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

S No	DESCRIPTION
1	Display of College Vision and Mission in website
2	Display of Department Vision and Mission in website
3	Display of Department Vision, Mission , Program Outcome (PO) and Program Specific Outcomes (PSO)
4	Department Vision and Mission
5	Department Program Outcome (PO) and Program Specific Outcomes (PSO)
6	Series Test Question Papers
7	IQAC meeting minutes

NEHRU COLLEGE OF ENGINEERING & RESEARCH CENTRE PAMPADY THIRUVILWAMALA THRISSUR DT

PRINCIPAL
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INSTITUTION VISION AND MISSION DISPLAYED IN COLLEGE WEBSITE : www.ncerc.ac.in

NEHRU COLLEGE
OF ENGINEERING & RESEARCH CENTRE

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Objectives

- To build a center of excellence in higher education and research and to train students in advanced technologies in Mechanical, Automobile, Electrical, Electronics, and Computer Engineering.
- To provide students with comprehensive knowledge of principles of engineering with a multidisciplinary approach that is challenging.
- To create an intellectually stimulating environment for research, scholarship, creativity, innovation and professional activity, besides exposing our students to the challenges of the industrial world.

Vision & Mission

Vision : To mould true citizens who are millennium leaders and catalysts of change through excellence in education.

Mission : NCERC is committed to transform itself into a center of excellence in Learning and Research in Engineering and Frontier Technology and to impart quality education to mould technically competent citizens with moral integrity, social commitment and ethical values. We intend to facilitate our students to assimilate the latest technological know-how and to imbibe discipline, culture and spiritually, and to mould them in to technological giants, dedicated research scientists and intellectual leaders of the country who can spread the beams of light and happiness among the poor and the underprivileged.

ADMISSION

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Not secure | ncerc.ac.in/computer-science-and-engineering

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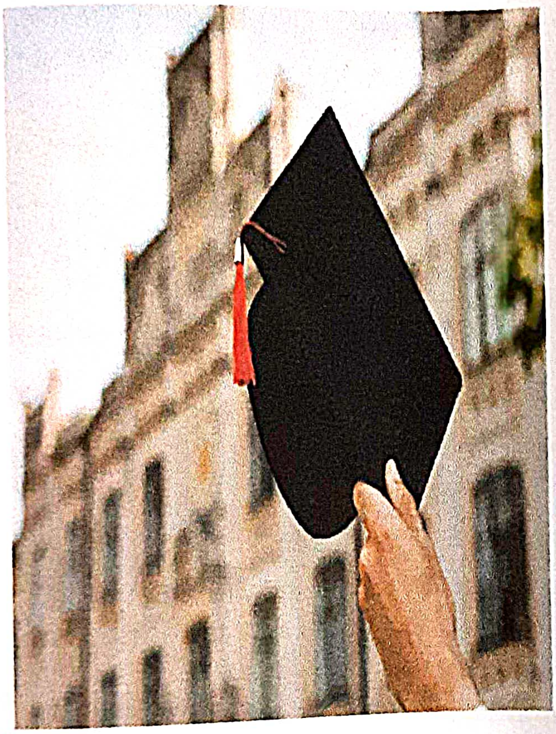

Department Vision

Producing Highly Competent, Innovative and Ethical Computer Science and Engineering Professionals to facilitate continuous technological advancement.

Department Mission

» To Impart Quality Education by creative Teaching Learning Process.

» To promote cutting-edge Research and Development Process to solve real world problems with emerging technologies.

» To Inculcate Entrepreneurship Skills among Students.

» To cultivate Moral and Ethical Values in their Profession.

ADMISSION

Program Outcomes (POs)

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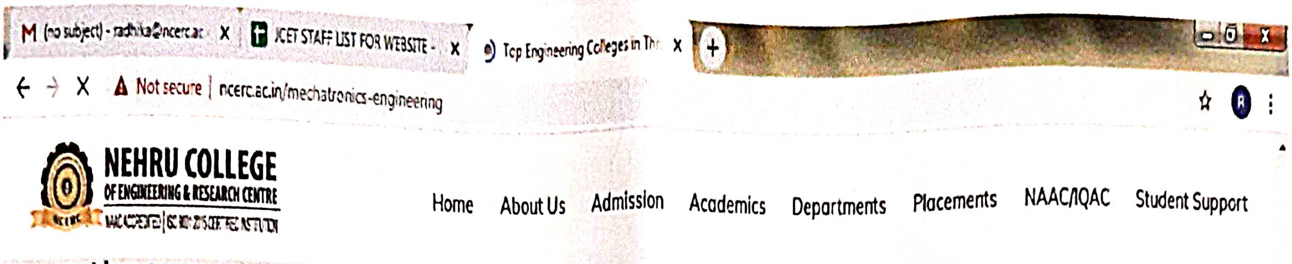

About

NCERC is the first institution offered the Mechatronics Engineering since 2013 (Approved by AICTE New Delhi and Accredited by NAAC and Affiliated to the University of Dr. A P J Abdul Kalam Technological University)provides a platform to create and apply knowledge by thinking and doing in this rapidly changing world. We aim to provide our students with a perfect blend of intellectual and practical experiences that helps them to be a King of industrial automation.

This program developed in direct response to industrial demand for engineers with multidisciplinary skills is a combination of Mechanical, Electronics, Computer, Telecommunications, Systems design engineering streams. Here we allow our students to design, construct and run automated processes, where they use their skills in computers, micro-controllers, programmable logic controllers, programming, industrial sensors, hydraulic, pneumatic and electronic drives, the design of mechanical structures and mechanisms and knowledge of manufacturing processes.

VISION : To mould self motivated graduates with knowledge in diverse areas of engineering and a desire for lifelong learning , who will be employable, will be conversant with ethical practices and teamwork, will excel in higher studies, proficient in research with a flair for publication of scientific findings, capable of conducting seminars and conferences, talented in developing products and processes with an intrinsic knowledge in the fundamentals of Intellectual Property Rights.

MISSION : To built a strong centre of excellence in learning and research in engineering and frontiers in technology. To felicitate students to learn and imbibe discipline, culture and spirituality besides encouraging them to assimilate the latest technological know-how to render a helping hand to the underprivileged, thereby acquiring happiness and imparting the same to others without any reservation what's ever to turn the college into a magnificent and mighty launching pad to turn out technological giants, dedicated research scientists and intellectual leaders of the society who could prepare the country for a quantum jump in all fields of science and technology.

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PHOTOGRAPHS OF DEPARTMENT VISION MISSION PO & PSO ARE DISPLAYED IN CLASS ROOMS AND OTHER AREAS

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NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

PROGRAM OUTCOMES

After the successful completion of the Couse, B.Tech. Computer Science and Engineering, Graduates can able to

PO 1	**ENGINEERING KNOWLEDGE :** Apply the knowledge of Mathematics, Science, and Computer Science and Engineering to solve complex engineering problems related to Design, Development, Testing and Maintenance of Software and System Tools.
PO 2	**PROBLEM ANALYSIS :** Identify, Analyse and Formulate complex Computer Science and Engineering problems to achieve significant conclusions by applying Mathematics, Natural Sciences and Computer Science and Engineering Principles and Technologies.
PO 3	**DESIGN / DEVELOPMENT OF SOLUTIONS :** Design and construct software system, programme, component or process to meet the desired needs within the realistic constraints.
PO 4	**CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS :** Use research based knowledge and research methods to perform Literature Survey, design experiments for complex problems in designing, developing and maintaining computing systems, collect data from experimental outcome, analyse and interpret the interesting patterns and to provide effective conclusions.
PO 5	**MODERN TOOL USAGE :** Create, select and apply appropriate state-of-the-art Tools and Techniques in designing, developing, testing and validating Computing Systems, Tools and Components.
PO 6	**THE ENGINEER AND SOCIETY :** Assess the societal, health, security, legal and cultural issues that might arise during Professional Practice in Computer Science and Engineering.
PO 7	**ENVIRONMENT AND SUSTAINABILITY :** Demonstrate the knowledge of sustainable development of Software, Components, Tools, Computing Systems and Solutions with an understanding of the impact of these engineering solutions on society and environment.
PO 8	**ETHICS :** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice of Computer Science and Engineering.
PO 9	**INDIVIDUAL AND TEAM WORK :** Function effectively as an individual, and as a member or leader in multi - disciplinary teams, and strive to achieve common goals.
PO 10	**COMMUNICATION :** Communicate effectively with engineering community and society and be able to comprehend and write effective reports and documents, make effective presentations and give and receive clear instructions.
PO 11	**PROJECT MANAGEMENT AND FINANCE :** Apply knowledge of the Engineering and Management principles to one's own work, as a member and leader in a team, to manage projects in Multi disciplinary Teams.
PO 12	**LIFE-LONG LEARNING :** Recognize the need for lifelong learning to cope up with the rapidly emerging Cutting Edge Technologies in Computer Science and Engineering and its allied Engineering application domains.

PROGRAMME SPECIFIC OUTCOMES

PSO 1	**ANALYSIS SKILLS :** Ability to Formulate and Simulate Innovative Ideas to provide software solutions for Real-time Problems.
PSO 2	**DESIGN SKILLS :** Ability to Analyze and design various methodologies for facilitating development of high quality System Software Tools and Efficient Web Design Models with a focus on performance optimization.
PSO 3	**PRODUCT DEVELOPMENT :** Ability to Apply Knowledge for developing Codes and integrating hardware / software products in the domains of Big Data Analytics, Web Applications and Mobile Apps.

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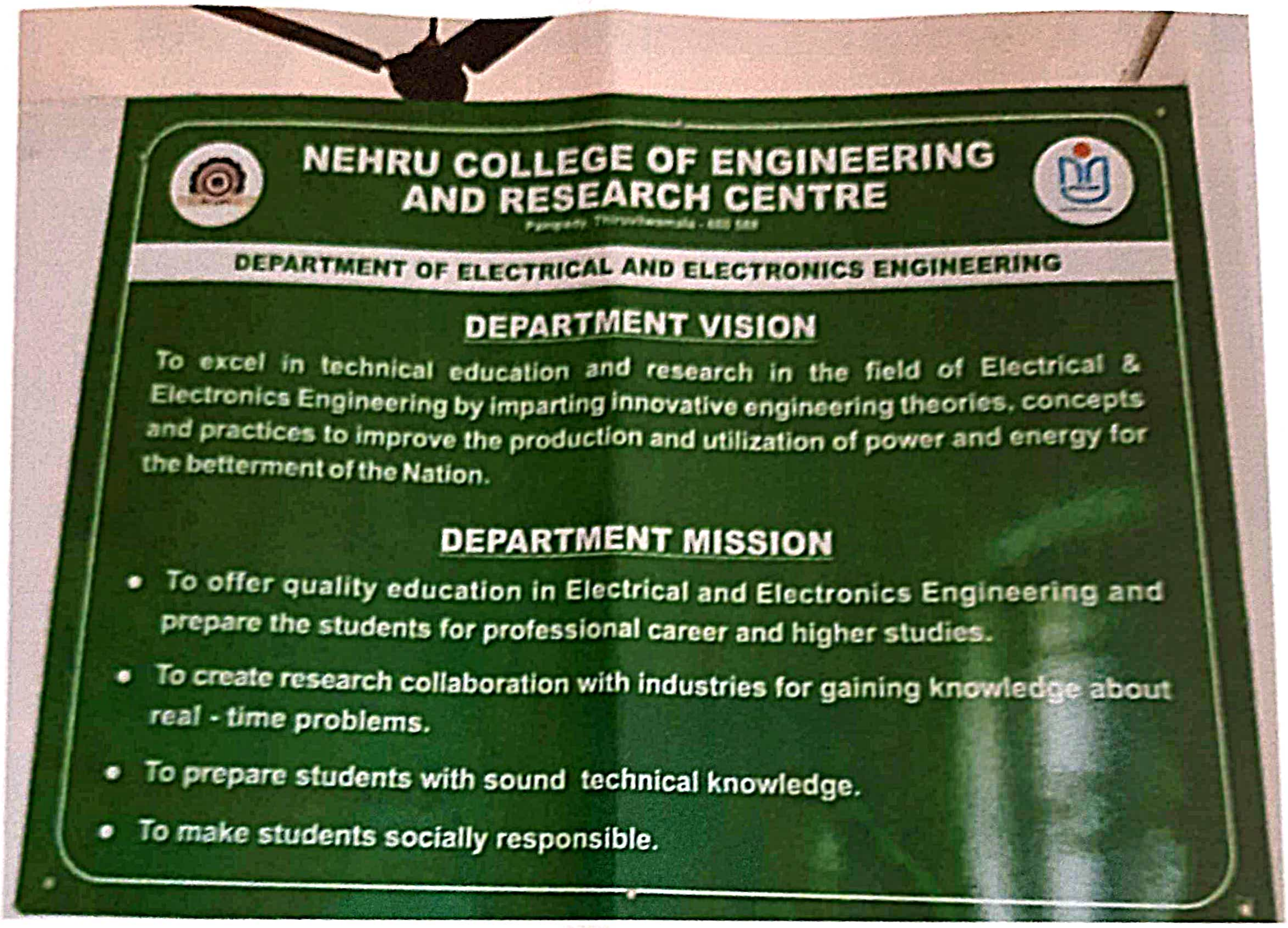

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Pampady, Thiruvilwamala - 680 588

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

PROGRAM OBJECTIVES

1. **ENGINEERING KNOWLEDGE :** Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization for the solution of complex engineering problems.
2. **PROBLEM ANALYSIS :** Identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural science and engineering sciences.
3. **DESIGN AND DEVELOPMENT OF SOLUTIONS :** Design solutions for complex engineering problems and design system components or processes that meet the specific needs with appropriate considerations for public health safety and 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 predictions and modelling 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 practices.
7. **ENVIRONMENT AND SUSTAINABILITY :** Understand the impact of the professional engineering solutions in societal and environmental context 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 multi disciplinary settings.
10. **COMMUNICATION :** Communicate effectively on complex engineering activities with the engineering community and with the 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 multi disciplinary 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

1. Apply Science, Engineering, Mathematics through differential and Integral Calculus, Complex Variables to solve Electrical Engineering Problems.
2. Demonstrate proficiency in the use of software and hardware to be required to practice electrical engineering profession.
3. Apply the knowledge of Ethical and Management principles required to work in a team as well as to lead a team.

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DEPARTMENT OF AUTOMOBILE ENGINEERING

DEPARTMENT VISION

Create a centre of excellence in the field of Automobile Engineering through industrial and academic research by training the learners for acceptance the modern world.

DEPARTMENT MISSION

- To work with commitment and dedication for the improvement of quality teaching.
- To conduct the innovative research by addressing the needs of Automotive Industries and Society.
- To develop professional practices among the learners to encourage life long team work and leadership.

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Since 1968

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

DEPARTMENT VISION

Producing Highly Competent, Innovative and Ethical Computer Science and Engineering Professionals to facilitate continuous technological advancement

DEPARTMENT MISSION

- To Impart Quality Education by creative Teaching Learning Process
- To Promote cutting-edge Research and Development Process to solve real world problems with emerging technologies.
- To Inculcate Entrepreneurship Skills among Students
- To cultivate Moral and Ethical Values in their Profession

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

DEPARTMENT VISION

Providing Universal Communicative Electronics Engineers with corporate and social relevance towards sustainable developments through quality education.

DEPARTMENT MISSION

- Imparting Quality education by providing excellent teaching, learning environment.
- Transforming and adopting students in this knowledgeable era, where the electronic gadgets (things) are getting obsolete in short span.
- To initiate multi-disciplinary activities to students at earliest and apply in their respective fields of interest later.
- Promoting leading edge Research & Development through collaboration with academia & industry.

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

DEPARTMENT VISION

To excel in technical education and research in the field of Electrical & Electronics Engineering by imparting innovative engineering theories, concepts and practices to improve the production and utilization of power and energy for the betterment of the Nation.

DEPARTMENT MISSION

- To offer quality education in Electrical and Electronics Engineering and prepare the students for professional career and higher studies.
- To create research collaboration with industries for gaining knowledge about real-time problems.
- To prepare students with sound technical knowledge.
- To make students socially responsible.

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MASTER OF BUSINESS ADMINISTRATION

DEPARTMENT VISION

To become the Centre of Excellence in Management and Innovation

DEPARTMENT MISSION

To evolve and sustain the business school as a vibrant institution of excellence in management education, for the development of talented and proficient leaders, who will be having values of entrepreneurship, uprightness and societal responsibilities.

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MASTERS IN COMPUTER APPLICATIONS

DEPARTMENT VISION

To create a school of distinction for the PG students, prepare them to be industry-ready, and achieve Academic excellence by continuous endorsement of the Faculty team in terms of Academics, Applications & Research.

DEPARTMENT MISSION

The Department of Computer Applications strives to provide quality and competency- based education and fine-tune the younger generation through curricular, co-curricular and Extra=curricular activities so as to encounter the Professional and Personnel challenges ahead with Pragmatic skills & courage , thereby 'Creating the True Citizens'.

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DEPARTMENT OF MECHANICAL ENGINEERING

DEPARTMENT VISION

Producing internationally competitive Mechanical engineers with social responsibilities and sustainable employability through viable strategies as well as competent exposure oriented quality education

DEPARTMENT MISSION

- Imparting high impact education by providing conductive teaching learning environment
- Fostering effective modes of continuous learning process with moral and ethical values
- Enhancing leadership qualities with social commitment, professional attitude, unity and harmony as e spirit- de corps, and communication skill
- Introducing present scenario in research and development through collaborative efforts blended with industry and institution

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DEPARTMENT OF MECHATRONICS ENGINEERING

DEPARTMENT VISION

To develop professionally ethical and socially responsible Mechatronics engineers to serve the humanity through quality professional education.

DEPARTMENT MISSION

- The department is committed to impart the right blend of knowledge and quality education to create professionally ethical and socially responsible graduates.
- The department is committed to impart the awareness to meet the current challenges in technology.
- Establish state-of-the-art laboratories to promote practical knowledge of mechatronics to meet the needs of the society

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

PROGRAMME OUTCOMES (PO)

- Programme Outcomes describe what students are expected to know and be able to do upon the graduation.

The Program Outcomes of under Graduate program in Electronics and Communication Engineering are:

Students will have:

a) Ability to apply knowledge of mathematics, science and engineering in the field of electronics and communication engineering.
b) Ability to design and conduct experiments, analyse and interpret data and results in electronics and communication engineering.
c) Ability to design electronics and communication systems, components, or processes to meet the desired needs within realistic constraints such as health and safety, manufacturability and sustainability with economic, environmental, social, political and ethical considerations.
d) Ability to work individually as well as in multidisciplinary teams as a member or as a leader to accomplish the common goal.
e) Ability to identify, analyse, formulate, and solve engineering problems
f) Knowledge of professional and ethical responsibility.
g) Ability to communicate effectively in any area of their field to the industry, fellow beings and society.
h) Broad knowledge necessary to understand the impact of engineering solutions on individuals, organizations and society.
i) Ability to engage in life-long learning to update their knowledge to keep pace with changes caused by dynamic nature of engineering field.
j) Awareness of the contemporary issues that help to integrate advanced and sustainable solutions in the user environment.
k) Ability to use the techniques, skills, and modern engineering tools, software and equipment to analyse and model complex engineering solutions

COURSE OUTCOME (CO)

- Course outcomes are statements that describe significant and essential learning that learners have achieved, and can reliably demonstrate at the end of a course or program.

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➢ Identify what the learner will know and be able to do by the end of a course or program.

SCHEME : 2015

FIRST SEMESTER			
University		**KTU**	
Sl No.	**Course Code & Title**	**Course Outcome**	
1	**MA 101 Calculus**	**CO1**	Students will be able to model physical phenomena involving functions of variables and parameters.
		CO2	Students will be able to acquire basic training in visualizing graphs and surfaces.
		CO3	Ability to use suitable softwares for plotting graphs.
2	**PH 100 Engineering Physics**	**CO1**	Students will be familiar with the principles of Physics.
		CO2	Students will be familiar significance of Physics in engineering systems and technological advances.
3	**BE101-03 Introduction to Electrical Engineering**	**CO1**	Students will be able to know the basic laws of Electrical and Magnetic Circuits.
		CO2	Students will get an overview of ac fundamentals and complex power.
		CO3	Students will get the basics of three phase systems.
		CO4	Students will get knowledge of the basic concepts of wiring and necessity of earthing

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4	**BE 103 Introduction to Sustainable Engineering**	**CO1**	The student will be able to understand the different types of environmental pollution problems and their sustainable solutions.
		CO2	The student will be able to work in the area of sustainability for research and education
		CO3	The student will be having a broader perspective in thinking for sustainable practices by utilizing the engineering knowledge and principles gained from this course
5	**ME 100 Basics of Mechanical Engineering**	**CO1**	To understand the basic principles of thermodynamics and refrigeration systems.
		CO2	To understand and familiarize the theory behind Engines and to get the basics of automobile field.
		CO3	To get knowledge of the basic structure of power transmission system.
		CO4	To get the basic idea of various manufacturing process
		CO5	To explain the various machine tools and CNC.
6	**BE 100 Engineering Mechanics**	**CO1**	To utilize scalar and vector analytical techniques for analyzing forces in statically determinate structures.
		CO2	To apply fundamental concepts of kinematics and kinetics of particles to the analysis of simple, practical problems.
		CO3	To identify, formulate, and solve engineering problems by applying the methods learned in Engineering Mechanics.
		CO4	To apply basic knowledge of mathematics and physics to solve real-world problems.
		CO5	To utilize scalar and vector analytical techniques for analyzing forces in statically determinate structures.

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7	**PH 110 Engineering Physics Lab**	**CO1**	Ability to design and conduct experiments including electronics, optics, lasers etc.
		CO2	Recognize how observation, experiment and theory work together to expand the frontiers of knowledge of the physical universe.
		CO3	Communicate verbally, graphically and in writing the results of calculations and laboratory experiments in a clear and concise manner used by physicists worldwide.
8	**EE 110 Electrical Engineering Workshop**	**CO1**	Familiarity with supply arrangements and their limitations, knowledge of standard voltages and their tolerances, safety aspects of electrical systems and importance of protective measures in wiring systems
		CO2	Knowledge about the types of wires, cables and other accessories used in wiring. Creating awareness of energy conservation in electrical systems
		CO3	Students should be able to wire simple lighting circuits for domestic buildings, distinguish between light and power circuits
		CO4	To measure electrical circuit parameters and current, voltage and power in a circuit. Familiarity with backup power supply in domestic installation
9	**ME 110 Mechanical Engineering Workshop**	**CO1**	Students are able to understand the basic manufacturing methods in industries
		CO2	Students will develop the technical skills regarding manufacturing
		CO3	To develop practical skills on operating machineries.

PRINCIPAL

SECOND SEMESTER			
University		KTU	
Sl No.	Course Code & Title	Course Outcome	
1	MA 102 Differential Equations	CO1	Ability to analyse physical phenomena involving differential equations
		CO2	Ability to use differential equations in Fluid Mechanics
		CO3	Ability to use Fourier series in circuits and other engineering applications
2	CY 100 Engineering Chemistry	CO1	With the syllabus and the portion proposed ,it will be possible for the students to get detailed knowledge on the topics taught
		CO2	It will also inculcate in students the current development in the field of Engineering Chemistry
		CO3	The student will be able to apply the knowledge of chemistry and will be equipped to take up chemistry related topics as part of their project works during higher semester of the course
3	BE 110 Engineering Graphics	CO1	Students will be able to acquiring capacity to understand the language of Engineering Graphics to read and interpret drawings and visualize shape of objects and their relative locations.
		CO2	Students will be able to develop skill to prepare drawings as per ISO code of practice to convey and document information about engineering objects as orthographic views or pictorial views.

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		CO3	Students will be able to get introduction to computer aided drafting.
4	**BE 102 Design and Engineering**	**CO1**	Able to appreciate the different elements involved in good designs and to apply them in practice when called for
		CO2	Aware of the product oriented and user oriented aspects that make the design a success.
		CO3	Will be capable to think of innovative designs incorporating different segments of knowledge gained in the course;
		CO4	Students will have a broader perspective of design covering function, cost, environmental sensitivity, safety and other factors other than engineering analysis.

5	**CE 100 Basics of Civil Engineering**	**CO1**	The students will be able to illustrate the fundamental aspects of Civil Engineering.
		CO2	The students will be able to plan and set out a building.
		CO3	Students will be able to explain the concepts of surveying for making horizontal and vertical measurements.
		CO4	They will able to illustrate the uses of various building materials and explain the method of construction of different components of a building.

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6	**EC 100 Basics of Electronics Engineering**	**CO1**	Students can identify the active and passive components
		CO2	Students can setup simple circuits using diodes and transistors
		CO3	Students will get fundamental -idea about basic communication systems and entertainment electronics
7	**CY 110 Engineering Chemistry Lab**	**CO1**	Ability to design and conduct experiments.
		CO2	Recognize how observation, experiment and theory work together to continue to expand the frontiers of knowledge of the physical universe.
		CO3	Communicate verbally, graphically and in writing the results of calculations and laboratory experiments in a clear and concise manner that incorporates the stylistic conventions used by chemists worldwide.
		CO4	Use experimental techniques and measurement technology
8	**CE 110 Civil Engineering Workshop**	**CO1**	To illustrate the common procedures regarding building construction works like setting out.
		CO2	To explain about length, area and volume measurements of building features.
		CO3	To illustrate the importance of brick masonry in building construction
		CO4	To explain the concept of surveying for making horizontal and vertical measurements
9	**EC 110 Electronics Engineering Workshop**	**CO1**	Student can identify the active and passive electronic components
		CO2	Student gets hands-on assembling, testing, assembling, dismantling, fabrication and repairing systems by making use of the various tools and instruments available in the Electronics Workshop.

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THIRD SEMESTER			
University		CALICUT	
Sl No.	**Course Code & Title**	**Course Outcome**	
1	EC14 303 NETWORK ANALYSIS AND SYNTHESIS	**CO1**	Analyze circuits using various electrical network theorems and methods
		CO2	Solve simple networks using analytical method as well as Pspice simulator
		CO3	Apply s domain analysis to evaluate parameters of electrical networks
		CO4	Analyze pole-zero plots and obtain the time domain response from the plot
		CO5	Synthesize electrical networks from a given network function
2	**EC14 304 SOLID STATE DEVICES**	**CO1**	analyze different band structure of materials
		CO2	Apply the knowledge for manufacturing the components
		CO3	Design the instruments properly which are used for home appliances
		CO4	Modify the components by understanding the drawback of each components
		CO5	create an insight in to the working of different conventional electronic devices
3	**EC207: Logic Circuit Design**	**CO1**	Compare various positional number systems and binary codes (Understand, Analyze)

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		CO2	Apply Boolean algebra in logic circuit design(Apply)
		CO3	Develop combinational circuits(Apply)
		CO4	Develop sequential circuits(Apply)
		CO5	Explain logic families and compare their characteristics(Understanding)
		CO6	Develop digital systems using basic programmable blocks(Apply)
4	**EC205 Electronics circuits**	**CO1**	Students will able to analyse and design the different circuits using discrete electronics equipments.
5	**EC209 Analog electronics**	**CO1**	Students will get knowledge on electronic elements and their characteristics.
6	**MA201 Linear algebra and complex analysis**	**CO1**	Solve any given system of linear equations
		CO2	Find the eign values of a matrix and how to diagonalize a matrix.
		CO3	Identify analytic functions and harmonic functions.
		CO4	Evaluate real definite integrals as application of residue theorem.

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		CO5	Identify conformal mappings
		CO6	Find regions that are mapped under certain transformations.
7	**EC231 Electronic devices and circuit lab**	CO1	Design and demonstrate functioning of various discrete analog circuits.
		CO2	Function effectively as an individual and ina team to accomplish the given risk.
8	**EC233 Electronics design automation lab**	CO1	An ability to apply knowledge of computer,science, and engineering to the analysis of electrical and electronic engineering problems.
		CO2	An ability to design systems include hardware and software components.
9	**EC235 Analog electronics laboratory**	CO1	The student will able to understand the working of electrical devices and their performance characteristics.
FOURTH SEMESTER			
1	**EC202: Signals & Systems**	CO1	Define, represent, classify and characterize basic properties of continuous and discrete time signals and systems. (Understanding
		CO2	Represent the CT signals in Fourier series and interpret the properties of Fourier transform, Laplace transform(Applying)

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		CO3	Outline the relation between convolutions, correlation and to describe the orthogonality of signals.
		CO4	Illustrate the concept of transfer function and determine the Magnitude and phase response of systems.
		CO5	Explain sampling theorem and techniques for sampling and reconstruction.
		CO6	Determine z transforms, inverse z transforms signals and analyze systems using z transforms.
2	**EC204 ANALOG INTEGRATED CIRCUITS**	**CO1**	Understanding of operational amplifiers.
		CO2	Able to design circuits using operational amplifiers for various applications.
3	**EC206 COMPUTER ORGANISATION**	**CO1**	Understand the functional units of a computer.
		CO2	Identify the different types of instructions.
		CO3	Understand the various addressing modes.
		CO4	Understand the I/O addressing system.
		CO5	Categorize the different types of memories.
4	**EC212 Linear integrated circuits and digital electronics**	**CO1**	Students will learn to know about the IC's and their application, digital circuits, combinational and sequential circuits.

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5	**MA202 Probability distributions,transforms and numerical methods**	**CO1**	Discrete and continuous probability ~~density~~ functions and special probability distributions.
		CO2	Laplace and fourier transforms and apply them in their engineering branch.
		CO3	Numerical methods and their applications in solving engineering problems.
6	**EC230 Logic circuit design lab**	**CO1**	Design and demonstrate functioning of various combination circuits.
		CO2	Design and demonstrate functioning of various sequential circuits.
		CO3	Function effectively as an individual and in a team to accomplish the given task.
7	**EC232 Analog integrated circuit lab**	**CO1**	Design demonstrate functioning of various analog circuits.
		CO2	Able to analyse and design various applications of analog circuits.
8	**EC234 Linear integrated circuits and digital electronics laboratory**	**CO1**	Design simple circuits like amplifiers using op-amps.
		CO2	Design waveform generating circuits.
		CO3	Understand digital concepts.
		CO4	Logically explain the concepts of combinational and sequential circuits.

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9	**EC208 Analog communication engineering**	**CO1**	Understand the different analog modulation schemes.
		CO2	Understand the fundamental ideas of noises and effects in communication systems.
		CO3	Explain the principle and working of analog tansmitters and receivers.
		CO4	Know the basic idea of telephone systems.
		FIFTH SEMESTER	
1	EC 301 Digital signalprocessing	**CO1**	The student will understand the principle of digital signal processing and applications.
		CO2	The utilization of DSP to electronics engineering.
2	EC303 Applied electromagnetic theory	**CO1**	To develop a solid foundation and a fresh perspective in the analysis and application of electromagnetic fields.
		CO2	To analyse the propagation of electromagnetic waves in different media.
		CO3	To analyze the characteristics of transmission lines.
		CO4	To solve the different transmission line problem using smith chart.
		CO5	To understand the different modes of propagation in wavegides.
3	**EC305: Microprocessors and Microcontrollers**	**CO1**	Distinguish various types of processor architectures.
		CO2	Describe architectures.memory organization of 8085 microprocessor and 8051.
		CO3	Develop programming skills in assembly for interfacing peripheral devices with 8051.

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4	EC307 Power electronics and instrumentation	CO1	To understand the concept of power electronics and various applications.
		CO2	To get an insight on various electronic instruments,their configuration and measurements using them.
		CO3	To understand the principle of operation of transducers.
5	EC361 DIGITAL SYSTEM DESIGN	CO1	To analyze and design clocked sequential circuits.
		CO2	To analyse and design asynchronous sequential circuits.
		CO3	To apply their knowledge in diagnosing faults in digital circuits,PLA.
		CO4	To interpret architecture of CPLDs and FPGA.
6	EC 363 Optimization techniques	CO1	The students will have a thorough understanding of optimization techniques.
		CO2	Students will able to formulate and solving the engineering optimization problems.
7	EC365 Biomedical engineering	CO1	To understand diagnosis and therepy related equipments.
		CO2	To understand the problem and identify the necessity of equipment for diagnosis and therapy.
		CO3	To understand the importance of electronics engineering in medical field.
		CO4	To understand the importance of telemetry in patient care.
8	**EC367 Soft Computing**	CO1	Identify and describe soft computing techniques and their roles in building intelligent Machines

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		CO2	Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems
		CO3	Recognize the feasibility of applying a soft computing methodology for a particular Problem
		CO4	Apply neural networks to pattern classification and regression problems.
		CO5	Apply genetic algorithms to combinatorial optimization problems
9	**EC333 Digital Signal Processing Lab**	**CO1**	Design, simulate and realize various systems related to DSP.
10	EC 335 Power Electronics & Instrumentation Lab	**CO1**	Design and demonstrate basic power electronic circuits.
		CO2	Use transducers for application.
		CO3	Function effectively as an individual and in a team to accomplish the given task.
SIXTH SEMESTER			
1	**EC302 Digital Communication**	**CO1**	Illustrate the Digital representation of analog source
		CO2	Apply the knowledge of ISI problems in Digital communication to derive Nyquist criteria for zero ISI
		CO3	Analyse the need for introducing ISI in Digital Communication in a controlled manner.

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		CO4	Construct signal space representation of signal using Gram Schmidt orthonormalisation procedure
2	**EC304 VLSI**	**CO1**	The students will be able to design and analyse various MOSFET and CMOS logic circuits.
3	**EC306 Antenna & Wave Propagation**	**CO1**	The basic working of antennas
		CO2	Various antennas, arrays and radiation patterns of antennas
		CO3	Various techniques involved in various antenna parameter measurements.
		CO4	The propagation of radio waves in the atmosphere.

4	**EC308 Embedded Systems**	**CO1**	Understand the basics of an embedded system
		CO2	Develop program for an embedded system.
		CO3	Design, implement and test an embedded system.
5	EC362 Modelling & Simulation of Communication Systems	**CO1**	The students will be able to apply modeling and computational techniques to problems in the communication field
6	**EC366 Real Time Operating Systems**	**CO1**	The students will be familiar with operating systems. They will have an in depth knowledge about the real time operating systems and its applications

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7	**EC332 Communication Engineering Lab**	**CO1**	The students will be able to understand the basic concepts of circuits used in communication systems.
8	**EC334 Microcontroller Lab**	**CO1**	Program Micro controllers.
		CO2	Interface various peripheral devices to Micro controller.
		CO3	Function effectively as an individual and in a team to accomplish the given task.
		SEVENTH SEMESTER	
1	EC401 Information theory and coding	**CO1**	Students will able to understand the concept of information and entropy
		CO2	Students will able to design a lossless transmission system on the basis of channel capacity and source coding theorem.
		CO3	Students will be able to understand the basics of gaussian channel and Shannon's limit.
		CO4	Students will be able to analyse error correction and detection using linear block codes.
2	EC403 Microwave and radar energy	**CO1**	The students will be able to understand the basics of microwave engineering and radar systems.
		CO2	To study the various microwave hybrid circuits and formulate their S matrices.
		CO3	To understand the basic concepts, types, working of radar and introduce to radar transmitters and receivers.
		CO4	To introduce the various microwave sources, their principle of operation and measurement of various parameters
3	**EC405 OPTICAL COMMUNICATION**	**CO1**	Know the working of optical source and detectors.
		CO2	Compare the performance of various optical modulation schemes.

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		CO3	Apply the knowledge of optical amplifiers in the design of optical link.
		CO4	Analyse the performance of optical amplifiers.
		CO5	Know the concept of WDM
		CO6	Describe the principle of FSO and LiFi
4	EC407 COMPUTER COMMUNICATION	CO1	Different types of network topologies and protocols.
		CO2	The layers of the OSI model and TCP/IP with their functions.
		CO3	The concept of subnetting and routing mechanisms.
5	EC409 CONTROL SYSTEMS	CO1	Represent mathematically a systems and deriving their transfer function model
		CO2	Analyse the time response and frequency response of the systems for any input
		CO3	Design a control system with suitable compensation techniques
6	EC461 MICROWAVE DEVICES AND CIRCUITS	CO1	The Students will be able to understand with active & passive microwave devices & components used in microwave communication systems and analyse microwave networks.
7	EC431 COMMUNICATION SYSTEMS LAB	CO1	To provide practical experience in design, testing, and analysis of few electronic devices and circuits used for microwave and optical communication engineering.
EIGHT SEMESTER			
1	EC402 NANOELECTRONICS	CO1	The students will be able to understand basic concepts of nanoelectronic devices and nano technology.
2	EC404 ADVANCED COMMUNICATION SYSTEMS	CO1	The students will be able to understand the basics and technology of advanced communication system

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3	**EC466 CYBER SECURITY**	**CO1**	The students will be able to understand cyber-attacks, types of cybercrimes, cyber laws and also how to protect them self and ultimately the entire Internet community from such attacks
4	**EC468 SECURE COMMUNICATION**	**CO1**	Exposed to the different approaches that handle security and the algorithms in use for maintaining data integrity and authenticity.
		CO2	Enabled student to appreciate the practical aspects of security features design and their implementation

KTU SCHEME 2015: CO-PO Matrix

FIRST AND SECOND SEMESTER

BE101-04	INTRODUCTION TO ELECTRONICS ENGINEERING													
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2
BE101-04.1	3	2	2	1	-	-	1	-	1	1	-	1	1	1
BE101-04.2	3	2	2	1	-	-	1	-	1	1	-	1	-	-
BE101-04.3	3	3	3	2	-	-	-	-	1	1	-	1	-	-
BE101-04.3	3	1	1	1	-	1	-	-	1	1	-	1	1	1
BE10104	3	2	2	1	-	0	1	-	1	1	-	1	1	1

BE102	DESIGN AND ENGINEERING													
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
BE102.1	2	-	-	-	-	2	2	-	1	-	-	3	2	2
BE102.2	2	-	-	2	-	2	2	-	1	-	-	3	2	2
BE102.3	2	2	2	2	2	3	3	2	1	2	2	3	2	2
BE102.4	2	2	2	2	2	3	3	2	2	3	3	3	3	3
BE102.5	2	2	2	2	2	3	3	3	2	3	3	3	3	3
BE102.6	2	3	3	2	2	3	3	2	3	3	3	3	3	3
BE102	**2**	**2**	**2**	**2**	**1**	**3**	**3**	**2**	**2**	**2**	**2**	**3**	**3**	**3**

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THIRD AND FOURTH SEMESTER

EC202	SIGNALS AND SYSTEMS													
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2
EC202.1	3	2	2	-	2	-	-	-	1	-	-	3	1	1
EC202.2	3	3	3	3	2	-	-	-	1	-	-	3	1	1
EC202.3	3	2	2	-	2	-	-	-	1	-	-	3	1	-
EC202.4	3	3	3	3	2	-	-	-	1	-	-	3	1	1
EC202.5	3	3	3	3	2	-	-	-	1	-	-	3	1	1
EC202.6	3	3	3	3	2	-	-	-	1	-	-	3	1	1
EC202	**3**	**3**	**3**	3	2	-	-	-	**1**	-	-	**3**	**1**	**1**

EC207	LOGIC CIRCUIT DESIGN													
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2
EC207.1	3	3	2	3	-	-	-	-	-	1	-	2	1	2
EC207.2	3	3	3	3	3	1	-	-	-	1	-	2	1	2
EC207.3	3	3	3	3	3	1	-	-	1	1	-	2	1	2
EC207.4	3	3	3	3	3	-	-	-	1	1	-	2	1	2
EC207.5	2	2	1	-	-	-	-	-	-	1	-	2	1	2
EC207.6	3	3	2	-	-	-	-	-	-	1	-	2	1	2
EC207	**3**	**3**	**2**	**3**	**3**	-	-	-	-	**1**	-	**2**	**1**	**2**

FIFTH AND SIXTH SEMESTER

EC305	MICROPROCESSORS AND MICROCONTROLLERS													
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO2
EC305.1	3	1	1	-	-	-	-	-	-	-	-	-	-	-
EC305.2	3	3	3	3	3	-	-	-	-	-	2	-	1	2
EC305.3	3	2	3	3	3	-	-	-	-	-	1	-	2	3
EC305.4	2	2	3	3	3	-	-	-	1	2	2	1	3	3
EC305.5	3	3	3	3	3	1	1	-	2	2	2	1	3	3
EC305.6	3	3	3	3	3	2	-	-	3	2	3	1	3	3
EC305	**3**	**2**	**3**	**3**	**3**	**1**	-	-	**1**	**1**	**2**	**1**	**2**	**2**

EC308	EMBEDDED SYSTEM													
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EC308.1	3	1	-	-	-	-	-	-	-	-	-	-	-	-
EC308.2	1	3	2	2		2	-	-	-	-	-	-	-	3
EC308.3	3	2	-	-	3	-	-	-	-	-	-	-	1	-
EC308.4	2	3	1	-	3	-	-	-	-	-	-	-	-	2
EC308.5	2	2	1	-	3	-	-	-	-	-	-	-	2	3
EC308	**2**	**2**	**1**	**2**	**3**	-	-	-	-	-	-	-	**1**	**2**

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SEVENTH AND EIGHTH SEMESTER

EC409	CONTROL SYSTEMS												
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EC409.1	3	2	-	-	3	-	-	-	-	-	-	2	-	3
EC409.2	3	3	3	2	3	-	-	-	-	-	-	1	-	3
EC409.3	3	3	3	2	-	-	-	-	-	-	-	1	-	3
EC409.4	3	3	3	2	-	-	-	-	-	-	-	1	-	3
EC409.5	3	2	3	2	-	-	-	-	-	-	-	1	-	3
EC409.6	3	3	3	2	-	-	-	-	-	-	-	1	-	3
EC409	**3**	**3**	**3**	**2**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**3**

EC402	NANO ELECTRONICS													
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EC402.1	3	-	-	-	-	-	-	-	-	-	-	2	2	2
EC402.2	3	-	2	-	-	-	-	-	-	-	-	2	2	2
EC402.3	3	-	2	-	2	-	-	-	-	-	-	2	2	2
EC402.4	3	-	-	-	-	-	-	-	-	-	-	1	2	2
EC402.5	3	-	-	-	-	-	-	-	-	-	-	1	2	2
EC402.6	3	3	2	-	2	-	-	-	-	-	-	2	2	2
EC402	**3**	**1**	**1**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**2**	**2**	**2**

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KTU SCHEME:Program level Course-PO matrix of all courses INCLUDING first year courses

Sl No	COURSE CODE	SUBJECT CODE	PO												PSO	
			1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	C101	MA101	3	3	2	1	-	-	2	-	-	-	-	3	-	-
2	C102	PH100	3	2	2	-	2	3	2	-	-	-	-	3	-	-
3	C103	BE110	2	1	1	1	3	1	1	1	2	1	-	2	-	-
4	C104	BE101-04	3	2	2	1	-	1	1	-	1	1	-	1	2	2
5	C105	BE103	3	2	-	-	-	3	2	3	3	3	2	3	-	-
6	C106	EE100	3	2	2	-	-	-	-	-	-	-	-	3	-	-
7	C107	PH110	3	-	-	1	3	-	-	-	-	-	-	-	-	-
8	C108	EC110	3	-	2	1	2	2			1	1	-	2	3	3
9	C109	EE110	3	1	1	1	-	-	1	-	2	1	-	3	-	-
10	C110	MA102	3	3	2	1	-	-	2	-	-	-	-	3	-	-
11	C111	CY100	3	-	1	-	1	1	1	-	-	-	2	1	-	-
12	C112	BE102	2	2	2	2	1	3	3	2	2	2	2	3	3	3
13	C113	CE100	3	2	2	-	1	1	1	1	1	1	1	2	-	-
14	C114	ME100	2	2	2	1	-	1	1	1	1	-	-	2	-	-
15	C115	CY110	-	1	-	1	-	-	1	-	1	1	1	-	-	-
16	C116	CE110	3	2	3	1	2	1	2	2	3	2	2	2	-	-
17	C117	ME110	1	1	1	1	-	1	1	1	2	1	-	2	-	-
18	C201	MA201	3	3	2	1	-	-	2	-	-	-	-	3	-	-
19	C202	EC201	3	3	3	3	-	-	-	-	1	-	-	2	-	3
20	C203	EC203	3	3	1	1	-	-	-	-	1	1	-	2	-	2
21	C204	EC205	3	3	3	3	3	1	-	-	1	-	-	3	3	3
22	C205	EC207	3	3	2	3	3	-	-	-	-	1	-	2	2	3
23	C206	HS200	2	2	2	1	2	1	1	3	3	2	3	3	3	3
24	C207	EC231	3	3	3	-	-	1	-	-	2	1	-	2	-	2
25	C208	EC233	2	2	2	-	3	-	-	-	2	-	-	-	3	-
26	C209	MA204	3	3	2	1	-	-	2	-	-	-	-	3	-	-
27	C210	EC202	3	3	3	3	2	-	-	-	1	-	-	3	2	2
28	C211	EC204	3	3	3	3	2	2	-	-	2	2	-	3	3	3
29	C212	EC206	2	1	2	-	2	-	-	-	-	-	-	-	3	2

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30	C213	EC208	2	2	1	3	2	2	2	2	1	2	1	2	-	3
31	C214	HS210	-	1	1	1	1	1	1	1	1	2	-	3	-	3
32	C215	EC232	3	2	2	2	2	-	-	-	1	1	-	-	-	-
33	C216	EC230	2	2	2	-	2	-	-	-	2	1	-	1	3	3
34	C301	EC301	3	2	2	3	3	-	-	-	1	-	-	2	2	2
35	C302	EC303	3	3	1	3	3	1	1	-	1	2	-	2	3	3
36	C303	EC305	3	2	3	3	3	1	-	-	1	1	2	1	3	3
37	C304	EC307	2	2	3	3	2	3	1	-	1	2	-	3	3	3
38	C305	HS300	2	2	2	2	2	2	2	2	3	3	3	3	3	3
39	C306.1	EC361	2	2	3	2	1	-	-	-	1	-	-	2	3	3
40	C306.2	EC365	3	1	-	1	-	2	-	1	-	1	-	3	-	3
41	C307	EC341	2	2	1	2	3	1	1	-	1	1	1	1	2	3
42	C308	EC333	3	3	2	3	3	-	-	-	3	2	-	2	2	3
43	C309	EC335	3	-	1	-	2	-	-	-	1	1	-	2	3	3
44	C310	EC302	3	2	2	3	2	-	-	-	-	-	-	2	2	2
45	C311	EC304	2	2	3	3	3	-	-	-	2	-	-	2	3	3
46	C312	EC306	1	2	-	3	3	-	-	-	-	-	-	-	-	-
47	C313	EC308	2	2	1	2	3	-	-	-	-	-	-	-	2	3
48	C314	EC312	1	-	2	2	3	-	-	-	-	-	1	3	3	3
49	C315.1	EC368	3	3	3	2	1	-	-	-	-	-	-	-	3	3
50	C315.2	EC370	3	2	2	1	2	1	-	-	1	-	-	3	3	3
51	C316	EC332	1	1	-	2	2	-	-	-	1	1	-	-	-	-
52	C317	EC334	2	2	2	2	3	-	-	-	-	-	-	-	3	3
53	C318	EC352	2	2	3	3		1	1	-	3	3	3	2	3	3
54	C401	EC401	3	3	2	3	1	-	-	-	1	-	-	2	2	3
55	C402	EC403	3	3	1	2	3	2	2	-	2	2	-	1	3	3
56	C403	EC405	2	2	-	-	-	-	-	-	-	-	-	-	2	3
57	C404	EC407	3	2	2	-	-	2	-	1	-	-	-	3	3	3
58	C404	EC409	3	3	3	2	3	-	-	-	-	-	-	1	-	3
59	C405	EC465	3	1	1	-	-	-	-	-	-	1	-	-	-	-
60	C406	EC451	2	2	2	2	3	2	1	1	2	3	-	3	3	3
61	C407	EC431	3	1	1	2	3	1	1	1	-	1	-	-	3	3
62	C408	EC402	3	1	1	-	1	-	-	-	-	-	-	2	3	3
63	C409	EC404	3	1	-	-	-	-	-	-	-	-	-	-	2	-
64	C410.1	EC464	3	2	1	2	-	2	-	-	-	-	-	1	2	-
65	C410.2	EC468	2	1	-	1	-	2	-	1	-	-	-	2	2	2
66	C411	EC492	2	2	3	3	3	1	1	-	3	3	3	2	3	3

KTU SCHEME: 2014

SL NO.	COURSE CODE AND TITLE	COURSE OUTCOMES	
1	EN14101 ENGINEERING MATHEMATICS I	CO1	To provide an avenue to scientific knowledge which opens new vistas of mental activity. A sound knowledge of engineering mathematics is a "sine qua non" for the modern engineer to attain new heights in

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			all aspects of engineering practice
		CO2	To provide the student with plentiful opportunities to work with and apply the concepts, and to build skills and experience in mathematical reasoning and engineering problem solving.
2	EN14102 ENGINEERING MATHEMATICS II	CO1	To apply the subject at the proper place and time, while keeping him/her aware to the needs of the society where he/she can lend his/her expert service, and also to those who can be useful to the community without even going through the formal process of drilling through rigorous treatment of mathematics.
3	EN 14 103: ENGINEERING PHYSICS	CO1	To impart the basic concepts and ideas in physics.
		CO2	To develop scientific attitudes and enable the students to correlate the concepts of physics with the core programmes.
4	EN 14 104: ENGINEERING CHEMISTRY	CO1	To familiarize the students on application oriented themes like the chemistry of materials used in engineering discipline
		CO2	To focus the students on the chemistry of compounds resulting from pollution, waste generation and environmental degradation and to apply the knowledge in solving these current environmental problems effectively.
5	EN 14 105: ENGINEERING MECHANICS	CO1	To acquaint with general approach of solving engineering problems.
		CO2	To illustrate the application of the theory learned in Mechanics in practical engineering problems.
6	EN 14 106: BASICS OF CIVIL	CO1	To give a basic knowledge of the topics in Civil Engineering.

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	AND MECHANICAL ENGG.		
7	SECTION 2: BASICS OF MECHANICAL ENGINEERING	CO1	Gives an introduction as well as an overview on the concepts and applications of Mechanical Engineering .
8	EN14 107: BASICS OF ELECTRICAL, ELECTRONICS & COMMUNICATION ENGINEERING	CO1	This course provides a quick overview of the concepts and results in Basic analysis that may be useful in engineering. Also it gives an introduction to Very basic concept and theory of Electrical Engineering

THIRD SEMESTER			
SL.NO	COURSE CODE AND TITLE	COURSE OUTCOMES	
1	EN14 301 ENGINEERING MATHEMATICS III	CO1	This course provides a quick overview of the concepts and results in complex analysis that may be useful in engineering.
		CO2	it gives an introduction to linear algebra and Fourier transform which are wealth of ideas and results with wide area of application
2	EN14 302: COMPUTER PROGRAMMING IN C	CO1	To impart the basic concepts of computer and information technology
		CO2	To develop skill in problem solving concepts through learning C programming in practical approach
3	EC14 303 NETWORK ANALYSIS & SYNTHESIS	CO1	To expose the students to the basic concepts of electric circuits and their analysis in time and frequency domain
		CO2	To introduce the concept of filter circuits and design of passive filters

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		CO3	To introduce the techniques of network synthesis
4	EC14 304: SOLID STATE DEVICES	CO1	To impart the basic concepts of semiconductor Physics
		CO2	To create an insight into the working of different conventional electronic devices
5	EC14 305 ELECTRONIC CIRCUITS I	CO1	To impart the basic idea of constructing passive devices
		CO2	To develop the skill of analysis and design of various circuits using electronic devices
6	EC14 306 ELECTRICAL ENGINEERING	CO1	To study the operation, performance and characteristics of different types of electrical machines
		CO2	To familiarise various electrical measuring instruments.
7	EC 14 307(P) BASIC ELECTRONICS LAB	CO1	Implementation of basic Electronic circuits
8	EC14 308 (P) ELECTRICAL ENGINEERING LAB	CO1	To Familiarise various electrical measurement equipments and measurement methods.
		CO2	To obtain the performance characteristics of dc and ac machines
FOURTH SEMESTER			
1	EN14 401B: ENGINEERING MATHEMATICS IV	CO1	To inculcate the students an adequate understanding of the basic concepts of probability theory.
		CO2	To make them develop an interest in the area which may find useful to pursue

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			their studies
		CO3	To stimulate the students understanding of the z-transform
		CO4	To make the student get acquainted with the basics of PDE
2	EN14 402 ENVIRONMENTAL SCIENCE	CO1	To understand the problems of pollution, deforestation, solid waste disposal, degradation of environment, loss of biodiversity and other environmental issues at local and global levels.
		CO2	To create awareness among the students to address these issues and conserve the environment in a better way.
3	EC14 403 SIGNALS AND SYSTEMS	CO1	To introduce the student to the idea of signals , system analysis and its characterization.
		CO2	To provide a foundation to numerous other courses that deal with signal and System concepts directly or indirectly: viz: communication, control, instrumentation etc.
4	EC14 404 ELECTRONIC CIRCUITS II	CO1	To develop the skill of analysis and design of various circuits using electronic devices
5	EC14 405 DIGITAL ELECTRONICS	CO1	This paper exposes the students to digital fundamentals
		CO2	Through learning this paper students are expected to gain knowledge in designing combinational as well as synchronous sequential circuits .

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6	EC14 406 ANALOG COMMUNICATION	CO1	To impart the basic concepts of analog modulation schemes
		CO2	To develop understanding about performance of analog communication systems
7	EC14 407(P): DIGITAL ELECTRONICS LAB	CO1	To provide experience on design, testing, and analysis of digital electronic circuits
8	EC14408(P) ELECTRONIC CIRCUITS LAB	CO1	To design and setup circuits
FIFTH SEMESTER			
1	EC14 501: COMPUTER ORGANISATION AND ARCHITECTURE	CO1	To impart the basic idea of memory and system organisation and architecture of Computers.
2	EC14 502: LINEAR INTEGRATED CIRCUITS	CO1	To develop the skill of analysis and design of various circuits using operational amplifiers
		CO2	To develop design skills to design various circuits using different data conversion systems
3	EC14 503 DIGITAL COMMUNICATION	CO1	To impart the basic concepts of various digital modulation schemes
		CO2	To develop understanding about digital transmitters & Receivers
4	EC14504: ELECTROMAGNETIC FIELD THEORY	CO1	To impart the knowledge of electric, magnetic fields and the equations governing them as well as time varying field
		CO2	To develop understanding about guided waves & transmission lines
5	EC14505: MICROPROCESSORS	CO1	To introduce the student with knowledge about architecture, interfacing and programming with 8086

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	AND MICROCONTROLLERS		microprocessors and 8051 microcontrollers. It gives a brief introduction to ARM 7 and ARM 9 micro controllers.
		CO2	After studying this subject, the student should be able to design microprocessor/controller based system for any relevant applications.
6	EC14506 QUANTITATIVE TECHNIQUESAND MANAGERIAL DECISIONS	CO1	To impart basic ideas on various quantitative techniques for managerial decision making
7	EC14 507(P) ANALOG COMMUNICATION LAB	CO1	To design and setup circuits for Analog communication
SIXTH SEMESTER			
1	EC14 601: RADIATION AND PROPAGATION	CO1	To impart the basic concepts of radiating structures and their arrays
		CO2	To give understanding about analysis and synthesis of arrays
		CO3	To give idea about basic propagation mechanisms
2	EC14 602 OPTICAL COMMUNICATION	CO1	To provides the basic theory of optical fibres and principle of various components in optical communication system.
		CO2	To give basic idea about system aspects and design concepts of fiber optical system
3	EC14 603 VLSI DESIGN	CO1	To study the issues in devices used for VLSI design
		CO2	To introduce the various steps in IC fabrication , starting from the raw material to the finished product as well

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			as physical principles involved in these processes
4	EC14 604: DIGITAL SIGNAL PROCESSING	CO1	To impart basic ideas (i) in the transforms used in digital domain (ii) in the design and hardware realization of digital filters
5	EC14 605: CONTROL SYSTEMS	CO1	To impart the basic theory behind the analysis of continuous and discrete Systems in time and frequency domains
		CO2	To introduce concepts about the state space modeling of systems.
6	EC14 606 SATELLITE COMMUNICATION	CO1	To impart the basic concepts of satellite communication and systems
		CO2	To develop understanding about the link design and the latest trends in satellite communication
SEVENTH SEMESTER			
1	EC14 701 INFORMATION THEORY AND CODING	CO1	To provide basic concepts of Information theory
		CO2	To enable the students to propose, design and analyse suitable coding/decoding scheme for a particular digital communication application
2	EC14 702 MICROWAVE ENGINEERING	CO1	To give the basic ideas about the characteristics and applications of microwave frequency bands
		CO2	To understand the working of various microwave passive and active devices and circuits.
3	EC14 703: DIGITAL SYSTEM DESIGN	CO1	After learning this subject students must be able to simulate and implement typical digital circuits

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4	EC14 704(A) INTERNET TECHNOLOGY	CO1	To make the student aware of the various protocols used in internet.
5	EC14 704(B) TELEVISION AND RADAR ENGINEERING	CO1	To give the basic ideas & operating principles of different types of b/w as well as color CTV and radar (both transmitter and receiver) and their uses.
		CO2	To create the awareness about the different standards of TV systems used in different countries and their basic principles.
6	EC14 704(C) EMBEDDED SYSTEMS	CO1	To give ideas about embedded systems and system development
		CO2	To impart knowledge about real time operating systems and microcontrollers
7	EC14 704(D): NANOTECHNOLGY	CO1	To provide basic knowledge about nano/microdevices, mathematical modeling of electromechanical systems and applications
8	EC14 704(E) IMAGE AND VIDEO PROCESSING	CO1	To give ideas & techniques of image & video processing
		CO2	To impart knowledge about image filtering, restoration & reconstruction
9	EC14 705(A) SOFT COMPUTING	CO1	To acquaint the students with the important soft computing methodologies- neural networks, fuzzy logic, genetic algorithms and genetic programming
10	EC14 705(B) HIGH SPEED DIGITAL DESIGN	CO1	To give the basic ideas involved in high speed digital design
		CO2	To understand the transmission line effects and cross talk and the effects of terminations & vias
EIGHTH SEMESTER			

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1	EC14 801 DATA AND COMMUNICATION NETWORKS	CO1	To give the basic ideas of data communication networks-queuing theory, architecture and protocol
		CO2	To understand the concept of switching networks
2	EC14 802 ENGINEERING ECONOMICS AND PRINCIPLES OF MANAGEMENT	CO1	The prime objective of the Engineering Economics course is to make students familiar with the economic way of thinking.
		CO2	This course provides the students with the foundations of economic theory, tools and techniques for use in the process of efficient economic decision-making in their engineering and managerial profession.
3	EC14 803 WIRELESS MOBILE COMMUNICATION	CO1	To provide a strong background in the basics of wireless mobile communication
		CO2	To impart knowledge about the existing GSM and CDMA mobile communication technology
4	EC14 804(A) INTRODUCTION TO MEMS	CO1	To prepare students for a career as power system engineers with a basic understanding of modern tools and practices
		CO2	To impart an understanding of the activities in load dispatch centers
		CO3	To instill an awareness of current research topics
5	EC14 805(A) MULTIMEDIA COMMUNICATION SYSTEMS	CO1	To impart knowledge in audio/video standards and different types of multimedia networks and technology.

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2014 SCHEME : CO-PO MATRIX

EC14 303	NETWORK ANALYSIS AND SYSNTHESIS												
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EC14 303.1	3	3	3	3	-	-	-	-	-	-	-	2	1	2
EC14 303.2	3	3	3	3	-	-	-	-	-	-	-	2	1	2
EC14 303.3	3	3	3	3	2	-	-	-	-	-	-	2	1	2
EC14 303.4	3	3	3	3	2	-	-	-	-	1	-	2	1	2
EC14 303	**3**	**3**	**3**	**3**	**2**	-	-	-	-	**1**	-	**2**	**1**	**2**

EC14 404	ELECTRONIC CIRCUITS II													
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EC14 404.1	3	3	3	3	3	-	1	-	-	-	-	-	3	2
EC14 404.2	3	3	3	3	3	1	1	-	-	1	-	2	3	3
EC14 404.3	3	3	3	3	3	1	1	-	-	1	-	2	3	3
EC14 404.4	3	3	3	3	3	1	-	-	-	1	-	-	3	2
EC14 404	**3**	**3**	**3**	**3**	**3**	**1**	**1**	-	-	**1**	-	**2**	**3**	**3**

EC14 503	DIGITAL COMMUNICATION													
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EC14 503.1	3	3	3	3	3	-	1	-	-	-	-	2	3	3
EC14 503.2	3	3	3	3	3	1	-	-	-	1	-	-	3	3
EC14 503.3	3	3	3	3	3	1	1	-	-	1	-	2	3	3
EC14 503.4	3	3	3	3	3	1	1	-	-	1	-	-	3	3
EC14 503	**3**	**3**	**3**	**3**	**3**	**1**	**1**	-	-	**1**	-	**2**	**3**	**3**

EC14 601	RADIATION AND PROPAGATION													
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EC14 601.1	3	3	3	3	3	-	1	-	-	1	-	-	3	3
EC14 601.2	3	3	3	3	3	1	-	-	-	1	-	2	3	3
EC14 601.3	3	3	3	3	3	1	1	-	-	-	-	2	3	3
EC14 601.4	3	3	3	3	3	1	1	-	-	1	-	-	3	3
EC14 601	**3**	**3**	**3**	**3**	**3**	**1**	**1**	-	-	**1**	-	**2**	**3**	**3**

EC14 702	MICROWAVE ENGINEERING													
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EC14 702.1	3	3	3	3	2	1	-	-	-	1	-	-	2	1
EC14 702.2	3	3	3	3	2	1	1	-	-	1	-	2	2	-
EC14 702.3	3	3	3	3	-	-	1	-	-	1	-	2	-	-
EC14 702.4	3	3	3	3	-	1	1	-	-	-	-	-	-	1
EC14 702	**3**	**3**	**3**	**3**	**2**	**1**	**1**	-	-	**1**	-	**2**	**3**	**1**

KTU SCHEME:**Program level Course-PO matrix of all courses INCLUDING first year courses**

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Sl No	COURSE CODE	SUBJECT CODE	PO												PSO	
			1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	C101	EN14 101	3	3	2	1			2					3		
2	C102	EN14 102	3	3	2	1			2					3		
3	C103	EN14 103	3	3	2	1			2					3		
4	C104	EN14 103(P)	3	3	3	3	3			1	3	3	1	3		
5	C105	EN14 104	2	1					1					2		
6	C106	EN14 104(P)	3	3	3	3	3			1	3	3	1	3		
7	C107	EN14 105	3	3	2	1			2					3		
8	C108	EN14 106	3	3	2	1			2					3		
9	C109	EN14 107	3	3	2	1			2					3		
10	C110	EN14 108	3	3	2	1			2					3		
11	C111	EN14 109	3	3	2	1			3	3		3		3		
12	C112	EN14 110(P)	3	3	3	3	3			1	3	3	1	3		
13	C113	EN14 111(P)	3	3	3	3	3			1	3	3	1	3		
14	C201	EN14 301	3	3	2	1			2					3	2	2
15	C202	EN14 302	3	3	3	2	3	1	1		2	1	1	2	3	3
16	C203	EC14 303	3	3	3	3	2					1		2	1	2
17	C204	EC14 304	3	3	3	3	1					1		2	2	1
18	C205	EC14 305	3	3	3	3	3	1	1			1		2	3	2
19	C206	EC14 306	3	3	3	3								2		
20	C207	EC14 307(P)	3	3	3	3	3	2			3	2	1	2	3	3
21	C208	EC14 308(P)	3	3	3	3	3	2			3	2	1	2	3	3
22	C209	EC14 401B	3	3	2	2			1					3	2	2
23	C210	EC14 402	2	2	2	1		3	3	2	1	2		2		1
24	C211	EC14 403	3	3	3	3	3	1				1		2	3	2
25	C212	EC14 404	3	3	3	3	3	1	1			1		2	3	3
26	C213	EC14 405	3	3	3	3	3	1	1			1		2	3	3
27	C214	EC14 406	3	3	3	3	3	1	1			1		2	3	3
28	C215	EC14 407(P)	3	3	3	3	3	2			3	2	1	2	3	3
29	C216	EC14 408(P)	3	3	3	3	3	2			3	2	1	2	3	3
30	C301	EC14 501	3	3	3	3	3	1	1			1		2	3	3
31	C302	EC14 502	3	3	3	3	3	1	1			1		2	3	3
32	C303	EC14 503	3	3	3	3	3	1	1			1		2	3	3
33	C304	EC14 504	3	3	3	3	3	1	1			1		2	3	3
34	C305	EC14 505	3	3	3	3	3	1	1			1		2	3	3
35	C306	EC14 506	2	2	2	2	2	2	2	1	2	3	3	3	2	3
36	C307	EC14 507(P)	3	3	3	3	3	2			3	2	1	2	3	3
37	C308	EC14 508(P)	3	3	3	3	3	2			3	2	1	2	3	3
38	C309	EC14 601	3	3	3	3	3	1	1			1		2	3	3
39	C310	EC14 602	3	3	3	3	2	1	1			1		2	2	1
40	C311	EC14 603	3	3	3	3	3	1	1			1		2	3	3
41	C312	EC14 604	3	3	3	3	3	1	1			1		2	3	3

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42	C313	EC14 605	3	3	3	3	3	1	1			1		2	3	3
43	C314	EC14 606	3	2	2	1		1	1			1		2	2	
44	C315	EC14 607(P)	3	3	3	3	3	2			3	2	1	2	3	3
45	C316	EC14 608(P)	3	3	3	3	3	3	2	1	3	2	2	3	3	3
46	C401	EC14 701	3	3	3	3	3	1	1			1		2	2	1
47	C402	EC14 702	3	3	3	3	2	1	1			1		2	2	1
48	C403	EC14 703	3	3	3	3	2	1	1			1		2	2	2
49	C404.1	EC14 704(B)	3	2	2	2		1	1			1		1	2	1
50	C404.2	EC14 705E	3	2	1	1		2	1			1		2	2	1
51	C406	EC14 706(P)	3	3	3	3	3	2			3	2	1	2	3	3
52	C407	EC14 707(P)	3	3	3	3	3	3	2	1	3	2	2	3	3	3
53	C408	EC14 708(P)	3	3	3	3	3	3	2	1	3	2	2	3	3	3
54	C409	EC14 801	3	2	1	1		1				1		2	2	1
55	C410	EC14 802	2	2	2	2	2	2	2	2	3	3	3	3		
56	411	EC14 803	3	2	1	1		1				1		2	2	1
57	C412.1	EC14 804(D)	3	2	1	1		1	1		0	1		2	2	1
58	C412.2	EC14 805(B)	3	3		3	3						1			
59	C413	EC14 806(P)	3				1			1	1	3		2	2	2
60	C414	EC14 807(P)	3	3	3	3	3	3	3	2	3	3	3	3	3	3
61	C415	EC14 808(P)	3	2	2	2	2	3	2	1	2	3	1	3	3	2

SCHEME 2009

SL NO.	COURSE CODE AND TITLE	COURSE OUTCOMES	
1	EN09 101: Engineering Mathematics I	CO1	This course is addressed to those who intend to apply the subject at the proper place and time, while keeping him/her aware to the needs of the society where he/she can lend his/her expert service, and also to those who can be useful to the community without even going through the formal process of drilling through rigorous treatment of mathematics.
2	EN09 102: Engineering Mathematics II	CO1	Mathematics is a necessary avenue to scientific knowledge which opens new vistas of mental activity. A sound knowledge of engineering mathematics is a 'sine qua non'

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			for the modern engineer to attain new heights in all aspects of engineering practice.
		CO2	This course provides the student with plentiful opportunities to work with and apply the concepts, and to build skills and experience in mathematical reasoning and engineering problem solving.
3	EN09 103: Engineering Physics	CO1	To impart the basic concepts and ideas in physics
		CO2	To develop scientific attitudes and enable the students to correlate the concepts of physics with the core programmes
4	EN09 103(P) : Physics Lab	CO1	To develop scientific and experimental skills of the students
		CO2	To correlate the theoretical principles with application based studies.
5	EN09 104: Engineering Chemistry	CO1	To familiarise the students on application oriented themes like the chemistry of materials used in engineering discipline
		CO2	To focus the students on the chemistry of compounds resulting from pollution, waste generation and environmental degradation and to apply the knowledge in solving these current environmental problems effectively.
6	EN09 105: Engineering Mechanics	CO1	To acquaint with general method of solving engineering problems.
		CO2	To illustrate the application of the methods learned in Mechanics in practical engineering problems.
7	EN 09 106: Basics of Civil and Mechanical Engg.	CO1	To give a basic knowledge of the topics in Civil Engineering.
8	EN09 107: Basics of	CO1	To provide the basic concepts and an

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	Electrical, Electronics & Communication Engineering		overview of Electrical Engineering.
9	EN09 108: Engineering Graphics	CO1	Understand systems of drawing.
		CO2	Produce orthographic drawing of points, lines and solids.
		CO3	Produce isometric views of any object.
10	EN09 109(P): Computer Programming in C	CO1	To impart the basic concepts of computer and information technology
		CO2	To develop skill in problem solving concepts through learning C programming in practical approach.

THIRD SEMESTER			
SL NO.	**COURSE CODE AND TITLE**	**COURSE OUTCOMES**	
1	EN09 301: Engineering Mathematics III	CO1	This course provides a quick overview of the concepts and results in complex analysis that may be useful in engineering
		CO2	Also it gives an introduction to linear algebra and Fourier transform which are wealths of ideas and results with wide area of application
2	EN09 302: HUMANITIES AND COMMUNICATION SKILLS	CO1	To identify the most critical issues that confronted particular periods and locations in history;
		CO2	To identify stages in the development of science and technology;

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3	EC09 303: NETWORK ANALYSIS & SYNTHESIS	CO1	To expose the students ~~to~~ the basic concepts of electric circuits and their analysis in time and frequency domain
		CO2	To introduce the concept of filter circuits and design of passive filters
4	EC09 304: SIGNALS AND SYSTEMS	CO1	To give basic ideas about different signals and systems
		CO2	To impart basic knowledge about the representations and transforms of the signals
5	EC09 305 DIGITAL ELECTRONICS	CO1	THIS SUBJECT EXPOSES THE STUDENTS TO DIGITAL FUNDAMENTALS
		CO2	AFTER STUDYING THIS SUBJECT THE STUDENT WILL BE ABLE TO DESIGN, ANALYZE AND INTERPRET COMBINATIONAL AND SEQUENTIAL DIGITAL CIRCUITS OF MEDIUM COMPLEXITY.
6	EC09 306 ELECTRICAL ENGINEERING	CO1	To Study the, operation, performance and characteristics of different dc and ac machines
		CO2	To familiarise various electrical measuring instruments
7	EC09 307(P) DIGITAL ELECTRONICS LAB	CO1	To provide experience on design, testing, and analysis of digital electronic circuits
FOURTH SEMESTER			
1	EN09 401B: Engineering Mathematics IV	CO1	Objective of this course is to inculcate the students an adequate understanding of the basic concepts of probability theory to make them develop an interest in the area which may find useful to pursue their

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			studies
		CO2	Also it is intended to stimulate the students understanding of the Ztransform. A study of some important partial differential equations is also included to make the student get acquainted with the basics of PDE.
2	EN09 402: ENVIRONMENTAL SCIENCE	CO1	To understand the problems of pollution, loss of forest, solid waste disposal, degradation of environment, loss of biodiversity and other environmental issues and create awareness among the students to address these issues and conserve the environment in a better way.
3	EC09 403: ELECTRONIC CIRCUITS	CO1	To impart the basic idea of constructing passive devices
		CO2	To develop the skill of analysis and design of various circuits using electronic devices.
4	EC09 404: ANALOG COMMUNICATION	CO1	To impart the basic concepts of basic analog modulation schemes.
		CO2	To develop understanding about performance of analog communication system.
5	EC09 405: Computer Organization and Architecture	CO1	To impart the basic idea of memory & system organisation and architecture of computers.
		CO2	To develop the basic understanding & programming concepts of 8085 microprocessor.
6	EC09 406: SOLID STATE DEVICES	CO1	To impart the basic concepts of semiconductor Physics.
		CO2	To create an insight into the working of different conventional electronic devices.
FIFTH SEMESTER			

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1	EC09 501: Digital Signal Processing	CO1	To impart basic ideas (i) in ~~the~~ transform used in digital domain (ii) in the design and hardware realization of digital filters
2	EC09 502: Quantitative Techniques for Managerial Decisions	CO1	To impart basic ideas on various quantitative techniques for managerial decision making
3	EC09503: Electromagnetic Field Theory	CO1	To impart the knowledge of electric, magnetic fields and the equations governing them as well as time varying field
		CO2	To develop understanding about guided waves & transmission lines
4	EC09 504: Digital Communication	CO1	To impart the basic concepts of various digital modulation schemes
		CO2	To develop understanding about digital transmitters & Receivers
5	EC09505: Microprocessors and Microcontrollers	CO1	To introduce the student with knowledge about architecture, interfacing and programming with 8086 microprocessors and 8051 microcontrollers. It gives a brief introduction to ARM 7 and ARM 9 micro controllers.
		CO2	After studying this subject, the student should be able to design microprocessor/controller based system for any relevant applications.
6	EC09 506: Linear Integrated Circuits	CO1	To develop the skill of analysis and design of various circuits using operational amplifiers
		CO2	To develop design skills to design various circuits using different data conversion systems
SIXTH SEMESTER			

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1	EC09 601: VLSI DESIGN	CO1	To study the issues in devices used for VLSI design
		CO2	To introduce the various building blocks and test methods in a digital integrated circuit design
2	EC09602: ENGINEERING ECONOMICS AND PRINCIPLES OF MANAGEMENT	CO1	Impart fundamental economic principles that can assist engineers to make more efficient and economical decisions.
3	EC09 603: RADIATION & PROPAGATION	CO1	To impart the basic concepts of radiating structures and their arrays
		CO2	To give understanding about analysis and synthesis of arrays
4	EC09 604: CONTROL SYSTEMS	CO1	To impart the basic theory behind the analysis of continuous and discrete control systems in time and frequency domains
		CO2	To introduces concepts about the state space modelling of systems.
5	EC09 605: Optical Communication	CO1	To provides the basic theory of optical fibres and principle of various components in optical communication system.
		CO2	To give basic idea about system aspects and design concepts of fiber optical system.
SEVENTH SEMESTER			
1	EC09 701: Information Theory and Coding	CO1	To provide basic concepts of Information.
		CO2	To enable the students to propose, design and analyse suitable coding/decoding scheme for a particular digital communication application.
2	EC09 702: Microwave	CO1	To give the basic ideas about the characteristics and applications of

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	Engineering		microwave frequency bands.
		CO2	To understand the working of various microwave passive and active devices and Circuits.
3	EC09 703: ANALOG & MIXED MOS CIRCUITS	CO1	To impart the concepts of analog & mixed circuit design using MOS transistors.
4	EC09 704: Digital System Design	CO1	After learning this subject students must be able to simulate and implement typical combinational and sequential digital systems in PLDs and express the design in VHDL.
5	EC09 709(P): PROJECT	CO1	To judge the capacity of the students in converting the theoretical knowledge into practical systems/investigative analysis.
EIGHTH SEMESTER			
1	EC09 801: Data and Communication Networks	CO1	To give the basic ideas of data communication networks-queuing theory, architecture and protocol
		CO2	To understand the concept of switching networks
2	EC09 802: Wireless Mobile Communication	CO1	To provide a strong background in the basics of wireless mobile communication
		CO2	To impart knowledge about the existing GSM and CDMA mobile communication technology
3	EC09 807(P): Viva-Voce	CO1	To examine the knowledge acquired by the student during the B.Tech. course, through an oral examination

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4	EC09 805(P): SEMINAR	+CO1.	To assess the ability of ~~the~~ student to study and present a seminar on a topic of current relevance in electronics/communication/computer science. Or allied areas.

SCHEME 2009: CO-PO MATRIX

EC09 305	DIGITAL ELECTRONICS												
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EC09 305.1	3	3	2	2	-	-	-	-	-	1	-	2	3	-
EC09 305.2	3	3	3	3	3	1	-	-	-	1	-	2	-	3
EC09 305.3	3	3	3	3	3	1	1	-	-	1	-	2	3	3
EC09 305.4	3	3	3	3	-	-	-	-	-	1	-	2	-	3
EC09 305.5	2	2	1	-	-	-	-	-	-	1	-	2	-	-
EC09 305	**3**	**3**	**3**	**3**	**3**	**1**	**1**	**-**	**-**	**1**	**-**	**2**	**3**	**3**

EC09 404	ANALOG COMMUNICATION													
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EC09 404.1	3	-	3	3	-	-	1	-	-	1	-	-	3	-
EC09 404.2	3	3		2	-	1	-	-	-	1	-	2	3	3
EC09 404.3	3	3	3	3	-	1	1	-	-	1	-	2	-	3
EC09 404.4	3			3	-	-	-	-	-	1	-	2	3	3
EC09 404	**3**	**3**	**3**	**3**	**-**	**1**	**1**	**-**	**-**	**1**	**-**	**2**	**3**	**3**

EC09 503	ELECTROMAGNETIC FIELD THEORY													
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EC09 503.1	3	3	3	3	3	-	1	-	-	1	-	-	3	3
EC09 503.2	3	3	3	3	3	1	-	-	-	1	-	2	3	3
EC09 503.3	3	3	3	3	3	1	1	-	-	-	-	2-	3	3
EC09 503.4	3	3	3	3	3	1	1	-	-	1	-	-	3	3
EC09 503	3	3	3	3	3	1	1	-	-	1	-	2	3	3

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EC09 605	OPTICAL COMMUNICATION												
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EC09 605.1	3	3	3	3	2	-	1	-	-	1	-	-	2	1
EC09 605.2	3	3	3	3	2	1	-	-	-	1	-	2	2	1
EC09 605.3	3	3	3	3	2	1	1	-	-	-	-	2	2	1
EC09 605.4	3	3	3	3	2	1	1	-	-	1	-	- -	2	1
EC09 605	**3**	**3**	**3**	**3**	**2**	**1**	**1**	**-**	**-**	**1**	**-**	**2**	**2**	**1**

EC09 801	DATA AND COMMUNICATION NETWORK													
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EC09 801.1	3	3	2	-	-	2	-	-	-	-	-	3	3	2
EC09 801.2	3	-	-	-	-	2	-	-	-	-	-	2	2	2
EC09 801.3	3	-	-	-	-	2	-	-	-	-	-	2	2	2
EC09 801.4	3	-	-	-	-	3	-	2	-	-	-	2	3	2
EC09 801	**3**	**3**	**2**	**-**	**-**	**2**	**-**	**2**	**-**	**-**	**-**	**2**	**3**	**2**

EC09 805(P)	SEMINAR													
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
EC09 805(P).1	3	3	-	1	2	2	-	1	2	3	-	2	3	2
EC09 805(P).2	3	3	-	1	-	2	-	-	2	2	-	2	-	2
EC09 805(P).3	3	3	3	2	2	2	-	1	3	2	-	2	3	3
EC09 805(P).4	3	2	2	1	2	2	-	1	3	2	-	2	3	3
EC09 805(P).5	-	-	-	-	-	-	-	2	3	3	-	2	-	2
EC09 805(P)	**3**	**3**	**3**	**1**	**2**	**2**	**-**	**1**	**3**	**2**	**-**	**2**	**3**	**2**

KTU SCHEME:Program level Course-PO matrix of all courses INCLUDING first year courses

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Sl No	COURSE CODE	SUBJECT CODE	PO												PSO	
			1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	C101	EN09 101	3	3	2	1			2					3		
2	C102	EN09 102	3	3	2	1			2					3		
3	C103	EN09 103	3	3	2	1			2					3		
4	C104	EN09 103(P)	3	3	3	3	3			1	3	3	1	3		
5	C105	EN09 104	2	1					1					2		
6	C106	EN09 104(P)	3	3	3	3	3			1	3	3	1	3		
7	C107	EN09 105	3	3	2	1			2					3		
8	C108	EN09 106	3	3	2	1			2					3		
9	C109	EN09 107	3	3	2	1			2					3		
10	C110	EN09 108	3	3	2	1			2					3		
11	C111	EN09 109(P)	3	3	2	1						3		3	2	2
12	C112	EN09 110(P)	3	3	3	3	3			1	3	3	1	3		
13	C113	EN09 111(P)	3	3	3	3	3			1	3	3	1	3		
14	C201	EN09 301	3	3	2	1			2					3	2	2
15	C202	EN09 302	3	3	2	1			3	3		3		3	2	2
16	C203	EC09 303	3	3	3	3	2					1		2	1	2
17	C204	EC09 304	3	3	3	3	3	1				1		2	3	2
18	C205	EC09 305	3	3	3	3	3	1	1			1		2	3	3
19	C206	EC09 306	3	3	3	3								2		
20	C207	EC09 307(P)	3	3	3	3	3	2			3	2	1	2	3	3
21	C208	EC09 308(P)	3	3	3	3	3	2			3	2	1	2	3	3
22	C209	EN09 401(B)	3	3	2	2			1					3	2	2
23	C210	EN09 402	2	2	2	1		3	3	2	1	2		2		1
24	C211	EC09 403	3	3	3	3	3	1	1			1		2	3	2
25	C212	EC09 404	3	3	3	3	3	1	1			1		2	3	3
26	C213	EC09 405	3	3	3	3	3	1	1			1		2	3	3
27	C214	EC09 406	3	3	3	3	1					1		2	2	1
28	C215	EC09 407(P)	3	3	3	3	3	2			3	2	1	2	3	3
29	C216	EC09 408(P)	3	3	3	3	3	2			3	2	1	2	3	3
30	C301	EC09 501	3	3	3	3	3	1	1			1		2	3	3
31	C302	EC09 502	2	2	2	2	2	2	2	1	2	3	3	3	2	3
32	C303	EC09 503	3	3	3	3	3	1	1			1		2	3	3
33	C304	EC09 504	3	3	3	3	3	1	1			1		2	3	3
34	C305	EC09 505	3	3	3	3	2	1	1			1		2	3	3
35	C306	EC09 506	3	3	3	3	3	1	1			1		2	3	3
36	C307	EC09 507(P)	3	3	3	3	3	2			3	2	1	2	3	3
37	C308	EC09 508(P)	3	3	3	3	3	2			3	2	1	2	3	3
38	C309	EC09 601	3	3	3	3	3	1	1			1		2	3	3
39	C310	EN09 602	2	2	2	2	2	2	2	2	3	3	3	3		
40	C311	EC09 603	3	3	3	3	3	1	1			1		2	3	3
41	C312	EC09 604	3	3	3	3	3	1	1			1		2	3	3
42	C313	EC09 605	3	3	3	3	2	1	1			1		2	2	1
43	C314	EC09 L05	3	2	2	1		1	1			1		2	2	
44	C315	EC09 607(P)	3	3	3	2	3	2			3	2		2	3	3
45	C316	EC09 608(P)	3	3	3	3	3	3	2	1	3	2	2	3	3	3
46	C401	EC09 701	3	3	3	3	3	1	1			1		2	2	1
47	C402	EC09 702	3	3	3	3	2	1	1			1		2	2	1
48	C403	EC09 703	3	3	3	3	3	1	1			1		2	3	2
49	C404	EC09 704	3	3	3	3	2	1	1			1		2	2	2
50	C405.1	EC09 L15	3	2	2	2		1	1			1		1	2	1
51	C405.2	EC09 L25	3	2	1	1		2	1			1		2	2	1
52	C406	EC09 707(P)	3	3	3	3	3	2			3	2	1	2	3	3
53	C407	EC09 708(P)	3	3	3	3	3	2			3	2	1	2	3	3
54	C408	EC09 709(P)	3	3	3	3	3	3	2	1	3	2	2	3	3	3
55	C409	EC09 801	3	2	1	1		1				1		2	2	1
56	C410	EC09 802	3	2	1	1		1				1		2	2	1
57	C411.1	EC09 L20	3	2	1	1		1	1		0	1		2	2	1
58	C411.2	AI09 L25	3	3		3	3						1			
59	C412	EC09 805(P)	3				1			1	1	3		2	2	2
60	C412	EC09 806(P)	3	3	3	3	3	3	3	2	3	3	3	3	3	3
61	C413	EC09 807(P)	3	2	2	2	2	3	2	1	2	3	1	3	3	2

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

PROGRAMME OUTCOMES (PO)

- Programme Outcomes describe what students are expected to know and be able to do upon the graduation.

The Program Outcomes of under Graduate program in Electrical & Electronics Engineering are:

Students will have:

a) Ability to apply knowledge of mathematics, science and engineering in the field of electrical and electronics engineering.
b) Ability to design and conduct experiments, analyse and interpret data and results in electrical and electronics engineering.
c) Ability to design electrical and electronics systems, components, or processes to meet the desired needs within realistic constraints such as health and safety, manufacturability and sustainability with economic, environmental, social, political and ethical considerations.
d) Ability to work individually as well as in multidisciplinary teams as a member or as a leader to accomplish the common goal.
e) Ability to identify, analyse, formulate, and solve engineering problems
f) Knowledge of professional and ethical responsibility.
g) Ability to communicate effectively in any area of their field to the industry, fellow beings and society.
h) Broad knowledge necessary to understand the impact of engineering solutions on individuals, organizations and society.
i) Ability to engage in life-long learning to update their knowledge to keep pace with changes caused by dynamic nature of engineering field.
j) Awareness of the contemporary issues that help to integrate advanced and sustainable solutions in the user environment.
k) Ability to use the techniques, skills, and modern engineering tools, software and equipment to analyse and model complex engineering solutions

COURSE OUTCOME (CO)

- Course outcomes are statements that describe significant and essential learning that learners have achieved, and can reliably demonstrate at the end of a course or program.
- Identify what the learner will know and be able to do by the end of a course or program.

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FIRST SEMESTER					
University		**KTU**		**Scheme**	**2015**
Sl No.	**Course Code & Title**	**Course Outcome**		**PO Mapping**	**Justification**
1	MA 101 Calculus	**CO1**	Students will be able to model physical phenomena involving functions of variables and parameters.	a,e,k	Knowledge of mathematics
		CO2	Students will be able to acquire basic training in visualizing graphs and surfaces.		Analyse, formulate, and solve problems
		CO3	Ability to use suitable softwares for plotting graphs.		Use the techniques, skills, and modern engineering tools, software
2	PH 100 Engineering Physics	**CO1**	Students will be familiar with the principles of Physics.	a,e,h	Knowledge of mathematics and engineering
		CO2	Students will be familiar significance of Physics in engineering systems and technological advances.		Analyse, formulate, and solve problems
					Broad knowledge
3	BE101-03 Introduction to Electrical Engineering	**CO1**	Students will be able to know the basic laws of Electrical and Magnetic Circuits.	a,b,c,d,e,h,i,j	Knowledge of mathematics and engineering
					Analyse and interpret data and results.
		CO2	Students will get an overview of ac fundamentals and complex power.		Design electrical and electronics components, or processes
					Multidisciplinary teams
		CO3	Students will get the basics of three phase systems.		Analyse, formulate, and solve problems
					Broad knowledge
		CO4	Students will get knowledge of the basic concepts of wiring and necessity of earthing		Life-long learning
					Awareness of the contemporary issues

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4	BE 103 Introduction to Sustainable Engineering	CO1	The student will be able to understand the different types of environmental pollution problems and their sustainable solutions.	d,f,h,j	Multidisciplinary teams Knowledge of professional and ethical responsibility
		CO2	The student will be able to work in the area of sustainability for research and education		Broad knowledge
		CO3	The student will be having a broader perspective in thinking for sustainable practices by utilizing the engineering knowledge and principles gained from this course		Awareness of the contemporary issues
5	ME 100 Basics of Mechanical Engineering	CO1	To understand the basic principles of thermodynamics and refrigeration systems.	b,c,e,h,j,k	Analyse and interpret data and results. Design electrical and electronics components, or processes
		CO2	To understand and familiarize the theory behind Engines and to get the basics of automobile field.		Analyse, formulate, and solve problems
		CO3	To get knowledge of the basic structure of power transmission system.		Broad knowledge
		CO4	To get the basic idea of various manufacturing process		Awareness of the contemporary issues
		CO5	To explain the various machine tools and CNC.		Use the techniques, skills, and modern engineering tools, software
6	BE 100 Engineering Mechanics	CO1	To utilize scalar and vector analytical techniques for analyzing forces in statically determinate structures.	a,b,c,d,e,i,j	Knowledge of mathematics and engineering
		CO2	To apply fundamental concepts of kinematics and kinetics of particles to the analysis of simple, practical problems.		Analyse and interpret data and results. Design electrical and electronics components, or processes

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		CO3	To identify, formulate, and solve engineering problems by applying the methods learned in Engineering Mechanics.		Multidisciplinary teams
		CO4	To apply basic knowledge of mathematics and physics to solve real-world problems.		Analyse, formulate, and solve problems
		CO5	To utilize scalar and vector analytical techniques for analyzing forces in statically determinate structures.		Life-long learning
					Awareness of the contemporary issues
7	**PH 110 Engineering Physics Lab**	**CO1**	Ability to design and conduct experiments including electronics, optics, lasers etc.	a,b,e,g,h	Knowledge of mathematics and engineering
					Analyse and interpret data and results.
		CO2	Recognize how observation, experiment and theory work together to expand the frontiers of knowledge of the physical universe.		Analyse, formulate, and solve problems
					Communicate effectively
		CO3	Communicate verbally, graphically and in writing the results of calculations and laboratory experiments in a clear and concise manner used by physicists worldwide.		Broad knowledge
8	**EE 110 Electrical Engineering Workshop**	**CO1**	Familiarity with supply arrangements and their limitations, knowledge of standard voltages and their tolerances, safety aspects of electrical systems and importance of protective measures in wiring systems	a,b,c,d,e,h,i	Knowledge of mathematics and engineering
					Analyse and interpret data and results.
		CO2	Knowledge about the types of wires, cables and other accessories used in wiring. Creating awareness of energy conservation in electrical systems		Design electrical and electronics components, or processes
					Multidisciplinary teams
		CO3	Students should be able to wire simple lighting circuits for domestic buildings, distinguish between light and power circuits		Analyse, formulate, and solve problems
					Broad knowledge

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		CO4	To measure electrical circuit parameters and current, voltage and power in a circuit. Familiarity with backup power supply in domestic installation		Life-long learning
9	ME 110 Mechanical Engineering Workshop	CO1	Students are able to understand the basic manufacturing methods in industries	a,b,c,h	Knowledge of mathematics and engineering
		CO2	Students will develop the technical skills regarding manufacturing		Analyse and interpret data and results.
		CO3	To develop practical skills on operating machineries.		Design electrical and electronics components, or processes
					Broad knowledge

SECOND SEMESTER					
University		KTU		Scheme	2015
Sl No.	Course Code & Title	Course Outcome		PO Mapping	Justification
1	MA 102 Differential Equations	CO1	Ability to analyse physical phenomena involving differential equations	a,b,c,e,h,i	Knowledge of mathematics and engineering
					Analyse and interpret data and results.
		CO2	Ability to use differential equations in Fluid Mechanics		Design electrical and electronics components, or processes
					Analyse, formulate, and solve problems
		CO3	Ability to use Fourier series in circuits and other engineering applications		Broad knowledge
					Life-long learning
2	CY 100 Engineering Chemistry	CO1	With the syllabus and the portion proposed ,it will be possible for the students to get detailed knowledge on the topics taught	a,b,c,d,e,g,h	Knowledge of mathematics and engineering
					Analyse and interpret data and results.
		CO2	It will also inculcate in students the current development in the field of Engineering Chemistry		Design electrical and electronics components, or processes
					Multidisciplinary teams

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		CO3	The student will be able to apply the knowledge of chemistry and will be equipped to take up chemistry related topics as part of their project works during higher semester of the course		Analyse, formulate, and solve problems Communicate effectively Broad knowledge
3	BE 110 Engineering Graphics	CO1	Students will be able to acquiring capacity to understand the language of Engineering Graphics to read and interpret drawings and visualize shape of objects and their relative locations.	a,c,g,i,k	Knowledge of mathematics and engineering Design electrical and electronics components, or processes
		CO2	Students will be able to develop skill to prepare drawings as per ISO code of practice to convey and document information about engineering objects as orthographic views or pictorial views.		Communicate effectively Life-long learning Use the techniques, skills, and modern engineering tools, software
		CO3	Students will be able to get introduction to computer aided drafting.		
4	BE 102 Design and Engineering	CO1	Able to appreciate the different elements involved in good designs and to apply them in practice when called for	a,b,c,d,e,f,g,k	Knowledge of mathematics and engineering Analyse and interpret data and results.
		CO2	Aware of the product oriented and user oriented aspects that make the design a success.		Design electrical and electronics components, or processes Multidisciplinary teams
		CO3	Will be capable to think of innovative designs incorporating different segments of knowledge gained in the course;		Analyse, formulate, and solve problems Knowledge of professional and ethical responsibility
		CO4	Students will have a broader perspective of design covering function, cost, environmental sensitivity, safety and other factors other than engineering analysis.		Communicate effectively Use the techniques, skills, and modern engineering tools, software

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5	CE 100 Basics of Civil Engineering	CO1	The students will be able to illustrate the fundamental aspects of Civil Engineering.	a,b,d,e,f,g,h,i,j,k	Knowledge of mathematics and engineering Analyse and interpret data and results. Multidisciplinary teams
		CO2	The students will be able to plan and set out a building.		Analyse, formulate, and solve problems Knowledge of professional and ethical responsibility Communicate effectively
		CO3	Students will be able to explain the concepts of surveying for making horizontal and vertical measurements.		Use the techniques, skills, and modern engineering tools, software Broad knowledge
		CO4	They will able to illustrate the uses of various building materials and explain the method of construction of different components of a building.		Life-long learning
6	EC 100 Basics of Electronics Engineering	CO1	Students can identify the active and passive components	a,b,c,e	Knowledge of mathematics and engineering
		CO2	Students can setup simple circuits using diodes and transistors		Analyse and interpret data and results.
		CO3	Students will get fundamental idea about basic communication systems and entertainment electronics		Design electrical and electronics components, or processes Analyse, formulate, and solve problems
7	CY 110 Engineering Chemistry Lab	CO1	Ability to design and conduct experiments.	a,b,d,g,h,k	Knowledge of mathematics and engineering
		CO2	Recognize how observation, experiment and theory work together to continue to expand the frontiers of knowledge of the physical universe.		Analyse and interpret data and results. Multidisciplinary teams
		CO3	Communicate verbally, graphically and in writing the results of calculations and laboratory experiments in a clear and concise manner that		Communicate effectively Broad knowledge

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			incorporates the stylistic conventions used by chemists worldwide.		
		CO4	Use experimental techniques and measurement technology		Use the techniques, skills, and modern engineering tools, software
8	CE 110 Civil Engineering Workshop	CO1	To illustrate the common procedures regarding building construction works like setting out.	a,b,d,e,f	Knowledge of mathematics and engineering
		CO2	To explain about length, area and volume measurements of building features.		Analyse and interpret data and results.
		CO3	To illustrate the importance of brick masonry in building construction		Multidisciplinary teams
		CO4	To explain the concept of surveying for making horizontal and vertical measurements		Analyse, formulate, and solve problems
					Knowledge of professional and ethical responsibility
9	EC 110 Electronics Engineering Workshop	CO1	Student can identify the active and passive electronic components	a,b,c,e	Knowledge of mathematics and engineering
					Analyse and interpret data and results.
		CO2	Student gets hands-on assembling, testing, assembling, dismantling, fabrication and repairing systems by making use of the various tools and instruments available in the Electronics Workshop.		Design electrical and electronics components, or processes
					Analyse, formulate, and solve problems

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THIRD SEMESTER					
University		CALICUT		Scheme	2014
Sl No.	Course Code & Title	Course Outcome		PO Mapping	Justification
1	EN14 301 Engineering Mathematics – III	CO1	Students will be able to know the high level concepts from complex analysis, including analyticity of functions and conformality of mappings to real world mechanical problems	a,b,e,k	Knowledge of mathematics, science and engineering
					Design electrical and electronics components, or processes
		CO2	Students will get a brief idea about linear algebra		Analyse, formulate, and solve problems
		CO3	Students will be able to evaluate contour integrals using the Cauchy Integral Theorem and the Cauchy Integral Formula in basic and extended form		Use the techniques, skillstoanalyse and model complex engineering solutions
2	EN14 302 Computer Programming in C	CO1	Students will get a basic knowledge about Computer Science Engineering also	a,b,c,d,e,,i,k	Knowledge of Engg,
		CO2	Students will have learned the fundamentals of C programming		design and conduct experiments,
					design electrical and electronics systems, components, or processes
		CO3	Students will be familiarized with the concepts of functions, arrays, structures and pointers		multidisciplinary team
					solve engineering problems, engineering solutions
		CO4	Students will be able to solve some real life COMPUTING problems also		lifelong learning,
					Use the techniques, skills, and modern engineering tools, software
3	EE14 303 Electric Circuit Theory	CO1	Students are able to perform well the analysis of electrical circuits in a much simpler way with the help of network theorems.	a,b,e,h,i,k	Knowledge of mathematics, science and engineering
					Design, analyse and interpret data and results
		CO2	Students are able to apply the different mathematical tools(eg:Laplace) for the		Analyse, formulate, and solve engineering problems

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			solution of equations governing Electrical networks		Broad knowledge
		CO3	Students are able to model the electrical and electronic networks as a two port network using the two port parameter representation		lifelong learning
					Use the techniques, skillstoanalyse and model complex engineering solutions
4	EE14 304 Electrical measurements & Instrumentation Systems	CO1	Students get a clear knowledge of the basic laws governing the operation of the instruments, relevant circuits and their working.	a,b,c,d,e,h,i,j	Knowledge of mathematics, science and engineering
					Design, analyse and interpret data and results
		CO2	Students acquire knowledge on methods of measurements and about storage & display devices.		Design electrical and electronics systems, components, or processes
					multidisciplinary teams
		CO3	Students will be aware of various types of measurements, requirements of calibrations, instruments used in measurement etc.		analyse, formulate, and solve engineering problems
					Broad knowledge
		CO4	Students get exposure to various transducers and its applications.		Life-long learning
					Contemporary issues
5	EE14 305 Analog Electronics	CO1	Students will be familiarized with basic concepts of the various electronic components such as diode, BJT, FET, MOSFET, etc.	a,b,c,d,e,g,h,i	Knowledge of mathematics, science and engineering
					Design, analyse and interpret data and results
		CO2	Students acquire knowledge on the different basic electronic circuits and their characteristics.		Design electrical and electronics systems, components, or processes
					multidisciplinary teams
		CO3	Students will be aware of various types of amplifiers circuits based on the BJT, FET and OPAMP as the basic element and their applications.		analyse, formulate, and solve engineering problems
					Knowledge of professional and ethical responsibility
		CO4	Students will be familiarized with the different OPAMP circuits and their characteristics.		Broad knowledge
					Life-long learning

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6	EE14 306 Mechanical Engineering	CO1	Students shall be able to understand the basic applications of thermodynamics and solve simple problems.	a,b,c,e,k	Knowledge of mathematics, science and engineering
		CO2	Students shall be able to solve elementary heat transfer and fluid mechanics problems		Design, analyse and interpret data and results
		CO3	Students shall be familiarized with the working principles of various hydraulic machines and able solve elementary level problems in hydraulic machines.		Design systems, components, or processes
					analyse, formulate, and solve engineering problems
					Software Tool
7	EE14 307 (P) Basic Electrical Engineering LAB	CO1	Students will be able toanalyse and verify various network theorems in a dc circuit.	a,b,c,d,e,i	Knowledge of mathematics, science and engineering
					Design, analyse and interpret data and results
		CO2	Students will be able to measure power in ac and dc circuits		Design electrical and electronics systems, components, or processes
					multidisciplinary teams
		CO3	Students will be able to analyse the properties of RLC series and parallel circuits.		analyse, formulate, and solve engineering problems
					Life-long learning
8	EE14 308 (P) Electronics LAB	CO1	Students will be familiarised with the various electronic components, circuit models and their connections.	a,b,c,e,h,i,k	Knowledge of mathematics, science and engineering
					Design, analyse and interpret data and results
		CO2	Students will be able to apply this knowledge for the design and analysis of basic electronic circuits.		Design electrical and electronics systems, components, or processes
					analyse, formulate, and solve engineering problems
					Broad knowledge
		CO3	Students will be able to design and conductexperiments, as well as to organize, analyze, and interpret data and to take up project works.		Life-long learning

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		CO4	Students will get a better understanding of simulation tools.		Software Tool

FOURTH SEMESTER					
University		**CALICUT**		**Scheme**	**2014**
Sl No.	**Course Code & Title**	**Course Outcome**		**PO Mapping**	**Justification**
1	EN14 401 B Engineering Mathematics – IV	CO1	Students will be able to know the basic concept of probability theory	a,c,d,e,h,i	Knowledge of mathematics, science and engineering
		CO2	Students will get knowledge about Z-transform		Design electrical and electronics systems, components, or processes
		CO3	Students will aquainted with the concept of partial differential equation.		multidisciplinary teams
		CO4	Students will be able to apply all the mathematical aspects that contribute to the solution of heat conduction of a rod problem with constant temperature boundary conditions		analyse, formulate, and solve engineering problems
					Broad knowledge
					Life-long learning
2	EN14 402 Environmental Science	CO1	Students will understand how closely human beings are related to their environment.	a,c,d,f,g,j	Knowledge of science and engineering
		CO2	Students will understand constraints put by the environment in applications of science		Design electrical and electronics components, or processes
		CO3	Students will have ability to analyse impact of technologies on environment		Multidisciplinary teams
		CO4	Students will get motivation to optimize use of natural resources in their engineering design flow as well as in everyday life		Knowledge of professional and ethical responsibility
		CO5	Students will familiarize non-conventional, sustainable and eco-friendly technologies		Communicate effectively
					Contemporary issues

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3	EE14 403 Electrical Machines I	CO1	Students can apply the basic knowledge gathered in the course to select a suitable rating/type of dc machine/transformer for a particular application in industry.	a,b,c,d,e,h,i,j	Knowledge of mathematics, science and engineering Design, analyse and interpret data and results Design electrical and electronics systems, components, or processes
		CO2	Students will have the ability to carry out the performance analysis of a dc Machine/transformer manufactured.		Multidisciplinary teams Analyse, formulate, and solve engineering problems
		CO3	Students will have the ability to understand/trouble shoot the technical issues in a Transformer/dc machine		Broad knowledge Life-long learning Contemporary issues
4	EE14 404 Signals & Systems	CO1	Students will have the ability to mathematically represent a digital signal as a function of time or frequency.	a,b,c,e,h,i,k	Knowledge of mathematics, science and engineering Design, analyse and interpret data and results
		CO2	Students will be able to apply various transformation techniques to represent time domain signals in frequency domain & vice versa		Design electrical and electronics systems, components, or processes Analyse, formulate, and solve engineering problems
		CO3	Students will have the ability to apply various transformation techniques to analyze a digital signal		Broad knowledge Life-long learning
		CO4	Students will be able to mathematically represent the functionality of a digital system.		Use the techniques, skills, and modern engineering toolstoanalyse and model complex engineering solutions
5	EE14 405 Digital Electronics	CO1	Students will be able to understand the various number systems and simplify the logical expressions using Karnaugh map method.	a,b,c,d,e,h,i,k	Knowledge of mathematics, science and engineering Design, analyse and interpret data and results

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					Design electrical and electronics systems, components, or processes
		CO2	Students will be able to understand the implementation of various combinational and sequential circuits.		Multidisciplinary teams Analyse, formulate, and solve engineering problems Broad knowledge
		CO3	Students will be able to understand the architecture and implementation of a digital computer		Life-long learning Use the techniques, skills, and modern engineering toolstoanalyse and model complex engineering solutions
6	**EE14 406 Electro Magnetic Field Theory**	CO1	Students will have ability to analyze all electrical systems in its very fundamental aspects	a,b,c,d,e,h,i	Knowledge of mathematics, science and engineering
		CO2	Students will have ability to represent fields in different coordinate systems		Design, analyse and interpret data and results
		CO3	Students will have knowledge in basic laws of electric and magnetic fields		Design electrical and electronics systems, components, or processes
		CO4	Students will have cognition on electromagnetic waves		Multidisciplinary teams Analyse, formulate, and solve engineering problems
		CO5	Students will have ability to design transmission lines		Broad knowledge Life-long learning
7	**EE14 407 (P) Mechanical Engineering LAB**	CO1	Students will be able to understand different piping system and its components	a,b,c,h	Knowledge of mathematics, science and engineering
		CO2	Students will be able to evaluate and compare different flow meters and calibration of various flow meters		Design, analyse and interpret data and results
		CO3	Students will be able to understand the working of fluid machineries like turbines, pumps etc		Design electrical and electronics systems, components, or processes
		CO4	Students will be able to understand the operating characteristics of different fluid machineries		

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		CO5	Students will be able to understand the issues developed while designing the machineries		Broad knowledge
8	EE14 408 (P) Electrical Measurements & Instrumentation Lab	CO1	Students get trained in the measurement of displacement, resistance, torque and angle etc	a,b,c,d,h,i	Knowledge of mathematics
					Design, analyse and interpret data and results
		CO2	Students get exposure to DC bridges		Design electrical and electronics systems, components, or processes
					Multidisciplinary teams
		CO3	Students get exposed to the different types of calibration methods of electrical instruments.		Broad knowledge
					Life-long learning

FIFTH SEMESTER					
University		CALICUT		Scheme	2009
Sl No.	Course Code & Title	Course Outcome		PO Mapping	Justification
1	EE09 501 Synchronous and Induction Machines	CO1	Students can apply the basic knowledge gathered in the course to select a suitable rating/type of AC machine for a particular application in industry.	a,b,e,i,j	Apply knowledge of mathematics, science and engineering
		CO2	Students will have the ability to carry out the performance analysis of a ac machine manufactured.		Conduct experiments, analyse and interpret data
					Analyse, formulate, and solve engineering problems
		CO3	Students will have the ability to understand the technical issues in a ac machine		Life-long learning to update their knowledge
					Awareness of the contemporary issues

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2	EE09 502 Power Generation Transmission and Distribution	CO1	Students will be able to understand Conventional and Non-Conventional Energy Resources	a,c,d,e,h,i,j	Knowledge of mathematics, science and engineering
		CO2	Students will be able to analyze the Performance of Transmission Lines		Design electrical and electronics systems, components
		CO3	Students will be able to understand basics of Corona, Sag and other problems arise in Transmission Lines.		Work individually as well as in multidisciplinary teams
					Analyse and solve engineering
		CO4	Students will be able to understand Power Factor improvement		Broad knowledge
		CO5	Students will be able to evaluate performance of transmission lines		Life-long learning
					Contemporary issues
3	EE09 503 Linear Control Systems	CO1	Students will be able to understand how to model different systems mathematically and understand the concept of Transfer Function	a,b,c,d,e,h,I,j;k	Knowledge of mathematics and engineering
					Design and conduct experiments
		CO2	Students will be able to analyze the system models in time domain, understand time domain specifications, concept of steady state error and the stability requirements.		Design electrical and electronics systems, components, or processes
					Work individually as well as in multidisciplinary teams
		CO3	Students will gain adequate knowledge in the discrete time systems and its stability analysis.		Analyse and solve engineering problems
					Broad knowledge
					Life-long learning
		CO4	Students will be able to design compensator and controller to achieve a desired response from a system.		Awareness of the contemporary issues
					Use of modern engineering tools, software

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4	EE09 504 Power Electronics	CO1	Students will be able to get in depth knowledge of various PE devices	a,b,c,e,h,k	Knowledge of mathematics and engineering
		CO2	Students will be able to analyze the various rectifier under different load conditions and to carry out their design and to understand the impact of PE converters on utility		Design, analyse and interpret data
		CO3	Students will be able to analyze the inverter circuits under different load and concepts of online and offline UPS		Design electrical and electronics systems, components, or processes
		CO4	Students will have the ability to understand the role power electronics in the improvement of energy usage efficiency		Identify, analyse, and solve engineering problems
		CO5	Students will be able to design and model basic SMPS for a particular application		Broad knowledge Modern engineering tools & software
5	EE09 505 Digital System Design	CO1	Students will be able to design a digital system for given specifications	a,b,c,d,e,h,I,j,k	Knowledge of engineering
		CO2	Students will be able to write the VHDL code for given digital system and verify the same using simulation software.		Design and conduct experiments Design electrical and electronics systems, components, or processes
		CO3	Students will be able to implement the digital system using a FPGA trainer kit		Work individually as well as in multidisciplinary teams Analyse and solve engineering problems
		CO4	Students will be proficient to use Modelsim and Xilinx software		Broad knowledge Life-long learning
		CO5	Students will be able to follow the stepwise design process starting from concept		Awareness of the contemporary issues Use of modern engineering tools, software

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6	EE09 506 Electrical Material Science	CO1	The students are able to identify the materials required for a particular application.	a,c,e,i,j	Knowledge of science and engineering
		CO2	The students understand the basic properties of various materials		Design electrical and electronics systems, components
		CO3	The students are able to understand the elementary concepts of solar energy materials and their applications		Identify, analyse, and solve engineering problems
		CO4	The students will be able to identify the insulators required for various applications		Life-long learning Awareness of the contemporary issues
7	EE09 507(P) Electrical Machines Lab I	CO1	Students can apply the basic knowledge gathered in the course to select a suitable DC machine for specific application in industries.	a,b,d,e,h	Knowledge of mathematics and engineering Design and conduct experiments
		CO2	Students are able to analsze the performance characteristic of a transformer		To work individually as well as in multidisciplinary teams
		CO3	Students will have the ability to understand / troubleshoot the technical issues in a transformer/ dc machines		Analyse and solve engineering problems Broad knowledge
8	EE09 508 (P) Digital Electronics Lab	CO1	Students will get the clear idea and working of logic gates, flip flops, multiplexers, demultiplexers, microprocessor and FPGAs.	a, b, c, d, e, h, i, j, k	Knowledge of engineering Design and conduct experiments
		CO2	Students will be able to design and implement logic circuits based on boolean functions using logic gates and multiplexer.		Design electrical and electronics systems, components, or processes Work individually as well as in multidisciplinary teams
		CO3	Students will be able to design and implement different types of counter and sequencing circuits.		Analyse and solve engineering problems Broad knowledge

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		CO4	Students will be familiarized with the programming of 8085 microprocessor, VHDL programming for simple circuits and implementing it in FPGA.		Life-long learning Awareness of the contemporary issues
		CO5	Students will be able to generate various waveforms by interfacing DAC with 8085 microprocessor.		Use of modern engineering tools, software

SIXTH SEMESTER					
University		CALICUT		Scheme	2009
Sl No.	Course Code & Title	Course Outcome		PO Mapping	Justification
1	EE09 601 Microprocessors And Microcontrollers	CO1	Students will be able to write assembly program for various tasks using 8086 microprocessor/ 8051 Microcontroller	a,b,c,d,e,h,i,k	Knowledge of engineering Design and conduct experiments
		CO2	Students will be able to interface 8086 microprocessor with various peripheral devices		Design electrical and electronics systems, components, or processes Work individually as well as in multidisciplinary teams
		CO3	Students will be able to effectively utilize the 8051 microcontroller peripherals		Analyse and solve engineering problems Broad knowledge
		CO4	Students will be able to design and implement simple embedded systems		Life-long learning Use of modern engineering tools, software
2	EE09 602 Engineering Economics & Principles Of Management	CO1	Students will be able to do creative planning	a,d,e,f,g,h,j,k	Knowledge of mathematics, science Multidisciplinary teams
		CO2	Students will be able to understand the importance of medium of exchange, measure of value and means of storing wealth		Analyse,and solve engineering problems Professional and ethical responsibility.

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		CO3	Students will be able to understand several steps in management and various duties of managers		Communicate effectively in any area of their field to the industry, fellow beings and society. Broad knowledge
		CO4	Students will be able to analyze various problems involved and suggest several remedial measures		Awareness of contemporary issues Use the techniques and skill
3	**EE09 603 Modern Control Theory**	CO1	Students will be able to model, design and analyze control system	a,b,c,d,e,h,i,j,k	Knowledge of Mathematics & engineering Design and conduct experiments
		CO2	Students will be able to understand the basic concepts of State space modeling of general systems pertaining to linear time invariant systems		Design electrical and electronics systems, components, or processes Work individually as well as in multidisciplinary teams Analyse and solve engineering problems
		CO3	Students can understand the concept of stability and its relation with pole placements		Broad knowledge Life-long learning
		CO4	Students will have the ability to use the advanced techniques, and modern engineering tools		Awareness of the contemporary issues Use of modern engineering tools, software
4	**EE09 604 Electric Drives**	CO1	Students are able to get the concept of an electric drive and understand the various control schemes involved.	a,b,e,h,i,j,k	Knowledge of mathematics and engineering
		CO2	Students are able to get a better understanding of a DC motor drive		Design and conduct experiments, analyse and interpret data
		CO3	Students are able to understand the Induction motor drives and thereby get an idea of various schemes employed in the Industry.		Analyse, and solve engineering problems Broad knowledge
		CO4	Students are able to understand the basics of vector control involved in the control of Induction motors		Life-long learning

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		CO5	Students get a better understanding of the different Special Machines and its control which is very relevant in the current scenario		Contemporary issues Modern engineering tools & software
5	EE09 605 Electrical Engineering Drawing	CO1	Students acquire graphic skills for communication of concepts and ideas of electrical equipments and systems using engineering sketches and also the usage of modern engineering tools and softwares for the same.	a,c,d,e,h,i,j	Apply knowledge of mathematics and engineering Design electrical and electronics systems, components
		CO2	Students know the standards applicable to engineering drawing and know a variety of electrical graphical symbols used in the drawings.		Work individually as well as in multidisciplinary teams
		CO3	Students will be able to identify and interpret the different machine types, their basic structure and the design of winding arrangements in each of them.		Identify, analyse and solve engineering
		CO4	Students can understand the basic structure and design of the transmission and distribution systems.		Broad knowledge
		CO5	Students will be able to represent the transmission system using single line diagram for the effective understanding of the system rather than showing the actual system diagram and also visualizing the actual system from the single line diagram.		Life-long learning Awareness of the contemporary issues
6	EE09 L02 Numerical Analysis and Optimization Techniques	CO1	Students will understand the importance of computers and the role of approximations and errors in the implementation and development of numerical methods.	a,b,d,e,h,i	Apply knowledge of mathematics Design and interpret data
		CO2	Students will gain sufficient information to successfully approach a wide variety of engineering problems dealing with roots of equations.		Multidisciplinary teams

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		CO3	Students will have the ability to solve problems involving linear algebraic equations and appreciate the application of these equations in many fields of engineering		Solve engineering problems
		CO4	Students will have the ability to solve wide variety of engineering problems dealing with optimization.		Broad knowledge
		CO5	Students will have the ability to solve many numerical integration and differentiation problems and appreciate their application for engineering problem solving.		Life-long learning
7	EE09 L05 Bio- Medical Engineering	CO1	Students get acquaintance with the physiology of the heart, lung, blood circulation and respiration.	a,b,c,e,f,h,i	Knowledge of science and engineering Analyse and interpret data
		CO2	Students understand the various sensing and measuring devices of electrical origin.		Health and safety Analyse and solve engineering problems
		CO3	Students get awareness of electrical safety of medical equipments		Knowledge of professional
		CO4	Students will get ability to use different transducers for biomedical applications		Broad knowledge Life-long learning
8	EE09 607(P) Electrical Machines Lab II	CO1	Students get the knowledge on the performance of different types of induction motors.	a,b,d,e	Apply knowledge of mathematics and engineering
		CO2	Students get the experimental skill to obtain the performance of synchronous generator		Conduct experiments, analyse and interpret data Work individually as well as in multidisciplinary teams
		CO3	Students learn the process of synchronising alternator with the mains.		Identify, analyse, and solve engineering problems
9	EE09 608(P) Mini Project	CO1	Students are able to analyse a problem, identify	a, b, c, d, e, f, g, h, i, j, k	Knowledge of mathematics and Engg. Design and conduct experiments ,analyse and interpret data and results

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			and define the computing requirements appropriate to its solutions		Design electrical and electronics systems, components, or processes
					Multidisciplinary teams
					Analyse, formulate, and solve engineering problems
		CO2	Students are able to function effectively on teams to accomplish a common goal		Knowledge of professional and ethical responsibility.
					communication
					Broad knowledge
					Life-long learning
					contemporary issues
		CO3	Students are able to use current techniques, skill and tools necessary for computing practices		Use the techniques, skills, and modern engineering tools, software and equipment to analyse and model complex engineering solutions

SEVENTH SEMESTER					
University		**CALICUT**		**Scheme**	**2009**
Sl No.	**Course Code & Title**	**Course Outcome**		**PO Mapping**	**Justification**
1	**EE09 701 Power System Analysis**	**CO1**	Students are able to model the power system under steady state operating conditions	a,b,c,e,h,i	Apply knowledge of mathematics and engineering
					To design, analyse and interpret data
		CO2	Students are able to apply different numerical methods to solve the power flow problem.		Design electrical and electronics systems, components
					Analyse and solve engineering problems
		CO3	Students are able to analyze the power system under abnormal conditions.		Broad knowledge
		CO4	Students understand the concept of stability in power system.		Life-long learning

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2	EE09 702 Analog And Digital Communication	CO1	Students can understand the basic model of any communication system.	a,d,e,h,i,j,k	Knowledge of mathematics and engineering Work in multidisciplinary teams
		CO2	Students acquire the skill to identify and interpret various types of communication techniques.		Analyse and solve engineering problems Broad knowledge
		CO3	Students know the basic concepts of communication techniques (both analog and digital) and can implement it in many real time communication systems.		Life-long learning Awareness of the contemporary issues Analyse and model complex engineering solutions
3	EE09 703 Digital Signal Processing	CO1	Students will have the ability to mathematically represent a digital signal as a function of time or frequency.	a,b,c, e, h,i,k	Apply knowledge of mathematics and engineering
		CO2	Students will have the ability to apply various transformation techniques to represent and transform signals in time & frequency domain.		Design, analyse and interpret data
		CO3	Students will have the ability to mathematically represent the functionality of a digital system and apply various transformation techniques to analyze a Digital Signal.		Design electrical and electronics systems, components
		CO4	Students will have the ability to derive mathematical representation and draw realization structures for digital filter implementation from a mathematical representation of a Digital Filter.		Analyse and solve engineering problems Broad knowledge Life-long learning
		CO5	Students will have the ability to understand the architectural level working principles of currently existing Digital Signal Processors and their features.		Analyse and model complex engineering solutions

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4	EE09 704 Electrical Machine Design	CO1	Students will have the ability to model small size transformers.	a, b, c, d, e, h, i	Knowledge of mathematics, Design analyse and interpret data
		CO2	Students will be able to design armature and field systems for D.C. machines		Design electrical and electronics systems, components Work individually as well as in multidisciplinary teams
		CO3	Students will be able to design armature and field systems for alternators		Analyse and solve engineering problems Broad knowledge
		CO4	Students will be able to design cooling tubes for the transformer		Life-long learning
5	EE09 L13 High Voltage Engineering	CO1	Students will be aware of the happenings in the high voltage and current testing and generating stations.	a,b,c,d,e,h,i,j	Knowledge of mathematics, Design analyse and interpret data
		CO2	Students will Gain the knowledge about the designing of different dielectric loss measurement bridges.		Design electrical and electronics systems, components Work individually as well as in multidisciplinary teams
		CO3	Students will be aware of the different instruments used in the testing of high voltage equipment.		Analyse and solve engineering problems Broad knowledge
		CO4	Students will understand about the travelling waves.		Life-long learning Sustainable solutions
6	EE09 L23 Process Control & Instrumentation	CO1	Students will learn the fundamental of instrumentation (valves, sensors, transmitters, and controllers) and Evaluate stability, frequency response, and other characteristics relevant to process control.	a,b,c,d,e,h,i,j	Knowledge of mathematics and engineering Design analyse and interpret data Design electrical and electronics systems, components Work individually as well as in multidisciplinary teams

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		CO2	Students will understand the fundamental principles of equipment operation.		Analyse and solve engineering problems
		CO3	Students will be able to do projects in process control industry.		Broad knowledge
		CO4	Students will be able to design and maintain a process control system.		Life-long learning
		CO5	Students will be able to apply the concept of different temperature and flow measurement techniques in the industry.		Sustainable solutions
7	EE09 707(P) Power Electronics Lab	CO1	Students will be able to understand various power electronics devices such as SCR, TRIAC, DIAC, MOSFET, GTO etc	a, b, c, d, e, k	Knowledge of mathematics and engineering Design,coduct, analyse and interpret data
		CO2	Students will be able to understand application of aforesaid power electronics devices in choppers, inverters and converters etc		Design electrical and electronics systems, components Work individually as well as in multidisciplinary teams
		CO3	Students will be able to understand control of electrical motors through dc-dc converters, ac converters etc.		Analyse and solve engineering problems
		CO4	Students will be able to understand the use of inductors and capacitors in choppers, converters		Use of software to analyse and model complex engineering solutions
8	EE09 708 (P) Advanced Electrical Engineering Lab	CO1	Students will gain the knowledge to write the assembly language programs for 8086 and 8051	a, b, c, d, e, i, k	Knowledge of mathematics and engineering
		CO2	Students will gain the skills to write Matlab programs		Design,coduct, analyse and interpret data
		CO3	Students will gain the knowledge to use different matlab tools		Design electrical and electronics systems, components Work individually as well as in

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					multidisciplinary teams
		CO4	Students will gain the knowledge to devloptranfer function model of DC Machine		Analyse and solve engineering problems
					Life-long learning
		CO5	Students will gain the knowledge to conduct Load and Fault analysis of given power system		use of software to analyse and model complex engineering solutions
9	EE09 709(P) Project	CO1	Students will understand the recent development of technology related their project topic	a, b, c, d, e, f, g, h, i, j,k	Knowledge of mathematics and Engg.
					Design and conduct experiments ,analyse and interpret data and results
					Design electrical and electronics systems, components, or processes
					Multidisciplinary teams
					Analyse, formulate, and solve engineering problems
		CO2	Students will gain the skill to write literature review for a research work		Knowledge of professional and ethical responsibility.
					communication
					Broad knowledge
					Life-long learning
					contemporary issues
		CO3	Students will get exposed to presentations and exhibitions.		Use software and equipment to analyse and model complex engineering solutions

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EIGHTH SEMESTER					
University		CALICUT		Scheme	2009
Sl No.	Course Code & Title	Course Outcome		PO Mapping	Justification
1	EE09 801 Electrical System Design	CO1	Students will have ability to design different electrical systems	a, b, c	Knowledge of mathematics and Engg.
		CO2	Students will have knowledge about various standards in electricity		Design ,analyse and interpret data and results
		CO3	Students will have the ability to do lighting calculations in various type of buildings		Design electrical and electronics systems, components, or processes
		CO4	Students will understand the design of substation and earthing systems		
2	EE09 802 Power System Protection And Utilization	CO1	Students will get knowledge of causes of overvoltage in power system and schemes for protection of different power system elements.	a,h,i,j	Knowledge of mathematics and Engg.
		CO2	Students could understand the principle of operation of various types of protective relays and circuit breakers.		Broad knowledge
		CO3	Students understand the working of static relays and the microprocessor based control schemes.		Life-long learning
		CO4	Students learn about the mechanics of traction and electric heating.		Sustainable solutions
3	EE09 L06 Special Electrical Machines	CO1	Students get a clear knowledge on Construction, principle of operation and performance of Stepper Motor	a, b, c. d, e, h, i, j	Knowledge of mathematics and engineering
					Design analyse and interpret data
		CO2	Students acquire knowledge on Construction, principle of operation, control and performance of synchronous reluctance motors and switched reluctance motor.		Design electrical and electronics systems, components
					Work individually as well as in multidisciplinary teams
		CO3	Students get an aware of various types of sensors used		Analyse and solve engineering problems

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			in the BLDC Motor and its performance and its different control schemes.		Broad knowledge
		CO4	Students will have the knowledge about Construction, principle of operation and performance of Permanent Magnet Synchronous Motor its different control schemes.		Life-long learning Sustainable solutions
4	EE09 L09 Renewable Energy Resources, Electricity Billing, Energy Conservation And Management	CO1	Students will aware of the different renewable energy sources available	a, b, c, d, e, h, i	Knowledge of mathematics and engineering Design analyse and interpret data
		CO2	Students will be able to do the energy auditing for small industries		Design electrical and electronics systems, components Work individually as well as in multidisciplinary teams
		CO3	Students will be able to give energy saving methods in small scale.		Analyse and solve engineering problems
		CO4	Students will be able to analyze the energy economics		Broad knowledge Life-long learning
5	EE09 805(P) Seminar	CO1	Students will develop the confidence to prepare and present a topic before the audience	a,c,e,g,h,i,j	Knowledge of mathematics and engineering
		CO2	Students will gain knowledge in any of the technically relevant current topics		Design electrical and electronics systems, components
		CO3	Students will develop knowledge about the recent advancements in the areas of their topic through the detailed literature survey being carried out and will be able to write a technical report		Communicateeffectivey Broad knowledge Life-long learning
6	EE09 806(P) Project	CO1	Students will understand the recent development of technology related their project topic	a, b, c, d, e, f, g, h, i, j,k	Knowledge of mathematics and Engg. Design and conduct experiments .analyse and interpret data and results

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					Design electrical and electronics systems, components, or processes
					Multidisciplinary teams
					Analyse, formulate, and solve engineering problems
		CO2	Students will gain the skill to write literature review for a research work		Knowledge of professional and ethical responsibility.
					communication
					Broad knowledge
					Life-long learning
					contemporary issues
		CO3	Students will get exposed to presentations and exhibitions.	- -	Use software and equipment to analyse and model complex engineering solutions

The students will be able to achieve the following graduate attributes

I) Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization for the solution of complex engineering problems.

II) Problem Analysis: Identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural science and engineering sciences.

III) Design and development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specific needs with appropriate considerations for public health safety and cultural, societal and environmental considerations.

IV) 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.

V) Modern tool usage: create, select and apply appropriate techniques, resources and modern engineering and IT tools including predictions and modelling to complex engineering activities with an understanding of the limitations.

VI) 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 practices.

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

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

IX) Individual and team work: Function effectively as an individual and as a member or leader in diverse teams and in multi disciplinary settings.

X) Communication: Communicate effectively on complex engineering activities with the engineering community and with the 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.

XI) 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.

XII) 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.

Alignment of POs with GA and Justification

Graduate Attributes	PROGRAMME OUTCOMES										
	a	b	c	d	e	f	g	h	i	j	k
Engineering Knowledge	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
Problem Analysis	✓	✓	✓	✓	✓					✓	✓
Design & Development of Solutions	✓	✓	✓	✓	✓					✓	✓
Conduct investigations of complex problems	✓	✓	✓	✓	✓					✓	✓
Modern Tools Usage		✓	✓	✓	✓				✓	✓	✓
The Engineer and Society			✓	✓		✓	✓	✓	✓	✓	✓
Environment & Sustainability			✓			✓		✓		✓	
Ethics			✓	✓		✓					
Individual & Team work			✓	✓		✓					
Communication			✓	✓		✓	✓	✓			

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Project management & Finance			√	√		√					
Lifelong Learning	√	√	√		√			√	√	√	

Alignment of POs with GA and Justification

GRADUATE ATTRIBUTES	PO's	JUSTIFICATIONS
Engineering Knowledge	**a**	Apply knowledge of mathematics, science and engineering
	b	Design and conduct experiments, analyse and interpret data and results
	c	Design electrical and electronics systems, components, or processes
	d	Work individually as well as in multidisciplinary teams
	e	Identify, analyse, formulate, and solve engineering problems
	g	Communicate effectively in any area of their field
	h	Broad knowledge
	i	Life-long learning
	j	Awareness of the contemporary issues
	k	Ability to use the techniques, skills, and modern engineering tools, software and equipment
Problem Analysis	**a**	Apply knowledge of mathematics, science and engineering
	b	Design and conduct experiments, analyse and interpret data and results
	c	Design electrical and electronics systems, components, or processes
	d	Work individually as well as in multidisciplinary teams
	e	Identify, analyse, formulate, and solve engineering problems

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	j	Awareness of the contemporary issues
	k	Ability to use the techniques, skills, and modern engineering tools, software and equipment
Design & Development of Solutions	a	Apply knowledge of mathematics, science and engineering
	b	Design and conduct experiments, analyse and interpret data and results
	c	Design electrical and electronics systems, components, or processes
	d	Work individually as well as in multidisciplinary teams
	e	Identify, analyse, formulate, and solve engineering problems
	j	Awareness of the contemporary issues
	k	Ability to use the techniques, skills, and modern engineering tools, software and equipment
Conduct investigations of complex problems	a	Apply knowledge of mathematics, science and engineering
	b	Design and conduct experiments, analyse and interpret data and results
	c	Design electrical and electronics systems, components, or processes
	d	Work individually as well as in multidisciplinary teams
	e	Identify, analyse, formulate, and solve engineering problems
	j	Awareness of the contemporary issues
	k	Ability to use the techniques, skills, and modern engineering tools, software and equipment
Modern Tools Usage	b	Design and conduct experiments, analyse and interpret data and results
	c	Design electrical and electronics systems, components, or processes
	d	Work individually as well as in multidisciplinary teams

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	e	Identify, analyse, formulate, and solve engineering problems

	i	Life-long learning
	j	Awareness of the contemporary issues
	k	Ability to use the techniques, skills, and modern engineering tools, software and equipment
Engineer and Society	c	Design electrical and electronics systems, components, or processes
	d	Work individually as well as in multidisciplinary teams
	f	Ability to communicate effectively
	g	Communicate effectively in any area of their field
	h	Broad knowledge
	i	Life-long learning
	j	Awareness of the contemporary issues
	k	Ability to use the techniques, skills, and modern engineering tools, software and equipment
Environment & Sustainability	c	Design electrical and electronics systems, components, or processes
	f	Ability to communicate effectively
	h	Broad knowledge
	j	Awareness of the contemporary issues
Ethics	c	Design electrical and electronics systems, components, or processes
	d	Work individually as well as in multidisciplinary teams

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	f	Ability to communicate effectively

Individual & Team work	c	Design electrical and electronics systems, components, or processes
	d	Work individually as well as in multidisciplinary teams
	f	Ability to communicate effectively
Communication	c	Design electrical and electronics systems, components, or processes
	d	Work individually as well as in multidisciplinary teams
	f	Ability to communicate effectively
	g	Communicate effectively in any area of their field
	h	Broad knowledge
Project management & Finance	c	Design electrical and electronics systems, components, or processes
	d	Work individually as well as in multidisciplinary teams
	f	Ability to communicate effectively
Lifelong Learning	a	Apply knowledge of mathematics, science and engineering
	b	Design and conduct experiments, analyse and interpret data and results
	c	Design electrical and electronics systems, components, or processes
	e	Identify, analyse, formulate, and solve engineering problems
	h	Broad knowledge
	i	Life-long learning

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	j	Awareness of the contemporary issues

Correlation between the POs and the PEOs

Programme Educational Objectives (PEO)	PROGRAMME OUTCOMES(PO)											Justifications
	a	b	c	d	e	f	g	h	i	j	k	
PEO 1 Fundamental and practical aspects of Mathematics and Engineering Sciences	✓	✓	✓		✓					✓	✓	Apply knowledge of mathematics, science and engineering Design and conduct experiments, analyse and interpret data and results Design electrical and electronics systems, components, or processes Identify, analyse, formulate, and solve engineering problems Awareness of the contemporary issues Ability to use the techniques, skills, and modern engineering tools, software and equipment
PEO II Latest technological developments pursue higher education and research		✓	✓	✓	✓			✓	✓	✓	✓	Design and conduct experiments, analyse and interpret data and results Design electrical and electronics systems, components, or processes

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												Work individually as well as in multidisciplinary teams Identify, analyse, formulate, and solve engineering problems Broad knowledge Life-long learning Awareness of the contemporary issues Use of Modern Techniques/ Tools
PEO III professional ethics and good communication ability along with entrepreneurial skills			✓			✓	✓	✓				Design electrical and electronics systems, components, or processes . Knowledge of professional and ethical responsibility Ability to communicate effectively in any area of their field Broad knowledge

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Attainment of Programme Outcomes

Mapping of Individual Courses in the current academic year 2015 – 2016 for finding the correlation

Sl No.	Semester	Course Code & Title	Programme Outcomes										
			a	b	c	d	e	f	g	h	i	j	k
1	FIRST	MA 101 Calculus	✓				✓						✓
2		PH 100 Engineering Physics	✓				✓			✓			
3		BE101-03 Introduction to Electrical Engineering	✓	✓	✓	✓	✓			✓	✓	✓	
4		BE 103 Introduction to Sustainable Engineering				✓		✓		✓		✓	
5		ME 100 Basics of Mechanical Engineering		✓	✓		✓			✓		✓	✓
6		BE 100 Engineering Mechanics	✓	✓	✓	✓	✓				✓	✓	
7		PH 110 Engineering Physics Lab	✓	✓			✓		✓	✓			
8		EE 110 Electrical Engineering Workshop	✓	✓	✓	✓	✓			✓	✓		
9		ME 110 Mechanical Engineering Workshop	✓	✓	✓					✓			
10	SECOND	MA 102 Differential Equations	✓	✓	✓		✓			✓	✓		
11		CY 100 Engineering Chemistry	✓	✓	✓	✓	✓		✓	✓			
12		BE 110 Engineering Graphics	✓		✓				✓		✓		✓
13		BE 102 Design and Engineering	✓	✓	✓	✓	✓	✓	✓				✓
14		CE 100 Basics of Civil Engineering	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓
15		EC 100 Basics of Electronics Engineering	✓	✓	✓		✓						
16		CY 110 Engineering Chemistry Lab	✓	✓		✓			✓	✓			✓
17		CE 110 Civil Engineering Workshop	✓	✓		✓	✓	✓					
18		EC 110 Electronics Engineering Workshop	✓	✓	✓		✓						

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19	THIRD	EN14 301 Engineering Mathematics – III	✓	✓			✓						✓
20		EN14 302 Computer Programming in C	✓	✓	✓	✓	✓				✓		✓
21		EE14 303 Electric Circuit Theory	✓	✓			✓			✓	✓		✓
22		EE14 304 Electrical measurements & Instrumentation Systems	✓	✓	✓	✓	✓			✓	✓	✓	
23		EE14 305 Analog Electronics	✓	✓	✓	✓	✓		✓	✓	✓		
24		EE14 306 Mechanical Engineering	✓	✓	✓		✓						✓
25		EE14 307 (P) Basic Electrical Engineering LAB	✓	✓	✓	✓	✓				✓		
26		EE14 308 (P) Electronics LAB	✓	✓	✓		✓			✓	✓		✓
27	FOURTH	EN14 401 B Engineering Mathematics – IV	✓		✓	✓	✓			✓	✓		
28		EN14 402 Environmental Science	✓		✓	✓		✓	✓			✓	
29		EE14 403 Electrical Machines I	✓	✓	✓	✓	✓			✓	✓	✓	
30		EE14 404 Signals & Systems	✓	✓	✓		✓			✓	✓		✓
31		EE14 405 Digital Electronics	✓	✓	✓	✓	✓			✓	✓		✓
32		EE14 406 Electro Magnetic Field Theory	✓	✓	✓	✓	✓			✓	✓		
33		EE14 407 (P) Mechanical Engineering LAB	✓	✓	✓					✓			
34		EE14 408 (P) Electrical Measurements & Instrumentation Lab	✓	✓	✓	✓				✓	✓		
35	FIFTH	EE09 501 Synchronous and Induction Machines	✓	✓			✓				✓	✓	
36		EE09 502 Power Generation Transmission And Distribution	✓		✓	✓	✓			✓	✓	✓	
37		EE09 503 Linear Control Systems	✓	✓	✓	✓	✓			✓	✓	✓	✓
38		EE09 504 Power Electronics	✓	✓	✓		✓			✓			✓
39		EE09 505 Digital System Design	✓	✓	✓	✓	✓			✓	✓	✓	✓
40		EE09 506 Electrical Material Science	✓		✓		✓				✓	✓	
41		EE09 507(P) Electrical Machines Lab I	✓	✓		✓	✓			✓			

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42		EE09 508 (P) Digital Electronics Lab	✓	✓	✓	✓	✓			✓	✓	✓	✓
43	SIXTH	EE09 601 Microprocessors And Microcontrollers	✓	✓	✓	✓	✓			✓	✓		✓
44		EE09 602 Engineering Economics & Principles of Management	✓			✓	✓	✓	✓	✓		✓	✓
45		EE09 603 Modern Control Theory	✓	✓	✓	✓	✓			✓	✓	✓	✓
46		EE09 604 Electric Drives	✓	✓			✓			✓	✓	✓	✓
47		EE09 605 Electrical Engineering Drawing	✓		✓	✓	✓			✓	✓	✓	
48		EE09 L02 Numerical Analysis and Optimisation Techniques	✓	✓		✓	✓			✓	✓		
49		EE09 L05 Bio- Medical Engineering	✓	✓	✓		✓	✓		✓	✓		
50		EE09 607(P) Electrical Machines Lab II	✓	✓		✓	✓						
51		EE09 608(P) Mini Project	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
52	SEVENTH	EE09 701 Power System Analysis	✓	✓	✓		✓			✓	✓		
53		EE09 702 Analog And Digital Communication	✓			✓	✓			✓	✓	✓	✓
54		EE09 703 Digital Signal Processing	✓	✓	✓		✓			✓	✓		✓
55		EE09 704 Electrical Machine Design	✓	✓	✓	✓	✓			✓	✓		
56		EE09 L13 High Voltage Engineering	✓	✓	✓	✓	✓			✓	✓	✓	
57		EE09 L23 Process Control & Instrumentation	✓	✓	✓	✓	✓			✓	✓	✓	
58		EE09 707(P) Power Electronics Lab	✓	✓	✓	✓	✓						✓
59		EE09 708 (P) Advanced Electrical Engineering Lab	✓	✓	✓	✓	✓				✓		✓
60		EE09 709(P) Project	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

61	EIGHTH	EE09 801 Electrical System Design	✓	✓	✓								
62		EE09 802 Power System Protection And Utilization	✓							✓	✓	✓	

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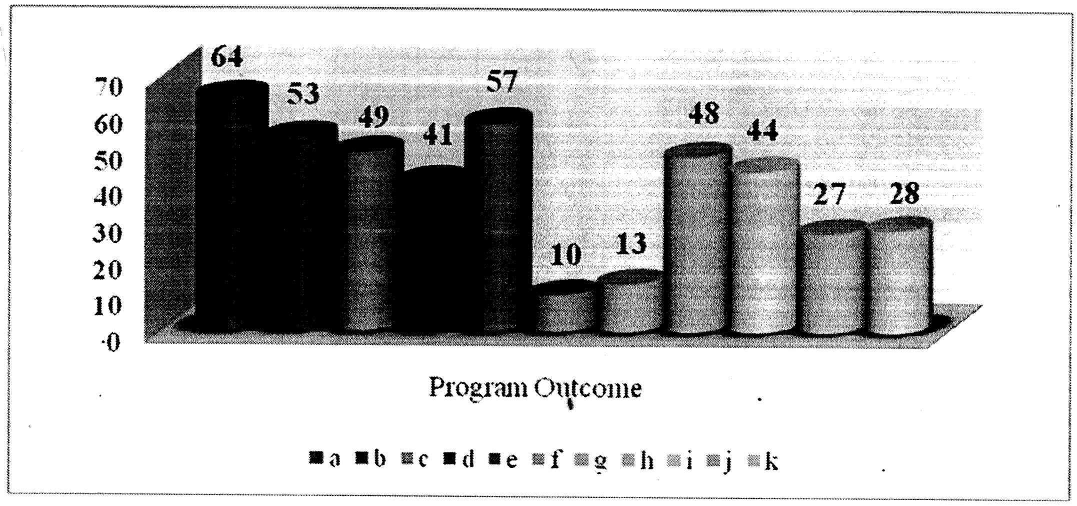
63		EE09 L06 Special Electrical Machines	√	√	√	√	√			√	√	√	
64		EE09 L09 Renewable Energy Resources, Electricity Billing, Energy Conservation and Management	√	√	√	√	√			√	√		
65		EE09 805(P) Seminar	√		√		√		√	√	√	√	
66		EE09 806(P) Project	√	√	√	√	√	√	√	√	√	√	√

STRENGTH OF CORRELATION

Program Outcomes	a	b	c	d	e	f	g	h	i	j	k
Strength	64	53	49	41	57	10	13	48	44	27	28



The following activities are undertaken to improve the level of attainment of the programme outcome 'g' to improve the communication skills:

1) Seminar
2) Participation in symposiums
3) Language Lab
4) Placement training Programmes

The following activities are undertaken to improve the level of attainment of the programme outcome 'f' to improve the ethical skills.

1) Morning prayer before starting the class for all students.
2) Retreat and holy mass for Catholic students and value education for others.

Strength of Correction of Course Domain to Programme Outcomes
Academic Year 2015-16

Sl.No.	Course Component	Course Code	Course Name	Semester	PROGRAMME OUTCOMES										
					a	b	c	d	e	f	g	h	i	j	k
1	Mathematics	MA 101	Calculus	1	√				√						√
2		MA 102	Differential Equations	2	√	√	√		√			√	√		
3		EN14 301	Engineering Mathematics III	3	√	√			√						√
4		EN14 401A	Engineering Mathematics IV	4	√		√	√	√			√	√		
1	Basic Sciences	PH 100	Engineering Physics	1	√				√			√			
2		PH 110	Engineering Physics Lab	1	√	√			√		√	√			
3		CY 100	Engineering Chemistry	2	√	√	√	√	√		√	√			
4		CY 110	Engineering Chemistry Lab	2	√	√		√			√	√			√
1	Basic Engineering Courses	BE101-03	Introduction to Electrical Engineering	1	√	√	√	√	√			√	√	√	
2		ME 100	Basics of Mechanical Engineering	1		√	√		√			√		√	√
3		BE 100	Engineering Mechanics	1	√	√	√	√	√				√	√	
4		EE 110	Electrical Engineering Workshop	1	√	√	√	√	√			√	√		
5		ME 110	Mechanical Engineering Workshop	1	√	√	√					√			
6		BE 110	Engineering Graphics	2	√		√				√		√		√
7		CE 100	Basics of Civil Engineering	2	√	√		√	√	√	√	√	√	√	√
8		EC 100	Basics of Electronics Engineering	2	√	√	√		√						
9		CE 110	Civil Engineering Workshop	2	√	√		√	√	√					

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10		EC 110	Electronics Engineering Workshop	2	√	√	√		√						
11		EN14 302	Computer Programming in C	3	√	√	√	√	√				√		√
1	Humanities	BE 103	Introduction to Sustainable Engineering	1				√		√		√		√	
2		BE 102	Design and Engineering	2	√	√	√	√	√	√	√				√
3		EN14 402	Environmental Science	4	√		√	√		√	√			√	
1	Breadth	EE14 306	Mechanical Engineering	3	√	√	√		√						√
2		EE14 407 (P)	Mechanical Engineering LAB	4	√	√	√					√			
3		EE09 702	Analog And Digital Communication	7	√			√	√			√	√	√	√
4		EE09 703	Digital Signal Processing	7	√	√	√		√			√	√		√
1	Professional Core	EE14 303	Electric Circuit Theory	3	√	√			√			√	√		√
2		EE14 304	Electrical measurements & Instrumentation Systems	3	√	√	√	√	√			√	√	√	
3		EE14 305	Analog Electronics	3	√	√	√	√	√		√	√	√		
4		EE14 307 (P)	Basic Electrical Engineering LAB	3	√	√	√	√	√				√		
5		EE14 308 (P)	Electronics LAB	3	√	√	√		√			√	√		√
6		EE14 403	Electrical Machines I	4	√	√	√	√	√			√	√	√	
7		EE14 404	Signals & Systems	4	√	√	√		√			√	√		√
8		EE14 405	Digital Electronics	4	√	√	√	√	√			√	√		√
9		EE14 406	Electro Magnetic Field Theory	4	√	√	√	√	√			√	√		

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10		EE14 408 (P)	Electrical Measurements & Instrumentation Lab	4	√	√	√	√				√	√		
11		EE09 501	Synchronous and Induction Machines	5	√	√			√				√	√	
12		EE09 502	Power Generation Transmission And Distribution	5	√		√	√	√			√	√	√	
13		EE09 503	Linear Control Systems	5	√	√	√	√	√			√	√	√	√
14		EE09 504	Power Electronics	5	√	√	√		√			√			√
15		EE09 505	Digital System Design	5	√	√	√	√	√			√	√	√	√
16		EE09 506	Electrical Material Science	5	√		√		√				√	√	
17		EE09 507(P)	Electrical Machines Lab I	5	√	√		√	√–			√			
18		EE09 508 (P)	Digital Electronics Lab	5	√	√	√	√	√			√	√	√	√
19		EE09 601	Microprocessors And Microcontrollers	6	√	√	√	√	√			√	√		√
20		EE09 603	Modern Control Theory	6	√	√	√	√	√			√	√	√	√
21		EE09 604	Electric Drives	6	√	√			√			√	√	√	√
22		EE09 605	Electrical Engineering Drawing	6	√		√	√	√			√	√	√	
23		EE09 607(P)	Electrical Machines Lab II	6	√	√		√	√						
24		EE09 608(P)	Mini Project	6	√	√	√	√	√	√	√	√	√	√	√
25		EE09 701	Power System Analysis	7	√	√	√		√			√	√		
26		EE09 704	Electrical Machine Design	7	√	√	√	√	√			√	√		
27		EE09 707(P)	Power Electronics Lab	7	√	√	√	√	√						√
28		EE09 708 (P)	Advanced Electrical Engineering Lab	7	√	√	√	√	√				√		√
29		EE09 709(P)	Project	7	√	√	√	√	√	√	√	√	√	√	√
30		EE09 801	Electrical System Design	8	√	√	√								
31		EE09 802	Power System Protection And Utilization	8	√							√	√	√	

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32		EE09 805(P)	Seminar	8	√		√		√		√	√	√	√	
33		EE09 805(P)	Project	8	√	√	√	√	√	√	√	√		√	√
1	Electives	EE09 L02	Numerical Analysis and Optimisation Techniques	6	√	√		√	√			√	√		
2		EE09 L05	Bio- Medical Engineering	6	√	√	√		√	√		√	√		
3		EE09 L13	High Voltage Engineering	7	√	√	√	√	√			√	√	√	
4		EE09 L23	Process Control & Instrumentation	7	√	√	√	√	√			√	√	√	
5		EE09 L06	Special Electrical Machines	8	√	√	√	√	√			√	√	√	
6		EE09 L09	Renewable Energy Resources, Electricity Billing, Energy Conservation and Management	8	√	√	√	√	√			√	√		
1	Management	EE09 602	Engineering Economics & Principles of Management	6	√			√	√	√	√	√		√	√

Course Component	PROGRAMME OUTCOMES										
	a	b	c	d	e	f	g	h	i	j	k
Mathematics	S	G	G	M	S	N	N	G	G	N	G
Basic Sciences	S	S	M	G	S	N	S	S	N	N	M
Basic Engineering Courses	S	S	S	G	S	W	W	G	G	G	G
Humanities	G	M	G	S	M	S	G	M	N	G	M
Breadth	S	S	S	M	S	N	N	S	G	M	S
Professional Core	S	S	S	G	S	W	M	S	S	G	G
Electives	S	S	S	S	S	M	N	S	S	G	N
Management	S	N	N	S	S	S	S	S	N	S	S

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S	Strong Correlation	W	Weak Correlation
G	Good Correlation	N	No Correlation
M	Moderate Correlation		

LABORATORIES IN 2009 SCHEME

Theory Course			Associated Lab		
Sl No.	**Course Code**	**Course Name**	**Sl No.**	**Course Code**	**Name of the Lab**
1	EN09 103	Engineering Physics	1	EN09 103 (P)	Physics Lab
2	EN09 104	Engineering Chemistry	2	EN09 104 (P)	Chemistry Lab
3	EN09 107	Basics of Electrical, Electronics & Communication Engineering	3	EN09 110 (P) & EN09 111 (P)	Mechanical Workshops & Electrical and Civil Workshops
4	EN09 106	Basics of Civil and mechanical Engg.	4		
5	EE09 303	Electric Circuit Theory	5	EE09 307 (P)	Basic Electrical Engg. Lab
6	EE09 305	Analog Electronics	6	EE09 308 (P)	Analog Electronics Lab
7	EE09 306	Mechanical Engineering	7	EE09 407 (P)	Mechanical Engg. Lab
8	EE09 404	DC Machines and Transformers	8	EE09 507 (P)	Electrical Machines Lab –I
9	EE09 405	Digital Electronics	9	EE09 508 (P)	Digital Electronics Lab
10	EE09 406	Electrical Measurements & Instrumentation Systems	10	EE09 408 (P)	Electrical Measurements & Instrumentation Lab
11	EE09 501	Synchronous and Induction Machines	11	EE09 607 (P)	Electrical Machines Lab –II
12	EE09 504	Power Electronics	12	EE09 707 (P)	Power Electronics Lab

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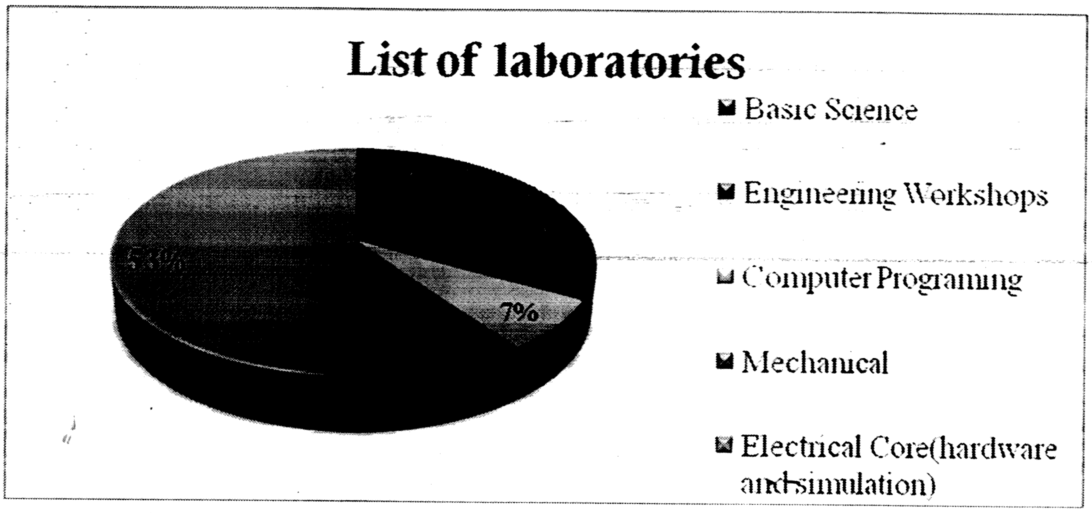
13	EE09 601	Microprocessors and Microcontrollers	13	EE09 708 (P)	Advanced Electrical Engg. Lab



2014 SCHEME

Theory Course			Associated Lab		
Sl No.	**Course Code**	**Course Name**	**Sl No.**	**Course Code**	**Name of the Lab**
1	EN14 103	Engineering Physics	1	EN14 103 (P)	Physics Lab
2	EN14 104	Engineering Chemistry	2	EN14 104 (P)	Chemistry Lab
3	EN14 107	Basics of Electrical, Electronics & Communication Engineering	3	EN14 110 (P) & EN14 111 (P)	Mechanical Workshops & Electrical and Civil Workshops
4	EN14 106	Basics of Civil and mechanical Engg.	4		
5	EE14 303	Electric Circuit Theory	5	EE14 307 (P)	Basic Electrical Engg. Lab
6	EE14 304	Electrical Measurements & Instrumentation Systems	6	EE14 408(P)	Electrical Measurements & Instrumentation Lab
7	EE14 305	Analog Electronics	7	EE14 308 (P)	Electronics Lab
8	EE14 306	Mechanical Engineering	8	EE14 407 (P)	Mechanical Engg. Lab

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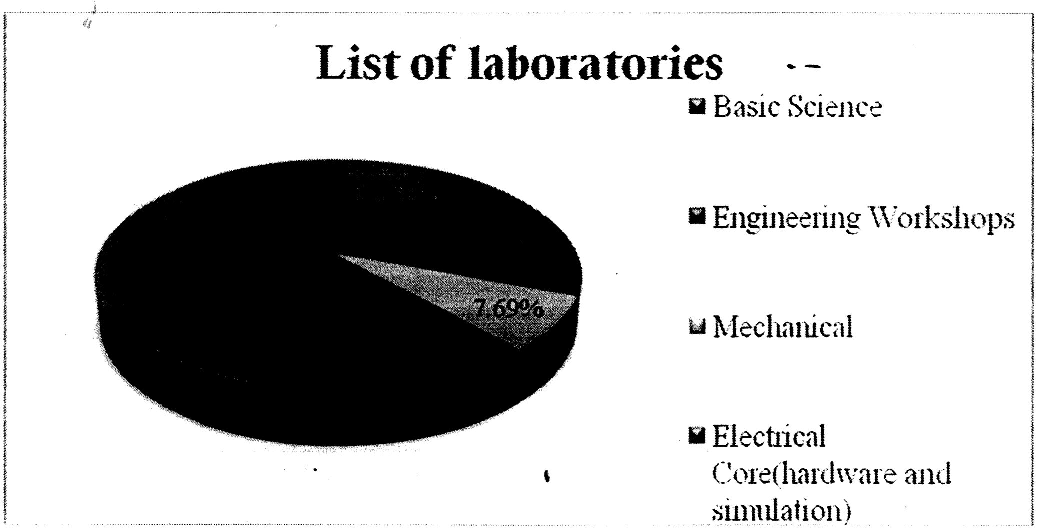
9	EE14 403	Electrical Machines I	9	EE14 507 (P)	Electrical Machines Lab –I
10	EE14 405	Digital Electronics	10	EE14 508 (P)	Integrated Circuits Lab
11	EE14 501	Power Electronics	11	EE14 706(P)	Power Electronics Lab
12	EE14 503	Electrical Machines II	12	EE14 607 (P)	Electrical Machines Lab –II
	EE14 603	Electrical Machines III		EE14 607 (P)	
13	EE14 604	Microprocessors and Microcontrollers	13	EE14 707 (P)	System Simulation and Control Lab



INDIVIDUAL LAB COURSES PO MAPPING IN THE ACADEMIC YEAR

2015 – 2016

SL NO	Course Code & Course Title	PROGRAMME OUTCOMES										
		a	b	c	d	e	f	g	h	i	j	K
1	PH 110 Engineering Physics Lab	✓	✓			✓		✓	✓			
2	EE110 Electrical Engineering Workshop	✓	✓	✓	✓	✓			✓	✓		

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3	ME 110 Mechanical Engineering Workshop											
4	CY 110 Engineering Chemistry Lab	√	√		√			√	√			√
5	CE 110 Civil Engineering Workshop	√	√		√	√	√					
6	EC 110 Electronics Engineering Workshop	√	√	√		√						
7	EE14 307(P) Basic Electrical Engineering Lab	√	√	√	√	√				√		
8	EE14 308(P) Electronics Lab	√	√	√		√			√	√		√
9	EE14 407(P) Mechanical Engineering Lab	√	√	√					√			
10	EE14 408(P) Electrical Measurements & Instrumentation Lab	√	√	√	√				√	√		
11	EE09 507(P) Electrical Machine Lab I	√	√		√	√			√			
12	EE09 508(P) Digital Electronics Lab	√	√	√	√	√			√	√	√	√
13	EE09 607(P) Electrical Machines Lab II	√	√		√	√						
14	EE09 707(P) Power Electronics Lab	√	√	√	√	√						√
15	EE09 708(P) Advanced Electrical Engineering Lab	√	√	√	√	√				√		√

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DEPARTMENT OF AUTOMOBILE ENGINEERING

PROGRAM OUTCOMES

After completion of the course, B. Tech Automobile Engineering graduates will have ability to:

PO 1	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	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	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	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO 6	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	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	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	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	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	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

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PROGRAM SPECIFIC OUTCOMES (PSO)

PSO 1	Graduates able to apply principles of engineering, basic sciences and analytics including multi-variant calculus and higher order partial differential equations.
PSO 2	Graduates able to perform modelling, analysing, designing and simulating physical systems, components and processes.
PSO 3	Graduates able to work professionally on mechanical systems, thermal systems and production systems.

COURSE OUTCOMES (CO's)

MA201 LINEAR ALGEBRA & COMPLEX ANALYSIS	
201.1	To understand the basic concepts in complex analysis
201.2	To understand about conformal Transformation.
201.3	To understand the basic theory of functions of a complex variable.
201.4	To equip the students for solving particular types of real integrals with the help of theory of functions of a complex variable
201.5	equip the students with methods of solving a general system of linear equations.
201.6	To familiarize the students with the concept of Eigen values & diagonalization of a matrix which have many applications in engineering

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
201.1	3	3	3									
201.2	2	2	3									
201.3	2	2	3									
201.4	2	2	3									
201.5	2	2	2									
201.6	2	2	2									

CO	PSO1	PSO2	PSO3
201.1	2	2	
201.2	2	2	
201.3	2	2	
201.4	2	2	
201.5	2	2	
201.6	2	2	

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ME201 MECHANICS OF SOLIDS	
201.1	Understand basic concepts of stress and strain in solids and the material behavior
201.2	Understand the concepts of elastic constants and determine the torsional rigidity of engineering component
201.3	Understand the different types of beams and analyze the shear force and bending moment in different loading conditions
201.4	Analyze the bending stress conditions in different engineering sections
201.5	Determine the deflections in beams by different methods
201.6	Determine principal planes and stresses and apply the results to the combined loading case.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
201.1	3	3	1									
201.2	3	3	2									
201.3	3	3	1									
201.4	3	3	1									
201.5	3	3										
201.6	3	3										

CO	PSO1	PSO2	PSO3
201.1	2	2	2
201.2	2	2	2
201.3	2	2	2
201.4	2	2	2
201.5	2	2	2
201.6	2	2	2

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ME200 FLUID MECHANICS & MACHINERY	
200.1	To introduce students, the fundamental concepts related to the mechanics of fluids.
200.2	To understand the basic principles of fluid pressure measuring devices.
200.3	To understand the basic flow types and equations of motion.
200.4	To apply acquired knowledge on real life problems.
200.5	To analyze existing fluid systems.
200.6	To design new fluid systems.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
200.1	2											
200.2	3	2										
200.3	3	3										
200.4	1	3	2									
200.5	1	3										
200.6	1			3								

CO	PSO1	PSO2	PSO3
200.1	2		
200.2	1		3
200.3	2		2
200.4			3
200.5		3	
200.6			2

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AU 201 SI ENGINE & COMBUSTION	
201.1	To impart basic concepts of SI engine and combustion, automotive engines
201.2	To know about basic concepts of combustion in SI engines
201.3	To understand fuel supply system and ignition control system
201.4	To know constructional details of engine components
201.5	To understand valve and valve mechanism
201.6	To understand lubrication and cooling systems in SI engines

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
201.1	2											1
201.2	2											1
201.3	2											1
201.4	2											1
201.5	2											1
201.6	2											1

CO	PSO1	PSO2	PSO3
201.1	2		2
201.2	2		2
201.3	2		2
201.4	2		2
201.5	2		2
201.6	2		2

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AU 203 AUTO CHASSIS	
203.1	Study of the Constructional details and Theory of basic automobile components.
203.2	Study of the Constructional details and Theory of important driveline.
203.3	Understand about Construction and Design of Drive Axles and Differential principles and types.
203.4	Study of the Constructional details of Suspension Systems of Automobiles.
203.5	Study of the Constructional details and Theory of Braking and Problem-Solving ability in Braking.
203.6	Study of the Constructional details of Steering and Problem-Solving ability in Steering Mechanism.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
203.1	3	1	1									
203.2	3	2	1									
203.3	3	2	2									
203.4	3	1	1									
203.5	3	2	2									
203.6	3	2	2									

CO	PSO1	PSO2	PSO3
203.1	2	2	1
203.2	2	3	1
203.3	2	2	1
203.4	2	2	1
203.5	2	2	1
203.6	2	2	1

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HS 210 LIFE SKILLS	
210.1	To develop communication competence in prospective engineers.
210.2	To develop report writing skills
210.3	To equip them to face interviews & Group Discussion.
210.4	To prepare them on problem solving skills.
210.5	To create an awareness on Engineering Ethics and Human Values.
210.6	To learn leadership qualities and practice them

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
210.1	1	1	2									
210.2	3	2	2									
210.3	2	2	2									
210.4	2	1	2		2							
210.5	2	2	2									
210.6	3	2	2									

CO	PSO1	PSO2	PSO3
210.1	2		
210.2	2		
210.3	2		
210.4	1		
210.5	2		
210.6	2		

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ME 230 FLUID MECHANICS & MACHINES LAB	
230.1	Demonstrate the applications of flow measuring equipment.
230.2	Demonstrate the applications of gauges.
230.3	Demonstrate the applications of valves.
230.4	Demonstrate the applications of pumps.
230.5	Demonstrate the applications of Turbines.
230.6	Demonstrate the applications of Hydraulic ram, accumulator etc.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
230.1	2	3		2				1	3	1	1	1
230.2	2	3		2				1	3	1	1	1
230.3	2	3		2				1	3	1	1	1
230.4	2	3		2				1	3	1	1	1
230.5	2	3		2				1	3	1	1	1
230.6	2	3		2				1	3	1	1	1

CO	PSO1	PSO2	PSO3
230.1	1	2	2
230.2	1	2	2
230.3	1	2	2
230.4	1	2	2
230.5	1	2	2
230.6	1	2	2

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CE 230 MATERIAL TESTING LAB	
230.1	Provide knowledge on mechanical behaviour of materials.
230.2	Acquaint with the experimental methods to determine the mechanical properties of materials
230.3	Understand the causes behind metal failure and deformation
230.4	Identify the materials for various engineering applications.
230.5	Understand the behaviour of materials in engineering applications
230.6	Develop an awareness to apply the properties of materials in material design

<u>CO's MAPPING WITH PO's AND PSO's MAPPING</u>

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
230.1	2	3		2				1	3	1	1	1
230.2	2	3		2				1	3	1	1	1
230.3	2	3		2				1	3	1	1	1
230.4	2	3		2				1	3	1	1	1
230.5	2	3		2				1	3	1	1	1
230.6	2	3		2				1	3	1	1	1

CO	PSO1	PSO2	PSO3
230.1	1	2	2
230.2	1	2	2
230.3	1	2	2
230.4	1	2	2
230.5	1	2	2
230.6	1	2	2

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MA 202 PROBABILITY DISTRIBUTION, TRANSFORMS AND NU,ERAICAL METHODS	
202.1	To introduce the concept of random variable, probability distributions , specific discrete distribution with practical application in various engineering & social life situations.
202.2	To introduce the concept of specific continuous distribution with practical application in various engineering & social life situations.
202.3	To know Laplace Transforms which has wide applications in all engineering courses
202.4	To know Fourier Transforms which has wide applications in all engineering courses
202.5	To enable the students to solve various engineering problems using numerical methods
202.6	To familiarise the students with the concept of numerical differentiation & numerical integration which have many applications in engineering.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
202.1	3	2										
202.2	3	2										
202.3	3	2										
202.4	3	2										
202.5	3	2										
202.6	3	2										

CO	PSO1	PSO2	PSO3
202.1	3	2	
202.2	3	2	
202.3	3	2	
202.4	3	2	
202.5	3	2	
202.6	3	2	

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AU 202 ADVANCED THERMODYNAMICS	
202.1	To impart knowledge to the students thermodynamic concepts.
202.2	To know Zeroth and First law which has wide applications in all engineering.
202.3	To introduce Second and Third law with practical application in various engineering & social life situations.
202.4	To impart knowledge to the students thermodynamic relations.
202.5	To make the students solve numerical problems based on laws of thermodynamics.
202.6	To make the students to solve numerical problems based on different power cycles.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
202.1	3											
202.2	2	3										
202.3	2	3	3									
202.4	3											
202.5	2	3	3									
202.6	2	3	3									

CO	PSO1	PSO2	PSO3
202.1			3
202.2			3
202.3	1	1	3
202.4			3
202.5	1	1	3
202.6	1	1	3

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AU 204 CI ENGINES & COMBUSTION	
204.1	Students will be able to explain CI Engine and Combustion.
204.2	Students will be able to know about CI engine emissions and their treatments.
204.3	Students will be able to differentiate and analyse ideal and actual cycles.
204.4	Students will be able to diagnose FI systems in CI engines.
204.5	Understand the thermodynamics of combustion.
204.6	Know more about the emission treatments to improve engine efficiency.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
204.1	2	2										1
204.2	2	2										1
204.3	2	2										1
204.4	2	2										1
204.5	2	2										1
204.6	2	2										1

CO	PSO1	PSO2	PSO3
204.1	2		2
204.2	2		2
204.3	2		2
204.4	2		1
204.5	2		2
204.6	2		2

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AU 206 AUTOMOTIVE TRANSMISSION	
206.1	To understand solving the Problems on performance of automobiles.
206.2	Study of the Constructional details of various types of gear box and Determination of gear ratios for vehicles.
206.3	To know Construction and operation of Ford – T-model gearbox, Wilson Gear box and electromagnetic transmission.
206.4	To impart the knowledge of torque converter and principle of operation.
206.5	To understand about the Need for automatic transmission and working of automatic transmission.
206.6	Study of the Constructional details and working of hydrostatic drive.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
206.1	3	2										1
206.2	3	2										1
206.3	3	2										1
206.4	3	2										1
206.5	3	2										1
206.6	3	2										1

CO	PSO1	PSO2	PSO3
206.1	2		1
206.2	2		1
206.3	2		1
206.4	2		1
206.5	2		1
206.6	2		1

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AU 234 VEHICLE SYSTEMS LAB	
234.1	To study about hand tools, special purpose tools, and their uses.
234.2	To familiarize with various systems and components of an automobile.
234.3	To know about servicing of automobile components.
234.4	To know about writing technical specifications and description of all types of chassis and transmission components of automobiles, including body and interiors.
234.5	Understand the behaviour of valve time and valve timing setting.
234.6	To familiarize with tyre removal and inspection, wheel balancing and wheel alignment checking.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
234.1	2	2									1	1
234.2	2	2									1	1
234.3	2	2									2	1
234.4	2	2									2	1
234.5	2	2									2	1
234.6	2	2									1	1

CO	PSO1	PSO2	PSO3
234.1	2	1	1
234.2	2	1	1
234.3	2	1	1
234.4	2	1	1
234.5	2	1	1
234.6	2	1	1

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ME307 MACHINE DESIGN - I	
307.1	Understand the basic components and layout of linkages in the assembly of a system/machine.
307.2	Students can analyse velocity, acceleration and forces in a mechanism.
307.3	Able to solve problems of governors and gyroscopic couples.
307.4	Students can analyse the turning moment diagram of the flywheel.
307.5	Able to draw the cam profiles.
307.6	Able to solve gear train problems.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
307.1	3	3	3	2								
307.2	2	3	3	2								
307.3	2	3	3	2	1							
307.4	3	3	2									
307.5	3	3	2									
307.6	3	3	3		1							

CO	PSO1	PSO2	PSO3
307.1	3	1	1
307.2			3
307.3	1	1	3
307.4	1		3
307.5	1	2	3
307.6	1	2	3

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ME309 METALLURGY & MATERIAL SCIENCE	
309.1	Provide fundamental science relevant to materials
309.2	Provide physical concepts of atomic radius, atomic structure, chemical bonds, crystalline and non-crystalline materials and defects of crystal structures, grain size, strengthening mechanisms, heat treatment of metals with mechanical properties and changes in structure
309.3	Enable students to be more aware of the behaviour of materials in engineering applications and select the materials for various engineering applications.
309.4	Understand the causes behind metal failure and deformation
309.5	Determine properties of unknown materials and develop an awareness to apply this knowledge in material design.
309.6	Analyse fracture and fatigue mechanisms in materials and apply core concepts in materials science to solve engineering problems.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
309.1	3											
309.2	3											
309.3	3	2	1	1								
309.4	3			1								
309.5	2	1	2	1								
309.6	3	3	1	1								

CO	PSO1	PSO2	PSO3
309.1	2		
309.2	2		
309.3	2	2	2
309.4	2	2	2
309.5	2	2	2
309.6	2	2	2

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ME 311 MANUFACTURING PROCESSES	
311.1	Understand types of Casting Processes and materials.
311.2	Understand types of Forging, Rolling and Drawing and applications.
311.3	Understand types of Sheet metal forming processes.
311.4	Know about of Joining processes of metals.
311.5	Understand more about non-traditional machining processes.
311.6	Know about advanced manufacturing techniques.

<u>CO's MAPPING WITH PO's AND PSO's MAPPING</u>

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
311.1	3	1										1
311.2	3	1										1
311.3	3	1										1
311.4	3	1										1
311.5	3	1										1
311.6	3	1										1

CO	PSO1	PSO2	PSO3
311.1	1	1	1
311.2	1	1	1
311.3	1	1	1
311.4	1	1	1
311.5	1	1	1
311.6	1	1	1

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AU307 VEHICLE BODY ENGINEERING	
307.1	To impart knowledge on the design of vehicle body to coachwork type, terms used in body building construction and basic dimension.
307.2	To impart knowledge about Aerodynamics of automobiles.
307.3	To provide knowledge about Vehicle Body Materials.
307.4	To know about the various Load distribution of vehicles.
307.5	To get knowledge about Noise and vibration of vehicles.
307.6	To discuss the methods of various technologies for design aspects.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
307.1	3	2										1
307.2	3	2	1									1
307.3	3	2		1								1
307.4	3	2		1								1
307.5	3	2	1									1
307.6	3	2	1		1							1

CO	PSO1	PSO2	PSO3
307.1	2		2
307.2	2	1	2
307.3	2		2
307.4	2		2
307.5	2	1	2
307.6	2	1	2

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ME 367 NON-DESTRUCTIVE TESTING	
367.1	Know basic principles, techniques, equipment of NDT methods.
367.2	Understand the applications and limitations of NDT methods.
367.3	Students enable selection of appropriate NDT methods.
367.4	Identify advantages and limitations of nondestructive testing methods.
367.5	Students are aware of the developments in NDT.
367.6	Students are aware of the future trends in NDT.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
367.1	3	1										1
367.2	3	1										1
367.3	3	1										1
367.4	3	1										1
367.5	3	1										1
367.6	3	1										1

CO	PSO1	PSO2	PSO3
367.1	1	1	1
367.2	1	1	1
367.3	1	1	1
367.4	1	1	1
367.5	1	1	1
367.6	1	1	1

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AU341 DESIGN PROJECT	
341.1	To understand the engineering aspects of design with reference to simple products
341.2	To foster innovation in design of products, processes or systems
341.3	To develop design that add value to products and solve technical problems

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
341.1	3											
341.2		3	3	2	2	1	1	1	2	1	2	2
341.3		3	3	2	2	1	1	1	2	1	2	2

CO	PSO1	PSO2	PSO3
341.1	3		
341.2		3	3
341.3		3	3

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ME 333 HEAT ENGINE LAB	
333.1	Provide knowledge and give hands on experience in testing different properties of fuels and lubricants
333.2	To perform characteristic tests on petrol and diesel engines.
333.3	Understand about the Valve Timing on Four stroke Diesel/ Petrol Engine.
333.4	To know and Determination of calorific value of fuel.
333.5	To provide knowledge and perform the Morse test and Heat balance test.
333.6	To impart the knowledge and performance of flash and fire point of fuel.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
333.1	2	3		2				1	3	1	1	1
333.2	2	3		2				1	3	1	1	1
333.3	2	3		2				1	3	1	1	1
333.4	2	3		2				1	3	1	1	1
333.5	2	3		2				1	3	1	1	1
333.6	2	3		2				1	3	1	1	1

CO	PSO1	PSO2	PSO3
333.1	1	2	2
333.2	1	2	2
333.3	1	2	2
333.4	1	2	2
333.5	1	2	2
333.6	1	2	2

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ME 335 PRODUCTION ENGINEERING LAB	
335.1	Get ideas about different types of welding.
335.2	Know about different operations done on lathe.
335.3	Understand ideas about drilling.
335.4	Students will be able to perform welding.
335.5	students will be able to perform machining operations in lathe.
335.6	students will be able to perform operations in drilling machine

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
335.1	2	3		2				1	3	1	1	1
335.2	2	3		2				1	3	1	1	1
335.3	2	3		2				1	3	1	1	1
335.4	2	3		2				1	3	1	1	1
335.5	2	3		2				1	3	1	1	1
335.6	2	3		2				1	3	1	1	1

CO	PSO1	PSO2	PSO3
335.1	1	2	2
335.2	1	2	2
335.3	1	2	2
335.4	1	2	2
335.5	1	2	2
335.6	1	2	2

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ME302 HEAT AND MASS TRANSFER	
302.1	Understand both the physics and the mathematical treatment of the topics pertaining to the modes of heat transfer.
302.2	Apply principles of heat transfer in convection.
302.3	Apply principles of heat transfer to develop mathematical models for uniform and non-uniform fins and transient heat conduction.
303.4	Analyse free and forced convection problems involving complex geometries with proper boundary conditions like heat exchangers and heat pipes.
303.5	Apply the concepts of radiation heat transfer for enclosure analysis.
303.6	Understand physical and mathematical aspects of mass transfer.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
302.1	3	1		2	1			1				1
302.2	3	2		2	1			2				1
302.3	3	1		2	2			1				1
302.4	3	1		2	2			2				1
302.5	3	1		1	1			2				1
302.6	3	1		1	1			1				1

CO	PSO1	PSO2	PSO3
302.1	2	1	1
302.2	3	1	1
302.3	1	1	1
302.4	1	2	3
302.5	2	2	2
302.6	3	1	2

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ME304 DYNAMICS OF MACHINERY	
304.1	Impart knowledge on static force analysis
304.2	Impart knowledge on dynamic force analysis
304.3	Understand the importance of balancing of rotating and reciprocating machines
304.4	Develop a knowledge about gyroscope and energy fluctuation in machines
304.5	Introduce the fundamentals in vibrations
304.6	Understand the physical significance and design of vibration systems with desired conditions

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
304.1	3	3	2									1
304.2	3	3	2									1
304.3	3	3	2									2
304.4	3	3	1									2
304.5	3	3	1									1
304.6	3	3	1									1

CO	PSO1	PSO2	PSO3
304.1	3	2	2
304.2	3	2	2
304.3	3	2	2
304.4	3	2	2
304.5	3	2	2
304.6	3	2	2

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ME314 MACHINE DESIGN - II	
314.1	To introduce the design considerations needed for different types of machine components
314.2	To get knowledge about Shaft design
314.3	To understand the design concept of clutches, brakes
314.4	To design different types of bearings
314.5	Able to design different types of gear
314.6	To impart the design knowledge of IC engine parts design

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
314.1	3	2	1									2
314.2	3	2	1									2
314.3	3	2	1									2
314.4	3	2	1									2
314.5	3	2	1									2
314.6	3	2	1									2

CO	PSO1	PSO2	PSO3
314.1	3	2	2
314.2	3	2	2
314.3	3	2	2
314.4	3	2	2
314.5	3	2	2
314.6	3	2	2

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AU302 AUTOMOTIVE ELECTRICALS AND ELECTRONICS	
302.1	To impart knowledge on the principles of operation and constructional details of various Automotive Electrical and Electronic Systems like batteries.
302.2	To impart knowledge on the principles of operation and constructional details of the Starting System.
302.3	To understand the knowledge on the principles of operation and constructional details of the Charging System.
302.4	To impart knowledge on the principles of operation and constructional details of Ignition System.
302.5	To impart knowledge on the sensors and applications in automobiles.
302.6	To familiarize the students with the concept of electronic fuel injection system.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
302.1	2	1										1
302.2	2	2										1
302.3	3	1										1
302.4	3	1										1
302.5	3	1										1
302.6	3	1	1									1

CO	PSO1	PSO2	PSO3
302.1	2		2
302.2	2		2
302.3	2		1
302.4	2		2
302.5	2		2
302.6	2		2

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HS300 PRINCIPLES OF MANAGEMENT	
300.1	To develop ability to critically analyse and evaluate a variety of management practices in the contemporary context
300.2	To understand and apply a variety of management and organizational theories in practice;
300.3	To be able to mirror existing practices or to generate their own innovative management competencies, required for today's complex and global workplace;
300.4	To be able to critically reflect on ethical theories and social responsibility ideologies to create sustainable organizations
300.5	plan and make decisions for organizations
300.6	do staffing and related HRD functions

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
300.1						3					3	
300.2						2		3	3		3	3
300.3									2		3	3
300.4						3		3	2			2
300.5						2					3	3
300.6									3		3	

CO	PSO1	PSO2	PSO3
300.1	3	2	
300.2	2	2	
300.3	2	2	
300.4	2	2	
300.5	3	2	
300.6	2	2	

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AU364 VEHICLE PERFORMANCE & TESTING	
364.1	To provide knowledge about various Vehicle Performance Characteristics.
364.2	To impart knowledge about Laboratory testing and Dynamometers.
364.3	To provide knowledge about Wheel balancing & Wheel alignment.
364.4	To know about the importance of NVH.
364.5	To get knowledge about road and track testing.
364.6	To understand about chassis dynamometers.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
364.1	3	1		1								1
364.2	3	1		1								2
364.3	3	1		1								2
364.4	3	1	1	1								2
364.5	3	1	1	1								2
364.6	3	1		1								1

CO	PSO1	PSO2	PSO3
364.1	2	1	2
364.2	2	1	2
364.3	2	1	2
364.4	2	1	2
364.5	3	1	2
364.6	2	1	2

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ME332 COMPUTER AIDED DESIGN & ANALYSIS LAB	
332.1	Gain working knowledge on Computer Aided Design methods and procedures
332.2	Obtain the knowledge in solid modeling software
332.3	Obtain knowledge in finite element analysis software
332.4	Design 3d engineering components using standard solid modeling software.
332.5	Create the assembled view of different components like riveted joints, Cotter joints
332.6	Simulate the solutions of structural, thermal and fluid flow problems using a standard analysis software

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
332.1	3	2			1							2
332.2	3	2			1							2
332.3	3	2			1							2
332.4	3	2			1							2
332.5	3	2			1							2
332.6	3	2			1							2

CO	PSO1	PSO2	PSO3
332.1	3		2
332.2	3		2
332.3	3		2
332.4	3		2
332.5	3		2
332.6	3		2

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AU332 AUTO ELECTRICAL & ELECTRONICS LAB	
332.1	Familiarize the students with the electrical system used in Automobiles.
332.2	Familiarize the students with testing of batteries.
332.3	Familiarize the students with testing the charging system.
332.4	Familiarize about the starting system.
332.5	Familiarize about the ignition system.
332.6	Impart knowledge about design and working model of lighting circuit.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
332.1	2	1	1								2	2
332.2	2	1	1								2	2
332.3	2	1	1								2	2
332.4	2	1	1								2	2
332.5	2	1	1				1				2	2
332.6	2	1	1								2	2

CO	PSO1	PSO2	PSO3
332.1	2	1	2
332.2	2	1	2
332.3	2	1	2
332.4	2	1	2
332.5	2	1	2
332.6	2	1	2

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AU352 COMPREHENSIVE EXAM	
352.1	To assess the comprehensive knowledge gained in basic courses relevant to the branch of study
352.2	To comprehend the questions asked and answer them with confidence.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
352.1	2	2					2					2
352.2	2	2					2					2

CO	PSO1	PSO2	PSO3
352.1	2		2
352.2	2		2

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AU401 AUTOMOTIVE SYSTEM DESIGN	
401.1	To get knowledge about the design parameters and basic definitions.
401.2	To impart the design parameters of a multi cylinder engine.
401.3	To impart the design of valve gear.
401.4	To get the knowledge about the design of engine structure and lubricating system.
401.5	Able to design the cooling system components.
401.6	Able to design speed gearboxes.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
401.1	3	2										1
401.2	3	2										1
401.3	3	2										1
401.4	3	2										1
401.5	3	2										1
401.6	3	2										1

CO	PSO1	PSO2	PSO3
401.1	2		2
401.2	2		2
401.3	2		2
401.4	2		2
401.5	2		2
401.6	2		2

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AU403 VEHICLE DYNAMICS	
403.1	To familiarize the students with vibrating systems.
403.2	To understand the characteristics of the tires.
403.3	To understand the characteristics of suspension systems.
403.4	To know about the stability and handling characteristics of vehicles at different track
403.5	To familiarize the students with directional stability of the vehicle.
403.6	To understand the aerodynamic forces and air flow around the vehicle.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
403.1	3	2										1
403.2	2	2										1
403.3	2	2										1
403.4	2	2										1
403.5	2	2										1
403.6	2	2										1

CO	PSO1	PSO2	PSO3
403.1	2		1
403.2	2		1
403.3	2		1
403.4	2		1
403.5	2		1
403.6	2		1

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AU405 AUTOMOTIVE REFRIGERATION & AIR CONDITIONING	
405.1	Impart knowledge about refrigeration.
405.2	Know about air conditioning systems.
405.3	Understand the components of different air conditioning systems.
405.4	Understand the control and service of different air conditioning systems.
405.5	Understand the procedure for refrigeration.
405.6	Students will be able to do refrigeration and air conditioning load calculation.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
405.1	3	2										1
405.2	2	2										1
405.3	2	2										1
405.4	2	2										1
405.5	2	2										1
405.6	2	2										1

CO	PSO1	PSO2	PSO3
405.1	2		2
405.2	2		2
405.3	2		2
405.4	2		2
405.5	2		2
405.6	2		2

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AU407 ADVANCED IC ENGINES	
407.1	To impart the basic concepts of non-conventional IC engines.
407.2	To know the new concepts of automotive engine combustion technology
407.3	To understand concept of the Lean burn engines
407.4	To get the knowledge about the Gas turbine plants
407.5	To discuss about the future engine technologies
407.6	To impart the knowledge about HCCI and CAI engines.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
407.1	3	2										1
407.2	2	2										1
407.3	2	2										1
407.4	2	2										1
407.5	2	2										1
407.6	2	2										1

CO	PSO1	PSO2	PSO3
407.1	2		2
407.2	2		2
407.3	2		2
407.4	2		2
407.5	2		2
407.6	2		2

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AU409 SIMULATION AND ANALYSIS OF IC ENGINE PROCESSES	
409.1	To provide an outline of the simulation methods and basics of combustion calculations.
409.2	To provide the basic concept of Simulation of SI Engine Combustion.
409.3	To provide the basic concept of Simulation of CI Engine Combustion.
409.4	To get the knowledge about the gas exchange process.
409.5	To discuss the Two stroke engine scavenging parameters and two stroke engine simulation.
409.6	To impart the knowledge about Heat Transfer and Friction in Engines.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
409.1	3	2	1	2	1							1
409.2	3	2	1	2	2							1
409.3	3	2	1	2	2							1
409.4	3	2	1	1	1							1
409.5		2	1	2	1							1
409.6	2	2	1	1								1

CO	PSO1	PSO2	PSO3
409.1	3	2	1
409.2	3	2	1
409.3	3	2	1
409.4	3	2	1
409.5	3	1	
409.6	3	2	

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AU410 VEHICLE TRANSPORT & FLEET MANAGEMENT	
410.1	To give the basic idea on the Mass transport system.
410.2	To understand the features of Bus depot organisation structure, and Economics of Road Transport
410.3	To understand the characteristics of Route planning and Scheduling of the transportation system.
410.4	To know about the Vehicle maintenance, supply management and budget
410.5	To familiarize the students with Fleet Management, Data Processing And Fare Structure.
410.6	To understand about Motor vehicle act.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
410.1	2	2	1									1
410.2	2	2	2									1
410.3	2	2	1									1
410.4	2	2	1	1								1
410.5	2	1	1	2								1
410.6	2	1	2									1

CO	PSO1	PSO2	PSO3
410.1	2		1
410.2	2		2
410.3	2		2
410.4	2		2
410.5	2		2
410.6	2		

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AU451 SEMINAR & PROJECT PRELIMINARY	
451.1	Identify the datas that is already done related to the topics.
451.2	Find new ideas at the engineering level.
451.3	Develop skills in doing literature survey and technical presentation.
451.4	Develop skills in report preparation.
451.5	Analyse a current topic of professional interest and present it before an audience.
451.6	Identify an engineering problem, analyse it and propose a work plan to solve it.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
451.1	2	2	2	2		1	1	2	2	2	2	2
451.2	2	2	2	2		1	1	2	2	2	2	2
451.3	2	2	2	2		1	1	2	2	2	2	2
451.4	2	2	2	2		1	1	2	2	2	2	2
451.5	2	2	2	2		1	1	2	2	2	2	2
451.6	2	2	2	2		1	1	2	2	2	2	2

CO	PSO1	PSO2	PSO3
451.1	2	3	2
451.2	2	3	2
451.3	2	3	2
451.4	2	3	2
451.5	2	3	2
451.6	2	3	2

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AU431 AUTOTRONICS LAB	
431.1	Familiarize the students with the various sensors used in Automobiles
431.2	Familiarize the students with testing of electronic components
431.3	Familiarize the students with testing of electric circuits used in automobiles
431.4	Familiarize about digital electronics
431.5	Impart knowledge in designing electronic circuits in automotive systems.
431.6	Impart knowledge about microcontroller and microprocessor

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
431.1	3	2										1
431.2	2	2										1
431.3	2	2										1
431.4	2	2										1
431.5	2	2										1
431.6	2	2										1

CO	PSO1	PSO2	PSO3
431.1	2		2
431.2	2		2
431.3	2		2
431.4	2		2
431.5	2		2
431.6	2		2

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AU402 TWO AND THREE WHEELERS	
402.1	To understand the constructional details operating characteristics power plants used in two and three wheelers.
402.2	To know about fuel and ignition systems.
402.3	To understand the transmission system used in two and three wheelers.
402.4	To know about Chassis and subsystems - Main frame for two and three wheelers. And Front and rear suspension systems.
402.5	To get knowledge about the brakes and wheels used in two and three wheelers.
402.6	To impart the knowledge about two and three wheelers recent developments and maintenance.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
402.1	2	1										1
402.2	2	1										1
402.3	2	1										1
402.4	2	1										1
402.5	2	1										1
402.6	2	1										1

CO	PSO1	PSO2	PSO3
402.1	2		
402.2	2		
402.3	2		
402.4	2		
402.5	2		
402.6	2		

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AU404 ENGINE & VEHICLE MANAGEMENT SYSTEMS	
404.1	To understand the principles of various electronic systems in engine and vehicle management systems.
404.2	To know about Electronic engine control
404.3	To understand the Electronic fuel control
404.4	To know about parameters affecting Fuel injection system
404.5	To get knowledge about the Electronic control transmission
404.6	To impart the knowledge about Cruise control system & Anti-lock braking system

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
404.1	3	2										1
404.2	2	2										1
404.3	2	2										1
404.4	2	2										1
404.5	2	2										1
404.6	2	2										1

CO	PSO1	PSO2	PSO3
404.1	2		
404.2	2		
404.3	2		
404.4	2		
404.5	2		
404.6	2		

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AU466 AUTOMOBILE MANUFACTURING TECHNOLOGY	
466.1	To know about Material selection and Manufacturing methods for Casted Engine Components.
466.2	To know about Material selection and Manufacturing methods for Forged Engine Components.
466.3	To understand the Material selection and Manufacturing methods for transmission system of automobiles.
466.4	To understand about Methods of gear manufacture.
466.5	To get knowledge about Material selection and Manufacturing methods for vehicle chassis.
466.6	To impart the knowledge about Recent Developments of an automobiles.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
466.1	2	1										1
466.2	2	1										1
466.3	2	1										1
466.4	2	1										1
466.5	2	1										1
466.6	2	1										1

CO	PSO1	PSO2	PSO3
466.1	2		
466.2	2		
466.3	2		
466.4	2		
466.5	2		
466.6	2		

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AU486 NOISE, VIBRATION AND HARSHNESS	
486.1	Understand the basics of noise, vibration, sources of vibration and noise in automobiles.
486.2	Study the effect of noise and vibration on human beings and nature.
486.3	Understand the engine related noises.
486.4	Understand the prediction and control techniques of noise, vibration pertain to an automobile.
486.5	Understand the measurement techniques of noise, vibration pertain to an automobile.
486.6	Know about reduction of noise and vibration from an automobile.

CO's MAPPING WITH PO's AND PSO's MAPPING

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
486.1	3	2										1
486.2	2	3										1
486.3	2	2										1
486.4	3	2										1
486.5	2	3										1
486.6	2	2										1

CO	PSO1	PSO2	PSO3
486.1	2		1
486.2	2		1
486.3	2		1
486.4	2		1
486.5	2		1
486.6	2		1

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EE494 Instrumentation Systems

Semester:**VIII**	Programe:**B.TECH**	Max.Mark:**40**	Date:
Course Code & Name:**EE494 Instrumentation Systems**		Duration:**90 MINS**	SET : **ONE**
Knowledge Level (KL)	K1 : Remembering	K3:Applying	K5: Evaluating
Course Outcome Level(COL)	K2: Understanding	K4: Analysing	K6: Creating

Part A — **4 x5 = 20 Marks**
Answer all questions

Sl.No	Questions	KL/COL
1	Summarize the various pressure measuring devices.	K2/CO3
2	Examine the importance of manometers in measurement systems.	K4/CO3
3	Compare between vacuum, low, medium and high pressure measurements.	K4/CO4
4	Summarize the various sound measuring devices.	K2/CO4

Part B — **2 x 10 = 20 Marks**
Answer any TWO questions

Sl.No	Questions	KL/COL
5	Design an instrumentation system using dead weight gages.	K6/CO3
	(OR)	
6	Design an instrumentation system to measure sound.	K6/CO3
7	Design an instrumentation system to measure pressure using resistive and inductive transducer.	K6/CO4
	(OR)	
8	Construct an instrumentation system for the measurement of flow using Turbine Meters.	K6/CO4

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Question paper quality assessment using Blooms taxonomy

RUBRICS

Blooms taxonomy Definitions	Scale
Remembering	1
Understanding	2
Applying	3
Analyzing	4
Evaluating	5
Creating	6

Questions to Blooms taxonomy mapping

Question Number	Marks	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	5		√				
2	5				√		
3	5				√		
4	5		√				
5	10						√
6	10						√
7	10						√
8	10						√

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EVALUATION OF QUALITY OF QUESTION PAPER USING BLOOMS TAXONOMY

Blooms taxonomy definitions	Scale	Marks	Rating(out of 6)
Remembering	1		5
Understanding	2	10	
Applying	3		
Analyzing	4	10	
Evaluating	5		
Creating	6	40	

CO MAPPING WITH QUESTIONS

COs	T1	T2	T3	A1	A2
C494.1					
C494.2					
C494.3		Q(1), Q(2),Q(5), Q(6)			
C494.4		Q(3), Q(4), Q(7)			
C494.5					
C494.6					

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SERIES TEST - 2 (2018-19)

EE494 Instrumentation Systems

Semester:**VIII**	Programe:**B.TECH**	Max.Mark:**40**	Date:
Course Code & Name:**EE494 Instrumentation Systems**		Duration:**90 MINS**	SET : **TWO**
Knowledge Level (KL)	K1 : Remembering	K3:Applying	K5: Evaluating
Course Outcome Level(COL)	K2: Understanding	K4: Analysing	K6: Creating

Part A **4 x 5 = 20 Marks**
Answer all questions

Sl.No	Questions	KL/COL
1	Examine the standards used for pressure measurements.	K5/CO3
2	Categorize the dynamometers based on the type of absorption units.	K4/CO3
3	Define Gross Observed Volume and Gross Standard Volume.	K1/CO4
4	Summarize the various flow measuring devices.	K2/CO4

Part B **2 x 10 = 20 Marks**
Answer any TWO questions

Sl.No	Questions	KL/COL
5	Design an instrumentation system to measure pressure using photoelectric and piezoelectric transducer.	K6/CO3
	(OR)	
6	Build a system to measure torque using strain gauge.	K6/CO3
7	Design an instrumentation system to measure sound using Microphones.	K6/CO4
	(OR)	
8	Construct an instrumentation system for the measurement of flow using Hot Wire Anemometers.	K6/CO4

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Question paper quality assessment using Blooms taxonomy

RUBRICS

Blooms taxonomy Definitions	Scale
Remembering	1
Understanding	2
Applying	3
Analyzing	4
Evaluating	5
Creating	6

Questions to Blooms taxonomy mapping

Question Number	Marks	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	5					√	
2	5				√		
3	5	√					
4	5		√				
5	10						√
6	10						√
7	10						√
8	10						√

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EVALUATION OF QUALITY OF QUESTION PAPER USING BLOOMS TAXONOMY

Blooms taxonomy definitions	Scale	Marks	Rating(out of 6)
Remembering	1	5	5
Understanding	2	5	
Applying	3		
Analyzing	4	5	
Evaluating	5	5	
Creating	6	40	

CO MAPPING WITH QUESTIONS

COs	T1	T2	T3	A1	A2
C494.1					
C494.2					
C494.3		Q(1), Q(2),Q(5), Q(6)			
C494.4		Q(3), Q(4), Q(7),Q(8)			
C494.5					
C494.6					

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SERIES TEST - 2 (2018-19)

Since 1968

EE494 Instrumentation Systems

Semester: **VIII**	Programe: **B.TECH**	Max.Mark: **40**	Date:
Course Code & Name: **EE494 Instrumentation Systems**		Duration: **90 MINS**	SET : **THREE**
Knowledge Level (KL)	K1 : Remembering	K3: Applying	K5: Evaluating
Course Outcome Level(COL)	K2: Understanding	K4: Analysing	K6: Creating

Part A **4 x 5 = 20 Marks**
Answer all questions

Sl.No	Questions	KL/COL
1	Judge the importance of capacitive transducers for measuring pressure.	K5/CO3
2	Build a system to measure sound using optical fibre transducer.	K6/CO3
3	Define Net Observed Volume and Net Standard Volume.	K1/CO4
4	Design a bridge circuit using thermistors for the measurement of flow.	K6/CO4

Part B **2 x 10 = 20 Marks**
Answer any TWO questions

Sl.No	Questions	KL/COL
5	Build a system to measure torque and rotational speed using dynamometer.	K6/CO3
	(OR)	
6	Design an instrumentation system using dead weight gages.	K6/CO3
7	Design an instrumentation system to measure vacuum pressure.	K6/CO4
	(OR)	
8	Design an instrumentation system to measure low pressure.	K6/CO4

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Question paper quality assessment using Blooms taxonomy

RUBRICS

Blooms taxonomy Definitions	Scale
Remembering	1
Understanding	2
Applying	3
Analyzing	4
Evaluating	5
Creating	6

Questions to Blooms taxonomy mapping

Question Number	Marks	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
1	5					√	
2	5						√
3	5	√					
4	5						√
5	10						√
6	10						√
7	10						√
8	10						√

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Blooms taxonomy definitions	Scale	Marks	Rating(out of 6)
Remembering	1	5	5.5
Understanding	2		
Applying	3		
Analyzing	4		
Evaluating	5	5	
Creating	6	50	

CO MAPPING WITH QUESTIONS

COs	T1	T2	T3	A1	A2
C494.1					
C494.2					
C494.3		Q(1), Q(2), Q(5),Q(6)			
C494.4		Q(3), Q(4), Q(7), Q(8)			
C494.5					
C494.6					

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SERIES TEST - II (2018-19)

Semester: IV	Programme : **B.TECH**	Max.Mark:**40**	Date:
Course Code & Name: **ME 220 MANUFACTURING TECHNOLOGY**		Duration:**90 MINS**	SET : TWO
Knowledge Level (KL)	K1 : Remembering	K3:Applying	K5: Evaluating
Course Outcome Level(COL)	K2: Understanding	K4: Analysing	K6: Creating

PART B (Answer Any Four Questions)

1	(a) Differentiate between Hot and Cold extrusion. (6M) (b) List forging defects? Write short note on any two forging defects. (4M)	K4,K2/CO3
2	(a) With the aid of a sketch list the terminology for a forging die. (4M) (b) With the help of neat sketches, explain the differences between open die forging and closed die forging.(6M)	K3,K4/CO3
3	Write shot note on the following forging methods: upsetting, fullering and edging. (3+3+4M)	K2/CO3

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4	(a) Define the principles of clamping. Explain the various types of clamp used. (6M) (b) Explain 3-2-1 principle using a suitable example. (4M)	K3,K2/CO4
5	(a) Write short note on the following location methods: Location from circular surfaces, concentric locating. (6M) (b) Define degree of freedom with a neat sketch. What are the advantages of locating a work piece? (4M)	K2,K4/CO4
6	Describe with neat sketches the working principle of (a) Vacuum clamp. (5M) (b) Magnetic clamp. (5M)	K4/CO4

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MODEL EXAMINATION
MT09705 (B) : COMPUTER INTEGRATED MANUFACTURING

Year / Semester & Branch : IV / S7
Faculty Name: RANJITH P N
Time : Three hours

B.Tech. MECHATRONICS
Exam Date: 21.10.2016
Max. Marks: 70 Marks

PART-A
*Answer **ALL** Questions (5 x 2 = 10 Marks)*

1. List out the advantages of NC
2. Explain clasiification of NC system
3. List out various types of commands used in APT language
4. Write notes on Programming languages
5. Features of Opitz classification

PART- B
*Answer any **FOUR** Questions (4 x 5 = 20 Marks)*

6. Describe briefly the closed loop system.
7. Distinguish between Point to point and countouring systems
8. Explain the working of post processor technology
9. Describe the advantages of Group Technology
10. What are the benefits of FMS ?
11. Write a note on end effectors of robots.

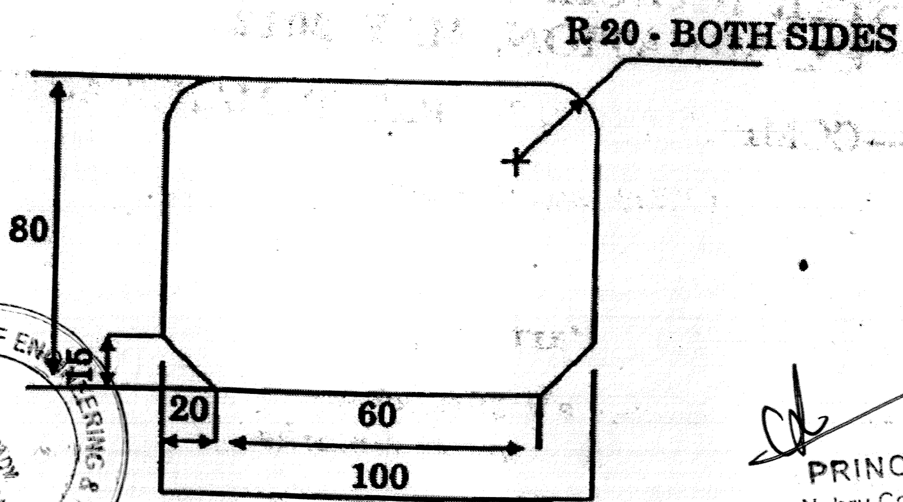
PART- C
*Answer **ALL** Questions (4 x 10 = 40 Marks)*

12. Describe briefly about features of Incremental and Absolute systems.

OR

13. Discuss the features of NC machine tools

14. Write a part programme in APT for the part shown in figure below :



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OR

15. Explain the steps involved in manual part programming.

16. Discuss briefly the functions of computer control in CIM

OR

17. Discuss in detail about multiclass coding system in Group Technology .

18. Explain components of FMS

OR

19. Briefly describe the control systems used in robots.

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SRIES TEST - 1 (2018-19)

Semester:S7	Programe:B.TECH	Max.Mark:40	Date:
Course Code & Name:EE405 & Electrical System Design		Duration: 90Minutes	SET : One
Knowledge Level (KL)	K1 : Remembering	K3:Applying	K5:Creating
Course Outcome (COL)	K2: Understanding	K4: Analysing	K6:Evaluation

Part – A, Answer ALL Questions. 4x5 = 20 Marks

S.No	Questions	KL/COL
1	Briefly explain the role of NEC in the design of installation.	K1/CO1
2	Mention the classification of voltages with their ranges.	K1/CO1
3	Describe safety equipments to be provided in domestic installation.	K2/CO2
4	Write the function of MCB, ELCB and MCCB.	K2/CO2

Part – B, Answer Any Two Questions. 2 x 10= 20 Marks

5	. i. Discuss the relevant IE rules pertaining to the following. (a) Declared voltage and frequency of supply to consumer(3M) (b) Clearance between the nearest conductor and any part of the building for voltage up to and including 11 kV.(4M) (c) Minimum clearance above ground for a low voltage line crossing a street. (3M)	K3/CO1
6	Explain the design aspects of electrical installations in domestic buildings. (10 M)	K4/CO2
7	b) Briefly explain the electrical services in buildings.(6M) c) Explain the IS standards IS 2675.(4M)	K2/CO1 K1/CO1

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SERIES TEST – II

EC100 BASICS OF ELECTRONICS ENGINEERING

Year / Semester & Branch : I / S1 B.Tech MTR,CSE(A&B)
Faculty Name:

Time : 60 Min **Exam Date: /10/16**
Max. Marks: 40

PART-A

Answer ALL Questions (5 Marks)

1. State the key advantages of Negative feedback.
2. Define bandwidth of an amplifier.
3. What is meant by CMMR?

PART- B

*Answer any **THREE** Questions (3 x 5 = 15 Marks)*

4. Give the Block diagram description of a DC power supply.
5. With a neat circuit diagram explain the working of RC phase shift oscillator.
6. List of the parameters of ideal op-amp . Draw any two Op-amp circuits.
7. What is a public address system? Explain using a neat block diagram.

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SERIES TEST – I

EE09 802: POWER SYSTEM PROTECTION AND ITS UTILIZATION

Year / Semester & Branch: IV / S8 B.Tech. Electrical & Electronics Engineering
Faculty Name: Rajesh P
Time: 90 Min
Exam Date: 04.03.2016
Max. Marks: 45

PART-A

*Answer **ALL** Questions (5 x 2 = 10 Marks)*

1. Define the term plug setting multiplier with respect to protective relaying.
2. Explain primary protection and back up protection.
3. Discuss the properties of SF_6 gas.
4. Explain the consequences of faults in a power system.
5. What are the essential qualities to be met by a protection scheme? Explain.

PART- B

*Answer any **THREE** Questions (3 x 5 = 15 Marks)*

6. Explain any one protection scheme of parallel lines.
7. Explain the following terms:(a) Restriking voltage, (b) Recovery voltage, (c) RRRV
8. A three phase circuit breaker is rated at 1250A, 2000MVA, 33Kv, 4 seconds. Find the rated symmetrical breaking current, making current and short time rating.
9. Explain the characteristics of an IDMT relay. Mention its applications.

PART- C

*Answer **ALL** Questions (2 x 10 = 20 Marks)*

10. Explain the construction and operation of Buchholz relay for the protection of transformers.

OR

11. What are the difficulties encountered in providing a differential protection to a power transformer? How are they overcome?

12. With the help of neat sketch, explain the construction, principle of operation and working of air blast circuit breaker with its merits and demerits.

OR

13. In a short circuit test on a circuit breaker the following readings were obtained on single frequency constraint. (i) Time to reach the peak restriking voltage, 50microseconds. (ii) The peak restriking voltage, 100kV.

Determine the average RRRV and frequency of oscillations.

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SERIES TEST – I

AM 09 802: VEHICLE MAINTENANCE AND TESTING

Year/Semester:IV / S8- B.Tech Automobile Engineering
Faculty Name: Mr. Rejumon R
Time: 90 Min

Exam Date:14.03.2017
Max. Marks: 45

PART-A

Answer ALL Questions (5 x 2 = 10Marks)

1. What is the main objective of maintenance?
2. Describe the term "top and major overhaul"
3. List out the benefits of preventive maintenance of vehicles.
4. Define the term clutch slip.
5. Classify the specific tools used for the overhauling of engine.

PART- B

Answer any THREE Questions (3 x 5 = 15 Marks)

6. Briefly explain about PDI chart?
7. Discuss the troubles involved in engine.
8. Explain the term 'de-carbonizing'.
9. What is the use of transmission system? Explain its functions in details.

PART- C

Answer ALL Questions (2 x 10 = 20 Marks)

10. Explain about the complete overhauling of engine.

OR

11. Explain typical maintenance of two wheeler and LMV.

12. Give a detailed procedure for hydraulic brake adjustment.

OR

13. Explain the layout for service station with the help of suitable diagram

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SERIES TEST – I

AM14 305: ENGINEERING THERMODYNAMICS

Year / Semester & Branch :II / S3
Faculty Name: AJITH G
Time: 90 Min

B.Tech. Automobile Engineering
Exam Date: 18.04.2015
Max. Marks: 50

PART-A

Answer any ***FOUR*** *Questions (4 x 5 = 20 Marks)*

1. Define Quasi-static process.
2. What is the principle of increase of entropy?
3. What do you understand by concept of continuum?
4. Define a perpetual motion machine of second kind.
5. State and explain zeroth law of thermodynamics.
6. One kg of water at 273K is brought into contact with a heat reservoir at 373K. When the water has reached 373K, what is the entropy of
   i. The water
   ii. The heat reservoir, and
   iii. The universe.

PART-B

Answer ***ALL*** *Questions (2 x 15 = 30 Marks)*

7. A) (i) Define a new thermodynamic scale say degree N, in which the freezing point and boiling point of water are 100°N and 300°N respectively. Correlate this temperature scale with centigrade scale.

   A) (ii) Explain the causes of irreversibility.

   OR

   B) (i) Show that a violation of the Kelvin-Plank statement of the second law implies a violation of the Clausius statement

   (ii) Define macroscopic approach and microscopic approach.

8. A) (i) State and prove Clausius inequality.

   (ii) State and explain Zeroth law of thermodynamics.

   OR

   B) Describe in brief the steady flow energy equation with assumptions made. Deduce suitable expression applied to a turbine and nozzle.

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SERIES TEST – I

AM14 305: ENGINEERING THERMODYNAMICS

Year / Semester & Branch :II / S3
Faculty Name: AJITH G
Time: 90 Min

B.Tech. Automobile Engineering
Exam Date: 19.08.2015
Max. Marks: 50

PART-A

Answer any ***FOUR*** *Questions (4 x 5 = 20 Marks)*

1. One kg of water at 273K is brought into contact with a heat reservoir at 373K. When the water has reached 373K, what is the entropy of
   i. The water
   ii. The heat reservoir, and
   iii. The universe.
2. What is the principle of increase of entropy?
3. What do you understand by concept of continuum?
4. Define a perpetual motion machine of first kind.
5. State and explain second law of thermodynamics.
6. Define quasi static process.

PART-B

Answer ***ALL*** *Questions (2 x 15 = 30 Marks)*

7. A) (i) Define a new thermodynamic scale say degree N, in which the freezing point and boiling point of water are 100^0N and 300^0N respectively. Correlate this temperature scale with centigrade scale.

   A) (ii) Explain the causes of irreversibility.

   OR

   B) (i) Show that a violation of the Kelvin-Plank statement of the second law implies a violation of the Clausius statement

   (ii) Define macroscopic approach and microscopic approach.

8. A) Explain the following:
   i) Carnot theorem
   ii) Gibb's and Helmholtz functions.

   OR

   B) Describe in brief the steady flow energy equation with assumptions made. Deduce suitable expression applied to a turbine and nozzle

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SERIES TEST-I
08EE7013(C)-ENERGY EFFICIENT BUILDINGS

Year / Semester & Branch: III/S3 M.Tech Energy Systems
Faculty Name: Aruna N
Time: 60Min

Exam date: 08.09.16
Maximum: 20Marks

ANSWER ALL QUESTIONS
(2x 10=20 Marks)

MODULE-III

1\. a))With a neat sketch explain NH_3-H_2O coolers (5marks)

b) With a neat sketch explain intermittent absorption cooling (5marks)

OR

2\. a) What is ventilation. Explain in detail about function of ventilation (5marks)

b) What are the factors a designer should be followed for controlling the climatic conditions of out-door spaces in warm humid climates (5 marks)

MODULE-IV

3\. a) Explain the meters and monitor for effective energy conservation in a building. (5Marks)

b) Explain the major steps to be followed in the energy conservation of building. (5marks)

OR

4\. Explain with a neat sketch

a) What is passive heating system? Explain in detail about roof storage. (5marks)

b) With the help of neat sketch explain convective loop passive solar heating (5marks)

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SERIES TEST – I

160 copies

EC09 701: INFORMATION THEORY AND CODING

Year / Semester & Branch : IV / S7 B.Tech. Electronics and Communication Engineering
Faculty Name: S.B ERSHAD
Exam Date: 31st JULY 2014
Time : 90 Min
Max. Marks: 45

PART-A

Answer ALL Questions (5 x 2 = 10 Marks)

1. Explain the concept of information.
2. What is entropy?
3. Explain Kraft –inequality.
4. Define Primitive element.
5. Define Field.

PART- B

Answer any Three Questions (3 x 5 = 15 Marks)

6. Explain binary symmetric channel.
7. Explain Huffman coding algoritham.
8. State source conding and channel coding theorem.
9. Calculate the amount of information if binary digits occur with equal likelihood in a binary PCM system.

PART- C

Answer ALL Questions (2 x 10 = 20 Marks)

10. A source has five equally likely symbols. i) Construct a Shannon Fano code for this Source ar find the entropy. ii) Construct another Shannon Fano code and Compare the Efficiency.

OR

11. Explain the properties of Galois Field.

12. Prove that I (x,y) = H(x) + H (y) – H (x,y).

OR

13. State and prove Source coding Theorem.

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SERIES TEST – II
EC O9 504 : DIGITAL COMMUNICATION

Year / Semester & Branch : III / S5 B.Tech. ECE-B
Faculty Name: NITHIN.S.S
Time : 90 Min

Exam Date: 24/9/14
Max. Marks: 45

PART-A
Answer ALL Questions (5 x 2 = 10 Marks)

1. What is meant by pulse shaping?
2. Draw the ASK waveform.
3. Define descrambling.
4. Write short notes on AWGN channel.
5. Define optimum receiver.

PART- B
Answer any THREE Questions (3 x 5 = 15 Marks)

6. State and prove Schwarz inequality.
7. Explain eye diagram with suitable figures.
8. Explain maximum likelihood receiver.
9. With block diagram and waveform explain matched filter.

PART- C
Answer ALL Questions (2 x 10 = 20 Marks)

10. Derive the conversion of continuous AWGN channel to vector channel.

OR

11. Derive the Nyquist criterion for distortion less base binary transmission.

12. Explain scrambling and descrambling with suitable diagrams.

OR

13. Calculate the probability of error of BPSK and draw the signal space diagram.

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SERIES TEST – II

EE14 803: POWER SYSTEM PROTECTION

Year / Semester & Branch: IV / S8 B.Tech. Electrical & Electronics Engineering
Faculty Name: Rajesh P
Time: 60 Min
Exam Date: 07.03.2018
Max. Marks: 25

PART-A
Answer ALL Questions (5 x 2 = 10 Marks)

1. What are the essential qualities to be met by a protection scheme? Explain.
2. Explain the characteristics of an IDMT relay. Mention its applications.

PART- B
Answer ALL Questions (15 Marks)

3. Explain the construction and operation of directional overcurrent relay. (8 Marks)
4. Discuss the different types of PTs with their areas of applications. (7 Marks)

OR

5. Describe with a neat sketch, the percentage differential protection scheme. (9 Marks)
6. What are the important operating principles which are used in wire pilot schemes? Explain any one. (7 Marks)

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Reg No: ______________ Name: ______________

NEHRU SCHOOL OF MANAGEMENT @ NCERC
NILA GARDENS, PAMPADY
T5 MBA FIRST SERIES EXAMINATION
JAN 2020

Subject code:51 **Subject Name:ENTREPRENEURSHIP**

Time: One and half Hours **Max Marks: 30**

PART - A.Answer all the five questions (5*1=5marks)

1. Define entrepreneur.
2. Distinguish between entrepreneur and intrapreneur.
3. List the different forms of business.
4. State the difference between entrepreneur and manager.
5. What are the characteristics of Entrepreneurship?

PART - B.Answer any three questions (3*5=15marks)

6. Give a description on entrepreneurial traits.
7. Sate the opportunities for entrepreneurship in aboard.
8. What do you understand by the term entrepreneur? State the functions of entrepreneurs.
9. What are the different types of entrepreneurship?
10. Discuss the different challenges of women entrepreneurs.

PART C. Compulsury1 Question carries 10 Marks

11. Discuss the role of entrepreneurship in economic development.

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Name: ______________

NEHRU SCHOOL OF MANAGEMENT @ NCERC
NILA GARDENS, PAMPADY
T1MBA SECONDN SERIES EXAMINATION
OCTOBER 2019

SUBJECT CODE: MBA12 SUBJECT NAME: ORGANIZATIONAL BEHAVIOUR 1

Time: One and half Hours

Max Marks: 30

PART AAnswer all the five questions (5*1=5marks)

1. Define Emotion.
2. What are the components of attitudes?
3. List the steps in motivation process.
4. Write a note on job satisfaction.
5. Discuss the importance of perception.

PART BAnswer any three questions (3*5=15marks)

6. Discuss the structure of personality.
7. Highlight the effects of employee attitudes.
8. Describe the elements of motivation.
9. Discuss the individual differences influencing work behavior.
10. Elaborate the personality traits theories.

PART CCompulsory Question (1*10=10 marks)

11. Suppose you have an employee whose lack of commitment is affecting others in the work group. How would you go about persuading the person to change attitude?

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NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE

DEPARTMENT OF MCA

PROBLEM SOLVING AND COMPUTER PROGRAMMING

FIRST SERIES EXAMINATION (SEMESTER 1) SEPTEMBER 2018

Time:1hr **Total Marks :15**

PART A (Answer ALL Questions, Each Carries 3 Marks)

1. **Describe the important characteristics of C programming and it's structure.**
2. **Write an algorithm and flow chart to find the largest of 3 numbers.**
3. **List the basic data types used in C with example.**

PART B (Answer ANY ONE Questions, 6 marks)

4. **Explain different types of operators available in C.**
5. **What are the input/output functions used in C programming, explain with example.**

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NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE

DEPARTMENT OF MCA

FIRST SERIES EXAMINATION (THIRD SEMESTER) SEPTEMBER 2018

COMPUTER NETWORKS

Time:1hr **Total Marks :15**

PART A(Answer All Questions, Each Carries 3 Marks Each)

1. **What do you mean by a network? Differentiate it from internet.**
2. **Differentiate between protocols and standards with examples.**
3. **What are the two techniques implemented for the quality of services in networks?**

PART B(Answer Any One Question & Carries 6 Marks)

1. **Detail about ISO OSI model with diagram.**
2. **Define a) HTTP**
   b) WEB
   c) SMTP

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NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE

DEPARTMENT OF MCA

PRINCIPLES OF MANAGEMENT

FIRST SERIES EXAMINATION (SEMESTER 1) SEPTEMBER 2018

Time:1hr **Total Marks :15**

PART A (Answer ALL Questions, Each Carries 3 Marks)

6. ***Quote*** **any two accepted Definitions of Management**
7. ***Comment on*** **Contingency Approach**
8. ***Write short note on*** **Decision Making**

PART B (Answer ANY ONE Questions, 6 marks)

9. ***Explain*** **Six Management Functions**
10. ***Comment on*****Fayol's 14 Principles of Management**

Faculty in charge: **HOD:**

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NEHRU COLLEGE OF ENGINEERING & RESEARCH CENTRE

SERIES 1

RLMCA 103 DISCRETE MATHEMATICS

TIME : 60 min **Max Marks : 15**

PART A

Answer all questions (3 marks each)

1 . Define a Partial order relation with an example.

2 .If A, B & C are sets , prove that $A-(B\cap C)=(A-B)\cup(A-C)$.

3 . The relation R on the set A = { 1,2,3,4,5} is defined by the rule $(a,b)\in R$ if 3 divides a-b

(i) List the elements of R&R^{-1} . (ii) List the elements of $\bar{R}$.

PART B

Answer any one question (6 marks each)

4 . If R is the relation on A = {1,2,3} such that $(a,b)\in R\ if\ and\ only\ if\ \ a+b=even,$

find$M_R, M_{R^{-1}}, M_{\bar{R}}$& M_{R^2} .

5 . Find the Reflexive , Symmetric & Transitive closures of the relation on {a,b,c,d,e}

R = { (a,c) , (b,d) , (c,a) , (d,b) , (e,d) } .

V.G.Nair

Faculty in charge: **HOD:**

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DEPARTMENT OF MCA

FIRST SERIES EXAMINATION (THIRD SEMESTER) SEPTEMBER 2019

SOFTWARE ENGINEERING

Time:1hr **Total Marks :15**

PART A(Answer All Questions, Each Carries 3 Marks Each)

4. **What is the importance of Software Engineering?**
5. **Write a short note on software testing.**
6. **Explain the software scope.**

PART B(6 marks)

3. **Explain SDLC.**

Faculty in charge: **HOD:**

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Composition of IQAC for the academic year 2018 – 19

S.No	Name	Designation	IQAC designation
1	**Dr.T.Ambikadevi Amma,** Principal, NCERC	Principal, NCERC	Chairperson
2	**Dr.S.Muthukrishnan,** Prof & Head / EEE	HoD, Department of Electrical and Electronics Engineering	Coordinator – IQAC
3	**Dr.P.Krishnadas**	Chairman & Managing Trustee -NGI	Member
3	**Dr.P.Krishnakumar**	CEO & Secretary	Member
	Ms. Bindu Krishnakumar	Asst.Manager - HR	Member
4	Mr.R.Ambikadas	Academic Superintendent, NCERC	Member
5	Mr.Vimal M N	Asst Professor , AUE	Member
6	Ms.Anu Rinny Sunny	Asst Professor , CSE	Member
7	Mr.Vishnu Prabha N Kaimal	Asst Professor , ECE	Member
8	Mr.David E	Asst Professor , EEE	Member
9	Mr.Rahul	Asst Professor , ME	Member
10	Mr.Nikil	Asst Professor , MT	Member
11	Mr.Alex	Asst Professor , MBA	Member
12	Dr.Sudheer Marar	HoD, MCA	Member
13	Mr.Ragesh P R and Ms.Sreekala R	Mechanical and CSE	Nominee - Alumni
14	Mr.Bibin Antony	HR Manager, Accenta Education	Nominee - Employer
15	Mr.P R Krishnakumar	Head, Aryavaidya Pharmacy, CBE	Nominee – Industrialist
16	Mr. Ravi	Parent	Nominee - Stakeholder

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Internal Quality Assurance Cell (IQAC)

Minutes of meeting held on 5th March 2019

Agenda:

1. IPR cell activity.
2. III cell activity
3. Preparation for AQAR 2018-19 submission.
4. Initiating Green measures.

Members present: 16

The following points were discussed in the meeting:

1. Principal welcomed all the members of IQAC. Members confirmed the minutes of last IQAC meeting held.
2. The IPR cell coordinator briefly explained about IPR cell activities of current semester. He narrated that, along with teaching and extension activities, an educational institution needs to encourage creativity, research and provide conductive environment through.
3. The number of students placed through campus drive in the academic year 2018-19 was presented by the Placement officer. Placement willing students bagged many offers in Top MNCs with good salary packages. Training and placement cell's efforts are appreciated by the members. Industry interactions can help further improvements in future.
4. The III cell coordinator presented the achievements for the academic year 2018-19 including Information and Communication Technologies (ICT) learning, Industry – Institute Interactions, Faculty Development Programs(FDP), Research activities, and Academic Audit.

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5. Principal suggested that the MoU activities have to be initiated in all departments.
6. The expert suggested that the students who have undergone internships will have a better chance at placement. Placement cell can interact with the industries and help students to bag internships. Coding skills have to be improved by value added courses with Industry experts or Alumni resource persons.
7. Members suggested to organize project expo and poster exhibition in due course.
8. All the 7 Criteria Data templates of NAAC AQAR have been explained to all the Heads and members were asked to be prepared for the yearly report well in advance.
9. Members have taken responsibilities for all the seven criteria and further meetings will be conducted by them individually to collect the details of data templates.
10. It was proposed to initiate Green measures in planting trees and maintenance in the campus.
11. It was suggested to conduct Green measures appraisal on regular basis in order to spread the environment consciousness among all the stake holders and also to make the campus eco-friendly.
12. Meeting ended with concluding remarks by the Principal. IQAC Coordinator recorded the minutes.

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Principal

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Internal Quality Assurance Cell (IQAC)

Minutes of meeting held on 4th January 2019

Agenda:

1. Discussion regarding professional society activity
2. Smart India Hackathon
3. Organizing FDP/seminar/workshop for faculty and students
4. Training students for competitive exams like GATE,CAT etc.

Members present: 16

The following points were discussed in the meeting:

1. Principal welcomed all the members of IQAC. Members confirmed the minutes of last IQAC meeting held.
2. The coordinators of professional societies CSI, SEEM, ISTE and SAE explained their target achievements of the semester and discussed the action plan of coming months.
3. Principal gave brief idea about different co-curricular activities that a student can participate. And she asked all the HODs to encourage those activities.
4. It was resolved to prepare the students for participating Smart India Hackathon competition. Class advisors and corresponding heads of departments will take appreciate actions.
5. A core committee was set up to organize/supervise FDP, seminar and workshops for both faculties and students.
6. It was discussed to conduct seminar on outcome-based education in every semester for newly joined faculty members.
7. With the permission of Principal, decided to conduct few seminars and workshops for students and faculties in the next month.

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8. Principal suggested that Extension service involving cost effective coaching classes to encourage students to appear for competitive exams could be organized.
9. It was discussed to form a set of senior faculties to formulate and implement training classes for students to participate in the competitive exams like GATE, CAT etc.
10. A discussion was started in the meeting that student should get more practice for appearing in technical aptitude test also.
11. Meeting ended with concluding remarks by the Principal. IQAC Coordinator recorded the minutes.

Principal

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Internal Quality Assurance Cell (IQAC)

Minutes of meeting held on 12th November 2018

Agenda:

1. Internal academic audit.
2. Analysis of the feedback taken from the stakeholders.
3. Introduction of certificate courses.
4. Applying research funds from AICTE, DST, DRDO etc.

Members present: 15

The following points were discussed in the meeting:

1. Principal welcomed all members of IQAC. The last IQAC meeting minutes and action taken were reviewed.
2. The IQAC coordinator gave the brief idea to all members about each and every point in the academic audit checklist.
3. The internal academic audit schedule has been prepared with the approval of Principal. A team comprising members from each department was formulated to conduct the internal audit.
4. It was agreed that the feedback from stakeholders of the college should be taken.
5. It was resolved to request heads of all the departments to take necessary measures on the consolidation of the feedback from the stakeholders like students, parents, employers and alumni.
6. Student feedback collected for teaching learning evaluation process has been discussed and the different categories of faculty were identified. The Principal addressed all Heads to take further initiatives to improve faculty performance in teaching learning process.

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7. It was resolved to organize skill-based certificate courses on different topics like python with machine learning, android app development, IOT and embedded system, cable design etc.
8. More number of students can be motivated to enroll for online certification courses which enables Local chapter establishment at the college.
9. It was advised that minimum of 30 hours should be taken for each of the certificate courses.
10. Principal urged that the focus should be on three main aspects of teaching, research and outreach programmes. In the production of knowledge, research components should be well highlighted. There are many agencies like AICTE, DST, DRDO that funds research projects.
11. Principal gave instructions to the head of all departments to form a senior core team to formulate the procedure for applying research funds from various agencies.
12. Meeting ended with concluding remarks by the Principal.

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Principal

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David

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Internal Quality Assurance Cell (IQAC)

Minutes of meeting held on 6th August 2018

Agenda:

1. Recomposition of IQAC 2018-19.
2. Usage of ICT tools for teaching learning.
3. Research and development activities.
4. CO/PO mapping and attainment values.
5. Enhancement of internet/Wi-fi

Members present: 17

The following points were discussed in the meeting:

1. Principal welcomed the new members of IQAC. The restructured composition of IQAC was presented.
2. The functions and role of IQAC in sustaining the quality of the academic programmes of the college was highlighted.
3. The action plan for the academic year 2018-19 including Information and Communication Technologies (ICT) learning was presented
4. Principal elaborated academic results are improved compared to previous year and further improvement can be done by using ICT facility, handwritten notes, NPTEL facility etc.
5. IQAC recommended a policy should be prepared to enhance use of ICT too' i teaching learning.
6. Principal suggested that the Best Researcher award can be given to the faculty with reputed publications, and funding activities can be encouraged with research policies.

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All senior faculties in the department have to plan for book publication with renowned publishers.

7. IQAC recommended that research and development department introduce incentives for publications in high impact factor journals at regular intervals.
8. It was agreed to enhance research and development activities by motivating teacher quality improvement, in encouraging the research-based work culture and in recommending student centric core project.
9. The institution has decided to shift teaching learning process to outcome-based education system as per the guidelines of NBA. The attainment of outcome can be analyzed through the assessment of COs and POs.
10. Principal presented time lines for the assessment cycle. At the beginning of every semester Cos, POs and CO-PO mappings should be discussed at the department level. And the attainment level can be calculated at the end of the semester.
11. It was discussed to increase the usage of internet facilities and members suggested to increase the wi-fi band width.
12. Meeting ended with concluding remarks by the Principal. IQAC Coordinator recorded the minutes.

Principal

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ACTION TAKEN REPORT OF IQAC (2018-19)

PLAN OF ACTION	ACTION TAKEN
Formation of various committees for smooth functioning of the college	Formed various committees for smooth functioning of the college
Strengthening ICT enabled teaching	Strengthened ICT enabled teaching
Preparation of teaching plans according to syllabus and maintaining course dairy by all teachers.	Prepared Teaching plans according to syllabus and maintaining course dairy by all teachers
Introducing certificate courses	Introduced certificate courses like Java Oracle certified course, Embedded System and IOT, Advanced Control Strategies on Electric Vehicle, CAD/CATIA, Robotics Operating System, Non-Destructive Testing etc.
Organizing seminars on soft skills and career guidance	Organized seminars on soft skills and career guidance.
Motivating faculty for publications	Motivated faculties for publications
Motivating faculty to attend FDP, Conferences etc.	Motivated faculties to attend FDP, Conferences etc.
Strengthening feedback system of various stakeholders	Collected and analyzed feedback from various stakeholders and action taken
Promoting ICT based teaching learning	Promoted ICT based teaching learning. The faculty members of the college used power point presentation and taught

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	through Internet and students used e-resources available in the college
Organizing workshops, seminars and conferences in various subjects	Organized workshops, seminars and conferences in various subjects
Organizing institutional level workshop on Teaching Learning and Evaluation by IQAC	Organized institutional level workshop on Teaching Learning and Evaluation by IQAC
Conducting Green audit	Conducted Green audit by arranging various programs.
Creating linkages and collaboration with industries	Created linkages and collaboration with different industries like FACE, SIPL, TCS Ion, Infosys Campus Connect, 6Phrase, Vajra Learning, Konfident etc.
Organizing inter collegiate games and sport events.	Organized inter collegiate games and sport events.
Strengthening professional society activity.	Organized various activities of professional societies like CSI, SEEM, ISTE and SAE etc
Participation in Smart India Hackathon projects	6 project groups participated in Smart India Hackathon.
Conducting Internal Academic Audit	Conducted Internal Academic Audit
Preparing AQAR 2018-19	Prepared AQAR for the year 2018-19
Verification of CO-PO mapping and attainment level	CO-PO mapping and attainment level had been calculated and verified by concerned heads of departments.
Strengthening IPR and III cell activities	Planned and Organized various activities of IPR Cell and III Cell

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Principal

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Internal Quality Assurance Cell (IQAC)

Minutes of meeting held on12thMarch 2018

Agenda:

1. Placement training
2. Activities of Industry-Institute Interaction Cell
3. Improving Green measures.
4. Enhancement of research activities

Members present: 16

The following points were discussed in the meeting:

1. Principal welcomed all the members of IQAC. Members confirmed the minutes of last IQAC meeting held.
2. For the improvement of campus placement, various activities such as soft skill training, group discussion practice, personal interview practice session, sessions for higher studies like GATE, CAT,GMAT etc are proposed to conduct for our students
3. It was also suggested to advice the students to participate in job fair conducted by nearby campuses. All the heads of department are advised to encourage the students to participate in various placement training activities too.
4. The III cell coordinator presented the achievements for the academic year 2017-18 including Information and Communication Technologies (ICT) learning, Industry – Institute Interactions, Faculty Development Programs(FDP), Research activities, and Academic Audit.

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5. The number of students placed through campus drive in the academic year 2017-18 was presented by the Placement officer. Placement willing students bagged many offers in Top MNCs with good salary packages. Training and placement cell's efforts are appreciated by the members. Industry interactions can help further improvements in future.
6. It was proposed to initiate Green measures in planting trees and maintenance in the campus.It was suggested to conduct Green measures appraisal on regular basis in order to spread the environment consciousness among all the stake holders and also to make the campus eco-friendly.
7. Various activities such as arranging workshops on IPR, writing research proposals are planned. It is also decided to focus on various funding agencies for major research grants. Final year students will be promoted to apply for granting patents, writing the research works and publish in reputed journals.
8. Meeting ended with concluding remarks by the Principal. IQAC Coordinator recorded the minutes.

Principal

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Internal Quality Assurance Cell (IQAC)

Minutes of meeting held on 8th January 2018

Agenda:

1. Training students for competitive exams.
2. Campus beautification and infrastructure
3. Online student feedback.
4. Submission of AQAR

Members present: 16

The following points were discussed in the meeting:

1. Principal welcomed all the members of IQAC. Members confirmed the minutes of last IQAC meeting held.
2. It was discussed to formulate and implement training classes for students to participate in the competitive exams like GATE, CAT etc.Principal suggested that Extension service involving cost effective coaching classes to encourage students to appear for competitive exams could be organized.
3. A discussion was started in the meeting that student should get more practice for appearing in technical aptitude testand soft skills also.
4. It was resolved to prepare a detailed proposal for infrastructure development in different departments. The IQAC members and head of departments would undertake the visit to the departments and assess current facilities as well as future requirements considering the upcoming NAAC visit.
5. Campus infrastructure modernization would also be suggested. Principal suggested to have beautification works for all buildings with in the campus with the involvement of department concern.

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6. An online portal for obtaining feedback of all the even semester students was developed by computer science department and updated the same to all the department heads.
7. The feedback received is being compiled by IQAC in association with computer science department
8. The annual quality assurance report covering the period 1st July 2017 to 30th June 2018 is reviewed and verified under the supervision of IQAC coordinator and head of the departments.
9. Meeting ended with concluding remarks by the Principal. IQAC Coordinator recorded the minutes.

Principal

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Internal Quality Assurance Cell (IQAC)

Minutes of meeting held on 10th November 2017

Agenda:

1. Research funds from AICTE, DST,DRDO etc.
2. Status of patenting.
3. Academic and industrial collaboration.
4. Discussion on NAAC activities.

Members present: 15

The following points were discussed in the meeting:

1. Principal welcomed all members of IQAC.The last IQAC meeting minutes and action taken were reviewed.
2. IQAC coordinator urged that the focus should be on three main aspects of teaching, research and outreach programs. In the production of knowledge, research components should be well highlighted. There are many agencies like AICTE, DST, DRDO that funds research projects.
3. Principal gave instructions to the head of all departments to form a senior core team to formulate the procedure for applying research funds from various agencies.
4. IQAC noted satisfaction on gradual rise in patent application by the students. It was resolved that a meeting of patent applicants may be called to facilitate them. It was also resolved that a meeting of teachers interested in patenting may be held and awareness may be given on the occasion.
5. Resolved to convene a meeting of Centre of academic and industrial collaboration. Also resolved to examine the possibilities for student skill enhancement through short term training and internship programs.

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6. The IQAC coordinator suggested the need for training on software applications like SAP. The Centre to examine areas for action in this regard.
7. It was discussed to concentrate on NAAC activities. Apart from criteria documents it was discussed about alumni coordination, academic audit, PTA, student satisfaction survey, parent satisfaction survey, infrastructure development, workshops on research outcome, waste management and e-waste management etc.
8. A sub-committee will be formed for documentation and uploading the above mentioned files
9. Meeting ended with concluding remarks by the Principal.

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Internal Quality Assurance Cell (IQAC)

Minutes of meeting held on 9th August 2017

Agenda:

1. Recomposition of IQAC 2017-18.
2. Formation of NAAC working committee
3. Strengthening of MOOC
4. ICT enabled teaching learning.
5. Creation of E-Courses and E-Contents

Members present: 17

The following points were discussed in the meeting:

1. Principal welcomed the new members of IQAC. The restructured composition of IQAC was presented.
2. The action taken report on the decisions of previous academic year meeting was presented.
3. A separate working committee to coordinate NAAC criteria on documentation and support services to be formed. IQAC conducted extensive discussions in this regard and resolved to constitute the NAAC working committee including members of IQAC
4. It was discussed to make available necessary academic and physical infrastructure to adopt MOOC courses and assign new course coordinators to support the students in this regard

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5. Principal suggested that, each department should make it mandatory that at least one among the extra departmental activities must be from MOOC.
6. The action plan for the academic year 2017-18 including Information and Communication Technologies learning was presented. Coordinator elaborated that academic results are improved compared to previous year and further improvement can be done by using ICT facility, handwritten notes, NPTEL facility etc.
7. Principal recommended a policy should be prepared to enhance use of ICT tools in teaching learning.
8. It is resolved to upload the e-content of faculties from different departments. A committee consists of department heads and senior professors is entrusted to work out the ways and means to encourage teachers to develop e-contents and e-courses for various subjects.
9. Meeting ended with concluding remarks by the Principal. IQAC Coordinator recorded the minutes.

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Internal Quality Assurance Cell (IQAC)

Minutes of meeting held on 20th March 2017

Agenda:

1. Organizing seminar/workshop for students.
2. Academic Audit
3. AQAR(2016-17) review
4. IPR cell activity.

Members present: 17

The following points were discussed in the meeting:

1. Principal welcomed all the members for the meeting.
2. Department wise students committee as well as faculty committee was set up to organize seminar and workshops for the benefit of students.
3. Principal reminded to conduct regular meetings of each department head, faculties and selected students regarding the smooth functioning of seminars and workshops. Apart from participants from outside colleges, it was decided to give more chance to internal participants for their improvement
4. The previous academic audit feedback were reviewed and based on that it was discussed to concentrate on different files updation for the entire academic year. Syllabus completion status need to be maintained including laboratories along with sample documents.
5. All the IQAC members and head of the departments are asked to conduct an internal mock review inside the department before the external visit. Each and every documents should be verified according to the set checklist.

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ACTION TAKEN REPORT OF IQAC (2017-18)	
PLAN OF ACTION	**ACTION TAKEN**
Strengthening of MOOC	A new MOOC courses coordinator has been assigned to support the students and arranging necessary academic and physical infrastructure.
Strengthening of ICT enabled teaching learning	Strengthened ICT enabled teaching by implementing the policy enhancing with ICT tools, handwritten notes, NPTEL facility etc.
Creation of E-Courses and E-Contents	A committee consists of department heads and senior professors are formed to encourage teachers to develop e-contents and e-courses for various subjects.
Preparation of AQAR for the academic year 2015-16	AQAR for the academic year 2015-16 were prepared and verified.
Strengthening department association.	Inaugurated association of each department separately and Organized seminars and other technical activities in the name of department association.
Participation of students in various technical events.	IQAC motivated the students and students have participated in various technical events in and around the institution.
Academic and industrial collaboration.	The Centre of academic and industrial collaboration are resolved to examine the possibilities for student skill

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	enhancement through short term training and internship programs.
Strengthening EDC cell activities	Conducted various Entrepreneurship development programs for the betterment of students.
Promoting Extension activities under the program of NSS	Promoted NSS activities and conducted more extracurricular activities under NSS club.
Status of patenting	IQAC noted satisfaction on gradual rise in patent application by the students. A meeting of patent applicants was conducted to facilitate them.
Organizing Annual technical event NSITE.	Organized annual technical event NSITE. Behalf of this technical fest, various technical events and project expo programs were conducted for the students.
Conducting Internal and external academic audit.	Conducted Internal and external academic audit and verified all the audit report.
Updating Online student feedback.	An online portal for obtaining feedback of all the even semester students was developed by computer science department and updated the same to all the department heads.
Analysis and verification of AQAR 2017-18	Analyzed and verified the report of AQAR 2017-18 and corrections were cleared

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Improving On-campus placement	Improved campus placement activities by conducting programs such as soft skill training, group discussion practice, personal interview practice session, aptitude training for our students
Campus beautification and infrastructure	The beautification works for all buildings with in the campus has been completed with the involvement of department concern.
Training students for competitive exams.	The training classes were implemented for students to participate in the competitive exams like GATE, CAT etc.

Principal

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6. All the seven Criteria heads along with department coordinators presented the details ofprepared AQAR for the academic year 2016-17.It was analyzed and areas of improvement for each department presentations are monitored. The observations and suggestions for improvement are taken by all criterion heads.
7. The IPR cell coordinator briefly explained about IPR cell activities of current semester. He narrated that, along with teaching and extension activities, an educational institution needs to encourage creativity, research and provide conductive environment through.
8. Meeting ended with concluding remarks by the Principal. IQAC Coordinator recorded the minutes.

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Internal Quality Assurance Cell (IQAC)

Minutes of meeting held on 16th January 2017

Agenda:

1. Review of Academic results and student's feedback
2. Data updating in icampuz software
3. Resources and infra structure requirement
4. Review of placement of students

Members present: 15

The following points were discussed in the meeting:

1. Principal welcomed all the members for the meeting and she started the meeting with a silent prayer.
2. The even semester KTU results of different departments were reviewed and based on that suggestions were asked from the head of departments for the improvement of academic results.
3. It was resolved to request the department coordinators to take necessary measures on collecting the feedback from the stakeholders like students, parents, employers and alumni.
4. The Principal addressed all heads of departments to take initiatives for improving faculty performance in teaching learning process. It was decided to update the students details including results in to the online software icampuz.
5. IQAC coordinator suggested to upload the study materials and lecture videos in that software so that students can access the same using their individual user id. Also decided that the hole campus is to be maintained with high speed wi-fi set up.

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6. Principal asked the head of departments to submit the department wiseinfrastructure and resource requirement for the smooth functioning of upcoming academic year.
7. It was resolved to prepare the students for participating different soft skill training and aptitude classes. It will be very useful for the students to get placed in reputed MNCs. Class advisors and corresponding heads of departments ~~will~~ take appreciate actions.
8. Meeting ended with concluding remarks by the Principal. IQAC Coordinator recorded the minutes.

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Internal Quality Assurance Cell (IQAC)

Minutes of meeting held on 8th August 2016

Agenda:

1. Re-composition of IQAC 2016-17.
2. Infosys campus connect
3. Placement activities
4. CO and PO attainment
5. Internal and External academic audit.

Members present: 16

The following points were discussed in the meeting:

1. Principal welcomed the new members of IQAC. The restructured composition of IQAC was presented.
2. The action taken report on the decisions of previous academic year meeting was presented.
3. Principal nominated two faculties from computer science department to attend faculty enablement program at Infosys campus as part of advancing the campus to FP4.0 level.
4. IQAC discussed the current status of placement activities and members suggested to concentrate in aptitude training for the pre-final year students.
5. It was decided to conduct mock tests of different MNCs for the final year students to be prepared for the recruitment procedures of technical and general aptitude test, group discussion, self-introduction etc.

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6. IQAC coordinator presented the manual and time lines for the assessment cycle. At the beginning of every semester Course Outcomes, Programmed Outcomes and CO-PO mappings should be discussed at the department level. And the attainment level can be calculated at the end of the semester.
7. Principal gave the brief idea about each and every point in the academic audit manual and based on that it was decided to form a checklist for the internal audit.
8. The internal academic audit schedule has been prepared with the approval of Principal. A team comprising members from each department was formulated to conduct the internal audit.
9. It was decided to prepare for the KTU external audit based on the feedback collected from the internal auditors.
10. Meeting ended with concluding remarks by the Principal. IQAC Coordinator recorded the minutes.

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Internal Quality Assurance Cell (IQAC)

Minutes of meeting held on 14th November 2016

Agenda:

1. Academic matters
2. Department-wiseSWOT analysis
3. Stock verification
4. Mentorship and student progression
5. Preparation for AQAR 2016-17.

Members present: 17

The following points were discussed in the meeting:

1. Principal welcomed all the members for the meeting
2. The academic performance of students was discussed with comparison of previous university results. It was decided to monitor the regularity of lectures, tutorials and practical sessions of different subjects.
3. Coordinator suggested to strengthen the use of teaching aids such as projectors, computers, smart class rooms etc and asked to concentrate on encouragement of questioning and queries in classrooms.
4. Inputs from Library staff was taken to find the gap between their existing knowledge and new technology updated.
5. It was decided to update the SWOT analysis of every departments and all the head of departments are asked to submit the suggestions to increase the strength of the department.

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6. It was discussed to prepare a time schedule for the smooth verification of stock registers in different departments. The previous stock verification status was reviewed and a common template was sent to department coordinators
7. It was decided with the permission of chair to verify the mentorship registers of different batches, wherein each teacher would be given a set of students to mentor.
8. All the Heads and members were asked to be prepared for the yearly reportof NAAC AQAR well in advance so that it will be easy to do the corrections required by reviewing all the seven criteria.
9. Meeting ended at 12:30pm with concluding remarks by the Principal. IQAC Coordinator recorded the minutes.

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ACTION TAKEN REPORT OF IQAC (2016-17)	
PLAN OF ACTION	**ACTION TAKEN**
Attending Faculty enablement programs.	Two faculties from computer science department were nominated and then attended faculty enablement program at Infosys campus as part of advancing the campus to FP4.0 level.
Strengthening placement activities.	Strengthened Industry-Institute Interaction activities and formed MOUs with various organizations.
Conducting mock test for final year students.	Conducted mock tests of different MNCs for the final year students for the recruitment procedures of technical and general aptitude test, group discussion, self-introduction etc.
Verification of CO-PO attainment.	The Course Outcome, Programmed Outcomes and CO-PO mappings are verified at the department level with the help of senior professors.
Conducting Internal academic audit.	Conducted Internal academic audit and verified all the audit report. Preparation started for the KTU external audit based on the feedback collected from the internal auditors.
Strengthening the use of ICT facilities	Faculties started using the teaching aids such as projectors, computers, smart class

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	rooms etc at the institution.
Updating SWOT analysis	The SWOT analysis of every departments are updated and the suggestions to increase the strength of the department has been recorded.
Conducting Stock verification	Physical stock verification has been conducted in different departments and it is recorded in common template.
Data updating in online software Icamptiz.	Students details are updated and the study materials and lecture videos are uploaded and students are accessing it.
Organizing soft skill training and aptitude classes	Different soft skill training and aptitude classes were conducted for the students to get placed in reputed MNCs
Organizing Annual technical event NSITE.	Organized annual technical event NSITE. Behalf of this technical fest, various technical events and project expo programs were conducted for the students.
Organizing seminar and workshop for students.	Conducted various seminars and workshops for students with internal participants as well as external participants.
Conducting External academic audit	KTU academic audit were conducted. An internal mock review inside each department were conducted before the external visit.

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Analysis and verification of AQAR 2016-17	Analyzed and verified the report of AQAR 2016-17 and corrections were cleared
Strengthening of III cell activities.	Strengthened Industry-Institute Interaction activities and formed MOUs with various organizations.
Organizing inter collegiate games and sport events.	Organized inter collegiate games and sport events.
Conducting Green audit	Conducted Green audit by conducting various programs.

Principal

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Internal Quality Assurance Cell (IQAC)

Minutes of meeting held on 24th March 2016

Agenda:

1. External academic audit.
2. Improving teaching learning skills for the faculties.
3. Enhancement of research activities
4. Analysis of AQAR 2015-16
5. Improving On-campus placement

Members present: 17

The following points were discussed in the meeting:

1. Principal welcomed all the members for the meeting.
2. Principal reminded here, to take follow up of external academic audit from KTU and then it is decided to work on feedback of the previous audit so as to improve overall academic and administrative activities.
3. The IQAC coordinator raised the point about strengthen the activities related to teaching learning enhancement. All the committee members and head of departments are agreed to conduct various faculty and staff development programs.
4. All departments are planned to conduct workshops on IPR. It was decided to file the patents in the coming academic session. It was also decided to encourage the faculties to apply for various research agencies for funding and also for publications of research articles in reputed journals.
5. A brief AQAR of 2015-16 is analyzed and areas of improvement for departments are discussed. The observations and suggestions for improvement are taken by all criterion heads.
6. Various activities such as arranging workshops on IPR, writing research proposals are planned. It is also decided to focus on various funding agencies for major research grants.

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Final year students will be promoted to apply for granting patents, writing the research works and publish in reputed journals.

7. For the improvement of campus placement, various activities such as soft skill training, group discussion practice, personal interview practice session, sessions for higher studies like GATE, CAT,GRE,GMAT etc are proposed to conduct for our students
8. It was also suggested to conduct a job fair in the campus. All the heads of department are advised to encourage the students to participate in various placement training activities.

Principal

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Internal Quality Assurance Cell (IQAC)

Minutes of meeting held on 4th January 2016

Agenda:

1. Academic activities
2. Organizing alumni meet
3. Promoting research culture and policies
4. NSS activities.
5. Annual technical event NSITE.

Members present: 15

The following points were discussed in the meeting:

1. Principal welcomed all the members for the meeting and she started the meeting with a silent prayer.
2. It was decided to formulate a question paper scrutiny committee which should include senior professors of different departments. All are advised to form the internal exam question papers by following the bloom taxonomy.
3. Principal appreciated all the head of departments for the betterment of students' previous university results. She also suggested conducting special classes for the students who are academically slower.
4. The coordinator point out that in addition to the academic feedback taken from students, parents and employers, alumni interaction is equally important.
5. The teams suggested with the permission of chair to collect the alumni feedback and to organize alumni meet.
6. Principal suggested that research culture should inculcate in academics and industry-institute interaction is to be strengthened.

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7. The coordinator suggested that the academic policies are need to be revised and related activities definitely promoting research culture.
8. The chairperson decided to conduct various NSS activities in near future namely tree plantation, blood donation camp and road safety program on the basis of suggestion for all the committee members.
9. Annual technical event 'NSITE' is conducted every year. For the next event 'NSITE' it is discussed in the meeting to invite students of all other institutions from Kerala to provide the exposure and build a bond between institutes. Overall it is decided to make a grand technical event.
10. Meeting ended with concluding remarks by the Principal. IQAC Coordinator recorded the minutes.

Principal

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Internal Quality Assurance Cell (IQAC)

Minutes of meeting held on 16th November 2015

Agenda:

1. Strengthening of department association
2. Student's participation in technical events.
3. Academic and administrative performance
4. Activities of EDC cell
5. Extension activities under the program of NSS

Members present: 17

The following points were discussed in the meeting:

1. Principal welcomed all the members for the meeting at 11:40am
2. The principal discussed the various aspects of strengthening of all department association and related activities to promote students participation in different technical events.
3. Chairperson and coordinator proposed to organize different national and international conferences in every department so that students can explore their knowledge in different platforms.
4. In order to improve the academic as well as administrative performance of the institution, the IQAC members discussed in depth the current status of academics, administrative procedure and student activities.
5. The IQAC members decided for conducting the internal academic as well as administrative audits of all the departments.

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6. Prof.Radhakrishnan suggested taking lead initiatives to promote innovation in student's project and their Entrepreneurship. IQAC committee recommended to start activities under Entrepreneurship Development cell to promote students innovative ideas.
7. Principal suggested to organizing more extracurricular activities under NSS club. Principal also appreciated the NSS coordinator for the previous achievements.
8. Meeting ended at 12:30pm with concluding remarks by the Principal. IQAC Coordinator recorded the minutes.

Principal

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ACTION TAKEN REPORT OF IQAC (2015-16)	
PLAN OF ACTION	**ACTION TAKEN**
Formation of E-governance in academics for the academic year 2015-16	Formed online software's for maintai[illegible] library database, students as well as faculties data's and activities
Strengthening of Industry-Institute Interaction activities.	Strengthened Industry-Institute Interaction activities and formed MOUs with various organizations.
Introducing Eco-friendly measures include steps to reduce consumption of electrical energy	Conducted Green audit by conducting various programs and reduced the consumption of electrical energy [illegible] margin.
Preparation of AQAR for the academic year 2015-16	AQAR for the academic year 2015-16 were prepared and verified.
Strengthening department association.	Inaugurated association of each department separately and Organized seminars and other technical activities in the name of department association.
Participation of students in various technical events.	IQAC motivated the students [illegible] students have participated in various technical events in and around the institution.
Monitoring academic and administrative performance.	Conducted internal academic and administrative audit and monitored all the activities of academic as well as administrative performance.
Strengthening EDC cell activities	Conducted various Entrepreneu[illegible]p

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Pin 680 597 Kerala

	development programs for the betterment of students.
Promoting Extension activities under the program of NSS	Promoted NSS activities and conducted more extracurricular activities under NSS club
Organizing workshops and seminars in various subjects	Organized workshops and seminars in various subjects.
Organizing Annual technical event NSITE.	Organized annual technical event NSITE. Behalf of this technical fest, various technical events and project expo programs were conducted for the students.
Conducting Internal and external academic audit.	Conducted Internal and external academic audit and verified all the audit report.
Improving teaching learning skills for the faculties.	Conducted faculty development programs for improving teaching learning skills for the faculties.
Analysis and verification of AQAR 2015-16	Analyzed and verified the report of AQAR 2015-16 and corrections were cleared
Improving On-campus placement	Improved campus placement activities by conducting programs such as soft skill training, group discussion practice, personal interview practice session, aptitude training for our students

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Principal

NEHRU COLLEGE OF ENGINEERING AND RESEARCH CENTRE
(NAAC Accredited)
(Approved by AICTE, Affiliated to APJ Abdul Kalam Technological University, Kerala)

Since 1968

Internal Quality Assurance Cell (IQAC)

Minutes of meeting held on 11th August 2015

Agenda:

1. Recomposition of IQAC 2015-16.
2. E-Governance in academics for academics reforms.
3. Industry-Institute Interaction through membership and MOUs
4. Eco-friendly measures include steps to reduce consumption of electrical energy.
5. NAAC AQAR preparation for the academic year 2015-16

Members present: 16

The following points were discussed in the meeting:

1. Principal welcomed the new members of IQAC. The restructured composition of IQAC was presented.
2. The coordinator emphasized on digitization to improve the student's database such as attendance, mark statements, achievements, training, placements and other activity records. IQAC committee members supported the views of the above regarding the need of digitization required for integrating all academic and administrative activities.
3. IQAC committee recommended for continuing institutional membership with professional bodies. Committee also suggested exploring the possibilities of MOUs with various organizations.
4. IQAC members recommended increasing the frequency of industrial visits, expert's lectures, and industrial exposure training from industry persons, membership and MOUs to explore the various practical aspects of industrial development to the students.

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5. It was suggested to take review on status of eco-friendly measure already taken in campus in order to reduce consumption of electrical energy, where incandescent light bulbs and fluorescent tube-lights are to be replaced by cost effective, high efficient LEDs.
6. Templates of NAAC AQAR have been explained by the chairman to all the members and are asked to start the preparation work for the yearly report well in advance. Chairman also intimated the review status of NAAC peer members visit to the college.
7. Meeting ended with concluding remarks by the Principal. IQAC Coordinator recorded the minutes.

Principal

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