication system	K2
4	Demonstrate their knowledge in base band signaling schemes through implementation of digital modulation schemes.	K2
5	Apply various channel coding schemes & demonstrate their capabilities towards the improvement of the noise performance of Communication system.	K2

8.Course Code and Name : **EC3462-Linear Integrated Circuits Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Analyze various types of feedback amplifiers	K2
2	Design oscillators, tuned amplifiers, wave-shaping circuits and multivibrators	K2
3	Design and simulate feedback amplifiers,oscillators, tuned amplifiers, waveshaping circuits and multivibrators, filters using SPICE Tool.	K2
4	Design amplifiers, oscillators, D-A converters using operational amplifiers.	K2
5	Design filters using op-amp and perform an experiment on frequency response.	K2

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2017 REGULATION

COURSE OUTCOME STATEMENTS FOR B.E.ELECTRONICS AND COMMUNICATION ENGINEERING (2017 REGULATION)

SEMESTER 01

1.Course Code and Name : **HS8151- Communicative English**

	CO Statements	Knowledge Level
The students should be able to		
1	Communicate clearly both in the written form and orally using appropriate vocabulary and comprehend written texts to make inferences.	K2
2	Speak persuasively in different social contexts and write biographical details and technical documents cohesively, coherently and flawlessly using appropriatewords.	K2
3	Speak, read and write effectively for a variety of professional and social settings.	K2
4	Read descriptive, narrative, expository and interpretive texts and write using creative, critical, analytical and evaluative methods.	K3
5	Listen, comprehend and respond to different spoken and written discourses/excerpts in different accents and write different genres of textsadopting various writing strategies.	K3

2.Course Code and Name : **MA8151-Engineering Mathematics - I**

	CO Statements	Knowledge Level
The students should be able to		
1	Use both the limit definition and rules of differentiation to differentiate functions.	K3
2	Apply differentiation to solve maxima and minima problems.	K3
3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus, also evaluate integrals using techniques of integration, suchas substitution, partial fractions and integration by parts, in addition to determine convergence/divergence of improper integrals and evaluate convergent improperintegrals.	K3
4	Apply integration to compute multiple integrals, area, volume, integrals in polarcoordinates, in addition to change of order and change of variables.	K3
5	Apply various techniques in solving differential equations.	K3

3.Course Code and Name : **PH8151-Engineering Physics**

	CO Statements	Knowledge Level
The students should be able to		
1	Analyze the elastic nature of materials and be able to choose the materials depending upon the modulus of elasticity for different applications.	K2
2	Illustrate the advantages of optical communication using LASER.	K2
3	Explain the conducting properties of solids, liquids, good thermal conductor andbad thermal conductors	K2

HOME

4	Apply the knowledge of quantum mechanics and classical mechanics inaddressing the problems related to science and technology	K2
5	Describe the crystal structures, crystal defects and various crystal growthtechniques.	K2
4.Course Code and Name : **CY8151-Engineering Chemistry**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Describe the importance of water technology in the purification of water and its domestic and industrial applications.	K2
2	Illustrate the concept of absorption in surface chemistry and catalysis and itsapplications.	K2
3	Review use of the phase rule in identifying its application in metallurgy andmanufacture of alloys.	K2
4	Compare the different types of industrial techniques of petroleum processing and the determination of caloric values and combustion parameters.	K2
5	Explain the fundamentals of different alternative source of energy, the generationprocess and batteries.	K2
5.Course Code and Name : **GE8151-Problem Solving and Python Programming**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop algorithmic solutions to simple computational problems.	K2
2	Read, write and execute simple python programs.	K3
3	Apply control, looping structures and functions to solve problems.	K3
4	Represent compound data using python lists, tuples, and dictionaries.	K3
5	Read and Write data from/to files in python programs.	K3
6.Course Code and Name : **GE8152-Engineering Graphics**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Familiarize with the fundamentals and standards of Engineering graphics	K2
2	Perform freehand sketching of basic geometrical constructions and multiple viewsof objects.	K3
3	Project orthographic projections of lines and plane surfaces.	K3
4	Draw projections and section of solids and development of surfaces.	K3
5	Visualize and to project isometric and perspective sections of simple solids.	K3
7.Course Code and Name : **GE8161 -Problem Solving and Python Programming Laboratory**		
	CO Statements	**Knowledge Level**

The students should be able to		
1	Write, test, and debug simple Python programs.	K2
2	Implement Python programs with conditionals and loops.	K3
3	Develop Python programs step-wise by defining functions and calling them.	K3
4	Demonstrate the use Python lists, tuples, and dictionaries for representingcompound data.	K3
5	Illustrate the concepts of read and write data from/to files in Python.	K3
8.Course Code and Name : **BS8161- Physics and Chemistry Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Test materials by using their knowledge of applied physics principles in optics and properties of matter.	K2
2	Perform the quantitative chemical analysis of chloride, dissolved oxygen, hardness, alkalinity and copper ions by titration methods.	K3
3	Demonstrate basic concepts in the determination of acids, sodium, potassium andiron by the instrumental methods of analysis.	K3
SEMESTER 02		
1.Course Code and Name : **HS8251- Technical English**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Read technical texts and write area specific texts effortlessly.	K2
2	Listen and comprehend lectures and talks in their areas of specialization and writeeffectively for a variety of professional and social settings.	K2
3	Speak and write appropriately and effectively in varied formal and informalcontexts.	K2
4	Write effectively and persuasively and produce different types of writing such asletters, minutes, reports and winning job applications.	K3
5	Communicate clearly using technical vocabulary in their professionalcorrespondences.	K3
2.Course Code and Name : **MA8251 Engineering Mathematics - II**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Compute the Eigenvalues and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.	K3
2	Find Gradient, divergence and curl of a vector point function and related identities, Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.	K3
3	Solve problems on Analytic functions and conformal mapping.	K3

4	Evaluate complex integrals.	K3
5	Find Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constantcoefficients.	K3
3.Course Code and Name : **PH8253-Physics for Electronics Engineering**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the properties of conducting materials using classical and quantum concepts.	K2
2	Apply the fundamental knowledge about the semiconductors and able todifferentiate different types of semiconductors.	K2
3	Explain the properties of Magnetic, Dielectric materials and devices for modernday to day applications.	K2
4	Explain the properties and applications of Optical materials and devices.	K2
5	Apply the knowledge about the nano-electronic materials and devices for various applications.	K2
4.Course Code and Name : **BE8254- Basic Electrical and Instrumentation Engineering**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the operation of three phase electrical circuits and power system.	K2
2	Determine the regulation and efficiency of transformers.	K3
3	Describe the characteristics of DC Generator and Motor.	K2
4	Analyze the performance of AC and DC machines.	K2
5	Apply the concepts of measurements and instruments for real time applications.	K2
5.Course Code and Name : **EC8251-Circuit Analysis**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Determine current and voltage in circuits using Ohm's Law, Kirchhoff's laws, mesh current method, node voltage method and network topology.	K2
2	Apply the Network theorems to the analysis of AC and DC circuits.	K3
3	Calculate the response of the series and parallel resonance circuits, coupledcircuits and tune circuits.	K5
4	Solve first and second order AC and DC circuits for steady-state and transient response in the time domain using Laplace transforms.	K2
5	Understand the concept of two port network, its various parameters andsymmetrical	K6
6.Course Code and Name : **EC8252- Electronic Devices**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the structure, operations and characteristics of PN Junction diode.	K4

2	Describe the basic geometry, operation and various configuration of BipolarJunction Transistor.	K3
3	Analyze the operation of various Field Effect Transistors.	K4
4	Describe the operations of Special Semiconductor Devices.	K4
5	Explain the basic concepts of Power and Display devices.	K4
7.Course Code and Name : **EC8261- Circuits and Devices Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Analyze the characteristics of basic electronic devices.	K5
2	Determine the transient response of RL and RC circuits.	K3
3	Perform Kirchoff's Current Law and Kirchoff's Voltage Law..	K5
4	Verify Thevinin, Norton, Superposition, Maximum Power Transfer andReciprocity Theorems.	K5
5	Determine the Resonant frequency of RLC circuits.	K4
8.Course Code and Name : **GE8261-Engineering Practices Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Construct carpentry components and pipe connections including plumbing works.	K2
2	Use welding equipment's to join the structures	K2
3	Illustrate the basic machining operations	K2
4	Construct the models using sheet metal works	K4
5	Describe centrifugal pump, Air conditioner, operations of smithy, foundry andfittings.	K4
6	Construct the basic Electrical and Electronics circuits.	K2
7	Examine the different types of electronic circuits and components.	K2
8	Explain the electrical safety rules, grounding, general house wiring.	K2
9	Perform soldering in various electronic circuits.	K4
10	Illustrate the basic operation of domestic electrical appliances	K2
SEMESTER 03		
1.Course Code and Name : **MA8352-Linear Algebra and Partial Differential Equations**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts, to demonstrate accurate and efficient use of advanced algebraic techniques and to demonstrate their	K3
	mastery by solving non - trivial problems related to the concepts and by proving	

	simple theorems about the statements proven by the text on the topic Vector Spaces.	
2	Explain the fundamental concepts of advanced algebra and their role in modernmathematics and applied contexts, to demonstrate accurate and efficient use of advanced algebraic techniques and to demonstrate their mastery by solving non - trivial problems related to the concepts and by proving simple theorems about thestatements proven by the text on the topic Linear Transformationand Diagonalization.	K3
3	Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts, to demonstrate accurate and efficient use of advanced algebraic techniques and to demonstrate their mastery by solving non - trivial problems related to the concepts and by proving simple theorems about the statements proven by the text on the topic Inner Product Spaces.	K3
4	Solve various types of partial differential equations.	K3
5	Solve engineering problems using Fourier series.	K3
2.Course Code and Name : **EC8393-Fundamentals of Data Structures In C**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop the programs in C using basic constructs.	K2
2	Develop the programs in C using function, pointers, structures and unions.	K2
3	Suggest and Implement appropriate linear data structure operations for any given data set in C.	K2
4	Suggest and Implement appropriate non-linear data structure operations for a given application in C.	K2
5	Appropriately choose the sorting algorithms and also apply hashing concepts for a given problem.	K2
3.Course Code and Name : **EC8351-Electronic Circuits-I**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Design the various biasing circuits of BJT, JFET and MOSFET.	K2
2	Analyze the small signal equivalent and design BJT amplifier circuits.	K3
3	Analyze the small signal equivalent and design JFET and MOSFET amplifiercircuits.	K6
4	Plot the frequency response of all amplifiers.	K3
5	Design the regulated power supply, troubleshoot and analyze the faults in powersupplies.	K2
4.Course Code and Name : **EC8352-Signals and Systems**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Analyze the various properties of signals and systems.	K2

2	Apply Laplace transform and Fourier transform in signal analysis.	K3
3	Analyze linear time invariant continuous time systems using Laplace and FourierTransforms.	K2
4	Analyze discrete time signals using Z transform and DTFT.	K2
5	Interpret the linear time invariant discrete time systems using Z transform andDTFT.	K2
5.Course Code and Name : **EC8392 Digital Electronics**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply the concepts of digital electronics in the present contemporary world.	K3
2	Design and implement various combinational digital circuits using logic gates.	K3
3	Analysis and design synchronous sequential circuits.	K3
4	Design and implement asynchronous sequential circuits.	K3
5	Apply the concepts of memory devices and programmable logic devices inIntegrated Circuits	K3
6.Course Code and Name : **EC8391 Control Systems Engineering**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Perform modeling of control system using various techniques.	K3
2	Obtain the time response and steady state error of control systems.	K3
3	Design various compensators and to analyse the frequency response of the systemusing various plots.	K3
4	Determine the stability of control systems.	K3
5	Analyse and obtain state space model using state variables.	K3
7.Course Code and Name : **EC8381-Fundamentals of Data Structures in C Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop C programs for simple applications making use of basic constructs.	K4
2	Apply basic data structures for a given problem using C.	K4
3	Implement linear and non-linear data structures using C.	K4
4	Implement functions and recursive functions in C.	K2
5	Choose appropriate searching, sorting and hashing algorithm for an applicationand implement it in a modularized way.	K5
8.Course Code and Name : **EC8361-Analog and Digital Circuits Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Plot the frequency response of CE, CB, CC & CS amplifiers.	K2
2	Measure CMRR in differential amplifier.	K2

3	Analyze the limitation in bandwidth of single stage and multistage amplifiers.	K3
4	Simulate the amplifiers using SPICE tool.	K3
5	Design and implement combinational and sequential logic circuits.	K3
9.Course Code and Name : **HS8381 Interpersonal Skills/Listening & Speaking**		
1	Speak effectively on various academic topics and respond to questions.	K2
2	Converse effectively with the use of conversation starters and discourse markers.	K2
3	Listen and respond to various academic dialogues and discussions.	K3
4	Participate confidently and appropriately in informal and formal conversationsand group discussions.	K3
5	Use a range of presentation tools like PPT, Videos, and Charts etc. to make anengaging presentation.	K2
SEMESTER 04		
1.Course Code and Name : **MA8451-Probability and Random Processes**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.	K2
2	Illustrate the basic concepts of one and two dimensional random variables and apply in engineering	K2
3	Apply the concept random processes in engineering disciplines.	K3
4	Apply the concept of correlation and spectral densities.	K3
5	Analyze the response of random inputs to linear time invariant systems.	K4
2.Course Code and Name : **EC8452-Electronic Circuits II**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Analyze the concepts of Feedback Amplifiers in various applications	K3
2	Design different types of Oscillator at different frequencies.	K3
3	Analyze the performance of Tuned amplifiers	K4
4	Design Pulse circuits and Multivibrators	K3
5	Apply the various design techniques to analyze Power Amplifiers and DCconvertors	K2
3.Course Code and Name : **EC8491-Communication Theory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Analyze the various modulation techniques used for communication.	K2

2	Elaborate the angle modulation and demodulation techniques.	K3
3	Apply the concepts of Random Process.	K3
4	Analyze the noise performance of AM and FM systems.	K3
5	Design applications using the various types of sampling and quantization	K2
4.Course Code and Name : **EC8451-Electromagnetic Fields**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply the basic mathematical concepts of vector analysis.	K3
2	Describe the laws associated to static electric field and the properties of conductors and dielectrics.	K3
3	Analyze the field potentials due to static magnetic fields and explain howmaterials affect electric and magnetic fields.	K2
4	Analyze the relation between the fields under time varying situations and applyMaxwell's equations to electric and magnetic fields.	K2
5	Explain electromagnetic wave propagation in lossy and in lossless media.	K4
5.Course Code and Name : **EC8453-Linear Integrated Circuits**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Design linear and non-linear applications of op-amps.	K2
2	Design applications using Analog multipliers and PLL.	K3
3	Design ADC and DAC using op-amps.	K3
4	Design waveform Generators using op-amps.	K3
5	Analyze special function ICs.	K1
6.Course Code and Name : **GE8291 Environmental Science and Engineering**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Summarize the importance of environment, biodiversity, ecosystem and how to solve environmental related problems.	K2
2	Describe the causes, effect and control measures of air pollution, water pollution, soil pollution, noise pollution, radioactive pollution and thermal pollution with their relevant case studies.	K2
3	Discuss the various renewable and non-renewable resources and energyconservation processes.	K2
4	Explain the social issues and solutions for sustainable environment with relevantActs and case studies.	K2
5	Review the impact of human population in the environment and its remedialmeasures.	K2
7.Course Code and Name :**EC8461 Circuits Design and Simulation Laboratory**		
	CO Statements	**Knowledge Level**

The students should be able to		
1	Differentiate feedback amplifiers with oscillators	K2
2	Calculate the frequency response & the output impedance for various types offeedback amplifiers	K2
3	Design different types of RC, LC oscillators and tuned amplifiers.	K2
4	Analyze the various types of wave-shaping circuits and multivibrators.	K2
5	Simulate oscillators, tuned amplifiers and power amplifiers using SPICE tool	K2
8.Course Code and Name : **EC8462- Linear Integrated Circuits Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Analyze the basics of linear integrated circuits and available ICs.	K2
2	Design the oscillators, amplifiers and filters using operational amplifiers.	K2
3	Analyze and implement the frequency multiplier using PLL.	K2
4	Design DC power supply using ICs.	K2
5	Analyze the performance of filters, Multivibrators, A/D converters and analogmultiplier using SPICE.	K2
SEMESTER 05		
1.Course Code and Name : **EC8501-Digital Communication**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Design applications using the various source coding techniques.	K1
2	Interpret the various waveform coding schemes and their representation.	K2
3	Analyze the various baseband transmission schemes.	K3
4	Develop applications using the various band pass signalling schemes.	K4
5	Apply the basic concepts of channel coding techniques.	K6
2.Course Code and Name : **EC8553-Discrete Time Signal Processing**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply DFT for the analysis of digital signals & systems.	K3
2	Design Infinite Impulse response (IIR) digital filters.	K3
3	Design Finite Impulse response (FIR) digital filters.	K2
4	Analyze the finite Word length effects in digital filters.	K2
5	Explain the functionalities and architecture of DSP processors.	K2
3.Course Code and Name : **EC8552-Computer Architecture and Organization**		
	CO Statements	**Knowledge**

		Level
The students should be able to		
1	Analyze the performance of the computer system and understand the different instructions formats in MIPS architecture	K2
2	Illustrate the internals of arithmetic and logic units for fixed point and floating point operations.	K2
3	Describe the purposes of data path and control path, pipeline for execution of instructions and its hazards.	K3
4	Explain the various memory organizations with its performances, internal communications methodologies for I/O devices.	K3
5	Interpret the various parallel processing architectures, principles and their challenges.	K4
4.Course Code and Name : **EC8551-Communication Networks**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Describe the concepts of the network fundamentals and different layers.	K2
2	Identify the components required to build different types of networks and internetworking protocols.	K2
3	Apply the concept of various protocols in routing and multicasting.	K2
4	Explain the flow of information from one node to another in the networks.	K2
5	Analyze the operations of various application layer protocols such as WWW, HTTP, and DNS.	K2
5.Course Code and Name : OMD551 -Basic of Biomedical Instrumentation		
	CO Statements	**Knowledge Level**
The students should be able to		
1	To study about the different bio potential and its propagation	K2
2	To understand the different types of electrodes and its placement for various recording	K2
3	To study the design of bio amplifier for various physiological recording	K3
4	To learn the different measurement techniques for non-physiological parameters	K3
5	To familiarize the different biochemical measurements.	K2
6.Course Code and Name : GE8077 -Total Quality Management		
	CO Statements	**Knowledge Level**
The students should be able to		
1	The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.	K3
2	Describe the dimensional barrier regarding Quality.	K2
3	Demonstrate the tools utilization for quality improvement.	K5
4	Analyze the various types of techniques are used to measure quality.	K3
5	Apply the various quality systems in implementation of Total quality management	K3
7.Course Code and Name : **EC8562 Digital Signal Processing Laboratory**		

	CO Statements	Knowledge Level
The students should be able to		
1	Generate various signals using MATLAB and DSP processor	K4
2	Implement Linear and circular convolution programs and Frequency Analysisusing DFT in MATLAB	K4
3	Implement Auto correlation and Cross Correlation using MATLAB	K2
4	Design FIR and IIR Filters using MATLAB and DSP Processor	K3
5	Analyze the architecture of a DSP Processor and to implement Up-sampling and Down-sampling operation in DSP Processor	K3
8.Course Code and Name : **EC8561 Communication Systems Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Analyze the effects of sampling and TDM	K6
2	Design AM & FM modulation and demodulation	K6
3	Implement Pulse Code Modulation and Delta Modulation	K6
4	Implement the signal constellations of Digital Modulation schemes	K6
5	Implement various Error control coding schemes	K2
9.Course Code and Name : **EC8563 Communication Networks Laboratory**		
	CO Statements	**Knowledge Level**
1	Perform client-server communication between two desktop computers using Socket Programming.	K6
2	Implement the different protocols.	K6
3	Simulate various network topologies like Star, Bus and Ring.	K6
4	Implement and compare the different routing algorithms.	K6
5	Simulate the algorithms with the help of Network Simulator tool.	K2
SEMESTER 06		
1.Course Code and Name : **EC8691-Microprocessors and Microcontrollers**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Describe the architecture of microprocessor 8086 and execute programs based on 8086 microprocessor.	K2
2	Explain about design aspects of I/O and Memory Interfacing circuits.	K2
3	Interface 8086 microprocessors with supporting chips.	K2
4	Describe the architecture of microcontroller 8051.	K2
5	Implement 8051 microcontroller based systems.	K2

2.Course Code and Name : **EC8095-VLSI Design**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Realize the concepts of digital building blocks using MOS transistor.	K3
2	Design combinational MOS circuits and power strategies.	K3
3	Design and construct Sequential Circuits and Timing systems.	K5
4	Design arithmetic building blocks and memory subsystems.	K2
5	Apply and implement FPGA design flow and testing.	K2
3.Course Code and Name : **EC8652-Wireless Communications**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Elaborate the characteristics of a wireless channel and evolve the system design specifications	K3
2	Apply the various cellular concepts like frequency reuse, channel assignments, handoff strategies etc., in mobile communication.	K1
3	Analyze the performance of various digital signalling schemes of fading channels.	K3
4	Apply the multipath mitigation techniques based on the application.	K4
5	Implement the concept of transmit/receive diversity in MIMO systems.	K3
4.Course Code and Name : **MG8591-Principles of Management**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Discuss the evolution of management, functions and roles of managers.	K3
2	Explain the different types of planning process and tools used for planning.	K3
3	Elaborate different organization structures and functions of human resource manager.	K3
4	Interpret the concepts in motivation techniques, leadership and communication processes	K3
5	Describe the control techniques and the role of technology in management.	K3
5.Course Code and Name : **EC8651-Transmission Lines and RF Systems**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Analyze the various types of transmission lines and the losses associated.	K2
2	Analyze different parameters and constraints in high frequency transmission ofinformation.	K4
3	Analyze impedance matching by stubs using smith charts.	K3
4	Analyze the characteristics of TE and TM waves in Guided systems.	K5
5	Design a RF transceiver system for wireless communication.	K3

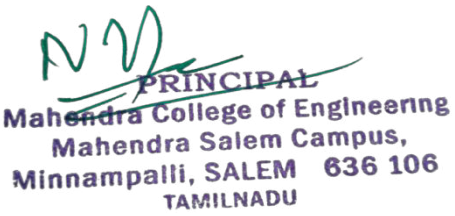
6.Course Code and Name : **EC8004-Wireless Networks**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Analyze different standards used for Wireless LAN.	K2
2	Apply the concepts of Network Layer protocols used for Mobile Applications.	K2
3	Apply the suitable network depending on the availability and requirement.	K2
4	Implement different type of applications for smart phones and mobile deviceswith latest network strategies.	K5
5	Converse with the latest 3G/4G and WiMAX networks and its architecture.	K2
7.Course Code and Name : **EC8681 Microprocessors and Microcontrollers Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Write ALP programmes for arithmetic operation, logical operations and data movement using 8086 microprocessor instructions.	K2
2	Implement ALP programmes for code conversion, decimal arithmetic and matrix operations using 8086 instructions.	K2
3	Generate result for floating point operations, string manipulations, sorting, Searching, Password checking, Print RAM size, System Date, Counters and TimeDelay using 8086 microprocessor and MASM software.	K2
4	Design 8086/8051 based systems using peripherals and interfaces.	K2
5	Calculate outputs for arithmetic operation, logical operation, square of a number and cube of a number using 8051 microcontroller/MASAM software.	K2
8.Course Code and Name : **EC8661-VLSI Design Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Write HDL code for basic as well as advanced digital integrated circuits.	K2
2	Synthesize, Place and Route the digital circuits.	K2
3	Import the logic modules in to FPGA boards.	K2
4	Design, Simulate and Extract the layouts of the digital circuits using EDAplatforms.	K6
5	Design and Simulate the analog circuits using EDA platforms.	K6
9.Course Code and Name : **EC8611-Technical Seminar**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the significance of learning recent advancement in electrical and electronics engineering discipline.	K2
2	Review and prepare the State-of-art technologies in the present technological developments.	K2
3	Organize the presentation using the concepts of ordering and determining the	K2

	central, main and supporting	
4	Present any topic in any recent advancement with good communicative skill infront of peers and faculty members.	K6
5	Perform well in placement recruitment drive with good technical skills and communication skills.	K6
SEMESTER 07		
1.Course Code and Name : **EC8701-Antennas and Microwave Engineering**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Analyze the basic antenna parameters and link power budget.	K4
2	Describe the design and radiation mechanism of various types of antennas.	K4
3	Explain about the various kinds of antenna arrays.	K2
4	Explain the basic concept of various microwave devices	K1
5	Design a microwave system for the given application.	K6
2.Course Code and Name : **EC8751-Optical Communication**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply the fundamental concept of optical fiber modes and their configurations.	K3
2	Analyze the various signal degradation factors associated with optical fiber.	K1
3	Explain the Various optical sources and optical detectors and their use in the optical communication system.	K6
4	Apply the techniques required to measure the optical fiber systems based on the applications.	K6
5	Analyze the Digital Transmission and its associated parameters on system performance	K2
3.Course Code and Name : **EC8791-Embedded and Real Time Systems**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the fundamental concepts of designing and the computing required for Embedded Systems.	K4
2	Describe the architecture and programming of ARM processor.	K3
3	Apply the programming concepts in embedded system.	K3
4	Analyze the techniques required for creating Real Time Embedded Systems.	K3
5	Apply the concepts of scheduling in Real Time Operating System and creating the model for Real Time applications	K4
4.Course Code and Name : **EC8702-Adhoc and Wireless Sensor Networks**		
	CO Statements	**Knowledge Level**

The students should be able to		
1	Explain the Basics of Adhoc networks and Wireless Sensor Networks	K4
2	Apply suitable routing algorithm based on network and user requirement	K4
3	Identify appropriate physical and MAC Layer protocols	K2
4	Describe the transport layer and security issues possible in wireless sensor networks	K1
5	Apply sensor network platforms and tools for various applications.	K2
5.Course Code and Name : OME75- Supply Chain Management		
	CO Statements	**Knowledge Level**
The students should be able to		
1	The student would understand the framework and scope of supply chain networks and functions	K2
2	Apply knowledge to evaluate and manage an effective supply chain.	K2
3	Understand the foundational role of logistics as it relates to transportation and warehousing.	K5
4	How to align the management of a supply chain with corporate goals and strategies	K3
5	Analyze and improve supply chain processes	K4
6.Course Code and Name :		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Illustrate the embedded design process and also well know about architecture and programming of ARM	K2
2	Design and analysis for hardware and software computing platforms	K6
3	Create their basic kmowledge in real time operating system for designing various multirate systems	K6
4	Illustrate the various protocols for designing nettwork architecture for embedded design	K2
5	Design a embedded system for various real time applications using basic concepts of computing.	K6
7.Course Code and Name : **EC8711 Embedded Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Write programs in ARM for a specific Application.	K2
2	Interface memory with ARM processor and write a program related to memory operations.	K6
3	Interface A/D and D/A convertors with ARM system.	K6
4	Analyze the performance of interrupt.	K2
5	Write programs for interfacing keyboard, display, motor and sensor.	K6

8.Course Code and Name : **EC8761 Advanced Communication Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Analyze the performance of simple optical link by measurement of losses	K2
2	Analyze the mode characteristics of fiber, eye pattern and the impact on BER	K6
3	Estimate the wireless channel characteristics and analyze the performance of wireless communication system	K6
4	Understand the intricacies in microwave system design and analyze the characteristics of Directional Couplers, Isolators, Circulators	K2
5	Understand the characteristics of Gunn diode and Microwave IC filter	K6
SEMESTER 08		
1.Course Code and Name : **EC8094 Satellite Communication**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Determine the azimuth and elevation angles and visibility of a geostationary satellite from an earth station	K6
2	Explain the concept of signal propagation of space segment components and create link budgets for an uplink and a downlink	K2
3	Analyze the effect of rain attenuation in a satellite link and the availability of the link based on geographic location of the earth terminals.	K6
4	Design satellite communication system to carry voice, video or data signals using analog or digital modulation.	K6
5	Analyze the various types of satellite services according to its applications.	K6
2.Course Code and Name : **EC8093-Digital Image Processing**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Know and understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms.	K2
2	Operate on images using the techniques of smoothing, sharpening and enhancement.	K5
3	Understand the restoration concepts and filtering techniques	K3
4	Learn the basics of segmentation, features extraction, compression	K4
5	Learn the basics of recognition methods for color models.	K2
3.Course Code and Name : **EC8811 Project Work**		
	CO Statements	**Knowledge Level**
The students should be able to		

1	Apply the fundamental knowledge and skills, which are acquired within the technical area, to a given problem	K2
2	???? Identify and summarize an appropriate list of literature review, analyze previous researchers work and relate them to the project ? Within given constraints, even with limited information, the students will be able to independently analyze and discuss complex inquiries/problems and handle larger problems on the advanced level within the technical area.	K3
3	???? Design engineering solutions to complex problems in a systematic approach. ???? Identify and apply appropriate parameters, assumptions and design criteria in consideration of health and safety (example: the use of codes of practice),ethics, economics, environment, sustainability	K3
4	Apply research and conduct experiments, as well as to analyze and interpret data that yield the results and answer important applicable research questions.	K4
5	Utilize technology tools for communication, collaboration, information management, and decision support.	K2



2013 regulation

COURSE OUTCOME STATEMENTS FOR B.E.ELECTRONICS AND COMMUNICATION ENGINEERING (2013 REGULATION)		
SEMESTER 01		
1.Course Code and Name : HS6151 - TECHNICAL ENGLISH I		
	CO Statements	Knowledge Level
1	Classify the types of listening and writing skills with acquired knowledge	K2
2	Demonstrate speaking skills in various occasions	K2
3	Compare the formal and informal writing skills by using the mail and blocks	K2
4	Apply the speaking etiquitte to build up communication proficiency	K3
5	Develop presentations with the use of LSRW skills	K3
2.Course Code and Name : MA6151 - MATHEMATICS I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Solve the Eigen values and Eigen vectors to diagonalise and reduce a matrix to quadratic form	K3
2	Identify the convergences, divergences of infinite series	K3
3	Solve evolutes and envelopes of a given curve by using radius of curvature and center of curvature	K3
4	Identify the maxima and minima value functions of two variables	K3
5	Solve area of plain curves and volume of solid using double and triple integrals	K3
3.Course Code and Name : PH6151 - ENGINEERING PHYSICS I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the basics of properties of matter and its applications	K2
2	Summarize the concepts of waves and optical devices and their applications in fiber optics	K2
3	Demonstrate the concepts of thermal properties of materials and their applications in expansion joints and heat	K2
4	Outline the concepts of advanced physics quantum theory and its applications in tunneling microscopes	K2
5	Explain the basics of crystals, their structures and different crystal growth techniques	K2
4.Course Code and Name : CY6151 - ENGINEERING CHEMISTRY I		
	CO Statements	**Knowledge Level**
The students should be able to		

1	Classify the polymers and their utility in the industries and explain the techniques of polymerization and	K2
2	Relate various thermodynamic functions such as enthalpy, entropy, free energy and their importance	K2
3	Explain the photo physical processes such as fluorescence and phosphorescence and various components of	K2
4	Illustrate the phase transitions of one component and two component systems and the types of alloys and their	K2
5	Outline the synthesis, characteristics and the applications of nano materials	K2
5.Course Code and Name : GE6151- COMPUTER PROGRAMMING		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Describe the function of a Computer and problem solving techniques.	K2
2	Write simple C programs using basic constructs	K3
3	Implement applications to manage data using arrays and strings	K3
4	Apply functions and pointers for solving problems	K3
5	Develop simple applications using structure and union	K3
6.Course Code and Name : GE6152- ENGINEERING GRAPHICS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Demonstrate freehand sketching of basic geometrical constructions and multiple views of objects	K2
2	Develop orthographic projections of points, lines and plane surfaces	K3
3	Construct projections of simple solids and truncated solids	K3
4	Develop projection of sectioned solids and utilize development of surfaces	K3
5	Construct isometric and perspective projections of simple solids	K3
7.Course Code and Name : GE6161- COMPUTER PRACTICES LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply the usage of office automation tools.	K2
2	Apply good programming design methods for program development.	K3
3	Design and implement C programs for simple applications.	K3

4	Develop recursive programs.	K3
8.Course Code and Name : GE6162 - ENGINEERING PRACTICES LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Construct carpentry components and pipe connections including plumbing works	K2
2	Make use of welding equipments to join the structures	K3
3	Develop models using sheet metal work	K3
4	Illustrate the working of centrifugal pump and air conditioner	K3
5	Demonstrate basic home electrical works, measurement of the electrical quantities and soldering practices	K3
9.Course Code and Name : GE6163 - PHYSICS AND CHEMISTRY LABORATORY - I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Make use of spectrometer to find the wavelength of spectral lines, and laser	K3
2	Make use of ultrasonic interferometer and Lee's disc apparatus to find the velocity of sound, compressibility	K3
3	Demonstrate the estimation of DO content in water sample by Winkler's method and molecular weight of	K2
4	Experiment with the strength of an acid using pH meter and conductometer	K3
5	Demonstrate the estimation of weak and strong acids in a mixture by conductometer	K2
SEMESTER 02		
1.Course Code and Name : HS6251 - TECHNICAL ENGLISH II		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop the communication skills with proper grammar usage	K2
2	Summarize the various advanced technical and non-technical english tools	K2
3	Classify the speaking skills and expression through professional english	K2
4	Apply the interview techniques for career development	K3
5	Outline the use of writing skills to express innovatiove	K3

	ideas	
2.Course Code and Name : MA6251 - MATHEMATICS II		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply solenoidal, irrotational vectors and make use of the concepts of Green's, Gauss divergence , Stokes theorem to evaluate single, double and triple integrals	K3
2	Solve simultaneous linear equations and P.I. of Cauchy and Legendre Equation	K3
3	Solve Laplace Transforms of periodic functions and ODE using Inverse Laplace Transform	K3
4	Make use of the properties of analytic functions for verifying C-R equations for determination of Bilinear	K3
5	Develop the functions of two variables as Taylor's and Laurent's series and Contour integrals by using	K3
3.Course Code and Name : PH6251 - ENGINEERING PHYSICS II		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the basics, properties and applications of conducting materials	K2
2	Summarize the properties of semiconducting materials and semiconductor devices.	K2
3	Explain the basics, properties and applications of the magnetic materials and super conducting material	K2
4	Illustrate the concepts, mechanisms and applications of dielectric materials	K2
5	Outline the method of synthesis and explain the properties of Nano materials, SMA, Metallic glasses and	K2
4.Course Code and Name : CY6251 - ENGINEERING CHEMISTRY I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the problems of using hard water in boilers and methods of treatment of water for boiler use	K2
2	Apply the design principles to electro chemical cell. Identify the types of corrosion and the methods of	K3
3	Illustrate the methods of harnessing energy from non-conventional energy sources	K2
4	Classify various engineering materials and explain their importance	K2
5	Relate the significance of solid, liquid and gaseous fuels. Explain the calorific values of fuels and air	K2

5.Course Code and Name : EC6201 Electronic Devices		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Describe the current voltage characteristics of semiconductor devices,	K2
2	Model the basic operations of Transistor	K3
3	Measure the Gain and Frequency response of Amplifier	K5
4	Develop the different power amplifier circuits, their design and use in electronics and communication circuits.	K2
5	Design the different oscillator circuits for various frequencies	K6
6.Course Code and Name : EE6201 - Circuit Theory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Examine the electrical circuits	K4
2	Apply circuit theorems	K3
3	Analyze AC and DC Circuits	K4
4	Analyze coupled circuits and the transient response of circuits	K4
5	Analyze Phasor diagrams and analysis of three phase circuits	K4
7.Course Code and Name : GE6262 - Physics and Chemistry Laboratory - II		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Appraise the Young's modulus of the beam by uniform and non-uniform bending method, the moment of inetria and regidity modules for thin wire Torsion pendulum	K5
2	Make use Poiseuille's method for determining the coefficient of viscous city of the liquid	K3
3	Evaluate the refractive index of spectral lines for determining the dispersive power of a prism and the thickness of a thin wire through interference fringers using Air wedge apparatus.	K5
4	Determine the type, amount of alkalinity, hardness in a given water sample and evaluate the amount of copper	K5
5	Examine the potentiometric redox titration and conductometric precipitation titration	K4
8.Course Code and Name :EC6211 - Circuits and Devices Laboratory		

	CO Statements	Knowledge Level
The students should be able to		
1	Describe the characteristics of basic electronic devices	K2
2	Demonstrate the RL and RC circuits	K2
3	Demonstrate the Thevinin & Norton theorem	K2
4	Test for KVL & KCL, and Super Position Theorems	K4
5	Test for maximum power transfer & reciprocity theorems	K4

SEMESTER 03

1.Course Code and Name : MA6351 - Transforms and Partial Differential Equations		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Solve differential equations using Fourier series analysis for engineering applications.	K3
2	Utilize Dirichlet's condition for finding the Fourier series of a given function	K3
3	Apply Fourier series to solve one dimensional way, one and two dimensional heat equations.	K3
4	Solve Fourier transform for a given function and make use of them to evaluate certain definite Integrals	K3
5	Solve z transforms of standard functions and make use of use them to solve difference equations	K3
2.Course Code and Name : EE6352 - Electrical Engineering and Instrumentation		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Expalin the three phase supply and power measurement	K2
2	Interpret the concepts in electrical generators, motors and transformers	K2
3	Demonstrate the basic measurement and instrumentation based devices.	K2
4	Summarize the digital instruments in measurements	K2
5	Exaplain the power generation, transmission and distribution concepts	K2
3.Course Code and Name : EC6301 - Object Oriented Programming and Data Structures		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the concepts of Object oriented programming.	K2
2	Develop a simple applications program using C++	K3

3	Discuss the different methods of organizing large amount of data	K6
4	Demonstrate the linear and non-linear data structures	K3
5	Develop a simple applications of linear and non-linear data structures	K2
4.Course Code and Name : EC6302 - Digital Electronics		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Demonstrate the concept of Boolean algebra and show the correlation between Boolean expressions	K2
2	Construct different methods used for simplification of Boolean expressions	K3
3	Interpret and implement Combinational circuits.	K2
4	Illustrate synchronous and asynchronous sequential circuits	K2
5	Develop a simple HDL codes for the circuits	K2
5.Course Code and Name : EC6303- Signals and Systems		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Make use of the properties of signals & systems	K3
2	Apply Laplace transform, Fourier transform, Z transform and DTFT in signal analysis	K3
3	Build the continuous time LTI systems using Fourier and Laplace Transforms	K3
4	Build discrete time LTI systems using Z transform and DTFT	K3
5	Apply the transforms in designing the systems	K3
6.Course Code and Name : EC6304 - Electronic Circuits-I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Model the circuits with transistor biasing	K3
2	Construct simple amplifier circuits	K3
3	Construct the small signal equivalent circuits of transistors	K3
4	Model the amplifiers with active loads	K3
5	Develop large signal amplifiers	K3
7.Course Code and Name : EC6311- Analog and Digital Circuits Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Distinguish cascade and cascade amplifier	K4

2	Analyze the limitation in bandwidth of single stage amplifier	K4
3	Analyze the limitation in bandwidth of multi stage amplifier	K4
4	Develop and Simulate amplifiers using Spice	K2
5	Measure CMRR in differential amplifier	K5
8.Course Code and Name : EC6312 - OOPS and Data Structures Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop and implement C++ programs for manipulating stacks and queues	K2
2	Develop and implement C++ programs for manipulating linked lists, trees, and graphs	K2
3	Apply different data structures in programs	K3
4	Apply good programming design methods for program development.	K3
5	Apply the different data structures for implementing solutions to practical problems	K3
SEMESTER 04		
1.Course Code and Name : MA6451- Probability and Random Processes		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.	K2
2	Illustrate the basic concepts of one and two dimensional random variables and apply in engineering	K2
3	Apply the concept random processes in engineering disciplines.	K3
4	apply the concept of correlation and spectral densities.	K3
5	analyze the response of random inputs to linear time invariant systems.	K4
2.Course Code and Name : EC6401- Electronic Circuits II		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Model the feedback amplifiers	K3
2	Illustrate about the frequency stability of Oscillators	K3

3	Analyze performance of tuned amplifiers	K4
4	Construct about Multivibrator Circuits	K3
5	Explain about the Wave Shaping and Blocking Oscillator	K2

3.Course Code and Name : EC6402 Communication Theory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain AM communication systems	K2
2	Construct an Angle modulated communication systems	K3
3	Apply the concepts of Random Process to the design of Communication systems	K3
4	Model the noise performance of AM and FM systems	K3
5	Explain the limits set by Information Theory	K2

4.Course Code and Name : EC6404 Linear Integrated Circuits		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Model linear and non linear applications of op – amps	K3
2	construct applications using analog multiplier and PLL	K3
3	Develop ADC and DAC using op – amps	K2
4	Develop waveforms using op – amp circuits	K2
5	Analyze special function ICs.	K4

5.Course Code and Name : EC6405 Control System Engineering		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the elements of control system and their modeling using various Techniques	K2
2	Build time domain analysis of control systems required for stability analysis	K3
3	Build frequency domain analysis of control systems required for stability analysis	K3
4	Construct the compensation technique that can be used to stabilize control systems	K3
5	Find the state variable analysis methods	K1

6.Course Code and Name : EC6403 Electromagnetic Fields		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Illustrate the basic mathematical concepts related to electromagnetic vector fields	K2

2	Explain the potential,energy density and their applications	K2
3	acquire the knowledge in magneto static fields, magnetic flux density, vector potential and its applications	K2
4	Distinguish the different methods of emf generation and Maxwell's equations	K4
5	Suimmarize the basic concepts electromagnetic waves and characterizing parameters	K2
7.Course Code and Name : EC6411 Circuit and Simulation Integrated Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Analyze various types of feedback amplifiers	K4
2	Design and Analyze Oscillator and Tuned Amplifier	K6
3	Design and Analyze Wave-shaping circuits	K6
4	Model the different Multivibrator circuits	K3
5	Design and simulate feedback amplifiers, oscillators, tuned amplifiers, wave-shaping circuits and	K6
8.Course Code and Name : EC6412 Linear Integrated Circuit Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Design oscillators and amplifiers using operational amplifiers	K6
2	Design filters using Opamp and perform experiment on frequency response.	K6
3	Analyse the working of PLL and use PLL as frequency multiplier.	K4
4	Design DC power supply using ICs	K6
5	Analyse the performance of oscillators and multivibrators using SPICE	K4
9.Course Code and Name : EE6461 Electrical Engineering and Control System Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop experiments to study the load characteristics of DC motors / generators	K2
2	Design bridge network circuit to measure the values of passive component	K6
3	Analyse the stability of linear system through simulation software.	K2
4	Develop experimens to transfer function of DC generators.	K3
5	Understand the behavior of linear system through	K3

	simulation	

SEMESTER 05		
1.Course Code and Name : EC6501 Digital Communication		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Illustrate the principles of Sampling and Quantization.	K1
2	Explain base band transmission schemes	K2
3	Construct and implement band pass signaling schemes	K3
4	Analyze the spectral characteristics of band pass signaling schemes and their noise performance.	K4
5	Design an Error control coding scheme	K6
2.Course Code and Name : EC6502 Principles of Digital Signal Processing		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Interpret the transformation of discrete data between time and frequency domains and also apply mathematical tool for accelerating calculations in signal processing applications	K2
2	Construct IIR filtering for undesired signal and learn the frequency response characteristics of IIR filter	K3
3	Construct FIR filtering for undesired signal and know the linear phase response characteristics of FIR filter	K3
4	Classify the concept of quantization and also analyze how its affect in digital filters	K2
5	Explain various approach for changing the sampling rate of a digital signal is to convert it back into analog	K2
3.Course Code and Name : EC6503 Transmission Lines and Wave Guides		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the propagation of signal through Transmission Lines	K2
2	Illustrate the concept of the design of high frequency transmission lines	K2
3	Construct high frequency components and systems with proper matching	K3
4	Construct and implement the different types of filters for high frequency application	K3
5	Analyze the propagation of waves in waveguides and	K4

	resonators	
4.Course Code and Name : GE6351 Environmental Science and Engineering		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Illustrate the concepts of an ecosystem , energy flow and conservation of biodiversity.	K2
2	Explain the causes, effects and control of various types of pollution.	K2
3	Outline the conservation of natural resources.	K2
4	Summarize the social issues of environment and legislative guidelines for disaster management.	K2
5	Relate population growth and its impact on environment and human health.	K2
5.Course Code and Name : EC6504 Microprocessor and Microcontroller		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Constuct ALP on 8086 microprocessor.	K2
2	Construct I/O circuits	K2
3	Develop Memory Interfacing circuits.	K3
4	Develop 8051 microcontroller based systems	K3
5	Explain the architecture and instruction set of ARM microcontroller	K2
6.Course Code and Name : EC6511 Digital Signal Processing Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop various types of continuous signal and discrete signal.	K3
2	Demonstrate their abilities towards DSP processor based implementation of DSP system.	K2
3	Analyze a continuous and discrete signals using FFT algorithm.	K4
4	Analyze Finite word length effect on DSP systems.	K4
5	Construct an adaptive filters for various applications of DSP.	K3
7.Course Code and Name : EC6512 Communication System Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Distinguish various modulation and demodulation techniques	K4

2	Analyze and demonstrate a good background in analyzing the block diagram of communication system.	K4
3	Illustrate how the mathematical concepts bend the analog communication process	K2
4	Construct with formulate the frequency modulation and angle modulation signals	K3
5	Interpret with differentiate types of transmitters and receivers used for particular application. system.	K3
8.Course Code and Name :EC6513 Microprocessor and Microcontroller Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop an ALP for fixed and Floating Point and Arithmetic	K6
2	Develop an ALP for Interface different I/Os with processor	K6
3	Develop an ALP to Generate waveforms using Microprocessors	K6
4	Develop an ALP using 8051 microcontroller	K6
5	Explain the difference between simulator and Emulator	K2
SEMESTER 06		
1.Course Code and Name : MG6851 Principles of Management		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Illustrate the principle of managerial function planning and organizing	K2
2	Summarise the managerial function staffing and leading	K2
3	Illustrate the principle of managerial function directing	K2
4	Outline the managerial function controlling	K2
5	Interpret the knowledge on international aspect of management	K2
2.Course Code and Name : CS6303 Computer Architecture		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Model arithmetic and logic unit	K3
2	Construct and anlayse pipelined control units	K3
3	Evaluate performance of memory systems	K5

4	Illustrate parallel processing architectures	K2
5	Interpret the different ways of communication with I/O devices and standard I/O interfaces	K2
3.Course Code and Name : CS6551 Computer Networks		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Identify the components required to build different types of networks	K3
2	Choose the required functionality at each layer for given application	K1
3	Identify solution for each functionality at each layer	K3
4	Examine the flow of information from one node to another node in the network	K4
5	Apply the flow control and congestion control algorithms	K3
4.Course Code and Name : EC6601 VLSI Design		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the basics of CMOS circuits and the CMOS process technology.	K2
2	Construct and analysis of combinational logic circuits.	K3
3	Develop and analysis of sequential logic circuits.	K3
4	Construct and realization of adder circuits and multipliers.	K3
5	Model and Implementation of Full custom and Semicustom ICs.	K3
5.Course Code and Name : EC6602 Antenna and Wave propagation		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Illustrate the various types of antennas and wave propagation	K2
2	Analyze the antenna arrays, aperture antennas and special antennas such as frequency independent and broad	K4
3	Make use of the radio wave propagation in sky	K3
4	Evaluate the ionospheric and tropospheric wave propagation	K5
5	Identify the radiation pattern from a current element	K3
6.Course Code and Name : EC6001 Medical Electronics		
	CO Statements	**Knowledge Level**

The students should be able to		
1	Illustrate the various physiological parameters both electrical and non electrical parametres	K2
2	Explain the methods of recording and also the method of transmitting the parameters	K2
3	Discuss the application of electronics in diagnostic and therapeutic area.	K2
4	Measure biochemical and various physiological information	K5
5	Explain the working of units which will help to restore normal functioning	K2
7.Course Code and Name : EC6611 Computer Networks Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop a program to Communicate between two desktop computers	K2
2	Develop a program to Implement the different protocols	K2
3	Develop a program using sockets	K2
4	Develop a program to Implement and compare the various routing algorithms	K2
5	Develop a program for simulation tool.	K2
8.Course Code and Name : EC6612 VLSI Design Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop the HDL code for basic as well as advanced digital integrated circuits.	K2
2	Develop the logic modules into FPGA Boards.	K2
3	Perform the Synthesization, Place and Route the digital IPs.	K2
4	Design, Simulate and Extract the layouts of Analog IC Blocks using EDA tools.	K6
5	Design and Simulate the modern chip manufacturing software tools.	K6
9.Course Code and Name : GE6674 Communication and Soft Skills - Laboratory Based		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Demonstrate reading and writing skills	K2
2	Develop listening and speaking skills	K3

3	Make use of acquired knowledge to take up international examination such as IELTS and TOEFL	K3
4	Apply the interview techniques for career development	K3
5	Illustrate the various aspects of soft skills	K2

SEMESTER 07		
1.Course Code and Name : EC6004 Satellite Communication		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Analyze the Satellite orbits.	K4
2	Analyze the Space segment and Satellite link design	K4
3	Explain about Earth segment and System noise	K2
4	Tell about various Multiple Access Techniques	K1
5	Design various satellite applications	K6
2.Course Code and Name : EC6008 Web Technology		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop a basic idea about Java Fundamentals	K3
2	Relate about the fundamental Java networking technologies	K1
3	Design their own web services using the client concepts	K6
4	Design their own web services using the server concepts	K6
5	Explain the techniques involved to support real-time Software development	K2
3.Course Code and Name : EC6016 Opto Electronic Devices		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Distinguish the solid state physics	K4
2	Model display devices	K3
3	Construct optoelectronic detection devices and modulators	K3
4	Constuct optoelectronic integrated circuits	K3
5	Analyze and choose the desired device for their applications	K4
4.Course Code and Name : EC6701 RF and Microwave Engineering		

	CO Statements	Knowledge Level
The students should be able to		
1	Analyze the different low frequency parameters and S parameters and describe the RF component basics	K4
2	Analyze the amplifiers by means of stability, noise figures and study of various matching networks.	K4
3	Explain the operation of passive and active microwave devices	K2
4	Define about the working principle of various microwave tubes and the limitations of conventional tubes	K1
5	Compare the principle of operation of measuring instruments and various microwave measuring procedures	K2
5.Course Code and Name : EC6702 Optical Communication and Networks		
	CO Statements	Knowledge Level
The students should be able to		
1	Illustrate the basic elements of optical fiber transmission link and modes of configuration.	K2
2	Illustrate the various signal degradation factors associated with optical fiber	K2
3	Conclude the knowledge on optical sources and optical detectors	K5
4	Model transmitter and receiver of optical fiber sources.	K3
5	Analyze the digital transmission and its associated parameters on system performance	K4
6.Course Code and Name : EC6703 Embedded and Real Time Systems		
	CO Statements	Knowledge Level
The students should be able to		
1	Illustrate the embedded design process and also well know about architecture and programming of ARM	K2
2	Design and analysis for hardware and software computing platforms	K6
3	Create their basic kmowledge in real time operating system for designing various multirate systems	K6
4	Illustrate the various protocols for designing nettwork architecture for embedded design	K2
5	Design a embedded system for various real time applications using basic concepts of computing.	K6
7.Course Code and Name : EC6711 Embedded Laboratory		
	CO Statements	Knowledge Level
The students should be able to		
1	Develop an ALP in ARM for a specific Application using	K6

	embedded-C	
2	Develop an ALP to Interface memory, A/D and D/A convertors with ARM system	K6
3	Analyze the performance of interrupt	K4
4	Develop an ALP for interfacing keyboard, display, motor and sensor.	K6
5	design a mini project using embedded system.	K6
8.Course Code and Name : EC6712 Optical and Microwave Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Analyze the performance of simple optical link	K4
2	Test microwave components	K6
3	Analyse the mode characteristics of fiber	K4
4	Analyse the radiation of pattern of antenna	K4
5	Measure the various parameters of Numerical Aperture,Connector and Bending loss	K5
SEMESTER 08		
1.Course Code and Name : EC6801 Wireless Communication		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Classify the characteristic of wireless channel	K2
2	Summarize the various cellular architectures	K2
3	Demonstrate the concepts behind various digital signaling schemes for fading channels	K2
4	Illustrate the various multipath mitigation techniques	K2
5	Model the various multiple antenna systems	K3
2.Course Code and Name : EC6802 Wireless Networks		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Contrast with the latest 3G/4G networks	K4
2	Illustrate the WiMAX networks and its architecture	K2
3	Apply wireless network environment for any application using latest wireless protocols and standards	K3
4	Distinguish applications for smart phones and mobile devices with latest network strategies	K4
5	Classify the evolution of 4G Networks, its architecture and applications	K2

3.Course Code and Name : GE6075 Professional Ethics in Engineering		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Illustrate the principles of human values	K2
2	Demonstrate the techniques and theories of Engineering Ethics	K2
3	Explain the procedure for Engineering As Social Experimentation	K2
4	Summarize the concept of Safety, Responsibilities And Rights	K2
5	Explain the different Global Issues	K2

4.Course Code and Name : GE6757 Total Quality Management		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop an understanding of quality management philosophies and Framework.	K3
2	Discuss the need of customer expectations, employee involvement and Supplier partnership.	K6
3	Analyze the TQM tools and Techniques to improve the product and process Quality.	K4
4	Apply modern tools to improve quality of the product.	K3
5	Explain an ISO 9001, Environmental Management Standards and ISO 14001 Certification process.	K2

5.Course Code and Name : EC6811 Project Work		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Demonstrate a sound technical knowledge of their selected project topic.	K2
2	Estimate the problem identification, formulation and solution.	K6
3	Design engineering solutions to complex problems and Conduct an engineering project	K6
4	Construct a group Communicate with engineers and the community at large in written an oral forms.	K6
5	Demonstrate the knowledge, skills and attitudes of a professional engineer.	K2

Mahendra College of Engineering SALEM 636 106 Mahendra Salem Campus

PRINCIPAL
Mahendra College of Engineering
Mahendra Salem Campus,
Minnampalli, SALEM 636 106
TAMILNADU

DEPARTMENT OF INFORMATION TECHNOLOGY

2021 REGULATION

DEPARTMENT OF INFORMATION TECHNOLOGY

2021 REGULATION

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1	Demonstrate technical competence with analytical and critical thinking to understand and meet the diversified requirements of industry, academia and research.
PEO 2	Exhibit technical leadership, team skills and entrepreneurship skills to provide business solutions to real world problems.
PEO 3	Work in multi-disciplinary industries with social and environmental responsibility, work ethics and adaptability to address complex engineering and social problems.
PEO 4	Pursue lifelong learning, use cutting edge technologies and involve in applied research to design optimal solutions.

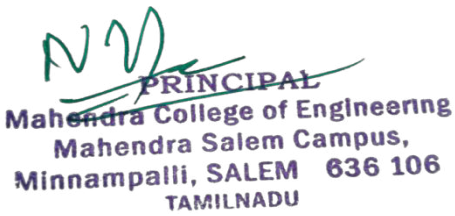
PROGRAM OUTCOMES (POs)

PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

The students will demonstrate the abilities
PSO1: Have proficiency in programming skills to design, develop and apply appropriate techniques, to solve complex engineering problems.
PSO2: Have knowledge to build, automate and manage business solutions using cutting edge technologies.
PSO3: Have excitement towards research in applied computer technologies.



LIST OF COURSES

REGULATION 2021

INFORMATION TECHNOLOGY		
SEMESTER I		
S. NO.	**COURSE CODE**	**COURSE TITLE**
1	IP3151	Induction Programme
THEORY		
2	HS3152	Professional English - I
3	MA3151	Matrices and Calculus
4	PH3151	Engineering Physics
5	CY3151	Engineering Chemistry
6	GE3151	Problem Solving and Python Programming
7	GE3152	Heritage of Tamils
PRACTICALS		
8	GE3171	Problem Solving and Python Programming Laboratory
9	BS3171	Physics and Chemistry Laboratory
10	GE3172	English Laboratory
SEMESTER II		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	HS3252	Professional English - II
2	MA3251	Statistics and Numerical Methods
3	PH3256	Physics for Information Science
4	BE3251	Basic Electrical and Electronics Engineering
5	GE3251	Engineering Graphics
6	CS3251	Programming in C
7	GE3252	Tamils and Technology
8	NCC Credit Course Level 1#	
PRACTICALS		
9	GE3271	Engineering Practices Laboratory
10	CS3271	Programming in C Laboratory
11	GE3272	Communication Laboratory / Foreign Language
SEMESTER III		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	MA3354	Discrete Mathematics

HOME

2	CS3351	Digital Principles and Computer Organization
3	CS3352	Foundations of Data Science
4	CD3291	Data Structures and Algorithms
5	CS3391	Object Oriented Programming
PRACTICALS		
6	CD3281	Data Structures and Algorithms Laboratory
7	CS3381	Object Oriented Programming Laboratory
8	CS3361	Data Science Laboratory
9	GE3361	Professional Development
SEMESTER IV		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	CS3452	Theory of Computation
2	CS3491	Artificial Intelligence and Machine Learning
3	CS3492	Database Management Systems
4	CS3401	Algorithms
5	CS3451	Introduction to Operating Systems
6	GE3451	Environmental Sciences and Sustainability
7		NCC Credit Course Level 2[#]
PRACTICALS		
8	CS3461	Operating Systems Laboratory
9	CS3481	Database Management Systems Laboratory
SEMESTER V		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	CS3591	Computer Networks
2	I T3501	Full Stack Web Development
3	CS3551	Distributed Computing
4	CS3691	Embedded Systems and IoT
5	CCS339	Cryptocurrency and Blockchain Technologies
6	CCS366	Software Testing and Automation
PRACTICALS		
1	IT3511	Full Stack Web Development Laboratory
SEMESTER VI		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	CCS356	Object Oriented Software Engineering
2	OMA351	Graph Theory
3	CCS335	Cloud computing

4	CCS334	Big Data Analytics
5	CCS363	Social NetworkSecurity
6	CCS342	DevOps
7	MX3086	History of Science and Technology in India
8	NCC Credit Course Level 3#	
PRACTICALS		
9	IT3681	Mobile Applications Development Laboratory
SEMESTER VII		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	G E3791	Human Values and Ethics
2	GE3752	Total Quality Management
3	OIE352	Resource ManagementTechniques
4	OIM351	Industrial Management
5	OAI351	Urban Agriculture
PRACTICALS		
6	IT3711	Summer internship
SEMESTER VIII		
S. NO.	**COURSE CODE**	**COURSE TITLE**
PRACTICALS		
1	IT3811	Project Work/Internship

COURSE OUTCOME FOR INFORMATION TECHNOLOGY- 2021 REGULATIONS

DEGREE	**U.G**
PROGRAMME	**B.TECH- INFORMATION TECHNOLOGY**
ACADEMIC YEAR	**2021-22**
REGULATION	**2021**

SEMESTER 01		
1.Course Code and Name : HS3152 PROFESSIONAL ENGLISH - I		
	CO Statements	**Knowledge Level**
At the end of the course, learners will be able:		
1	To use appropriate words in a professional context.	K2
2	To gain understanding of basic grammatic structures and use them in right context.	K2
3	To read and infer the denotative and connotative meanings of technical texts.	K2
4	To write definitions, descriptions, narrations and essays on various topics.	K3
5	To develope language effectively in professional contexts.	K2
2.Course Code and Name : MA3151 MATRICES AND CALCULUS		

HOME

	CO Statements	Knowledge Level
At the end of the course the students will be able to:		
1	Use the matrix algebra methods for solving practical problems.	K3
2	Apply differential calculus tools in solving various application problems.	K3
3	Able to use differential calculus ideas on several variable functions.	K3
4	Apply different methods of integration in solving practical problems.	K3
5	Apply multiple integral ideas in solving areas, volumes and other practical problems.	K3

3.Course Code and Name : PH3151 ENGINEERING PHYSICS		
	CO Statements	**Knowledge Level**
After completion of this course, the students should be able to:		
1	Understand the importance of mechanics.	K1
2	Express their knowledge in electromagnetic waves.	K2
3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.	K3
4	Understand the importance of quantum physics.	K3
5	Comprehend and apply quantum mechanical principles towards the formation of energy bands	K4

4.Course Code and Name : CY3151 ENGINEERING CHEMISTRY		
	CO Statements	**Knowledge Level**
At the end of the course, the students will be able:		
1	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.	K3
2	To identify and apply basic concepts of nano science and nanotechnology in designing the synthesis of nano materials for engineering and technology applications.	K4
3	To apply the knowledge of phase rule and composites for material selection requirements.	K2
4	To recommend suitable fuels for engineering processes and applications.	K2
5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.	K3

5.Course Code and Name : GE3151 PROBLEM SOLVING AND PYTHON PROGRAMMING		
	CO Statements	**Knowledge Level**
Upon completion of the course, students will be able to:		
1	Develop algorithmic solutions to simple computational problems.	K3
2	Develop and execute simple Python programs.	K3
3	Write simple Python programs using conditionals and loops for solving problems.	K4
4	Decompose a Python program into functions.	K4
5	Represent compound data using Python lists, tuples, dictionaries etc.	K4
6	Read and write data from/to files in Python programs.	K4

6.Course Code and Name : GE3171 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY

	CO Statements	Knowledge Level
On completion of the course, students will be able to:		
1	Develop algorithmic solutions to simple computational problems	K3
2	Develop and execute simple Python programs.	K4
3	Implement programs in Python using conditionals and loops for solving problems.	K2
4	Deploy functions to decompose a Python program.	K3
5	Process compound data using Python data structures.	K4
6	Utilize Python packages in developing software applications.	K2

7.Course Code and Name : BS3171 PHYSICS AND CHEMISTRY LABORATORY		
	CO Statements	**Knowledge Level**
Upon completion of the course, the students will be able to:		
PHYSICS LABORATORY :		
1	Understand the functioning of various physics laboratory equipment.	K3
2	Use graphical models to analyze laboratory data.	K2
3	Use mathematical models as a medium for quantitative reasoning and describing physical reality.	K1
4	Access, process and analyze scientific information.	K1
5	Solve problems individually and collaboratively.	K1
CHEMISTRY LABORATORY:		
1	To analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO.	K2
2	To determine the amount of metal ions through volumetric and spectroscopic techniques	K1
3	To analyse and determine the composition of alloys.	K1
4	To learn simple method of synthesis of nanoparticles.	K2
5	To quantitatively analyse the impurities in solution by electroanalytical techniques.	K3

8.Course Code and Name :GE3172 English Laboratory		
	CO Statements	**Knowledge Level**
At the end of the course, learners will be able:		
1	To listen to and comprehend general as well as complex academic information.	K2
2	To listen to and understand different points of view in a discussion.	K1
3	To speak fluently and accurately in formal and informal communicative contexts.	K3
4	To describe products and processes and explain their uses and purposes clearly and accurately.	K2
5	To express their opinions effectively in both formal and informal discussions.	K3

SEMESTER 02

1.Course Code and Name : HS3252 PROFESSIONAL ENGLISH - II		
	CO Statements	**Knowledge Level**
At the end of the course learners will be able to:		
1	To compare and contrast products and ideas in technical texts.	K2
2	To identify cause and effects in events, industrial processes through technical texts.	K2

3	To analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format.	K2
4	To present their ideas and opinions in a planned and logical manner.	K3
5	To draft effective resumes in the context of job search.	K4
2.Course Code and Name : MA3251 STATISTICS AND NUMERICAL METHODS		
	CO Statements	**Knowledge Level**
Upon successful completion of the course, students will be able to:		
1	Apply the concept of testing of hypothesis for small and large samples in real life problems.	K3
2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.	K3
3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.	K3
4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.	K3
5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	K3
3.Course Code and Name : PH3256 PHYSICS FOR INFORMATION SCIENCE		
	CO Statements	**Knowledge Level**
At the end of the course, the students should be able to:		
1	Gain knowledge on classical and quantum electron theories, and energy band structures.	K2
2	Acquire knowledge on basics of semiconductor physics and its applications in various devices.	K3
3	Get knowledge on magnetic properties of materials and their applications in data storage.	K3
4	Have the necessary understanding on the functioning of optical materials for optoelectronics.	K2
5	Understand the basics of quantum structures and their applications in carbon electronicsand basics of quantum computing.	K2
4.Course Code and Name : BE3251 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING		
	CO Statements	**Knowledge Level**
At the end of the course, the students should be able to:		
1	Compute the electric circuit parameters for simple problems.	K3
2	Explain the working principle and applications of electrical machines.	K2
3	Analyze the characteristics of analog electronic devices.	K4
4	Explain the basic concepts of digital electronics.	K2
5	Explain the operating principles of measuring instruments.	K2
5.Course Code and Name : GE3251 ENGINEERING GRAPHICS		
	CO Statements	**Knowledge Level**

At the end of the course, the students should be able to:		
1	Use BIS conventions and specifications for engineering drawing.	K3
2	Construct the conic curves, involutes and cycloid.	K3
3	Solve practical problems involving projection of lines.	K3
4	Draw the orthographic, isometric and perspective projections of simple solids.	K5
5	Draw the development of simple solids.	K5
6.Course Code and Name : CS3251 PROGRAMMING IN C		
	CO Statements	**Knowledge Level**
Upon completion of the course, the students will be able to :		
1	Demonstrate knowledge on C Programming constructs.	K2
2	Develop simple applications in C using basic constructs.	K5
3	Design and implement applications using arrays and strings	K5
4	Develop and implement modular applications in C using functions.	K5
5	Develop applications in C using structures and pointers.	K5
6	Design applications using sequential and random access file processing.	K5
7.Course Code and Name : GE8261 ENGINEERING PRACTICES LABORATORY		
	CO Statements	**Knowledge Level**
Upon completion of this course, the students will be able to:		
1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.	K5
2	Wire various electrical joints in common household electrical wire work.	K6
3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.	K2
4	Solder and test simple electronic circuits.	K6
5	Assemble and test simple electronic components on PCB.	K6
8.Course Code and Name : CS3271 PROGRAMMING IN C LABORATORY		
	CO Statements	**Knowledge Level**
1	Demonstrate knowledge on C programming constructs.	K2
2	Develop programs in C using basic constructs.	K5
3	Develop programs in C using arrays.	K5
4	Develop applications in C using strings, pointers, functions.	K5
5	Develop applications in C using structures.Develop applications in C using file processing.	K5
SEMESTER 03		
1.Course Code and Name : MA3354 DISCRETE MATHEMATICS		
	CO Statements	**Knowledge Level**
At the end of the course, students would :		
1	Have knowledge of the concepts needed to test the logic of a program.	K1

2	Have an understanding in identifying structures on many levels.	K1
3	Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.	K2
4	Be aware of the counting principles.	K2
5	Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.	K2

2.Course Code and Name : CS3351 DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION		
	CO Statements	**Knowledge Level**
At the end of the course, students would :		
1	Design various combinational digital circuits using logic gates.	K5
2	Design sequential circuits and analyze the design procedures.	K5
3	State the fundamentals of computer systems and analyze the execution of an instruction.	K1
4	Analyze different types of control design and identify hazards.	K4
5	Identify the characteristics of various memory systems and I/O communication.	K1

3.Course Code and Name : CS3352 FOUNDATIONS OF DATA SCIENCE		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Define the data science process.	K1
2	Understand different types of data description for data science process.	K1
3	Gain knowledge on relationships between data.	K1
4	Use the Python Libraries for Data Wrangling.	K3
5	Apply visualization Libraries in Python to interpret and explore data.	K3

4.Course Code and Name : CS3301 DATA STRUCTURES ALGORITHMS		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Explain abstract data types.	K1
2	Design, implement, and analyze linear data structures, such as lists, queues, and stacks, according to the needs of different applications.	K3
3	Design, implement, and analyze efficient tree structures to meet requirements such as searching, indexing, and sorting.	K3
4	Model problems as graph problems and implement efficient graph algorithms to solve them.	K3

5.Course Code and Name : CS3391 OBJECT ORIENTED PROGRAMMING		
	CO Statements	**Knowledge Level**
On completion of this course, the students will be able to:		
1	Apply the concepts of classes and objects to solve simple problems.	K3
2	Develop programs using inheritance, packages and interfaces.	K5
3	Make use of exception handling mechanisms and multithreaded model to solve	K3

	real world problems.	
4	Build Java applications with I/O packages, string classes, Collections and generics concepts.	K5
5	Integrate the concepts of event handling and JavaFX components and controls for developing GUI based applications.	K5

6.Course Code and Name : CD3281 DATA STRUCTURES AND ALGORITHMS LABORATORY		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Implement ADTs as Python classes.	K5
2	Design, implement, and analyse linear data structures, such as lists, queues, and stacks, according to the needs of different applications.	K5
3	Design, implement, and analyse efficient tree structures to meet requirements such as searching, indexing, and sorting.	K5
4	Model problems as graph problems and implement efficient graph algorithms to solve them.	K5

7.Course Code and Name : CS3381 OBJECT ORIENTED PROGRAMMING LABORATORY		
	CO Statements	**Knowledge Level**
On completion of this course, the students will be able to:		
1	Design and develop java programs using object oriented programming concepts.	K5
2	Develop simple applications using object oriented concepts such as package, exceptions.	K5
3	Implement multithreading, and generics concepts.	K5
4	Create GUIs and event driven programming applications for real world problems.	K5
5	Implement and deploy web applications using Java.	K5

8.Course Code and Name :CS3361 DATA SCIENCE LABORATORY		
	CO Statements	**Knowledge Level**
On completion of this course, the students will be able to:		
1	Make use of the python libraries for data science.	K3
2	Make use of the basic Statistical and Probability measures for data science.	K3
3	Perform descriptive analytics on the benchmark data sets.	K3
4	Perform correlation and regression analytics on standard data sets.	K3
5	Present and interpret data using visualization packages in Python.	K4

9.Course Code and Name :GE3361 PROFESSIONAL DEVELOPMENT		
	CO Statements	**Knowledge Level**
On completion of this course, the students will be able to:		
1	Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements.	K3
2	Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding.	K3
3	Use MS PowerPoint to create high quality academic presentations by including common tables, charts, graphs, interlinking other elements, and using media	K3

	objects.	

SEMESTER 04		
1.Course Code and Name : CS3452 THEORY OF COMPUTATION		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Construct automata theory using Finite Automata.	K5
2	Write regular expressions for any pattern.	K5
3	Design context free grammar and Pushdown Automata.	K5
4	Design Turing machine for computational functions.	K5
5	Differentiate between decidable and undecidable problems.	K2
2.Course Code and Name : CS3491 ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Use appropriate search algorithms for problem solving.	K3
2	Apply reasoning under uncertainty.	K3
3	Build supervised learning models.	K5
4	Build ensembling and unsupervised models.	K5
5	Build deep learning neural network models.	K5
3.Course Code and Name : CS3492 DATABASE MANAGEMENT SYSTEMS		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Construct SQL Queries using relational algebra.	K5
2	Design database using ER model and normalize the database.	K5
3	Construct queries to handle transaction processing and maintain consistency of the database.	K5
4	Compare and contrast various indexing strategies and apply the knowledge to tune the performance of the database.	K2
5	Appraise how advanced databases differ from Relational Databases and find a suitable database for the given requirement.	K2
4.Course Code and Name : IT3401 - Web Essentials		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Apply JavaScript, HTML and CSS effectively to create interactive and dynamic websites.	K4
2	Create simple PHP scripts.	K3
3	Design and deploy simple web-applications.	K3
4	Create simple database applications.	K3
5	Handle multimedia components.	K3
5.Course Code and Name : CS3451 INTRODUCTION TO OPERATING SYSTEMS		

	CO Statements	Knowledge Level
At the end of this course, the students will be able to:		
1	Analyze various scheduling algorithms and process synchronization.	K4
2	Explain deadlock prevention and avoidance algorithms.	K2
3	Compare and contrast various memory management schemes.	K2
4	Explain the functionality of file systems, I/O systems, and Virtualization.	K2
5	Compare iOS and Android Operating Systems.	K2
6.Course Code and Name : GE3451 ENVIRONMENTAL SCIENCES AND SUSTAINABILITY		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.	K2
2	To identify the causes, effects of environmental pollution and natural disasters and contribute to the preventive measures in the society.	K2
3	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.	K2
4	To recognize the different goals of sustainable development and apply them for suitable technological advancement and societal development.	K2
5	To demonstrate the knowledge of sustainability practices and identify green materials, energy cycles and the role of sustainable urbanization.	K2
7.Course Code and Name : CS3461 OPERATING SYSTEMS LABORATORY		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Define and implement UNIX Commands.	K2
2	Compare the performance of various CPU Scheduling Algorithms.	K2
3	Compare and contrast various Memory Allocation Methods.	K2
4	Define File Organization and File Allocation Strategies.	K2
5	Implement various Disk Scheduling Algorithms.	K2
8.Course Code and Name : CS3481 DATABASE MANAGEMENT SYSTEMS LABORATORY		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Create databases with different types of key constraints.	K5
2	Construct simple and complex SQL queries using DML and DCL commands.	K5
3	Use advanced features such as stored procedures and triggers and incorporate in GUI based application development.	K3
4	Create an XML database and validate with meta-data (XML schema).	K5
5	Create and manipulate data using NOSQL database.	K5
SEMESTER 05		
1.Course Code and Name : CS3591 COMPUTER NETWORKS		

	CO Statements	Knowledge Level
At the end of this course, the students will be able to:		
1	Explain the basic layers and its functions in computer networks.	K2
2	Understand the basics of how data flows from one node to another.	K2
3	Analyze routing algorithms.	K4
4	Describe protocols for various functions in the network.	K2
5	Analyze the working of various application layer protocols.	K4

2.Course Code and Name : IT3501 FULL STACK WEB DEVELOPMENT		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Understand the various stacks available for web application development.	K2
2	Use Node.js for application development.	K3
3	Develop applications with MongoDB.	K3
4	Use the features of Angular and Express.	K3
5	Develop React applications.	K2

3.Course Code and Name : CS3551 DISTRIBUTED COMPUTING		
	CO Statements	**Knowledge Level**
Upon the completion of this course, the student will be able to:		
1	Explain the foundations of distributed systems.	K2
2	Solve synchronization and state consistency problems.	K3
3	Use resource sharing techniques in distributed systems.	K3
4	Apply working model of consensus and reliability of distributed systems.	K3
5	Explain the fundamentals of cloud computing.	K2

4.Course Code and Name : CS3691 EMBEDDED SYSTEMS AND IOT		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Explain the architecture of embedded processors.	K2
2	Write embedded C programs.	K3
3	Design simple embedded applications.	K3
4	Compare the communication models in IOT.	K3
5	Design IoT applications using Arduino/Raspberry Pi /open platform.	K2

5.Course Code and Name :CCS339 CRYPTOCURRENCY AND BLOCKCHAIN TECHNOLOGIES		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Understand emerging abstract models for Blockchain Technology.	K3
2	Identify major research challenges and technical gaps existing between theory and practice in the crypto currency domain.	K2
3	It provides conceptual understanding of the function of Blockchain as a method of securing distributed ledgers, how consensus on their contents is achieved, and the new applications	K2

	that they enable.	
4	Apply hyperledger Fabric and Ethereum platform to implement the Block chain Application.	K3

6.Course Code and Name : CCS366 SOFTWARE TESTING AND AUTOMATION		
	CO Statements	**Knowledge Level**
1	Understand the basic concepts of software testing and the need for software testing.	K2
2	Design Test planning and different activities involved in test planning.	K3
3	Design effective test cases that can uncover critical defects in the application.	K3
4	Carry out advanced types of testing.	K3
5	Automate the software testing using Selenium and TestNG.	K2

7.Course Code and Name : IT3511 FULL STACK WEB DEVELOPMENT LAB		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Design full stack applications with clear understanding of user interface, business logic and data storage.	K2
2	Design and develop user interface screens.	K5
3	Implement the functional requirements using appropriate tool.	K3
4	Design and develop database based on the requirements.	K3
5	Integrate all the necessary components of the application.	K2

SEMESTER 06		
1.Course Code and Name : CCS356 OBJECT ORIENTED SOFTWARE ENGINEERING		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Compare various Software Development Lifecycle Models.	K2
2	Evaluate project management approaches as well as cost and schedule estimation strategies.	K1
3	Perform formal analysis on specifications.	K3
4	Use UML diagrams for analysis and design.	K3
5	Architect and design using architectural styles and design patterns, and test the system.	K3

2.Course Code and Name: OMA351 GRAPH THEORY		
	CO Statements	**Knowledge Level**
At the end of this course, the student will be able to:		
1	Apply graph models for solving real world problem.	K3
2	Understand the importance the natural applications of trees and graph connectivity.	K3
3	Understand the characterization study of Eulerian graphs and Hamiltonian graphs.	K3
4	Apply the graph colouring concepts in partitioning problems.	K2
5	Apply the standard optimization graph algorithms in solving application problems.	K1

3.Course Code and Name: CCS335 CLOUD COMPUTING		
	CO Statements	**Knowledge**

		Level
At the end of this course, the student will be able to:		
1	Understand the design challenges in the cloud.	K2
2	Apply the concept of virtualization and its types.	K3
3	Experiment with virtualization of hardware resources and Docker.	K3
4	Develop and deploy services on the cloud and set up a cloud environment.	K3
5	Explain security challenges in the cloud environment.	K2
4.Course Code and Name: CCS334 BIG DATA ANALYTICS		
	CO Statements	**Knowledge Level**
After the completion of this course, students will be able to:		
1	Describe big data and use cases from selected business domains.	K3
2	Explain NoSQL big data management.	K3
3	Install, configure, and run Hadoop and HDFS.	K3
4	Perform map-reduce analytics using Hadoop.	K2
5	Use Hadoop-related tools such as HBase, Cassandra, Pig, and Hive for big data analytics.	K3
5.Course Code and Name : CCS363 SOCIAL NETWORK SECURITY		
	CO Statements	**Knowledge Level**
After the completion of this course, students will be able to:		
1	Develop semantic web related simple applications.	K3
2	Address Privacy and Security issues in Social Networking.	K3
3	Explain the data extraction and mining of social networks.	K2
4	Discuss the prediction of human behavior in social communities.	K2
5	Describe the applications of social network.	K3
6.Course Code and Name : CCS342 DEVOPS		
	CO Statements	**Knowledge Level**
After the completion of this course, students will be able to:		
1	Understand different actions performed through Version control tools like Git.	K3
2	Perform Continuous Integration and Continuous Testing and Continuous Deployment using Jenkins by building and automating test cases using Maven & Gradle.	K2
3	Ability to Perform Automated Continuous Deployment.	K3
4	Ability to do configuration management using Ansible.	K3
5	Understand to leverage Cloud-based DevOps tools using Azure DevOps.	K2
7.Course Code and Name : MX3086 HISTORY OF SCIENCE AND TECHNOLOGY IN INDIA		
	CO Statements	**Knowledge Level**
After the completion of this course, students will be able to:		
1	Understand the concepts and perspectives of historical india.	K3
2	Develope the application related to historiography of science and technology in	K3

	india.	
3	Discuss the importance of science and technology in ancient india.	K3
4	Ability to define the concept of science and technology in medieval india.	K2
5	Develope the application related to growth of techno-scientific institutions.	K3
PRACTICALS		
7.Course Code and Name : IT3681 MOBILE APPLICATIONS DEVELOPMENT LABORATORY		
On successful completion of this course, the student should be able to:		
1	Design and build simple mobile applications supporting multiple platforms.	K5
2	Apply various programming techniques and patterns to build mobile applications.	K5
3	Build real-time mobile applications for society/environment.	K5
4	Build gaming and multimedia based mobile applications.	K5
5	Build AI based mobile applications for society/environment following g ethical practices.	K5
SEMESTER 07		
1.Course Code and Name : GE3791 HUMAN VALUES AND ETHICS		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field	K2
2	Identify the multiple ethical interests at stake in a real-world situation or practice	K2
3	Articulate what makes a particular course of action ethically defensible	K2
4	Assess their own ethical values and the social context of problems	K2
5	Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human	K2
2.Course Code and Name : GE3752 TOTAL QUALITY MANAGEMENT		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Ability to apply TQM concepts in a selected enterprise.	K2
2	Ability to apply TQM principles in a selected enterprise.	K3
3	Ability to understand Six Sigma and apply Traditional ,New tools,Benchmarking andFMEA.	K3
4	Ability to understand Taguchi's Quality Loss Function, Performance Measures and apply QFD, TPM, COQ and BPR.	K5
5	Ability to apply QMS and EMS in any organization.	K3
3.Course Code and Name : OIE352 RESOURCE MANAGEMENT TECHNIQUES		
	CO Sttements	**Knowledge Level**
Upon Completion of the course, the students should be able to:		
1	Understand to formulatelinear programming problems and solve LPP simplealgorithm.	K3

2	Understand to solve networking problems.	K3
3	Understand to formulate and solve integer programming problems.	K3
4	Understand to solve Non Linear programming problems.	K5
5	Understad to understand and solve project management problems.	K5
4.Course Code and Name : OAI351 URBAN AGRICULTURE		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Demonstrate the principles behind crop production and various parameters that influencesthe crop growth on roof tops.	K3
2	Explain different methods of crop production on roof tops.	K3
3	Explain nutrient and pest management for crop production on roof tops.	K2
4	Illustrate crop water requirement and irrigation water management on roof tops.	K2
5	Explain the concept of waste management on roof tops.	K3
5.Course Code and Name : CBM370 WEARABLE DEVICES		
	CO Statements	**Knowledge Level**
On successful completion of this course, the student will be able to		
1	Describe the concepts of wearable system.	K3
2	Explain the energy harvestings in wearable device.	K3
3	Use the concepts of BAN in health care.	K5
4	Illustrate the concept of smart textile.	K3
5	Compare the various wearable devices in healthcare system.	K3
6.Course Code and Name : IT3711 SUMMER INTERNSHIP		
	CO Statements	**Knowledge Level**
On completion of the course, the student will know about		
1	Industry Practices, Processes,Techniques, technology, automation and other core aspectsof software industry.	K5
2	Analyze, Design solutions to complex business problems.	K5
3	Build and deploy solutions for target platform.	K3
4	Preparation of Technical reports and presentation.	K3
5	Develop technical, soft, team skills for growth of the industry.	K2
SEMESTER 08		
1.Course Code and Name : CS3811 PROJECT WORK/ INTERNSHIP		
	CO Statements	**Knowledge Level**
At the end of this course, the students will be able to:		
1	Gain Domain knowledge and technical skill set required for solving industry / research problems.	K5
2	Provide solution architecture, module level designs, algorithms .	K5
3	Implement, test and deploy the solution for the target platform.	K5
4	Prepare detailed technical report, demonstrate and present the work.	K3

2017 REGULATION

B.Tech - INFORMATION TECHNOLOGY (2017 REGULATION)

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PEO1: To ensure graduates will be proficient in utilizing the fundamental knowledge of basic sciences, mathematics and Information Technology for the applications relevant to various streams of Engineering and Technology.

PEO2: To enrich graduates with the core competencies necessary for applying knowledge of computers and telecommunications equipment to store, retrieve, transmit, manipulate and analyze data in the context of business enterprise.

PEO3: To enable graduates to think logically, pursue lifelong learning and will have the capacity to understand technical issues related to computing systems and to design optimal solutions.

PEO 4: To enable graduates to develop hardware and software systems by understanding the importance of social, business and environmental needs in the human context.

PEO 5: To enable graduates to gain employment in organizations and establish themselves as professionals by applying their technical skills to solve real world problems and meet the diversified needs of industry, academia and research.

PROGRAM OUTCOMES (POs)

Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

Design / Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

HOME

Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
Program Specific Outcomes (PSOs)
The students will demonstrate the abilities
PSO1: To create, select, and apply appropriate techniques, resources, modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PSO2: To manage complex IT projects with consideration of the human, financial, ethical and environmental factors and an understanding of risk management processes, and operational and policy implications.

OURSE OUTCOME STATEMENTS FOR B.TECH.INFORMATION TECHNOLOGY(2017 REGULATION)

SEMESTER 01

1.Course Code and Name : HS8151 - COMMUNICATIVE ENGLISH

	CO Statements	Knowledge Level
The students should be able to		
1	Read articles of a general kind in magazines and newspapers.	K1 & K2
2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.	K3
3	Comprehend conversations and short talks delivered in English	K6
4	Write short essays of a general kind and personal letters and emails in English.	K6

2.Course Code and Name : MA8151 - ENGINEERING MATHEMATICS – I

	CO Statements	Knowledge Level
The students should be able to		
1	Use both the limit definition and rules of differentiation to differentiate functions.	K3
2	Apply differentiation to solve maxima and minima problems.	K3
3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.	K5
4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.	K3
5	Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.	K5
6	Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.	K1, K2, K3 & K4
7	Apply various techniques in solving differential equations.	K3

3.Course Code and Name : PH8151 - ENGINEERING PHYSICS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	The students will gain knowledge on the basics of properties of matter and its applications	K1
2	The Students Will Acquire Knowledge On The Concepts Of Waves And Optical Devices And Their Applications in fibre optics	K1
3	The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers	K1
4	The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and	K1 & K3
5	The students will understand the basics of crystals, their structures and different crystal growth techniques.	K1, K2 & K4
4.Course Code and Name : CY8151 - ENGINEERING CHEMISTRY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	The knowledge gained on engineering materials and will understand the concepts and properties of engineering materials with their applications.	K1, K3, K4
2	The knowledge gained on the current scenario of fuels and energy sources and the alternative fuels and energy sources.	K1, K3, K4 & K5
3	The knowledge gained on water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.	K1, K3, K4 & K5
5.Course Code and Name : GE8151- PROBLEM SOLVING AND PYTHON PROGRAMMING		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop algorithmic solutions to simple computational problems	K6
2	Read, write, execute by hand simple Python programs.	K2
3	Structure simple Python programs for solving problems.	K2
4	Decompose a Python program into functions.	K3
5	Represent compound data using Python lists, tuples, dictionaries.	K2
6	Read and write data from/to files in Python Programs	K2
6.Course Code and Name : GE8152- ENGINEERING GRAPHICS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Familiarize with the fundamentals and standards of Engineering graphics	K1
2	Perform freehand sketching of basic geometrical constructions and multiple views of objects.	K4
3	Project orthographic projections of lines and plane surfaces.	K3 & K4
4	Draw projections and solids and development of surfaces.	K6
5	Visualize and to project isometric and perspective sections of simple solids.	K2, K3 & K5

HOME

7.Course Code and Name : GE8161 - PROBLEM SOLVING AND PHYTHON PROGRAMMING LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Write, test, and debug simple Python programs.	K2
2	Implement Python programs with conditionals and loops.	K3
3	Develop Python programs step-wise by defining functions and calling them.	K3
4	Use Python lists, tuples, dictionaries for representing compound data.	K3
5	Read and write data from/to files in Python.	K3
8.Course Code and Name : BS8161 - PHYSICS AND CHEMISTRY LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
	PHYSICS LABORATORY	
1	Apply principles of elasticity, optics and thermal properties for engineering applications.	K2, K4 & K5
	CHEMISTRY LABORATORY	
2	The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.	K2, K4 & K5
SEMESTER 02		
1.Course Code and Name : HS8251 - TECHNICAL ENGLISH		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Read technical texts and write area- specific texts effortlessly.	K2
2	Listen and comprehend lectures and talks in their area of Specialization successfully.	K1 & K2
3	Speak appropriately and effectively in varied formal and informal contexts.	K6
4	Write reports and winning job applications.	K6
2.Course Code and Name : MA8251 - ENGINEERING MATHEMATICS II		
	CO Statements	**Knowledge Level**
1	Eigenvalues and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.	K1
2	Gradient, divergence and curl of a vector point function and related identities.	K1
3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.	K5
4	Analytic functions, conformal mapping and complex integration.	K4
5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.	K3
3.Course Code and Name : BE8255 -BASIC ELECTRICAL, ELECTRONICS AND MEASUREMENT ENGINEERING		
	CO Statements	**Knowledge Level**

1	Discuss the essentials of electric circuits and analysis.	K2
2	Discuss the basic operation of electric machines and transformers	K2
3	Introduction of renewable sources and common domestic loads.	K1
4	To understand the fundamentals of electronic circuit constructions.	K2
5	Introduction to measurement and metering for electric circuits.	K2
4.Course Code and Name : IT8201 - INFORMATION TECHNOLOGY ESSENTIALS		
	CO Statements	**Knowledge Level**
1	Design and deploy web-sites	K6
2	Design and deploy simple web-applications	K6
3	Create simple database applications	K6
4	Develop information system	K6
5	Describe the basics of networking and mobile communications	K2
5.Course Code and Name : CS8251 - PROGRAMMING IN C		
	CO Statements	**Knowledge Level**
1	Develop simple applications in C using basic constructs	K6
2	Design and implement applications using arrays and strings	K6
3	Develop and implement applications in C using functions and pointers.	K6
4	Develop applications in C using structures.	K6
5	Design applications using sequential and random access file processing.	K3
6.Course Code and Name : GE8261 - ENGINEERING PRACTICES LABORATORY		
	CO Statements	**Knowledge Level**
1	Fabricate carpentry components and pipe connections including plumbing works.	K6
2	Use welding equipments to join the structures.	K6
3	Carry out the basic machining operations	K4
4	Make the models using sheet metal works	K6
5	Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings	K4
6	Carry out basic home electrical works and appliances	K4
7	Measure the electrical quantities	K4
8	Elaborate on the components, gates, soldering practices.	K1
7.Course Code and Name CS8261- C PROGRAMMING LABORATORY		
	CO Statements	**Knowledge Level**
1	Develop C programs for simple applications making use of basic constructs, arrays and strings.	K6
2	Develop C programs involving functions, recursion, pointers, and structures.	K6
3	Design applications using sequential and random access file processing.	K6
8.Course Code and Name : IT8211 - INFORMATION TECHNOLOGY ESSENTIALS LABORATORY		
	CO Statements	**Knowledge Level**
1	Design interactive websites using basic HTML tags, different styles, links and with all	K6

2	Basic control elements.	K2
3	Create client side and server side programs using scripts using PHP.	K6
4	Design dynamic web sites and handle multimedia components	K6
5	Create applications with PHP connected to database.	K6
6	Create Personal Information System	K6
7	Implement the technologies behind computer networks and mobile communication.	K4
SEMESTER 03		
1.Course Code and Name MA8351 - DISCRETE MATHEMATICS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Have knowledge of the concepts needed to test the logic of a program.	K1
2	Have an understanding in identifying structures on many levels.	K2
3	Be aware of a class of functions which transform a finite set into another finite set which relates to input and output functions in computer science.	K1
4	Be aware of the counting principles.	K1
5	Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.	K2
2.Course Code and Name : CS8351 - DIGITAL PRINCIPLES AND SYSTEM DESIGN		
	CO Statements	**Knowledge Level**
1	Simplify Boolean functions using KMap	K3
2	Design and Analyze Combinational and Sequential Circuits	K3 & K4
3	Implement designs using Programmable Logic Devices	K3
4	Write HDL code for combinational and Sequential Circuits	K6
3.Course Code and Name : CS8391- DATA STRUCTURES		
	CO Statements	**Knowledge Level**
1	Implement abstract data types for linear data structures.	K2 & K3
2	Apply the different linear and non-linear data structures to problem solutions.	K3
3	Critically analyze the various sorting algorithms.	K3
4.Course Code and Name : CS8392 - OBJECT ORIENTED PROGRAMMING		
	CO Statements	**Knowledge Level**
1	Develop Java programs using OOP principles	K3
2	Develop Java programs with the concepts inheritance and interfaces	K3
3	Build Java applications using exceptions and I/O streams	K3
4	Develop Java applications with threads and generics classes	K2
5	Develop interactive Java programs using swings	k6
5.Course Code and Name : EC8394 - ANALOG AND DIGITAL COMMUNICATION		
	CO Statements	**Knowledge Level**
1	Apply analog and digital communication techniques.	K3
2	Use data and pulse communication techniques.	K2

3	Analyze Source and Error control coding.	K4
4	Utilize multi-user radio communication.	K3
6.Course Code and Name : CS8381 - DATA STRUCTURES LABORATORY		
	CO Statements	**Knowledge Level**
1	Write functions to implement linear and non-linear data structure operations	K1
2	Suggest appropriate linear / non-linear data structure operations for solving a given problem	K2
3	Appropriately use the linear / non-linear data structure operations for a given problem	K3
4	Apply appropriate hash functions that result in a collision free scenario for data storage and retrieval	K3
7.Course Code and Name : CS8383 - OBJECT ORIENTED PROGRAMMING LABORATORY		
	CO Statements	**Knowledge Level**
1	Develop and implement Java programs for simple applications that make use of classes, packages and interfaces.	K2
2	Develop and implement Java programs with arraylist, exception handling and multithreading.	K2
3	Design applications using file processing, generic programming and event handling.	K3
8.Course Code and Name : CS8382 - DIGITAL SYSTEMS LABORATORY		
	CO Statements	**Knowledge Level**
1	Implement simplified combinational circuits using basic logic gates	K3
2	Implement combinational circuits using MSI devices	K3
3	Implement sequential circuits like registers and counters	K3
4	Simulate combinational and sequential circuits using HDL	K3
9.Course Code and Name : HS8381 - INTERPERSONAL SKILLS/LISTENING & SPEAKING		
	CO Statements	**Knowledge Level**
1	Listen and respond appropriately.	K2
2	Participate in group discussions	K3
3	Make effective presentations	K3
4	Participate confidently and appropriately in conversations both formal and informal	K3
SEMESTER 04		
1.Course Code and Name : MA8391 - PROBABILITY AND STATISTICS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.	K2
2	Understand the basic concepts of one and two dimensional random variables and apply in engineering applications.	K2
3	Apply the concept of testing of hypothesis for small and large samples in real life problems.	K3

4	Apply the basic concepts of classifications of design of experiments in the field of agriculture and statistical quality control.	K3
5	Have the notion of sampling distributions and statistical techniques used in engineering and management problems.	K1

2.Course Code and Name : CS8491 - COMPUTER ARCHITECTURE		
	CO Statements	**Knowledge Level**
1	Understand the basics structure of computers, operations and instructions.	K2
2	Design arithmetic and logic unit.	K3
3	Understand pipelined execution and design control unit.	K2
4	Understand parallel processing architectures.	K2
5	Understand the various memory systems and I/O communication	K2

3.Course Code and Name : CS8492 - DATABASE MANAGEMENT SYSTEMS		
	CO Statements	**Knowledge Level**
1	Classify the modern and futuristic database applications based on size and complexity	K2
2	Map ER model to Relational model to perform database design effectively	K3
3	Write queries using normalization criteria and optimize queries	K2
4	Compare and contrast various indexing strategies in different database systems	K4
5	Appraise how advanced databases differ from traditional databases.	K2

4.Course Code and Name : CS8451 - DESIGN AND ANALYSIS OF ALGORITHMS		
	CO Statements	**Knowledge Level**
1	Design algorithms for various computing problems.	K2
2	Analyze the time and space complexity of algorithms.	K4
3	Critically analyze the different algorithm design techniques for a given problem.	K4
4	Modify existing algorithms to improve efficiency.	K4

5.Course Code and Name : CS8493 - OPERATING SYSTEMS		
	CO Statements	**Knowledge Level**
1	Analyze various scheduling algorithms.	K4
2	Understand deadlock, prevention and avoidance algorithms.	K2
3	Compare and contrast various memory management schemes.	K4
4	Understand the functionality of file systems.	K2
5	Perform administrative tasks on Linux Servers.	K4
6	Compare iOS and Android Operating Systems.	K4

6.Course Code and Name :GE8291 - ENVIRONMENTAL SCIENCE AND ENGINEERING		
	CO Statements	**Knowledge Level**
1	Public awareness of environment at infant stage.	K2
2	Ignorance and incomplete knowledge has lead to misconceptions.	K2
3	Development and improvement in standard of living has lead to serious environmental disasters.	K2

7.Course Code and Name : CS8481 - DATABASE MANAGEMENT SYSTEMS LABORATORY		
	CO Statements	**Knowledge Level**
1	Use typical data definitions and manipulation commands.	K3
2	Design applications to test Nested and Join Queries	K3
3	Implement simple applications that use Views	K3
4	Implement applications that require a Front-end Tool	K3
5	Critically analyze the use of Tables, Views, Functions and Procedures	K2
8.Course Code and Name : CS8461 - OPERATING SYSTEMS LABORATORY		
	CO Statements	**Knowledge Level**
1	Compare the performance of various CPU Scheduling Algorithms	K4
2	Implement Deadlock avoidance and Detection Algorithms	K3
3	Implement Semaphores	K3
4	Create processes and implement IPC	K3
5	Analyze the performance of the various Page Replacement Algorithms	K4
6	Implement File Organization and File Allocation Strategies	K3
9.Course Code and Name : HS8461 - ADVANCED READING AND WRITING		
	CO Statements	**Knowledge Level**
1	Write different types of essays.	K1
2	Write winning job applications.	K1
3	Read and evaluate texts critically.	K2
4	Display critical thinking in various professional contexts.	K1
SEMESTER 05		
1.Course Code and Name : MA8551 - ALGEBRA AND NUMBER THEORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply the basic notions of groups, rings, fields which will then be used to solve related problems.	K3
2	Explain the fundamental concepts of advanced algebra and their role in modern mathematics and applied contexts.	K2
3	Demonstrate accurate and efficient use of advanced algebraic techniques.	K3
4	Demonstrate their mastery by solving non - trivial problems related to the concepts, and by proving simple theorems about the, statements proven by the text.	K3
5	Apply integrated approach to number theory and abstract algebra, and provide a firm basis for further reading and study in the subject.	K3
2.Course Code and Name : CS8591 - COMPUTER NETWORKS		
	CO Statements	**Knowledge Level**
1	Understand the basic layers and its functions in computer networks.	K2
2	Evaluate the performance of a network.	K5
3	Understand the basics of how data flows from one node to another.	K2
4	Analyze and design routing algorithms.	K4

5	Design protocols for various functions in the network.	K3
6	Understand the working of various application layer protocols	K2
3.Course Code and Name : EC8691 - MICROPROCESSORS AND MICROCONTROLLERS		
	CO Statements	**Knowledge Level**
1	Understand and execute programs based on 8086 microprocessor.	K2
2	Design Memory Interfacing circuits.	K3
3	Design and interface I/O circuits.	K3
4	Design and implement 8051 microcontroller based systems.	K3
4.Course Code and Name : IT8501 - WEB TECHNOLOGY		
	CO Statements	**Knowledge Level**
1	Design simple web pages using markup languages like HTML and XHTML.	K3
2	Create dynamic web pages using DHTML and java script that is easy to navigate and use.	K3
3	Program server side web pages that have to process request from client side web pages.	K3
4	Represent web data using XML and develop web pages using JSP.	K3
5	Understand various web services and how these web services interact.	K2
5.Course Code and Name : CS8494 - SOFTWARE ENGINEERING		
	CO Statements	**Knowledge Level**
1	Identify the key activities in managing a software project.	K2
2	Compare different process models.	K4
3	Concepts of requirements engineering and Analysis Modeling.	K1
4	Apply systematic procedure for software design and deployment.	K3
5	Compare and contrast the various testing and maintenance.	K4
6	Manage project schedule, estimate project cost and effort required.	K4
6.Course Code and Name : OEC552 - Soft Computing		
	CO Statements	**Knowledge Level**
1	Apply various soft computing concepts for practical applications	K3
2	Choose and design suitable neural network for real time problems	K3
3	Use fuzzy rules and reasoning to develop decision making and expert system	K6
4	Explain the importance of optimization techniques and genetic programming	K1,K2
5	Review the various hybrid soft computing techniques and apply in real time problems	K2
7.Course Code and Name :EC8681 - MICROPROCESSORS AND MICROCONTROLLERS LABORATORY		
	CO Statements	**Knowledge Level**
1	Write ALP Programmes for fixed and Floating Point and Arithmetic operations	K1
2	Interface different I/Os with processor	K4
3	Generate waveforms using Microprocessors	K6
4	Execute Programs in 8051	K3
5	Explain the difference between simulator and Emulator	K3

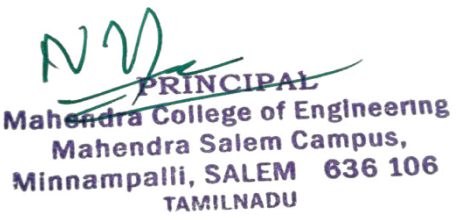
8.Course Code and Name : CS8581 - NETWORKS LABORATORY		
	CO Statements	**Knowledge Level**
1	Implement various protocols using TCP and UDP.	K3
2	Compare the performance of different transport layer protocols.	K4
3	Use simulation tools to analyze the performance of various network protocols.	K3
4	Analyze various routing algorithms.	K4
5	Implement error correction codes.	K3
9.Course Code and Name : IT8511 - WEB TECHNOLOGY LABORATORY		
	CO Statements	**Knowledge Level**
1	Design simple web pages using markup languages like HTML and XHTML.	K3
2	Create dynamic web pages using DHTML and java script that is easy to navigate and use.	K3
3	Program server side web pages that have to process request from client side web pages.	K3
4	Represent web data using XML and develop web pages using JSP.	K3
5	Understand various web services and how these web services interact	K2
SEMESTER 06		
1.Course Code and Name : IT8601 - COMPUTATIONAL INTELLIGENCE		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Provide a basic exposition to the goals and methods of Computational Intelligence.	K2
2	Study of the design of intelligent computational techniques.	K3
3	Apply the Intelligent techniques for problem solving	K2
4	Improve problem solving skills using the acquired knowledge in the areas of, reasoning, natural language understanding, computer vision, automatic programming and machine learning.	K2
2.Course Code and Name :CS8592 - OBJECT ORIENTED ANALYSIS AND DESIGN		
	CO Statements	**Knowledge Level**
1	Express software design with UML diagrams	K2
2	Design software applications using OO concepts.	K2
3	Identify various scenarios based on software requirements	K2
4	Transform UML based software design into pattern based design using design patterns	K3
5	Understand the various testing methodologies for OO software	K3
3.Course Code and Name :IT8602 - MOBILE COMMUNICATION		
	CO Statements	**Knowledge Level**
1	Explain the basics of mobile telecommunication system	K2
2	Illustrate the generations of telecommunication systems in wireless network	K3
3	Understand the architecture of Wireless LAN technologies	K3

4	Determine the functionality of network layer and Identify a routing protocol for a given Ad hoc networks	K2
5	Explain the functionality of Transport and Application layer	K3
4.Course Code and Name : CS8091 - BIG DATA ANALYTICS		
	CO Statements	**Knowledge Level**
1	Work with big data tools and its analysis techniques	K2
2	Analyze data by utilizing clustering and classification algorithms	K2
3	Learn and apply different mining algorithms and recommendation systems for large volumes of data	K3
4	Perform analytics on data streams	K2
5	Learn NoSQL databases and management.	K3
5.Course Code and Name : CS8092 -COMPUTER GRAPHICS AND MULTIMEDIA		
	CO Statements	**Knowledge Level**
1	Design two dimensional graphics.	K6
2	Apply two dimensional transformations.	K3
3	Design three dimensional graphics.	K6
4	Apply three dimensional transformations.	K3
5	Apply Illumination and color models.	K3
6	Apply clipping techniques to graphics.	K3
7	Understood Different types of Multimedia File Format	K2
8	Design Basic 3d Scenes using Blender	K6
6.Course Code and Name : CS8072 - Agile Methodologies		
	CO Statements	**Knowledge Level**
1	Realize the importance of interacting with business stakeholders in determining the requirements for a software system	K3
2	Perform iterative software development processes: how to plan them, how to execute them.	K2
3	Point out the impact of social aspects on software development success.	K3
4	Develop techniques and tools for improving team collaboration and software quality.	K3
5	Perform Software process improvement as an ongoing task for development teams.	K4
6	Show how agile approaches can be scaled up to the enterprise level.	K3
7.Course Code and Name : CS8662 - MOBILE APPLICATION DEVELOPMENT LABORATORY		
	CO Statements	**Knowledge Level**
1	Develop mobile applications using GUI and Layouts.	K3
2	Develop mobile applications using Event Listener.	K3
3	Develop mobile applications using Databases.	K3
4	Develop mobile applications using RSS Feed, Internal/External Storage, SMS, Multi-threading and GPS.	K3
5	Analyze and discover own mobile app for simple needs.	K4
8.Course Code and Name : CS8582 - Object Oriented Analysis and Design Laboratory		

	CO Statements	Knowledge Level
1	Implement the symbol table and compiler writing tools for lexical analyzer.	K3
2	Design and implement different phases of compiler.	K6
3	Implement the concepts of control flow and data flow analysis.	K3
4	Apply simple optimization techniques for code generation.	K3
9.Course Code and Name **: HS8581 - Professional Communication**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Make effective presentations	K3
2	Participate confidently in Group Discussions	K6
3	Attend job interviews and be successful in them.	K3
4	Develop adequate Soft Skills required for the workplace	K3
SEMESTER 07		
1.Course Code and Name: **MG8591 - Principles of Management**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Upon completion of the course, students will be able to have clear understanding of managerial functions like planning.	K2
2	Students will be able to have clear understanding of managerial functions like organizing.	K2
3	Students will be able to have clear understanding of managerial functions like staffing.	K2
4	Students will be able to have clear understanding of managerial functions like leading & controlling.	K2
5	Students will be able to have clear understanding of managerial functions like have same basic knowledge on international aspect of management.	K2
2.Course Code and Name: CS8792 - Cryptography and Network Security		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Understand the fundamentals of networks security, security architecture, threats and vulnerabilities	K2
2	Apply the different cryptographic operations of symmetric cryptographic algorithms	K3
3	Apply the different cryptographic operations of public key cryptography	K3
4	Apply the various Authentication schemes to simulate different applications.	K3
5	Understand various Security practices and System security standards	K2
3.Course Code and Name: **CS8791 - Cloud Computing**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Articulate the main concepts, key technologies, strengths and limitations of cloud computing.	K2
2	Learn the key and enabling technologies that help in the development of cloud.	K2
3	Develop the ability to understand and use the architecture of compute and storage cloud, service and delivery models.	K3

4	Explain the core issues of cloud computing such as resource management and security.	K1
5	Be able to install and use current cloud technologies.	K6
6	Evaluate and choose the appropriate technologies, algorithms and approaches for implementation and use of cloud.	K4
4.Course Code and Name: **OME752 - Supply Chain Management**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	The student would understand the framework and scope of supply chain networks and functions.	k2
2	The student would understand the framework and scope of supply chain designs.	k2
3	The student would understand the supply chain relationship and IT tools.	k2
4	The student would understand the role of e-commerce in supply chain.	k2
5.Course Code and Name: GE8077 - Total Quality Management		
	CO Statements	**Knowledge Level**
The students should be able to		
1	The student would be able to apply the tools and techniques of quality management to manufacturing and services processes.	k3
2	The student would be able to apply the principles in Quality management.	k3
3	The student would be able to understand the various Quality management system exists.	k2
6.Course Code and Name: CS8079 - Human Computer Interaction		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Design effective dialog for HCI	k6
2	Design effective HCI for individuals and persons with disabilities	k6
3	Assess the importance of user feedback.	k1
4	Explain the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites.	k1
5	Develop meaningful user interface.	k3
7.Course Code and Name: IT8711 - FOSS and Cloud Computing Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Configure various virtualization tools such as Virtual Box, VMware workstation.	k6
2	Design and deploy a web application in a PaaS environment.	k6
3	Learn how to simulate a cloud environment to implement new schedulers.	k6
4	Install and use a generic cloud environment that can be used as a private cloud.	k6
5	Manipulate large data sets in a parallel environment.	k6
8.Course Code and Name: IT8761 - Security Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop code for classical Encryption Techniques to solve the problems.	k6
2	Build cryptosystems by applying symmetric and public key encryption algorithms.	k6

3	Construct code for authentication algorithms.	k6
4	Develop a signature scheme using Digital signature standard.	k6
5	Demonstrate the network security system using open source tools	k6
SEMESTER 08		
1.Course Code and Name: CS8074 - Cyber Forensics		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Understand the basics of computer forensics.	K2
2	Apply a number of different computer forensic tools to a given scenario.	K3
3	Analyze and validate forensics data	K4
4	Identify the vulnerabilities in a given network infrastructure	K5
5	Implement real-world hacking techniques to test system security	K6
2.Course Code and Name: CS8080 - Information Retrieval Techniques		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Use an open source search engine framework and explore its capabilities.	K3
2	Apply appropriate method of classification or clustering.	K3
3	Design and implement innovative features in a search engine.	K6
4	Design and implement a recommender system.	K6
3.Course Code and Name: IT8811 - PROJECT WORK		
	CO Statements	**Knowledge Level**
The students should be able to		
1	On Completion of the project work students will be in a position to take up any challenging practical problems.	K3, K4,K5
2	Find the solution by formulating proper methodology	K6



2013 REGULATION

COURSE OUTCOME STATEMENTS FOR B.Tech.INFORMATION TECHNOLOGY (2013 REGULATIONS)

SEMESTER 01

1.Course Code and Name : HS6151 - TECHNICAL ENGLISH I

	CO Statements	Knowledge Level
The students should be able to		
1	Classify the types of listening and writing skills with acquired knowledge	K2
2	Demonstrate speaking skills in various occasions	K2
3	Compare the formal and informal writing skills by using the mail and blocks	K2
4	Apply the speaking etiquitte to build up communication proficiency	K3
5	Develop presentations with the use of LSRW skills	K3

2.Course Code and Name : MA6151 - MATHEMATICS I

	CO Statements	Knowledge Level
The students should be able to		
1	Solve the Eigen values and Eigen vectors to diagonalise and reduce a matrix to quadratic form	K3
2	Identify the convergences, divergences of infinite series	K3
3	Solve evolutes and envelopes of a given curve by using radius of curvature and center of curvature	K3
4	Identify the maxima and minima value functions of two variables	K3
5	Solve area of plain curves and volume of solid using double and triple integrals	K3

3.Course Code and Name : PH6151 - ENGINEERING PHYSICS I

	CO Statements	Knowledge Level
The students should be able to		
1	Explain the basics of properties of matter and its applications	K2
2	Summarize the concepts of waves and optical devices and their applications in fiber optics	K2
3	Demonstrate the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers	K2
4	Outline the concepts of advanced physics quantum theory and its applications in tunneling microscopes	K2
5	Explain the basics of crystals, their structures and different crystal growth techniques	K2

4.Course Code and Name : CY6151 - ENGINEERING CHEMISTRY I

	CO Statements	Knowledge Level
The students should be able to		
1	Classify the polymers and their utility in the industries and explain the techniques of polymerization and properties of polymers	K2
2	Relate various thermodynamic functions such as enthalpy, entropy, free energy and their importance	K2
3	Explain the photo physical processes such as fluorescence and phosphorescence and various components of UV and IR spectrophotometer	K2

HOME

4	Illustrate the phase transitions of one component and two component systems and the types of alloys and their application in industries	K2
5	Outline the synthesis, characteristics and the applications of nano materials	K2

5.Course Code and Name : GE6151- COMPUTER PROGRAMMING		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Describe the function of a Computer and problem solving techniques.	K2
2	Write simple C programs using basic constructs	K3
3	Implement applications to manage data using arrays and strings	K3
4	Apply functions and pointers for solving problems	K3
5	Develop simple applications using structure and union	K3

6.Course Code and Name : GE6152- ENGINEERING GRAPHICS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Demonstrate freehand sketching of basic geometrical constructions and multiple views of objects	K2
2	Develop orthographic projections of points, lines and plane surfaces	K3
3	Construct projections of simple solids and truncated solids	K3
4	Develop projection of sectioned solids and utilize development of surfaces	K3
5	Construct isometric and perspective projections of simple solids	K3

7.Course Code and Name : GE6161- COMPUTER PRACTICES LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply the usage of office automation tools.	K2
2	Apply good programming design methods for program development.	K3
3	Design and implement C programs for simple applications.	K3
4	Develop recursive programs.	K3

8.Course Code and Name : GE6162 - ENGINEERING PRACTICES LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Construct carpentry components and pipe connections including plumbing works	K2
2	Make use of welding equipments to join the structures	K3
3	Develop models using sheet metal work	K3
4	Illustrate the working of centrifugal pump and air conditioner	K3
5	Demonstrate basic home electrical works, measurement of the electrical quantities and soldering practices	K3

9.Course Code and Name : GE6163 - PHYSICS AND CHEMISTRY LABORATORY - I		
	CO Statements	**Knowledge Level**

The students should be able to		
1	Make use of spectrometer to find the wavelength of spectral lines, and laser	K3
2	Make use of ultrasonic interferometer and Lee's disc apparatus to find the velocity of sound, compressibility of the liquid and thermal conductivity	K3
3	Demonstrate the estimation of DO content in water sample by Winkler's method and molecular weight of polymer by Ostwald viscometer	K2
4	Experiment with the strength of an acid using pH meter and conductometer	K3
5	Demonstrate the estimation of weak and strong acids in a mixture by conductometer	K2

SEMESTER 02		
1.Course Code and Name : HS6251 - TECHNICAL ENGLISH II		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop the communication skills with proper grammar usage	K2
2	Summarize the various advanced technical and non-technical english tools	K2
3	Classify the speaking skills and expression through professional english	K2
4	Apply the interview techniques for career development	K3
5	Outline the use of writing skills to express innovatiove ideas	K3
2.Course Code and Name : MA6251 - MATHEMATICS II		
	CO Statements	**Knowledge Level**
1	Apply solenoidal, irrotational vectors and make use of the concepts of Green's, Gauss divergence , Stokes theorem to evaluate single, double and triple integrals	K3
2	Solve simultaneous linear equations and P.I. of Cauchy and Legendre Equation	K3
3	Solve Laplace Transforms of periodic functions and ODE using Inverse Laplace Transform	K3
4	Make use of the properties of analytic functions for verifying C-R equations for determination of Bilinear Transformation	K3
5	Develop the functions of two variables as Taylor's and Laurent's series and Contour integrals by using Cauchy's Integral formula	K3

3.Course Code and Name : PH6251 - ENGINEERING PHYSICS II		
	CO Statements	**Knowledge Level**
1	Explain the basics, properties and applications of conducting materials	K2
2	Summarize the properties of semiconducting materials and semiconductor devices.	K2
3	Explain the basics, properties and applications of the magnetic materials and super conducting material	K2
4	Illustrate the concepts, mechanisms and applications of dielectric materials	K2
5	Outline the method of synthesis and explain the properties of Nano materials, SMA, Metallic glasses and Ceramics	K2

4.Course Code and Name : CY6251 - ENGINEERING CHEMISTRY II		
	CO Statements	**Knowledge**

		Level
1	Explain the problems of using hard water in boilers and methods of treatment of water for boiler use	K2
2	Apply the design principles to electro chemical cell. Identify the types of corrosion and the methods of prevention	K3
3	Illustrate the methods of harnessing energy from non-conventional energy sources	K2
4	Classify various engineering materials and explain their importance	K2
5	Relate the significance of solid, liquid and gaseous fuels. Explain the calorific values of fuels and air requirement for combustion in furnaces	K2

5.Course Code and Name : CS6201 Digital Principles and System Design		
	CO Statements	**Knowledge Level**
1	Demonstrate the concept of Boolean algebra and show the correlation between Boolean expressions	K2
2	Simplify Boolean functions using KMap	K4
3	Design and Analyze Combinational and Sequential Circuits	K6
4	Implement designs using Programmable Logic Devices	K6
5	Build HDL code for combinational and Sequential Circuits	K3
6.Course Code and Name : CS6202 and Programming and Data Structures I		
	CO Statements	**Knowledge Level**
1	Design programs using control structures, functions,pointers and files.	K2
2	Implement applications using structures, union and files.	K3
3	Implement abstract data type (ADT) for Linear data structures.	K3
4	Apply the different Linear data structures for solving problems.	K3
5	Analyze the various searching and sorting algorithms.	K3
7.Course Code and Name :GE6262- PHYSICS AND CHEMISTRY LABORATORY - II		
	CO Statements	**Knowledge Level**
1	Illustrate the determination of Young's modulus of the beam and moment of inertia and rigidity modules of thin wire Torsion pendulum	K2
2	Make use of Poiseuille's method to determine the coefficient of viscosity of the liquid	K3
3	Illustrate the determination of dispersive power of a prism and the thickness of a thin wire through interference fringes using Air wedge apparatus	K2
4	Experiment with the type, amount of alkalinity, hardness in a given water sample and evaluate the Amount of copper using EDTA method	K3
5	Demonstrate titration by potentiometric redox and conductometric precipitation methods	K2
8.Course Code and Name : IT6211 - Digital Laboratory		
	CO Statements	**Knowledge Level**
1	Summarize simplified combinational circuits using basic logic gates	K2
2	Explain combinational circuits using MSI devices	K2
3	Build sequential circuits like registers and counters	K3

4	Construct combinational and sequential circuits using HDL	K3
5	Design and implement simple digital system	K6

9.Course Code and Name : IT6212 and Programming and Data Structures Laboratory I		
	CO Statements	**Knowledge Level**
1	Apply good programming design methods for program development.	K3
2	Design and implement C programs for Linear data structures	K3
3	Develop applications using different data structures	K3
4	Implement searching and sorting algorithms	K3

SEMESTER 03		
1.Course Code and Name :MA6351- TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Solve differential equations using Fourier series analysis for engineering applications.	K3
2	Utilize Dirichlet's condition for finding the Fourier series of a given function	K3
3	Apply Fourier series to solve one dimensional way, one and two dimensional heat equations.	K3
4	Solve Fourier transform for a given function and make use of them to evaluate certain definite Integrals	K3
5	Solve z transforms of standard functions and make use of use them to solve difference equations	K3
2.Course Code and Name : CS6301 and Programming and Data Structures II		
	CO Statements	**Knowledge Level**
1	Describe various concepts of Object Oriented programming.	K2
2	Apply the concepts of data abstraction, encapsulation and inheritance for problem solutions.	K3
3	Implement exception, generic programming and file concepts for various problems.	K3
4	Apply the different Non-Linear data structures for solving problems.	K3
5	Analyze the various traversing techniques and algorithms for Non-Linear data structure.	K3
3.Course Code and Name : CS6302 and Database Management System		
	CO Statements	**Knowledge Level**
1	Explain the basic concepts of Database management system.	K2
2	Design and manipulation of database using structured Query language and optimization techniques.	K3
3	Apply concurrency control and recovery mechanisms for various Applications.	K3
4	Describe various storage structures, indexing, hashing and different types of databases.	K2
5	Apply security concepts to databases.	K3
4.Course Code and Name : CS6303 and Computer Architecture		
	CO Statements	**Knowledge**

		Level
1	Explain various operations, instructions and addressing modes of computer systems.	K2
2	Design Arithmetic and Logic Unit.	K3
3	Design and analysis of Control unit and pipelining.	K3
4	Describe various parallelism techniques.	K2
5	Analyse performance of Memory and I/O systems.	K4

5.Course Code and Name : CS6304 and Analog and Digital Communication		
	CO Statements	**Knowledge Level**
1	Summarize the different analog modulation techniques	K2
2	Explain analog and digital communication techniques.	K2
3	Utilize data and pulse communication techniques.	K3
4	Analyze Source and Error control coding.	K3
5	Utilize multi-user radio communication.	K3

6.Course Code and Name : GE6351 and Environmental Science and Engineering		
	CO Statements	**Knowledge Level**
1	Illustrate the concepts of an ecosystem , energy flow and conservation of biodiversity.	K2
2	Explain the causes, effects and control of various types of pollution.	K2
3	Outline the conservation of natural resources.	K2
4	Summarize the social issues of environment and legislative guidelines for disaster management.	K2
5	Relate population growth and its impact on environment and human health.	K2

7.Course Code and Name : IT6311 Programming and Data Structure Laboratory II		
	CO Statements	**Knowledge Level**
1	Apply good programming design methods for program development using C++.	K3
2	Design and implement C++ programs for Linear data structures	K3
3	Design and implement C++ programs for Non-Linear data structures	K3
4	Implement recursive programs and various algorithms for graph.	K3

8.Course Code and Name : IT6312 Database Management Systems Laboratory		
	CO Statements	**Knowledge Level**
1	Design and implement a database schema for a given problem-domain	K3
2	Write SQL query to manipulate database.	K3
3	Create and maintain tables using PL/SQL.	K3
4	Develop an application using Oracle.	K3

9.Course Code and Name : IT6313 and Digital Communication Laboratory		
	CO Statements	**Knowledge Level**
1	Design and Implement combinational and sequential circuits.	K3

2	Analyze a given digital circuit – combinational and sequential.	K3
3	Design the different functional units in a digital computer system.	K3
4	Design and Implement a simple digital system.	K3

SEMESTER 04		
1.Course Code and Name : MA6453 and Probability and Queuing Theory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	The probabilityMethods techniques are used to find the solution for the partial problems in engineering.	K3
2	The graduates will be able to grow professionally in their careers throughcontinued development of technical and management skills, achievement ofprofessional licenses and acquire role of leadership or entrepreneurship inprofessional service.	K3
3	To afford students with a solid base in scientific, mathematical, and engineeringfundamentals needed to examine, plan.	K3
4	To inculcate professionals relate to computer engineering issues with ethicalattitude, multi-disciplinary projects, social, environmental and economic considerations.	K3
5	A graduate engineer during his course of study should inbuilt social ethics andprofessionalism and should apply them in his carrier.	K3
2.Course Code and Name : EC6504 and Microprocessor and Microcontroller		
	CO Statements	**Knowledge Level**
1	Design and implement programs on 8086 microprocessor.	K6
2	Design I/O circuits	K2
3	Design Memory Interfacing circuits.	K6
4	Design and implement 8051 microcontroller based systems	K6
5	Explain the architecture and instruction set of ARM microcontroller	K2

3.Course Code and Name : CS6402 and Design and Analysis of Algorithm		
	CO Statements	**Knowledge Level**
1	Describe various methods for analyzing algorithms to solve different types of problems.	K2
2	Design and analyze algorithms for various computing problems using brute force and divide-and-conquer techniques.	K3
3	Design and analyze algorithms for various computing problem using dynamic programming and greedy techniques.	K3
4	Analyze different algorithm design techniques for a given problem using Iterative improvement.	K3
5	Describe the limitations of algorithm power for various problems.	K2
4.Course Code and Name : CS6401 and Operating System		
	CO Statements	**Knowledge**

		Level
1	Describe the basic concepts and functions of Operating System.	K2
2	Design various scheduling algorithms and apply the principles of concurrency.	K3
3	Demonstrate various memory management techniques	K2
4	Design and implement prototype file systems.	K3
5	Implement administrative tasks on Linux Servers.	K3

5.Course Code and Name : CS6403 and Software Engineeering		
	CO Statements	**Knowledge Level**
1	Describe the concepts of various process models.	K2
2	Describe the concepts of requirement engineering and analysis.	K2
3	Apply systematic procedure for software design and deployment.	K3
4	Compare and contrast the various testing and maintenance.	K2
5	Identify the key activities in managing a software project.	K3

6.Course Code and Name : IT6411 and Microprocessor and Microcontroller Laboratory		
	CO Statements	**Knowledge Level**
1	Develop an ALP for fixed and Floating Point and Arithmetic	K3
2	Develop an ALP for Interface different I/Os with processor	K3
3	Develop an ALP to Generate waveforms using Microprocessors	K3
4	Develop an ALP using 8051 microcontroller	K3
5	Explain the difference between simulator and Emulator	K2

7.Course Code and Name : IT6412 and Operating Systems Laboratory		
	CO Statements	**Knowledge Level**
1	Implement various CPU scheduling algorithms	K3
2	Implement deadlock avoidance and detection algorithms.	K3
3	Implement file system concepts and file access control.	K3
4	Implementation of threads and synchronization algorithms	K3

8.Course Code and Name : IT6413 and Software Engineering Laboratory		
	CO Statements	**Knowledge Level**
1	Use open source case tools to develop software.	K3
2	Analyze and design software requirements in efficient manner.	K3
3	Understand the normalization of databases through various case studies	K3
4	Use of query optimization techniques, backup and recovery features of database management software	K3

SEMESTER 05

1.Course Code and Name : CS6551 and Computer Networks		
	CO Statements	**Knowledge Level**
1	Describe the basic layers and its functions in Computer Network.	K2
2	Describe the basics of data flows in a network.	K2

3	Analyze and design various routing algorithms.	K3
4	Apply TCP and UDP protocols for various functions.	K3
5	Describe various protocols for application layer.	K2

2.Course Code and Name : IT6501 and Graphics and Multimedia		
	CO Statements	**Knowledge Level**
1	Recognize a graphic design problem.	K2
2	Describe the concepts of 3D representation.	K3
3	Discuss the concepts of multimedia technologies.	K3
4	Apply compression & decompression techniques.	K2
5	Recognize issues related to emerging techniques & graphic design.	K3

3.Course Code and Name : CS6502 and Object Oriented Analysis and Design		
	CO Statements	**Knowledge Level**
1	Describe the UML analysis and design diagrams.	K2
2	Interpret the GRASP design pattern and GoF design pattern.	K3
3	Design usecase modeling and domain modeling.	K3
4	Apply appropriate design patterns.	K3
5	Compare and contrast various testing techniques.	K2

4.Course Code and Name : IT6502 and Digital Signal Processing		
	CO Statements	**Knowledge Level**
1	Understand the basics of signals and systems	K2
2	Apply frequency transformations for the signal	K2
3	Design IIR Filter	K2
4	Design FIR Filter	K3
5	Characterize finite word length effects in digital filter	K3

5.Course Code and Name : IT6503 and Web Programming		
	CO Statements	**Knowledge Level**
1	Recognize and apply the technologies used in Web Programming.	K3
2	Apply object oriented aspects in Scripting.	K3
3	Construct database connectivity using JDBC.	K3
4	Implement the concepts of web based application using sockets.	K3
5	Construct Web services in java and learn about XML.	K3

6.Course Code and Name : EC6801 and Wireless Communication		
	CO Statements	**Knowledge Level**
1	Understand the comparison & contrast between Wireless networks and Wired	K3

	networks.	
2	Analyze various categories in multiple access techniques and their functions involved in it.	K2
3	Identify the core types involved in modulation techniques, shift keying methods and can solve the various wireless channels characteristics.	K3
4	Differentiate between various equalization methods involved and can differentiate their performances	K3
5	Describe Multiple Antenna techniques used between a transmitter and receiver and can detect various error probabilities in fading channels.	K2

7.Course Code and Name : IT6511 and Networks Laboratory		
	CO Statements	**Knowledge Level**
1	Implement the socket programming and client-server model.	K3
2	Implement the various protocols.	K3
3	Analyze various routing algorithms.	K3
4	Simulate congestion control algorithms using network simulation tool.	K3

8.Course Code and Name : IT6512 WebProgramming Laboratory		
	CO Statements	**Knowledge Level**
1	Design Web pages using HTML/XML and style sheets	K3
2	Implement user interfaces using Java frames and applets.	K3
3	Implement dynamic web pages using server side scripting.	K3
4	Develop Client Server applications.	K3
5	Develop simple programs using JSP Strut, Hibernate and Spring frameworks.	K3

9.Course Code and Name : IT6513 and Case Tools Laboratory		
	CO Statements	**Knowledge Level**
1	Design and Implement projects using OO concepts.	K3
2	Design UML analysis and design diagrams.	K3
3	Apply appropriate design patterns.	K3
4	Create code from design.	K3

SEMESTER 06

1.Course Code and Name : CS6601 and Distributed Systems		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Describe the basic components, concepts, foundation and challenges related to Distributed Systems	K2
2	Apply network virtualization, remote method invocation and objects.	K3
3	Demonstrate peer to peer services and distributed file system.	K2
4	Explain the concepts in synchronization and communication mechanism used in modern Distributed Systems	K2
5	Describe the resource allocation and process management techniques in Distributed operating systems	K2

2.Course Code and Name : IT6601 and Mobile Computing		
	CO Statements	**Knowledge Level**
1	Explain the basics of mobile computing system and MAC protocol.	K2
2	Choose the required functionality at each layer for given application.	K2
3	Explain the basics of mobile telecommunication system and MAC protocol.	K2
4	Design adhoc networks using simulated tools.	K3
5	Develop a mobile application.	K3

3.Course Code and Name : CS6659 and Aritificial Intelligence		
	CO Statements	**Knowledge Level**
1	Describe the concept of production systems, control and search strategies.	K2
2	Explain the concept of FOL and proportional logic for representation of knowledge.	K2
3	Apply knowledge Inferences to solve problems.	K3
4	Describe various planning strategies and Machine Learning techniques for appropriate problems.	K2
5	Develop Expert Systems for various applications.	K3

4.Course Code and Name : CS6660 and Compiler Design		
	CO Statements	**Knowledge Level**
1	Explain the basic concepts of compiler and its phases.	K2
2	Implement the functionalities of lexical analyzer and convert the given regular expression to DFA.	K3
3	Construct the parsing table using different parsing techniques and implement lexical analyser using compiler construction tools.	K3
4	Explain the translation processes and run time environment issues.	K2
5	Apply various code optimization techniques for generating machine code.	K3

5.Course Code and Name :IT6602 and Software Architecture		
	CO Statements	**Knowledge Level**
1	Generalize the aspects of software on business and technical activities.	K2
2	Design Quality attributes documents.	K3
3	Identify key architectural structures and views.	K3
4	Use different styles to design software architectures.	K2
5	Create document for a given architectures.	K3

6.Course Code and Name :GE6757 Total Quality Management (E-I)		
	CO Statements	**Knowledge Level**
1	Outline the Dimensions, Contributions and Barriers regarding with Quality	K2
2	Illustrate the TQM Principles.	K3
3	Demonstrate Tools utilization for Quality improvement.	K3

4	Explain the various types of Techniques are used to measure Quality..	K2
5	Apply various Quality Systems and Auditing on implementation of TQM.	K3

7.Course Code and Name :IT6611 Mobile Application Development Laboratory		
	CO Statements	**Knowledge Level**
1	Choose the required architecture based upon the mobile application to be developed.	K2
2	Design mobile applications using various layout and widgets	K3
3	Implement various mobile applications using emulators.	K3
4	Deploy applications to hand-held devices.	K3

8.Course Code and Name : IT6612 Compiler Laboratory		
	CO Statements	**Knowledge Level**
1	Implement the symbol table and compiler writing tools for lexical analyzer.	K3
2	Design and implement different phases of compiler.	K3
3	Implement the concepts of control flow and data flow analysis.	K3
4	Apply simple optimization techniques for code generation.	K3

9.Course Code and Name : GE6674- Communication and Soft Skills - Laboratory Based		
	CO Statements	**Knowledge Level**
1	Demonstrate reading and writing skills	K2
2	Develop listening and speaking skills	K3
3	Make use of acquired knowledge to take up international examination such as IELTS and TOEFL	K3
4	Apply the interview techniques for career development	K3
5	Illustrate the various aspects of soft skills	K2

SEMESTER 07

1.Course Code and Name : IT6701 Information Management		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain OSI security architecture, classical encryption techniques, finite fields and number theory.	K2
2	Compare various cryptographic techniques.	K2
3	Describe the usage of hash functions and digital signatures.	K2
4	Design secure applications.	K3
5	Describe the various web security techniques.	K2

2.Course Code and Name : CS6701 and Cryptography and Network Security		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain OSI security architecture, classical encryption techniques, finite fields and	K2

	number theory.	
2	Compare various cryptographic techniques.	K2
3	Describe the usage of hash functions and digital signatures.	K2
4	Design secure applications.	K3
5	Describe the various web security techniques.	K2

3.Course Code and Name : IT6702 and Data Warehousing and Data Mining		
	CO Statements	**Knowledge Level**
1	Describe the steps in building a Data warehouse architecture and schemas for decision support.	K2
2	Explain the usage of OLAP tools to extract knowledge from data warehouse.	K2
3	Describe the data mining functionalities and data preprocessing techniques.	K2
4	Apply the association rule mining and classification algorithms for a given problem.	K3
5	Summarize various clustering methods and applications of data mining techniques in knowledge discovery.	K3

4.Course Code and Name : CS6703 and Grid and Cloud Computing		
	CO Statements	**Knowledge Level**
1	Explain the architecture of grid and cloud computing.	K2
2	Decribe the various Functional and Non Functional Reruirements of OGSA	K2
3	Apply the concept of virtualization.	K2
4	Develop web services using grid and cloud technologies.	K3
5	Describe the security models in grid and cloud environment.	K2

5.Course Code and Name : CS6003 and Ad Hoc and Sensor Networks (E- II)		
	CO Statements	**Knowledge Level**
1	Explain the concepts, network architecture and applications of ad hoc and sensor networks.	K2
2	Describe the different types of MAC protocols in ad hoc networks.	K2
3	Describe various adhoc routing protocols and TCP issues in adhoc networks.	K2
4	Explain the architecture and MAC protocols of wireless sensor networks.	K3
5	Describe the routing, localization and QOS in WSN	K3

6.Course Code and Name : IT6711 Data Mining Laboratory		
	CO Statements	**Knowledge Level**
1	Apply data mining techniques and methods to large data sets.	K3
2	Use data mining tools.	K3
3	To enlist various algorithms used in information analysis of Data Mining Techniques.	K3
4	To demonstrate the knowledge retrieved through solving problems	K2

7.Course Code and Name : IT6712 Security Laboratory		
	CO Statements	**Knowledge Level**

1	Implement the cipher techniques	K3
2	Develop the various security algorithms	K3
3	Implement different network security and analysis using open source tools.	K3
4	Demonstrate the installation of rootkits.	K2

8.Course Code and Name : IT6713 Grid and Cloud Computing Laboratory		
	CO Statements	**Knowledge Level**
1	Design and Implement the applications of Grid	K3
2	Develop the Grid Service using Apache Axis	K3
3	Design and Implement the applications of Cloud	K3
4	Implement the Hadoop Cluster using FUSE .	K2

SEMESTER 08		
1.Course Code and Name : IT6801 and Service Oriented Architecture		
	CO Statements	**Knowledge Level**
1	Explain the fundamentals of XML	K2
2	Build application based on XML	K2
3	Compare and contrast SOA with other web architecture	K3
4	Develop web services using technology elements	K3
5	Build SOA based application for intra enterprise and inter enterprise	K3

2.Course Code and Name : GE6075 and Professional Ethics in Engineering (E- III)		
	CO Statements	**Knowledge Level**
1	Apply ethics in society	K2
2	Discuss the ethical issues related to engineering	K2
3	Realize the responsibilities in the society	K3
4	Realize the rights in the society	K3
5	Discuss the global issue	K3

3.Course Code and Name : CS6004 & Cyber Forensics (E- IV)		
	CO Statements	**Knowledge Level**
1	Describe the security issues in network and transport layer.	K2
2	Apply security principles in application layer.	K3
3	Describe the fundamental concepts of computer forensics.	K2
4	Explain the basics concepts in forensic tools and evidence collection.	K3
5	Describe the various techniques to validate the forensic data.	K2

4.Course Code and Name : IT6011 and Knoweledge Management (E-V)		
	CO Statements	**Knowledge Level**
1	Assess the role of knowledge management in organizations	K2

2	Become familiar with the theoretical perspectives of knowledge creation, knowledge transfer, knowledge sharing, and knowledge leadership roles and skills.	K2
3	Understand the relationship between knowledge management and a learning organization.	K2
4	Understand the differences between tacit knowledge and explicit knowledge and the way each is treated in the literature and in knowledge management/knowledge sharing programs.	K2
5	Learn about the ethical issues and problems inherent in knowledge management /knowledge sharing.	K2

5.Course Code and Name : IT6811 and Project Work		
	CO Statements	**Knowledge Level**
1	Analyze Problems in various domains and formulate methodology	K4
2	Develop different solutions and select the optimum solution	K3
3	Conclude using proper evidence to support them	K4

Mahendra College of Engineering SALEM 636 106 Mahendra Salem Campus

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TAMILNADU

DEPARTMENT OF BIOMEDICAL ENGINEERING

2021 REGULATION

B.E – BIOMEDICAL ENGINEERING (2021 REGULATION)

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PEO1: To enable the graduates to demonstrate their skills in design and develop medical devices for health care system through the core foundation and knowledge acquired in engineering and biology.

PEO2: To enable the graduates to exhibit leadership in health care team to solve health care problems and make decisions with societal and ethical responsibilities.

PEO3: To Carryout multidisciplinary research, addressing human healthcare problems and sustain technical competence with ethics, safety and standards.

PEO 4: To ensure that graduates will recognize the need for sustaining and expanding their technical competence and engage in learning opportunities throughout their careers.

PROGRAM OUTCOMES (POs)

Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

Design / Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

HOME

Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)
To ensure graduates
PSO1: To design and develop diagnostic and therapeutic devices that reduces physician burnout and enhance the quality of life for the end user by applying fundamentals of Biomedical Engineering.
PSO2: To apply software skills in developing algorithms for solving healthcare related problems in various fields of Medical sector.
PSO3: To adapt to emerging information and communication technologies (ICT) to innovate ideas and solutions for current societal and scientific issues thereby developing indigenous medical instruments that are on par with the existing technology

COURSE OUTCOME STATEMENTS FOR BIOMEDICAL ENGINEERING (2021 REGULATION)

SEMESTER 01

1.Course Code and Name **:HS3152 - Professional English - I**

	CO Statements	**Knowledge Level**
The students should be able to		
1	To use appropriate words in a professional context	K2
2	To gain understanding of basic grammatic structures and use them in right context.	K2
3	To read and infer the denotative and connotative meanings of technical texts	K2
4	To write definitions, descriptions, narrations and essays on various topics	K3

2.Course Code and Name : **MA3151 -Matrices and Calculus**

	CO Statements	**Knowledge Level**
The students should be able to		
1	Use the matrix algebra methods for solving practical problems..	K3
2	Apply differential calculus tools in solving various application problems	K3
3	Able to use differential calculus ideas on several variable functions.	K3
4	Apply different methods of integration in solving practical problems.	K3
5	Apply multiple integral ideas in solving areas, volumes and other practical problems.	K3

3.Course Code and Name : **PH3151 -Engineering Physics**

	CO Statements	**Knowledge Level**
The students should be able to		
1	Understand the importance of mechanics.	K2
2	Express their knowledge in electromagnetic waves.	K2
3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.	K3
4	Understand the importance of quantum physics.	K2
5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.	K3

4.Course Code and Name :**CY3151 -Engineering Chemistry**

	CO Statements	**Knowledge**

		Level
The students should be able to		
1	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.	K2
2	To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.	K2
3	To apply the knowledge of phase rule and composites for material selection requirements.	K2
4	To recommend suitable fuels for engineering processes and applications.	K2
5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.	K2
5.Course Code and Name : **GE3151 -Problem Solving and Python Programming**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop algorithmic solutions to simple computational problems.	K2
2	Develop and execute simple Python programs.	K3
3	Write simple Python programs using conditionals and loops for solving problems.	K3
4	Decompose a Python program into functions	K3
5	Represent compound data using Python lists, tuples, dictionaries etc.	K3
7.Course Code and Name : **BS3171-Physics And Chemistry Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Understand the functioning of various physics laboratory equipment.	K2
2	Use graphical models to analyze laboratory data.	K3
3	Use mathematical models as a medium for quantitative reasoning and describing physical reality.	K3
4	Access, process and analyze scientific information.	K3,K4
5	Solve problems individually and collaboratively.	K3
6	To analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO.	K4
7	To determine the amount of metal ions through volumetric and spectroscopic techniques	K5
8	To analyse and determine the composition of alloys.	K4
9	To learn simple method of synthesis of nanoparticles	K1
10	To quantitatively analyse the impurities in solution by electroanalytical techniques	K4
8.Course Code and Name :**GE3172-English Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	To listen to and comprehend general as well as complex academic information	K2
2	To listen to and understand different points of view in a discussion	K3
3	To speak fluently and accurately in formal and informal communicative contexts	K3
4	To describe products and processes and explain their uses and purposes clearly and accurately	K3
5	To express their opinions effectively in both formal and informal discussions	K3

9.Course Code and Name : **GE3171 -Problem Solving And Python Programming Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop algorithmic solutions to simple computational problems	K6
2	Develop and execute simple Python programs	K6
3	Implement programs in Python using conditionals and loops for solving problems..	K6
4	Deploy functions to decompose a Python program.	K6
5	Process compound data using Python data structures..	K3
6	Utilize Python packages in developing software applications.	K3

SEMESTER 02

1.Course Code and Name : **HS3252-Professional English - II**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	To compare and contrast products and ideas in technical texts.	K2
2	To identify cause and effects in events, industrial processes through technical texts	K2
3	To analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format.	K2
4	To present their ideas and opinions in a planned and logical manner	K3
5	To draft effective resumes in the context of job search.	K3

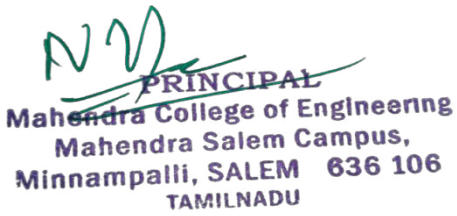
2.Course Code and Name : MA3251 -**Statistics and Numerical Methods**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply the concept of testing of hypothesis for small and large samples in real life problems	K3
2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.	K3
3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems..	K3
4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.	K3
5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	K3

3.Course Code and Name : **BM3251 –Bioscience for Medical Engineering**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the fundamentals of biochemistry	K2
2	Analyze structural and functional aspects of living organisms.	K2
3	Explain the function of microscope	K2
4	Describe methods involved in treating the pathological diseases.	K2

4.Course Code and Name : **BE3251 -Basic Electrical and Electronics Engineering**

	CO Statements	Knowledge Level
The students should be able to		
1	Compute the electric circuit parameters for simple problems.	K5
2	Explain the working principle and applications of electrical machines.	K1
3	Analyze the characteristics of analog electronic devices.	K4
4	Explain the basic concepts of digital electronics.	K1
5	Explain the operating principles of measuring instruments.	K1
5.Course Code and Name :**BM3252 –Medical Physics**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Interpret the properties of electromagnetic radiations and its effect on human.	K5
2	Apply the principles and understand the production of radioactive nuclides.	K1
3	Explain the interaction of radiation with matter	K4
4	Identify and Analyse the radiation quantities and its effects	K1
5	Demonstrate the knowledge on the properties of sound and its application in medicine.	K1
6.Course Code and Name :**GE3251 -Engineering Graphics**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Use BIS conventions and specifications for engineering drawing.	K2
2	Construct the conic curves, involutes and cycloid	K3
3	Solve practical problems involving projection of lines.	K5
4	Draw the orthographic, isometric and perspective projections of simple solids.	K2
5	Draw the development of simple solids.	K6
8.Course Code and Name : **GE3271-Engineering Practices Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.	K6
2	Wire various electrical joints in common household electrical wire work.	K6
3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.	K6
4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.	K6
9.Course Code and Name : **BM3271-Biosciences Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Understand the Biochemistry laboratory functional components	K6
2	Have a sound knowledge of qualitative test of different biomolecules.	K6

3	Understand the basics knowledge of Biochemical parameter and their interpretation in Blood sample	K6
4	Have a sound knowledge of separation technology of proteins and amino acids.	K6
5	Student can perform practical experiments on staining Processes.	K6
11.Course Code and Name : **GE3272-Communication Laboratory / Foreign Language**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Speak effectively in group discussions held in a formal/semi formal contexts.	K6
2	Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions	K6
3	Write emails, letters and effective job applications	K6
4	Write critical reports to convey data and information with clarity and precision	K6
5	Give appropriate instructions and recommendations for safe execution of tasks	K6



(2017 REGULATION)

BE-BIOMEDICAL ENGINEERING (2017 REGULATION)

SEMESTER 01		
1.Course Code and Name : - HS8151 & COMMUNICATIVE ENGLISH		
	CO Statements	**BLT**
The students should be able		
1	To classify the types of listening and writing skills with acquired knowledge	K2
2	To demonstrate speaking skills in various occasions	K2
3	To compare the formal and informal writing skills by using the mail and blocks	K2
4	To apply the speaking etiquitte to build up communication proficiency	K3
5	To develop presentations with the use of LSRW skills	K3
2.Course Code and Name : - MA8151 & ENGINEERING MATHEMATICS-I		
	CO Statements	**BLT**
The students should be able		
1	To solve the Eigen values and Eigen vectors to diagonalise and reduce a matrix to quadratic form	K3
2	To identify the convergences, divergences of infinite series	K3
3	To solve evolutes and envelopes of a given curve by using radius of curvature and center of curvature	K3
4	To identify the maxima and minima value functions of two variables	K3
5	To solve area of plain curves and volume of solid using double and triple integrals	K3
3.Course Code and Name : PH8151 & ENGINEERING PHYSICS		
	CO Statements	**BLT**
The students should be able		
1	To explain the basics of properties of matter and its applications	K2
2	To summarize the concepts of waves and optical devices and their applications in fiber optics	K2
3	To demonstrate the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers	K2
4	To outline the concepts of advanced physics quantum theory and its applications in tunneling microscopes	K2
5	To explain the basics of crystals, their structures and different crystal growth techniques	K2
4.Course Code and Name : CY8151 & ENGINEERING CHEMISTRY		
	CO Statements	**BLT**
The students should be able		
1	To classify the polymers and their utility in the industries and explain the techniques of polymerization and properties of polymers	K2
2	To relate various thermodynamic functions such as enthalpy, entropy, free energy and their importance	K2
3	To explain the photo physical processes such as fluorescence and phosphorescence and various components of UV and IR spectrophotometer	K2
4	To illustrate the phase transitions of one component and two component systems and the types of alloys and their application in industries	K2
5	To outline the synthesis, characteristics and the applications of nano materials	K2
5.Course Code and Name : GE8151 & PROBLEM SOLVING AND PYTHON PROGRAMMING		

	CO Statements	BLT
The students should be able		
1	To know the basics of algorithmic problem solving	K2
2	To read and write simple Python programs	K4
3	To develop Python programs with conditionals and loops	K4
4	To use Python data structures –- lists, tuples, dictionaries	K3
5	To do input/output with files in Python	K4

6.Course Code and Name : GE8152 & ENGINEERING GRAPHICS		
	CO Statements	**BLT**
The students should be able		
1	To demonstrate freehand sketching of basic geometrical constructions and multiple views of objects	K2
2	To develop orthographic projections of points, lines and plane surfaces	K3
3	To construct projections of simple solids and truncated solids	K3
4	To develop projection of sectioned solids and utilize development of surfaces	K3
5	To construct isometric and perspective projections of simple solids	K3

7.Course Code and Name : GE8161 & PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY		
The students should be able		
1	To write, test, and debug simple Python programs	K3
2	To implement Python programs with conditionals and loops	K3
3	To use functions for structuring Python programs	K3
4	To represent compound data using Python lists, tuples, dictionaries	K3
5	To read and write data from/to files in Python	K3

8.Course Code and Name : BS8162 & PHYSICS AND CHEMISTRY LABORATORY		
The students should be able		
1	To make use of spectrometer to find the wavelength of spectral lines, and laser	K3
2	To make use of ultrasonic interferometer and Lee's disc apparatus to find the velocity of sound, compressibility of the liquid and thermal conductivity	K3
3	To demonstrate the estimation of DO content in water sample by Winkler's method and molecular weight of polymer by Ostwald viscometer	K2
4	To experiment with the strength of an acid using pH meter and conductometer	K3
5	To demonstrate the estimation of weak and strong acids in a mixture by conductometer	K2

SEMESTER 02

1.Course Code and Name : - HS8251 & TECHNICAL ENGLISH		
	CO Statements	**BLT**
The students should be able		
1	To develop the communication skills with proper grammar usage	K2
2	To summarize the various advanced technical and non-technical english tools	K2

3	To classify the speaking skills and expression through professional english	K2
4	To apply the interview techniques for career development	K3
5	To outline the use of writing skills to express innovatiove ideas	K3
2.Course Code and Name : - MA8251 & ENGINEERING MATHEMATICS-II		
	CO Statements	**BLT**
The students should be able		
1	To apply solenoidal, irrotational vectors and make use of the concepts of Green's, Gauss divergence , Stokes theorem to evaluate single, double and triple integrals	K3
2	To solve simultaneous linear equations and P.I. of Cauchy and Legendre Equation	K3
3	To solve Laplace Transforms of periodic functions and ODE using Inverse Laplace Transform	K3
4	To make use of the properties of analytic functions for verifying C-R equations for determination of Bilinear Transformation	K3
5	To develop the functions of two variables as Taylor's and Laurent's series and Contour integrals by using Cauchy's Integral formula	K3
3.Course Code and Name : PH8253 & PHYSICS FOR ELECTRONICS ENGINEERING		
	CO Statements	**BLT**
The students should be able		
1	To explain the basics, properties and applications of conducting materials	K2
2	To summarize the properties of semiconducting materials and semiconductor devices.	K2
3	To explain the basics, properties and applications of the magnetic materials and super conducting material	K2
4	To illustrate the concepts, mechanisms and applications of dielectric materials	K2
5	To outline the method of synthesis and explain the properties of Nano materials, SMA, Metallic glasses and Ceramics	K2
4.Course Code and Name : BM8251 & ENGINEERING MECHANICS FOR BIOMEDICAL ENGINEERS		
	CO Statements	**BLT**
The students should be able		
1	To develop the vectorial and scalar representation of forces and moments	K3
2	To solve problems pertaining to rigid bodies in equilibrium	K3
3	To identify the properties of surfaces and solids like centriod and moment of inertia etc.	K3
4	To solve problems pertaining to rigid bodies under the effect of dynamic forces	K3
5	To apply the laws of friction for the solution of simple rigid bodies	K3
5.Course Code and Name : - BM8201 & FUNDAMENTALS OF BIO CHEMISTRY		
	CO Statements	**BLT**
The students should be able		
1	To study structural and functional properties of Biomolecules	K1
2	To understand the structural and functional properties of carbohydrates, proteins and lipids	K2
3	To understand the influence of biomolecules on diseases and disorders	K2
4	To understand the role of the biomolecules by providing basic information on specific metabolic diseases and disorders of these biomolecules	K2
5	To study the classification and applications of enzymes	K2

6.Course Code and Name : EC8251 - CIRCUIT ANALYSIS		
	CO Statements	**BLT**
The students should be able		
1	To understand the basic concepts of DC and AC circuits and analyze them	K4
2	To analyze the transient and steady state response of the circuits subjected to step and sinusoidal excitations.	K4
3	To understand different methods of circuit analysis using Network theorems	K4
4	To understand the concepts of duality and topology.	K4
5	To understand and analyze the Two Port networks	K4
7.Course Code and Name : GE8261 & ENGINEERING PRACTICES LABORATORY		
	CO Statements	**BLT**
The students should be able		
1	To construct carpentry components and pipe connections including plumbing works	K2
2	To make use of welding equipments to join the structures	K3
3	To develop models using sheet metal work	K3
4	To illustrate the working of centrifugal pump and air conditioner	K3
5	To demonstrate basic home electrical works, measurement of the electrical quantities and soldering practices	K3
8.Course Code and Name : BM8211 BIOCHEMISTRY LABORATORY		
	CO Statements	**BLT**
The students should be able		
1	To estimate and quantify biomolecules	K2
2	To understand separation of macromolecules.	K2
3	To estimate and interprete biochemical parameters	K2
4	To determine the type, amount of alkalinity, hardness in a given water sample and evaluate the amount of copper using EDTA method.	K5
5	To examine the potentiometric redox titration and conductometric precipitation titration	K4
SEMESTER 03		
1.Course Code and Name : MA8352- LINEAR ALGEBRA AND PARTIAL DIFFERENTIAL EQUATIONS		
	CO Statements	**BLT**
The students should be able		
1	To solve differential equations using Fourier series analysis for engineering applications.	K3
2	To utilize Dirichlet's condition for finding the Fourier series of a given function	K3
3	To apply Fourier series to solve one dimensional way, one and two dimensional heat equations.	K3
4	To solve Fourier transform for a given function and make use of them to evaluate certain definite Integrals	K3
5	To solve z transforms of standard functions and make use of use them to solve difference equations	K3
2.Course Code and Name : EC8352- SIGNALS AND SYSTEMS		
	CO Statements	**BLT**
The students should be able		
1	To make use of the properties of signals & systems	K3
2	To apply Laplace transform, Fourier transform, Z transform and DTFT in signal analysis	K3
3	To build the continuous time LTI systems using Fourier and Laplace Transforms	K3

4	To build discrete time LTI systems using Z transform and DTFT	K3
5	To apply the transforms in designing the systems	K3
3.Course Code and Name : BM8351 ANATOMY AND HUMAN PHYSIOLOGY		
	CO Statements	**BLT**
The students should be able		
1	To understand the basic structure and functions of cell	K1, K2
2	To learn about the mechanism, types and function of skeletal and respiratory system	K1, K2
3	To understand the interconnect of various systems	K1, K2
4	To learn about the composition of blood and it's function	K1, K2
5	To Learn about the various signal transmission occuring in human body	K1, K2
4.Course Code and Name : BM8301 SENSORS AND MEASUREMENTS		
	CO Statements	**BLT**
The students should be able		
1	To understand the measuring of various electrical parameters with accuracy,precision,resolution.	K2
2	To select appropriate passive or active transducers for measurement of physical phenomenon.	K2
3	To learn selection of appropriate light sensors for measurement of physical phenomenon.	K2
4	To understand AC and DC bridges for relevant parameter measurement.	K2
5	To understand multimeter,CRO and different types of recorders for appropriate measurement.	K2, K3
5.Course Code and Name : EC8353 ELECTRON DEVICES AND CIRCUITS		
	CO Statements	**BLT**
The students should be able		
1	To understand the structure of basic electronic devices.	K2
2	To get exposed to active and passive circuit elements.	K2
3	To get familiarized with the operation and applications of transistor like BJT and FET.	K2
4	To understand the characteristics of amplifier gain and frequency response.	K2
5	To understand the required functionality of positive and negative feedback systems.	K2
6.Course Code and Name : BM8302 PATHOLOGY AND MICROBIOLOGY		
	CO Statements	**BLT**
The students should be able		
1	To learn the structural and functional aspects of living organisms.	K1, K2
2	To know the etiology and remedy in treating the pathological diseases.	K1, K2
3	To learn the structure of Bacteria and virus and their impact on diseases	K1, K2
4	To learn the different types of microscopes	K1, K2
5	To understand the importance of public health.	K1, K2
7.Course Code and Name : BM8311 PATHOLOGY AND MICROBIOLOGY LABORATORY		
	CO Statements	**BLT**
The students should be able		
1	To use compound microscopes	K2
2	To practice on chemical examinations, Cryoprocessing	K2
3	To learn the different staining techniques	K2
4	To perform experiments on tissue processing	K2

5	To perform experiments on tissue processing histopathological examinations	K2
8.Course Code and Name : BM8312 DEVICES AND CIRCUITS LABORATORY		
	CO Statements	**BLT**
The students should be able		
1	To learn the characteristics of basic electronic devices such as Diode, BJT,FET, SCR	K2
2	To analyse the Common Emitter and Common Base Characteristics	K4
3	To verify the Thevinin & Norton theorem, KVL & KCL, and Super Position Theorems	K5
4	To design RL and RC Circuits	K6
5	To understand the working of clipper and clamper circuits	K2
9.Course Code and Name : BM8313 HUMAN PHYSIOLOGY LABORATORY		
	CO Statements	**BLT**
The students should be able		
1	To learn the estimation and quantification of blood cells	K2
2	To understand the Identification and enumeration of blood cells	K2
3	To learn the Enumeration of haematological parameters	K2
4	To analyse of special sensory organs test	K4
5	To learn the estimation and quantification of blood cells	K2

SEMESTER 04		
1.Course Code and Name : MA8391 & PROBABILITY AND STATISTICS		
	CO Statements	**BLT**
The students should be able		
1	To explain the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon.	K2
2	To illustrate the basic concepts of one and two dimensional random variables and apply in engineering applications.	K2
3	To apply the concept random processes in engineering disciplines.	K3
4	To apply the concept of correlation and spectral densities.	K3
5	To analyze the response of random inputs to linear time invariant systems.	K4
2.Course Code and Name : BM8401 MEDICAL PHYSICS		
	CO Statements	**BLT**
The students should be able		
1	To explain about non-ionizing radiation, interaction with tissue and its effects.	K2
2	To define and compare intensities of sensory stimuli	K1
3	To summarize ionizing radiation interaction with the human body and to quantify its levels seen in the environment and healthcare	K2
4	To explain the fundamentals of radioactivity and radioactive isotopes	K2
5	To Illustrates the methods of detecting and recording the ionizing radiation and its interaction with matte	K2
3.Course Code and Name : EE8452 BASICS OF ELECTRICAL ENGINEERING		
	CO Statements	**BLT**
The students should be able		
1	To design simple electrical circuits and understand through nodal, mesh analysis about constructing series and parallel circuits.	K1, K2, K3

2	To understand the basic principles of motors and their different applications	K2
3	To understand power distribution for application of safety principles in biomedical equipments	K2
4	To analyze electromagnetic fields and its effects on different media	K2
5	To understand the basic principles of electric power system and its applications	K2

4.Course Code and Name : EC8453-LINEAR INTEGRATED CIRCUITS		
	CO Statements	**BLT**
The students should be able		
1	To understand the design of linear and non-linear apllications of op-amps.	K2
2	To understand the design applications using Analog multipliers and PLL.	K2
3	To understand designing of ADC and DAC using op-amps.	K2
4	To design waveform Generators using op-amps.	K4
5	To analyze special function ICs.	K4

5.Course Code and Name : EC8393 & FUNDAMENTALS OF DATA STRUCTURES IN C		
	CO Statements	**BLT**
The students should be able		
1	To explain the concepts of Object oriented programming.	K2
2	To develop a simple applications program using C++	K3
3	To discuss the different methods of organizing large amount of data	K6
4	To demonstrate the linear and non-linear data structures	K3
5	To develop a simple applications of linear and non-linear data structures	K2

6.Course Code and Name : EC8392 - Digital Electronics		
	CO Statements	**BLT**
The students should be able		
1	To demonstrate the concept of Boolean algebra and show the correlation between Boolean expressions	K2
2	To construct different methods used for simplification of Boolean expressions	K3
3	To interpret and implement Combinational circuits.	K2
4	To illustrate synchronous and asynchronous sequential circuits	K2
5	To develop a simple HDL codes for the circuits	K2

7.Course Code and Name : EC8381 FUNDAMENTALS OF DATA STRUCTURES IN C LABORATORY		
	CO Statements	**BLT**
The students should be able		
1	To develop and implement C++ programs for manipulating stacks and queues	K2
2	To develop and implement C++ programs for manipulating linked lists, trees, and graphs	K2
3	To apply different data structures in programs	K3
4	To apply good programming design methods for program development.	K3
5	To apply the different data structures for implementing solutions to practical problems	K3

6.Course Code and Name : BM8411 INTEGRATED CIRCUITS LABORATORY		
	CO Statements	**BLT**
The students should be able		
1	To design oscillators and amplifiers using operational amplifiers.	K4
2	To design filters using opamp and perform experiment on frequency response.	K4
3	To analyse the working of PLL and use PLL as frequency mutilplier.	K4
4	To design DC power supply using ICs.	K4
5	To aquire knowledge in using SPICE.	K4

SEMESTER 05		
1.Course Code and Name : EC8394 ANALAOG AND DIGITAL COMMUNICATIONS		
	CO Statements	**BLT**
The students should be able		
1	To understand the importance of analog and digital communication techniques	K4
2	To acquire knowledge about data communication techniques.	K4
3	To be familiarized with source and Error Control Coding	K4
4	To obtain knowledge on multi user radio communication.	K4
5	TO understan the imortance of Pulse Communication Techniques	K4
2.Course Code and Name : BM8501 BIOCONTROL SYSTEMS		
	CO Statements	**BLT**
The students should be able to		
1	To understand the modeling of mechanical, rotational and translational systems	K4
2	To understand and analyze time domain response	K4
3	To understand the concepts of stability and learn different stability analysis	K4
4	To understand and analyze frequency domain response	K4
5	To learn the physiological control system and its similarity with Engineering control system	K4

3.Course Code and Name : BM8502-BIOMEDICAL INSTRUMENTATION		
	CO Statements	**BLT**
The students should be able		
1	To learn about different bio potential electrodes and the related artifacts	K2
2	To learn about different electrode configurations	K2
3	To understand different bio-amplifiers and their applications	K2
4	To understand the measuring of different non-electrical parameters	K2
5	To learn about different bio-chemical parameters	K2

4.Course Code and Name : EC8553 DISCRETE- TIME SIGNAL PROCESSING		
	CO Statements	**BLT**
The students should be able		
1	To learn discrete fourier transform , properties of DFT and its application to linear Filtering	K4
2	To understand the characterstics of digital filters,design digital IIR and FIR Filters	K4
3	To learn the effects of finite precision representation of digital filters	K4
4	To know about the fundamental concepts of multi rate signal processing and its applications	K4
5	To learn the concepts of adaptive filters and its application to communication Engineering	K4

5.Course Code and Name : BM8001- MEDICAL OPTICS		
	CO Statements	**BLT**
The students should be able		
1	To understand the optical properties of the tissues and the interactions of light with tissues	
2	To know about the instrumentation and componenets inMedical Opticss	

3	To learn about Medical Lasers and their applications	
4	To understand about the optical diagonstic applications	
5	To understand emerging optical diagnostic and therupatic equipments	

6.Course Code and Name : OR0551- RENEWAL ENERGY SOURCES		
	CO Statements	**BLT**
The students should be able		
1	To get an Exposure on Solar Radiation and environmental impact to power	K2
2	To acquire knowledge about the various collections used for storing solar energy	K2
3	To know about the various applications in solar energy	K2
4	To learn about the wind energy and biomass	K2
5	To understand about geothermal energy with other energy sources	K2

7.Course Code and Name : EC8562 DIGITAL SIGNAL PROCESSING LABORATORY		
	CO Statements	**BLT**
The students should be able		
1	To develop various types of continuous signal and discrete signal.	K3
2	To demonstrate their abilities towards DSP processor based implementation of DSP system.	K2
3	To analyze a continuous and discrete signals using FFT algorithm.	K4
4	To analyze Finite word length effect on DSP systems.	K4
5	To construct an adaptive filters for various applications of DSP.	K3

8.Course Code and Name : BM8511 & BIOMEDICAL INSTRUMENTATION LABORATORY		
	CO Statements	**BLT**
The students should be able		
1	To design the amplifier for Bio signal measurements	K4
2	To record and analyze bio signals	K4
3	To get training on Measurement of physiological parameters	K4
4	To get training on Measurement of biological parameters	K4
5	To study the characteristics of bio-amplifiers	K4

9.Course Code and Name : HS8381 INTERPERSONAL SKILLS/LISTENING & SPEAKING		
	CO Statements	**BLT**
The students should be able to		
1	To demonstrate reading and writing skills	K2
2	To develop listening and speaking skills	K3
3	To make use of acquired knowledge to take up international examination such as IELTS and TOEFL	K3
4	To apply the interview techniques for career development	K3
5	To illustrate the various aspects of soft skills	K2

SEMESTER 06		
1.Course Code and Name : EC8691 MICROPROCESSORS AND MICROCONTROLLERS		
	CO Statements	**BLT**
The students should be able		
1	To learn the features, architecture and instruction set of 8086	K2

2	To understand the 8086 bus structure	K2
3	To understand the different I/O interfacing techniques	K2
4	To learn about 8051 architecture	K2
5	To learn the different I/O interfacing with 8051 microcontroller	K2

2.Course Code and Name : BM8601 DIAGNOSTIC AND THERAPEUTIC EQUIPMENT I		
	CO Statements	**BLT**
The students should be able		
1	To understand the devices for mesurement of parameters related to cardiology	K2
2	To understand the different equipment related to cardiology	K2
3	To understand the different equipment related to skelatal muscular equipment	K2
4	To learn the basic concepts of biotelemetry and patient monitoring	K2
5	To understand the extra corpeal devices and their applications	K2

3.Course Code and Name : BM8651 BIOMECHANICS		
	CO Statements	**BLT**
The students should be able		
1	To understand the principles of mechanics.	K2
2	To learn the mechanics of physiological systems.	K2
3	To understand the mechanics of joints.	K2
4	To illustrate the mathematical models used in the analysis of biomechanical systems	K2
5	To analyze the biomechanical systems	K4

4.Course Code and Name : GE8291 ENVIRONMENTAL SCIENCE AND ENGINEERING		
	CO Statements	**BLT**
The students should be able		
1	To illlustrate the concepts of an ecosystem , energy flow and conservation of biodiversity.	K2
2	To explain the causes, effects and control of various types of pollution.	K2
3	To outline the conservation of natural resources.	K2
4	To summarize the social issues of environment and legislative guidelines for disaster management.	K2
5	To relate population growth and its impact on environment and human health.	K2

5.Course Code and Name : MD8091 HOSPITAL MANAGEMENT		
	CO Statements	**BLT**
The students should be able		
1	To understand the basic priciples of hospital administration	K2
2	To learn about hospital management and human resource	K2
3	To get familiarizedn with marketing and consumer behaviour	K2
4	To understand hospital information systems	K2
5	To understand the quality and safety aspects in hospital	K2

6.Course Code and Name : MD8071 TELEHEALTH TECHNOLOGY		
	CO Statements	**BLT**
The students should be able		
1	To learn the key principles for telemedicine and health	K2
2	To understand telemedical technology	K2
3	To know telemedical standards, mobile telemedicine and it applications	K2
4	To apply multimedia technologies in telemedicine	K5

5	To apply telehealth in healthcare	K5

7.Course Code and Name : EC8681 MICROPROCESSOR AND MICROCONTROLLER LABORATORY		
	CO Statements	**BLT**
The students should be able		
1	To write ALP Programmes for fixed and Floating Point and Arithmetic operations	K3
2	To interface different I/Os with processor	K3
3	To generate waveforms using Microprocessors	K3
4	To execute Programs in 8051	K3
5	To explain the difference between simulator and Emulator	K3

8.Course Code and Name : BM8611 & DIAGNOSTIC AND THERUPATIC EQUIPMENT LABORATORY		
	CO Statements	**BLT**
The students should be able		
1	To be practiced on recording and analysis of different Bio potentials	K4
2	To study the function of different Therapeutic equipments	K4
3	To analyze the Bio medical signals	K4
4	To check the safety of any medical equipments	K4
5	To develop knowledge about therapeutic equipments	K4
9.Course Code and Name : BM8612 MINIPROJECT		
	CO Statements	**BLT**
The students should be able		
1	To develop knowledge to formulate a technical project	K4
2	To estimate the ability of student in transforming the theoretical knowledge and convert in to a working model of biomedical	K4
3	To gain experience in organisation and implementation of small project	K4
4	to know about use of new tools, algorithms and technique required to carry out the project.	K4
5	To acquire knowledge about guideliness to prepare technical report of the project.	K4
10.Course Code and Name : HS8581 PROFESSIONAL COMMUNICATION		
	CO Statements	**BLT**
The students should be able		
1	To enhance the employability and carreer skills of students	K4
2	To orient the students towards grooming as professional	K4
3	To make them as a Employable Graduates	K4
4	To develop the interpersonal skills	K4
5	To help them to attend interview successfully	K4
SEMESTER 07		
1.Course Code and Name :BM8701 DIAGNOSTIC AND THERAPEUTIC EQUIPMENT-II		
	CO Statements	**BLT**
The students should be able		
1	To understand the various equipment used in ICU and applications of telemetry.	K2
2	To explain the types of diathermy and its applications.	K2
3	To express the basics of ultrasound and its application in medicine	K2

4	To learn the various extracorporeal and special diagnostic devices used in hospitals	K2
5	To outline the importance of patient safety against electrical hazard	K2

2.Course Code and Name : EC8093 DIGITAL IMAGE PROCESSING		
	CO Statements	**BLT**
The students should be able		
1	To interpret the transformation of discrete data between time and frequency domains and also apply mathematical tool for accelerating calculations in signal processing applications	K2
2	To construct IIR filtering for undesired signal and learn the frequency response characteristics of IIR filter	K3
3	To construct FIR filtering for undesired signal and know the linear phase response characteristics of FIR filter	K3
4	To classify the concept of quantization and also analyze how its affect in digital filters	K2
5	To explain various approach for changing the sampling rate of a digital signal is to convert it back into analog and then to re-digitize it at the new rate	K2

3.Course Code and Name :BM8702 RADIOLOGICAL EQUIPMENTS		
	CO Statements	**BLT**
The students should be able		
1	To understand generation of x-rays and its uses in imaging	K2
2	To learn different types of radio diagnostic techniques	K2
3	To know techniques used for visualizing different sections of the body	K2
4	To learn radiation therapy methodologies and the radiation safety	K2
5	To explain the different radio diagnostic and therapeutic techniques	K2

4.Course Code and Name : BM8703 REHABILITATION ENGINEERING		
	CO Statements	**BLT**
The students should be able		
1	To study the principles of rehabilitation	K2
2	To know new rehabilitation concepts for future development and applications	K2
3	To learn therapeutic Exercise Techniques	K2
4	To understand orthopedic prosthetics and orthotics in rehabilitation	K2
5	To explore the principles of management in rehabilitation	K2

5.Course Code and Name : GE8071 DISASTER MANAGEMENT		
	CO Statements	**BLT**
The students should be able		
1	To provide students an exposure to disasters, their significance and types	K2
2	To ensure the students begin to understand the relationship betweeen vulnerability, disasters, disaster prevention and their reduction	K2
3	To gain a perlimnary understanding of apporaches of Disaster risk reduction	K2
4	To enhance awareness of instituional process in the country	K2
5	To develop rudimentry ability to respond to their surroundings with potential disaster response in areas	K2

6.Course Code and Name : OCH752 ENERGY TECHNOLOGY		
	CO Statements	**BLT**
The students should be able		
1	To know the introduction about Global and Indian Energy Scenario	K2
2	To understand the concept of various conventional Energy	K2

3	To acquire knowledge about non convetional energy	K2
4	To gain a knowledge on Biomass Energy	K2
5	To understand the concept of various energy conservation	K2

7.Course Code and Name : EC8762 DIGITAL IMAGE PROCESSING LABORATORY		
	CO Statements	**BLT**
The students should be able		
1	To perform filtering operations in the image	K4
2	To use transforms and analyse the characteristics of the image	K4
3	To write program to analyse the texture of the image	K4
4	To implement project on simple image processing applications	K5
5	To Apply image processing technique to solve real world problems	K5

8.Course Code and Name : MD8751 HOSPITAL TRAINING		
	CO Statements	**BLT**
The students should be able		
1	To advocate a patient-centred approach in healthcare	K2
2	To communicate with other health professionals in a respectful and responsible manner	K2
3	To recognize the importance of inter-professional collaboration in healthcare.	K2
4	To propose a patient-centred inter-professional health improvement plan based upon the patient‘s perceived needs	K2
5	To use the knowledge of one‘s own role and those of other professions to address the healthcare needs of populations and patients served.	K2

SEMESTER 08		
1.Course Code and Name : BM8073 & BIOMETRIC SYSTEMS		
	CO Statements	**BLT**
The students should be able		
1	To understand the technologies of Fingerprint, iris, face and speech recogantion	K2
2	To know about the general principle of design of biometric systems	K2
3	To Recognize personal privacy and security implication of biometrics based identification	K2
4	To identify issues in the realistic evaluavation of biometric systems	K2
5	To understand the general principles underlying trade offs	K2
2.Course Code and Name:GE8076 & PROFESSIONAL ETHICS IN ENGINEERING		
	CO Statements	**BLT**
The students should be able		
1	To enable the students to create an awareness on Engineering Ethics and Human Values	K2
2	To instill Moral and Social Values and Loyalty	K2
3	To appreciate the rights of others	K2
4	To make aware of global issues	K2
5	To understand the social responsibilities and rights	K2

3.Course Code and Name : BM8076 & ELECTRICAL SAFETY AND QUALITY ASSURANCE		
	CO Statements	**BLT**

The students should be able		
1	To understand the basics of Electrical Hazards	K2
2	To clearly understand the standards and requirements of Electrical Hazards	K2
3	To know about the Electrical protection and Maintenance	K2
4	To Acquire knowledge about the standardization of Quality Medical Care in the hospital	K2
5	To know the regulatory requirement of Health care.	K2

4.Course Code and Name : GE8073 & FUNDAMENTAL OF NANOSCIENCE		
	CO Statements	**BLT**
The students should be able		
1	To learn the basic s about Nanoscience	K2
2	To understand the preparation method of Nanomaterial	K2
3	To acquire knowledge about the types of nanomaterials present in the Nanomateials	K2
4	To identfy the methods to preparation of nanomaterials.	K2
5	To understand the applications of Nanomaterials	K2

5.Course Code and Name : BM8811 & PROJECT WORK		
	CO Statements	**BLT**
The students should be able		
1	To demonstrate a sound technical knowledge of their selected project topic.	K2
2	To estimate the problem identification, formulation and solution.	K6
3	To design engineering solutions to complex problems and Conduct an engineering project	K6
4	To construct a group Communicate with engineers and the community at large in written an oral forms.	K6
5	To demonstrate the knowledge, skills and attitudes of a professional engineer.	K2

2013 REGULATION

COURSE OUTCOME STATEMENTS FOR B.E.BIO-MEDICAL ENGINEERING (2013 REGULATION)		
	SEMESTER 01	
1.Course Code and Name : - HS8151 & COMMUNICATIVE ENGLISH		
	CO Statements	**BLT**
The students should be able		
1	To classify the types of listening and writing skills with acquired knowledge	K2
2	To demonstrate speaking skills in various occasions	K2
3	To compare the formal and informal writing skills by using the mail and blocks	K2
4	To apply the speaking etiquitte to build up communication proficiency	K3
5	To develop presentations with the use of LSRW skills	K3
2.Course Code and Name : MA6151 - MATHEMATICS I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Solve the Eigen values and Eigen vectors to diagonalise and reduce a matrix to quadratic form	K3
2	Identify the convergences, divergences of infinite series	K3
3	Solve evolutes and envelopes of a given curve by using radius of curvature and center of curvature	K3
4	Identify the maxima and minima value functions of two variables	K3
5	Solve area of plain curves and volume of solid using double and triple integrals	K3
3.Course Code and Name : PH6151 - ENGINEERING PHYSICS I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the basics of properties of matter and its applications	K2
2	Summarize the concepts of waves and optical devices and their applications in fiber optics	K2
3	Demonstrate the concepts of thermal properties of materials and their applications in expansion joints and heat	K2
4	Outline the concepts of advanced physics quantum theory and its applications in tunneling microscopes	K2
5	Explain the basics of crystals, their structures and different crystal growth techniques	K2
4.Course Code and Name : CY6151 - ENGINEERING CHEMISTRY I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Classify the polymers and their utility in the industries and explain the techniques of polymerization and properties of	K2

2	Relate various thermodynamic functions such as enthalpy, entropy, free energy and their importance	K2
3	Explain the photo physical processes such as fluorescence and phosphorescence and various components of UV and IR spectrophotometer	K2
4	Illustrate the phase transitions of one component and two component systems and the types of alloys and their	K2
5	Outline the synthesis, characteristics and the applications of nano materials	K2
5.Course Code and Name : GE6151- COMPUTER PROGRAMMING		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Describe the function of a Computer and problem solving techniques.	K2
2	Write simple C programs using basic constructs	K3
3	Implement applications to manage data using arrays and strings	K3
4	Apply functions and pointers for solving problems	K3
5	Develop simple applications using structure and union	K3
6.Course Code and Name : GE6152- ENGINEERING GRAPHICS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Demonstrate freehand sketching of basic geometrical constructions and multiple views of objects	K2
2	Develop orthographic projections of points, lines and plane surfaces	K3
3	Construct projections of simple solids and truncated solids	K3
4	Develop projection of sectioned solids and utilize development of surfaces	K3
5	Construct isometric and perspective projections of simple solids	K3
7.Course Code and Name : GE6161- COMPUTER PRACTICES LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply the usage of office automation tools.	K2
2	Apply good programming design methods for program development.	K3
3	Design and implement C programs for simple applications.	K3
4	Develop recursive programs.	K3
8.Course Code and Name : GE6162 - ENGINEERING PRACTICES LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Construct carpentry components and pipe connections including plumbing works	K2

2	Make use of welding equipments to join the structures	K3
3	Develop models using sheet metal work	K3
4	Illustrate the working of centrifugal pump and air conditioner	K3
5	Demonstrate basic home electrical works, measurement of the electrical quantities and soldering practices	
9.Course Code and Name : GE6163 - PHYSICS AND CHEMISTRY LABORATORY - I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Make use of spectrometer to find the wavelength of spectral lines, and laser	K3
	Make use of ultrasonic interferometer and Lee's disc apparatus to find the velocity of sound, compressibility of the	K3
2	liquid and thermal conductivity	
	Demonstrate the estimation of DO content in water sample by Winkler's method and molecular weight of polymer by	K2
3	Ostwald viscometer	
4	Experiment with the strength of an acid using pH meter and conductometer	K3
5	Demonstrate the estimation of weak and strong acids in a mixture by conductometer	K2
		K3
SEMESTER 02		
1.Course Code and Name : - HS6251 & TECHNICAL ENGLISH		
	CO Statements	**BLT**
The students should be able		
1	To develop the communication skills with proper grammar usage	K2
2	To summarize the various advanced technical and non-technical english tools	K2
3	To classify the speaking skills and expression through professional english	K2
4	To apply the interview techniques for career development	K3
5	To outline the use of writing skills to express innovatiove ideas	K3
2.Course Code and Name : - MA6251 & ENGINEERING MATHEMATICS-II		
	CO Statements	**BLT**
The students should be able		
	To apply solenoidal, irrotational vectors and make use of the concepts of Green's, Gauss divergence , Stokes theorem	K3
1	to evaluate single, double and triple integrals	
2	To solve simultaneous linear equations and P.I. of Cauchy and Legendre Equation	K3
3	To solve Laplace Transforms of periodic functions and ODE using Inverse Laplace Transform	K3
4	To make use of the properties of analytic functions for verifying C-R equations for determination of Bilinear	K3

5	To develop the functions of two variables as Taylor's and Laurent's series and Contour integrals by using Cauchy's	K3
3.Course Code and Name : PH6253 & PHYSICS FOR ELECTRONICS ENGINEERING		
	CO Statements	**BLT**
The students should be able		
1	To explain the basics, properties and applications of conducting materials	K2
2	To summarize the properties of semiconducting materials and semiconductor devices.	K2
3	To explain the basics, properties and applications of the magnetic materials and super conducting material	K2
	To illustrate the concepts, mechanisms and applications of dielectric materials	K2
4		
5	To outline the method of synthesis and explain the properties of Nano materials, SMA, Metallic glasses and Ceramics	K2
4.Course Code and Name : BM6251 & ENGINEERING MECHANICS FOR BIOMEDICAL ENGINEERS		
	CO Statements	**BLT**
The students should be able		
1	To develop the vectorial and scalar representation of forces and moments	K3
2	To solve problems pertaining to rigid bodies in equilibrium	K3
3	To identify the properties of surfaces and solids like centriod and moment of inertia etc.	K3
4	To solve problems pertaining to rigid bodies under the effect of dynamic forces	K3
5	To apply the laws of friction for the solution of simple rigid bodies	K3
5.Course Code and Name : - BM6201 & FUNDAMENTALS OF BIO CHEMISTRY		
	CO Statements	**BLT**
The students should be able		
1	To study structural and functional properties of Biomolecules	K1
2	To understand the structural and functional properties of carbohydrates, proteins and lipids	K2
3	To understand the influence of biomolecules on diseases and disorders	K2
4	To understand the role of the biomolecules by providing basic information on specific metabolic diseases and disorders	K2
5	To study the classification and applications of enzymes	K2
6.Course Code and Name : EC6251 - CIRCUIT ANALYSIS		
	CO Statements	**BLT**
The students should be able		
1	To understand the basic concepts of DC and AC circuits and analyze them	K4
2	To analyze the transient and steady state response of the circuits subjected to step and sinusoidal excitations.	K4
3	To understand different methods of circuit analysis using Network theorems	K4

4	To understand the concepts of duality and topology.	K4
5	To understand and analyze the Two Port networks	K4
7.Course Code and Name : GE6261 & ENGINEERING PRACTICES LABORATORY		
	CO Statements	**BLT**
The students should be able		
1	To construct carpentry components and pipe connections including plumbing works	K2
2	To make use of welding equipments to join the structures	K3
3	To develop models using sheet metal work	K3
4	To illustrate the working of centrifugal pump and air conditioner	K3
5	To demonstrate basic home electrical works, measurement of the electrical quantities and soldering practices	K3
8.Course Code and Name : BM6211 BIOCHEMISTRY LABORATORY		
	CO Statements	**BLT**
The students should be able		
1	To estimate and quantify biomolecules	K2
2	To understand separation of macromolecules.	K2
3	To estimate and interprete biochemical parameters	K2
4	To determine the type, amount of alkalinity, hardness in a given water sample and evaluate the amount of copper using	K5
5	To examine the potentiometric redox titration and conductometric precipitation titration	K4
SEMESTER 03		
1.Course Code and Name : MA8352- LINEAR ALGEBRA AND PARTIAL DIFFERENTIAL EQUATIONS		
	CO Statements	**BLT**
The students should be able		
1	To solve differential equations using Fourier series analysis for engineering applications.	K3
2	To utilize Dirichlet's condition for finding the Fourier series of a given function	K3
3	To apply Fourier series to solve one dimensional way, one and two dimensional heat equations.	K3
4	To solve Fourier transform for a given function and make use of them to evaluate certain definite Integrals	K3
5	To solve z transforms of standard functions and make use of use them to solve difference equations	K3
2.Course Code and Name : EC8352- SIGNALS AND SYSTEMS		
	CO Statements	**BLT**
The students should be able		
1	To make use of the properties of signals & systems	K3
2	To apply Laplace transform, Fourier transform, Z transform and DTFT in signal analysis	K3

3	To build the continuous time LTI systems using Fourier and Laplace Transforms	K3
4	To build discrete time LTI systems using Z transform and DTFT	K3
5	To apply the transforms in designing the systems	K3
3.Course Code and Name : BM8351 ANATOMY AND HUMAN PHYSIOLOGY		
	CO Statements	**BLT**
The students should be able		
1	To understand the basic structure and functions of cell	K1, K2
2	To learn about the mechanism, types and function of skeletal and respiratory system	K1, K2
3	To understand the interconnect of various systems	K1, K2
4	To learn about the composition of blood and it's function	K1, K2
5	To Learn about the various signal transmission occuring in human body	K1, K2
4.Course Code and Name : BM8301 SENSORS AND MEASUREMENTS		
	CO Statements	**BLT**
The students should be able		
1	To understand the measuring of various electrical parameters with accuracy,precision,resolution.	K2
2	To select appropriate passive or active transducers for measurement of physical phenomenon.	K2
3	To learn selection of appropriate light sensors for measurement of physical phenomenon.	K2
4	To understand AC and DC bridges for relevant parameter measurement.	K2
5	To understand multimeter,CRO and different types of recorders for appropriate measurement.	K2, K3
5.Course Code and Name : EC6201 Electronic Devices and CIRCUITS		
	CO Statements	**BLT**
The students should be able		
1	To understand the structure of basic electronic devices.	K2
2	To get exposed to active and passive circuit elements.	K2
3	To get familiarized with the operation and applications of transistor like BJT and FET.	K2
4	To understand the characteristics of amplifier gain and frequency response.	K2
5	To understand the required functionality of positive and negative feedback systems.	K2
6.Course Code and Name : BM8302 PATHOLOGY AND MICROBIOLOGY		
	CO Statements	**BLT**
The students should be able		
1	To learn the structural and functional aspects of living organisms.	K1, K2
2	To know the etiology and remedy in treating the pathological diseases.	K1, K2
3	To learn the structure of Bacteria and virus and their impact on diseases	K1, K2
4	To learn the different types of microscopes	K1, K2

5	To understand the importance of public health.	K1, K2
7.Course Code and Name : BM8311 PATHOLOGY AND MICROBIOLOGY LABORATORY		
	CO Statements	**BLT**
The students should be able		
1	To use compound microscopes	K2
2	To practice on chemical examinations, Cryoprocessing	K2
3	To learn the different staining techniques	K2
4	To perform experiments on tissue processing	K2
5	To perform experiments on tissue processing histopathological examinations	K2
8.Course Code and Name : BM8312 DEVICES AND CIRCUITS LABORATORY		
	CO Statements	**BLT**
The students should be able		
1	To learn the characteristics of basic electronic devices such as Diode, BJT,FET, SCR	K2
2	To analyse the Common Emitter and Common Base Characteristics	K4
3	To verify the Thevinin & Norton theorem, KVL & KCL, and Super Position Theorems	K5
4	To design RL and RC Circuits	K6
5	To understand the working of clipper and clamper circuits	K2
9.Course Code and Name : BM8313 HUMAN PHYSIOLOGY LABORATORY		
	CO Statements	**BLT**
The students should be able		
1	To learn the estimation and quantification of blood cells	K2
2	To understand the Identification and enumeration of blood cells	K2
3	To learn the Enumeration of haematological parameters	K2
4	To analyse of special sensory organs test	K4
5	To learn the estimation and quantification of blood cells	K2
SEMESTER 04		
1.Course Code and Name : MA8391 & PROBABILITY AND STATISTICS		
	CO Statements	**BLT**
The students should be able		
	To explain the fundamental knowledge of the concepts of probability and have knowledge of standard distributions	K2
1	which can describe real life phenomenon.	
2	To illustrate the basic concepts of one and two dimensional random variables and apply in engineering applications.	K2
3	To apply the concept random processes in engineering disciplines.	K3
4	To apply the concept of correlation and spectral densities.	K3
5	To analyze the response of random inputs to linear time invariant systems.	K4

2.Course Code and Name : BM8401 MEDICAL PHYSICS		
	CO Statements	**BLT**
The students should be able		
1	To explain about non-ionizing radiation, interaction with tissue and its effects.	K2
2	To define and compare intensities of sensory stimuli	K1
3	To summarize ionizing radiation interaction with the human body and to quantify its levels seen in the environment and	K2
4	To explain the fundamentals of radioactivity and radioactive isotopes	K2
	To Illustrates the methods of detecting and recording the ionizing radiation and its interaction with	K2
5	matte	
3.Course Code and Name : EE8452 BASICS OF ELECTRICAL ENGINEERING		
	CO Statements	**BLT**
The students should be able		
1	To design simple electrical circuits and understand through nodal, mesh analysis about constructing series and parallel	K1, K2, K3
2	To understand the basic principles of motors and their different applications	K2
3	To understand power distribution for application of safety principles in biomedical equipments	K2
4	To analyze electromagnetic fields and its effects on different media	K2
5	To understand the basic principles of electric power system and its applications	K2
4.Course Code and Name : EC8453-LINEAR INTEGRATED CIRCUITS		
	CO Statements	**BLT**
The students should be able		
1	To understand the design of linear and non-linear apllications of op-amps.	K2
2	To understand the design applications using Analog multipliers and PLL.	K2
3	To understand designing of ADC and DAC using op-amps.	K2
4	To design waveform Generators using op-amps.	K4
5	To analyze special function ICs.	K4
5.Course Code and Name : EC8393 & FUNDAMENTALS OF DATA STRUCTURES IN C		
	CO Statements	**BLT**
The students should be able		
1	To explain the concepts of Object oriented programming.	K2
2	To develop a simple applications program using C++	K3
3	To discuss the different methods of organizing large amount of data	K6
4	To demonstrate the linear and non-linear data structures	K3
5	To develop a simple applications of linear and non-linear data structures	K2
6.Course Code and Name : EC8392 - Digital Electronics		
	CO Statements	**BLT**

The students should be able		
1	To demonstrate the concept of Boolean algebra and show the correlation between Boolean expressions	K2
2	To construct different methods used for simplification of Boolean expressions	K3
3	To interpret and implement Combinational circuits.	K2
4	To illustrate synchronous and asynchronous sequential circuits	K2
5	To develop a simple HDL codes for the circuits	K2
7.Course Code and Name : EC8381 FUNDAMENTALS OF DATA STRUCTURES IN C LABORATORY		
	CO Statements	**BLT**
The students should be able		
1	To develop and implement C++ programs for manipulating stacks and queues	K2
2	To develop and implement C++ programs for manipulating linked lists, trees, and graphs	K2
3	To apply different data structures in programs	K3
4	To apply good programming design methods for program development.	K3
5	To apply the different data structures for implementing solutions to practical problems	K3
6.Course Code and Name : BM8411 INTEGRATED CIRCUITS LABORATORY		
	CO Statements	**BLT**
The students should be able		
1	To design oscillators and amplifiers using operational amplifiers.	K4
2	To design filters using opamp and perform experiment on frequency response.	K4
3	To analyse the working of PLL and use PLL as frequency mutilplier.	K4
4	To design DC power supply using ICs.	K4
5	To aquire knowledge in using SPICE.	K4
SEMESTER 05		
1.Course Code and Name : BM6501 BIOCONTROL SYSTEMS		
	CO Statements	**BLT**
The students should be able		
1	To understand the modeling of mechanical, rotational and translational systems	K4
2	To understand and analyze time domain response	K4
3	To understand the concepts of stability and learn different stability analysis	K4
4	To understand and analyze frequency domain response	K4
5	To learn the physiological control system and its similarity with Engineering control system	K4
2.Course Code and Name : BM6502 DIAGNOSTIC AND THERAPEUTIC EQUIPMENT I		
	CO Statements	**BLT**
The students should be able to		

1	To understand the different equipment related to cardiology	K2
2	To understand the different equipment related to cardiology	K2
3	To understand the different equipment related to skelatal muscular equipment	K2
4	To learn the basic concepts of biotelemetry and patient monitoring	K2
5	To understand the extra corpeal devices and their applications	K2
3.Course Code and Name : BM6503-BIOMATERIALS AND ARTIFICIAL ORGANS		
	CO Statements	**BLT**
The students should be able		
1	To learn the structure of biomaterials and their bio-compatability	K2
2	To get famialirized with different implant biomaterials	K2
3	To get famialirized with different polymeric implant materials	K2
4	To learn about tissue replacements and their related implants	K2
5	To get familiarized with artificial organs	K2
4.Course Code and Name : BM6504 BIOMEDICAl INSTRUMENTATION		
	CO Statements	**BLT**
The students should be able		
1	To learn about different bio potential electrodes and the related artifacts	K2
2	To learn about different electrode configurations	K2
3	To understand different bio-amplifiers and their applications	K2
4	To understand the measuring of different non-electrical parameters	K2
5	To learn about different bio-chemical parameters	K2
5.Course Code and Name : EC6504 MICROPROCESSOR AND MICROCONTROLLER		
	CO Statements	**BLT**
The students should be able		
1	To learn the features, architecture and instruction set of 8086	K2
2	To understand the 8086 bus structure	K2
3	To understand the different I/O interfacing techniques	K2
4	To learn about 8051 architecture	K2
5	To learn the different I/O interfacing with 8051 microcontroller	K2
6.Course Code and Name : MD6501 HOSPITAL MANAGEMENT		
	CO Statements	**BLT**
The students should be able		
1	To understand the basic priciples of hospital administration	K2
2	To learn about hospital management and human resource	K2
3	To get familiarizedn with marketing and consumer behaviour	K2
4	To understand hospital information systems	K2
5	To understand the quality and safety aspects in hospital	K2
7.Course Code and Name : BM6511 MICROPROCESSORS AND MICROCONTROLLER LABORATORY		
	CO Statements	**BLT**

The students should be able		
1	To write ALP Programmes for fixed and Floating Point and Arithmetic operations	K3
2	To interface different I/Os with processor	K3
3	To generate waveforms using Microprocessors	K3
4	To execute Programs in 8051	K3
5	To explain the difference between simulator and Emulator	K3
8.Course Code and Name : BM6512 & BIOMEDICAL INSTRUMENTATION LABORATORY		
	CO Statements	**BLT**
The students should be able		
1	To design the amplifier for Bio signal measurements	K4
2	To record and analyze bio signals	K4
3	To get training on Measurement of physiological parameters	K4
4	To get training on Measurement of biological parameters	K4
5	To study the characteristics of bio-amplifiers	K4
9.Course Code and Name : GE6674 & COMMUNICATION AND SOFT SKILLS- LABORATORY BASED		
	CO Statements	**BLT**
The students should be able to		
1	To demonstrate reading and writing skills	K2
2	To develop listening and speaking skills	K3
3	To make use of acquired knowledge to take up international examination such as IELTS and TOEFL	K3
4	To apply the interview techniques for career development	K3
5	To illustrate the various aspects of soft skills	K2
SEMESTER 06		
1.Course Code and Name : BM6601 & RADIOLOGICAL EQUIPMENT		
	CO Statements	**BLT**
The students should be able		
1	To understand generation of x-rays and its uses in imaging	K2
2	To learn different types of radio diagnostic techniques	K2
3	To know techniques used for visualizing different sections of the body	K2
4	To learn radiation therapy methodologies and the radiation safety	K2
5	To explain the different radio diagnostic and therapeutic techniques	K2
2.Course Code and Name : BM6602 & BIOMECHANICS		
	CO Statements	**BLT**
The students should be able		
1	To understand the principles of mechanics.	K2
2	To learn the mechanics of physiological systems.	K2

3	To understand the mechanics of joints.	K2
4	To illustrate the mathematical models used in the analysis of biomechanical systems	K2
5	To analyze the biomechanical systems	K4
3.Course Code and Name : BM6603 DIAGNOSTIC AND THERUPATICE EQUIPMENT II		
	CO Statements	**BLT**
The students should be able		
1	To understand the various equipment used in ICU and applications of telemetry.	K2
2	To explain the types of diathermy and its applications.	K2
3	To express the basics of ultrasound and its application in medicine	K2
4	To learn the various extracorporeal and special diagnostic devices used in hospitals	K2
5	To outline the importance of patient safety against electrical hazard	K2
4.Course Code and Name : EC6502 & PRINCIPLE OF DIGITAL SIGNA PROCESSING		
	CO Statements	**BLT**
The students should be able		
	To interpret the transformation of discrete data between time and frequency domains and also apply mathematical tool	K2
1	for accelerating calculations in signal processing applications	
2	To construct IIR filtering for undesired signal and learn the frequency response characteristics of IIR filter	K3
3	To construct FIR filtering for undesired signal and know the linear phase response characteristics of FIR filter	K3
4	To classify the concept of quantization and also analyze how its affect in digital filters	K2
	To explain various approach for changing the sampling rate of a digital signal is to convert it back into analog and then	K2
5	to re-digitize it at the new rate	
5.Course Code and Name : GE6351 & ENVIRONMENTAL SCIENCE AND ENGINEERING		
	CO Statements	**BLT**
The students should be able		
1	To illlustrate the concepts of an ecosystem , energy flow and conservation of biodiversity.	K2
2	To explain the causes, effects and control of various types of pollution.	K2
3	To outline the conservation of natural resources.	K2
4	To summarize the social issues of environment and legislative guidelines for disaster management.	K2
5	To relate population growth and its impact on environment and human health.	K2
6.Course Code and Name : BM6002 & BIOMETRIC SYSTEMS		
	CO Statements	**BLT**

The students should be able		
1	To understand the technologies of fingerprint, iris, face and speech recognition	K2
2	To understand the general principles of design of biometric systems and the underlying trade-offs	K2
3	To recognize personal privacy and security implications of biometrics based identification technology	K2
4	To identify issues in the realistic evaluation of biometrics based systems	K2
5	To demonstrate knowledge engineering principles underlying biometric systems	K2
7.Course Code and Name : BM6611 & DIGITAL SIGNAL PROCESSING LABORATORY		
	CO Statements	**BLT**
The students should be able		
1	To develop various types of continuous signal and discrete signal.	K3
	To demonstrate their abilities towards DSP processor based	K2
2	implementation of DSP system.	
	To analyze a continuous and discrete signals	K4
3	using FFT algorithm.	
4	To analyze Finite word length effect on DSP systems.	K4
5	To construct an adaptive filters for various applications of DSP.	K3
8.Course Code and Name : BM6612 & DIAGNOSTIC AND THERUPATIC EQUIPMENT LABORATORY		
	CO Statements	**BLT**
The students should be able		
1	To be practiced on recording and analysis of different Bio potentials	K4
2	To study the function of different Therapeutic equipments	K4
3	To analyze the Bio medical signals	K4
4	To check the safety of any medical equipments	K4
5	To develop knowledge about therapeutic equipments	K4
SEMESTER 07		
1.Course Code and Name :BM6701 Pattern Recognition and Neural Networks		
	CO Statements	**BLT**
The students should be able		
1	To understand the fundamentals of pattern recognition and its application.	K2
2	To learn about the computational methods such as linear discriminant functions and nearest neighbor rule	K2
3	To understand the basic neural network architectures and learning algorithms for applications in pattern recognition	K2
4	To analyse the back propagation and associative memory of neural network	K4
5	To design and apply different pattern recognition techniques to the applications of interest.	K5

2.Course Code and Name : BM6702 MEDICAL INFORMATICS		
	CO Statements	**BLT**
The students should be able		
1	To learn about the health informatics and different ICT applications in medicine	K2
2	To understand the various medical standards	K2
3	To study the function of Hospital Information Systems	K2
4	To understand the data storage and automation process of medical data	K2
5	To analyse the recent trends in medical informatics	K4
3.Course Code and Name :BM6703 MEDICAL OPTICS		
	CO Statements	**BLT**
The students should be able		
1	To understand the fundamentals of optical properties of tissues	K2
2	To learn about the photonics	K2
3	To learn the surgical applications of laser	K2
4	To understand about the diagnostic application	K2
5	To understand about the therapeutic application	K2
4.Course Code and Name : IT6005 DIGITAL IMAGE PROCESSING		
	CO Statements	**BLT**
The students should be able		
1	To understand about digital image fundamentals.	K2
2	To apply image enhancement techniques.	K3
3	To apply image restoration techniques.	K3
4	To use image compression and segmentation Techniques.	K4
5	To use image representation	K4
5.Course Code and Name : MD6010 Telehealth Technology		
	CO Statements	**BLT**
The students should be able		
1	To learn the key principles for telemedicine and health	K2
2	To understand telemedical technology	K2
3	To know telemedical standards, mobile telemedicine and it applications	K2
4	To apply multimedia technologies in telemedicine	K5
5	To apply telehealth in healthcare	K5
6.Course Code and Name : CS6551 Computer Networks		
	CO Statements	**BLT**
The students should be able		
1	To describe the basic layers and its functions in Computer Network.	K2
2	To describe the basics of data flows in a network.	K2
3	To analyze and design various routing algorithms.	K3
4	To apply TCP and UDP protocols for various functions.	K3

5	To describe various protocols for application layer.	K2
7.Course Code and Name : BM6712 DIGITAL IMAGE PROCESSING LABORATORY		
	CO Statements	**BLT**
The students should be able		
1	To perform filtering operations in the image	K4
2	To use transforms and analyse the characteristics of the image	K4
3	To write program to analyse the texture of the image	K4
4	To implement project on simple image processing applications	K5
5	To Apply image processing technique to solve real world problems	K5
8.Course Code and Name : BM6711 HOSPITAL TRAINING		
	CO Statements	**BLT**
The students should be able		
1	To advocate a patient-centred approach in healthcare	K2
2	To communicate with other health professionals in a respectful and responsible manner	K2
3	To recognize the importance of inter-professional collaboration in healthcare.	K2
4	To propose a patient-centred inter-professional health improvement plan based upon the patient‘s perceived needs	K2
	To use the knowledge of one‘s own role and those of other professions to address the healthcare needs of populations	K2
5	and patients served.	
SEMESTER 08		
1.Course Code and Name : BM6801 & REHABILATION ENGINEERING		
	CO Statements	**BLT**
The students should be able		
1	To study the principles of rehabilitation	K2
2	To know new rehabilitation concepts for future development and applications	K2
3	To learn therapeutic Exercise Techniques	K2
4	To understand orthopedic prosthetics and orthotics in rehabilitation	K2
5	To explore the principles of management in rehabilitation	K2
2.Course Code and Name:BM6010 & ASSIST DEVICES		
	CO Statements	**BLT**
The students should be able		
1	To study various mechanical techniques that will help failing heart.	K2
2	To learn the functioning of the unit which does the clearance of urea from the blood	K2
3	To understand the tests to assess the hearing loss and development of electronic devices to compensate for the loss	K2

4	To know the various orthodic devices and prosthetic devices to overcome orthopaedic problems	K2
5	To understand electrical stimulation techniques used in clinical applications	K2
3.Course Code and Name : GE6075 & PROFESSIONAL ETHICS IN ENGINEERING		
	CO Statements	**BLT**
The students should be able		
1	To enable the students to create an awareness on Engineering Ethics and Human Values	K2
2	To instill Moral and Social Values and Loyalty	K2
3	To appreciate the rights of others	K2
4	To make aware of global issues	K2
5	To understand the social responsibilities and rights	K2
4.Course Code and Name : BM6012 & WERABLE SYSTEMS		
	CO Statements	**BLT**
The students should be able		
1	To study about sensors and its application in wearable systems	K2
2	To learn about applications of wearable systems	K2
3	To learn the energy harvesting for wearable systems	K2
4	To get familiarized with wireless wearable systems	K2
5	To understand the applications of wearable systems	K2
5.Course Code and Name : BM6811 & PROJECT WORK		
	CO Statements	**BLT**
The students should be able		
1	To demonstrate a sound technical knowledge of their selected project topic.	K2
2	To estimate the problem identification, formulation and solution.	K6
3	To design engineering solutions to complex problems and Conduct an engineering project	K6
4	To construct a group Communicate with engineers and the community at large in written an oral forms.	K6
5	To demonstrate the knowledge, skills and attitudes of a professional engineer.	K2

PRINCIPAL
Mahendra College of Engineering
Mahendra Salem Campus,
Minnampalli, SALEM 636 106
TAMILNADU

DEPARTMENT OF MECHANICAL ENGINEERING

2021 REGULATION

MAHENDRA COLLEGE OF ENGINEERING
(Approved by AICTE, Affiliated to Anna University, Chennai-25)
Chennai Main Road, Minnampalli
Salem – 636106

B.E – MECHANICAL ENGINEERING(2021 REGULATION)

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PEO1: Effectuating success in careers by exploring with the design, digital and computational analysis of engineering systems, experimentation and testing, smart manufacturing, technical services, and research.

PEO2: Amalgamating effectively with stakeholders to update and improve their core competencies and abilities to ethically compete in the ever-changing multicultural global enterprise.

PEO3: To encourage multi-disciplinary research and development to foster advanced technology, and to nurture innovation and entrepreneurship in order to compete successfully in the global economy.

PEO 4: To globally share and apply technical knowledge to create new opportunities that proactively advances our society through team efforts and to solve various challenging technical, environmental and societal problems.

PEO5: To create world class mechanical engineers capable of practice engineering ethically with a solid vision to become great leaders in academia, industries and society.

PROGRAM OUTCOMES (POs)

Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

Design / Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

HOME

Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)

To ensure graduates

PSO1: Apply the knowledge gained in Mechanical Engineering for design and development and manufacture of engineering systems.

PSO2: Apply the knowledge acquired to investigate research-oriented problems in mechanical engineering with due consideration for environmental and social impacts.

PSO3: Use the engineering analysis and data management tools for effective management of multidisciplinary projects.

MAHENDRA COLLEGE OF ENGINEERING

(Approved by AICTE, Affiliated to Anna University, Chennai-25) Chennai Main Road, Minnampalli

Salem – 636106

COURSE OUTCOME STATEMENTS FOR MECHANICAL ENGINEERING (2021 REGULATION)

SEMESTER 01

1.Course Code and Name **:HS3152 - Professional English - I**

	CO Statements	Knowledge Level
The students should be able to		
1	To use appropriate words in a professional context	K2
2	To gain understanding of basic grammatic structures and use them in right context.	K2
3	To read and infer the denotative and connotative meanings of technical texts	K2
4	To write definitions, descriptions, narrations and essays on various topics	K3

2.Course Code and Name : **MA3151 -Matrices and Calculus**

	CO Statements	Knowledge Level
The students should be able to		
1	Use the matrix algebra methods for solving practical problems..	K3
2	Apply differential calculus tools in solving various application problems	K3
3	Able to use differential calculus ideas on several variable functions.	K3
4	Apply different methods of integration in solving practical problems.	K3
5	Apply multiple integral ideas in solving areas, volumes and other practical problems.	K3

3.Course Code and Name : **PH3151 -Engineering Physics**

	CO Statements	Knowledge Level
The students should be able to		
1	Understand the importance of mechanics.	K2

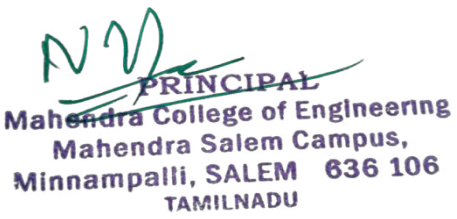
HOME

2	Express their knowledge in electromagnetic waves.	K2
3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.	K3
4	Understand the importance of quantum physics.	K2
5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.	K3
4.Course Code and Name :**CY3151 -Engineering Chemistry**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.	K2
2	To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.	K2
3	To apply the knowledge of phase rule and composites for material selection requirements.	K2
4	To recommend suitable fuels for engineering processes and applications.	K2
5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.	K2
5.Course Code and Name : **GE3151 -Problem Solving and Python Programming**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop algorithmic solutions to simple computational problems.	K2
2	Develop and execute simple Python programs.	K3
3	Write simple Python programs using conditionals and loops for solving problems.	K3
4	Decompose a Python program into functions	K3
5	Represent compound data using Python lists, tuples, dictionaries etc.	K3
6.Course Code and Name : **GE3152 –Heritage of Tamils**		
7.Course Code and Name : **BS3171-Physics And Chemistry Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Understand the functioning of various physics laboratory equipment.	K2
2	Use graphical models to analyze laboratory data.	K3
3	Use mathematical models as a medium for quantitative reasoning and describing physical reality.	K3
4	Access, process and analyze scientific information.	K3,K4
5	Solve problems individually and collaboratively.	K3
6	To analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO.	K4
7	To determine the amount of metal ions through volumetric and spectroscopic techniques	K5
8	To analyse and determine the composition of alloys.	K4
9	To learn simple method of synthesis of nanoparticles	K1
10	To quantitatively analyse the impurities in solution by electroanalytical techniques	K4
8.Course Code and Name :**GE3172-English Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	To listen to and comprehend general as well as complex academic information	K2
2	To listen to and understand different points of view in a discussion	K3

3	To speak fluently and accurately in formal and informal communicative contexts	K3
4	To describe products and processes and explain their uses and purposes clearly and accurately	K3
5	To express their opinions effectively in both formal and informal discussions	K3
9.Course Code and Name : **GE3171 -Problem Solving And Python Programming Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop algorithmic solutions to simple computational problems	K6
2	Develop and execute simple Python programs	K6
3	Implement programs in Python using conditionals and loops for solving problems..	K6
4	Deploy functions to decompose a Python program.	K6
5	Process compound data using Python data structures..	K3
6	Utilize Python packages in developing software applications.	K3
SEMESTER 02		
1.Course Code and Name : **HS3252-Professional English - II**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	To compare and contrast products and ideas in technical texts.	K2
2	To identify cause and effects in events, industrial processes through technical texts	K2
3	To analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format.	K2
4	To present their ideas and opinions in a planned and logical manner	K3
5	To draft effective resumes in the context of job search.	K3
2.Course Code and Name : MA3251 -**Statistics and Numerical Methods**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply the concept of testing of hypothesis for small and large samples in real life problems	K3
2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.	K3
3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems..	K3
4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.	K3
5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	K3
3.Course Code and Name : **PH3251 –Materials Science**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	know basics of crystallography and its importance for varied materials properties	K2
2	gain knowledge on the electrical and magnetic properties of materials and their applications	K2
3	understand clearly of semiconductor physics and functioning of semiconductor devices	K2
4	understand the optical properties of materials and working principles of various optical devices	K2
5	appreciate the importance of functional nanoelectronic devices.	K2

4.Course Code and Name : **BE3251 -Basic Electrical and Electronics Engineering**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Compute the electric circuit parameters for simple problems.	K5
2	Explain the working principle and applications of electrical machines.	K1
3	Analyze the characteristics of analog electronic devices.	K4
4	Explain the basic concepts of digital electronics.	K1
5	Explain the operating principles of measuring instruments.	K1
5.Course Code and Name :**GE3251 -Engineering Graphics**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Use BIS conventions and specifications for engineering drawing.	K2
2	Construct the conic curves, involutes and cycloid	K3
3	Solve practical problems involving projection of lines.	K5
4	Draw the orthographic, isometric and perspective projections of simple solids.	K2
5	Draw the development of simple solids.	K6
8.Course Code and Name: **GE3252 -□□□□□□□□□□ /Heritage of Tamils**		
9.Course Code and Name : **GE3271-Engineering Practices Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.	K6
2	Wire various electrical joints in common household electrical wire work.	K6
3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.	K6
4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.	K6
10.Course Code and Name : **BE3271-Basic Electrical and Electronics Engineering Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Use experimental methods to verify the Ohm's and Kirchhoff's Laws	K6
2	Analyze experimentally the load characteristics of electrical machines	K6
3	Analyze the characteristics of basic electronic devices	K6
4	Use DSO to measure the various parameters	K6
11.Course Code and Name : **GE3272-Communication Laboratory / Foreign Language**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Speak effectively in group discussions held in a formal/semi formal contexts.	K6
2	Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions	K6

3	Write emails, letters and effective job applications	K6
4	Write critical reports to convey data and information with clarity and precision	K6
5	Give appropriate instructions and recommendations for safe execution of tasks	K6



2017 REGULATION

DEPARTMENT OF MECHANICAL ENGINEERING

2017 REGULATION

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1	Have a successful career in Mechanical Engineering and allied industries.
PEO 2	Have expertise in the areas of Design, Thermal, Materials and Manufacturing
PEO 3	Contribute towards technological development through academic research and industrial practices.
PEO 4	Practice their profession with good communication, leadership, ethics and social responsibility.
PEO 5	Graduates will adapt to evolving technologies through life-long learning.

PROGRAM OUTCOMES (POs)

PO1	An ability to apply knowledge of mathematics and engineering sciences to develop mathematical models for industrial problems.
PO2	An ability to identify, formulates, and solve complex engineering problems. with high degree of competence.
PO3	An ability to design and conduct experiments, as well as to analyze and interpret data obtained through those experiments.
PO4	An ability to design mechanical systems, component, or a process to meet desired needs within the realistic constraints such as environmental, social, political and economic sustainability.
PO5	An ability to use modern tools, software and equipment to analyze multidisciplinary problems.
PO6	An ability to demonstrate on professional and ethical responsibilities.
PO7	An ability to communicate, write reports and express research findings in a scientific community
PO8	An ability to adapt quickly to the global changes and contemporary practices.
PO9	An ability to engage in life-long learning.

HOME

LIST OF COURSES

REGULATION 2017

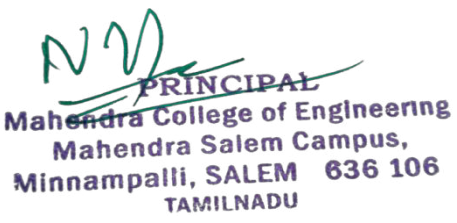
MECHANICAL ENGINEERING REGULATION 2017		
SEMESTER I		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	HS8151	Communicative English
2	MA8151	Engineering Mathematics - I
3	PH8151	Engineering Physics
4	CY8151	Engineering Chemistry
5	GE8151	Problem Solving and Python Programming
6	GE8152	Engineering Graphics
PRACTICALS		
7	GE8161	Problem Solving and Python Programming Laboratory
8	BS8161	Physics and Chemistry Laboratory
SEMESTER II		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	HS8251	Technical English
2	MA8251	Engineering Mathematics - II
3	PH8251	Materials Science
4	BE8253	Basic Electrical, Electronics and Instrumentation Engineering
5	GE8291	Environmental Science and Engineering
6	GE8292	Engineering Mechanics
PRACTICALS		
9	GE8261	Engineering Practices Laboratory
10	BE8261	Basic Electrical, Electronics and Instrumentation Engineering Laboratory
SEMESTER III		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	MA8353	Transforms and Partial Differential Equations
2	ME8391	Engineering Thermodynamics
3	CE8394	Fluid Mechanics and Machinery
4	ME8351	Manufacturing Technology - I
5	EE8353	Electrical Drives and Controls
PRACTICALS		
6	ME8361	Manufacturing Technology Laboratory - I
7	ME8381	Computer Aided Machine Drawing

HOME

8	EE8361	Electrical Engineering Laboratory
9	HS8381	Interpersonal Skills/Listening &Speaking
SEMESTER IV		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	MA8452	Statistics and Numerical Methods
2	ME8492	Kinematics of Machinery
3	ME8451	Manufacturing Technology – II
4	ME8491	Engineering Metallurgy
5	CE8395	Strength of Materials for Mechanical Engineers
6	ME8493	Thermal Engineering- I
PRACTICALS		
7	ME8462	Manufacturing Technology Laboratory – II
8	CE8381	Strength of Materials and Fluid Mechanics and Machinery Laboratory
9	HS8461	Advanced Reading and Writing
SEMESTER V		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	ME8595	Thermal Engineering- II
2	ME8593	Design of Machine Elements
3	ME8501	Metrology and Measurements
4	ME8594	Dynamics of Machines
5	ORO551	Renewable Energy Sources
PRACTICALS		
7	ME8511	Kinematics and Dynamics Laboratory
8	ME8512	Thermal Engineering Laboratory
9	ME8513	Metrology and Measurements Laboratory
SEMESTER VI		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	ME8651	Design of Transmission Systems
2	ME8691	Computer Aided Design and Manufacturing
3	ME8693	Heat and Mass Transfer
4	ME8692	Finite Element Analysis
5	ME8694	Hydraulics and Pneumatics
6	ME8091	Automobile Engineering
7	PR8592	Welding Technology
PRACTICALS		
7	ME8681	CAD / CAM Laboratory
8	ME8682	Design and Fabrication Project

9	HS8581	Professional Communication

SEMESTER VII		
S. NO.	**COURSE CODE**	**COURSE TITLE**
THEORY		
1	ME8792	Power Plant Engineering
2	ME8793	Process Planning and Cost Estimation
3	ME8791	Mechatronics
4	OML751	Testing of Materials
5	ME8073	Unconventional Machining Processes
6	MF8071	Additive Manufacturing
7	ME8097	Non Destructive Testing and Evaluation
PRACTICALS		
7	ME8711	Simulation and Analysis Laboratory
8	ME8781	Mechatronics Laboratory
9	ME8712	Technical Seminar
SEMESTER VIII		
S. NO.	**COURSE CODE**	**COURSE TITLE**
PRACTICALS		
1	MG8591	Principles of Management
2	IE8693	Production Planning and Control
3	MG8091	Entrepreneurship Development
4	ME8094	Computer Integrated Manufacturing Systems
PRACTICALS		
3	ME8811	Project Work



COURSE OUTCOME FOR MECHANICAL ENGINEERING

DEGREE	**U.G**
PROGRAMME	**B.E - MECHANICAL ENGINEERING**
ACADEMIC YEAR	**2017-18**
REGULATION	**2017**

SEMESTER 01		
1.Course Code and Name : HS8151 - Communicative English		
	CO Statements	**Knowledge Level**
AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:		
1	Read articles of a general kind in magazines and newspapers.	K2
2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.	K2
3	Comprehend conversations and short talks delivered in English	K2
4	Write short essays of a general kind and personal letters and emails in English	K3
2.Course Code and Name : MA8151 ENGINEERING MATHEMATICS – I		
	CO Statements	**Knowledge Level**
After completing this course, students should demonstrate competency in the following skills:		
1	Use both the limit definition and rules of differentiation to differentiate functions.	K2
2	Apply differentiation to solve maxima and minima problems.	K3
3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theoremof Calculus.	K5
4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.	K3
5	Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.	K5
6	Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.	K2
7	Apply various techniques in solving differential equations.	K3
3.Course Code and Name : PH8151 ENGINEERING PHYSICS		
	CO Statements	**Knowledge Level**
Upon completion of this course,		
1	The students will gain knowledge on the basics of properties of matter and its applications,	K3
2	The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,	K3

3	The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers,	K3
4	The students will get knowledge on advanced physics concepts of quantum theory andits applications in tunneling microscopes, and	K3
5	The students will understand the basics of crystals, their structures and different crystal growth techniques.	K4
4.Course Code and Name : CY8151 ENGINEERING CHEMISTRY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.	K3
2	Relate various thermodynamic functions such as enthalpy, entropy, free energy and theirimportance	K4
3	Explain the photo physical processes such as fluorescence and phosphorescence and various components of UV and IR spectrophotometer	K2
4	Illustrate the phase transitions of one component and two component systems and the types of alloys and their application in industries	K2
5	Outline the synthesis, characteristics and the applications of nano materials	K3
5.Course Code and Name : GE8151 PROBLEM SOLVING AND PYTHON PROGRAMMING		
	CO Statements	**Knowledge Level**
Upon completion of the course, students will be able to		
1	Develop algorithmic solutions to simple computational problems	K3
2	Read, write, execute by hand simple Python programs.	K3
3	Structure simple Python programs for solving problems.	K4
4	Decompose a Python program into functions.	K4
5	Represent compound data using Python lists, tuples, dictionaries	K4
6	Read and write data from/to files in Python Programs	K4
6.Course Code and Name : GE8152 ENGINEERING GRAPHICS		
	CO Statements	**Knowledge Level**
On successful completion of this course, the student will be able to:		
1	Familiarize with the fundamentals and standards of Engineering graphics	K2
2	Perform freehand sketching of basic geometrical constructions and multiple views of objects	K3
3	Project orthographic projections of lines and plane surfaces.	K2
4	Draw projections and solids and development of surfaces.	K3
5	Visualize and to project isometric and perspective sections of simple solids.	K2

7.Course Code and Name : GE8161 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY		
	CO Statements	**Knowledge Level**
Upon completion of the course, students will be able to:		
1	Write, test, and debug simple Python programs.	K6
2	Implement Python programs with conditionals and loops.	K6
3	Develop Python programs step-wise by defining functions and calling them.	K6
4	Use Python lists, tuples, dictionaries for representing compound data.	K3
5	Read and write data from/to files in Python.	K2

8.Course Code and Name : BS8161 PHYSICS AND CHEMISTRY LABORATORY		
	CO Statements	**Knowledge Level**
Upon completion of the course, the students will be able to		
1	Apply principles of elasticity, optics and thermal properties for engineering applications	K3
2	The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.	K2
3	Experiment with the strength of an acid using pH meter and conductometer	K3

SEMESTER 02

1.Course Code and Name : HS8251 TECHNICAL ENGLISH		
	CO Statements	**Knowledge Level**
At the end of the course learners will be able to:		
1	Read technical texts and write area- specific texts effortlessly.	K2
2	Listen and comprehend lectures and talks in their area of specialisation successfully.	K2
3	Speak appropriately and effectively in varied formal and informal contexts.	K2
4	Write reports and winning job applications.	K3

2.Course Code and Name : MA8251 ENGINEERING MATHEMATICS – II		
	CO Statements	**Knowledge Level**
1	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positivedefinite matrices and similar matrices.	K3
2	Gradient, divergence and curl of a vector point function and related identities	K3
3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green‘s theorems and their verification.	K3
4	Analytic functions, conformal mapping and complex integration.	K3
5	Laplace transform and inverse transform of simple functions, properties, various relatedtheorems and application to differential equations with constant coefficients.	K3

3.Course Code and Name : PH8251 - MATERIALS SCIENCE		
	CO Statements	**Knowledge**

		Level
1	The students will have knowledge on the various phase diagrams and their applications	K2
2	The students will acquire knowledge on Fe-Fe3C phase diagram,various microstructures and alloys	K3
3	The students will get knowledge on mechanical properties of materials and their measurement	K3
4	The students will gain knowledge on magnetic, dielectric and superconducting properties of materials	K2
5	The students will understand the basics of ceramics, composites and nanomaterials.	K2
4.Course Code and Name : BE8253 BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING		
	CO Statements	**Knowledge Level**
1	Understand electric circuits and working principles of electrical machines	K2
2	Understand the concepts of various electronic devices	K2
3	Choose appropriate instruments for electrical measurement for a specific application	K2
5.Course Code and Name : GE8291 ENVIRONMENTAL SCIENCE AND ENGINEERING		
	CO Statements	**Knowledge Level**
1	Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.	K2
2	Public awareness of environmental is at infant stage.	K2
3	Ignorance and incomplete knowledge has lead to misconceptions	K2
4	Development and improvement in std. of living has lead to serious environmental disasters	K2
6.Course Code and Name : GE8292 ENGINEERING MECHANICS		
	CO Statements	**Knowledge Level**
1	Illustrate the vectorial and scalar representation of forces and moments	K3
2	Analyse the rigid body in equilibrium	K3
3	Evaluate the properties of surfaces and solids	K3
4	Calculate dynamic forces exerted in rigid body	K3
5	Determine the friction and the effects by the laws of friction	K3
7.Course Code and Name : GE8261 ENGINEERING PRACTICES LABORATORY		
	CO Statements	**Knowledge Level**
1	Fabricate carpentry components and pipe connections including plumbing works.	K2
2	Use welding equipments to join the structures.	K2
3	Carry out the basic machining operations	K2
4	Make the models using sheet metal works	K6

5	Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings	K2
6	Carry out basic home electrical works and appliances	K2
7	Measure the electrical quantities	K2
8	Elaborate on the components, gates, soldering practices.	K2

	8.Course Code and Name : BE8261 BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING LABORATORY	
	CO Statements	**Knowledge Level**
1	Ability to determine the speed characteristic of different electrical machines	K3
2	Ability to design simple circuits involving diodes and transistors	K3
3	Ability to use operational amplifiers	K3
	SEMESTER 03	
	1.Course Code and Name : MA8353 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS	
	CO Statements	**Knowledge Level**
At the end of the course, students would:		
1	Understand how to solve the given standard partial differential equations.	K2
2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications	K2
3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.	K2
4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.	K2
5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.	K2
	2.Course Code And Name : ME8391 ENGINEERING THERMODYNAMICS	
	CO Statements	**Knowledge Level**
1	Apply the first law of thermodynamics for simple open and closed systems under steady and unsteady conditions.	K3
2	Apply second law of thermodynamics to open and closed systems and calculate entropy and availability.	K6
3	Apply Rankine cycle to steam power plant and compare few cycle improvement methods	K3
4	Derive simple thermodynamic relations of ideal and real gases	K2
5	Calculate the properties of gas mixtures and moist air and its use in psychometric processes	K3
	3.Course Code and Name : CE8394 FLUID MECHANICS AND MACHINERY	
	CO Statements	**Knowledge Level**
1	Apply mathematical knowledge to predict the properties and characteristics of a fluid	K3
2	Can analyse and calculate major and minor losses associated with pipe flow in piping networks.	K3

3	Can mathematically predict the nature of physical quantities	K4
4	Can critically analyse the performance of pumps	K4
5	Can critically analyse the performance of turbines.	K3
4.Course Code and Name : ME8351 MANUFACTURING TECHNOLOGY - I		
	CO Statements	**Knowledge Level**
1	Explain different metal casting processes, associated defects, merits and demerits	K6
2	Compare different metal joining processes.	K6
3	Summarize various hot working and cold working methods of metals.	K3
4	Explain various sheet metal making processes.	K3
5	Distinguish various methods of manufacturing plastic components	K6
5.Course Code and Name : . EE8353 ELECTRICAL DRIVES AND CONTROLS		
	CO Statements	**Knowledge Level**
1	Upon Completion of this subject, the students can able to explain different types of electrical machines and their performance	K2
6.Course Code and Name : ME8361 MANUFACTURING TECHNOLOGY LABORATORY - I		
	CO Statements	**Knowledge Level**
1	Demonstrate the safety precautions exercised in the mechanical workshop.	K2
2	Make the work piece as per given shape and size using Lathe.	K2
3	Join two metals using arc welding.	K2
4	Use sheet metal fabrication tools and make simple tray and funnel	K3
5	Use different moulding tools, patterns and prepare sand moulds.	K3
7.Course Code and Name : ME8381 COMPUTER AIDED MACHINE DRAWING		
	CO Statements	**Knowledge Level**
1	Follow the drawing standards, Fits and Tolerances	K2
2	Re-create part drawings, sectional views and assembly drawings as per standards	K2
8.Course Code and Name :EE8361 ELECTRICAL ENGINEERING LABORATORY		
	CO Statements	**Knowledge Level**
1	Ability to perform speed characteristic of different electrical machine	K3
9.Course Code and Name : HS8381 INTERPERSONAL SKILLS/LISTENING&SPEAKING		
	CO Statements	**Knowledge Level**
1	Listen and respond appropriately.	K1
2	Participate in group discussions	K6
3	Make effective presentations	K6
4	Participate confidently and appropriately in conversations both formal and informal	K6

SEMESTER 04		
1.Course Code and Name : MA8452 STATISTICS AND NUMERICAL METHODS		
	CO Statements	**Knowledge**
The students should be able to		
1	Apply the concept of testing of hypothesis for small and large samples in real life problems.	K2
2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.	K2
3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.	K3
4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.	K2
5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications	K2
2.Course Code and Name : ME8492 KINEMATICS OF MACHINERY		
	CO Statements	**Knowledge Level**
1	Discuss the basics of mechanism	K2
2	Calculate velocity and acceleration in simple mechanisms	K3
3	Develop CAM profiles	K2
4	Solve problems on gears and gear trains	K2
5	Examine friction in machine elements	K2
3.Course Code and Name : ME8451 MANUFACTURING TECHNOLOGY - II		
	CO Statements	**Knowledge Level**
1	Explain the mechanism of material removal processes.	K2
2	Describe the constructional and operational features of centre lathe and other special purpose lathes.	K2
3	Describe the constructional and operational features of shaper, planner, milling, drilling, sawing and broaching machines	K2
4	Explain the types of grinding and other super finishing processes apart from gear manufacturing processes.	K4
5	Summarize numerical control of machine tools and write a part program.	K2
4.Course Code and Name : ME8491 ENGINEERING METALLURGY		
	CO Statements	**Knowledge Level**
1	Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification.	K3
2	Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes.	K4
3	Clarify the effect of alloying elements on ferrous and non-ferrous metals	K4
4	Summarize the properties and applications of non metallic materials.	K2
5	Explain the testing of mechanical properties. .	K4
5.Course Code and Name : CE8395 STRENGTH OF MATERIALS FOR MECHANICAL ENGINEERS		

	CO Statements	Knowledge Level
1	Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes.	K4
2	Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment.	K2
3	Apply basic equation of simple torsion in designing of shafts and helical spring	K2
4	Calculate the slope and deflection in beams using different methods	K2
5	Analyze and design thin and thick shells for the applied internal and external pressures.	K2

6.Course Code and Name : ME8493 THERMAL ENGINEERING - I

	CO Statements	Knowledge Level
1	Apply thermodynamic concepts to different air standard cycles and solve problems.	K2
2	Solve problems in single stage and multistage air compressors	K2
3	Explain the functioning and features of IC engines, components and auxiliaries.	K4
4	Calculate performance parameters of IC Engines.	K3
5	Explain the flow in Gas turbines and solve problems.	K2

7.Course Code and Name : ME8462 MANUFACTURING TECHNOLOGY LABORATORY - II

	CO Statements	Knowledge Level
1	Use different machine tools to manufacturing gears	K2
2	Ability to use different machine tools to manufacturing gears	K3
3	Ability to use different machine tools for finishing operations	K3
4	Ability to manufacture tools using cutter grinder	K3
5	Develop CNC part programming	K4

8.Course Code and Name : CE8381 STRENGTH OF MATERIALS AND FLUID MECHANICS AND MACHINERY LABORATORY

	CO Statements	Knowledge Level
1	Ability to perform Tension, Torsion, Hardness, Compression, and Deformation test on Solid materials.	K2
2	Perform Tension, Torsion, Hardness, Compression, and Deformation test on Solid materials.	K3
3	Use the measurement equipments for flow measurement.	K3
4	Perform test on different fluid machinery	K6

9.Course Code and Name : HS8461 ADVANCED READING AND WRITING

	CO Statements	Knowledge Level
1	Write different types of essays.	K2
2	Write winning job applications.	K2
3	Read and evaluate texts critically.	K2
4	Display critical thinking in various professional contexts.	K2

SEMESTER 05

1.Course Code and Name : ME8595 THERMAL ENGINEERING - II

	CO Statements	Knowledge Level
Upon successful completion of the course, students should be able to:		
1	Solve problems in Steam Nozzle	K3
2	Explain the functioning and features of different types of Boilers and auxiliaries and calculate performance parameters.	K3
3	Explain the flow in steam turbines, draw velocity diagrams for steam turbines and solve problems.	K2
4	Summarize the concept of Cogeneration, Working features of Heat pumps and Heat exchangers	K2
5	Solve problems using refrigerant table / charts and psychrometric charts	K2

2.Course Code and Name : ME8593 DESIGN OF MACHINE ELEMENTS		
	CO Statements	**Knowledge Level**
1	Explain the influence of steady and variable stresses in machine component design.	K2
2	Apply the concepts of design to shafts, keys and couplings.	K5
3	Apply the concepts of design to temporary and permanent joints.	K2
4	Apply the concepts of design to energy absorbing members, connecting rod and crank shaft.	K4
5	Apply the concepts of design to bearings.	K3

3.Course Code and Name : ME8501 METROLOGY AND MEASUREMENTS		
	CO Statements	**Knowledge Level**
1	Describe the concepts of measurements to apply in various metrological instruments	K2
2	Outline the principles of linear and angular measurement tools used for industrial applications	K3
3	Explain the procedure for conducting computer aided inspection.	K3
4	Demonstrate the techniques of form measurement used for industrial components	K3
5	Discuss various measuring techniques of mechanical properties in industrial applications	K3

4.Course Code and Name : ME8594 DYNAMICS OF MACHINES		
	CO Statements	**Knowledge Level**
1	Calculate static and dynamic forces of mechanisms.	K2
2	Calculate the balancing masses and their locations of reciprocating and rotating masses	K2
3	Compute the frequency of free vibration.	K3
4	Compute the frequency of forced vibration and damping coefficient	K2
5	Calculate the speed and lift of the governor and estimate the gyroscopic effect on automobiles, ships and airplanes.	K5

5.Course Code and Name : ORO551 RENEWABLE ENERGY SOURCES		
	CO Statements	**Knowledge Level**
1	Understanding the physics of solar radiation	K1
2	Ability to classify the solar energy collectors and methodologies of storing solar energy.	K3
3	Knowledge in applying solar energy in a useful way.	K1

4	Knowledge in wind energy and biomass with its economic aspects.	K2
5	Knowledge in capturing and applying other forms of energy sources like wind, biogas and geothermal energies.	K2
6.Course Code and Name : ME8511 KINEMATICS AND DYNAMICS LABORATORY		
	CO Statements	**Knowledge Level**
1	Explain gear parameters, kinematics of mechanisms, gyroscopic effect and working of lab equipments.	K1
2	Determine mass moment of inertia of mechanical element, governor effort and range sensitivity, natural frequency and damping coefficient, torsional frequency, critical speeds of shafts, balancing mass of rotating and reciprocating masses, and transmissibility ratio.	K2

7.Course Code and Name : ME8512 THERMAL ENGINEERING LABORATORY		
	CO Statements	**Knowledge Level**
1	Conduct tests on heat conduction apparatus and evaluate thermal conductivity of materials.	K1
2	Conduct tests on natural and forced convective heat transfer apparatus and evaluate heat transfer coefficient.	K3
3	Conduct tests on radiative heat transfer apparatus and evaluate Stefan Boltzmann constant and emissivity.	K1
4	Conduct tests to evaluate the performance of parallel/counter flow heat exchanger apparatus and reciprocating air compressor.	K2
5	Conduct tests to evaluate the performance of refrigeration and airconditioning test rigs.	K2
8.Course Code and Name : ME8513 METROLOGY AND MEASUREMENTS LABORATORY		
	CO Statements	**Knowledge Level**
1	Measure the gear tooth dimensions, angle using sine bar, straightness and flatness, thread parameters, temperature using thermocouple, force, displacement, torque and vibration.	K2
2	Calibrate the vernier, micrometer and slip gauges and setting up the comparator for the inspection.	K4
SEMESTER 06		
1.Course Code and Name : ME8651 DESIGN OF TRANSMISSION SYSTEMS		
	CO Statements	**Knowledge Level**
1	Apply the concepts of design to belts, chains and rope drives.	K2
2	Apply the concepts of design to spur, helical gears.	K2
3	Apply the concepts of design to worm and bevel gears.	K2
4	Apply the concepts of design to gear boxes .	K3
5	Apply the concepts of design to cams, brakes and clutches	K2

2.Course Code and Name : ME8691 COMPUTER DESIGN AND MANUFACTURING		
	CO Statements	**Knowledge Level**
1	Explain the 2D and 3D transformations, clipping algorithm, Manufacturing models and Metrics	K4
2	Explain the fundamentals of parametric curves, surfaces and Solids	K2
3	Summarize the different types of Standard systems used in CAD	K3
4	Apply NC & CNC programming concepts to develop part programme for Lathe & Milling Machines	K4
5	Summarize the different types of techniques used in Cellular Manufacturing and FMS	K3
3.Course Code and Name : ME8693 HEAT AND MASS TRANSFER		
	CO Statements	**Knowledge Level**
At the end of the course, the students should be able to:		
1	Apply heat conduction equations to different surface configurations under steady state and transient conditions and solve problems	K3
2	Apply free and forced convective heat transfer correlations to internal and external flows through/over various surface configurations and solve problems	K3
3	Explain the phenomena of boiling and condensation, apply LMTD and NTU methods of thermal analysis to different types of heat exchanger configurations and solve problems	K3
4	Explain basic laws for Radiation and apply these principles to radiative heat transfer between different types of surfaces to solve problems	K3
5	Apply diffusive and convective mass transfer equations and correlations to solve problems for different applications	K3
4.Course Code and Name : ME8692 FINITE ELEMENT ANALYSIS		
	CO Statements	**Knowledge Level**
1	Summarize the basics of finite element formulation.	K2
2	Apply finite element formulations to solve one dimensional Problems	K2
3	Apply finite element formulations to solve two dimensional scalar Problems	K2
4	Apply finite element method to solve two dimensional Vector problems.	K3
5	Apply finite element method to solve problems on iso parametric element and dynamic Problems	K3
5.Course Code and Name : ME8694 HYDRAULICS AND PNEUMATICS		
	CO Statements	**Knowledge Level**
1	Explain the Fluid power and operation of different types of pumps.	K2
2	Summarize the features and functions of Hydraulic motors, actuators and Flow control valves	K2
3	Explain the different types of Hydraulic circuits and systems	K2
4	Explain the working of different pneumatic circuits and systems	K2
5	Summarize the various trouble shooting methods and applications of hydraulic and pneumatic systems.	K3

6.Course Code and Name : ME8091 AUTOMOBILE ENGINEERING		
	CO Statements	**Knowledge Level**
1	Recognize the various parts of the automobile and their functions and materials	K2
2	Discuss the engine auxiliary systems and engine emission control.	K3
3	Distinguish the working of different types of transmission systems.	K3
4	Explain the Steering, Brakes and Suspension Systems.	K2
5	Predict possible alternate sources of energy for IC Engines	K2

7.Course Code and Name : PR8592 WELDING TECHNOLOGY		
	CO Statements	**Knowledge Level**
1	Understand the construction and working principles of gas and arc welding process	K5
2	Understand the construction and working principles of resistance welding process	K2
3	Understand the construction and working principles of various solid state welding process.	K2
4	Understand the construction and working principles of various special welding processes.	K2
5	Understand the concepts on weld joint design, weldability and testing of weldments.	K2

8.Course Code and Name : ME8681 CAD / CAM LABORATORY		
	CO Statements	**Knowledge Level**
1	Draw 3D and Assembly drawing using CAD software	K5
2	Demonstrate manual part programming with G and M codes using CAM	K5

9.Course Code and Name : ME8682 DESIGN AND FABRICATION PROJECT		
	CO Statements	**Knowledge Level**
1	Design and Fabricate the machine element or the mechanical product.	K3
2	Demonstrate the working model of the machine element or the mechanical product.	K6

10.Course Code and Name : HS8581 PROFESSIONAL COMMUNICATION		
	CO Statements	**Knowledge Level**
1	Make effective presentations	K6
2	Participate confidently in Group Discussions.	K6
3	Attend job interviews and be successful in them.	K6
4	Develop adequate Soft Skills required for the workplace	K6

SEMESTER 07

1.Course Code and Name : ME8792 POWER PLANT ENGINEERING		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the layout, construction and working of the components inside a thermal power plant	K2

2	Explain the layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants.	K2
3	Explain the layout, construction and working of the components inside nuclear power plants	K2
4	Explain the layout, construction and working of the components inside Renewable energy power plants.	K3
5	Explain the applications of power plants while extend their knowledge to power plant economics and environmental hazards and estimate the costs of electrical energy production.	K2
2.Course Code and Name : ME8793 PROCESS PLANNING AND COST ESTIMATION		
	CO Statements	**Knowledge**
1	select the process, equipment and tools for various industrial products	K2
2	Prepare process planning activity chart	K3
3	Explain the concept of cost estimation	K3
4	Compute the job order cost for different type of shop floor	K3
5	Calculate the machining time for various machining operations.	K2
3.Course Code and Name : ME8791 MECHATRONICS		
	CO Statements	**Knowledge Level**
1	Discuss the interdisciplinary applications of Electronics, Electrical, Mechanical and Computer Systems for the Control of Mechanical, Electronic Systems and sensor technology.	K2
2	Discuss the architecture of Microprocessor and Microcontroller, Pin Diagram, Addressing Modes of Microprocessor and Microcontroller.	K1
3	Discuss Programmable Peripheral Interface, Architecture of 8255 PPI, and various device interfacing	K3
4	Explain the architecture, programming and application of programmable logic controllers to problems and challenges in the areas of Mechatronic engineering.	K2
5	Discuss various Actuators and Mechatronics system using the knowledge and skills acquired through the course and also from the given case studies	K3
4.Course Code and Name : OML751 TESTING OF MATERIALS		
	CO Statements	**Knowledge Level**
1	Identify suitable testing technique to inspect industrial component	K2
2	Ability to use the different technique and know its applications and limitations	K2
5.Course Code and Name :ME8073 UNCONVENTIONAL MACHINING PROCESSES		
	CO Statements	**Knowledge Level**
1	Explain the need for unconventional machining processes and its classification	K2
2	Compare various thermal energy and electrical energy based unconventional machining processes.	K2
3	Summarize various chemical and electro-chemical energy based unconventional machining processes.	K2
4	Explain various nano abrasives based unconventional machining processes.	K2

5	Distinguish various recent trends based unconventional machining processes.	K2
6.Course Code and Name : MF8071 ADDITIVE MANUFACTURING		
	CO Statements	**Knowledge Level**
1	On completion of this course, students will learn about a working principle and construction of Additive Manufacturing technologies, their potential to support design and manufacturing, modern development in additive manufacturing process and case studies relevant to mass customized manufacturing.	K2
7.Course Code and Name : ME8097 NON DESTRUCTIVE TESTING AND EVALUATION		
	CO Statements	**Knowledge Level**
1	Explain the fundamental concepts of NDT	K3
2	Discuss the different methods of NDE	K3
3	Explain the concept of Thermography and Eddy current testing	K2
4	Explain the concept of Ultrasonic Testing and Acoustic Emission	K3
5	Explain the concept of Radiography	K3
8.Course Code and Name : ME8711 SIMULATION AND ANALYSIS LABORATORY		
	CO Statements	**Knowledge Level**
1	Simulate the working principle of air conditioning system, hydraulic and pneumatic cylinder and cam follower mechanisms using MATLAB.	K3
2	Analyze the stresses and strains induced in plates, brackets and beams and heat transfer problems.	K3
3	Calculate the natural frequency and mode shape analysis of 2D components and beams	K3
9.Course Code and Name : ME8781 MECHATRONICS LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Demonstrate the functioning of mechatronics system with various pneumatic, hydraulic and electrical systems.	K2
2	Demonstrate the functioning of control systems with the help of PLC and microcontrollers.	K3
SEMESTER 08		
1.Course Code and Name : MG8591 PRINCIPLES OF MANAGEMENT		
	CO Statements	**Knowledge Level**
1	Upon completion of the course, students will be able to have clear understanding of managerial functions like planning, organizing, staffing, leading & controlling and have same basic knowledge on international aspect of management	K4
2.Course Code and Name : IE8693 PRODUCTION PLANNING AND CONTROL		
	CO Statements	**Knowledge Level**

The students should be able to		
1	Upon completion of this course, the students can able to prepare production planning and control activities such as work study, product planning, production scheduling, Inventory Control..	K2
2	They can plan manufacturing requirements manufacturing requirement Planning (MRP II) and Enterprise Resource Planning (ERP).	K3
3.Course Code and Name : MG8091 ENTREPRENEURSHIP DEVELOPMENT		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Upon completion of the course, students will be able to gain knowledge and skills needed to run a business successfully.	K3
4.Course Code and Name : ME8094 COMPUTER INTEGRATED MANUFACTURING SYSTEMS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the basic concepts of CAD, CAM and computer integrated manufacturing systems	K3
2	Summarize the production planning and control and computerized process planning	K3
3	Differentiate the different coding systems used in group technology	K2
4	Explain the concepts of flexible manufacturing system (FMS) and automated guided vehicle (AGV) system	K3
5	Classification of robots used in industrial applications	K3
5.Course Code and Name : ME8811 PROJECT WORK		
	CO Statements	**Knowledge Level**
1	On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology.	K3

2013 REGULATION

COURSE OUTCOME STATEMENTS FOR B.E.MECHANICAL ENGINEERING (2013 REGULATION)		
SEMESTER 01		
1.Course Code and Name : HS6151 - TECHNICAL ENGLISH I		
	CO Statements	**Knowledge Level**
The students should be able to		
	Classify the types of listening and writing skills with acquired knowledge	K2
	Demonstrate speaking skills in various occasions	K2
	Compare the formal and informal writing skills by using the mail and blocks	K2
	Apply the speaking etiquitte to build up communication proficiency	K3
	Develop presentations with the use of LSRW skills	K3
2.Course Code and Name : MA6151 - MATHEMATICS I		
	CO Statements	**Knowledge Level**
The students should be able to		
	Solve the Eigen values and Eigen vectors to diagonalise and reduce a matrix to quadratic form	K3
	Identify the convergences, divergences of infinite series	K3
	Solve evolutes and envelopes of a given curve by using radius of curvature and center of curvature	K3
	Identify the maxima and minima value functions of two variables	K3
	Solve area of plain curves and volume of solid using double and triple integrals	K3
3.Course Code and Name : PH6151 - ENGINEERING PHYSICS I		
	CO Statements	**Knowledge Level**
The students should be able to		
	Explain the basics of properties of matter and its applications	K2
	Summarize the concepts of waves and optical devices and their applications in fiber optics	K2
	Demonstrate the concepts of thermal properties of materials and their applications in expansion joints and heat	K2
	Outline the concepts of advanced physics quantum theory and its applications in tunneling microscopes	K2
	Explain the basics of crystals, their structures and different crystal growth techniques	K2
4.Course Code and Name : CY6151 - ENGINEERING CHEMISTRY I		
	CO Statements	**Knowledge Level**
The students should be able to		
	Classify the polymers and their utility in the industries and explain the techniques of polymerization and	K2
	Relate various thermodynamic functions such as enthalpy, entropy, free energy and their importance	K2
	Explain the photo physical processes such as fluorescence and phosphorescence and various components of	K2
	Illustrate the phase transitions of one component and two component	K2

HOME

	systems and the types of alloys and their	
	Outline the synthesis, characteristics and the applications of nano materials	K2
5.Course Code and Name : GE6151- COMPUTER PROGRAMMING		
	CO Statements	**Knowledge Level**
The students should be able to		
	Describe the function of a Computer and problem solving techniques.	K2
	Write simple C programs using basic constructs	K3
	Implement applications to manage data using arrays and strings	K3
	Apply functions and pointers for solving problems	K3
	Develop simple applications using structure and union	K3
6.Course Code and Name : GE6152- ENGINEERING GRAPHICS		
	CO Statements	**Knowledge Level**
The students should be able to		
	Demonstrate freehand sketching of basic geometrical constructions and multiple views of objects	K2
	Develop orthographic projections of points, lines and plane surfaces	K3
	Construct projections of simple solids and truncated solids	K3
	Develop projection of sectioned solids and utilize development of surfaces	K3
	Construct isometric and perspective projections of simple solids	K3
7.Course Code and Name : GE6161- COMPUTER PRACTICES LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
	Apply the usage of office automation tools.	K2
	Apply good programming design methods for program development.	K3
	Design and implement C programs for simple applications.	K3
	Develop recursive programs.	K3
8.Course Code and Name : GE6162 - ENGINEERING PRACTICES LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
	Construct carpentry components and pipe connections including plumbing works	K2
	Make use of welding equipments to join the structures	K3
	Develop models using sheet metal work	K3
	Illustrate the working of centrifugal pump and air conditioner	K3
	Demonstrate basic home electrical works, measurement of the electrical quantities and soldering practices	K3
9.Course Code and Name : GE6163 - PHYSICS AND CHEMISTRY LABORATORY - I		
	CO Statements	**Knowledge Level**
The students should be able to		
	Make use of spectrometer to find the wavelength of spectral lines, and laser	K3

	Make use of ultrasonic interferometer and Lee's disc apparatus to find the velocity of sound, compressibility	K3
	Demonstrate the estimation of DO content in water sample by Winkler's method and molecular weight of	K2
	Experiment with the strength of an acid using pH meter and conductometer	K3
	Demonstrate the estimation of weak and strong acids in a mixture by conductometer	K2
SEMESTER 02		
1.Course Code and Name : HS6251 - TECHNICAL ENGLISH II		
	CO Statements	**Knowledge Level**
The students should be able to		
	Develop the communication skills with proper grammar usage	K2
	Summarize the various advanced technical and non-technical english tools	K2
	Classify the speaking skills and expression through professional english	K2
	Apply the interview techniques for career development	K3
	Outline the use of writing skills to express innovatiove ideas	K3
2.Course Code and Name : MA6251 - MATHEMATICS II		
	CO Statements	**Knowledge Level**
The students should be able to		
	Apply solenoidal, irrotational vectors and make use of the concepts of Green's, Gauss divergence , Stokes	K3
	Solve simultaneous linear equations and P.I. of Cauchy and Legendre Equation	K3
	Solve Laplace Transforms of periodic functions and ODE using Inverse Laplace Transform	K3
	Make use of the properties of analytic functions for verifying C-R equations for determination of Bilinear	K3
	Develop the functions of two variables as Taylor's and Laurent's series and Contour integrals by using	K3
3.Course Code and Name : PH6251 - ENGINEERING PHYSICS II		
	CO Statements	**Knowledge Level**
The students should be able to		
	Explain the basics, properties and applications of conducting materials	K2
	Summarize the properties of semiconducting materials and semiconductor devices.	K2
	Explain the basics, properties and applications of the magnetic materials and super conducting material	K2
	Illustrate the concepts, mechanisms and applications of dielectric materials	K2
	Outline the method of synthesis and explain the properties of Nano materials, SMA, Metallic glasses and	K2
4.Course Code and Name : CY6251 - ENGINEERING CHEMISTRY I		
	CO Statements	**Knowledge Level**

The students should be able to		
	Explain the problems of using hard water in boilers and methods of treatment of water for boiler use	K2
	Apply the design principles to electro chemical cell. Identify the types of corrosion and the methods of	K3
	Illustrate the methods of harnessing energy from non-conventional energy sources	K2
	Classify various engineering materials and explain their importance	K2
	Relate the significance of solid, liquid and gaseous fuels. Explain the calorific values of fuels and air	K2
5.Course Code and Name : GE6252- BASIC ELECTRICAL AND ELECTRONICS ENGINEERING		
	CO Statements	**Knowledge Level**
The students should be able to		
	Apply the basic theorems to solve problems in Electrical circuits	K3
	Classify the different components and function of electrical machines	K2
	Summarize the characteristics of electronic components	K2
	Outline the basic concepts of communication engineering	K2
	Solve design problems in digital electronic circuits	K3
6.Course Code and Name : GE6253- ENGINEERING MECHANICS		
	CO Statements	**Knowledge Level**
The students should be able to		
	Develop the vectorial and scalar representation of forces and moments	K3
	Solve problems pertaining to rigid bodies in equilibrium	K3
	Identify the properties of surfaces and solids like centriod and moment of inertia etc.	K3
	Solve problems pertaining to rigid bodies under the effect of dynamic forces	K3
	Apply the laws of friction for the solution of simple rigid bodies	K3
7.Course Code and Name : GE6261 - COMPUTER AIDED DRAFTING AND MODELING LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
	Develop front view and top view of simple solids and objects	K3
	Construct isometric projection and sectional views of objects and simple solids	K3
	Construct plan of a residential building	K3
	Demonstrate the drawing of truss and curves	K2
	Model simple objects and construct 2-D multi-view drawings from 3-D using drafting software	K3
8.Course Code and Name :GE6262- PHYSICS AND CHEMISTRY LABORATORY - II		
	CO Statements	**Knowledge Level**
The students should be able to		
	Illustrate the determination of Young's modulus of the beam and moment of inertia and rigidity modules of	K2

	Make use of Poiseuille's method to determine the coefficient of viscosity of the liquid	K3
	Illustrate the determination of dispersive power of a prism and the thickness of a thin wire through	K2
	Experiment with the type, amount of alkalinity, hardness in a given water sample and evaluate the Amount of	K3
	Demonstrate titration by potentiometric redox and conductometric precipitation methods	K2
SEMESTER 03		
1.Course Code and Name : MA6351 - Transforms and Partial Differential Equations		
	CO Statements	**Knowledge Level**
The students should be able to		
	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.	K1
	Understand the mathematical principles on transforms and partial differential equations would provide them the	K2
	classify the given standard partial differential equations	K2
	Explain the physical significance of Fourier series techniques in solving one and two dimensional heat flow prob	K2
	Develop the effective mathematical tools for the solutions of partial differential equations by using Z transform t	K2
2.Course Code and Name : CE6306 - Strength of Materials		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Summarize the concepts of stress and strain in simple and compound bars, the importance of principal stresses	K2
	Construct the load transferring mechanism in beams and stress distribution due to shearing force and bending m	K3
	Apply basic equation of simple torsion in designing of shafts and helical spring.	K3
	Identify the slope and deflection in beams using different methods.	K3
	Analyze and design thin and thick shells for the applied internal and external pressures.	K4
3.Course Code and Name : ME6301 - Engineering Thermodynamics		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Apply the first law of thermodynamics for simple open and closed systems.	K3
	Construct the second law of thermodynamics and apply to open and closed systems	K3
	Make use of Rankine cycle to steam power plant and compare few cycle improvement methods	K3
	Classify the simple thermodynamic relations of ideal and real gases	K2
	Solve the properties of gas mixtures and moist air and its use in psychometric processes	K2
4.Course Code and Name : CE6451 - Fluid Mechanics and Machinery		

	CO Statements	Knowledge Level
	The students should be able to	
	Explain the effect of fluid properties on a flow system and Identify type of fluid flow patterns and describe conti	K2
	Develop the experiments and analyse data on different types of loses in pipes of varying cross section.	K3
	Plan the use dimensional analysis concept in flow problem.	K3
	Identify a performance parameters of a given Centrifugal pump.	K3
	Show the characteristic curves of hydraulic machines.	K2
5.Course Code and Name : ME6302 - Manufacturing Technology - I		
	CO Statements	Knowledge Level
	The students should be able to	
	Explain different metal casting processes, associated defects, merits and demerits	K2
	Compare different metal joining processes.	K2
	Summarize various hot working and cold working methods of metals.	K2
	Explain various sheet metal making processes.	K2
	Distinguish various methods of manufacturing plastic components.	K4
6.Course Code and Name : EE6351 - Electrical Drives and Controls		
	CO Statements	Knowledge Level
	The students should be able to	
	Explain the elements of electrical drives	K2
	Outline drive motor characteristics	K2
	Summarize the starting method of DC and AC motors	K2
	Illustate the conventional speed control of DC and AC drives	K2
	Infer the concepts of Solid State speed Control of DC and AC drives	K2
7.Course Code and Name : ME6311 - Manufacturing Technology Laboratory - I		
	CO Statements	Knowledge Level
	The students should be able to	
	Explain different metal casting processes, associated defects, merits and demerits	K2
	Compare different metal joining processes.	K2
	Summarize various hot working and cold working methods of metals.	K2
	Identify the Work on various sheet metal making processes.	K3
	Distinguish various methods of manufacturing plastic components.	K2
8.Course Code and Name : CE6461 - Fluid Mechanics and Machinery Laboratory		
	CO Statements	Knowledge Level
	The students should be able to	
	Identify the flow in pipes	K3
	Examine the frictional losses in pipes	K4
	Develop characteristics of pumps	K3

	Develop characteristics of turbines	K3
	Analyze the metacentric height of floating bodies	K4

9.Course Code and Name : EE6365 - Electrical Engineering Laboratory		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Demonstrate the speed control of DC motor using different methods	K2
	Demonstrate the load test on DC machines to determine its efficiency	K2
	Build the equivalent circiut of transformer under different loading	K3
	Demonstrate the suitable test on synchronous motor to draw V and Inverted V curves	K2
	Determine the regulation of three phase alternator by Pessimistic and Optimistic methods	K4

Semester 04		
1.Course Code and Name : MA6452 Statistics and Numerical Methods		
	CO Statements	**Knowledge Level**
The students should be able to		
	Apply the concept of testing of hypothesis for small and large samples in real life problems.	K3
	Utilize the basic concepts of classifications of design of experiments in the field of agriculture.	K3
	Develop the numerical techniques of interpolation in various intervals and apply the numerical techniques of diff	K3
	Understand the knowledge of various techniques and methods for solving first and second order ordinary differe	K2
	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniq	K3

2.Course Code and Name : ME6401 - Kinematics of Machinery		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Explain the basics of mechanism	K2
	Analyse the assembly with respect to the displacement, velocity and acceleration	K4
	Construct the CAM profiles	K3
	Analyse problems on gears and gear trains	K4
	Identify the friction in machine elements	K3

3.Course Code and Name : ME6402 - Manufacturing Technology– II		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Explain the mechanism of material removal processes.	K2
	Illustarte the constructional and operational features of centre lathe and other special purpose lathes.	K2

	Describe the constructional and operational features of shaper, planner, milling, drilling,sawing and broaching m	K2
	Classify the types of grinding and other super finishing processes apart from gear manufacturing processes.	K2
	Summarize numerical control of machine tools and write part program.	K2
4.Course Code and Name : ME6403 - Engineering Materials and Metallurgy		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Analyze the phase diagrams of metals/alloys.	K4
	Select appropriate heat-treatment techniques to impart desired properties in materials /alloys.	K3
	Utilize acquire knowledge in the classification, properties, processing methods and applications for various ferr	K3
	Choose the materials and develop novel materials for design and construction.	K3
	Identify the acquire knowledge on how the material properties can be calculated experimentally and recognize t	K3
5.Course Code and Name : GE6351 - Environmental Science and Engineering		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Illustrate the concepts of an ecosystem , energy flow and conservation of biodiversity.	K2
	Explain the causes, effects and control of various types of pollution.	K2
	Outline the conservation of natural resources.	K2
	Summarize the social issues of environment and legislative guidelines for disaster management.	K2
	Relate population growth and its impact on environment and human health.	K4
6.Course Code and Name : ME6404 Thermal Engineering		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Apply thermodynamic concepts to different air standard cycles and solve problems	K3
	Explain the functioning,features	K2
	Make use of the thermodynamic concepts to steam power cycles	K3
	Solve problems in single stage and multistage air compressors	K3
	Summerise the thermodynamic effects on refrigeration and air conditioning	K2
7.Course Code and Name : ME6411 - Manufacturing Technology Laboratory - II		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Utilize different machine tools to manufacturing gears	K3
	Plan different machine tools for finishing operations	K3
	Select the Manufacture tools using cutter grinder	K3

	Develop CNC part programming	K3
8.Course Code and Name : ME6412 Thermal Engineering Laboratory - I		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Solve problems in Steam Nozzle	K3
	Explain the functioning and features of different types of Boilers and auxiliaries and calculate performance para	K3
	Explain the flow in steam turbines, draw velocity diagrams for steam turbines and solve problems.	K3
	Summarize the concept of Cogeneration, Working features of Heat pumps and Heat exchangers	K3
	Identify problems using refrigerant table / charts and psychrometric charts	K3
9.Course Code and Name : CE6315 Strength of Materials Laboratory		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Analyze the various stresses on mild steel rod by conducting tension and torsion tests	K4
	Identify deflection test of metals and carriage springs	K3
	Test for compression strength of wood and helical springs	K4
	Compare hardness and impact strength of different metals	K4
	Examine the shear strength of mild steel rod and properties of cement	K4
SEMESTER 05		
1.Course Code and Name : ME6501 - Computer Aided Design		
	CO Statements	**Knowledge Level**
The students should be able to		
	Explain the fundamentals of Computer Graphics	K2
	Classify the different type of geometric modelling techniques	K2
	Illustrate the various algorithms for visual realism	K2
	Describe the assembly modeling approaches	K2
	Infer the different CAD/CAM data exchange standards	K2
2.Course Code and Name : ME6502 - Heat and Mass Transfer		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Apply heat conduction equations to different surface configurations under steady state and transient conditions t	K3
	Apply convective heat transfer correlations to internal and external flows through various surface configurations	K3
	Explain the phenomena of boiling and condensation and thermal analysis of different types of heat exchanger co	K2
	Explain basic laws for Radiation and apply principles to different types of	K2

	surfaces to solve problems	
	Apply diffusive and convective mass transfer equations and correlations to solve problems for different applicati	K3
3.Course Code and Name : ME6503 Design of Machine Elements		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Explain the influence of steady and variable stresses in machine component design.	K2
	Apply the concepts of design to shafts, keys and couplings.	K3
	Apply the concepts of design to temporary and permanent joints.	K3
	Apply the concepts of design to energy absorbing members, connecting rod and crank shaft.	K3
	Apply the concepts of design to bearings.	K3
4.Course Code and Name : ME6504 Metrology and Measurements		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Explain the basics of standards of measurement, limits, fits &tolerances industrial applications.	K2
	Identify the uses of gauges and comparators.	K3
	Understand the significance of measurement system, errors, transducers, intermediate modifying and terminating	K2
	Comprehend the fundamentals of thermocouple and strain measurement.	K2
	Illustrate the measurement of field variables like force, torque and pressure.	K2
5.Course Code and Name : ME6505 Dynamics of Machines		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Solve static and dynamic forces of mechanisms	K3
	Summarize the balancing masses and their locations of reciprocating and rotating masses	K2
	Determine the frequency of free vibration and damping	K2
	Explain the frequency of forced vibration and damping coefficient	K2
	Illustrate governor variables and estimate the gyroscopic effect on automobiles, ships and airplanes	K2
6.Course Code and Name : GE6075 Professional Ethics in Engineering		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Illustrate the principles of human values	K2
	Demonstrate the techniques and theories of Engineering Ethics	K2
	Explain the procedure for Engineering As Social Experimentation	K2
	Summarize the concept of Safety, Responsibilities And Rights	K2
	Explain the different Global Issues	K2

7.Course Code and Name : ME6511 Dynamics Laboratory		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Demonstrate the principles of kinematics and dynamics of machinery	K2
	Explain the measuring devices for dynamic testing	K2
	Solve the mass moment of inertia of mechanical element, governor effort and range sensitivity, natural fr	K3

8.Course Code and Name : ME6512 Thermal Engineering Laboratory-II		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Explain heat conduction apparatus and evaluate thermal conductivity of materials	K2
	Summarize the natural and forced convective heat transfer apparatus and evaluate heat transfer coefficient	K2
	Compare radiative heat transfer apparatus and evaluate Stefan Boltzmann constant and emissivity	K2
	Conduct tests to evaluate the performance of parallel/counter flow heat exchanger apparatus and reciprocating	K2
	Simplify the performance of refrigeration and airconditioning test rigs	K4

9.Course Code and Name : ME6513 Metrology and Measurements Laboratory		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Explain about the gear tooth dimensions, angle using sine bar, straightness and flatness,temperature using therm	K2
	Make use of the vernier, micrometer and slip gauges and setting up the comparator for the inspection	K3
	Show the testing and measurement with the aid of CMM, Autocollimator & Profile Projector.	K2

SEMESTER 06		

1.Course Code and Name : ME6601 Design of Transmission Systems		
	CO Statements	**Knowledge Level**
The students should be able to		
	Apply the design concepts to belts, chains and rope drives	K3
	Design spur, helical gears	K4
	Design worm and bevel gears	K4
	Design gear boxes	K4
	Apply the concepts of design to cams, clutches and brakes	K3

2.Course Code and Name : MG6851 Principles of Management		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Summarize the evolution of management concepts.	K2
	Classify the functions and principles of management	K2
	Plan the use of POM tools for domain specific applications in an organization	K2
	Demonstrate the application of various motivational theories to enrich the proper leadership qualities in an	K2
	Summarize the various budgetary Techniques.	K2
3.Course Code and Name : ME6602 Automobile Engineering		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Understand the vehicle structure and engines	K2
	Explain the concepts of engine auxiliary systems	K2
	Knowing the concepts of transmission systems	K2
	Demonstrate the steering, brakes and suspension systems	K2
	Utilize alternative energy sources	K3
4.Course Code and Name : ME6603 Finite Element Analysis		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Express the various approximation and elimination methods to find the solution.	K2
	Solve various numerical engineering problems in 1D bar & Truss element.	K3
	Make use of the fem analysis in structural and thermal problem.	K3
	Compile the elements in CST & Axisymmetric.	K4
	Compare iso, super and sub parametric elements.	K2
5.Course Code and Name : ME6604 Gas Dynamics and Jet Propulsion		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Apply the concept of compressible fluid flow in variable area ducts, nozzles and diffusers	K3
	Apply the concept of compressible fluid flow in constant area ducts	K3
	Examine the effect shock waves in compressible flow	K4
	Demonstrate the concept of gas dynamics in Jet Propulsion	K2
	Apply the concepts of gas dynamics in Space Propulsion	K3
6.Course Code and Name : ME6004 Unconventional Machining Processes		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Explain the classification of unconventional machining processes and its	K2
	Demonstrate the mechanical energy base unconventional machining	K2

	processes	
	Discuss the electrical energy based unconventional machining processes	K4
	Summarize various chemical and electrochemical energy based process	K2
	Illustrate various thermal energy based unconventional machining processes	K2
7.Course Code and Name : ME6611 C.A.D. / C.A.M. Laboratory		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Develop 2D and 3D models using modeling softwares.	K3
	Understand the CNC control in modern manufacturing system.	K2
	Construct the CNC part programming and perform manufacturing.	K3
8.Course Code and Name : ME6612 Design and Fabrication Project		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Design and Fabricate the machine element or the mechanical product.	K4
	Demonstrate the working model of the machine element or the mechanical product.	K2
	Conclude using proper evidence to support them	K4
9.Course Code and Name : GE6674- Communication and Soft Skills - Laboratory Based		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Demonstrate reading and writing skills	K2
	Develop listening and speaking skills	K3
	Make use of acquired knowledge to take up international examination such as IELTS and TOEFL	K3
	Apply the interview techniques for career development	K3
	Illustrate the various aspects of soft skills	K2
SEMESTER 07		
1.Course Code and Name : ME6701 Power Plant Engineering		
	CO Statements	**Knowledge Level**
The students should be able to		
	Describe the layout, construction and working of the components of a thermal power plant	K2
	Outline the layout, construction and working of the components of a Diesel, Gas and Combined cycle power	K2
	Illustrate the layout, construction and working of the components of nuclear power plant	K2
	Ouline the layout, construction and working of the components of a	K2

	Renewable energy power plants	
	Explain about energy,economic and environmental issues of power plant	K2
2.Course Code and Name : ME6702 Mechatronics		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Explain about various sensors and its working principles	K2
	Design the microprocessor of 8085 and 8051	K4
	Identify the program and the microcontroller	K3
	Know about the functions, working and selection of PLC	K2
	Design the mechatronic system with electrical and electronic circuits	K4
3.Course Code and Name : ME6703 Computer Integrated Manufacturing Systems		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Make use of CAD/CAM system and will acquire concepts of CAD Packages	K3
	Understand the data transmission methods in CIM.	K2
	Relationshipof the basic knowledge in grouping of manufacturing processes and machines.	K4
	Explain the concepts of flexible manufacturing system (FMS) and automated guided vehicle (AGV) system	K2
	Classification of robots used in industrial applications	K2
4.Course Code and Name : GE6757 Total Quality Management		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Develop an understanding of quality management philosophies and Framework.	K3
	Discuss the need of customer expectations, employee involvement and Supplier partnership.	K4
	Analyze the TQM tools and Techniques to improve the product and process Quality.	K4
	Apply modern tools to improve quality of the product.	K3
	Explain about ISO 9001, Environmental Management Standards and ISO 14001 Certification process.	K2
5.Course Code and Name : ME6005 Process Planning and Cost Estimation		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Choose the process, equipment and tools for various industrial products	K2
	Construct the process planning activity Chart	K2
	Explain the concept of cost estimation	K2
	Illustrate the job order for different type of shop floor	K2
	Solve the machining time for various machining operations	K2
6.Course Code and Name : ME6012 Maintenance Engineering		

	CO Statements	Knowledge Level
	The students should be able to	
	Understand the principles and practices of maintenance planning	K2
	Explain the maintenance policies,preventive maintenance	K2
	Summarize condition monitoring	K2
	Discover the repair methods for basic machine elements	K4
	Understand the repair methods for material handling equipment	K2

7.Course Code and Name : ME6711 Simulation and Analysis Laboratory		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Ebplain about the Model making	K2
	Construct the working principle of air conditioning system, hydraulic and pneumatic cylinder	K3
	Analyse and simulate experiments to meet real world system and evaluate the performance	K4

8.Course Code and Name : ME6712 Mechatronics Laboratory		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Demonstrate the functioning of mechatronics system	K2
	Illustrate the various pneumatic, hydraulic and electrical systems	K2
	Summarize the functioning of control systems with the help of PLC and microcontrollers	K2

9.Course Code and Name : ME6713 Comprehension		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Understand and comprehend any given problem related to mechanical engineering field.	K2
	Solve any given problems related to mechanical engineering field using theoretical concepts	K2
	Develop the ideas to solve the field problems of mechanical engineering.	K4

SEMESTER 08		

1.Course Code and Name : MG6863 Engineering Economics		
	CO Statements	**Knowledge Level**
The students should be able to		
	Explain the skills to apply the basics of economics.	K2
	Show the cost analysis to engineering and take economically sound decisions.	K2
	Illustrate the knowledge about the industrial cost analysis and they will know the importance of costing.	K2
	Make use of decision to keep the equipment or not for the desired	K3

	operation	
	Solve the worth of the machinery	K3
2.Course Code and Name : IE6605 Production Planning and Control		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Explain the systems concept for the design of production and service systems.	K2
	Make use of forecasts in the manufacturing and service sectors using selected quantitative and qualitative techni	K3
	Apply the principles and techniques for planning and control of the production and service systems to optimize/	K3
	Outline the application and evaluation of scheduling and sequencing methodologies	K2
	Understand the importance and function of inventry and to be to apply selected techniques for its control and m	K2
3.Course Code and Name : ME6016 Advanced I.C. Engines		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Understand the principle of spark ignition engine components	K2
	Explain the principle of compression ignition engine components	K2
	Choose the pollutant formation and control	K3
	Summarize various alternative fuels for automobile engines	K2
	Discuss the recent trends I automobile engines	K4
4.Course Code and Name : ME6811 Project Work		
	CO Statements	**Knowledge Level**
	The students should be able to	
	Analyze problems in various domains and formulate methodology	K4
	Develop different solutions and select the optimum solution.	K3
	Conclude using proper evidence to support them	K4

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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

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B.Tech – ARTIFICIAL INTELLIGENCE AND DATA SCIENCE (2021 REGULATION)

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PEO1: Utilize their proficiencies in the fundamental knowledge of basic sciences, mathematics, Artificial Intelligence, data science and statistics to build systems that require management and analysis of large volumes of data.

PEO2: Advance their technical skills to pursue pioneering research in the field of AI and Data Science and create disruptive and sustainable solutions for the welfare of ecosystems.

PEO3: Think logically, pursue lifelong learning and collaborate with an ethical attitude in a multidisciplinary team.

PEO 4: Design and model AI based solutions to critical problem domains in the real world.

PEO5: Exhibit innovative thoughts and creative ideas for effective contribution towards economy building.

PROGRAM OUTCOMES (POs)

Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

Design / Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)

To ensure graduates

PSO1: Evolve AI based efficient domain specific processes for effective decision making in several domains such as business and governance domains.

PSO2: Arrive at actionable Foresight, Insight, hindsight from data for solving business and engineering problems.

PSO3: Create, select and apply the theoretical knowledge of AI and Data Analytics along with practical industrial tools and techniques to manage and solve wicked societal problems.

PSO4: Develop data analytics and data visualization skills, skills pertaining to knowledge acquisition, knowledge representation and knowledge engineering, and hence be capable of coordinating complex projects.

PSO5: Able to carry out fundamental research to cater the critical needs of the society through cutting edge technologies of AI.

MAHENDRA COLLEGE OF ENGINEERING

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COURSE OUTCOME STATEMENTS FOR ARTIFICIAL INTELLIGENCE AND DATA SCIENCE (2021 REGULATION)

SEMESTER 01

1.Course Code and Name **:HS3152 - Professional English - I**

	CO Statements	Knowledge Level
The students should be able to		
1	To use appropriate words in a professional context	K2
2	To gain understanding of basic grammatic structures and use them in right context.	K2
3	To read and infer the denotative and connotative meanings of technical texts	K2
4	To write definitions, descriptions, narrations and essays on various topics	K3

2.Course Code and Name : **MA3151 -Matrices and Calculus**

	CO Statements	Knowledge Level
The students should be able to		
1	Use the matrix algebra methods for solving practical problems..	K3
2	Apply differential calculus tools in solving various application problems	K3
3	Able to use differential calculus ideas on several variable functions.	K3
4	Apply different methods of integration in solving practical problems.	K3
5	Apply multiple integral ideas in solving areas, volumes and other practical problems.	K3

3.Course Code and Name : **PH3151 -Engineering Physics**

	CO Statements	Knowledge Level
The students should be able to		
1	Understand the importance of mechanics.	K2

2	Express their knowledge in electromagnetic waves.	K2
3	Demonstrate a strong foundational knowledge in oscillations, optics and lasers.	K3
4	Understand the importance of quantum physics.	K2
5	Comprehend and apply quantum mechanical principles towards the formation of energy bands.	K3
4.Course Code and Name :**CY3151 -Engineering Chemistry**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water.	K2
2	To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.	K2
3	To apply the knowledge of phase rule and composites for material selection requirements.	K2
4	To recommend suitable fuels for engineering processes and applications.	K2
5	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.	K2
5.Course Code and Name : **GE3151 -Problem Solving and Python Programming**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop algorithmic solutions to simple computational problems.	K2
2	Develop and execute simple Python programs.	K3
3	Write simple Python programs using conditionals and loops for solving problems.	K3
4	Decompose a Python program into functions	K3
5	Represent compound data using Python lists, tuples, dictionaries etc.	K3
6.Course Code and Name : **GE3152 –Heritage of Tamils**		
7.Course Code and Name : **BS3171-Physics And Chemistry Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Understand the functioning of various physics laboratory equipment.	K2
2	Use graphical models to analyze laboratory data.	K3
3	Use mathematical models as a medium for quantitative reasoning and describing physical reality.	K3
4	Access, process and analyze scientific information.	K3,K4
5	Solve problems individually and collaboratively.	K3
6	To analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO.	K4
7	To determine the amount of metal ions through volumetric and spectroscopic techniques	K5
8	To analyse and determine the composition of alloys.	K4
9	To learn simple method of synthesis of nanoparticles	K1
10	To quantitatively analyse the impurities in solution by electroanalytical techniques	K4
8.Course Code and Name :**GE3172-English Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	To listen to and comprehend general as well as complex academic information	K2
2	To listen to and understand different points of view in a discussion	K3

3	To speak fluently and accurately in formal and informal communicative contexts	K3
4	To describe products and processes and explain their uses and purposes clearly and accurately	K3
5	To express their opinions effectively in both formal and informal discussions	K3
9.Course Code and Name : **GE3171 -Problem Solving And Python Programming Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop algorithmic solutions to simple computational problems	K6
2	Develop and execute simple Python programs	K6
3	Implement programs in Python using conditionals and loops for solving problems..	K6
4	Deploy functions to decompose a Python program.	K6
5	Process compound data using Python data structures..	K3
6	Utilize Python packages in developing software applications.	K3
SEMESTER 02		
1.Course Code and Name : **HS3252-Professional English - II**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	To compare and contrast products and ideas in technical texts.	K2
2	To identify cause and effects in events, industrial processes through technical texts	K2
3	To analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format.	K2
4	To present their ideas and opinions in a planned and logical manner	K3
5	To draft effective resumes in the context of job search.	K3
2.Course Code and Name : MA3251 -**Statistics and Numerical Methods**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply the concept of testing of hypothesis for small and large samples in real life problems	K3
2	Apply the basic concepts of classifications of design of experiments in the field of agriculture.	K3
3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems..	K3
4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.	K3
5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	K3
3.Course Code and Name : **PH3256 -Physics for Information Science**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Gain knowledge on classical and quantum electron theories, and energy band structures	K2
2	Acquire knowledge on basics of semiconductor physics and its applications in various devices	K2
3	Get knowledge on magnetic properties of materials and their applications in data storage	K2
4	Have the necessary understanding on the functioning of optical materials for optoelectronics	K2
5	Understand the basics of quantum structures and their applications and basics of quantum computing	K2

4.Course Code and Name : **BE3251 -Basic Electrical and Electronics Engineering**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Compute the electric circuit parameters for simple problems.	K5
2	Explain the working principle and applications of electrical machines.	K1
3	Analyze the characteristics of analog electronic devices.	K4
4	Explain the basic concepts of digital electronics.	K1
5	Explain the operating principles of measuring instruments.	K1

5.Course Code and Name :**GE3251 -Engineering Graphics**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Use BIS conventions and specifications for engineering drawing.	K2
2	Construct the conic curves, involutes and cycloid	K3
3	Solve practical problems involving projection of lines.	K5
4	Draw the orthographic, isometric and perspective projections of simple solids.	K2
5	Draw the development of simple solids.	K6

6.Course Code and Name : **AD3251-Data Structure Design**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain abstract data types	K3
2	Design, implement, and analyse linear data structures, such as lists, queues, and stacks, according to the needs of different applications	K6
3	Design, implement, and analyse efficient tree structures to meet requirements such as searching, indexing, and sorting	K6
4	Model problems as graph problems and implement efficient graph algorithms to solve them	K6

9.Course Code and Name : **GE3271-Engineering Practices Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.	K6
2	Wire various electrical joints in common household electrical wire work.	K6
3	Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts; Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.	K6
4	Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.	K6

10.Course Code and Name : **AD3271-Data Structure Design Laboratory**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Implement ADTs as Python classes	K6
2	Design, implement, and analyse linear data structures, such as lists, queues, and stacks, according to the needs of different applications	K6

3	Design, implement, and analyse efficient tree structures to meet requirements such as searching, indexing, and sorting	K6
4	Model problems as graph problems and implement efficient graph algorithms to solve them	K6
11.Course Code and Name : **GE3272-Communication Laboratory / Foreign Language**		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Speak effectively in group discussions held in a formal/semi formal contexts.	K6
2	Discuss, analyse and present concepts and problems from various perspectives to arrive at suitable solutions	K6
3	Write emails, letters and effective job applications	K6
4	Write critical reports to convey data and information with clarity and precision	K6
5	Give appropriate instructions and recommendations for safe execution of tasks	K6

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DEPARTMENT OF CIVIL ENGINEERING

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2017 REGULATION

MAHENDRA COLLEGE OF ENGINEERING

(Approved by AICTE, Affiliated to Anna University, Chennai-25)
Chennai Main Road, Minnampalli
Salem – 636106

B.E.CIVIL ENGINEERING (2017 REGULATION)

PROGRAM OUTCOMES POs:

Engineering Graduates will be able to:

Graduates will demonstrate knowledge of mathematics, science and engineering
Graduates will demonstrate an ability to identify, formulate and solve engineering problems..
Graduate will demonstrate an ability to design and conduct experiments, analyze and interpret data.
Graduates will demonstrate an ability to design a system, component or process as per needs and specifications
Graduates will demonstrate an ability to visualize and work on laboratory and multidisciplinary tasks
Graduate will demonstrate skills to use modern engineering tools, software and equipment to analyze problems.
Graduates will demonstrate knowledge of professional and ethical responsibilities
Graduate will be able to communicate effectively in both verbal and written form.
Graduate will show the understanding of impact of engineering solutions on the society and also will be aware of contemporary issues.
Graduate will develop confidence for self education and ability for life-long learning.

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COURSE OUTCOME STATEMENTS FOR B.E.CIVIL ENGINEERING (2017 REGULATION)

SEMESTER 01

1.Course Code and Name : HS8151 - Communicative English

	CO Statements	Knowledge Level
AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:		
1	Read articles of a general kind in magazines and newspapers.	K2
2	Participate effectively in informal conversations; introduce themselves and their friends and express opinions in English.	K2
3	Comprehend conversations and short talks delivered in English	K2
4	Write short essays of a general kind in English	K3
5	Write personal letters and emails in English	K2

2.Course Code and Name : MA8151 ENGINEERING MATHEMATICS – I

	CO Statements	Knowledge Level
After completing this course, students should demonstrate competency in the following skills:		
1	Use both the limit definition and rules of differentiation to differentiate functions.	K2

HOME

2	Apply differentiation to solve maxima and minima problems.	K3
3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.	K5
4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.	K3
5	Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.	K5
6	Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.	K2
7	Apply various techniques in solving differential equations.	K3
3.Course Code and Name : PH8151 ENGINEERING PHYSICS		
	CO Statements	**Knowledge Level**
Upon completion of this course,		
1	The students will gain knowledge on the basics of properties of matter and its applications,	K3
2	The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,	K3
3	The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers,	K3
4	The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and	K3
5	The students will understand the basics of crystals, their structures and different crystal growth techniques.	K4
4.Course Code and Name : CY8151 ENGINEERING CHEMISTRY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.	K3
2	Relate various thermodynamic functions such as enthalpy, entropy, free energy and their importance	K4
3	Explain the photo physical processes such as fluorescence and phosphorescence and various components of UV and IR spectrophotometer	K2
4	Illustrate the phase transitions of one component and two component systems and the types of alloys and their application in industries	K2
5	Outline the synthesis, characteristics and the applications of nano materials	K3
5.Course Code and Name : GE8151 PROBLEM SOLVING AND PYTHON PROGRAMMING		
	CO Statements	**Knowledge Level**
Upon completion of the course, students will be able to		
1	Develop algorithmic solutions to simple computational problems	K3
2	Read, write, execute by hand simple Python programs.	K3

3	Structure simple Python programs for solving problems.	K4
4	Decompose a Python program into functions.	K4
5	Represent compound data using Python lists, tuples, dictionaries	K4
6	Read and write data from/to files in Python Programs	K4
6.Course Code and Name : GE8152 ENGINEERING GRAPHICS		
	CO Statements	**Knowledge Level**
On successful completion of this course, the student will be able to:		
1	Familiarize with the fundamentals and standards of Engineering graphics	K2
2	Perform freehand sketching of basic geometrical constructions and multiple views of objects	K3
3	Project orthographic projections of lines and plane surfaces.	K2
4	Draw projections and solids and development of surfaces.	K3
5	Visualize and to project isometric and perspective sections of simple solids.	K2
7.Course Code and Name : GE8161 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY		
	CO Statements	**Knowledge Level**
Upon completion of the course, students will be able to:		
1	Write, test, and debug simple Python programs.	K6
2	Implement Python programs with conditionals and loops.	K6
3	Develop Python programs step-wise by defining functions and calling them.	K6
4	Use Python lists, tuples, dictionaries for representing compound data.	K3
5	Read and write data from/to files in Python.	K2
8.Course Code and Name : BS8161 PHYSICS AND CHEMISTRY LABORATORY		
	CO Statements	**Knowledge Level**
Upon completion of the course, the students will be able to		
1	Apply principles of elasticity, optics and thermal properties for engineering applications	K3
2	The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.	K2
3	Experiment with the strength of an acid using pH meter and conductometer	K3
SEMESTER 02		
1.Course Code and Name : HS8251 TECHNICAL ENGLISH		
	CO Statements	**Knowledge Level**
At the end of the course learners will be able to:		
1	Read technical texts and write area- specific texts effortlessly.	K2
2	Listen and comprehend lectures and talks in their area of specialisation successfully.	K2
3	Speak appropriately and effectively in varied formal and informal contexts.	K2
4	Write reports	K3
5	Winning job applications.	K2

2.Course Code and Name : MA8251 ENGINEERING MATHEMATICS – II		
	CO Statements	**Knowledge Level**
1	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.	K3
2	Gradient, divergence and curl of a vector point function and related identities	K3
3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.	K3
4	Analytic functions, conformal mapping and complex integration.	K3
5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.	K3
3.Course Code and Name : PH8201 PHYSICS FOR CIVIL ENGINEERING		
	CO Statements	**Knowledge Level**
1	The students will have knowledge on the thermal performance of buildings	K2
2	The students will acquire knowledge on the acoustic properties of buildings	K3
3	The students will get knowledge on various lighting designs for buildings	K3
4	The students will gain knowledge on the properties and performance of engineering materials,	K2
5	The students will understand the hazards of buildings	K2
4.Course Code and Name : BE8251 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING		
	CO Statements	**Knowledge Level**
1	Ability to identify the electrical components	K2
2	Explain the characteristics of electrical machines.	K2
3	Ability to identify electronics components	K2
4	Ability to understand the characteristics	K2
	Understand the basics of communication engineering	K2
5.Course Code and Name : GE8291 ENVIRONMENTAL SCIENCE AND ENGINEERING		
	CO Statements	**Knowledge Level**
1	Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.	K2
2	Public awareness of environmental is at infant stage.	K2
3	Ignorance and incomplete knowledge has lead to misconceptions	K2
4	Development and improvement in std. of living has lead to serious environmental disasters	K2
6.Course Code and Name : GE8292 ENGINEERING MECHANICS		
	CO Statements	**Knowledge Level**
1	Illustrate the vectorial and scalar representation of forces and moments	K3
2	Analyse the rigid body in equilibrium	K3

3	Evaluate the properties of surfaces and solids	K3
4	Calculate dynamic forces exerted in rigid body	K3
5	Determine the friction and the effects by the laws of friction	K3

7.Course Code and Name : GE8261 ENGINEERING PRACTICES LABORATORY		
	CO Statements	**Knowledge Level**
1	Fabricate carpentry components and pipe connections including plumbing works.	K2
2	Use welding equipments to join the structures.	K2
3	Carry out the basic machining operations	K2
4	Make the models using sheet metal works	K6
5	Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings	K2
6	Carry out basic home electrical works and appliances	K2
7	Measure the electrical quantities	K2
8	Elaborate on the components, gates, soldering practices.	K2

8.Course Code and Name : CE8211 COMPUTER AIDED BUILDING DRAWING		
	CO Statements	**Knowledge Level**
1	Able to draft the plan,	K3
2	Analyze elevation and sectional views of the buildings	K3
3	Able to devise industrial structures	K3
4	Able to frame buildings using computer softwares	K2
5	Illustrate the buildings with sloping roof	K2

SEMESTER 03

1.Course Code and Name : MA8353 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS		
	CO Statements	**Knowledge Level**
At the end of the course, students would:		
1	Understand how to solve the given standard partial differential equations	K2
2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.	K2
3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations	K2
4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.	K2
5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems	K2

2.Course Code and Name : CE8301 STRENGTH OF MATERIALS I STRENGTH OF MATERIALS I		
	CO Statements	**Knowledge Level**
1	Understand the concepts of stress and strain, principal stresses and principal planes	K3

2	Determine Shear force and bending moment in beams and understand concept of theory of simple bending	K6
3	Calculate the deflection of beams by different methods and selection of method for determining slope or deflection	K3
4	Apply basic equation of torsion in design of circular shafts and helical springs	K2
5	Analyze the pin jointed plane and space trusses	K2
3.Course Code and Name : CE8302 FLUID MECHANICS		
	CO Statements	**Knowledge Level**
1	Get a basic knowledge of fluids in static, kinematic and dynamic equilibrium	K3
2	Understand and solve the problems related to equation of motion	K3
3	Gain knowledge about dimensional and model analysis	K4
4	Learn types of flow and losses of flow in pipes	K2
5	Understand and solve the boundary layer problems	K2
		K2
4.Course Code and Name : CE8351 SURVEYING		
	CO Statements	**Knowledge Level**
1	The use of various surveying instruments and mapping	K6
2	Measuring Horizontal angle and vertical angle using different instruments	K6
3	Methods of Leveling and setting Levels with different instruments	K3
4	Concepts of astronomical surveying and methods to determine time, longitude, latitude and azimuth	K3
5	Concept and principle of modern surveying	K6
5.Course Code and Name : CE8391 CONSTRUCTION MATERIALS		
	CO Statements	**Knowledge Level**
1	Compare the properties of most common and advanced building materials.	K2
2	Understand the typical and potential applications of lime, cement and aggregates	K3
3	Know the production of concrete and also the method of placing and making of concrete elements.	K2
4	Understand the applications of timbers and other materials	K4
5	Understand the importance of modern material for construction	K2
6.Course Code and Name : CE8392 ENGINEERING GEOLOGY		
	CO Statements	**Knowledge Level**
1	Will be able to understand the importance of geological knowledge such as earth, earthquake, volcanism and the action of various geological agencies	K2
2	Will get basics knowledge on properties of minerals	K2
3	Gain knowledge about types of rocks, their distribution and uses	K2
4	Will understand the methods of study on geological structure	K3
5	Will understand the application of geological investigation in projects such as dams, tunnels, bridges, roads, airport and harbor	
7.Course Code and Name : CE8311 CONSTRUCTION MATERIALS LABORATORY		

	CO Statements	Knowledge Level
1	Understand the basic knowledge in the area of testing of construction materials	K3
2	Understand the basic knowledge about the components of construction elements experimentally.	K3
3	Able to understand the evaluation of concrete	K2
4	Illustrate the importance of test on bricks	K2
5	Illustrate the importance of test on blocks	K2

8.Course Code and Name :CE8361 SURVEYING LABORATORY		
	CO Statements	**Knowledge Level**
1	Understand the practical knowledge on handling basic survey instruments including Theodolite, Tacheometry	K3
2	Understand the practical knowledge on Total Station and GPS	K3
3	Understand the practical knowledge to carryout Triangulation	K3
4	Understand the practical knowledge to carryout Astronomical surveying including general field marking for various engineering projects and Location of site etc	K3
5	Able to form general field marking for various engineering projects and Location of site etc	K3

9.Course Code and Name : HS8381 INTERPERSONAL SKILLS/LISTENING&SPEAKING		
	CO Statements	**Knowledge Level**
1	Listen and respond appropriately.	K1
2	Participate in group discussions	K6
3	Make effective presentations	K6
4	Participate confidently and appropriately in conversations both formal and informal	K6

SEMESTER 04

1.Course Code and Name : MA8491 NUMERICAL METHODS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Understand the basic concepts and techniques of solving algebraic and transcendental equations.	K2
2	Appreciate the numerical techniques of interpolation and error approximations in various intervals in real life situations.	K2
3	Apply the numerical techniques of differentiation and integration for engineering problems.	K3
4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.	K2
5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	K2

2.Course Code and Name : CE8401 CONSTRUCTION TECHNIQUES AND PRACTICES		
	CO Statements	**Knowledge Level**

1	know the different construction techniques and structural systems	K2
2	Understand various techniques and practices on masonry construction, flooring, and roofing	K3
3	Plan the requirements for substructure construction	K2
4	Know the methods and techniques involved in the construction of various types of super structures	K2
5	Select, maintain and operate hand and power tools and equipment used in the building construction sites.	K2

3.Course Code and Name :CE8402 STRENGTH OF MATERIALS II		
	CO Statements	**Knowledge Level**
1	Determine the strain energy and compute the deflection of determinate beams, frames and trusses using energy principles.	K2
2	Analyze propped cantilever, fixed beams and continuous beams using theorem of three moment equation for external loadings and support settlements	K2
3	find the load carrying capacity of columns and stresses induced in columns and cylinders	K2
4	Determine principal stresses and planes for an element in three dimensional state of stress and study various theories of failure	K4
5	Determine the stresses due to Unsymmetrical bending of beams, locate the shear center, and find the stresses in curved beams	K2

4.Course Code and Name : CE8403 APPLIED HYDRAULIC ENGINEERING		
	CO Statements	**Knowledge Level**
1	Apply their knowledge of fluid mechanics in addressing problems in open channels	K3
2	Able to identify a effective section for flow in different cross sections.	K4
3	To solve problems in uniform, gradually and rapidly varied flows in steady state conditions	K4
4	Understand the principles, working and application of turbines	K2
5	Understand the principles, working and application of pumps.	K2

5.Course Code and Name : CE8404 CONCRETE TECHNOLOGY		
	CO Statements	**Knowledge Level**
1	The various requirements of cement, aggregates and water for making concrete	K4
2	The effect of admixtures on properties of concrete	K2
3	The concept and procedure of mix design as per IS method	K2
4	The properties of concrete at fresh and hardened state	K2
5	The importance and application of special concretes	K2

6.Course Code and Name :CE8491 SOIL MECHANICS		
	CO Statements	**Knowledge Level**
1	classify the soil and assess the engineering properties, based on index properties.	K2
2	Understand the stress concepts in soils	K2
3	Understand and identify the settlement in soils	K4
4	Determine the shear strength of soil	K3
5	Analyze both finite and infinite slopes	K2

7.Course Code and Name : CE8481 STRENGTH OF MATERIALS LABORATORY		
	CO Statements	**Knowledge Level**
1	Understand the knowledge in the area of testing of materials	K2
2	Understand the knowledge in the area of components of structural elements experimentally.	K3
3	Ability to understand the impact test on metal specimen	K3
4	Analyze the hardness test on metals	K3
5	Understand the process of deflection test on metal beam	K4

8.Course Code and Name : CE8461 HYDRAULIC ENGINEERING LABORATORY		
	CO Statements	**Knowledge Level**
1	Able to measure flow in pipes	K2
2	Able to determine frictional losses	K3
3	Able to develop characteristics of pumps	K3
4	Able to develop characteristics of turbines.	K6
5	Analyze about measuring the Calibration of Rotameter	K4

9.Course Code and Name :HS8461 ADVANCED READING AND WRITING		
	CO Statements	**Knowledge Level**
1	Write different types of essays.	K2
2	Write winning job applications.	K2
3	Read and evaluate texts critically.	K2
4	Display critical thinking in various professional contexts.	K2

SEMESTER 05		
1.Course Code and Name : CE8501 DESIGN OF REINFORCED CEMENT CONCRETE ELEMENTS		
	CO Statements	**Knowledge Level**
Upon successful completion of the course, students should be able to:		
1	Understand the various design methodologies for the design of RC elements	K3
2	Know the analysis and design of flanged beams by limit state method and sign of beams for shear, bond and torsion	K2
3	Design the various types of slabs and staircase by limit state method	K3
4	Design columns for axial, uniaxial and biaxial eccentric loadings.	K3
5	Design of footing by limit state method	K3

2.Course Code and Name : CE8502 STRUCTURAL ANALYSIS I		
	CO Statements	**Knowledge Level**
1	Analyze continuous beams, pin-jointed indeterminate plane frames and rigid plane frames by strain energy method	K2
2	Analyse the continuous beams and rigid frames by slope defection method.	K5
3	Understand the concept of moment distribution and analysis of continuous beams and rigid frames with and without sway.	K2
4	Analyse the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method	K4

5	Understand the concept of matrix stiffness method and analysis of continuous beams, pin jointed trusses and rigid plane frames	K3

3.Course Code and Name : EN8491 WATER SUPPLY ENGINEERING		
	CO Statements	**Knowledge Level**
1	An insight into the structure of drinking water supply systems, including water transport, treatment and distribution	K2
2	The knowledge in various unit operations and processes in water treatment	K3
3	An ability to design the various functional units in water treatment	K3
4	An understanding of water quality criteria and standards, and their relation to public health	K3
5	The ability to design and evaluate water supply project alternatives on basis of chosen criteria	K2

4.Course Code and Name : CE8591 FOUNDATION ENGINEERING		
	CO Statements	**Knowledge Level**
1	Understand the site investigation, methods and sampling.	K2
2	Get knowledge on bearing capacity and testing methods.	K2
3	Design shallow footings.	K3
4	Determine the load carrying capacity, settlement of pile foundation.	K2
5	Determine the earth pressure on retaining walls and analysis for stability.	K5

5.Course Code and Name :PROFESSIONAL ELECTIVE-I

6.Course Code and Name : OPEN ELECTIVE-I

7.Course Code and Name : CE8511 SOIL MECHANICS LABORATORY		
	CO Statements	**Knowledge Level**
1	Able to conduct tests to determine the index of soils	K2
2	Able to conduct tests to determine engineering properties of soils	K4
3	Able to conduct tests to characterize the soil based on their properties.	K3
4	Understand the Permeability determination	K3
5	Analyze about Unconfined compression test in cohesive soil	K4

8.Course Code and Name : CE8512 WATER AND WASTE WATER ANALYSIS LABORATORY		
	CO Statements	**Knowledge Level**
1	Quantify the pollutant concentration in water	K2
2	Quantify the pollutant concentration in wastewater	K2
3	Suggest the type of treatment required	K2
4	Suggest the amount of dosage required for the treatment	K3
5	Examine the conditions for the growth of micro-organisms	K2

9.Course Code and Name : CE8513 SURVEY CAMP		
	CO Statements	**Knowledge Level**

1	Understand the importance of Contouring	K4
2	Measuring the Offset of Buildings and Plotting the Location	K2
3	Analyze the Sun observation to determine azimuth	K3
4	Use of GPS to determine latitude and longitude	K4
5	Use to locate the survey camp location	K3

SEMESTER 06

1.Course Code and Name : CE8601 DESIGN OF STEEL STRUCTURAL ELEMENTS

	CO Statements	**Knowledge Level**
At the end of the course, the students should be able to:		
1	Understand the concepts of various design philosophies	K3
2	Design common bolted and welded connections for steel structures	K3
3	Design tension members and understand the effect of shear lag.	K3
4	Understand the design concept of axially loaded columns and column base connections	K3
5	Understand specific problems related to the design of laterally restrained and unrestrained steel beams	K3

2.Course Code and Name : CE8602 STRUCTURAL ANALYSIS II

	CO Statements	**Knowledge Level**
1	Draw influence lines for statically determinate structures and calculate critical stress resultants.	K2
2	Understand Muller Breslau principle and draw the influence lines for statically indeterminate beams.	K2
3	Analyse of three hinged, two hinged and fixed arches	K2
4	Analyse the suspension bridges with stiffening girders	K3
5	Understand the concept of Plastic analysis and the method of analyzing beams and rigid frames.	K3

3.Course Code and Name : CE8603 IRRIGATION ENGINEERING

	CO Statements	**Knowledge Level**
1	Have knowledge and skills on crop water requirements	K2
2	Understand the methods and management of irrigation	K2
3	Gain knowledge on types of Impounding structures	K2
4	Understand methods of irrigation including canal irrigation.	K2
5	Get knowledge on water management on optimization of water use.	K3

4.Course Code and Name : CE8604 HIGHWAY ENGINEERING

	CO Statements	**Knowledge Level**
1	Get knowledge on planning and aligning of highway	K2
2	Geometric design of highways	K3
3	Design flexible and rigid pavements.	K3
4	Gain knowledge on Highway construction materials, properties, testing methods	K2
5	Understand the concept of pavement management system, evaluation of distress and maintenance of pavements	K2

5.Course Code and Name :EN8592 WASTEWATER ENGINEERING		
	CO Statements	**Knowledge Level**
1	An ability to estimate sewage generation and design sewer system including sewage pumping stations	K5
2	The required understanding on the characteristics and composition of sewage, selfpurification of streams	K2
3	An ability to perform basic design of the unit operations and processes that are used in sewage treatment	K2
4	Understand the standard methods for disposal of sewage	K2
5	Gain knowledge on sludge treatment and disposal	K2
6.Course Code and Name : PROFESSIONAL ELECTIVE-II		
7.Course Code and Name : CE8611 HIGHWAY ENGINEERING LABORATORY		
	CO Statements	**Knowledge Level**
1	Ability to test on Aggregates	K3
2	Ability to test on Bitumen	K6
3	Ability to tests on Bituminous Mixes	K6
4	Analyze the Demonstration of any one field testing equipment like skid resistance tester	K3
5	Analyze the Demonstration of any one field testing equipment like Benkelman Beam	K3
8.Course Code and Name : CE8612 IRRIGATION AND ENVIRONMENTAL ENGINEERING DRAWING		
	CO Statements	**Knowledge Level**
1	Able to design Municipal water treatment plants.	K3
2	Able to draw various units of Municipal water treatment plants	K3
3	Able to design sewage treatment plants.	K3
4	Able to design canal regulation structures	K3
5	Able to Design and Drawing of screen chamber	K4
9.Course Code and Name : HS8581 PROFESSIONAL COMMUNICATION		
	CO Statements	**Knowledge Level**
1	Make effective presentations	K6
2	Participate confidently in Group Discussions.	K6
3	Attend job interviews and be successful in them.	K6
4	Develop adequate Soft Skills required for the workplace	K6
SEMESTER 07		
1.Course Code and Name : CE8701 ESTIMATION, COSTING AND VALUATION ENGINEERING		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Estimate the quantities for buildings	K2
2	Rate Analysis for all Building works, canals, and Roads and Cost Estimate	K2
3	Understand types of specifications, principles for report preparation, tender notices types	K2

4	Gain knowledge on types of contracts	K2
5	Evaluate valuation for building and land.	K2

2.Course Code and Name : CE8702 RAILWAYS, AIRPORTS, DOCKS AND HARBOUR ENGINEERING

	CO Statements	Knowledge Level
1	Understand the methods of route alignment and design elements in Railway Planning and Constructions.	K2
2	Understand the Construction techniques and Maintenance of Track laying and Railway stations.	K3
3	Gain an insight on the planning and site selection of Airport Planning and design	K3
4	Analyze and design the elements for orientation of runways and passenger facility systems	K3
5	Understand the various features in Harbours and Ports, their construction, coastal protection works and coastal Regulations to be adopted.	K2

3.Course Code and Name : CE8703 STRUCTURAL DESIGN AND DRAWING

	CO Statements	Knowledge Level
1	Design and draw reinforced concrete Cantilever and Counterfort Retaining Walls	K2
2	Design and draw flat slab as per code provisions	K1
3	Design and draw reinforced concrete and steel bridges	K3
4	Design and draw reinforced concrete and steel water tanks	K2
5	Design and detail the various steel trusses and cantry girders	K3

4.Course Code and Name : PROFESSIONAL ELECTIVE-III

5.Course Code and Name : OPEN ELECTIVE-II

6.Course Code and Name : CE8711 CREATIVE AND INNOVATIVE PROJECT

	CO Statements	Knowledge Level
1	State the objectives	K2
2	Develop a methodology to achieve the objectives	K2
3	Carryout the design	K2
4	Develop computer code.	K2
5	Demonstrate the novelty of the project through the results and outputs.	K2

7.Course Code and Name : CE8712 INDUSTRIAL TRAINING

	CO Statements	Knowledge Level
1	The intricacies of implementation textbook knowledge into practice	K3
2	The concepts of developments	K3
3	Implementation of new techniques	K2
4	Report on the work done will be prepared and presented.	K3
5	Evaluated through a viva-voce examination	K3

SEMESTER 08

1.Course Code and Name : PROFESSIONAL ELECTIVE-IV

2.Course Code and Name : PROFESSIONAL ELECTIVE-V	
3.Course Code and Name : CE8811 PROJECT WORK	

	CO Statements	**Knowledge Level**
1	Design, analyze, realize a physical system by using the technology they learnt during the program.	K4
2	Able to take up any challenging practical problems	K4
3	Integrate various methods into one problem.	K2
4	Work in a team with confined time duration.	K2
5	Find solution by formulating proper methodology.	K2

PRINCIPAL
Mahendra College of Engineering
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2013 REGULATION

B.E.CIVIL ENGINEERING (2013 REGULATION)
Program Outcomes (POs)
Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
Design / Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
Program Specific Outcomes (PSOs)

On completion of B.E. Civil Engineering programme, the graduates will be able to

PSO1: Demonstrate proficiency in mathematics and physical sciences and excel in the core areas of civil engineering such as structural, environmental, Geo-technical engineering.

PSO2: Plan, draw detailed drawings, write specifications and prepare cost estimates.

PSO3: Interact with stakeholders effectively and execute quality construction works using modern tools.

COURSE OUTCOME STATEMENTS FOR B.E.CIVIL ENGINEERING (2013 REGULATION)		
SEMESTER 01		
1.Course Code and Name : HS6151 - TECHNICAL ENGLISH I		
	CO Statements	**Knowledge Level**

2.6.1 - Programme and course outcomes for all Programmes offered by the institution are stated and displayed on website and communicated to teachers and students.		
1	**Classify** the types of listening and writing skills with acquired knowledge	K2
2	**Demonstrate** speaking skills in various occasions	K2
3	**Compare** the formal and informal writing skills by using the mail and blocks	K2
4	**Apply** the speaking etiquitte to build up communication proficiency	K3
5	**Develop** presentations with the use of LSRW skills	K3
2.Course Code and Name : MA6151 - MATHEMATICS I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	**Solve** the Eigen values and Eigen vectors to diagonalise and reduce a matrix to quadratic form	K3
2	**Identify** the convergences, divergences of infinite series	K3
3	**Solve** evolutes and envelopes of a given curve by using radius of curvature and center of curvature	K3
4	**Identify** the maxima and minima value functions of two variables	K3
5	**Solve** area of plain curves and volume of solid using double and triple integrals	K3
3.Course Code and Name : PH6151 - ENGINEERING PHYSICS I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the basics of properties of matter and its applications	K2
2	Summarize the concepts of waves and optical devices and their applications in fiber optics	K2
3	Demonstrate the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers	K2
4	Outline the concepts of advanced physics quantum theory and its applications in tunneling microscopes	K2
5	Explain the basics of crystals, their structures and different crystal growth techniques	K2

4.Course Code and Name : CY6151 - ENGINEERING CHEMISTRY I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Classify the polymers and their utility in the industries and explain the techniques of polymerization and properties of polymers	K2
2	Relate various thermodynamic functions such as enthalpy, entropy, free energy and their importance	K2
3	Explain the photo physical processes such as fluorescence and phosphorescence and various components of UV and IR spectrophotometer	K2
4	Illustrate the phase transitions of one component and two component systems and the types of alloys and their application in industries	K2
5	Outline the synthesis, characteristics and the applications of nano materials	K2

5.Course Code and Name : GE6151- COMPUTER PROGRAMMING		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Describe the function of a Computer and problem solving techniques.	K2
2	Write simple C programs using basic constructs	K3
3	Implement applications to manage data using arrays and strings	K3
4	Apply functions and pointers for solving problems	K3
5	Develop simple applications using structure and union	K3

6.Course Code and Name : GE6152- ENGINEERING GRAPHICS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Demonstrate freehand sketching of basic geometrical constructions and multiple views of objects	K2
2	Develop orthographic projections of points, lines and plane surfaces	K3
3	Construct projections of simple solids and truncated solids	K3
4	Develop projection of sectioned solids and utilize development of surfaces	K3
5	Construct isometric and perspective projections of simple solids	K3

7.Course Code and Name : GE6161- COMPUTER PRACTICES LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply the usage of office automation tools.	K2
2	Apply good programming design methods for program development.	K3
3	Design and implement C programs for simple applications.	K3
4	Develop recursive programs.	K3

8.Course Code and Name : GE6162 - ENGINEERING PRACTICES LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Construct carpentry components and pipe connections including plumbing works	K2
2	Make use of welding equipments to join the structures	K3
3	Develop models using sheet metal work	K3
4	Illustrate the working of centrifugal pump and air conditioner	K3
5	Demonstrate basic home electrical works, measurement of the electrical quantities and soldering practices	K3

9.Course Code and Name : GE6163 - PHYSICS AND CHEMISTRY LABORATORY - I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Make use of spectrometer to find the wavelength of spectral lines, and laser	K3

2	Make use of ultrasonic interferometer and Lee's disc apparatus to find the velocity of sound, compressibility of the liquid and thermal conductivity	K3
3	Demonstrate the estimation of DO content in water sample by Winkler's method and molecular weight of polymer by Ostwald viscometer	K2
4	Experiment with the strength of an acid using pH meter and conductometer	K3
5	Demonstrate the estimation of weak and strong acids in a mixture by conductometer	K2

SEMESTER 02		
1.Course Code and Name : HS6251 - TECHNICAL ENGLISH II		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop the communication skills with proper grammar usage	K2
2	Summarize the various advanced technical and non-technical english tools	K2
3	Classify the speaking skills and expression through professional english	K2
4	Apply the interview techniques for career development	K3
5	Outline the use of writing skills to express innovatiove ideas	K3
2.Course Code and Name : MA6251 - MATHEMATICS II		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply solenoidal, irrotational vectors and make use of the concepts of Green's, Gauss divergence , Stokes theorem to evaluate single, double and triple integrals	K3
2	Solve simultaneous linear equations and P.I. of Cauchy and Legendre Equation	K3
3	Solve Laplace Transforms of periodic functions and ODE using Inverse Laplace Transform	K3
4	Make use of the properties of analytic functions for verifying C-R equations for determination of Bilinear Transformation	K3
5	Develop the functions of two variables as Taylor's and Laurent's series and Contour integrals by using Cauchy's Integral formula	K3

3.Course Code and Name : PH6251 - ENGINEERING PHYSICS II		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the basics, properties and applications of conducting materials	K2
2	Summarize the properties of semiconducting materials and semiconductor devices.	K2
3	Explain the basics, properties and applications of the magnetic materials and super conducting material	K2
4	Illustrate the concepts, mechanisms and applications of dielectric materials	K2
5	Outline the method of synthesis and explain the properties of Nano materials, SMA, Metallic glasses and Ceramics	K2

4.Course Code and Name : CY6251 - ENGINEERING CHEMISTRY II

	CO Statements	Knowledge Level
The students should be able to		
1	Explain the problems of using hard water in boilers and methods of treatment of water for boiler use	K2
2	Apply the design principles to electro chemical cell. Identify the types of corrosion and the methods of prevention	K3
3	Illustrate the methods of harnessing energy from non-conventional energy sources	K2
4	Classify various engineering materials and explain their importance	K2
5	Relate the significance of solid, liquid and gaseous fuels. Explain the calorific values of fuels and air requirement for combustion in furnaces	K2

5.Course Code and Name : GE6252- BASIC ELECTRICAL AND ELECTRONICS ENGINEERING		
	CO Statements	Knowledge Level
The students should be able to		
1	Apply the basic theorems to solve problems in Electrical circuits	K3
2	Classify the different components and function of electrical machines	K2
3	Summarize the characteristics of electronic components	K2
4	Outline the basic concepts of communication engineering	K2
5	Solve design problems in digital electronic circuits	K3

6.Course Code and Name : GE6253- ENGINEERING MECHANICS		
	CO Statements	Knowledge Level
The students should be able to		
1	Develop the vectorial and scalar representation of forces and moments	K3
2	Solve problems pertaining to rigid bodies in equilibrium	K3
3	Identify the properties of surfaces and solids like centriod and moment of inertia etc.	K3
4	Solve problems pertaining to rigid bodies under the effect of dynamic forces	K3
5	Apply the laws of friction for the solution of simple rigid bodies	K3

7.Course Code and Name : GE6261 - COMPUTER AIDED DRAFTING AND MODELING LABORATORY		
	CO Statements	Knowledge Level
The students should be able to		
1	Develop front view and top view of simple solids and objects	K3
2	Construct isometric projection and sectional views of objects and simple solids	K3
3	Construct plan of a residential building	K3
4	Demonstrate the drawing of truss and curves	K2
5	Model simple objects and construct 2-D multi-view drawings from 3-D using drafting software	K3
8.Course Code and Name :GE6262- PHYSICS AND CHEMISTRY LABORATORY - II		
	CO Statements	Knowledge Level
The students should be able to		

1	Illustrate the determination of Young's modulus of the beam and moment of inertia and rigidity modules of thin wire Torsion pendulum	K2
2	Make use of Poiseuille's method to determine the coefficient of viscosity of the liquid	K3
3	Illustrate the determination of dispersive power of a prism and the thickness of a thin wire through interference fringes using Air wedge apparatus	K2
4	Experiment with the type, amount of alkalinity, hardness in a given water sample and evaluate the Amount of copper using EDTA method	K3
5	Demonstrate titration by potentiometric redox and conductometric precipitation methods	K2

SEMESTER 03		
1.Course Code and Name : MA6351 - TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Solve differential equations using Fourier series analysis for engineering applications.	K3
2	Utilize Dirichlet's condition for finding the Fourier series of a given function	K3
3	Apply Fourier series to solve one dimensional way, one and two dimensional heat equations.	K3
4	Solve Fourier transform for a given function and make use of them to evaluate certain definite Integrals	K3
5	Solve Z transforms of standard functions and make use of them to solve difference equations	K3
2.Course Code and Name : GE6351 - ENVIRONMENTAL SCIENCE AND ENGINEERING		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Illustrate the concepts of an ecosystem , energy flow and conservation of biodiversity.	K2
2	Explain the causes, effects and control of various types of pollution.	K2
3	Outline the conservation of natural resources.	K2
4	Summarize the social issues of environment and legislative guidelines for disaster management.	K2
5	Relate population growth and its impact on environment and human health.	K2
3.Course Code and Name : CE6301 - ENGINEERING GEOLOGY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the various geological agents and the processes involved	K2
2	Compare the available minerals on the basis of their properties & behaviour	K2
3	Classify & identify the available rocks in the construction site	K2
4	Interpret the different geological features & their engineering importance	K2

5	Relate the geological investigations and remote sensing in Civil Engineering projects	K2
4.Course Code and Name : CE6302 - MECHANICS OF SOLIDS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Summarize the concepts of stress, strain, thin cylinders and shells	K2
2	Construct the shear force and bending moment diagrams for beams	K3
3	Identify the deflection of beams by different methods	K3
4	Apply the conepts of torsion to circular shafts and helical springs, .	K2
5	Solve the pin jointed plane trusses	K2
5.Course Code and Name : CE6303 - MECHANICS OF FLUIDS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Summarize the basic properties of fluids	K2
2	Outline the properties of fluids in kinematic and dynamic equilibrium.	K2
3	Classify the various types of flow and losses of flow in pipes.	K2
4	Solve the boundary layer problems	K3
5	Develop dimensional and model analysis for various fluid properties	K3
6.Course Code and Name : CE6304 SURVEYING I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Outline preliminary surveying by adopting various surveying concepts	K2
2	Summarize the concepts of traversing using compass and plane table surveying	K2
3	Construct a contour plan by the application of leveling techniques	K3
4	Solve the problems relating to cross sectional areas and volumes of earthwork	K3
5	Identify the heights and distances by theodolite surveying	K3
7.Course Code and Name : CE6311 - SURVEY PRACTICAL I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Compare and contrast the handling of various types of basic survey instruments	K2
2	Construct site plan using plane table surveying	K3
3	Develop tabulation by conducting levelling	K3
4	Develop contour maps	K3
5	Demonstrate the working of theodolite	K2
8.Course Code and Name : CE6312 - COMPUTER AIDED BUILDING DRAWING		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Construct plan, section and elevation of buidings with load bearing walls	K3
2	Construct plan, section and elevation of buidings with sloping roofs	K3
3	Construct plan, section and elevation of RCC framed structures	K3
4	Develop plan, section and elevation of Industrial buildings	K3
5	Model various types of buildings using drafting software	K3

SEMESTER 04		
1.Course Code and Name : MA6459 - NUMERICAL METHODS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop the solution of algebraic and transcentendal system of linear equations	K3
2	Make use of Newton's Formula for interpolation of the values of unknown functions	K3
3	Construct the numerical values of the derivatives and integrals of unknown function	K3
4	Solve first and second order initial value problems	K3
5	Solve Numerical boundary value problems	K3
2.Course Code and Name : CE6401 - Construction Materials		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Compare the properties of most common and advanced building materials	K2
2	Classify the potential applications of lime, cement and aggregates	K2
3	Outline the production of concrete, placing and making of concrete elements	K2
4	Summarize the applications of timbers and other materials	K2
5	Explain the modern materials used for construction	K2
3.Course Code and Name : CE6402 - Strength of Materials		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Make use of energy principles for determination of deflection of determinate beams, frames and trusses	K3
2	Solve propped cantilever, fixed and continuous beams using theorem of three momentequation	K3
3	Identify the load carrying capacity of columns and stresses induced in columns and cylinders.	K3
4	Apply the concept of principal stresses to an element in three dimensional state of stress	K3
5	Examine the stresses due to unsymmetrical bending of beams and curved beams.	K4
4.Course Code and Name : CE6403 - Applied Hydraulic Engineering		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply the knowledge of fluid mechanics in addressing problems in open channels	K3
2	Solve problems in gradually varied flow and in steady state condition	K3
3	Solve problems in rapidly varied flows and in steady state conditions	K3
4	Develop characteristics of turbines	K3
5	Develop characteristics of pumps	K3
5.Course Code and Name : CE6404 -Surveying II		
	CO Statements	**Knowledge Level**
The students should be able to		

1	Solve for the height and distances between instrument stations and accessible/inaccessible objects by trignometrical levelling	K3
2	Apply mathematical adjustment of errors involved in surveying measurement	K3
3	Compare electronic surveying (total station) with conventional surveying methods	K2
4	Explain the working principle of GPS, its components, signal structure and error sources	K2
5	Contrast advanced surveying techniques and conventional surveying methods in the field of civil engineering	K2

6.Course Code and Name : CE6405 - Soil Mechanics		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Classify the soil and its engineering properties	K2
2	Summarize the stress concepts in soils	K2
3	Identify the settlement in soils	K3
4	Solve shear strength parameters of soil	K3
5	Compare finite and infinite slopes.	K2

7.Course Code and Name : CE6411 - Strength of Materials Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Analyze the various stresses on mild steel rod by conducting tension and torsion tests	K4
2	Identify deflection test of metals and carriage springs	K3
3	Test for compression strength of wood and helical springs	K4
4	Compare hardness and impact strength of different metals	K4
5	Examine the shear strength of mild steel rod and properties of cement	K4

8.Course Code and Name : CE6412 - Hydraulic Engineering Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Identify the flow in pipes	K3
2	Examine the frictional losses in pipes	K4
3	Develop characteristics of pumps	K3
4	Develop characteristics of turbines	K3
5	Analyze the metacentric height of floating bodies	K4

9.Course Code and Name : CE6413 - Survey Practical II		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Demonstrate the handling of theodolite	K2
2	Illustrate the handling of tacheometer	K2
3	Plan the general field marking for various engineering projects	K3
4	Experiment with setting of curves	K3

5	Make use of triangulation and astronomical surveying	K3

SEMESTER 05		
1.Course Code and Name : CE6501- Structural Analysis I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply the energy and consistent deformation methods to indeterminate frames	K3
2	Develop influence line diagrams for determinate and indeterminate structures with moving loads	K3
3	Analyze bending moment and shear force variants for various types of arches	K4
4	Solve beams and frames using slope-deflection method	K3
5	Solve beams and frames using moment distribution method	K3
2.Course Code and Name : CE6502 - Foundation Engineering		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Outline the appropriate site investigation techniques and suitable foundations	K2
2	Demonstrate settlement and shear failure of shallow foundation	K2
3	Choose safe dimensions for shallow footings	K3
4	Summarize load carrying capacity and settlement of single and pile groups	K2
5	Illustrate stability analysis of retaining walls	K2
3.Course Code and Name : CE6503 -Environmental Engineering I		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply the vlarious methods to calculate the total water demand for a town/city	K3
2	Classify the conduits for transportation of water	K2
3	Outline appropriate treatment systems for water available at the source	K2
4	Illustrate the advance treatment methods to treat the water	K2
5	Plan a good water distribution system for an individual building and for a community	K2
	CO Statements	**Knowledge Level**
The students should be able to		
1	Plan the alignment of highways	K2
2	Outline the geometric design of highways	K2
3	Compare flexible and rigid pavements	K2
4	Summarize the properties and testing methods for construction materials	K2
5	Explain about the management, distress evaluation and maintenance of pavements	K2
5.Course Code and Name : CE6505- Design of Reinforced Concrete Elements		

	CO Statements	Knowledge Level
	The students should be able to	
1	Compare the various design methodologies for the design of RC elements	K2
2	Solve rectangular and flanged beams by limit state method	K3
3	Analyze RC members for combined bending, shear and torsion	K4
4	Apply axial, uniaxial and biaxial eccentric loading to columns	K3
5	Make use of limit state method for footing design	K3

6.Course Code and Name : CE6506 - Construction Techniques, Equipment and Practice		
	CO Statements	**Knowledge Level**
	The students should be able to	
1	Classify different construction techniques and summarize the constituents of concrete and its production	K2
2	Summarize the various techniques and practices in masonry construction, flooring and roofing.	K2
3	Explain the various techniques for substructure construction	K2
4	Compare the various methods and techniques involved in the construction of super structures	K2
5	Classify various equipments for the construction of structures	K2

7.Course Code and Name : GE6674- Communication and Soft Skills - Laboratory Based		
	CO Statements	**Knowledge Level**
	The students should be able to	
1	Demonstrate reading and writing skills	K2
2	Develop listening and speaking skills	K3
3	Make use of acquired knowledge to take up international examination such as IELTS and TOEFL	K3
4	Apply the interview techniques for career development	K3
5	Illustrate the various aspects of soft skills	K2

8.Course Code and Name : CE6511- Soil Mechanics Laboratory		
	CO Statements	**Knowledge Level**
	The students should be able to	
1	Explain the various index properties of soil	K4
2	Analyze in situ density of soil	K4
3	Summarize compaction characteristics of soil	K2
4	Examine index properties of soil	K4
5	Demonstrate the determination of triaxial compression test and relative density test	K2

9.Course Code and Name : CE6512- Survey Camp		
	CO Statements	**Knowledge Level**

The students should be able to		
1	Demonstrate the various techniques of surveying including modern methods such as total station surveying	K2
2	Make use of theoretical knoledge to solve field problems	K3
3	Construct contour plans	K3
SEMESTER 06		
1. Course Code and Name : CE6601- Design of Reinforced Concrete & Brick Masonry Structures		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Solve the problems relating to reinforced concrete cantilever and counterfort Retaining Walls	K3
2	Apply design principles to rectangular and circular above and below ground level	K3
3	Construct reinforcement detailing for staircase, flat slab, box culvert and road bridge	K3
4	Summarize the concepts of yield line theory	K2
5	Solve the problems relating to axially and eccentrically loaded brick masonry walls	K3
2. Course Code and Name : CE6602 - Structural Analysis II		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Solve statically indeterminate beams and frames by using flexibility matrix method	K2
2	Compare flexibility and stiffness matrix methods for solution of statically indeterminate beams and frames	K3
3	Summarize the concepts of Finite element method of analysis for beams and frames	K2
4	Illustrate plastic analysis for beams and frames	K2
5	Solve curved beams, space trusses and suspension bridges	K3
3. Course Code and Name : CE6603 -Design of Steel Structures		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Outline the Fabrication Process, Types of connections and joints in Steel structures.	K2
2	Design tension members using limit state method	K3
3	Design compression members using limit state method	K3
4	Illustrate the load carrying capacity of steel beams and design procedure of beams	K2
5	Solve the problems and arrive at safe cross section for the elements of the industrial structures like long span trusses, roof truss and gantry girders	K3
4. Course Code and Name : CE6503- Railways, Airport and Harbour Engineering		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Summarize the functions of various components of railway track like rails, sleeper and ballast, gauge etc.	K2
2	Outline the construction and maintenance of tracks	K2

3	Demonstrate the planning & characteristics of air transport and air traffic control	K2
4	Explain the orientation, length and geometric design of runway	K2
5	Illustrate the planning and design of harbour and coastal protection works	K2
5. Course Code and Name : CE6605- Environmental Engineering II		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Summarize & classify the nature of wastewater generated from a town/ city	K2
2	Solve the design problems in sewers	K3
3	Outline the design principles of primary treatment of sewage	K2
4	Apply design principles to secondary treatment units for wastewater	K3
5	Demonstrate the suitable modes of disposal for the treated wastewater without endangering the environment.	K2
6. Course Code and Name : CE6002 - Concrete Technology		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Summarize the properties of various constituents of concrete and tests to ascertain its quality	K2
2	Compare and contrast the various mineral and chemical admixtures used in concrete construction	K2
3	Apply the properties of various constuients in the mix proportion of concrete by BIS method	K3
4	Explain the various properties of fresh and hardened concrete	K2
5	Outline the uses and applications of special types of concrete	K2
7. CE6611- Environmental Engineering Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Examine the pollutant concentration in water and wastewater	K4
2	Experiment with the types and amount of dosage required for the treatment	K3
3	Analyse the conditions needed for the growth of micro-organisms	K4
8. Course Code and Name: CE6612 - Concrete & Highway Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Examine fresh properties of concrete	K4
2	Examine hardened properties of concrete	K4
3	Test for determination of various properties of aggregates	K4
4	Identify various properties of bitumen	K3
5	Analyze the properties of bituminous mixes	K4

SEMESTER 07		
1. Course Code and Name : CE6701 - Structural Dynamics and Earthquake Engineering		
	CO Statements	**Knowledge**

		Level
The students should be able to		
1	Explain the mass-stiffness idealization for deriving equations of motion	K2
2	Solve the Eigen values and mode shapes for SDOF and MDOF systems	K3
3	Outline the causes associated with an earthquake and relate with the estimation of earthquake parameters	K2
4	Demonstrate the performance of various structures under seismic loading	K2
5	Make use of codal provisions for the design of an earthquake resistant structure	K3
2. Course Code and Name : CE6702 - Prestresssed Concrete Structures		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply the methods of prestressing to various elements	K3
2	Solve problems in flexural strength and shear in prestressed concrete structural elements	K3
3	Construct reinforcement detailing in various prestressed anchorage zones	K3
4	Identify the stresses in propped and unpropped condition for various prestressed concrete structural elements	K3
5	Summarize the design principles for miscellaneous structures like poles, tank, pipes etc.	K2
3. Course Code and Name : CE6703 - Water Resources and Irrigation Engineering		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Summarize water resources potential of India and Tamil Nadu.	K2
2	Demonstrate water budget and management policies.	K2
3	Illustrate the computation of water requirement for different crops.	K2
4	Explain the design procedure of irrigation canals	K2
5	Classify different irrigation methods and participatory irrigation water management.	K2
4. Course Code and Name : CE6704 - Estimation and Quantity Surveying		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Experiment with the calculation of quantities of materials required for Buildings and Arches	K3
2	Develop the detailed and abstract estimations for special structures, Roads, Canals etc.,	K3
3	Summarize the preparation of tenders and contracts with reference to the specifications.	K2
4	Explain the basics of valuation of buildings and rent calculation procedures.	K2
5	Explain the preparation of reports for buildings, road work, culvert etc.	K2
5. Course Code and Name : CE6006 - Traffic Engineering and Management		
	CO Statements	**Knowledge Level**
The students should be able to		

1	Analyse traffic problems and plan for traffic systems	K4
2	Compare different types of traffic surveys	K2
3	Design Channels, Intersections, signals and parking arrangements	K4
4	Summarize issues relating to traffic safety and environment	K2
5	Develop Traffic management Systems	K3
6. Course Code and Name : EN6501 - Municipal Solid Waste Management		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Outline the nature and characteristics of municipal solid wastes and the regulatory requirements regarding municipal solid waste management.	K2
2	Plan systems for reduction, reuse and recycling of waste.	K3
3	Design systems for storage, collection, transport, processing and disposal of municipal solid waste	K4
4	Summarize the various issues of solid waste management	K2
5	Design sanitary landfills	K4
7. Course Code and Name : CE6711 - Computer Aided Design and Drafting Laboratory		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Design and draw reinforced concrete cantilever and counterfort Retaining Walls	K4
2	Design and draw solid slab and Tee Beam bridges	K4
3	Design and draw circular and rectangular water tanks	K4
4	Design and draw plate girder and truss girder bridges	K4
5	Design and draw hemispherical bottom steel tank	K4
8. Course Code and Name : CE6712 - Design Project		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Analyse problems related to civil engineering	K4
2	Design solutions for problems related to civil engineering	K4
3	Construct plans for structure and reinforcement detailing for various elements	K2

SEMESTER 08		
1. Course Code and Name :MG6851 - Principles of Management		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Summarize the evolution of management concepts.	K2
2	Classify the functions and principles of management	K2
3	Plan the use of POM tools for domain specific applications in an organization	K3
4	Demonstrate the application of various motivational theories to enrich the proper leadership qualities in an organization.	K2
5	Summarize the various budgetary Techniques.	K2
2. Course Code and Name :CE6016 - Prefabricated Structures		
	CO Statements	**Knowledge Level**
The students should be able to		

1	Summarize the properties of various materials used in prefabricated units	K2
2	Classify the various components of prefabricated structures	K2
3	Apply the design principles in the prefabricated units	K3
4	Classify the joints provided in prefabricated connections	K2
5	Outline the erection and design of prefabricated elements	K2
3. Course Code and Name : CE6016 - Repair and Rehabilitation of Structures		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Summarize the significance of maintenance and repair strategies of building	K2
2	Interpret the quality of concrete construction and also the effects of environmental conditions on it	K2
3	Classify types of special concrete	K2
4	Explain the suitable techniques for repair and protection methods	K2
5	Compare the various repair and retrofitting techniques for different structural failure.	K2
4. Course Code and Name : CE6811 - Project Work		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Analyze problems in various domains and formulate methodology	K4
2	Develop different solutions and select the optimum solution.	K3
3	Conclude using proper evidence to support them	K4

Mahendra College of Engineering Mahendra Salem Campus SALEM 636 106

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TAMILNADU

DEPARTMENT OF MECHATRONICS ENGINEERING

2017 REGULATION

HOME

B.E.MECHATRONICS ENGINEERING (2017 REGULATION)		
PROGRAM OUTCOMES POs:		
Engineering Graduates will be able to:		
Will be able to apply the laws of science and mathematics to provide engineering solutions to solve complex problems.		
Will be able to identify and analyze complex problems by modeling with the help of literature survey and validate the solution with experiments		
Will be able to design and develop Mechatronics systems by selecting and integrating, sensors, appropriate materials, mechanics, thermal systems, manufacturing and automation methods.		
Will be able to collect, condition monitor and interpret data to provide engineering solutions.		
Will be able to create applications, products as well as modernizing the existing systems by using latest tools and technologies.		
Will be able to develop solutions for local and global requirements by applying engineering knowledge and professional ethics.		
Will have professional values on environmental and energy consumption for sustainability.		
Will be able to become a leader and contribute in a team with entrepreneurial qualities		
Will be able to interact effectively in both oral and written format.		
Will continuously update their knowledge and skills to meet the ever changing global needs.		
COURSE OUTCOME STATEMENTS FOR B.E.MECHATRONICS ENGINEERING(2017 REGULATION)		
SEMESTER 01		
1.Course Code and Name :HS8151 Communicative English		
	CO Statements	**Knowledge Level**
AT THE END OF THE COURSE, LEARNERS WILL BE ABLE TO:		
1	Read articles of a general kind in magazines and newspapers.	K2
2	Participate effectively in informal conversations	K2
3	introduce themselves and their friends and express opinions in English.	K2
4	Comprehend conversations and short talks delivered in English	K2
5	Write short essays of a general kind and personal letters and emails in English	K3
2.Course Code and Name : MA8151 ENGINEERING MATHEMATICS – I		
	CO Statements	**Knowledge Level**
After completing this course, students should demonstrate competency in the following skills:		
1	Use both the limit definition and rules of differentiation to differentiate functions.	K2
2	Apply differentiation to solve maxima and minima problems.	K3
3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.	K5
4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.	K3
5	Evaluate integrals using techniques of integration, such as substitution, partial fractions and integration by parts.	K5
6	Determine convergence/divergence of improper integrals and evaluate convergent improper integrals.	K2

7	Apply various techniques in solving differential equations.	K3
3.Course Code and Name : PH8151 ENGINEERING PHYSICS		
	CO Statements	**Knowledge Level**
Upon completion of this course,		
1	The students will gain knowledge on the basics of properties of matter and its applications,	K3
2	The students will acquire knowledge on the concepts of waves and optical devices and their applications in fibre optics,	K3
3	The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers,	K3
4	The students will get knowledge on advanced physics concepts of quantum theory and its applications in tunneling microscopes, and	K3
5	The students will understand the basics of crystals, their structures and different crystal growth techniques.	K4
4.Course Code and Name : CY8151 ENGINEERING CHEMISTRY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.	K3
2	Relate various thermodynamic functions such as enthalpy, entropy, free energy and their importance	K4
3	Explain the photo physical processes such as fluorescence and phosphorescence and various components of UV and IR spectrophotometer	K2
4	Illustrate the phase transitions of one component and two component systems and the types of alloys and their application in industries	K2
5	Outline the synthesis, characteristics and the applications of nano materials	K3
5.Course Code and Name : GE8151 PROBLEM SOLVING AND PYTHON PROGRAMMING		
	CO Statements	**Knowledge Level**
Upon completion of the course, students will be able to		
1	Develop algorithmic solutions to simple computational problems	K3
2	Read, write, execute by hand simple Python programs.	K3
3	Structure simple Python programs for solving problems.	K4
4	Decompose a Python program into functions.	K4
5	Represent compound data using Python lists, tuples, dictionaries	K4
6	Read and write data from/to files in Python Programs	K4
6.Course Code and Name : GE8152 ENGINEERING GRAPHICS		
	CO Statements	**Knowledge Level**
On successful completion of this course, the student will be able to:		

1	Familiarize with the fundamentals and standards of Engineering graphics	K2
2	Perform freehand sketching of basic geometrical constructions and multiple views of objects	K3
3	Project orthographic projections of lines and plane surfaces.	K2
4	Draw projections and solids and development of surfaces.	K3
5	Visualize and to project isometric and perspective sections of simple solids.	K2
7.Course Code and Name : GE8161 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY		
	CO Statements	**Knowledge Level**
Upon completion of the course, students will be able to:		
1	Write, test, and debug simple Python programs.	K6
2	Implement Python programs with conditionals and loops.	K6
3	Develop Python programs step-wise by defining functions and calling them.	K6
4	Use Python lists, tuples, dictionaries for representing compound data.	K3
5	Read and write data from/to files in Python.	K2
8.Course Code and Name : BS8161 PHYSICS AND CHEMISTRY LABORATORY		
	CO Statements	**Knowledge Level**
Upon completion of the course, the students will be able to		
1	Apply principles of elasticity, optics and thermal properties for engineering applications	K3
2	The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.	K2
3	Experiment with the strength of an acid using pH meter and conductometer	K3
SEMESTER 02		
1.Course Code and Name : HS8251 TECHNICAL ENGLISH		
	CO Statements	**Knowledge Level**
At the end of the course learners will be able to:		
1	Read technical texts and write area- specific texts effortlessly.	K2
2	Listen and comprehend lectures and talks in their area of specialisation successfully.	K2
3	Speak appropriately and effectively in varied formal and informal contexts.	K2
4	Write reports and winning job applications.	K3
2.Course Code and Name : MA8251 ENGINEERING MATHEMATICS – II		
	CO Statements	**Knowledge Level**
1	Eigen values and eigenvectors, diagonalization of a matrix, Symmetric matrices, Positive definite matrices and similar matrices.	K3
2	Gradient, divergence and curl of a vector point function and related identities	K3
3	Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification.	K3
4	Analytic functions, conformal mapping and complex integration.	K3

5	Laplace transform and inverse transform of simple functions, properties, various related theorems and application to differential equations with constant coefficients.	K3
3.Course Code and Name : PH8251 - MATERIALS SCIENCE		
	CO Statements	**Knowledge Level**
1	The students will have knowledge on the various phase diagrams and their applications	K2
2	The students will acquire knowledge on Fe-Fe3C phase diagram,various microstructures and alloys	K3
3	The students will get knowledge on mechanical properties of materials and their measurement	K3
4	The students will gain knowledge on magnetic, dielectric and superconducting properties of materials	K2
5	The students will understand the basics of ceramics, composites and nanomaterials.	K2
4.Course Code and Name : BE8253 BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING		
	CO Statements	**Knowledge Level**
1	Understand electric circuits and AC circuits	K2
2	Understand the working principles of electrical machines	K2
3	Understand the concepts of various electronic devices	K2
4	Introduction of various electronic circuits	K2
5	Choose appropriate instruments for electrical measurement for a specific application	K2
5.Course Code and Name : GE8291 ENVIRONMENTAL SCIENCE AND ENGINEERING		
	CO Statements	**Knowledge Level**
1	Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.	K2
2	Public awareness of environmental is at infant stage.	K2
3	Ignorance and incomplete knowledge has lead to misconceptions	K2
4	Development and improvement in std. of living has lead to serious environmental disasters	K2
6.Course Code and Name :GE8292 ENGINEERING MECHANICS		
	CO Statements	**Knowledge Level**
1	Illustrate the vectorial and scalar representation of forces and moments	K3
2	Analyse the rigid body in equilibrium	K3
3	Evaluate the properties of surfaces and solids	K3
4	Calculate dynamic forces exerted in rigid body	K3
5	Determine the friction and the effects by the laws of friction	K3

7.Course Code and Name : GE8261 ENGINEERING PRACTICES LABORATORY		
	CO Statements	**Knowledge Level**
1	Fabricate carpentry components and pipe connections including plumbing works.	K2
2	Use welding equipments to join the structures.	K2
3	Carry out the basic machining operations	K2
4	Make the models using sheet metal works	K6
5	Illustrate on centrifugal pump, Air conditioner, operations of smithy, foundary and fittings	K2
6	Carry out basic home electrical works and appliances	K2
7	Measure the electrical quantities	K2
8	Elaborate on the components, gates, soldering practices.	K2

8.Course Code and Name : BE8261 BASIC ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING LABORATORY		
	CO Statements	**Knowledge Level**
1	Ability to determine the speed characteristic of different electrical machines	K3
2	Ability to design simple circuits involving diodes and transistors	K3
3	Understand the characteristics of various electronic devices	K2
4	Ability to analyze the measurement of AC signals	K2
5	Ability to use operational amplifiers	K3

SEMESTER 03		
1.Course Code and Name : MA8353 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS		
	CO Statements	**Knowledge Level**
At the end of the course, students would:		
1	Understand how to solve the given standard partial differential equations.	K2
2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.	K2
3	Appreciate the physical significance of Fourier series techniques in solving one and two dimensional heat flow problems and one dimensional wave equations.	K2
4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.	K2
5	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems.	K2
2.Course Code and Name : CE8395 STRENGTH OF MATERIALS FOR MECHANICAL ENGINEERS		
	CO Statements	**Knowledge**

		Level
1	Understand the concepts of stress and strain in simple and compound bars, the importance of principal stresses and principal planes.	K3
2	Understand the load transferring mechanism in beams and stress distribution due to shearing force and bending moment.	K6
3	Apply basic equation of simple torsion in designing of shafts and helical spring	K3
4	Calculate the slope and deflection in beams using different methods	K2
5	Analyze and design thin and thick shells for the applied internal and external pressures.	K2
3.Course Code and Name : CE8394 FLUID MECHANICS AND MACHINERY		
	CO Statements	**Knowledge Level**
1	Apply mathematical knowledge to predict the properties and characteristics of a fluid.	K3
2	Can analyse and calculate major and minor losses associated with pipe flow in piping networks.	K3
3	Can mathematically predict the nature of physical quantities	K4
4	Can critically analyse the performance of pumps	K2
5	Can critically analyse the performance of turbines.	K2
4.Course Code and Name : EC8392 DIGITAL ELECTRONICS		
	CO Statements	**Knowledge Level**
1	Use digital electronics in the present contemporary world	K6
2	Design various combinational digital circuits using logic gates	K6
3	Do the analysis and design procedures for synchronous and asynchronous sequential circuits	K3
4	Use the semiconductor memories and related technology	K3
5	Use electronic circuits involved in the design of logic gates	K6
5.Course Code and Name : MT8301 ELECTRICAL MACHINES AND DRIVES		
	CO Statements	**Knowledge Level**
1	Get the basic knowledge about the Electric circuits and transformers.	K2
2	Understand the various types of electrical motors	K3
3	Know about speed control and starting methods DC and induction motors	K2
4	Understand about various types of electrical drives	K4
5	Get exposure with solid state drives	K2
6.Course Code and Name : MT8302 ANALOG DEVICES AND CIRCUITS		
	CO Statements	**Knowledge Level**
1	Apply the various switching devices in electronic circuits.	K2
2	Work with various applications of amplifiers	K2
3	Design various circuits using ICs.	K2
4	Test and measure different parameters available in electronic circuits.	K3

5	Explain the principles of various display devices.	K2

7.Course Code and Name :CE8381 STRENGTH OF MATERIALS AND FLUID MECHANICS & MACHINERY LABORATORY		
	CO Statements	**Knowledge Level**
1	Ability to perform Tension test on Solid materials	K3
2	Ability to perform Torsion test on Solid materials Deformation test on Solid materials.	K3
3	Ability to perform Hardness test on Solid materials	K3
4	Ability to perform Compression test on Solid materials	K2
5	Ability to perform Deformation test on Solid materials	K2

8.Course Code and Name :MT8311 ELECTRICAL MACHINES AND DRIVES LABORATORY		
	CO Statements	**Knowledge Level**
1	Test and assess the performances of the DC motors	K3
2	Test and assess the performances of single phase AC motor for varying load.	K3
3	Control the speed of AC motor	K3
4	Control the speed of DC motor	K3
5	Analyze and present the findings of experimental observations in both written and oral format.	K2

9.Course Code and Name : HS8381 INTERPERSONAL SKILLS/LISTENING&SPEAKING		
	CO Statements	**Knowledge Level**
1	Listen appropriately.	K1
2	Respond appropriately.	K2
3	Participate in group discussions	K6
4	Make effective presentations	K6
5	Participate confidently and appropriately in conversations both formal and informal	K6

SEMESTER 04

1.Course Code and Name : MA8452 STATISTICS AND NUMERICAL METHODS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply the concept of testing of hypothesis for small and large samples in real life problems	K2
2	Apply the basic concepts of classifications of design of experiments in the field of agriculture	K2
3	Appreciate the numerical techniques of interpolation in various intervals and apply the numerical techniques of differentiation and integration for engineering problems.	K3
4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.	K2
5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.	K2

2.Course Code and Name : ME8392 MANUFACTURING TECHNOLOGY		
	CO Statements	**Knowledge Level**
1	The Students can able to use casting process and use this in industry for component production	K2
2	The Students can able to use welding process and use this in industry for component production	K3
3	The Students can able to use machining process and use this in industry for component production	K2
4	The Students can able to use forming and shaping of plastics process and use this in industry for component production	K2
5	The Students can able to use metal forming and powder metallurgy process and use this industry for component production	K2
3.Course Code and Name : MT8491 MICROPROCESSORS AND MICROCONTROLLERS		
	CO Statements	**Knowledge Level**
1	Distinguish the feature of the 8085 microprocessor, Hardware Architecture and PIN diagram.	K2
2	Demonstrate programming proficiency using the various addressing modes and data transfer instructions of 8085 microprocessor	K2
3	Acquaint the knowledge on architecture and programming of Microcontroller 8051.	K2
4	Illustrate the interrupts handling and demonstrate peripherals applications in different IC and Know about A/D and D/A converters.	K4
5	Apply the programming concepts to interface the hardware units with microprocessor and Microcontroller	K2
4.Course Code and Name : ME8492 KINEMATICS OF MACHINERY		
	CO Statements	**Knowledge Level**
1	Discuss the basics of mechanism	K3
2	Calculate velocity and acceleration in simple mechanisms	K4
3	Develop CAM profiles	K4
4	Solve problems on gears and gear trains	K2
5	Examine friction in machine elements	K2
5.Course Code and Name : MT8401 THERMODYNAMICS AND HEAT TRANSFER		
	CO Statements	**Knowledge Level**
1	Understand the basic concepts associated first law of thermodynamics	K4
2	Understand basic concepts associated with second law of thermodynamics	K2
3	Describing the working of I.C engines and to determine its performance	K2

	parameters	
4	Basic principles of refrigeration, air conditioning and psychometric chart	K2
5	Distinguishing the various modes of heat transfer and its applications	K2
6.Course Code and Name : MT8411 MICROPROCESSOR AND MICROCONTROLLERS LABORATORY		
	CO Statements	**Knowledge Level**
1	Solve the arithmetic operations using microcontrollers	K2
2	Solve the arithmetic operations using various on-chip interfacing and algorithms	K2
3	Solve the arithmetic operations using various off-chip interfacing and algorithms	K2
4	Design the digital hardware interface for microcontroller-based systems.	K2
5	Design the analog hardware interface for microcontroller-based systems.	K4
7.Course Code and Name : ME8461 MANUFACTURING TECHNOLOGY LABORATORY		
	CO Statements	**Knowledge Level**
1	Ability to use different machine tools to manufacturing gears.	K2
2	Ability to use different machine tools for finishing operations	K3
3	Ability to manufacture tools using cutter grinder	K3
4	Develop CNC part programming	K6
5	Ability to perform planning and shaping process	K4
8.Course Code and Name : ME8381 COMPUTER AIDED MACHINE DRAWING		
	CO Statements	**Knowledge Level**
1	Follow the drawing standards, Fits and Tolerances	K2
2	Follow Fits and Tolerances	K2
3	Re-create part drawings	K2
4	Re-create sectional views	K2
5	Re-create assembly drawings as per standards	K2
9.Course Code and Name : HS8461 ADVANCED READING AND WRITING		
	CO Statements	**Knowledge Level**
1	Write different types of essays.	K2
2	Write winning job applications.	K2
3	Read texts critically.	K2
4	Evaluate texts critically.	K2
5	Display critical thinking in various professional contexts.	K2
SEMESTER 05		
1.Course Code and Name : EE8552 POWER ELECTRONICS		
	CO Statements	**Knowledge Level**

Upon successful completion of the course, students should be able to:		
1	Ability to analyse AC-AC converters.	K3
2	Ability to analyse DC-DC converters.	K2
3	Ability to analyse DC-AC converters.	K3
4	Ability to choose the converters for real time applications.	K3
5	Ability to analyze single phase and three phase cyclo converters	K3
2.Course Code and Name : MT8591 SENSORS AND INSTRUMENTATION		
	CO Statements	**Knowledge Level**
1	Familiar with various calibration techniques and signal types for sensors.	K2
2	Apply the various sensors in the Automotive and Mechatronics applications	K5
3	Describe the working principle and characteristics of force, magnetic and heading sensors.	K2
4	Understand the basic principles of various pressure and temperature, smart sensors.	K4
5	Ability to implement the DAQ systems with different sensors for real time applications.	K3
3.Course Code and Name : ME8594 DYNAMICS OF MACHINES		
	CO Statements	**Knowledge Level**
1	Calculate static and dynamic forces of mechanisms	K2
2	Calculate the balancing masses and their locations of reciprocating and rotating masses.	K3
3	Compute the frequency of free vibration.	K3
4	Compute the frequency of forced vibration and damping coefficient	K3
5	Calculate the speed and lift of the governor and estimate the gyroscopic effect on automobiles, ships and airplanes.	K2
4.Course Code and Name : EC8391 CONTROL SYSTEMS ENGINEERING		
	CO Statements	**Knowledge Level**
1	Identify the various control system components and their representations.	K2
2	Analyze the various time domain parameters	K2
3	Analysis the various frequency response plots and its system.	K3
4	Apply the concepts of various system stability criterions.	K2
5	Design various transfer functions of digital control system using state variable models.	K5
6.Course Code and Name : MT8511 POWER ELECTRONICS LABORATORY		
	CO Statements	**Knowledge Level**
1	Ability to use SCR in electronic circuit	K1
2	Ability to use MOSFET in electronic circuit	K3
3	Ability to use TRIAC in electronic circuit	K1
4	Ability to perform characteristic study on the electronics components.	K2
5	Ability to study the speed control of DC shunt motor.	K2

7.Course Code and Name : MT8512 SENSORS AND INSTRUMENTATION LABORATORY		
	CO Statements	**Knowledge Level**
1	Generate appropriate design procedure, suitable for signal conversion to interface with computer	K2
2	Design appropriate circuits by using conventional formulas used in signal conditioning and conversion.	K4
3	Implement their design in bread board and test it.	K3
4	Generate appropriate design procedure to obtain a required measurement data for temperature, force, humidity, displacement and sound.	K3
5	Log the data in computer using LABVIEW/ MATLAB/PSILAB.	K4
8.Course Code and Name : ME8481 DYNAMICS LABORATORY		
	CO Statements	**Knowledge Level**
1	Ability to demonstrate the principles of kinematics of machinery	K2
2	Ability to demonstrate the principles of dynamics of machinery	K2
3	Ability to use the measuring devices for dynamic testing.	K2
4	Understand the determination of transmissibility ratio using vibrating table.	K3
5	Understand the balance of rotating masses	K2
9.Course Code and Name : HS8581 PROFESSIONAL COMMUNICATION		
	CO Statements	**Knowledge Level**
1	Make effective presentations	K4
2	Participate confidently in Group Discussions.	K2
3	Attend job interviews and be successful in them	K3
4	Develop adequate Soft Skills required for the workplace	K4
5	Ability to recognize the difference between group and team.	K3
SEMESTER 06		
1.Course Code and Name : ME8591 APPLIED HYDRAULICS AND PNEUMATICS		
	CO Statements	**Knowledge Level**
At the end of the course, the students should be able to:		
1	Understanding operating principles of hydraulic and pneumatic systems.	K3
2	Understanding constructional features of hydraulic and pneumatic systems.	K3
3	Knowledge with selection of hydraulic components	K3
4	Knowledge with selection of pneumatic components	K3
5	Understanding of designing and layout of Hydraulic Power package and trouble shooting.	K3
2.Course Code and Name : MT8601 DESIGN OF MECHATRONICS SYSTEM		

	CO Statements	Knowledge Level
1	Understand the basics and key elements of Mechatronics design process	K2
2	Familiar with basic system modelling	K2
3	Understand the concepts of engineering system and dynamic response of the system	K2
4	Realize the concepts of real time interfacing and data acquisition	K3
5	Understanding the concepts of design of Mechatronics system through case studies	K3

3.Course Code and Name :ME8593 DESIGN OF MACHINE ELEMENTS		
	CO Statements	**Knowledge Level**
1	Explain the influence of steady and variable stresses in machine component design.	K2
2	Apply the concepts of design to shafts, keys and couplings	K2
3	Apply the concepts of design to temporary and permanent joints.	K2
4	Apply the concepts of design to energy absorbing members, bearings and connecting rod.	K2
5	Apply the concepts of design to bearings.	K3

4.Course Code and Name : MT8602 INDUSTRIAL AUTOMATION		
	CO Statements	**Knowledge Level**
1	Choose appropriate PLC and explain the architecture, installation procedures and trouble shooting.	K2
2	Develop PLC programs using various functions of PLCs for a given application.	K3
3	Explain the application development procedures in SCADA and manage data, alarm and storage.	K3
4	Distinguish DCS, SCADA and PLC and explain the architecture of DCS	K2
5	Describe the controller elements and program methods.	K2

5.Course Code and Name : MG8591 PRINCIPLES OF MANAGEMENT		
	CO Statements	**Knowledge Level**
1	Able to understand planning	K5
2	Able to understand organizing	K2
3	Able to understand staffing	K2
4	Able to understand leading & controlling	K2
5	Able to understand the basic knowledge on international aspect of management	K2

7.Course Code and Name : MT8611 APPLIED HYDRAULICS AND PNEUMATICS LABORATORY		
	CO Statements	**Knowledge Level**

1	Select the actuators for the design of fluid power circuits.	K3
2	Select the valves for the design of fluid power circuits.	K2
3	Design the fluid power circuits using software tool.	K6
4	Simulate the fluid power circuits using software tool.	K2
5	Test the simulated output by constructing the fluid power circuits using suitable actuators and valves	K6
8.Course Code and Name : MT8612 INDUSTRIAL AUTOMATION LABORATORY		
	CO Statements	**Knowledge Level**
1	Carryout wiring connections and troubleshoot in different PLCs	K3
2	Develop simple applications using LD, ST and FBD mode of programming	K3
3	Use timers and counter functions of PLC to construct simple applications.	K3
4	Integrate and control process station with PLC	K3
5	Develop SCADA application using open source software.	K4
9.Course Code and Name :ME8682 DESIGN AND FABRICATION PROJECT		
	CO Statements	**Knowledge Level**
1	Design the machine element or the mechanical product	K6
2	Fabricate the machine element or the mechanical product	K6
3	Demonstrate the working model of the machine element	K6
4	Demonstrate the working model of the the mechanical product.	K6
5	Ability to apply the tools.	K2
SEMESTER 07		
1.Course Code and Name : ME8691 COMPUTER AIDED DESIGN AND MANUFACTURING		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the 2D and 3D transformations, clipping algorithm, Manufacturing models and Metrics	K2
2	Explain the fundamentals of parametric curves, surfaces and Solids	K2
3	Summarize the different types of Standard systems used in CAD	K2
4	Apply NC & CNC programming concepts to develop part programme for Lathe & Milling Machines	K2
5	Summarize the different types of techniques used in Cellular Manufacturing and FMS	K2
2.Course Code and Name :MT8701 ROBOTICS AND MACHINE VISION SYSTEM		
	CO Statements	**Knowledge Level**
1	Express the basic concepts, laws, components and parameters of robots	K2
2	Explain the types of grippers and its functions.	K3
3	Evaluate the kinematic calculations and apply Lagrangian and Newton-Euler methods to analyze dynamic characteristics of robots	K3
4	Describing the various programming techniques used in industrial robots	K3

5	Basis of machine vision and apply the concept of image processing	K2
3.Course Code and Name : MT8791 EMBEDDED SYSTEM DESIGN		
	CO Statements	**Knowledge Level**
1	Explain the need of embedded systems and their development procedures	K2
2	Summaries the concepts involved in Real time operating systems.	K1
3	Use various tools for developing embedded applications	K3
4	Explain the construction, addressing modes and instructions sets of PIC micro controller.	K2
5	Conduct experiments with I/O systems used in embedded systems.	K3
7.Course Code and Name :MT8711 COMPUTER AIDED DESIGN AND MANUFACTURING LABORATORY		
	CO Statements	**Knowledge Level**
1	Model a given three dimensional engineering components	K3
2	Assemble a given three dimensional engineering components	
3	Perform various analyses on simple structures for the application of different loads.	K3
4	Generate CNC programs for a given components to work with CNC machines	K2
5	Ability to generate NC code for milling and turning using any CAM package.	K3
8.Course Code and Name : MT8781 ROBOTICS LABORATORY		
	CO Statements	**Knowledge Level**
1	Use of any robotic simulation software	K3
2	To model the different types of robots	K3
3	Understand to calculate work volume for different robots	K3
4	Ability to understand Robot programming	K3
5	Study and Analyze the simulation for Shape identification	K2
SEMESTER 08		
1.Course Code and Name : MT8801 AUTOMOTIVE ELECTRONICS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Know the importance of emission standards in automobiles	K2
2	Understand the electronic fuel injection/ignition components and their function.	K3
3	Choose and use sensors and equipment for measuring mechanical quantities, temperature and appropriate actuators	K4
4	Diagnose electronic engine control systems problems with appropriate diagnostic tools.	K2
5	Analyses the chassis and vehicle safety system	K3
4.Course Code and Name : MT8811 PROJECT WORK		
	CO Statements	**Knowledge Level**
1	Design, analyze, realize a physical system by using the technology they learnt during the program.	K2
2	Simulate a physical system by using the technology they learnt during the program.	K2

3	Integrate various systems into one Mechatronics product.	K2
4	Work in a team with confined time duration.	K2
5	Disseminate his work both in oral and written format.	K2

PRINCIPAL
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TAMILNADU

2013 REGULATION

B.E. MECHATRONICS ENGINEERING (2013 REGULATIONS)

Program Outcomes (POs)

Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

Design / Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental

Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear

Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

2.6.1 - Programme and course outcomes for all Programmes offered by the institution are stated and displayed on website and communicated to teachers and students.

The graduates will be able to

PSO 1: Inculcate Knowledge in Basic Engineering Sciences and Fundamentals of Mechanical, Electronics and Electrical Engineering.

PSO 2: Create ability to Design, Develop Product and applications in the field of Automation and Mechatronics.

PSO 3: Prepare Graduates to be valuable Engineers with excellent logical and Problem solving skills in a multidisciplinary environment.

COURSE OUTCOME STATEMENTS FOR B.E.MECHATRONICS ENGINEERING (2013 REGULATIONS)

SEMESTER 01

1.Course Code and Name : HS6151 - TECHNICAL ENGLISH I

	CO Statements	Knowledge Level
The students should be able to		
1	Classify the types of listening and writing skills with acquired knowledge	K2
2	Demonstrate speaking skills in various occasions	K2
3	Compare the formal and informal writing skills by using the mail and blocks	K2
4	Apply the speaking etiquitte to build up communication proficiency	K3
5	Develop presentations with the use of LSRW skills	K3
2.Course Code and Name : MA6151 - MATHEMATICS I		
	CO Statements	Knowledge Level
The students should be able to		
1	Solve the Eigen values and Eigen vectors to diagonalise and reduce a matrix to quadratic form	K3
2	Identify the convergences, divergences of infinite series	K3
3	Solve evolutes and envelopes of a given curve by using radius of curvature and center of curvature	K3
4	Identify the maxima and minima value functions of two variables	K3
5	Solve area of plain curves and volume of solid using double and triple integrals	K3
3.Course Code and Name : PH6151 - ENGINEERING PHYSICS I		
	CO Statements	Knowledge Level
The students should be able to		
1	Explain the basics of properties of matter and its applications	K2
2	Summarize the concepts of waves and optical devices and their applications in fiber optics	K2
3	Demonstrate the concepts of thermal properties of materials and their applications in expansion joints and heat exchangers	K2
4	Outline the concepts of advanced physics quantum theory and its applications in tunnelling microscopes	K2
5	Explain the basics of crystals, their structures and different crystal growth techniques	K2
4.Course Code and Name : CY6151 - ENGINEERING CHEMISTRY I		
	CO Statements	Knowledge Level
The students should be able to		
1	Classify the polymers and their utility in the industries and explain the techniques of polymerization and properties of polymers	K2
2	Relate various thermodynamic functions such as enthalpy, entropy, free energy and their importance	K2
3	Explain the photo physical processes such as fluorescence and phosphorescence and various components of UV and IR spectrophotometer	K2
4	Illustrate the phase transitions of one component and two component systems and the	K2

	types of alloys and their application in industries	
5	Outline the synthesis, characteristics and the applications of nano materials	K2

5.Course Code and Name : GE6151- COMPUTER PROGRAMMING		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Describe the function of a Computer and problem solving techniques.	K2
2	Write simple C programs using basic constructs	K3
3	Implement applications to manage data using arrays and strings	K3
4	Apply functions and pointers for solving problems	K3
5	Develop simple applications using structure and union	K3

6.Course Code and Name : GE6152- ENGINEERING GRAPHICS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Demonstrate freehand sketching of basic geometrical constructions and multiple views of objects	K2
2	Develop orthographic projections of points, lines and plane surfaces	K3
3	Construct projections of simple solids and truncated solids	K3
4	Develop projection of sectioned solids and utilize development of surfaces	K3
5	Construct isometric and perspective projections of simple solids	K3

7.Course Code and Name : GE6161- COMPUTER PRACTICES LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply the usage of office automation tools.	K2
2	Apply good programming design methods for program development.	K3
3	Design and implement C programs for simple applications.	K3
4	Develop recursive programs.	K3

8.Course Code and Name : GE6162 - ENGINEERING PRACTICES LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Construct carpentry components and pipe connections including plumbing works	K2
2	Make use of welding equipments to join the structures	K3
3	Develop models using sheet metal work	K3
4	Illustrate the working of centrifugal pump and air conditioner	K3
5	Demonstrate basic home electrical works, measurement of the electrical quantities and soldering practices	K3

9.Course Code and Name : GE6163 - PHYSICS AND CHEMISTRY LABORATORY - I		
	CO Statements	**Knowledge Level**

The students should be able to		
1	Make use of spectrometer to find the wavelength of spectral lines, and laser	K3
2	Make use of ultrasonic interferometer and Lee's disc apparatus to find the velocity of sound, compressibility of the liquid and thermal conductivity	K3
3	Demonstrate the estimation of DO content in water sample by Winkler's method and molecular weight of polymer by Ostwald viscometer	K2
4	Experiment with the strength of an acid using pH meter and conductometer	K3
5	Demonstrate the estimation of weak and strong acids in a mixture by conductometer	K2
SEMESTER 02		
1.Course Code and Name : HS6251 - TECHNICAL ENGLISH II		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop the communication skills with proper grammar usage	K2
2	Summarize the various advanced technical and non-technical english tools	K2
3	Classify the speaking skills and expression through professional english	K2
4	Apply the interview techniques for career development	K3
5	Outline the use of writing skills to express innovatiove ideas	K3
2.Course Code and Name : MA6251 - MATHEMATICS II		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply solenoidal, irrotational vectors and make use of the concepts of Green's, Gauss divergence , Stokes theorem to evaluate single, double and triple integrals	K3
2	Solve simultaneous linear equations and P.I. of Cauchy and Legendre Equation	K3
3	Solve Laplace Transforms of periodic functions and ODE using Inverse Laplace Transform	K3
4	Make use of the properties of analytic functions for verifying C-R equations for determination of Bilinear Transformation	K3
5	Develop the functions of two variables as Taylor's and Laurent's series and Contour integrals by using Cauchy's Integral formula	K3
3.Course Code and Name : PH6251 - ENGINEERING PHYSICS II		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the basics, properties and applications of conducting materials	K2
2	Summarize the properties of semiconducting materials and semiconductor devices.	K2
3	Explain the basics, properties and applications of the magnetic materials and super conducting material	K2
4	Illustrate the concepts, mechanisms and applications of dielectric materials	K2
5	Outline the method of synthesis and explain the properties of Nano materials, SMA, Metallic glasses and Ceramics	K2

4.Course Code and Name : CY6251 - ENGINEERING CHEMISTRY II		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the problems of using hard water in boilers and methods of treatment of water for boiler use	K2
2	Apply the design principles to electro chemical cell. Identify the types of corrosion and the methods of prevention	K3
3	Illustrate the methods of harnessing energy from non-conventional energy sources	K2
4	Classify various engineering materials and explain their importance	K2
5	Relate the significance of solid, liquid and gaseous fuels. Explain the calorific values of fuels and air requirement for combustion in furnaces	K2
5.Course Code and Name : GE6252- BASIC ELECTRICAL AND ELECTRONICS ENGINEERING		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply the basic theorems to solve problems in Electrical circuits	K3
2	Classify the different components and function of electrical machines	K2
3	Summarize the characteristics of electronic components	K2
4	Outline the basic concepts of communication engineering	K2
5	Solve design problems in digital electronic circuits	K3
6.Course Code and Name : GE6253- ENGINEERING MECHANICS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop the vectorial and scalar representation of forces and moments	K3
2	Solve problems pertaining to rigid bodies in equilibrium	K3
3	Identify the properties of surfaces and solids like centriod and moment of inertia etc.	K3
4	Solve problems pertaining to rigid bodies under the effect of dynamic forces	K3
5	Apply the laws of friction for the solution of simple rigid bodies	K3
7.Course Code and Name : GE6261 - COMPUTER AIDED DRAFTING AND MODELING LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop front view and top view of simple solids and objects	K3
2	Construct isometric projection and sectional views of objects and simple solids	K3
3	Construct plan of a residential building	K3
4	Demonstrate the drawing of truss and curves	K2
5	Model simple objects and construct 2-D multi-view drawings from 3-D using drafting software	K3
8.Course Code and Name :GE6262- PHYSICS AND CHEMISTRY LABORATORY - II		
	CO Statements	**Knowledge Level**
The students should be able to		

1	Illustrate the determination of Young's modulus of the beam and moment of inertia and rigidity modules of thin wire Torsion pendulum	K2
2	Make use of Poiseuille's method to determine the coefficient of viscosity of the liquid	K3
3	Illustrate the determination of dispersive power of a prism and the thickness of a thin wire through interference fringes using Air wedge apparatus	K2
4	Experiment with the type, amount of alkalinity, hardness in a given water sample and evaluate the Amount of copper using EDTA method	K3
5	Demonstrate titration by potentiometric redox and conductometric precipitation methods	K2
SEMESTER 03		
1.Course Code and Name : MA6351 - TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Solve differential equations using Fourier series analysis for engineering applications.	K1
2	Utilize Dirichlet's condition for finding the Fourier series of a given function	K2
3	Apply Fourier series to solve one dimensional way, one and two dimensional heat equations.	K2
4	Solve Fourier transform for a given function and make use of them to evaluate certain definite Integrals	K2
5	Solve Z transforms of standard functions and make use of them to solve difference equations	K2
2.Course Code and Name : CE6306 STRENGTH OF MATERIALS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Summarize the concepts of stress and strain in simple and compound bars, the importance	K2
2	Construct the load transferring mechanism in beams and stress distribution due to shearing	K3
3	Apply basic equation of simple torsion in designing of shafts and helical spring.	K3
4	Identify the slope and deflection in beams using different methods.	K3
5	Analyze and design thin and thick shells for the applied internal and external pressures.	K4
3.Course Code and Name : CE6451 - FLUID MECHANICS AND MACHINERY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the effect of fluid properties on a flow system and Identify type of fluid flow pattern	K2
2	Develop the experiments and analyse data on different types of loses in pipes of varying	K3
3	Plan the use dimensional analysis concept in flow problem.	K3
4	Identify a performance parameters of a given Centrifugal pump.	K3

5	Show the characteristic curves of hydraulic machines.	K2
4.Course Code and Name : EC6302 DIGITAL ELECTRONICS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Analyze different methods used for simplification of Boolean expressions.	K2
2	Design and implement Combinational circuits.	K3
3	Design and implement synchronous and asynchronous sequential circuits.	K3
4	Write simple HDL codes for the circuits.	K2
5.Course Code and Name :EE6358 ELECTRICAL MACHINES AND DRIVES		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the elements of electrical drives	K2
2	Outline drive motor characteristics	K2
3	Summarize the starting method of DC and AC motors	K2
4	Illustate the conventional speed control of DC and AC drives	K2
5	Infer the concepts of Solid State speed Control of DC and AC drives	K2
6.Course Code and Name : ME6401 KINEMATICS OF MACHINERY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the basics of mechanism	K2
2	Analyse the assembly with respect to the displacement, velocity and acceleration	K4
3	Construct the CAM profiles	K3
4	Analyse problems on gears and gear trains	K4
5	Identify the friction in machine elements	K3
7.Course Code and Name : CE6461 FLUID MECHANICS AND MACHINERY LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Identify the flow in pipes	K3
2	Examine the frictional losses in pipes	K4
3	Develop characteristics of pumps	K3
4	Develop characteristics of turbines	K3
5	Analyze the metacentric height of floating bodies	K4
8.Course Code and Name : EE6362 ELECTRICAL MACHINES AND DRIVES LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Ability to do characteristics of different electrical motors.	K2
2	To analyze the performance characteristics of single phase and Polyphase Induction Machines.	K2
3	To understand and analyze the concept of synchronous motor by conducting (or) demonstration through load test.	K2
4	To conduct the load test on single phase transformer for analyzing the performance characteristics.	K5

5	To Perform loading and speed control on DC Shunt Machine .	K4
9.Course Code and Name: MT6311 COMPUTER AIDED MACHINE DRAWING		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Ability to develop engineering drawing for the industrial component using Indian Standard code of practice.	K2
2	Ability to develop 2D and 3D models of the component using manual/software	K2
3	Develop 2D and 3D models using modeling softwares.	K2
SEMESTER 04		
1.Course Code and Name : MA6452 STATISTICS AND NUMERICAL METHODS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Apply the concept of testing of hypothesis for small and large samples in real life problems.	K3
2	Utilize the basic concepts of classifications of design of experiments in the field of agriculture	K3
3	Develop the numerical techniques of interpolation in various intervals and apply the numeric	K3
4	Understand the knowledge of various techniques and methods for solving first and second	K2
5	Solve the partial and ordinary differential equations with initial and boundary conditions	K3
2.Course Code and Name : ME6505 DYNAMICS OF MACHINES		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Solve static and dynamic forces of mechanisms	K3
2	Summarize the balancing masses and their locations of reciprocating and rotating masses	K2
3	Determine the frequency of free vibration and damping	K2
4	Explain the frequency of forced vibration and damping coefficient	K2
5	Illustrate governor variables and estimate the gyroscopic effect on automobiles, ships	K2
3.Course Code and Name : EC6405 CONTROL SYSTEM ENGINEERING		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Illustrate various modeling techniques for control systemdesign	K2
2	Analyse the control systems using different methods	K4
3	Analyse frequency domain analysis of control systems required for stability analysis	K4
4	Analyse the compensation techniques that can be used to stabilize control systems	K4
5	analyse state variables of the system	K4
4.Course Code and Name : ME6352 MANUFACTURING TECHNOLOGY		
	CO Statements	**Knowledge Level**
The students should be able to		

1	The Students can able to use different manufacturing process and use this in industry for component production	K2
2	Explain different metal casting processes, associated defects, merits and demerits	K2
3	Compare different metal joining processes.	K2
4	Summarize various hot working and cold working methods of metals.	K2
5	Identify the Work on various sheet metal making processes.	K3
5.Course Code and Name : ME6504 METROLOGY AND MEASUREMENTS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the basics of standards of measurement, limits, fits &tolerances industrial application	K2
2	Identify the uses of gauges and comparators.	K3
3	Understand the significance of measurement system, errors, transducers, intermediate modification	K2
4	Comprehend the fundamentals of thermocouple and strain measurement.	K2
5	Illustrate the measurement of field variables like force, torque and pressure.	K2
6.Course Code and Name : MT6401 MICROPROCESSORS AND APPLICATIONS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the architecture and the concepts of 8085 microprocessor	K2
2	develop simple assembly language programming (ALP) using 8085 microprocessor	K3
3	Explain the architecture, memory organization, data & I/O transfer and interrupt concepts o	K2
4	compare the functions of 8085 and 8051	K2
5	apply the usage of 8051 microcontroller in real time application	K3
7.Course Code and Name : MT6411 MICROPROCESSOR LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop an ALP for fixed and Floating Point and Arithmetic	K6
2	Develop an ALP for Interface different I/Os with processor	K6
3	Develop an ALP to Generate waveforms using Microprocessors	K6
4	Ability to use the microprocessor to perform simple programmes like addition, subtraction, multiplication, division	K2
5	Ability to use the microprocessor for interfacing for conversion of signals.	K2
8.Course Code and Name : ME6465 MANUFACTURING TECHNOLOGY LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the mechanism of material removal processes.	K2
2	Ability to use different machine tools to manufacturing gears.	K2
3	Ability to use different machine tools for finishing operations	K2
4	Ability to manufacture tools using cutter grinder	K2
5	Develop CNC part programming	K2

9.Course Code and Name : ME6511 DYNAMICS LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Demonstrate the principles of kinematics and dynamics of machinery	K2
2	Explain the measuring devices for dynamic testing	K2
3	Solve the mass moment of inertia of mechanical element, governor effort and range s	K3
SEMESTER 05		
1.Course Code and Name : ME6503 DESIGN OF MACHINE ELEMENTS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain the influence of steady and variable stresses in machine component design.	K2
2	Apply the concepts of design to shafts, keys and couplings.	K3
3	Apply the concepts of design to temporary and permanent joints.	K3
4	Apply the concepts of design to energy absorbing members, connecting rod and crank shaft.	K3
5	Apply the concepts of design to bearings.	K3
2.Course Code and Name : EE6503 POWER ELECTRONICS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Compare different types of power semiconductor devices and their switching characteristics	K2
2	Explain the operation, characteristics and performance parameters of controlled converters	K2
3	Explain different modulation techniques of pulse width modulated inverters.	K2
4	Explain the operation of control circuits to HVDC, UPS and tap changing transformer.	K2
5	Explain the operation, characteristics and performance parameters of DC-DC choppers	K2
3.Course Code and Name : MT6501 SENSORS AND SIGNAL PROCESSING		
	CO Statements	**Knowledge Level**
The students should be able to		
1	The students will be able to use various Sensors	K2
2	The students will be able to use various electrical and mechanical instruments in industries.	K2
3	Define units and standards, elements of measurement system and error analysis	K2
4	Understand the static and dynamic characteristics of transducers.	K2
4.Course Code and Name : GE6351 ENVIRONMENTAL SCIENCE AND ENGINEERING		
	CO Statements	**Knowledge Level**

The students should be able to		
1	Illustrate the concepts of an ecosystem , energy flow and conservation of biodiversity.	K2
2	Explain the causes, effects and control of various types of pollution.	K2
3	Outline the conservation of natural resources.	K2
4	Summarize the social issues of environment and legislative guidelines for disaster management.	K2
5	Relate population growth and its impact on environment and human health.	K4
5.Course Code and Name : MF6505 CNC MACHINING TECHNOLOGY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Upon completion of this course the student and can to provide knowledge on principles	K2
2	Understand the constructional features, programming, tooling and workholding devices in CNC machine tools	K2
3	Understand the CNC control in modern manufacturing system.	K2
4	Construct the CNC part programming and perform manufacturing.	K3
6.Course Code and Name : MT6502 THERMODYNAMICS PRINCIPLES AND APPLICATIONS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	The students will be able to apply the thermodynamics laws in the design of I.C engines , air conditioning and refrigeration equipments	K2
2	Apply the first law of thermodynamics for simple open and closed systems.	K3
3	Construct the second law of thermodynamics and apply to open and closed systems	K3
4	Make use of Rankine cycle to steam power plant and compare few cycle improvement meth	K3
5	Classify the simple thermodynamic relations of ideal and real gases	K2
7.Course Code and Name : MT6511 POWER ELECTRONICS LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Ability to use SCR, MOSFET, TRIAC in electronic circuit	K2
2	Ability to perform characteristic study on the electronics components	K2
3	Analyze characteristics of AC to DC fully controlled converter, half-controlled converter an	K4
4	Analyze characteristics of single phase and three phase IGBT PWM inverter	K4
8.Course Code and Name : SENSORS AND SIGNAL PROCESSING LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		

1	Ability to use the sensors for the measurement of different signals and use of signal processing techniques to convert them to useful signal.	K2
9.Course Code and Name : MT6513 CNC LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Ability to write manual part programming using G code and M code for simple components	K2
2	Ability to operate CNC controlled machine tools	K2
SEMESTER 06		
1. Course Code and Name : MG6851 PRINCIPLES OF MANAGEMENT		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Summarize the evolution of management concepts.	K2
2	Classify the functions and principles of management	K2
3	Plan the use of POM tools for domain specific applications in an organization	K2
4	Demonstrate the application of various motivational theories to enrich the proper leadership qualities in an organization.	K2
5	Summarize the various budgetary Techniques.	K2
2. Course Code and Name : MT6601 MICROCONTROLLER AND PLC		
	CO Statements	**Knowledge Level**
The students should be able to		
1	The students will learn the theory, programming and application of microcontroller	K2
2	The students will learn design of systems using Programmable Logic Controllers	K2
3	Develop Memory Interfacing circuits.	K3
4	Develop 8051 microcontroller based systems	K3
3. Course Code and Name : MT6602 APPLIED HYDRAULICS AND PNEUMATICS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	The students will be able to operate and maintain various pneumatic and hydraulic systems in industrial environments.	K2
2	Understanding operating principles and constructional features of hydraulic and pneumatic systems.	K2
3	Knowledge with selection of hydraulic / pneumatic components	K2
4	Understand of designing and layout of Hydraulic Power package and trouble shooting.	K3
4. Course Code and Name : MT6603 DESIGN OF		

MECHATRONICS SYSTEM		
	CO Statements	**Knowledge Level**
The students should be able to		
1	The students will be able to design systems in mechatronics approach using modern software packages.	K2
2	Familiar with basic system modelling	K2
3	Understand the concepts of engineering system and dynamic response of the system	K2
4	Realize the concepts of real time interfacing and data acquisition	K3
5	Understanding the concepts of design of Mechatronics system through case studies	K2

5. Course Code and Name : MT6604 OBJECT ORIENTED PROGRAMMING IN C++		
	CO Statements	**Knowledge Level**
The students should be able to		
1	The students will be able to develop C++ programs for object oriented systems and test the systems	K2
2	CO2: Define the fundamental concepts in programming with C++.	K2
3	Identify classes and objects from the given problem description and able to create classes and obj	K1
4	Achieve code reusability and extensibility by means of Inheritance and Polymorphism	K2
5	Translate the informal description of an algorithm to solutions for problems in engineering, scienc	K2

6. Course Code and Name : GE6757 Total Quality Management		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Develop an understanding of quality management philosophies and Framework.	K3
2	Discuss the need of customer expectations, employee involvement and Supplier partnership.	K4
3	Analyze the TQM tools and Techniques to improve the product and process Quality.	K4
4	Apply modern tools to improve quality of the product.	K3
5	Explain about ISO 9001, Environmental Management Standards and ISO 14001 Certificatio	K2

7. Course Code and Name: MT6611 MICRO CONTROLLER AND PLC LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Ability to use microcontroller and PLC to control different motor/equipment	K4

8. Course Code and Name: MT6612 OBJECT ORIENTED PROGRAMMING LABORATORY		
1	Gain the basic knowledge on Object Oriented concepts.	K3
2	Ability to develop applications using Object Oriented Programming Concepts.	K4
3	Ability to implement features of object oriented programming to solve real world	K3

	problems	
9. Course Code and Name: MT6613 APPLIED HYDRAULICS AND PNEUMATIC LABORATORY		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Ability to design and test hydraulic, pneumatic circuits	K2
2	Use of MATLAB/LABVIEW software for simulation of hydraulic, pneumatic and electrical circuits.	K2
3	Select the actuators and valves for the design of fluid power circuits.	K2
4	Design and simulate the fluid power circuits using software tool.	K3
5	Test the simulated output by constructing the fluid power circuits using suitable actuators and valves.	K3
SEMESTER 07		
1. Course Code and Name : MT6701 MEDICAL MECHATRONICS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Explain different measurement techniques used in physiological parameters measurement.	K2
2	Describe the sensors and signal conditioning circuits used in biomedical engineering.	K2
3	Understand about various amplifiers, recording and display devices.	K2
4	Differentiate the working of recorders and explain the advanced systems used in medicine	K4
5	Understand about various Bio- medical diagnostics instrumentation.	K2
2. Course Code and Name : MT6702 MODELING AND SIMULATION		
	CO Statements	**Knowledge Level**
The students should be able to		
1	The students will be able to design and develop products using simulation techniques.	K2
2	To know the basic concepts of modelling and assembly for different mechanical components	K2
3	To know the different types of CAD standards used in modeling of mechanical components	K2
4	To know about basic concepts of FEA and analysis software for analyzing mechanical components	K3
5	To know about different mathematical techniques used in finite element analysis to solve structural and thermal problems	K3
3. Course Code and Name : MT6703 ROBOTICS AND MACHINE VISION SYSTEM		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Upon completion of this course, the students can able to apply the basic engineering knowledge for the design of robotics	K2
2	Explain the types of grippers and its functions.	K2

3	Evaluate the kinematic calculations and apply Lagrangian and Newton-Euler methods to analyze dynamic characteristics of robots	K3
4	Describing the various programming techniques used in industrial robots	K2
5	Basis of machine vision and apply the concept of image processing	K2
4. Course Code and Name : ME6602 AUTOMOBILE ENGINEERING		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Upon completion of this course, the students will be able to identify the different components in automobile engineering.	K2
2	Have clear understanding on different auxiliary and transmission systems usual.	K2
3	Distinguish the working of different types of transmission systems.	K4
4	Explain the Steering, Brakes and Suspension Systems.	K2
5	Predict possible alternate sources of energy for IC Engines.	K2
5. Course Code and Name : MT6003 ENGINEERING ECONOMICS AND COST ANALYSIS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	The students would be able to remember knowledge of mathematics, economics, and engineering principles to solve engineering problems.	K2
2	Demonstrate any given problems related to mechanical engineering field.	K2
3	The students will be able to carryout cost analysis for capital subjecting based on depreciation, money available , supply of material and demand of products.in their management profession	K3
4	Correlate all theoretical concepts with field problems	K4
6. Course Code and Name : ME6501 Computer Aided Design		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Upon completion of this course, the students can able to use computer and CAD software's for modeling of mechanical components	K2
2	Explain the 2D and 3D transformations, clipping algorithm, Manufacturing models and Metrics	K2
3	Explain the fundamentals of parametric curves, surfaces and Solids	K2
4	Summarize the different types of Standard systems used in CAD	K2
5	Apply NC & CNC programming concepts to develop part programme for Lathe & Milling Machines	K3
7. Course Code and Name : MT6711 COMPUTER AIDED DESIGN AND COMPUTER AIDED MANUFACTURING LABORATORY		
	CO Statements	**Knowledge Level**
1	The students can able to apply mathematical knowledge in modeling and assembly of parts	K2
2	Model and assemble a given three dimensional engineering components	K3
3	Perform various analyses on simple structures for the application of different loads.	K3

4	Generate CNC programs for a given components to work with CNC machines	K3
8. Course Code and Name : MT6712 ROBOTICS LABORATORY		
1	Know the body type and configurations of industrial robots.	K3
2	Deal with mobile robots using different sensors, links and actuators.	K3
3	Handle a robot model using the robotics simulation software.	K4
4	Clarify various programming techniques used in industrial robots.	K4
5	Simulate kinematic and dynamic analysis of robots and estimate the end effectors of robots.	K4
9. Course Code and Name : MT6713 DESIGN AND FABRICATION PROJECT		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Use of design principles and develop conceptual and engineering design of any components.	K3
2	Ability to fabricate any components using different manufacturing tools.	K5
SEMESTER 08		
1. Course Code and Name : MT6801- AUTOMOTIVE ELECTRONICS		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Know the importance of emission standards in automobiles	K2
2	Understand the electronic fuel injection/ignition component sand their function.	K2
3	Choose and use sensors and equipment for measuring mechanical quantities, temperature and appropriate actuators	K2
4	Diagnose electronic engine control systems problems with appropriated diagnostic tools.	K3
5	Analyses the chassis and vehicle safety system.	K3
2. Course Code and Name :MF6009 Rapid Prototyping		
The students should be able to		
1	Understand the Rapid Manufacturing Principle and process.	K2
2	Understand the operating principles of liquid and solid based additive manufacturing system, includi	K2
3	Discuss the Powder Based Rapid Prototyping Systems.	K2
4	Demonstrate Materials For Rapid Prototyping Systems.	K3
5	Provide knowledge on Reverse Engineering And New Technologies its applications in various fields.	K2
3. Course Code and Name : GE6075-Professional Ethics in Engineering		
	CO Statements	**Knowledge Level**
The students should be able to		
1	Illustrate the principles of human values	K2
2	Demonstrate the techniques and theories of Engineering Ethics	K2
3	Explain the procedure for Engineering As Social Experimentation	K2
4	Summarize the concept of Safety, Responsibilities And Rights	K2
5	Explain the different Global Issues	K2
4. Course Code and Name : MT6811 - Project Work		
	CO Statements	**Knowledge Level**

The students should be able to		
1	Analyze problems in various domains and formulate methodology	K4
2	Develop different solutions and select the optimum solution.	K3
3	Conclude using proper evidence to support them	K4