



# RAAK

**COLLEGE OF ENGINEERING AND TECHNOLOGY**

(Approved by AICTE, New Delhi & Affiliated to Pondicherry University)  
An ISO 9001:2015 Certified Institution

## Program Outcomes (POs) and course outcomes (COs) for All Programmes



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DEPARTMENT OF INFORMATION TECHNOLOGY

DISSEMINATION OF PO, PEO & PSO TO STUDENTS

### RAAK COLLEGE OF ENGINEERING & TECHNOLOGY

#### DEPARTMENT OF INFORMATION TECHNOLOGY

PROGRAM EDUCATIONAL OBJECTIVES (PEO)	PROGRAM OUTCOMES		PROGRAM OUTCOMES
PEO I: Graduate possesses technical proficiency in IT projects and applications.	PO 1: <b>ENGINEERING KNOWLEDGE</b>	Apply the knowledge of mathematics, science, engineering fundamentals and IT specialization to solve complex information technology problems.	PO 7: <b>ENVIRONMENT AND SUSTAINABILITY</b>
PEO II: Graduates Analyze Program problems to understand cause and effect and related tasks.	PO 2: <b>PROBLEM ANALYSIS</b>	Identify, formulate and analyze complex IT problems to reach substantial conclusions using fundamental concepts of mathematics, science, and engineering.	PO 8: <b>ETHICS</b>
PEO III: Graduates Develop professional judgment, leadership and organizational skills.	PO 3: <b>DESIGN/DEVELOPMENT OF SOLUTIONS</b>	Design IT solutions for complex problems and develop viable alternatives or processes of their specified tasks and requirements, considering the safety health and society and cultural, societal, and environmental considerations.	PO 9: <b>INDIVIDUAL AND TEAMWORK</b>
PEO IV: Graduates Exhibit leadership, working, learning and adaptability in emerging IT technologies.	PO 4: <b>ENGINEERING COMMUNICATIONS</b>	Use technical knowledge and methods, including the design of systems, systems and components, to plan and synthesis of information to present IT solutions with confidence.	PO 10: <b>COMMUNICATIONS</b>
<b>PROGRAM SPECIFIC OUTCOMES (PSO)</b>	PO 5: <b>PROFESSIONAL ETHICS</b>	Apply ethics and social responsibility in the development and maintenance of IT systems, and in the use of IT systems in the workplace.	PO 11: <b>PROFESSIONAL RESPONSIBILITY</b>
PSO I: Apply the theoretical and practical knowledge of IT systems and applications.	PO 6: <b>PROFESSIONAL ETHICS</b>	Apply planning, organization, and management skills in the development and maintenance of IT systems, and in the use of IT systems in the workplace.	PO 12: <b>LEADERSHIP</b>
PSO II: Apply the theoretical and practical knowledge of IT systems and applications.			PO 13: <b>LEADERSHIP</b>

**GPS MAP CAMERA**

57 Puducherry IN

Latitude 11.9223327      Longitude 79.7679612

Date: 22 Jun 2022      Time: 12:22 PM

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### INFORMATION TECHNOLOGY

#### PROGRAM OUTCOMES (PO):

##### PO1 – ENGINEERING KNOWLEDGE:

Apply the knowledge of mathematics, science, engineering fundamentals, and IT specialization to solve complex information technology problems.

##### PO2 – PROBLEM ANALYSIS:

Identify, formulate, and analyze complex IT problems to reach substantiated conclusions using fundamental principles of mathematics, science, and engineering sciences.

##### PO3 – DESIGN/DEVELOPMENT OF SOLUTIONS:

Design IT solutions for complex problems and design system components or processes to meet specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.

##### PO4 – CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS:

Use research-based knowledge and methods, including the design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions in IT.

##### PO5 – MODERN TOOL USAGE:

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

##### PO6 – THE ENGINEER AND SOCIETY:

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

##### PO7 – ENVIRONMENT AND SUSTAINABILITY:

Understand the impact of professional IT solutions in societal and environmental contexts and demonstrate the knowledge of, and need for, sustainable development.


##### PO8 – ETHICS:

Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice in IT.

##### PO9 – INDIVIDUAL AND TEAM WORK:

Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings in IT.



  
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### PO10 – COMMUNICATION:

Communicate effectively on complex engineering activities with the engineering community and society at large, including the ability to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### PO11 – PROJECT MANAGEMENT AND FINANCE:

Demonstrate knowledge and understanding of 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 in IT.

### PO12 – LIFE-LONG LEARNING:

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

### PROGRAM EDUCATIONAL OBJECTIVES (PEO):

- **Technical Proficiency:** Achieve proficiency in IT principles and practices.
- **Career Readiness:** Prepare graduates for successful careers in IT and related fields.
- **Ethical Practices:** Demonstrate ethical values and professional responsibilities.
- **Lifelong Learning:** Promote lifelong learning and adaptation to emerging IT technologies.

### PROGRAM SPECIFIC OUTCOMES (PSO):

- **Software Development:** Design and develop quality software systems.
- **Advanced Technologies:** Apply knowledge in algorithms, networking, web design, cloud computing, IoT, and data analytics.
- **Research and Innovation:** Identify research gaps and develop innovative IT solutions.



  
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SUBJECT WISE COURSE OUTCOMES (2022- 2023)

SUBJECT LIST (13-14 Regulations)

SI NO.	COURSE CODE	COURSE NAME
01.	T101	Mathematics – I
02.	T102	Physics
03.	T103	Chemistry
04.	T104	Basic Electrical and Electronics Engineering
05.	T105	Engineering Thermodynamics
06.	T106	Computer Programming
07.	P101	Computer Programming Laboratory
08.	P102	Engineering Graphics
09.	P103	Basic Electrical and Electronics Laboratory
10.	T107	Mathematics –II
11.	T108	Material Science
12.	T109	Environmental Science
13.	T110	Basic Civil and Mechanical Engineering
14.	T111	Engineering Mechanics
15.	T112	Communicative English
16.	P104	Physics Lab



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17.	P105	Chemistry Lab
18.	P106	Work Shop Practice
19.	P107	NSS/NCC
20.	MA T31	Mathematics -III
21.	IT-T32	Electronic Devices And Circuits
22.	IT-T33	Data Structures
23.	IT-T34	Object Oriented Programming
24.	IT-T35	Digital System Design
25.	IT-T36	Computer Organization
26.	IT-P31	Data Structures Lab
27.	IT-P32	Electronic Devices And Circuits Lab
28.	IT-P33	Digital Lab
29.	MA-T41	Mathematics-IV
30.	IT-T42	Communication Engineering-I
31.	IT-T43	Design And Analysis Of Algorithms
32.	IT-T44	Microprocessors And Microcontrollers
33.	IT-T45	Java Programming
34.	IT-T46	System Software
35.	IT-P41	Algorithms Lab
36.	IT-P42	Microprocessors And Microcontrollers Lab
37.	IT-P43	Java Lab



  
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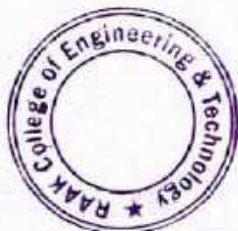


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38.	PE-P44	Physical Education -II
39.	IT-T51	Communication Engineering-II
40.	IT-T52	Software Engineering
41.	IT-T53	Operating Systems
42.	IT-T54	Data Base Management System
43.	IT-T55	Theory Of Computation
44.	IT-E51	Computer Hardware And Trouble Shooting
45.	IT-P51	Communication Engineering Lab
46.	IT-P52	Operating systems Lab
47.	IT-P53	Data Base Management System Lab
48.	HS-P54	General proficiency-I
49.	IT-T61	Computer Networks
50.	IT-T62	Web Technology
51.	IT-T63	Artificial Intelligence
52.	IT-T64	Information Coding Techniques
53.	IT-E62	Software Project Management
54.	IT-E68	User Interface Design
55.	IT-P61	Computer Networks Lab
56.	IT-P62	Web Technology Lab
57.	IT-P63	Mini Project
58.	HS-P64	General proficiency-II
59.	IT-T71	Mobile Computing



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60.	IT-T72	Web Services And Xml
61.	IT-T73	Cryptography And Network Security
62.	IT-E72	Software Testing
63.	IT-E73	Management Concepts And Strategies
64.	IT-P71	Mobile Computing Lab
65.	IT-P72	Web Services And Xml Lab
66.	IT-P73	Project work Phase-I
67.	IT-P74	Seminar
68.	IT-P75	Industrial Training / Internship
69.	IT-T81	Professional Ethics
70.	IT-T82	Distributed Computing
71.	IT-E81	E-Commerce
72.	IT-P81	Project work Phase-II
73.	IT-P82	Comprehensive Viva Voce



  
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### I-SEMESTER

T101 - Mathematics - I		Yr/Sem: I/I
CO 1	Apply knowledge of mathematics to solve functions of several variables.	
CO 2	Identify, formulate and solve engineering problems like multiple integrals and their usage.	
CO 3	To solve differential equations that model physical processes using effective mathematical tools	
CO 4	Able to find equation of straight line of shortest distance, equation of plane, angle between straight lines.	
CO 5	Gain the knowledge to solve first order differential equation arising in engineering.	

T102 - Physics		Yr/Sem: I/I
CO 1	Apply knowledge of science and engineering to understand physics and its significant contribution in the advancement of technology and invention of new products that dramatically transform modern day society.	
CO 2	Identify different areas of physics which have direct relevance and applications to different engineering disciplines	
CO 3	Apply fundamental knowledge to understand applications of ultrasonics, optics and some optical devices, lasers and fiber optics, nuclear energy sources and wave mechanics.	
CO 4	Understand the basic operating principles of laser, its applications, optical fiber, and its types, transmission characteristics, applications of optical fibers.	
CO 5	Understand the basic operating principles of laser, its applications, optical fiber, and its types, transmission characteristics, applications of optical fibers.	

T103 - Chemistry		Yr/Sem: I/I
CO 1	Apply knowledge of science and engineering to understand the importance of chemistry in engineering domain.	
CO2	Identify different electrochemical cells and their usage for industrial process.	
CO3	Apply fundamental knowledge of chemistry and build an interface of theoretical concepts with industrial applications/engineering applications.	
CO4	Guide the students to gain the knowledge about the cooling curves, phase diagrams, alloys and their practical importance.	



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CO 5	Strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial/engineering applications
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T110-Basic Civil and Mechanical Engineering		Yr/Sem: I/I
CO 1	Understanding the building classification as per National building code.	
CO 2	Get the idea about construction procedure for various components of the building.	
CO 3	Students understand the principles of surveying, construction procedure for roads, bridges and dams.	
CO 4	Student will be able to know about the working of internal and external combustion systems.	
CO 5	Student will be able to know about Non-Conventional Energy Systems	
CO 6	Student will be able to know about manufacturing process.	

T111- Engineering Mechanics		Yr/Sem: I/I
CO 1	Understand the basic laws of mechanics and resolution of forces using different methods.	
CO 2	Learn and apply the knowledge on analysis of forces acting on the trusses and effect of friction force on bodies.	
CO 3	Learn about the centroid and moment of inertia for plane and solid figures.	
CO 4	Understand the three laws of motion, principles of dynamics for particles.	
CO 5	The student will be able to analyze the laws of motion for rigid bodies.	

T112- Communicative English		Yr/Sem: I/I
CO 1	Learnt about the definition of communication, importance, concept. Sender, Ideation, the levels in communication, channels, oral and written way of communication, body language and non-verbal communication, Accuracy, Brevity and Clarity, different barriers for Communication, techniques in making effective communication, listening importance and types of listening.	
CO 2	Students learnt about the types of letters, report writing, notices and memo and also developed their skill in writing.	
CO 3	Understands the comprehension, identifies the difference between Skimming and scanning, guess the meaning of the words, Identify to make notes.	



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CO 4	Students learnt the writing skills, how to write a paragraph in a proper manner, four modes of writing and how to make bibliographical entries.
CO 5	Students were able to develop their spoken skills by making them to involve in many activities related to it.

P 104- Physics Lab		Yr/Sem: I/II
CO 1	Able to understand how to find the thickness of the specimen and also to find the radius of curvature of glass using the phenomenon of interference of light	
CO 2	Able to understand the specific rotatory power of an optical active solution using the principle of polarization.	
CO 3	To understand about the thermal conductivity of bad conductor and rubber tube.	
CO 4	Ability to understand about the optical properties like dispersive power, Resolving power by applying the knowledge of optics	
CO 5	To acquire knowledge about the magnetometer due to current coil and jolly method of determining the pressure coefficient of air at constant volume.	
CO 6	Ability to understand the basic knowledge of inference ,polarization ,Magnetic materials ,thermal conductivity that correlates the theory and practical	

P 105 - Chemistry Lab		Yr/Sem: I/II
CO 1	Students will become well acquainted to test amount of hardness present in sample of water for their engineering needs	
CO 2	Students will be efficient in estimating acidity/alkalinity in given samples.	
CO 3	Students will have knowledge about estimating amount of dissolved oxygen in water.	
CO 4	Students will become well acquainted to estimate copper in brass.	
CO 5	Students will have knowledge about determination of viscosity of sucrose using Ostwald's viscometer.	
CO 6	To develop an understanding of basic titration setup and methodologies for determining strength, hardness and alkalinity of various unknown solutions	



  
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<b>P 106 - Workshop Practice</b>		<b>Yr/Sem: I/II</b>
CO 1	Understand and comply with workshop safety regulations.	
CO 2	Student will be able to make various joints in the given object with the available work material.	
CO 3	Student will be able to know how much a joint will take for the assessment of time.	
CO 4	Students can able to Identify the hand tools and instruments.	
CO 5	Students can able to gain knowledge about various operations carried out in sheet metal.	
CO 6	Students can able to gain skills about various tools used in welding to make simple joints.	

### SEMESTER-II

<b>T 107 - Mathematics - II</b>		<b>Yr/Sem: I/II</b>
CO 1	Apply knowledge of mathematics to solve matrix algebra technique for practical applications and Curl, divergence and integration of vectors in vector calculus.	
CO 2	Identify, formulate and solve engineering problems like Laplace transform and to solve differential and integral equations.	
CO 3	Apply formulae and analyze problems of Fourier transform techniques.	
CO 4	Determine the Fourier transform, Fourier cosine and sine transform of elementary functions, properties of transforms and its application in engineering	
CO 5	Acquire knowledge of matrix algebra technique, vector calculus, Laplace and Fourier Transform.	

<b>T109 - Environmental Science</b>		<b>Yr/Sem: I/II</b>
CO 1	Apply fundamental knowledge to understand about the environment.	
CO 2	Identify environmental pollution through science	
CO 3	Apply basic knowledge to solve various environmental issues and problems	
CO 4	Ability to consider issues of environment and sustainable development in his personal and professional undertakings.	
CO 5	Provides a comprehensive knowledge in environmental science, environmental issues and the management from an interdisciplinary perspective.	



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T104 - Basic Electrical and Electronics Engineering		Yr/Sem: I/II
CO 1	Will learn the fundamentals of rotational and stationary machine operation, single-phase and three-phase power measurement, magnetic and electrical circuits, and these topics.	
CO 2	Will learn the fundamentals of measuring devices, communication systems, and network models.	
CO 3	Knowledge about non-conventional energy systems will be available to students.	
CO 4	The varieties of metal joining will be known by the students.	
CO 5	Students will learn about numerous engines, energies, and joints as well as construction and building components offered with diverse principles.	

T105 - Engineering Thermodynamics		Yr/Sem: I/II
CO 1	Apply knowledge of mathematics, science and engineering to understand the basics of thermodynamics.	
CO 2	Understand the importance of laws of thermodynamics applied to energy systems.	
CO 3	Understanding refrigeration, heat pump and their physical mechanism.	
CO 4	Understand the laws of motion for rigid bodies.	
CO 5	Understand the effects of forces acting on the bodies in practical situation.	

T106 - Computer Programming		Yr/Sem: I/II
CO 1	Know concepts in problem solving.	
CO 2	To do programming in C language.	
CO 3	To write diversified solutions using the C language.	
CO 4	To know about structures, pointers and its manipulation.	
CO 5	To know about the evaluation of computers, components and its applications. Basic knowledge on the internet, information technology, word processing and worksheets.	



  
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<b>P101 - Computer Programming Laboratory</b>		<b>Yr/Sem: I/II</b>
CO 1	Students can work with command line interface OS's, like MS-DOS.	
CO 2	Students can solve most of the real time problems with C program.	
CO 3	Students can interact with computer using C program, through various input and output functions.	
CO 4	Students can make a use of various keywords, constants, variables, data types, operators, type conversion in C program.	
CO 5	Students will have knowledge about arrays, functions, structures, and pointers in C program.	

<b>P102 - Engineering Graphics</b>		<b>Yr/Sem: I/II</b>
CO 1	Perform freehand sketching of basic geometrical constructions and multiple views of objects.	
CO 2	Project orthographic projections of lines and plane surfaces.	
CO 3	Draw projections and solids and development of surfaces.	
CO 4	visualize and to project isometric and perspective sections of simple solids.	
CO 5	Students will be able to draw orthographic projections and isometric projections.	

<b>P103 - Basic Electrical and Electronics Laboratory</b>		<b>Yr/Sem: I/II</b>
CO 1	Know about basic electrical tools, applications and precautions	
CO 2	Perform different types of wiring used in domestic and industrial applications.	
CO 3	Measurements of voltage and phase using CRO, basic operation and applications of devices such as PN junction diode and transistors.	
CO 4	Understand the function and applications of basic logic gates and flip flops.	
CO 5	Gain knowledge in domestic wiring and application of electronics device in the field of electrical engineering.	

<b>P107 - NSS/NCC</b>		<b>Yr/Sem: I/II</b>
CO 1	To create awareness in social and environmental issues.	
CO 2	To participate in relief and rehabilitation work during natural calamities.	

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CO 3	To develop some proposals for local slum area development and waste disposal.
CO 4	To create team works among students and produce efficient results.
CO 5	To operate scientific instruments or advanced software.

### SEMESTER-III

MA T31 - Mathematics - III		Yr/Sem: II/III
CO 1	Identify complex variable function, Apply CR equations for testing of analyticity of the complex function.	
CO 2	Construct conformal mappings between regions. Solve problems on bilinear transformation and find the Taylor's and Laurent's series.	
CO 3	Analyze the complex functions with reference to their analyticity, integration using Cauchy's integral theorem and Cauchy's Residue theorem.	
CO 4	Express any periodic function as Fourier series, Fourier sine and Cosine series.	
CO 5	Finding Fourier series for numerical values of any function. Interpret and use the basic concepts of analytic function, Taylor and Laurent series, singularities, residues, conformal mapping, Fourier series and Harmonic analysis.	

IT T32 - Electronic Devices and Circuits		Yr/Sem: II/II
CO 1	Classify semiconductor materials and discuss the construction and operation of PN junction diodes, Zener diodes. Need and use of Clippers, Clampers, Series and Shunt regulators.	
CO 2	Discuss the construction, operation, and characteristics of transistors. Analyze the transistor biasing circuits using the stability factor. Discuss the creation and operation of Field Effect Transistor devices, MOSFET, BJT, as well as their V-I Characteristics curves. Analyze the important parameters of FET, JFET, MOSFET.	
CO 3	Examine the circuit and operation of RC Coupled Amplifier, Class A, Class B, Class C and D amplifiers. Examine the Positive and Negative Feedback, Barkhausen Criterion, Wien Bridge, Hartley, Colpits and Crystal Oscillator.	
CO 4	Confer and examine op-amp characteristics, parameters and applications. Consider and review summer, subtractor, differentiator, integrator, comparator, multiplier filters.	
CO 5	Discuss the operation and principles of special purpose diodes, seven segment displays, OPTO-isolator. Examine characteristics and equivalent circuit of UJT, SCR, DIAC and TRIAC.	



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IT-T33 DATA STRUCTURE		Yr/Sem:II/III
CO 1	To introduce the primary data structures and the associated operations	
CO 2	To understand the applications of data structures with case studies	
CO 3	To learn the implementation issues of the data structures introduced	
CO 4	Discuss on graph, representation, traversals, topological sort, Operations, representation and applications on sets.	
CO 5	Confer on tables, its types, static and dynamic tree tables, hash tables. Discuss on files and sorting with tapes and disks.	

IT T34 - Object Oriented Programming		Yr/Sem: II/III
CO 1	Confer and discuss the concepts, advantages of OOP. Examine the structure of C++ program, control structures. Consider and explain classes and objects, OOPs Concepts (Encapsulation), friend function, member function, overloading member function. Discuss the L Values, R Values, return references and function overloading.	
CO 2	Review on the need of constructors, destructors, copy constructors, recursive constructor. Discuss about the overloading functions, classes and inheritance, pointers, and overloading member functions.	
CO 3	Examine pointers and arrays to classes and objects, void pointers. Confer the memory models and dynamic objects. Discuss about polymorphism, virtual functions, string attributes.	
CO 4	Discourse about file stream classes, binary and ASCII files, error handling functions. Converse generic programming, class templates and inheritance, operator overloading, class templates and exception handling.	
CO 5	Discuss OO concepts, UML diagrams, OO design methodology.	

IT T35 - Digital System Design		Yr/Sem: II/III
CO 1	Discuss Binary number systems, BCD codes, Excess-3 codes, Gray codes, Alphanumeric codes, Error detecting and correction codes. Confer De-Morgan's	



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	theorems, canonical form. Examine karnaugh maps, Quine-Mc-Cluskey method, universal gates.
CO 2	Confer combinational logic (adders, subtractors, multipliers), Encoders, Decoders, Multiplexers, De-multiplexers, comparators and parity checker.
CO 3	Discourse about flip flops, counters, types and applications of shift registers. Discuss the design of clocked sequential circuits, Mealy and Moore models, state reduction techniques.
CO 4	Discuss about organization of ROM and RAM, PLDs, PLAs, PAL devices, FPGAs implementation using PROMs, PLAs, PALs
CO 5	Discourse Verilog HDL, 4 bit ripple carry counter, Gate level Modeling, Data low Modeling. Discuss on counters, full adders and behavioral modeling

IT T36 - Computer Organization		Yr/Sem: II/III
CO 1	To understand the basic operation of a computer	
CO 2	To understand the design and organization of a Von-Neumann computer system.	
CO 3	To comprehend the importance of the hardware-software interface.	
CO 4	Can be familiar with the Von Neumann architecture, parallel, pipelined, superscalar, and RISC/CISC architectures.	
CO 5	Confess, multiple-bus organization, hardwired control, micro-programmed control, pipelining superscalar operations, performance considerations	

IT P32 - Data Structures Laboratory		Yr/Sem:II/III
CO 1	To introduce the basics of C++ programming language.	
CO 2	To introduce the concepts of ADTs.To introduce the concepts of Hashing and Sorting	



  
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IT P32 - Electronics Devices and Circuits Laboratory		Yr/Sem:II/III
CO 1	Demonstrate the V-I Characteristics of PN Junction diode, Zener diode, Clipper circuits, input & output Characteristics of BJT, JFET, MOSFET and UJT transistor configuration. Application of clippers, clampers	
CO 2	Application of OPAMP, Determination of ripple factor for of rectifiers with and without filters and Draw the Voltage regulation characteristics of shunt using IC	

IT P33 - Digital Laboratory		Yr/Sem: II/III
CO 1	Comprehension : Discuss the combinational circuit as Adder, Subtractor, Magnitude comparator, Multiplexers, Encoders, Decoders and De-multiplexers using basic logic gates.	
CO2	Comprehension: Discuss the sequential circuits Shift register, Ripple Counters, Synchronous Counters with the help of digital basic logic gate. Simulation of combinational and sequential logic using HDL.	

### SEMESTER-IV

MA T41 - Mathematics - IV		Yr/Sem: II/IV
CO 1	Formulate and solve partial differential equation.	
CO 2	Derive and obtain the solution of wave equation and boundary value problems.	
CO 3	Derive and obtain the solution of heat equation and boundary value problems.	
CO 4	Apply least square method to fit various curves for the given data investigate the validity of hypothesis by Z-distribution techniques.	
CO 5	Calculation of analysis of variance and explain the use of the Chi-squared test and its calculation.	

IT T42 – Communication Engineering-I		Yr/Sem: II/IV
CO 1	To introduce the basics of electronic communication	
CO 2	To introduce different analog modulation systems	



  
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CO 3	To introduce the operation of modulator and demodulator for different analog modulation systems.
CO 4	To explore the use of pulse modulation system
CO 5	To introduce the techniques of digital modulation

IT T43 - Design and Analysis of Algorithms		Yr/Sem: II/IV
CO 1	Confer asymptotic notations -Heap, shell, radix, insertion, selection and bubble sort; sequential, binary and Fibonacci search. Discuss about recurrence equations, analyzing control structures.	
CO 2	Exchange views on Divide and Conquer Method, Strassen's Matrix multiplication, knapsack problem - minimum spanning tree algorithms scheduling, optimal storage on tapes, optimal merge patterns.	
CO 3	Discuss on Dynamic Programming, all pair shortest path algorithm - 0/1 Knapsack and Traveling salesman problem - chained matrix multiplication. Techniques for binary trees and graphs - AND/OR graphs - bi-connected components - topological sorting.	
CO 4	Discourse - 8-queens problem - sum of subsets - graph coloring -Hamiltonian cycle - Knapsack problem.	
CO 5	Discuss Least Cost (LC) search - the 15-puzzle problem - control abstractions for LC-Search - Bounding- FIFO Branch-and-Bound - 0/1 Knapsack problem - Traveling Salesman Problem, NP-Hard and NP- Completeness.	

IT T44 - Microprocessors and Microcontrollers		Yr/Sem: II/IV
CO 1	Comprehension: Describe the architecture of 8085 and development of assembly language program by using instruction sets, stack and subroutines, looping statements and discuss about addressing modes of a typical microprocessor.	
CO 2	Comprehension: Describe the function of different peripheral IC's 8253, 8259, 8237 to interface with external peripheral device.	



  
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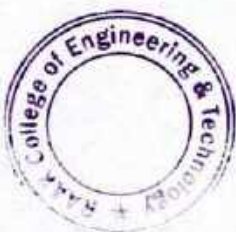
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CO 3	Application: Demonstrate the architecture of 8279, 8255 and also develop the assembly language program with the help of special function registers, timers and counters and demonstrate 8251 USART.
CO 4	Comprehension: Describe the architecture of 8086 and also develop the ASM program with the help of instruction set and addressing modes.
CO 5	Confer and demonstrate Intel 8051 Microcontroller, Pins and signals, Timing and control, interrupts and Instruction set.

<b>IT T45 – JAVA Programming</b>		<b>Yr/Sem: II/IV</b>
CO 1	To understand the basics of Java	
CO 2	To learn the features of Java	
CO 3	To learn the advanced concepts in Java.	
CO 4	Students will understand the benefits and capabilities of Java.	
CO 5	To summarize java offers code reusability, platform independence	

<b>IT T46 – System Software</b>		<b>Yr/Sem: II/IV</b>
CO 1	Understand the design and implementation of Assemblers, loaders, linkers and compilers.	
CO 2	Understand how source language programs are implemented at the machine level.	
CO 3	Understand compilation as an instance of language translation.	
CO 4	To design and implement a significant portion of a compiler for a language chosen by the instructor	
CO 5	To use of formal attributed grammars for specifying the syntax and semantics of programming languages. Have in depth Working knowledge of the major phases of Loading linking and compiling.	



  
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IT P41 - Algorithms Laboratory		Yr/Sem: II/IV
CO 1	To introduce the implementation of various design techniques using C and C++.	
CO 2	Learn to implement the complex tasks using various design techniques.	

IT P42- Microprocessors and Microcontrollers Laboratory		Yr/Sem: II/IV
CO 1	Experiment using 8085 microprocessor and implement arithmetic operations, block operations, code conversions, real time examples	
CO 2	Experiment and implement using 8086 microprocessor and 8051 microcontroller	

IT P43- JAVA Laboratory		Yr/Sem: II/IV
CO 1	To understand the basics of java	
CO 2	To write programs in Java covering the object oriented concepts. To write programs covering advanced concepts in java like thread handling, applets, RMI and JDBC	

SP P44 - Physical Education		Yr/Sem: II/IV
CO 1	Understanding the opportunities of students' physical, cognitive, social and emotional development.	
CO 2	Understanding of individual and group motivation and behavior.	
CO 3	To create teamwork among students and produce efficient results.	
CO 4	The students were taught to operate advanced playing kits.	
CO 5	to motivate the students to prepare the professional and scientific reports	

### SEMESTER-V

IT T51- Communication Engineering-II		Yr/Sem: II/IV
CO 1	To learn the various orbits used for satellite communication systems	
CO 2	To understand the working principle of various satellite systems and their applications.	



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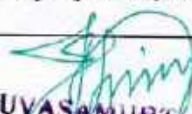
CO 3	To understand the concept of spread spectrum technologies, Rake receivers and CDMA
CO 4	To introduce the concept and operation of cellular mobile communication and to introduce various cellular standards
CO 5	To learn the need for fiber optics communication and the operation of fiber optic communication system.

<b>IT T52- Software Engineering</b>		<b>Yr/Sem: III/V</b>
CO 1	Understanding various approach in Software Development life Cycle.	
CO 2	Discuss about complete strategic approaches towards project management and estimation techniques followed in software development.	
CO 3	Discourse the good software design and the function oriented software design.	
CO 4	Confer the concepts of object oriented design approach.	
CO 5	Understanding the process involved in user interface design and studying various testing methods.	

<b>IT T53 - Operating Systems</b>		<b>Yr/Sem: III/V</b>
CO 1	Discuss about mainframe, distributed, multiprocessor, clustered, real time systems, OS services, system calls, system services, Inter process communication.	
CO 2	Discuss about scheduling criterion, threading issues, critical section, synchronization and semaphores.	
CO 3	Confer about deadlock, paging, segmentation.	
CO 4	Discourse file systems, access methods, file sharing.	
CO 5	Exchange views on disk scheduling, kernel and case study on linux system and windows.	

<b>IT T54- Database Management Systems</b>		<b>Yr/Sem: III/V</b>
CO 1	Discuss about database architecture, relational algebra, query languages, relational calculus, SQL.	
CO 2	Discourse DB design and ER model, Indexing and hashing concepts, static and dynamic hashing, bitmap indices.	
CO 3	Confer relational DB design, normal forms, temporal data.	
CO 4	Discuss about query processing, query optimization, ACID properties, isolation levels, transactions as SQL statements	



  
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CO 5	Exchange views on deadlocks, IBM DB2, My SQL, levels of consistency.
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IT T55- Theory of Computation		Yr/Sem: III/V
CO 1	Learning about automata, grammar, language, and their relationships. Further, gives an understanding of the power of Turing machine, and the decidability nature of a problem. Also, gives the idea on some new trends and applications.	
CO 2	Explain the basic concepts of deterministic and non-deterministic finite automata regular language, context-free language, Turing machines, computability and complexity.	
CO 3	Describe the formal relationships among machines, languages and grammars.	
CO 4	Solve the problems using formal language.	
CO 5	Develop a view on the importance of computational theory.	

IT E51- COMPUTER HARDWARE AND TROUBLESHOOTING		Yr/Sem: III/V
CO 1	It provides insight to the various parts and types of computer.	
CO 2	It familiarizes the hardware types and the evolution in each of them	
CO 3	It also gives the basics of troubleshooting.	
CO 4	Implementation of the data structures in different language platforms	
CO 5	The students will have theoretical exposure as well as hands on exposure to know about the hardware aspects of computer.	

IT P51- Communication Engineering Laboratory		Yr/Sem: III/V
CO 1	To understand the working of main concepts of analogue and digital communication systems	
CO 2	To enhance technical skills through analyzing the waveforms obtained at various stages of the experiment. To verify the experimentally obtained and simulated outputs and knowing the reason for the deviation.	



  
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### IT P52 - Operating Systems Laboratory Yr/Sem: III/V

CO 1	Implement basic UNIX /LINUX commands, programs implementing I/O system calls, implement scheduling algorithms.
CO 2	Implement synchronization problem, memory management schemes, and develop application using RTOS.

### IT P53 - Database Management System Laboratory Yr/Sem: III/V

CO 1	Study database, SQL, Query types and procedural query language
CO 2	Design and develop real time applications.

### HS P54 - General Proficiency - I Yr/Sem: III/V

CO 1	To understand and practice the art of communication
CO 2	To able to practice and showcase soft skills.
CO 3	To understand the importance of writing.
CO 4	To practice speaking skill.
CO 5	To practice verbal, non-verbal and numerical aptitude.

## SEMESTER-VI

### IT T61 - Computer Networks Yr/Sem: III/VI

CO 1	Discuss about the network hardware and software, various layer in the OSI.
CO 2	Discourse the data link layer in detail, services, design, protocols.
CO 3	Confer the network layer in detail, services, design, addresses.
CO 4	Exchange views on the transport layer in detail, services, design, congestion control.
CO 5	Discourse the application layer in detail, services, design, protocols.

### IT T62 - Web Technology Yr/Sem: III/VI

CO 1	Confer major components and protocols of internet applications and design web page.
CO 2	Discuss about client side and server side programming languages for web.



  
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CO 3	Enable to design and develop web page using xml .language by schema techniques and formatting objects.
CO 4	Confer the importance of multimedia in web designing and usage of web application development.
CO 5	Understand web services and modules involved in building in service. Confer and develop programs using ajax concepts.

IT T63 - Artificial Intelligence		Yr/Sem: III/VI
CO 1	Confer history of AI, exchange views on Heuristic Search Techniques, Means Ends Analysis, Intelligent agents.	
CO 2	Discuss about propositional logic, predicate logic, forward and backward reasoning, filler structure, Based agents.	
CO 3	Discourse about non-monotonic reasoning, certainty factors, Bayesian networks, Fuzzy logic.	
CO 4	Confer and analyze the planning techniques, forms of learning.	
CO 5	Discuss about mini max search procedure, expert system representation, expert system shells, robotics.	

IT T64 - Information Coding Techniques		Yr/Sem: III/VI
CO 1	To understand the coding principles and different security algorithms.	
CO 2	Learn the coding techniques.	
CO 3	Learn the cryptographic algorithms	
CO 4	Study the code generation process.	
CO 5	To analyze the compression techniques.	

IT E62- Software Project Management		Yr/Sem: III/VI
CO 1	To understand the roles of the project manager	
CO 2	To understand the threats and opportunities in project management	
CO 3	To gain Expertise in size, effort and cost estimation technique	



  
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CO 4	To understand the techniques available with which a project's aims and objectives, timetable, activities, resources and risks can be kept under control
CO 5	To understand the social and political problems a project will encounter against which the technical problems pale into insignificance--and to begin to understand how to approach non-technical problems

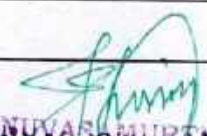
<b>IT E68- User Interface Design</b>		<b>Yr/Sem: III/VI</b>
CO 1	To study the basic characteristics of graphics and web interfaces	
CO 2	The students learn concepts of user interface and used for web applications, human interfaces and for multimedia interfaces.	
CO 3	To study Human Computer Interaction, multimedia interfaces for the web and the principles of evaluating interfaces	

<b>IT P61 - Computer Networks Laboratory</b>		<b>Yr/Sem: III/VI</b>
CO 1	Implement a socket program to transfer file using TCP, UDP, program for CRC and Hamming code, program for sliding window protocols, TCP module implementation.	
CO 2	Implementation of routing protocols, ARP, security compromise on a node using NS2, implementation of traffic sources using NS2.	

<b>IT P62 - Web Technology Laboratory</b>		<b>Yr/Sem: III/VI</b>
CO 1	Understand and work with client side scripting, ActiveX, web servers and Java Server Pages.	
CO 2	Work and develop applications using XML, Server Side scripting, Ajax programming, Web services and mini project on E-commerce application.	

<b>IT P63 - Mini Project</b>		<b>Yr/Sem: III/VI</b>
CO 1	Software requirements analysis and specification, Software testing and maintenance	
CO 2	Communication skills and teamwork	



  
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HS P64 – General Proficiency – II		Yr/Sem:III/VI
CO 1	Understand the composition analysis.	
CO 2	Developing letter and resume writing skills.	
CO 3	Understand and practice oral skills through group discussions and negotiation activities.	
CO 4	Practice corporate etiquette, grooming and dressing.	
CO 5	Practice verbal, non-verbal and numerical aptitude.	

### SEMESTER-VII

IT T71 - Mobile Computing		Yr/Sem: IV/VII
CO 1	To understand basic concepts of wireless and mobile communication.	
CO 2	Exchange views about the state of art industry standards in wireless networking.	
CO 3	Confer the various facilities available for mobile communication including protocol and security mechanism.	
CO 4	Discuss various transaction models associated with mobile data management in mobile computing.	
CO 5	Discourse the widely used mobile computing models.	

IT T72- Web Services and XML		Yr/Sem: IV/VII
CO 1	To understand the advantages of using XML technology family.	
CO 2	To analyze the problems associated with tightly coupled distributed software architecture.	
CO 3	To learn the Web services building block	
CO 4	To implement e-business solutions using XML based web services	
CO 5	Students will understand the benefits of XML, web services and SOA. They will learn how to develop e-business applications using these technologies.	



  
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IT T73- Cryptography and Network Security		Yr/Sem: IV/VII
CO 1	To learn about wired and wireless network security with various cryptographic techniques.	
CO 2	Use appropriate methods in security	
CO 3	Learn various methods of implementing security	
CO 4	Include private and public keys algorithms along with attacks types.	
CO 5	Advanced techniques of security and their implementation Implementation of the latest security for latest security threats	

IT E72- SOFTWARE TESTING		Yr/Sem: IV/VII
CO 1	To accuquire knowledge on various test design and strategies	
CO 2	To learn, practice and apply the software testing industry practices	
CO 3	Ability to apply appropriate testing methods for varying requirements of the software industry.	
CO 4	Understanding and executing the responsibility of the software testing personal and producing error free software	
CO 5	The students can be encouraged to apply concepts learnt in this course in their programming laboratory and project.	

IT E723- MANAGEMENT CONCEPTS AND STRATEGIES		Yr/Sem: IV/VII
CO 1	To introduce the fundamental of Management concept strategies	
CO 2	To study the concepts of Software Management	
CO 3	To get acquainted with Software Quality Assurance Standardization	
CO 4	Manage Software projects in organization	
CO 5	Follow Social responsibility, standards, policies and Ethics	



  
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### IT P71 - Mobile Computing Laboratory

Yr/Sem: III/VII

CO 1	To introduce the basics of Mobile computing.
CO 2	To introduce the WML and J2ME Technologies, to learn Bluetooth and distributed mobile computing.

### IT P72 - Web Services and XML Laboratory

Yr/Sem: III/VII

CO 1	The students learn how to design and develop business applications using the popular middleware technologies practiced in the industry.
CO 2	Develop distributed applications in popular platform independent technologies for any business domain.

### IT P73 - Project Phase - I

Yr/Sem: IV/VII

CO 1	Motivate students to select application related projects.
CO 2	Students study the reference papers from various domain and select domain of their wish.
CO 3	Students have detailed survey on selected domain and identify base paper and give presentation.
CO 4	Students identified problem formulation of their existing work.
CO 5	Students performed survey, identified the base paper, problem formulation and gave presentation.

### IT P74 - Seminar

Yr/Sem: IV /VII

CO 1	Students must be able to make critical review of literature.
CO 2	Preparation of report on the topic.

### IT P75 - Industrial Visits/ Training

Yr/Sem: IV/VII

CO 1	Ability to demonstrate the use, interpretation and application of an appropriate international engineering standard in a specific situation.
CO 2	Ability to analyze a given engineering problem, identify an appropriate problem solving methodology and propose a meaningful solution.



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### SEMESTER-VIII

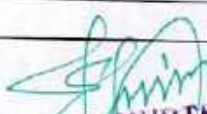
IT T81 - Professional Ethics		Yr/Sem: IV/VIII
CO 1	Discuss engineering ethics, moral issues, ethical theories and their uses in engineering	
CO 2	Realize code of ethics, engineer's responsibility for safety, rights and responsibilities	

IT T82- Distributed Computing		Yr/Sem: IV/VIII
CO 1	To understand the importance of communication in distributed environment.	
CO 2	To study the actual implementation of various communication mechanisms.	
CO 3	To learn the distributed resource management mechanisms	
CO 4	Learn the distributed computing concepts. learn the resource management techniques.	
CO 5	Learn the file management in distributed environment.	

IT E81- E-Commerce		Yr/Sem: IV/VIII
CO 1	The students can learn how companies use e-commerce to gain competitive advantage.	
CO 2	To familiarize the students with the concepts of e-commerce	
CO 3	The students can learn different models of e-commerce.	
CO 4	The students can understand how e-payment is affected.	
CO 5	E-commerce legal issues	

IT P81 - Project Phase-II		Yr/Sem: IV/VIII
CO 1	Student installed and learnt the software simulation tool.	
CO 2	System architecture is designed and implementation of modules were done.	
CO 3	Review was conducted.	
CO 4	Demonstration of project and performance analysis is done.	
CO 5	Presentation is done and Report is submitted	



  
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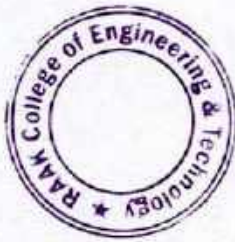
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IT P82 -Comprehensive Viva-Voce

Yr/Sem: IV/VIII

CO 1

Remember all areas of Computer Science and engineering.



  
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DEPARTMENT OF MECHANICAL ENGINEERING

DISSEMINATION OF PO, PEO & PSO TO STUDENTS

### RAAK COLLEGE OF ENGINEERING & TECHNOLOGY

#### DEPARTMENT OF MECHANICAL ENGINEERING

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)	PROGRAM OUTCOMES		PROGRAM OUTCOMES
PEO 1: Graduates will be able to apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialty to solve complex problems in mechanical engineering.	PO 1: <b>ENGINEERING KNOWLEDGE</b>	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialty to solve complex problems in mechanical engineering.	PO 7: <b>ENVIRONMENT AND SUSTAINABILITY</b>
PEO 2: Graduates will be able to identify, formulate, and solve complex engineering problems by applying principles of engineering, engineering fundamentals, and an engineering specialty.	PO 2: <b>PROBLEM ANALYSIS</b>	Identify, formulate, analyze, and solve complex engineering problems by applying principles of engineering, engineering fundamentals, and an engineering specialty.	PO 8: <b>ETHICS</b>
PEO 3: Graduates will be able to design a minimum one or more mechanical engineering systems, components, or processes to meet specified needs with appropriate consideration for public health, safety, and environmental, cultural, and societal considerations.	PO 3: <b>DESIGN/DEVELOPMENT OF SOLUTIONS</b>	Design a minimum one or more mechanical engineering systems, components, or processes to meet specified needs with appropriate consideration for public health, safety, and environmental, cultural, and societal considerations.	PO 9: <b>ENVIRONMENTAL AND TEAM WORK</b>
PEO 4: Graduates will be able to conduct investigations, experiments, and design projects to develop and test mechanical engineering systems, components, or processes, and to use the results to solve mechanical engineering problems and to make a design.	PO 4: <b>CONDUCT INVESTIGATIONS OR SIMPLE PROJECTS</b>	Conduct investigations, experiments, and design projects to develop and test mechanical engineering systems, components, or processes, and to use the results to solve mechanical engineering problems and to make a design.	PO 10: <b>COMMUNICATION</b>
PEO 5: Graduates will be able to apply engineering design to produce a solution to a problem, taking into account public health, safety, and environmental, cultural, and societal considerations.	PO 5: <b>MODERN TOOL USAGE</b>	Apply engineering design to produce a solution to a problem, taking into account public health, safety, and environmental, cultural, and societal considerations.	PO 11: <b>PROJECT MANAGEMENT AND FINANCE</b>
PEO 6: Graduates will be able to apply engineering design to produce a solution to a problem, taking into account public health, safety, and environmental, cultural, and societal considerations.	PO 6: <b>ENGINEERING SOCIETY</b>	Apply engineering design to produce a solution to a problem, taking into account public health, safety, and environmental, cultural, and societal considerations.	PO 12: <b>LIFELONG LEARNING</b>

**GPS MAP CAMERA**

**57 Puducherry IN**

Latitude **11.9223327**      Longitude **79.7679612**

Date: **22 Jun 2022**      Time: **12:15 PM**

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# RAAK

## COLLEGE OF ENGINEERING AND TECHNOLOGY

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### MECHANICAL ENGINEERING

#### PROGRAM OUTCOMES (PO):

##### PO1 – ENGINEERING KNOWLEDGE:

Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to solve complex problems in mechanical engineering.

##### PO2 – PROBLEM ANALYSIS:

Identify, formulate, review research literature, and analyze complex mechanical engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

##### PO3 – DESIGN/DEVELOPMENT OF SOLUTIONS:

Design solutions for complex mechanical engineering problems and design system components or processes to meet specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.

##### PO4 – CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS:

Use research-based knowledge and methods, including the design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions in mechanical engineering.

##### PO5 – MODERN TOOL USAGE:

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

##### PO6 – THE ENGINEER AND SOCIETY:

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

##### PO7 – ENVIRONMENT AND SUSTAINABILITY:

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

##### PO8 – ETHICS:

Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice in mechanical engineering.



*S. Seenuvasamurthi*  
Dr. S. SEENUVASAMURTHI, M.E., Ph.D.  
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### PO9 – INDIVIDUAL AND TEAM WORK:

Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings in mechanical engineering.

### PO10 – COMMUNICATION:

Communicate effectively on complex engineering activities with the engineering community and with society at large, including the ability to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### PO11 – PROJECT MANAGEMENT AND FINANCE:

Demonstrate knowledge and understanding of 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 in mechanical engineering.

### PO12 – LIFE-LONG LEARNING:

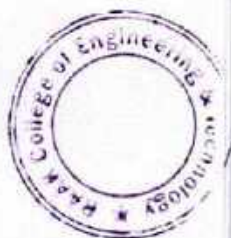
Recognize the need for, and have the preparation and ability to engage in, independent and life-long learning in the broadest context of technological change in mechanical engineering.

### PROGRAM EDUCATIONAL OBJECTIVES (PEO):

- **Technical Excellence:** Achieve excellence in mechanical engineering principles and practices.
- **Career Readiness:** Prepare graduates for successful careers in industry and academia.
- **Ethical Leadership:** Demonstrate ethical practices and leadership skills in professional activities.
- **Lifelong Learning:** Engage in lifelong learning to stay updated with technological advancements.

### PROGRAM SPECIFIC OUTCOMES (PSO):

- **System Design:** Design and develop mechanical systems and processes.
- **Sustainability:** Develop sustainable solutions in manufacturing and thermal engineering.
- **Research and Innovation:** Conduct research and innovate in mechanical engineering.



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DEPARTMENT OF MECHANICAL ENGINEERING  
SUBJECT WISE COURSE OUTCOME (2022 – 2023)

SUBJECT LIST  
(2013 -2014)

S. No.	Course Code	Course Name
1.	T101	Mathematics - I
2.	T102	Physics
3.	T103	Chemistry
4.	T104	Basic Electrical and Electronics Engineering
5.	T105	Engineering Thermodynamics
6.	T106	Computer Programming
7.	P101	Computer Programming Laboratory
8.	P102	Engineering Graphics
9.	P103	Basic Electrical and Electronics Laboratory
10.	T107	Mathematics - II
11.	T108	Material Science
12.	T109	Environmental Science
13.	T110	Basic Civil And Mechanical Engineering
14.	T111	Engineering Mechanics
15.	T112	Communicative English
16.	P104	Physics Laboratory
17.	P105	Chemistry Laboratory
18.	P106	Workshop Laboratory
19.	P107	NSS/NCC
20.	MA T31	Mathematics - III
21.	MET31	Mechanics of Solids
22.	MET32	Mechanics of Fluids
23.	MET33	Applied Thermodynamics
24.	MET34	Manufacturing process
25.	MET35	Electrical and Electronics Engineering



  
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26.	MEP31	Material Testing and Metallurgy Lab
27.	MEP32	Manufacturing Process Lab-1
28.	MEP33	Electrical And Electronics Lab
29.	MA T41	Mathematics - IV
30.	MET41	Engineering Metallurgy
31.	MET42	Fluid Machinery
32.	MET43	Kinematics of machinery
33.	MET44	Machine Drawing
34.	MET45	Machining Process
35.	MEP41	Fluid Mechanics And Machinery Lab
36.	MEP42	Manufacturing Process Lab-2
37.	MEP43	Computer Aided Machine Drawing Lab
38.	MEP44	Physical Education
39.	MET51	Dynamics of Machinery
40.	MET52	Design of Machine Element
41.	MET53	Metrology and Quality Control
42.	MET54	Heat and mass Transfer
43.	MET55	Mechanical Measurement
44.	MEE54	Industrial Casting Technology
45.	MEP51	Manufacturing Process Lab-3
46.	MEP52	Mechanical Measurement and Metrology Lab
47.	MEP53	Computational Method Lab
48.	MEP54	General proficiency Lab-1
49.	MET61	Operational Research
50.	MEP62	Design of Transmission System
51.	MEP63	Thermal Engineering
52.	MEP64	Computer Integrated Manufacturing
53.	MEP65	Control System Engineering
54.	MEE61	Automobile Engineering
55.	MEP61	Thermal Engineering Lab-1
56.	MEP62	Dynamics of Machine lab
57.	MEP63	Computational Fluid Dynamic Lab
58.	MEP64	General Proficiency Lab-2
59.	MET71	Computer Aided Design
60.	MET72	Industrial Engineering And Management
61.	MET73	Refrigeration , Air conditioning and Cryogenic engineering



  
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DEPARTMENT OF MECHANICAL ENGINEERING

SUBJECT WISE COURSE OUTCOME (2022 – 2023)

I- SEMESTER

T101 Mathematics – I	
CO1	Apply knowledge of mathematics to solve functions of several variables
CO2	Identify, formulate and solve engineering problems like multiple integrals and their usage
CO3	To solve differential equation that model physical processes using effective mathematical tools
CO4	Able to find equation of straight line of shortest distance, equation of plane, angle between straight lines
CO5	Gain the knowledge to solve first order differential equation arising in engineering

T102 Physics	
CO1	Apply knowledge of science and engineering to understand physics and its significant contribution in the advancement of technology and invention of new products that dramatically transform modern day society
CO2	Identify different areas of physics which have direct relevance and application to different engineering disciplines
CO3	Apply fundamental knowledge to understanding applications of ultrasonics, optics and some optical devices, lasers and fiber optics, nuclear energy sources and wave mechanics
CO4	Understanding the basic operating principles of laser, its applications, optical fibre and its types, transmission characteristics, applications of optical fiber
CO5	Understanding the basic operating principles of laser, its applications, optical fibre and its types, transmission characteristics, applications of optical fibers

T103 Chemistry	
CO1	Apply knowledge of science and engineering to understand the importance of chemistry in engineering domain
CO2	Identify different electrochemical cells and their usage for industrial process
CO3	Apply fundamental knowledge of chemistry and build an interface of theoretical concepts with industrial applications engineering applications.
CO4	Guide the students to gain the knowledge about the cooling curves, phase diagrams, alloys and their practical importance
CO5	Strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with the industrial engineering applications



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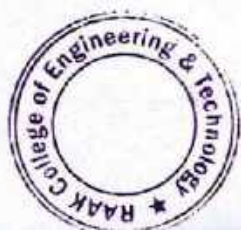
TI04 – Basic Electrical And Electronics Engineering	
CO1	Applying the kirchoff 's law , concept the series and parallel resistance , node , mesh analysis To solve dc circuit
CO2	Determine the average , RMS , form and peak factor of various waw form and the RL , RC and RLC series circuit
CO3	Explain the working principle of diode , Transistor , FET and analysis the characteristics curve
CO4	Also extend it on Rectifier , Amplifier , Oscillator application
CO5	Micro wave , Satellite , optical fiber and cellular mobile system

TI05 – Engineering Thermodynamics	
CO1	Understand and apply the Thermodynamics principle in analyzing thermal system
CO2	Analyze energy and working interaction using the first law of thermodynamics
CO3	Explore the law of implication of system behavior including entropy
CO4	Evaluate gas power cycle for efficiency in engineering application
CO5	Analyze Refrigeration cycle and system for practical use

TI06 – Computer Programming	
CO1	Know concept in problem solving
CO2	To do programming in c language
CO3	To write diversified solution using c language
CO4	To Know above the structure , pointer and its manipulation
CO5	To know about The evaluation of computer , components and its application

PI01 - Computer Programming Lab	
CO1	Students can work with command line interface OS's like MS-Dos
CO2	Students can solve most of the real time problems with C Program
CO3	Students can interact with computer using C program, through various input and output functions.
CO4	Students can make a use of various keywords constants, variables, data types operators, type conversion in C programs.

PI02 – Engineering Graphics	
CO1	Perform freehand sketching of basic geometrical constructions and multiple views of objects.



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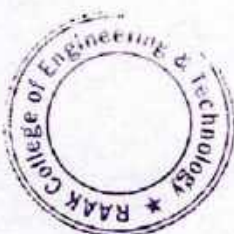
CO2	Project orthographic projections of lines and plane surfaces.
CO3	Draw projections and solids and development of surfaces.
CO4	Visualize and to project isometric and perspective sections of simple solids
CO5	Students will be able to draw orthographic projections and isomeric projections.


P103 – Basic Electrical And Electronics Engineering Lab	
CO1	Know about basic electrical tools ,applications and precautions
CO2	Perform different types of wiring used in domestic and industrial applications
CO3	Measurements of voltage and phase using CRO, basic operations and applications of devices such as PN junction diode and transistors.
CO4	Understand the function and application of basic logic gates and flip flops
CO5	Gain knowledge in domestic wiring and application of electronics devices in the field of electrical engineering

### II- SEMESTER

T107 - Mathematics - II	
CO1	Apply knowledge of mathematics to solve matrix algebra technique for practical applications and curl, divergence and integration of vectors in vector calculus
CO2	Identify, formulate and solve engineering problems like laplace transform and to solve differential and integral equations
CO3	Apply formulae and analyze problems of fourier transform techniques
CO4	Determine the fourier transform , Fourier cosine and sine transform of elementary functions, properties of transforms and its application in engineering
CO5	Acquire knowledge of matrix algebra techniques, vector calculus, laplace and Fourier Transform

T108 - Material Science	
CO1	Apply core concept in material science to solve engineering problems
CO2	Knowledgeable of contemporary issues relevant to material science and engineering
CO3	Understand about ferrites and its application to magnetic materials
CO4	Select materials for design and construction
CO5	Understand the importance and properties of materials



  
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TI09 - Environmental Science	
CO1	Apply fundamental knowledge to understand about the environment
CO2	Identify environmental pollution through science
CO3	Apply basic knowledge to solve various environmental issues and problems
CO4	Ability to consider issues of environment and sustainable development in his personal and professional undertakings
CO5	Provide a comprehensive knowledge in environmental science, environmental issues and the management from an interdisciplinary perspective

TI10 – Basic Civil & Mechanical Engineering	
CO1	Identify building types as per national code and comprehend construction material
CO2	Understand the building components , soil classification and basic infrastructure element
CO3	Grasp working principle of combustion system and boiler application
CO4	Analyze conventional and non conventional

TI11 – Engineering Mechanics	
CO1	Understanding the force and movements for static Equilibrium
CO2	Apply the laws of motion and Kinematics
CO3	Solve the Practical problems with mechanics Concepts
CO4	Analyze the force System in Structural members
CO5	Apply the Kinematics and kinetics to particles and rigid bodies

TI12 – Communicative English	
CO1	Learnt about the definition of communication, importance, concept. Sender, ideation, the levels in communication, channels, oral and return way of communication , body language and non verbal communication, accuracy, brevity and clarity, difference barriers for communication, techniques in making effective communication, listening importance and types of listening
CO2	Students learnt about the types of letters, report writing, notices and memo and also develop the skill in writing
CO3	Understands the comprehension, identifies the difference between skimming and scanning, guess the meaning of the words, indentify to make notes.
CO4	Students learn the writing skills, how to write a paragraph in a proper manner four modes of writing and how to bibliographical entries
CO5	Students were able to develop their spoken skills by making many activities related to it



  
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P104 – Physics Lab	
CO1	Able to understand how to find the thickness of specimen and also to find the radius of curvature of glass using the phenomenon of two interference of light
CO2	Able to understand the specific rotary power of an optical active solution using the principle of polarization
CO3	To understand about the thermal conductivity of bad conductor and rubber tube
CO4	Ability to understand about the optical properties like dispersive power, resolving power by applying the knowledge of optics

P105 – Chemistry Lab	
CO1	Students will become well acquainted to test amount of hardness present in samples of water
CO2	Students will be efficient in estimating acidity/alkalinity in given samples
CO3	Students will have knowledge about estimating amount of dissolved oxygen in water
CO4	Students will become well acquainted to estimate copper in brass
CO5	Students will have knowledge about determination of viscosity of sucrose using Ostwald's viscometer

P106 – Workshop Practice Lab	
CO1	To convey the basic of mechanical tools used in carpentry section and established hands on Training in making the different carpentry joint
CO2	To gain knowledge on types of tools and mechanics used in sheets metal shop and perform some exercise
CO3	To develop the basic welding and fitting joints using the hand tools and establish the importance of joints and fitting in engineering application
CO4	To gain knowledge of the different mechanics used in manufacturing process which are commonly employed in industry, to fabricate component using different material
CO5	To carry out simple manufacturing operation in lathe, drilling and shaping machine

### III– SEMESTER

MA T31 – Mathematics – III	
CO1	Familiarize with the concept of analytic function, C-R equations and its uses
CO2	Learn about Cauchy's theorem and its uses in complex integration. Taylor's and Laurent's series in complex form
CO3	Learn about Cauchy's Residues theorem and contour integrations



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CO4	Gain knowledge of Finite and Infinite Fourier Transforms and applications
CO5	To introduce the route means fire value and parallel theorem on Fourier for practical applications

MET31 – Mechanics of Solids	
CO1	Analyze of material behavior , thermal stress and beam force for comprehensive structural insights
CO2	Master stress variation , normal/shear stresses and design principle for beams under bending force
CO3	Apply double intergration moment area , and strain energy method for accurate structural analyzes
CO4	Expertise in analysing torsion designing shaft and applying torsional concept to springs
CO5	Applying Euler's equation , Emperical formulae and understand the cylinder mechanics for robust structural design

MET32 - Mechanics and Fluids	
CO1	Analyze the fluid property , viscosity and hydrostatic forces on surface for understanding the fluid behaviour
CO2	Master fluid flow of principle , including stream lines velocity and beernoulli's equation for diberse application
CO3	Understand the viscous flow, viscosity measurement and , energy losses in pipies for efficient fluid transport design
CO4	Apply diamental analysis and model law such as Reynolds and Froude model for a systematic fluid dynamic problem solving

MET 33 – Applied Thermodynamics	
CO1	To understand the laws of perfect gases, state equation , gas mixture and pure substance property
CO2	To master 1 <sup>st</sup> and 2 <sup>nd</sup> laws of thermodynamics , energy balance and entropy principle
CO3	Ti introduce the energy reversible work , and assess energy, emphasizing the 2 <sup>nd</sup> law efficiency
CO4	To study the Maxwell equation , TDS equation and equilibrium condition for gases
CO5	To explore storichiometry adiabatic flame temperature , and availability in chemical reaction , emplasizing combustion analysais

MET34 – manufacturing Process	
CO1	Learn casting classification , steps , pattern/core making , molding tools , sand properties , remidie for defect
CO2	Explore welding process , including gases , are , resistance welding , addressing standards , defect and dissimilar material welding
CO3	Understand terminology and common defect in metal forming with rolling , forging , extrusion ,



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	drawing and sheet metal operating
CO4	Master various surface finishing technique , include honing , lapping , super finishing , abrasive belt finishing, polishing, buffing and graining
CO5	Explore plastic and polymers , covering structure , additive ,manufacturing , molding , machining , joining and industrial application

MET35 – Electrical And Electronic Engineering	
CO1	Grasp transformer essential , including EMF equation , equivalent circuit, voltage regulation , efficiency band auto transformer application
CO2	Master three phase induction motor theory , construction , starting , speed control, single phase induction motor , stepper motor and AC series motor application
CO3	Understand alternator construction , operating principle , phasor diagram , losses, efficiency and parallel operation
CO4	Learn operational Amplifier characteristics, application and filter design using differentiation , integration , instrumental amplifier and 555 IC
CO5	Explore IC advantages , study 555 IC pin configuration and design multivibrators, counters and multiplexer

MEP31 – Material Testing and Metallurgy laboratory	
CO1	Develop practical skills in analysing mechanical properties and behavior of material through hand on testing
CO2	Master three phase induction motor , construction , starting , speed control , single phase induction motor , stepper motor and AC series motor application
CO3	Understand alternator construction , operating principle , phasor diagram , losses , efficiency , parallel operation
CO4	Learn operational Amplifier characteristics, application and filter design using differentiation , integration , instrumental amplifier and 555 IC
CO5	Explore IC advantages , study 555 IC pin configuration and design multivibrators, counters and multiplexer

MEP32 – Manufacturing Process lab -I	
CO1	Comprehend principle and operation of lathe and shaping machine and milling machine for metal cutting
CO2	Acquire hands on skills in lathe operation including turning , fasing , grooving chamfering , knurling and V-thread cutting
CO3	Develop practical expertise in shaping Machine operation involving cube shapping and grooving
CO4	Attain proficiency in milling machine operation, covering cube milling and step milling
CO5	Applying knowledge and skill in taper turning on the lathe, demonstrating bersatiliuty in metal



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MEP33 –Electrical And Electronic Lab	
CO1	Understand alternator construction , operating principle , phasor diagram , losses, efficiency and parallel operation
CO2	Master three phase induction motor , construction , starting , speed control , single phase induction motor , stepper motor and AC series motor application
CO3	Explore IC advantages , study 555 IC pin configuration and design multivibrators, counters and multiplexer

### IV- SEMESTER

MA T41 – Mathematics – IV	
CO1	Formulated solved partial differential equation
CO2	Derive and obtain the solution of wave equation and boundary value problems
CO3	Derive and obtain the solution of heat equation and boundary value problems
CO4	Apply least square method to fit various curves for the given data investigate the validity of hypothesis by z distribution techniques
CO5	Calculation of analysis of variance and explain the use of chi-squared test and its calculation

ME T41 – Engineering Metallurgy	
CO1	Acquire basic knowledge of material science concept , crystal structure , solid solution and metallurgy microscope
CO2	Construct and interrupt binary phase diagram comprehend iron /carbon equalbrium diagram and classify steel and alloy steel
CO3	Demonstrate knowledge of heat treatment process for steel , including critical temp, annealing normalizing harding and tempering
CO4	Understand the properties , application and manufacturing process of non-ferrous metal and alloy including copper , alluminium , nickel , zinc , lead based alloy
CO5	Analyze the plastic deformation , slip tinning ,and various working process , introduction to fracture mechanics , ductile to brittle transition and understanding of creep and fatigue fai

MET42 – Fluid Machinery	
CO1	Under the turbo machine , positive displacement pumps and application of impulse momentum and velocity triangles
CO2	Analyze the hydraulic turbine , including pelton wheels francis , Kaplan with velocity triangle and performance characteristic
CO3	Understand the hydraulic and centrifugal pump and reciprocating pump, considering power



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	estimation in governing mechanism
CO4	Explore air machine compressor, fan, including reciprocating, centrifugal, axial flow compressor, blower and fan

MET43 – Kinematics Of Machinery	
CO1	Understand kinematic chain element, mobility, application in mechanism and machine
CO2	Conduct kinematic analysis using instantaneous center and relative velocity method for planer mechanism
CO3	Learn graphical synthesis method for three point synthesis chebyshevs spacing
CO4	Analysing design cams with different profiles for varied cam followers configuration
CO5	Understanding gear classification, laws tooth profile, interference avoidance and gear ratio evaluation

MET44 – Machine Drawing	
CO1	Grasp conversion for sectioning, dimensioning and detailing the various mechanical components
CO2	Developing the proficiency in preparing the detail drawing for joint, coupling, bearing and various machine components
CO3	Apply fits and tolerance concept, machine, Symbol and geometric tolerance in components drawing
CO4	Demonstrate the ability to create assembly drawing for various joint, coupling, bearing and various machine components
CO5	Apply the drawing principle to represent and understand the design and assembly of mechanical components, joint and system

MET45 – Machining Process	
CO1	Understand the lathe operation including types, work holding, cutting parameter and, machine timing
CO2	Learn the basic machine operation on Shaping, planning and Slotting machine, along with the types and operation
CO3	Gain knowledge of milling operation. Including types, process, un conventional machine technique and machining types
CO4	Familiarize with cutting tools, material, geometric, mechanism, tools life and selection of cutting tools
CO5	Comprehend the drilling operation on various machin, covering operation and machining time



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MEP41 – Fluid Mechanics and Machinery Lab	
CO1	Understand the lathe operation including types , Reynolds and bernoullis theorem experiment
CO2	Proficiency calibration of flow measuring instruments like benturimeter , orificenter and rotometer
CO3	Practical knowledge determine performance and characteristics of pump and positive displacement pumps
CO4	Exploration of a turbine performance of characteristics , covering both reaction and impulse turbine

MEP42 – Manufacturing Processes Lab -2	
CO1	Comprehend principle and operation of lathe and shaping machine and milling machine for metal cutting
CO2	Acquire hands on skills in lathe operation including turning , fasing , grooving chamfering , knurling and V-thread cutting
CO3	Develop practical expertise in shaping Machine operation involving cube shapping and grooving
CO4	Attain proficiency in milling machine operation, covering cube milling and step milling
CO5	Applying knowledge and skill in taper turning on the lathe , demonstating bersatiility in metal shapping process

MEP43 – Computer Aided machine Drawing Lab	
CO1	Proficiency in utilizing the CAD , CAE software for designing and drawing machine components , creating 2d structure and understanding the permanent and temporary joints
CO2	Competence the drawing orthographic view for giving 3d blocks using auto CAD Screen icon and script files , demonstrating Skills in 2d representation
CO3	Ability to draw isometric view of object presented in orthographic view , enchancing visualization and spatial understanding
CO4	Application of draft Software for preparation of drawing for parts and Assembly of various components like gear coupling Safety valve , flange joint , hydraulic joint , etc
CO5	Skill Development in the preparation of production of drawing with tolerance limit and fit

MEP44 – Physical Education	
CO1	Understanding the opportunities of students physical, cognitive, social and emotional development
CO2	Understanding of individual and group motivation and behavior
CO3	To create teamwork among students and produce efficient result
CO4	The students were taught to operate advanced playing kits
CO5	To motivate the students to prepare the professional and scientific reports



  
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### V- SEMESTER

#### MET51 – Dynamics of Machinery

CO1	Understand the inertia forces , torque calculation in Slider crank mechanism and the functional role of fly wheel
CO2	Analyze the free force vibration , calculate the natural frequency for the longitudinal , transverse and torsional system and comprehend basic vibration isolation principle
CO3	Master analyze of transverse beam vibration, shaft whirling speed and comprehend torsional vibration causes and effects in rotor system
CO4	Gain proficiency in types of governor , characteristics and grasp gyroscopic effect and vehicle and machinery
CO5	Develop skills in static and dynamic skills balancing of rotating masses, applying partial balancing technique to reciprocating masses in various engine setup

#### MET52 – Design Of Machine Elements

CO1	Explain design procedure and measure , properties and engineering material and the selection material design against static fluctuation load
CO2	Solve the design problem in different types of joint
CO3	Analyze the design problem related to the design of spring under different loading condition
CO4	Analyze the transmission shaft under keys under the different loading condition
CO5	Design problem related to clutches , brakes and selection of bearing from manufacturing catalogue

#### MET53 – Metrology and Quality control

CO1	Recognize the importance of metrology in engineering design , manufacturing , and quality control
CO2	Understand the principle and application of comparators and its surface finished measurement technique
CO3	Acquire the knowledge of angular measurement screw thread metrology , gear metrology and advanced in metrology
CO4	Grasp in statistical quality control principle , acceptance sampling and various sampling plan
CO5	Learn about 6 sigma principle , quality standard and the application in manufacturing industries

#### MET54 – Heat and Mass Transfer

CO1	Apply heat condition principle to solve steady state and transient problem
CO2	Analyze the forced convection, laminar/turbulent flow and transfer during phase change
CO3	Explain the thermal radiation , black body radiation and radioactive heat exchange
CO4	Analyze the double pipe heat exchange , understand factor affecting performance and evaluate effectiveness



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CO5	Regionalize the similarities, analyze diffusion, mass transfer and understand convective mass transfer
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### MET55 – Mechanical Measurement

CO1	Understand the principle of basic detector transducer element and signal conducting system for mechanical measurement
CO2	Ability to apply strain gauge pressure measurement including bourden gauges and thermo coupling and orificemeter
CO3	Proficiency , load cell and dyanamometer for measuring strain force , torque accurate
CO4	Skill in displacement and motion and measurement utilizing LVDT accelerometer and strodscope along with analysing vibrating characteristis
CO5	Comprendency in utilizing digital technique for mechanical measurement and analyzing experiment data using representation methods on uncertainty analysis

### MEE54 – Industrial Casting Technology

CO1	Understand various casting technique for metal and plastic
CO2	Evaluate and selective suitable \casting process for specific application
CO3	Design gating and risering system for optimal casting quality
CO4	Apply advanced casting technology for involving manufacturing solution
CO5	Demonstrate competence in post casting process and quality control measure

### MEP51 – Manufacturing Process Lab III

CO1	Comprehend principle and operation of lathe and shaping machine and milling machine for metal cutting
CO2	Acquire hands on skills in lathe operation including turning , fasting , grooving chamfering , knurling and V-thread cutting
CO3	Develop practical expertise in shaping Machine operation involving cube shapping and grooving
CO4	Attain proficiency in milling machine operation, covering cube milling and step milling
CO5	Applying knowledge and skill in taper turning on the lathe , demonstrating bersatiliuty in metal shapping process

### MEP52 – Mechanical Measurement And Metrology lab

CO1	Understand the principle of basic detector transducer element and signal conducting system for mechanical measurement
CO2	Proficiency , load cell and dyanamometer for measuring strain force , torque accurate



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CO3	Comprehency in utilizing digital technique for mechanical measurement and analyzing experiment data using representation methods on uncertainty analysis
CO4	Skill in displacement and motion and measurement utilizing LVDT accelerometer and strodoscope along with analysing vibrating characteristic
CO5	Understand the application of the surface measurement technique for evaluating surface texture in engineering component

MEP53 – Computational Method Lab	
CO1	Understanding of numerical computational principle
CO2	Proficiency in implementation in numerical method for engineering problem solving
CO3	Competence in programming language like FORTRAN/C++, C or MATLAB
CO4	Ability to apply the numerical technique to find the solution for non -linear equation, linear system and differential equation
CO5	Skill in utilization of numerical integration and interpolation, optimization method in engineering analysis

MEP54 – GENERAL PROFICENCY	
CO1	Improved communication and soft skills
CO2	Enhanced writing & speaking ability
CO3	Proficient in inter personal communication and leadership
CO4	Developed aptitude in verbal and numerical reasoning

### VI- SEMESTER

MET61 – OPERATIONS REASEARCH	
CO1	Understand linear programming concepts and applied methods like simplex and graphical techniques for optimization
CO2	Solve transportation and assignment problems using MODI method and transshipment models
CO3	Utilize dynamic programming to solve allocation, investment, and equipment replacement problem effectively
CO4	Apply inventory control models including EOQ, shortages, and price breaks to manage inventory efficiently
CO5	Analyze waiting line problems using queuing theory and develop logical flow charts for queuing models

MET62 – DESIGN OF TRANSMISSION SYSTEM	
CO1	Understand the principle and design consideration of various mechanical transmission system



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	including bearings , chains , ropes
CO2	Demonstrate proficiency in designing different types gears , including spur gears , helical gears , and bevel gears, based on bending & wear criteria
CO3	Apply knowledge of belt drive and chain drives to select and design appropriate flat and V-belts , roller chain , sprocket wheels for specific application
CO4	Analyze the advantages of gears drives over other transmission system & design gears boxes , speed reducers and stepped pulleys for different speeding requirement
CO5	Develop skills in geometric progression , ray diagrams and kinematics layout design sliding mesh gears boxes, constant mesh gear boxes and multi speed gear boxes

MET 63 - THERMAL ENGINEERING	
CO1	Understand internal combustion engine and there operation
CO2	Learn about fuels , combustion & emission control in engines
CO3	Grasp the fundamental of compressible fluid flow
CO4	Explore shock wave formation and its effect on flow
CO5	Gain insight into jet propulsion system and their performance

MET 64 – COMPUTER INTEGRATED MANUFACTURING	
CO1	Understand the principle and benefits of computer integrated manufacturing (CIM) its evolution , including the use of CIM in hardware and software
CO2	Gain knowledge of communication fundamentals and network architectures relevant to CIM , including data representation , coding , transmission and network topology
CO3	Acquire an understanding of product design concepts such as design for manufacturability , CAD/CAM integration , and concurrent engineering
CO4	Learn about manufacturing planning control techniques in CAM including process planning , production planning and quality management

MET65 – CONTROL SYSTEM ENGINEERING	
CO1	Understand fundamental principle and components of control system , including open loop And closed loop system
CO2	Developed proficiency in mathematical modeling techniques for various physical system , such as mechanical , thermal , fluid and electrical system
CO3	Analyze time domain response 1 <sup>st</sup> – order and 2 <sup>nd</sup> order system to different input signals and identify source of error
CO4	Apply knowledge stability criteria , such as routh – Hurwitz criterion and root locus analysis , to assess a stability of control system
CO5	Interrupt frequency response characteristics of control system using tools like bode plots and



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nyquist stability criterion
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MEP61-THERMAL ENGINEERING LAB	
CO1	Understand fuel properties and measurement principles
CO2	Learn air compressor and blower operation principles
CO3	Explore heat transfer modes and co efficient of determination
CO4	Analyze exhaust gas composition using or at apparatus
CO5	Evaluate heat exchanger performance to experiment

MEP62 - DYNAMICS OF MACHINES LAB	
CO1	Gain practical understanding of fuel properties and measurement principle
CO2	Learn working principle of governors and modes balancing
CO3	Acquire proficiency in vibration analysis and damping co efficient
CO4	Explore practical application of machines dynamics through experiment
CO5	Enhance analytical skills in gyroscopic effects , critical speed determination and gear profile generation

MEE 61 – AUTOMOBILE ENGINEERING	
CO1	Understanding chassis construction and vehicle classification
CO2	Analysis automobile layout using mobility principles
CO3	Evaluate different IC engine configuration based on engine kinematics
CO4	Comprehend transmission system component and function
CO5	Gain knowledge of automobile electrical system and component

MEP 63-COMPUTATIONAL FLUID DYNAMIC LAB	
CO1	Develop proficiency in computational fluid dynamic(CFD) and heat transfer analysis
CO2	Gain expertise in pre and post processing steps involved in CFD studies
CO3	Apply physics based simulation for computer aided designing and engineering task
CO4	Master grid generation and boundary condition set up for complex geometric in CFD simulation
CO5	Understand and implement multi physics simulation approaches for investigating various phenomenon



  
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MEP64-GENERAL PROFICIENCY	
CO1	Develop critical thinking and analyzing skill through passage and analysis terminology
CO2	Master writing communication with job application letter and resume writing
CO3	Enhance oral communication skill in group discussion, negotiation and interview
CO4	Proficient in inter personal communication and leadership
CO5	Developed aptitude in verbal and numerical reasoning

### VII- SEMESTER

MET71 – Computer Aided Design	
CO1	Understand the principle of graphics and apply them to computer aided drawing and modeling technique
CO2	Implement the bresenhan lines and circle algorithm for a efficient rendering
CO3	Apply the transformation in graphics including rotation , scaling translation and perspective projection
CO4	Utilize the various geometric modeling technique such as wire frame, surface and solid modeling to represent the complex shape and object
CO5	Demonstrate proficiency in CAD software package such as PRO-E , CATIA and SOLID-EDGE for parametric and variational modeling , feature based modeling and animation

MET72 – Industrial Engineering and Management	
CO1	Competently employee broad based analytic tools and computer for decision making and system design , analysis for performance
CO2	Assume managerial and leader ship rules in their chosen professional carrier while working un multi-disciplinary team
CO3	Engage in continuous learning by seeking out opportunities for the higher education or ongoing training related to the employment
CO4	Effectively adopt to the changing demand in work place and able to perform increasingly complex task

MET73 – Refrigeration ,Air conditioning and Cryogenic Engineering	
CO1	Grasps various refrigeration method and system including vapour compression and absorption and thermoelectric refrigeration
CO2	Develop skills in analyzing air properties using psychometric chart for efficient air conditioning system design
CO3	Learn to calculate cooling load considering heat source like conduction , solar radiation and occupy the effective air condition system



  
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MEE71 – Energy and Environmental Management	
CO1	Understand forming process and their parameter like temperature , speed and friction
CO2	Learn forging classification , die design , defect analysis
CO3	Explore rolling mill operation , estimation of load and power
CO4	Study direct extrusion , hydrostatic extraction and related stress analysis
CO5	Gain inside into drawing process , sheet metal forming technique and application

MEP71 – Thermal Engineering Lab -2	
CO1	Understand fuel properties and measurement principles
CO2	Learn air compressor and blower operation principles
CO3	Explore heat transfer modes and co efficient of determination
CO4	Analyze exhaust gas composition using or at apparatus
CO5	Evaluate heat exchanger performance to experiment

MEP72 – Computer Aided Engineering Lab	
CO1	Master CAD software for designing machine components
CO2	Excel in 3d modeling technique and assembly
CO3	Apply the FEA for stress and thermal analysis
CO4	Analysis truss for force , beam SF/BMD, stress concentration
CO5	Utilize CAD and FAD for the practical engg., problem solving

MEP73 – Comprehensive VIVA-VOCE	
CO1	Understand core mechanical engineering principle
CO2	Apply theory to solve object question effectively
CO3	Successfully complete internal assessment demonstrating comprehensive understanding
CO4	Excel in viva-voce showing depth of understanding
CO5	Exhibit confidence and communication skill in viva-voce

MEP74 – Industrial Visit And Training Report	
CO1	Gain insight in industrial operation
CO2	Understand diverse industrial process



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CO3	Acquire practical skill relevant to the field
CO4	Demonstrate effective communication report
CO5	Reflect critically on industrial learning experience

MEPW7 – Project Work (phase I)	
CO1	Work effectively in group on project
CO2	Define clear problem statement
CO3	Develop problem solving method
CO4	Produce structure project report
CO5	Demonstrate understanding through evaluation

### VIII- SEMESTER

MET81 – Power Plant Engineering	
CO1	Grasp fundamental power generation
CO2	Understand power plant equipment and emission control
CO3	Gain insight into power plant economics and cost estimation
CO4	Analysis power plant performance and equipment selection
CO5	Conduct economic evaluation for power generation project

MEE81 – Advanced Welding Technique	
CO1	Comprehensive understanding of various welding technique
CO2	Knowledge of metal logical concept influence technique outcome
CO3	Proficiency in weld joint preparation , interpretation of welding symbol
CO4	Practical skill in conducting welding operation safely
CO5	Familiarity with testing and Inspection method to assist weld quality and compliance with standard

MEE85 – Maintenance and safety Engineering	
CO1	Use 7QCtools for data collection and analysis
CO2	Audit the quality system and take corrective action when necessary
CO3	Advice management for the TQM approach development



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CO4	Implement the TQM approach in a organization for continuous quality improvement
CO5	Asses where the organization stand on quality management with respect to various Quality standards

MEPW8 – Project Work (phase 2)**	
CO1	Work effectively in group on project
CO2	Define clear problem statement
CO3	Develop problem solving method
CO4	Produce structure project report
CO5	Demonstrate understanding through evaluation



  
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DISSEMINATION OF PO, PEO & PSO TO STUDENTS

### RAAK COLLEGE OF ENGINEERING & TECHNOLOGY

#### DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

PROGRAM EDUCATIONAL OBJECTIVES (PEO)	PROGRAM OUTCOMES	PROGRAM OUTCOMES
<p>PEO1: Graduates will possess the ability to apply their knowledge in solving engineering problems in their professional life.</p> <p>PEO2: Graduates will possess the ability to design and develop engineering systems.</p> <p>PEO3: Graduates will possess the ability to analyze and design engineering systems.</p> <p>PEO4: Graduates will possess the ability to work in a team and communicate effectively.</p>	<p>PO 1: ENGINEERING KNOWLEDGE: Apply the knowledge of mathematics, science, and engineering to solve engineering problems.</p> <p>PO 2: PROBLEM ANALYSIS: Identify, formulate, analyze and solve engineering problems using first principles of mathematics, science and engineering.</p> <p>PO 3: DESIGN/DEVELOPMENT OF SOLUTIONS: Design and develop solutions for complex engineering problems that meet specified needs and objectives with appropriate consideration for public health, safety, and environmental protection.</p> <p>PO 4: SKILLS ACQUISITION AND LEARNING: Acquire and apply the knowledge and skills to solve engineering problems.</p> <p>PO 5: PERSONAL SKILLS, ETHICS: Demonstrate professional ethics and values in their work and life.</p> <p>PO 6: THE ENGINEER AND SOCIETY: Apply their knowledge and skills to solve engineering problems in their professional life.</p>	<p>PO 7: EVALUATION/ASSESSMENT ABILITY: Evaluate the impact of professional engineering decisions in terms of professional standards and societal knowledge, and use the results to improve the performance in the field of engineering practice.</p> <p>PO 8: ETHICS: Uphold ethical principles and standards in their professional life and adhere to the Code of Ethics of the profession.</p> <p>PO 9: PROFESSIONAL AND TEAMWORK: Demonstrate professional and team spirit in their work and life.</p> <p>PO 10: COMMUNICATION: Communicate effectively in their professional life and use the results to improve the performance in the field of engineering practice.</p> <p>PO 11: PROFESSIONAL RESPONSIBILITY: Demonstrate professional responsibility and ethics in their work and life.</p> <p>PO 12: LIFELONG LEARNING: Engage in continuous learning and development to stay updated in their professional life.</p>

**GPS MAP CAMERA**

**57 Puducherry IN**

Latitude **11.9223327**      Longitude **79.7679612**

Date: **22 Jun 2022**      Time: **12:15 PM**

Google ARU



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### COMPUTER SCIENCE & ENGINEERING

#### PROGRAM OUTCOMES (PO):

##### PO1 – ENGINEERING KNOWLEDGE:

Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to solve complex problems in computer science and engineering.

##### PO2 – PROBLEM ANALYSIS:

Identify, formulate, review research literature, and analyze complex computer science problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

##### PO3 – DESIGN/DEVELOPMENT OF SOLUTIONS:

Design and develop solutions for complex computer science problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.

##### PO4 – CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS:

Use research-based knowledge and research methods, including the design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions in computer science.

##### PO5 – MODERN TOOL USAGE:

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex engineering activities in computer science with an understanding of the limitations.

##### PO6 – THE ENGINEER AND SOCIETY:

Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice in computer science.

##### PO7 – ENVIRONMENT AND SUSTAINABILITY:

Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of, and need for, sustainable development in the field of computer science.

##### PO8 – ETHICS:

Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice in computer science.



  
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### PO9 – INDIVIDUAL AND TEAM WORK:

Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings in computer science.

### PO10 – COMMUNICATION:

Communicate effectively on complex engineering activities with the engineering community and with society at large, including the ability to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### PO11 – PROJECT MANAGEMENT AND FINANCE:

Demonstrate knowledge and understanding of 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 in computer science.

### PO12 – LIFE-LONG LEARNING:

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


### PROGRAM EDUCATIONAL OBJECTIVES (PEO):

- **Professional Excellence:** Graduates will excel in professional careers through a strong foundation in computer science and engineering principles.
- **Lifelong Learning:** Graduates will engage in lifelong learning and adapt to emerging technologies.
- **Ethics and Leadership:** Graduates will demonstrate ethical practices and leadership skills in their professions.
- **Innovation and Research:** Graduates will contribute to innovation and research in computing.

### PROGRAM SPECIFIC OUTCOMES (PSO):

- **Software Development:** Design, develop, and test software systems based on specifications and methodologies.
- **Advanced Technologies:** Apply knowledge of algorithms, networking, web design, cloud computing, IoT, and data analytics.
- **Research and Innovation:** Identify research gaps and develop innovative solutions in computing.



  
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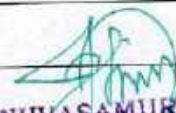
**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**SUBJECT WISE COURSE OUTCOMES (2022- 2023)**

**SUBJECT LIST(13-14 Regulations)**

SI NO.	COURSE CODE	COURSE NAME
01.	T101	Mathematics – I
02.	T102	Physics
03.	T103	Chemistry
04.	T104	Basic Electrical and Electronics Engineering
05.	T105	Engineering Thermodynamics
06.	T106	Computer Programming
07.	P101	Computer Programming Laboratory
08.	P102	Engineering Graphics
09.	P103	Basic Electrical and Electronics Laboratory
10.	T107	Mathematics –II
11.	T108	Material Science
12.	T109	Environmental Science
13.	T110	Basic Civil and Mechanical Engineering
14.	T111	Engineering Mechanics
15.	T112	Communicative English
16.	P104	Physics Lab



  
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17.	P105	Chemistry Lab
18.	P106	Work Shop Practice
19.	P107	NSS/NCC
20.	MA T31	Mathematics -III
21.	CS T32	Electronics Devices and Circuits
22.	CS T33	Object Oriented Programing and Design
23.	CST34	Digital System Design
24.	CST35	Data Structures
25.	CST36	Computer Organization and Architecture
26.	CSP31	Electronics Devices Circuits and Laboratory
27.	CSP32	Data Structure Laboratory
28.	CSP33	Digital System Design Laboratory
29.	MAT41	Mathematics -IV
30.	CST42	Microprocessors and Microcontrollers
31.	CST43	Automata Languages and Computations
32.	CST44	Design and Analysis of Algorithms
33.	CST45	Object Oreinted Programming
34.	CST46	Graphics and Image Processing
35.	CSP41	Microprocessors and Microcontrollers Laboratory
36.	CSP42	Design and Analysis of Algorithms Laboratory



  
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## COLLEGE OF ENGINEERING AND TECHNOLOGY

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37.	CSP43	Object Oriented Programming Laboratory
38.	SP P44	Physical Education
39.	CST51	Operating System
40.	CST52	Computer Networks
41.	CST53	Database Management System
42.	CST54	Language Translators
43.	CST55	Software Engineering
44.	CSP51	Operating System Laboratory
45.	CSP52	Computer Networks Laboratory
46.	CSP53	Database Management System Laboratory
47.	HSP54	General Proficiency-I
48.	CST61	Enterprise Solutions
49.	CST62	Embedded Systems
50.	CST63	Web Technology
51.	CSE63	E-Business
52.	CSE610	Distributed Computing
53.	CSP61	Enterprise Solution Laboratory
54.	CSP62	Embedded Systems Laboratory
55.	CSP63	Web Technology Laboratory
56.	CSP64	Industrial Visit /Training
57.	HSP65	General Proficiency-II



  
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58.	CST71	Artificial Intelligence
59.	CST72	Computer Hardware and Network Troubleshooting
60.	CST73	Platform Technology
61.	CSE77	Network Protocol
62.	CSP71	Artificial Intelligence Laboratory
63.	CSP72	Troubleshooting Laboratory
64.	CSP73	Platform Technology Laboratory
65.	CSPW7	Project Work-Phase I
66.	CST81	Professional Ethics
67.	CST82	Engineering Economics and Management
68.	CST83	Information Security
69.	CSE84	Mobile Computing
70.	CSE811	Cloud Computing
71.	CSP81	Seminar
72.	CSP82	Comprehensive Viva
73.	CSPW8	Project Work-Phase II



  
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### I-SEMESTER

T101 - Mathematics - I		Yr/Sem: I/I
CO 1	Apply knowledge of mathematics to solve functions of several variables.	
CO 2	Identify, formulate and solve engineering problems like multiple integrals and their usage.	
CO 3	To solve differential equations that model physical processes using effective mathematical tools	
CO 4	Able to find equation of straight line of shortest distance, equation of plane, angle between straight lines.	
CO 5	Gain the knowledge to solve first order differential equation arising in engineering.	

T102 - Physics		Yr/Sem: I/I
CO 1	Apply knowledge of science and engineering to understand physics and its significant contribution in the advancement of technology and invention of new products that dramatically transform modern day society.	
CO 2	Identify different areas of physics which have direct relevance and applications to different engineering disciplines	
CO 3	Apply fundamental knowledge to understand applications of ultrasonics, optics and some optical devices, lasers and fiber optics, nuclear energy sources and wave mechanics.	
CO 4	Understand the basic operating principles of laser, its applications, optical fiber, and its types, transmission characteristics, applications of optical fibers.	
CO 5	Understand the basic operating principles of laser, its applications, optical fiber, and its types, transmission characteristics, applications of optical fibers.	

T103 - Chemistry		Yr/Sem: I/I
CO 1	Apply knowledge of science and engineering to understand the importance of chemistry in engineering domain.	
CO2	Identify different electrochemical cells and their usage for industrial process.	
CO3	Apply fundamental knowledge of chemistry and build an interface of theoretical concepts with industrial applications/engineering applications.	
CO4	Guide the students to gain the knowledge about the cooling curves, phase diagrams, alloys and their practical importance.	



  
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CO 5	Strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial/engineering applications
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T110-Basic Civil and Mechanical Engineering		Yr/Sem: I/I
CO 1	Understanding the building classification as per National building code.	
CO 2	Get the idea about construction procedure for various components of the building.	
CO 3	Students understand the principles of surveying, construction procedure for roads, bridges and dams.	
CO 4	Student will able to know about the working of internal and external combustion systems.	
CO 5	Student will be able know about Non-Conventional Energy Systems	
CO 6	Student will be able to know about manufacturing process.	

T111- Engineering Mechanics		Yr/Sem: I/I
CO 1	Understand the basic laws of mechanics and resolution of forces using different methods.	
CO 2	Learn and apply the knowledge on analysis of forces acting on the trusses and effect of friction force on bodies.	
CO 3	Learn about the centroid and moment of inertia for plane and solid figures.	
CO 4	Understand the three laws of motion, principles of dynamics for particles.	
CO 5	The student will able to analyze the laws of motion for rigid bodies.	

T112- Communicative English		Yr/Sem: I/I
CO 1	Learnt about the definition of communication, importance, concept. Sender, Ideation, the levels in communication, channels, oral and written way of communication, body language and non-verbal communication, Accuracy, Brevity and Clarity, different barriers for Communication, techniques in making effective communication, listening importance and types of listening.	
CO 2	Students learnt about the types of letters, report writing, notices and memo and also developed their skill in writing.	
CO 3	Understands the comprehension, identifies the difference between Skimming and scanning, guess the meaning of the words, Identify to make notes.	



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CO 4	Students learnt the writing skills, how to write a paragraph in a proper manner, four modes of writing and how to make bibliographical entries.
CO 5	Students were able to develop their spoken skills by making them to involve in many activities related to it.

P 104 - Physics Lab		Yr/Sem: I/II
CO 1	Able to understand how to find the thickness of the specimen and also to find the radius of curvature of glass using the phenomenon of interference of light	
CO 2	Able to understand the specific rotatory power of an optical active solution using the principle of polarization.	
CO 3	To understand about the thermal conductivity of bad conductor and rubber tube.	
CO 4	Ability to understand about the optical properties like dispersive power, Resolving power by applying the knowledge of optics	
CO 5	To acquire knowledge about the magnetometer due to current coil and jolly method of determining the pressure coefficient of air at constant volume.	
CO 6	Ability to understand the basic knowledge of inference ,polarization ,Magnetic materials ,thermal conductivity that correlates the theory and practical	

P 105 - Chemistry Lab		Yr/Sem: I/II
CO 1	Students will become well acquainted to test amount of hardness present in sample of water for their engineering needs	
CO 2	Students will be efficient in estimating acidity/alkalinity in given samples.	
CO 3	Students will have knowledge about estimating amount of dissolved oxygen in water.	
CO 4	Students will become well acquainted to estimate copper in brass.	
CO 5	Students will have knowledge about determination of viscosity of sucrose using Ostwald's viscometer.	
CO 6	To develop an understanding of basic titration setup and methodologies for determining strength, hardness and alkalinity of various unknown solutions	



  
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P 106 - Workshop Practice		Yr/Sem: I/II
CO 1	Understand and comply with workshop safety regulations.	
CO 2	Student will be able to make various joints in the given object with the available work material.	
CO 3	Student will be able to know how much a joint will take for the assessment of time.	
CO 4	Students can able to Identify the hand tools and instruments.	
CO 5	Students can able to gain knowledge about various operations carried out in sheet metal.	
CO 6	Students can able to gain skills about various tools used in welding to make simple joints.	

### SEMESTER-II

T 107 - Mathematics - II		Yr/Sem: I/II
CO 1	Apply knowledge of mathematics to solve matrix algebra technique for practical applications and Curl, divergence and integration of vectors in vector calculus.	
CO 2	Identify, formulate and solve engineering problems like Laplace transform and to solve differential and integral equations.	
CO 3	Apply formulae and analyze problems of Fourier transform techniques.	
CO 4	Determine the Fourier transform, Fourier cosine and sine transform of elementary functions, properties of transforms and its application in engineering	
CO 5	Acquire knowledge of matrix algebra technique, vector calculus, Laplace and Fourier Transform.	

T109 - Environmental Science		Yr/Sem: I/II
CO 1	Apply fundamental knowledge to understand about the environment.	
CO 2	Identify environmental pollution through science	
CO 3	Apply basic knowledge to solve various environmental issues and problems	
CO 4	Ability to consider issues of environment and sustainable development in his personal and professional undertakings.	
CO 5	Provides a comprehensive knowledge in environmental science, environmental issues and the management from an interdisciplinary perspective.	



  
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<b>T104 - Basic Electrical and Electronics Engineering</b>		<b>Yr/Sem: I/II</b>
CO 1	Will learn the fundamentals of rotational and stationary machine operation, single-phase and three-phase power measurement, magnetic and electrical circuits, and these topics.	
CO 2	Will learn the fundamentals of measuring devices, communication systems, and network models.	
CO 3	Knowledge about non-conventional energy systems will be available to students.	
CO 4	The varieties of metal joining will be known by the students.	
CO 5	Students will learn about numerous engines, energies, and joints as well as construction and building components offered with diverse principles.	

<b>T105 - Engineering Thermodynamics</b>		<b>Yr/Sem: I/II</b>
CO 1	Apply knowledge of mathematics, science and engineering to understand the basics of thermodynamics.	
CO 2	Understand the importance of laws of thermodynamics applied to energy systems.	
CO 3	Understanding refrigeration, heat pump and their physical mechanism.	
CO 4	Understand the laws of motion for rigid bodies.	
CO 5	Understand the effects of forces acting on the bodies in practical situation.	

<b>T106- Computer Programming</b>		<b>Yr/Sem: I/II</b>
CO 1	Know concepts in problem solving.	
CO 2	To do programming in C language.	
CO 3	To write diversified solutions using the C language.	
CO 4	To know about structures, pointers and its manipulation.	
CO 5	To know about the evaluation of computers, components and its applications. Basic knowledge on the internet, information technology, word processing and worksheets.	



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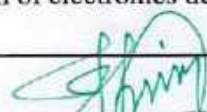
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P101 - Computer Programming Laboratory		Yr/Sem: I/II
CO 1	Students can work with command line interface OS's, like MS-DOS.	
CO 2	Students can solve most of the real time problems with C program.	
CO 3	Students can interact with computer using C program, through various input and output functions.	
CO 4	Students can make a use of various keywords, constants, variables, data types, operators, type conversion in C program.	
CO 5	Students will have knowledge about arrays, functions, structures, and pointers in C program.	

P102 - Engineering Graphics		Yr/Sem: I/II
CO 1	Perform freehand sketching of basic geometrical constructions and multiple views of objects.	
CO 2	Project orthographic projections of lines and plane surfaces.	
CO 3	Draw projections and solids and development of surfaces.	
CO 4	visualize and to project isometric and perspective sections of simple solids.	
CO 5	Students will be able to draw orthographic projections and isometric projections.	

P103 - Basic Electrical and Electronics Laboratory		Yr/Sem: I/II
CO 1	Know about basic electrical tools, applications and precautions	
CO 2	Perform different types of wiring used in domestic and industrial applications.	
CO 3	Measurements of voltage and phase using CRO, basic operation and applications of devices such as PN junction diode and transistors.	
CO 4	Understand the function and applications of basic logic gates and flip flops.	
CO 5	Gain knowledge in domestic wiring and application of electronics device in the field of electrical engineering.	



  
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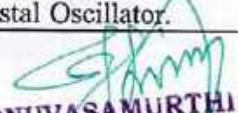
P107 - NSS/NCC		Yr/Sem: I/II
CO 1	To create awareness in social and environmental issues.	
CO 2	To participate in relief and rehabilitation work during natural calamities.	
CO 3	To develop some proposals for local slum area development and waste disposal.	
CO 4	To create team works among students and produce efficient results.	
CO 5	To operate scientific instruments or advanced software.	

### SEMESTER-III

MA T31 - Mathematics - III		Yr/Sem: II/III
CO 1	Identify complex variable function, Apply CR equations for testing of analyticity of the complex function.	
CO 2	Construct conformal mappings between regions. Solve problems on bilinear transformation and find the Taylor's and Laurent's series.	
CO 3	Analyze the complex functions with reference to their analyticity, integration using Cauchy's integral theorem and Cauchy's Residue theorem.	
CO 4	Express any periodic function as Fourier series, Fourier sine and Cosine series.	
CO 5	Finding Fourier series for numerical values of any function. Interpret and use the basic concepts of analytic function, Taylor and Laurent series, singularities, residues, conformal mapping, Fourier series and Harmonic analysis.	

CS T32 - Electronic Devices and Circuits		Yr/Sem: II/II
CO 1	Classify semiconductor materials and discuss the construction and operation of PN junction diodes, Zener diodes. Need and use of Clippers, Clampers, Series and Shunt regulators.	
CO 2	Discuss the construction, operation, and characteristics of transistors. Analyze the transistor biasing circuits using the stability factor. Discuss the creation and operation of Field Effect Transistor devices, MOSFET, BJT, as well as their V-I Characteristics curves. Analyze the important parameters of FET, JFET, MOSFET.	
CO 3	Examine the circuit and operation of RC Coupled Amplifier, Class A, Class B, Class C and D amplifiers. Examine the Positive and Negative Feedback, Barkhausen Criterion, Wien Bridge, Hartley, Colpits and Crystal Oscillator.	



  
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CO 4	Confer and examine op-amp characteristics, parameters and applications. Consider and review summer, subtractor, differentiator, integrator, comparator, multiplier, filters.
CO 5	Discuss the operation and principles of special purpose diodes, seven segment displays, OPTO- isolator. Examine characteristics and equivalent circuit of UJT, SCR, DIAC and TRIAC.

CS T33 - Object Oriented Programming and Design		Yr/Sem: II/III
CO 1	Confer and discuss the concepts, advantages of OOP. Examine the structure of C++ program, control structures. Consider and explain classes and objects, OOPs Concepts (Encapsulation), friend function, member function, overloading member function. Discuss the L Values, R Values, return references and function overloading.	
CO 2	Review on the need of constructors, destructors, copy constructors, recursive constructor. Discuss about the overloading functions, classes and inheritance, pointers, and overloading member functions.	
CO 3	Examine pointers and arrays to classes and objects, void pointers. Confer the memory models and dynamic objects. Discuss about polymorphism, virtual functions, string attributes.	
CO 4	Discourse about file stream classes, binary and ASCII files, error handling functions. Converse generic programming, class templates and inheritance, operator overloading, class templates and exception handling.	
CO 5	Discuss OO concepts, UML diagrams, OO design methodology.	

CS T34 - Digital System Design		Yr/Sem: II/III
CO 1	Discuss Binary number systems, BCD codes, Excess-3 codes, Gray codes, Alphanumeric codes, Error detecting and correction codes. Confer De-Morgan's theorems, canonical form. Examine karnaugh maps, Quine-Mc-Cluskey method, universal gates.	
CO 2	Confer combinational logic (adders, subtractors, multipliers), Encoders, Decoders, Multiplexers, De-multiplexers, comparators and parity checker.	
CO 3	Discourse about flip flops, counters, types and applications of shift registers. Discuss the design of clocked sequential circuits, Mealy and Moore models, state reduction techniques.	
CO 4	Discuss about organization of ROM and RAM, PLDs, PLAs, PAL devices, FPGAs implementation using PROMs, PLAs, PALs	



  
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CO 5	Discourse Verilog HDL, 4 bit ripple carry counter, Gate level Modeling, Data low Modeling. Discuss on counters, full adders and behavioral modeling
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CS T35- Data Structures		Yr/Sem:II/III
CO 1	Confer and discuss on algorithmic notation, programming principles, arrays and its types, pointer arrays. Discourse the searching techniques and internal and external sorting techniques.	
CO 2	Exchange views on definition, operation and applications of stack, queues and types of queues. Discuss linked list, types and applications of linked list along with dynamic storage management.	
CO 3	Discuss about Binary tree, Binary search tree, AVL tree, B+ Tree, Trie Tree	
CO 4	Discuss on graph, representation, traversals, topological sort, Operations, representation and applications on sets.	
CO 5	Confer on tables, its types, static and dynamic tree tables, hash tables. Discuss on files and sorting with tapes and disks.	

CS T36 - Computer Organization and Architecture		Yr/Sem: II/III
CO 1	Discuss on multiprocessors and multicomputer, instructions and instruction sequencing, addressing modes, basic input/output operations, stacks and queues, subroutines, shift and rotate instructions.	
CO 2	Confess and discuss on registers and addressing, flow control, logic and i/o operations, subroutines, other instructions, program examples.	
CO 3	Discuss about interrupts, controlling device reques, pentium interrupt structure, direct memory access, busses, interface circuits, and standard .i/o interfaces.	
CO 4	Exchange views on semiconductor ram memories, read-only memories, virtual memories, memory management requirements and secondary storage.	
CO 5	Confess, multiple-bus organization, hardwired control, micro-programmed control, pipelining superscalar operations, performance considerations	



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CS P31 - Electronics Devices and Circuits Laboratory		Yr/Sem:II/III
CO 1	Demonstrate the V-I Characteristics of PN Junction diode, Zener diode, Clipper circuits, input & output Characteristics of BJT, JFET, MOSFET and UJT transistor configuration. Application of clippers, clampers	
CO 2	Application of OPAMP, Determination of ripple factor for of rectifiers with and without filters and Draw the Voltage regulation characteristics of shunt using IC	

CS P32 - Data Structures Laboratory		Yr/Sem:II/III
CO 1	Understanding the concept of data abstraction and the problem of building implementations of abstract data types are emphasized with both Linear and Non linear data structures.	
CO 2	Understanding the Selection of relevant data structures and combinations of relevant data structures for the given problems in terms of memory and run time efficiency and improve the problem solving ability.	

CS P33 - Digital System Design Laboratory		Yr/Sem: II/III
CO 1	Comprehension : Discuss the combinational circuit as Adder, Subtractor, Magnitude comparator, Multiplexers, Encoders, Decoders and De-multiplexers using basic logic gates.	
CO2	Comprehension: Discuss the sequential circuits Shift register, Ripple Counters, Synchronous Counters with the help of digital basic logic gate. Simulation of combinational and sequential logic using HDL.	

### SEMESTER-IV

MA T41 - Mathematics - IV		Yr/Sem: II/IV
CO 1	Formulate and solve partial differential equation.	
CO 2	Derive and obtain the solution of wave equation and boundary value problems.	



  
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CO 3	Derive and obtain the solution of heat equation and boundary value problems.
CO 4	Apply least square method to fit various curves for the given data investigate the validity of hypothesis by Z-distribution techniques.
CO 5	Calculation of analysis of variance and explain the use of the Chi-squared test and its calculation.

CS T42 - Microprocessors and Microcontrollers		Yr/Sem: II/IV
CO 1	Comprehension: Describe the architecture of 8085 and development of assembly language program by using instruction sets, stack and subroutines, looping statements and discuss about addressing modes of a typical microprocessor.	
CO 2	Comprehension: Describe the function of different peripheral IC's 8253, 8259, 8237 to interface with external peripheral device.	
CO 3	Application: Demonstrate the architecture of 8279, 8255 and also develop the assembly language program with the help of special function registers, timers and counters and demonstrate 8251 USART.	
CO 4	Comprehension: Describe the architecture of 8086 and also develop the ASM program with the help of instruction set and addressing modes.	
CO 5	Confer and demonstrate Intel 8051 Microcontroller, Pins and signals, Timing and control, interrupts and Instruction set.	

CS T43 - Automata Languages and Computation		Yr/Sem: II/IV
CO 1	Confer and discuss about regular expressions, finite, automata, NFA, DFA, Moore Mooley and Mealey Machines	
CO 2	Exchange views on regular sets, CFG, Chomsky Normal Forms, ambiguous and unambiguous grammar.	
CO 3	Analyse and explore pushdown automata, CFG, CFL and its applications.	
CO 4	Discuss TM, variations of TMs - Recursive and Recursive. Enumerable languages, Recursive Function, Partial and Total Recursive Function, Primitive Recursive Function.	
CO 5	Confer NP hardness and NP Completeness.	



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CS T44 - Design and Analysis of Algorithms		Yr/Sem: II/IV
CO 1	Confer asymptotic notations -Heap, shell, radix, insertion, selection and bubble sort; sequential, binary and Fibonacci search. Discuss about recurrence equations, analyzing control structures.	
CO 2	Exchange views on Divide and Conquer Method, Strassen's Matrix multiplication, knapsack problem - minimum spanning tree algorithms scheduling, optimal storage on tapes, optimal merge patterns.	
CO 3	Discuss on Dynamic Programming, all pair shortest path algorithm - 0/1 Knapsack and Traveling salesman problem - chained matrix multiplication. Techniques for binary trees and graphs - AND/OR graphs - bi-connected components - topological sorting.	
CO 4	Discourse - 8-queens problem - sum of subsets - graph coloring -Hamiltonian cycle - Knapsack problem.	
CO 5	Discuss Least Cost (LC) search - the 15-puzzle problem - control abstractions for LC-Search - Bounding- FIFO Branch-and-Bound - 0/1 Knapsack problem - Traveling Salesman Problem, NP-Hard and NP- Completeness.	

CS T45- Object Oriented Programming		Yr/Sem: II/IV
CO 1	Confer about Java features, Java Platform, Java Fundamentals, Classes and Objects, Constructors, Destructors, Packages and Interfaces	
CO 2	Discuss about Overloading - Inheritance - Files and Stream - Multithreading - Exception Handling	
CO 3	Discuss on AWT package, Containers, Applets - Applet Application - Swing Fundamentals - Swing Classes.	
CO 4	Confer on JDBC, Java security, I/O packages.	
CO 5	Discourse on java beans, TCP/IP server, URL connection, RMI, Jar files.	



  
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<b>CST46 Graphics and Image Processing</b>		<b>Yr/Sem: II/IV</b>
CO 1	To describe acquainted Graphics and Image Processing domains.	
CO 2	To understand the major intricacies of Graphics and Image Processing.	
CO 3	To understand verbal descriptions to images and vice versa	
CO 4	To understand the image enhancement and restoration concept	
CO 5	To understand the compression techniques	

<b>CS P41- Microprocessors and Microcontrollers Laboratory</b>		<b>Yr/Sem: II/IV</b>
CO 1	Experiment using 8085 microprocessor and implement arithmetic operations, block operations, code conversions, real time examples	
CO 2	Experiment and implement using 8086 microprocessor and 8051 microcontroller	

<b>CS P42 - Design and Analysis of Algorithms Laboratory</b>		<b>Yr/Sem: II/IV</b>
CO 1	Implement the divide and conquer techniques, greedy techniques, dynamic programming techniques.	
CO 2	Implement the traversals, backtracking and branch and bound techniques.	

<b>CS P43 - Object Oriented Programming Lab</b>		<b>Yr/Sem: II/IV</b>
CO 1	Implement and understand the object oriented programming concept in C++.	
CO 2	Implement the JAVA connectivity and concepts.	

<b>SP P44- Physical Education</b>		<b>Yr/Sem: II/IV</b>
CO 1	Understanding the opportunities of students' physical, cognitive, social and emotional development.	
CO 2	Understanding of individual and group motivation and behavior.	



  
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# RAAK

## COLLEGE OF ENGINEERING AND TECHNOLOGY

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CO 3	To create teamwork among students and produce efficient results.
CO 4	The students were taught to operate advanced playing kits.
CO 5	to motivate the students to prepare the professional and scientific reports


### SEMESTER-V

CS T51 - Operating Systems		Yr/Sem: III/V
CO 1	Discuss about mainframe, distributed, multiprocessor, clustered, real time systems, OS services, system calls, system services, Inter process communication.	
CO 2	Discuss about scheduling criterion, threading issues, critical section, synchronization and semaphores.	
CO 3	Confer about deadlock, paging, segmentation.	
CO 4	Discourse file systems, access methods, file sharing.	
CO 5	Exchange views on disk scheduling, kernel and case study on linux system and windows.	

CS T52 - Computer Networks		Yr/Sem: III/V
CO 1	Discuss about the network hardware and software, various layer in the OSI.	
CO 2	Discourse the data link layer in detail, services, design, protocols.	
CO 3	Confer the network layer in detail, services, design, addresses.	
CO 4	Exchange views on the transport layer in detail, services, design, congestion control.	
CO 5	Discourse the application layer in detail, services, design, protocols.	

CS T53- Database Management Systems		Yr/Sem: III/V
CO 1	Discuss about database architecture, relational algebra, query languages, relational calculus, SQL.	
CO 2	Discourse DB design and ER model, Indexing and hashing concepts, static and dynamic hashing, bitmap indices.	
CO 3	Confer relational DB design, normal forms, temporal data.	
CO 4	Discuss about query processing, query optimization, ACID properties, isolation levels, transactions as SQL statements	
CO 5	Exchange views on deadlocks, IBM DB2, My SQL, levels of consistency.	



  
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CS T54 - Language Translators		Yr/Sem: III/V
CO 1	Overview of system software, machine structure, assembler, design, features, types of assembler.	
CO 2	Discuss on loaders and linkers, linkage editors, loader features, bootstrap loaders.	
CO 3	Discourse about lexical analyzer, role of lexical analyzer, tokens, .specification and recognition.	
CO 4	Confer about parsing, techniques, code generations.	
CO 5	Exchange views about optimization, invariant code motion, code generation, DAG representation.	

CS T55 - Software Engineering		Yr/Sem: III/V
CO 1	Understanding various approach in Software Development life Cycle.	
CO 2	Discuss about complete strategic approaches towards project management and estimation techniques followed in software development.	
CO 3	Discourse the good software design and the function oriented software design.	
CO 4	Confer the concepts of object oriented design approach.	
CO 5	Understanding the process involved in user interface design and studying various testing methods.	

CS P51 - Operating Systems Laboratory		Yr/Sem: III/V
CO 1	Implement basic UNIX /LINUX commands, programs implementing I/O system calls, implement scheduling algorithms.	
CO 2	Implement synchronization problem, memory management schemes, and develop application using RTOS.	

CS P52 - Computer Networks Laboratory		Yr/Sem: III/V
CO 1	Implement a socket program to transfer file using TCP, UDP, program for CRC and Hamming code, program for sliding window protocols, TCP module implementation.	
CO 2	Implementation of routing protocols, ARP, security compromise on a node using NS2, implementation of traffic sources using NS2.	



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CS P53 - Database Management System Laboratory		Yr/Sem: III/V
CO 1	Study database, SQL, Query types and procedural query language	
CO 2	Design and develop real time applications.	

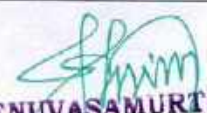
HS P54 - General Proficiency - I		Yr/Sem: III/V
CO 1	To understand and practice the art of communication	
CO 2	To able to practice and showcase soft skills.	
CO 3	To understand the importance of writing.	
CO 4	To practice speaking skill.	
CO 5	To practice verbal, non-verbal and numerical aptitude.	

### SEMESTER-VI

CST61 - Enterprise Solutions		Yr/Sem: III/VI
CO 1	Understand in-depth about basic ERP implementation and basic SCM, CRM and BPR	
CO 2	Understanding about SAP architecture with SAP modules and ABAP programming environment.	
CO 3	Confer in depth about SQL, PL/SQL, Forms and Reports.	
CO 4	Gain knowledge about People soft and People Soft Enterprise HRMs and financial management.	
CO 5	Gain knowledge about Siebel Business components and business objects.	

CS T62-Embedded Systems		Yr/Sem: III/VI
CO 1	Confer various embedded processor features and ARM family details.	
CO 2	Exchange views on registers and data processing instructions based on ARM instructions.	
CO 3	Exchange views on registers and data processing instructions based on THUMB instructions	
CO 4	Understand the execution of ARM based C program implementation.	
CO 5	Understand the various real time OS and their needs that support for scheduling various tasks.	



  
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CS T63 - Web Technology		Yr/Sem: III/VI
CO 1	Confer major components and protocols of internet applications and design web page.	
CO 2	Discuss about client side and server side programming languages for web.	
CO 3	Enable to design and develop web page using xml .language by schema techniques and formatting objects.	
CO 4	Confer the importance of multimedia in web designing and usage of web application development.	
CO 5	Understand web services and modules involved in building in service. Confer and develop programs using ajax concepts.	

CS E61 - Object Oriented Analysis and Design		Yr/Sem:III/VI
CO 1	Confer about life cycle model and different object methodologies.	
CO 2	Discuss about UML for specifying, constructing, visualizing and documenting the software system.	
CO 3	Analyze a complete, unambiguous, and consistent picture of the requirements.	
CO 4	Formalize the design process in establishing a scientific foundation for OO design process.	
CO 5	Understand problems occurring during software development and avoid error.	

CS E63 - E-Business		Yr/Sem:III/VI
CO 1	Confer an understanding of the foundation and importance of E-commerce	
CO 2	Exchange views on secure electronic transaction and its mechanism to protect their transaction and payment through online	
CO 3	Discourse the importance of encryption mechanism to protect personal information using various security threats.	
CO 4	Confer and acquire knowledge on flow of secure electronic transaction using master/ visa card and secure Email technologies.	
CO 5	Discuss on internet and website establishment, internet charges and internet access and architecture	

CS P61- Enterprise Solutions Laboratory		Yr/Sem: III/VI
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CO 1	Understand and create simple application using ERP packages. Study SQL and PL/SOL. Understand and use various components of Oracle and SAP.
CO 2	Confer People soft and SIEBEL concepts and develop simple applications using the same.

<b>CS P62 - Embedded Systems Laboratory</b>		<b>Yr/Sem: III/VI</b>
CO 1	Understand and implement programs on ARM based processors	
CO 2	Implement programs using ARM Tool chain and library	

<b>CS P63 - Web Technology Laboratory</b>		<b>Yr/Sem: III/VI</b>
CO 1	Understand and work with client side scripting, ActiveX, web servers and Java Server Pages.	
CO 2	Work and develop applications using XML, Server Side scripting, Ajax programming, Web services and mini project on E-commerce application.	

<b>CS P64 - Industrial Visits/ Training</b>		<b>Yr/Sem: III/VI</b>
CO 1	Ability to demonstrate the use, interpretation and application of an appropriate international engineering standard in a specific situation.	
CO 2	Ability to analyze a given engineering problem, identify an appropriate problem solving methodology and propose a meaningful solution.	

<b>HS P65 - General Proficiency - II</b>		<b>Yr/Sem: III/VI</b>
CO 1	Understand the composition analysis.	
CO 2	Developing letter and resume writing skills.	
CO 3	Understand and practice oral skills through group discussions and negotiation activities.	
CO 4	Practice corporate etiquette, grooming and dressing.	
CO 5	Practice verbal, non-verbal and numerical aptitude.	



  
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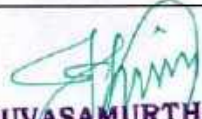
### SEMESTER-VII

<b>CS T71 - Artificial Intelligence</b>		<b>Yr/Sem: IV/VII</b>
CO 1	Confer history of AI, exchange views on Heuristic Search Techniques, Means Ends Analysis, Intelligent agents.	
CO 2	Discuss about propositional logic, predicate logic, forward and backward reasoning, filler structure, Based agents.	
CO 3	Discourse about non-monotonic reasoning, certainty factors, Bayesian networks, Fuzzy logic.	
CO 4	Confer and analyze the planning techniques, forms of learning.	
CO 5	Discuss about mini max search procedure, expert system representation, expert system shells, robotics.	

<b>CST72 - Computer Hardware and Network Trouble Shooting</b>		<b>Yr/Sem: IV/VII</b>
CO 1	Understand basic internal structures and evaluation of computers.	
CO 2	Identify and understand various components of motherboard, bus standards, SMPS and BIOS.	
CO 3	Understand memory hierarchy and needs of primary and secondary storage troubleshooting the memory problems.	
CO 4	Understand about various kinds of input and output devices and troubleshoot I/O related problems.	
CO 5	Interface external I/O devices with network topologies and troubleshoot network related problems.	

<b>CS T73 - Platform Technology</b>		<b>Yr/Sem: IV/VII</b>
CO 1	Confer knowledge of .NET framework, CLR, Class library, MSIL, components of CLR namespace, input and output, serialization, enterprise services, interoperability, GUIs	
CO 2	Ability to write C# .NET programs and knowledge on object oriented concepts.	
CO 3	Ability to write VB .NET programs and knowledge on object oriented concepts.	
CO 4	Direct access to data, accessing data with datasets and gain knowledge on the same	
CO 5	Gain knowledge of J2EE: Enterprise edition.	



  
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CS E71 –Software Testing and Quality Assurance		Yr/Sem: IV/VII
CO 1	Understand the theoretical aspects of software testing.	
CO2	Demonstrate the knowledge of the existing testing methods.	
CO 3	Demonstrate the knowledge of applying testing and analysis methods in software development and maintenance	
CO 4	To emphasis on software quality measurement and quality standards	
CO 5	Understand about software quality and software quality standards	


CS P71 -Artificial Intelligence Laboratory		Yr/Sem: IV/VII
CO 1	Understanding concepts of prolog and implementing recursive algorithms.	
CO 2	Understand and apply the search and traversal concepts and knowledge representation using propositional and predicate logic.	

CS P72 - Troubleshooting Laboratory		Yr/Sem: IV/VII
CO 1	Assemble personal computer, OS installation, circuit tracing, USB port programming and interfacing.	
CO 2	Troubleshooting printer port, serial port, USB port, PCI bus, networking devices using Bluetooth interface.	

CS P73 - Platform Technology Laboratory		Yr/Sem: IV/VII
CO 1	Analyze and program using C# .NET, ADO.NET.	
CO 2	Real time application using .NET framework.	

CS PW7 - Project Phase - I		Yr/Sem: IV/VII
CO 1	Motivate students to select application related projects.	
CO 2	Students study the reference papers from various domain and select domain of their wish.	
CO 3	Students have detailed survey on selected domain and identify base paper and give presentation.	
CO 4	Students identified problem formulation of their existing work.	



  
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CO 5	Students performed survey, identified the base paper, problem formulation and gave presentation.
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### SEMESTER-VIII

<b>CS T81 - Professional Ethics</b>		<b>Yr/Sem: IV/VIII</b>
CO 1	Discuss engineering ethics, moral issues, ethical theories and their uses in engineering	
CO 2	Realize code of ethics, engineer's responsibility for safety, rights and responsibilities	

<b>CS T82 - Engineering Economics and Management</b>		<b>Yr/Sem: IV/VIII</b>
CO 1	Confer the micro and macro, its applications, demand and supply concepts, break even analysis.	
CO 2	Discuss production and marketing management, concept of productivity, channels of distribution.	
CO 3	Discourse financial management, balance sheet, interest formulae.	
CO 4	Discuss methods of depreciation, declining method of depreciation.	
CO 5	Confer present and future worth method, annual equivalent method, rate of return method and examples.	

<b>CS T83 - Information Security</b>		<b>Yr/Sem: IV/VIII</b>
CO 1	Confer knowledge about security SDLC, providing security to components and make balance between security and access.	
CO 2	Ability to apply basic knowledge to handle threats, attacks, and legal professional issues while implementing security.	
CO 3	Analyze and access the impact of risk and they can make remedial measures to control risk on any organization.	
CO 4	Understand process involved in information security cycle and study security standard procedures.	



*(Signature)*  
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CO 5	Understand study of security technology and implement cryptography algorithms.
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CS E84 - Mobile Computing		Yr/Sem: IV/VIII
CO 1	To understand basic concepts of wireless and mobile communication.	
CO 2	Exchange views about the state of art industry standards in wireless networking.	
CO 3	Confer the various facilities available for mobile communication including protocol and security mechanism.	
CO 4	Discuss various transaction models associated with mobile data management in mobile computing.	
CO 5	Discourse the widely used mobile computing models.	

CS E811 - Cloud Computing		Yr/Sem: IV/VIII
CO 1	Confer roots of cloud computing, layers and types of cloud, features, challenges and risks.	
CO 2	Discuss cloud architecture, services, applications.	
CO 3	Discourse abstraction and virtualization, Virtual machines, provisioning in the cloud context.	
CO 4	Understand how to manage and secure data in cloud.	
CO 5	Understand the services provided by various clouds.	

CS P81 - Seminar		Yr/Sem: IV /VIII
CO 1	Students must be able to make critical review of literature.	
CO 2	Preparation of report on the topic.	

CS P82 -Comprehensive Viva-Voce		Yr/Sem: IV/VIII
CO 1	Remember all areas of Computer Science and engineering.	



  
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CS PW8 - Project Phase-II		Yr/Sem: IV/VIII
CO 1	Student installed and learnt the software simulation tool.	
CO 2	System architecture is designed and implementation of modules were done.	
CO 3	Review was conducted.	
CO 4	Demonstration of project and performance analysis is done.	
CO 5	Presentation is done and Report is submitted	



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### DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

### DISSEMINATION OF PO, PEO & PSO TO STUDENTS

## RAAK COLLEGE OF ENGINEERING & TECHNOLOGY

### DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

PROGRAM EDUCATIONAL OBJECTIVES (PEO)		PROGRAM OUTCOMES	
PEO 1	Graduates will possess strong foundation in technical and electronic engineering concepts and practices.	PO 1	ENGINEERING KNOWLEDGE: Apply the knowledge of mathematics, science, engineering fundamentals and an appropriate specialization to solve complex engineering problems.
PEO 2	Graduates will possess the professional skills and higher order skills.	PO 2	PROBLEM ANALYSIS: Identify, formulate, research relevant literature, and analyze complex electrical and electronic engineering problems using fundamental engineering principles, engineering software, and engineering design.
PEO 3	Graduates will possess professional skills to practice and undertake R&D in professional work areas.	PO 3	DESIGN/DEVELOPMENT OF SOLUTIONS: Design solutions to complex electrical and electronic engineering problems and design systems, components or processes to meet specified needs, with appropriate consideration for public health, safety, and cultural, societal, and environmental considerations.
PEO 4	Graduates will possess the skills to undertake learning in the domain with technological advancement.	PO 4	CONCEPTS OF COMPLEX PROBLEMS: Apply technical knowledge and methods including the design of electrical systems to solve complex problems in electrical and electronic engineering.
PROGRAM SPECIFIC OUTCOMES (PSO):		PO 5	MODERN TOOL USAGE: Apply and use modern engineering software, tools, and techniques to solve complex engineering problems in electrical and electronic engineering.
PSO 1	Graduates will possess the skills to design, develop and deploy complex electrical and electronic systems.	PO 6	THE ENGINEER AND SOCIETY: Apply knowledge to societal needs and ethical issues and the professional engineering practice in electrical and electronic engineering.
PSO 2	Graduates will possess the skills to undertake research in general electronics, instrumentation and automation.	PO 7	ENVIRONMENT AND SUSTAINABILITY: Understand the impact of engineering solutions in societal and environmental contexts and evaluate the sustainability of engineering solutions and design alternatives.
PSO 3	Graduates will possess the skills to undertake research in the domain with technological advancement.	PO 8	ETHICS: Apply ethical and professional principles to engineering practice and design alternatives.
PSO 4	Graduates will possess the skills to undertake research in the domain with technological advancement.	PO 9	INDIVIDUAL AND TEAM WORK: Function effectively as an individual or as a member or leader in diverse teams and multidisciplinary environments.
PSO 5	Graduates will possess the skills to undertake research in the domain with technological advancement.	PO 10	COMMUNICATION: Communicate effectively in oral and written forms, including technical reports, proposals, and presentations.
PSO 6	Graduates will possess the skills to undertake research in the domain with technological advancement.	PO 11	PROJECT MANAGEMENT AND FINANCE: Apply project management and financial principles to engineering practice and design alternatives.
PSO 7	Graduates will possess the skills to undertake research in the domain with technological advancement.	PO 12	LIFE-LONG LEARNING: Engage in continuous learning and development to enhance professional skills and knowledge in electrical and electronic engineering.

### GPS MAP CAMERA

57 Puducherry IN

Latitude 11.9223327      Longitude 79.7679612

Date: 22 Jun 2022      Time: 12:15 PM

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### ELECTRICAL AND ELECTRONICS ENGINEERING

#### PROGRAM OUTCOMES (PO):

##### PO1 – ENGINEERING KNOWLEDGE:

Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to solve complex problems in electrical and electronics engineering.

##### PO2 – PROBLEM ANALYSIS:

Identify, formulate, review research literature, and analyze complex electrical and electronics engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

##### PO3 – DESIGN/DEVELOPMENT OF SOLUTIONS:

Design solutions for complex electrical and electronics engineering problems and design system components or processes to meet specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.

##### PO4 – CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS:

Use research-based knowledge and methods, including the design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions in electrical and electronics engineering.

##### PO5 – MODERN TOOL USAGE:

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex engineering activities in electrical and electronics engineering with an understanding of the limitations.

##### PO6 – THE ENGINEER AND SOCIETY:

Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice in electrical and electronics engineering.

##### PO7 – ENVIRONMENT AND SUSTAINABILITY:

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

##### PO8 – ETHICS:

Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice in electrical and electronics engineering.



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### PO9 – INDIVIDUAL AND TEAM WORK:

Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings in electrical and electronics engineering.

### PO10 – COMMUNICATION:

Communicate effectively on complex engineering activities with the engineering community and with society at large, including the ability to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### PO11 – PROJECT MANAGEMENT AND FINANCE:

Demonstrate knowledge and understanding of 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 in electrical and electronics engineering

### PO12 – LIFE-LONG LEARNING:

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

### PROGRAM EDUCATIONAL OBJECTIVES (PEO):

- **Technical Excellence:** Achieve excellence in electrical and electronics engineering principles and practices.
- **Professional Growth:** Prepare graduates for successful careers and higher education.
- **Ethical Leadership:** Demonstrate ethical practices and leadership skills in professional activities.
- **Lifelong Learning:** Engage in lifelong learning to stay updated with technological advancements.

### PROGRAM SPECIFIC OUTCOMES (PSO):

- **System Design:** Design and develop complex electrical and electronic systems.
- **Sustainability:** Develop sustainable solutions in power generation, transmission, and distribution.
- **Research and Innovation:** Conduct research and innovate in electrical and electronics engineering



  
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SUBJECT LIST

(14-15 Regulations)

Code No.	Name of the Subjects
<b>SEMESTER I</b>	
<b>Theory</b>	
T101	Mathematics – I
T102	Physics
T103	Chemistry
T110	Basic Civil and Mechanical
T111	Engineering Mechanics
T112	Communicative English
<b>Practical</b>	
P104	Physics lab
P105	Chemistry lab
P106	Workshop Practice
<b>SEMESTER II</b>	
<b>Theory</b>	
T107	Mathematics – II
T108	Material Science
T109	Environmental Science
T104	Basic Electrical and Electronics Engineering
T105	Engineering Thermodynamics
T106	Computer Programming
<b>Practical</b>	
P101	Computer Programming Laboratory
P102	Engineering Graphics
P103	Basic Electrical & Electronics Laboratory
P107	NSS / NCC
<b>SEMESTER III</b>	
<b>Theory</b>	
MA T31	Mathematics – III



  
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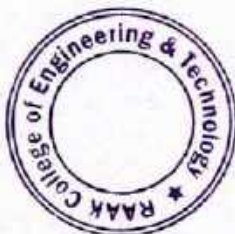
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EE T32	Electric Circuit Analysis
EE T33	Electrical Machines – I
EE T34	Electronic Devices and Circuits
EE T35	Electromagnetic Theory
EE T36	Fluid and Thermal Machines
	<b>Practical</b>
EE P31	Electrical Machines Lab-I
EE P32	Electronics Lab –I
EE P33	Fluid and Thermal Machines Lab
<b>SEMESTER IV</b>	
	<b>Theory</b>
MA T41	Mathematics – IV
EE T42	Electrical Machines – II
EE T43	Electronic Circuits
EE T44	Linear Control Systems
EE T45	Pulse and Digital Circuits
EE T46	Data structures and Object Oriented Programming
	<b>Practical</b>
EE P41	Electrical Machine Lab – II
EE P42	Electronics Lab – II
EE P43	Data Structures and Object Oriented Programming Lab
SP P44	Physical Education
<b>SEMESTER V</b>	
	<b>Theory</b>
EE T51	Communication Engineering
EE T52	Analog and Digital Integrated Circuits
EE T53	Transmission and Distribution
EE T54	Power Electronics
EE T55	Measurements and Instrumentation
EE E04	Energy Engineering
	<b>Practical</b>
EE P51	Electronics Lab – III
EE P52	Measurements and Control Lab
HS P53	General Proficiency – I



  
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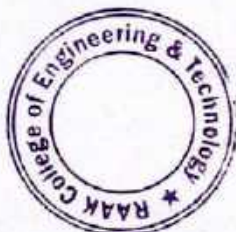
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<b>SEMESTER VI</b>	
	<b>Theory</b>
EE T61	Power System Analysis
EE T62	Utilization of Electrical Energy
EE T63	Microprocessors and Microcontrollers
EE T64	Electrical Machine Design
EE T65	Digital Signal Processing
EE E06	Special Electrical Machines
	<b>Practical</b>
EE P61	Power Electronics Lab
EE P62	Micro Processor and Microcontroller Lab
HS P63	General Proficiency – II
<b>SEMESTER VII</b>	
	<b>Theory</b>
EE T71	Industrial Management
EE T72	Solid State Drives
EE T73	Power system operation and control
EE E16	Power System Restructuring And Deregulation
EE E12	Renewable Energy Sources
	<b>Practical</b>
EE P71	Power System Simulation Lab
EE PW7	Project Phase – I
EE P72	Seminar
EE P73	Training/Industrial Visit
<b>SEMESTER VIII</b>	
	<b>Theory</b>
EE T81	Protection and Switchgear
EE T82	Professional Ethical Practice
EE E19	Smart Grid
EE E15	HVDC Transmission
	<b>Practical</b>
EE PW8	Project Phase –II
EE P81	Comprehensive Viva



  
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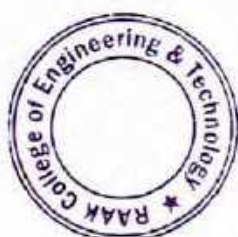
### DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

#### SEMESTER I

T101 Mathematics – I	
CO 1	Apply knowledge of mathematics to solve functions of several variables.
CO 2	Identify, formulate and solve engineering problems like multiple integrals and their usage.
CO 3	To solve differential equations that model physical process using effective mathematical tools.
CO 4	Able to find equation of straight line of shortest distance, equation of plane, angle between straight lines.
CO 5	Gain the knowledge to solve first order differential equation arising in engineering.

T102 Physics	
CO 1	Apply knowledge of science and engineering to understand physics and its significant contribution in the advancement of Technology and invention of new products that dramatically transform modern day society.
CO 2	Identify different areas of physics which have direct relevance and applications to different engineering disciplines.
CO 3	Apply fundamental knowledge to understand application of ultrasonics, optics and some optical devices, lasers and fiber optics, nuclear energy sources and wave mechanics.
CO 4	Understand the basic operating principles of laser its applications optical fiber and its types transmission characteristics applications of optical fibers.
CO 5	Understand the basic operating principles of laser its applications optical fiber and its types transmission characteristics applications of optical fibers.

T103 Chemistry	
CO 1	Apply knowledge of Science and Engineering to understand the importance of chemistry in engineering domain.
CO 2	Identify different electrochemical cells and their usage for industrial process.
CO 3	Apply fundamental knowledge of chemistry and build an interface of theoretical concepts with industrial applications / Engineering applications.
CO 4	Guide the students to gain the knowledge about the cooling curves, phase diagrams, alloys and their practical importance.
CO 5	Strengthen the fundamentals of chemistry and then built an interface of theoretical concepts with their industrial engineering /applications.



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T110 Basic Civil and Mechanical	
CO 1	Understand the building classification as per National Building code.
CO 2	Get the idea about construction procedure for various components of the building.
CO 3	Students understand the principles of Surveying, construction procedure for roads, bridges and dams.
CO 4	Student will be able to know about the working of internal and external combustion systems.
CO 5	Student will be able to know about Non-conventional energy systems.
CO 6	Student will be able to know about manufacturing process.

T111 Engineering Mechanics	
CO 1	Understand the basic laws of mechanics and resolution of forces using different methods.
CO 2	Learn and apply the knowledge on analysis of forces acting on the process and effect of friction force on bodies.
CO 3	Learn about the centroid and moment of inertia for plane and solid figures.
CO 4	Understand the three laws of motion principles of dynamics for particles.
CO 5	The student will be able to analyse the laws of motion for the rigid bodies.

T112 Communicative English	
CO 1	Learn about the definition of communication, importance, concept, sender, ideation, the levels in communication, channels, oral and written way of communication, body language and nonverbal communication, accuracy, Brevity and clarity, different barriers for communication, techniques in making effective communication, listening important and type of listening.
CO 2	Students learn about the types of letters, report writing, notices and memo and also develop skill in writing.
CO 3	Understand the comprehension, identify the difference between skimming and scanning, guess the meaning of the words, identify to make notes.
CO 4	Students learnt the writing skills, how to write a paragraph in a proper manner, four modes of writing and how to make bibliographical entries.
CO 5	Students are able to develop their spoken skills by making them to involve in many activities related to it.



  
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P104 Physics lab	
CO 1	Able to understand how to find the thickness of the specimen and also to find the radius of curvature of glass using the phenomena of interference of light.
CO 2	Able to understand the specific rotatory power of an optical active solution using the principle of polarization.
CO 3	To understand about thermal conductivity of bad conductor and rubber tube.
CO 4	Ability to understand about the optical properties like dispersive power, resolving power by applying the knowledge of optics.

P105 Chemistry lab	
CO 1	Student will become will acquainted to test amount of hardness present in sample of water for the year engineering needs.
CO 2	Students will be efficient in estimating acidity/alkalinity in given examples.
CO 3	Students will have knowledge about estimating amount of dissolved oxygen in water.
CO 4	Students will become well acquainted to estimate copper in brass.
CO 5	Students will have knowledge about determination of viscosity of sucrose using Ostwald's viscometer.
CO 6	To develop an understanding of basic titration setup and methodologies for determining strength, hardness and alkalinity of various unknown solutions.

P106 Workshop Practice	
CO 1	Understand and comply with workshop safety regulations
CO 2	Student will be able to make various joints in the given object with the available work material.
CO 3	Student will be able to know how much a joint will take for the assessment of time.
CO 4	Student can be able to identify the hand tools and instruments.
CO 5	Student can be able to gain knowledge about various operations carried out in sheet metal.
CO 6	Student can be able to gain skills about various tools used in welding to make simple joints.



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### SEMESTER II

<b>T107 Mathematics – II</b>	
CO 1	Apply knowledge of mathematics to solve Matrix algebra technique for practical applications and curl divergence and integration of vectors in vector calculus.
CO 2	Identify formulate and solve engineering problems like Laplace transform and to solve differential and integral equations.
CO 3	Apply formally and analyse problems of 4 year transform techniques.
CO 4	Determine the Fourier transform, Fourier cosine & sine transform of elementary functions, properties of transforms and its applications in engineering.
CO 5	Acquire knowledge of matrix algebra technique, vector calculus, Laplace and Fourier transform.

<b>T108 Material Science</b>	
CO 1	Apply core concepts in material science to solve engineering problems.
CO 2	Knowledgeable of contemporary issues relevant to material science and engineering
CO 3	Understand about the ferrites and its application to magnetic materials.
CO 4	Select materials for design and construction.
CO 5	Understand the importance and properties of materials

<b>T109-Environmental Science</b>	
CO 1	Apply fundamental knowledge to understand about the environment.
CO 2	Identify environmental pollution through science.
CO 3	Apply basic knowledge to solve various environmental issues and problems.
CO 4	Ability to consider issues of environment and sustainable development in his personal and professional undertakings.
CO 5	Provides a comprehensive knowledge in environmental science, environmental issues and the management from an interdisciplinary perspective.



  
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<b>T104-Basic Electrical and Electronics Engineering</b>	
CO 1	Will learn the fundamentals of rotational and stationary machine operation, single- phase and three-phase power measurement, magnetic and electrical circuits, and thesetopics.
CO 2	Will learn the fundamentals of measuring devices, communication systems, andnetwork models.
CO 3	Knowledge about non-conventional energy systems will be available to students.
CO 4	The varieties of metal joining will be known by the students.
CO 5	Students will learn about numerous engines, energies, and joints as well as construction and building components offered with diverse principles.

<b>T105-Engineering Thermodynamics</b>	
CO 1	Apply knowledge of mathematics, science and engineering to understand the basics of thermodynamics.
CO 2	Understand the importance of laws of thermodynamics applied to energy systems.
CO 3	Understanding refrigeration, heat pump and their physical mechanism.
CO 4	Understand the laws of motion for rigid bodies.
CO 5	Understand the effects of forces acting on the bodies in practical situation.

<b>T106-Computer Programming</b>	
CO 1	Know concepts in problem solving.
CO 2	To do programming in C language.
CO 3	To write diversified solutions using the C language.
CO 4	To know about structures, pointers and its manipulation.
CO 5	To know about the evaluation of computers, components and its applications. Basic knowledge on the internet, information technology, word processing and worksheets.

<b>P101-Computer Programming Laboratory</b>	
CO 1	Students can work with command line interface OS's, like MS-DOS.
CO 2	Students can solve most of the real time problems with C program.
CO 3	Students can interact with computer using C program, through various input and output functions.
CO 4	Students can make a use of various keywords, constants, variables, data



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	types, operators, type conversion in C program.
CO 5	Students will have knowledge about arrays, functions, structures and pointers in C program.

P102-Engineering Graphics	
CO 1	Perform freehand sketching of basic geometrical constructions and multiple views of objects.
CO 2	Project orthographic projections of lines and plane surfaces.
CO 3	Draw projections and solids and development of surfaces.
CO 4	Visualize and to project isometric and perspective sections of simple solids.
CO 5	Students will be able to draw orthographic projections and isometric projections.

P103-Basic Electrical and Electronics Laboratory	
CO 1	Know about basic electrical tools, applications and precautions
CO 2	Perform different types of wiring used in domestic and industrial applications.
CO 3	Measurements of voltage and phase using CRO, basic operation and applications of devices such as PN junction diode and transistors.
CO 4	Understand the function and applications of basic logic gates and flip flops.
CO 5	Gain knowledge in domestic wiring and application of electronics device in the field of electrical engineering.

P107-NSS/NCC	
CO 1	To create awareness in social and environmental issues.
CO 2	To participate in relief and rehabilitation work during natural calamities.
CO 3	To develop some proposals for local slum area development and waste disposal.
CO 4	To create team works among students and produce efficient results.
CO 5	To operate scientific instruments or advanced software.

### SEMESTER III

MA T31-Mathematics – III	
CO 1	Familiarize with the concept of analytic function, C-R equations and its uses.
CO 2	Learn about Cauchy's theorem and its uses in complex integration. Taylor's and Laurent's series in complex form.



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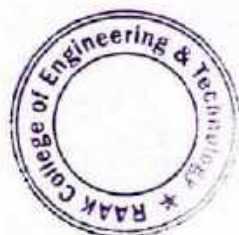
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CO 3	Learn about Cauchy Residues theorem and contour integrations.
CO 4	Gain knowledge of Finite and Infinite Fourier Transforms and applications.
CO 5	To introduce the Root mean square value and Parseval theorem on Fourier for practical applications.

EE T32 Electric Circuit Analysis	
CO 1	Illustrate various DC electrical networks by using principles of network theorems.
CO 2	Illustrate various AC electrical networks by using principles of network theorems.
CO 3	To analyse the three phase circuits with Star & Delta connected balanced and unbalanced loads and two port networks.
CO 4	Analyse transient response of RL, RC and RLC circuits for DC & AC network
CO 5	To analyse the frequency response characteristics of resonance circuits and its associated parameters and to explain the operation of single tuned circuit

EE T33 Electrical Machines – I	
CO 1	To emphasize the basic concepts of electromechanical energy conservation through energy and co-energy.
CO 2	To know about the elementary concepts of rotating machines (DC generator)
CO 3	To gain knowledge in the performance characteristics of DC motor.
CO 4	To understand the principles, the equivalent circuit, various characteristics and efficiency of transformers.
CO 5	To gain knowledge in polyphase transformer, special transformer and testing of various types of transformers.

EE T34 Electronic Devices and Circuits	
CO 1	To understand about the characteristics of semiconductor diodes and its Applications.
CO 2	To understand about the semiconductors in the functioning of BJT.
CO 3	To demonstrate the switching and amplification application for Field Effect Transistor..
CO 4	To know about the basic types of power diode and its working principles.
CO 5	To gain knowledge in types of diodes & about Opto electronic devices.



  
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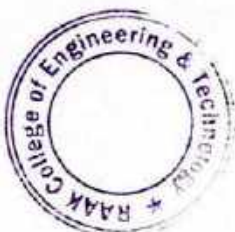
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<b>EE T35 Electromagnetic Theory</b>	
CO 1	To apply the various laws of Electrostatics
CO 2	To know about the basic laws of current electricity & about the process of dielectric medium & its strength.
CO 3	To know about the various laws in magnetic effects of electric current
CO 4	To analyse the magnetic forces, Self and Mutual inductances and energy stored in the magnetic field using laws of magneto-statics.
CO 5	To analyse Maxwell's equation in different forms (differential and integral) and apply them to diverse engineering problems. To Examine the phenomena of wave propagation in free space and different media and its interfaces.

<b>EE T36 Fluid and Thermal Machines</b>	
CO 1	Students will be able to apply Euler's, Bernoulli's equations and the conservation of mass to determine velocities, resources and accelerations for incompressible and in viscid fluids.
CO 2	Provide information about the different types of pump and hydraulic turbine and its efficiency.
CO 3	Providing knowledge about the working of steam turbine, efficiency and its working cycle.
CO 4	Students can understand the concepts of engine and air conditioning system.
CO 5	Providing knowledge about the various gas cycles and its efficiency and can able to know the working principles of air compressor and its selection process.

<b>EE P31 Electrical Machines Lab-I</b>	
CO 1	Knowledge on performance of DC Shunt and Series Motor and on speed control behaviour of DC Shunt Motor.
CO 2	Knowledge on the Characteristics of DC Shunt generator on O.C and Load conditions.
CO 3	Knowledge on the performance of Single Phase Transformer.
CO 4	Knowledge on performance of Synchronous machine.
CO 5	Knowledge on performance and speed control behaviour of an induction motor.



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EE P32-ELECTRONICS LAB-I	
CO 1	Proficient in using basic electronic measurement instruments such as multimeters, oscilloscopes, and function generators. They should be able to measure voltage, current, frequency, and other relevant parameters accurately.
CO 2	Analyze the V-I characteristics of diodes, transistors.
CO 3	Analyze the V-I characteristics of SCR, TRIAC and UJT.
CO 4	Implement the application of diode by constructing the rectifiers with and without filters.
CO 5	Design self-bias and fixed bias circuits using transistor.

EE P33-Fluid and Thermal Machines Lab	
CO 1	Understand turbo machines, positive displacement pumps, and application of impulse momentum equation and velocity triangles.
CO 2	Analyse hydraulic turbines, including Pelton Wheel, Francis, Kaplan, with velocity triangles and performance characteristics.
CO 3	Understand hydraulic pumps, centrifugal pumps, and reciprocating pumps, considering power estimation, efficiency, and governing mechanisms.
CO 4	Explore air machines, compressors, fans, including reciprocating, centrifugal, axial flow compressors, blowers, and fans.
CO 5	Study special purpose pumps, machines, and hydraulic devices, considering gear pump, vane pump, screw pump, vacuum pump, and applications.

### SEMESTER IV

MA T41-Mathematics-IV	
CO 1	Formulate and solve partial differential equation.
CO 2	Derive and obtain the solution of wave equation and boundary value problems.
CO 3	Derive and obtain the solution of heat equation and boundary value problems.
CO 4	Apply least square method to fit various curves for the given data investigate the validity of hypothesis by Z-distribution techniques.
CO 5	Calculation of analysis of variance and explain the use of the Chi-squared test and its calculation.



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EE T42-Electrical Machines-II	
CO 1	Evaluate and analyse the performance of three phase induction motor using equivalent circuits and circle diagram.
CO 2	Apply suitable starting and speed control methods to enhance the performance of three phase induction motors.
CO 3	Analyse the performance characteristics of alternator and compute voltage regulation with different methods.
CO 4	Analyse the characteristics of synchronous motor and its performance with effect of varying load and excitation.
CO 5	To characteristics of single phase induction motors and special machines as well as choose an appropriate motor for any industrial application.

EE T43-ELECTRONIC CIRCUITS	
CO 1	Design the transistor Amplifiers using its small signal model
CO 2	Design cascade amplifiers and sweep circuits
CO 3	Evaluate the performance analysis of large signal amplifier.
CO 4	Design the feedback amplifiers and analyze frequency response.
CO 5	Design oscillators for different types of signal generation.

EE T44-LINEAR CONTROL SYSTEMS	
CO 1	Express a translational and Rotational mechanical system into its equivalent Electrical system using free body diagrams and Force-voltage, force-current, Torque-voltage and Torque Current analogies. Solve for the transfer function for a given block diagram using block diagram reduction techniques and Mason' Gain formula.
CO 2	Determine the output response and time domain specifications of first and second order closed loop system through Laplace transform method and Apply the Positional, Integral and derivative controllers for reducing the steady state errors and transient response of first and second order control systems.
CO 3	Synthesize the frequency response from the transfer function using Bode plot and Polar plot and analyses the stability of the given systems.
CO 4	Diagnose the stability of a given system from its transfer function with the help of Routh- Hurwitz criteria and Root locus Techniques.
CO 5	To analyse model and design controllers for linear dynamic systems.



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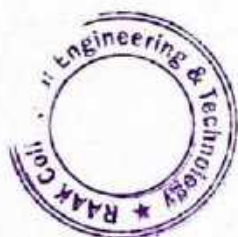
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<b>EE T45-PULSE AND DIGITAL CIRCUITS</b>	
CO 1	To have knowledge in various linear wave shaping circuits, pulse transformer and switching circuits.
CO 2	To describe the various operation in multi vibrator and time base circuit.
CO 3	Design of combinational circuits, encoders & decoders and simplification of Boolean expression using K-map.
CO 4	Design of counters such as up/down counters and knowledge about various types of memory.
CO 5	Design of synchronous sequential circuits with the help of model selection, state transition diagram, state synthesis table and state reduction technique. Analysis of asynchronous circuit with example problems.

<b>EE T46-DATA STRUCTURES AND OBJECT ORIENTED PROGRAMMING</b>	
CO 1	Discuss about programming principles and analyzing the problems and about types of arrays.
CO 2	To gain knowledge about linear data structure, representation of stack, operation of stack and its application.
CO 3	To describe about the non linear data structures.
CO 4	To discuss about the structures oriented objected programming with C++.
CO 5	To solve various computing problems using C++ languages.

<b>EE P41-ELECTRICAL MACHINES LAB-II</b>	
CO 1	Test the performance of induction and synchronous machines by conducting suitable experiments and report the results.
CO 2	Predetermine the different performance characteristics of single phase and three phase induction motors.
CO 3	Analyze the speed control techniques and electrical braking of induction motor.
CO 4	Experiment the synchronization of alternators and analyze the power exchange with the grid.
CO 5	Develop any prototype modules implementing different control techniques in Induction and Synchronous machines for various applications.

<b>EE P42-ELECTRONICS LAB-II</b>	
CO 1	With the help of design principles practice different types of amplifiers, high frequency oscillators and multi vibrators.
CO 2	To practice with the various combinational circuits using logic gates,



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counters using IC's.
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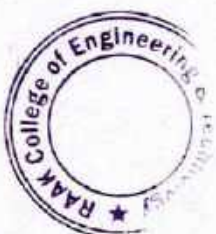
<b>EE T46-DATA STRUCTURES AND OBJECT ORIENTED PROGRAMMING</b>	
CO 1	To implement the linear and non linear data structure concept in C languages.
CO 2	To implement and understand the object oriented programming concept in C++.

<b>EE P41 – Electrical Machines Lab - II</b>	
CO 1	Analyze the performance of different induction motors under no load and load conditions.
CO 2	Demonstrate the predetermination methods of finding the losses and efficiency of synchronous machines.

<b>EE P42 – Electronics Lab - II</b>	
CO 1	With the help of design principles practice different configuration of amplifiers and demonstrate low and high frequency oscillators and multivibrators.
CO 2	Discuss the combinational circuit as Adder, subtractor, and magnitude comparator, multiplexers, encoders, decoders and demultiplexer using logic gates, counters using ICs.

<b>EE P43 – Object Oriented Programming Lab</b>	
CO 1	Implement the linear and non linear data structure concept in C language.
CO 2	Implement and understand the object oriented programming concept in C++.

<b>SP P44-Physical Education</b>	
CO 1	Understanding the opportunities of students' physical, cognitive, social and emotional development.
CO 2	Understanding of individual and group motivation and behaviour.
CO 3	To create teamwork among students and produce efficient results.
CO 4	The students were taught to operate advanced playing kits.
CO 5	To motivate the students to prepare the professional and scientific reports.



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### SEMESTER V

EE T51 – COMMUNICATION ENGINEERING	
CO1	To understand the concept of analog and digital modulation techniques
CO2	To understand the concept of ASK, PSK & FSK
CO3	To get a depth knowledge in spectrum system
CO4	Ability to understand the wireless system and protocol
CO5	To understand the design communication in smart Grid Technology

EE T52 – ANALOG AND DIGITAL INTEGRATED CIRCUITS	
CO1	Describe the IC fabrication process for any circuits.
CO2	Design and analyze OP AMP based circuits for different applications like A/D and D/A conversion
CO3	Design filters and waveform generation using OP AMP
CO4	Design regulation for Power supply circuits
CO5	Design multi-vibrators using 555 timer and demodulators using 565 PLL

EE T53 Transmission and Distribution	
CO 1	Summarize the structure of generation, transmission and distribution with real time connection schemes.
CO 2	Calculate the line parameters in the transmission system and their effects in the overhead lines.
CO 3	Analyze on different types of transmission lines (short, medium, long) and its performance.
CO 4	Choose the adaptable types of insulators and cables for transmission and distribution system.
CO 5	Compare various schemes of electrification and gain knowledge on high voltage AC/ DC systems.

EE T54 Power Electronics	
CO1	To explain the different types of power semiconductor devices and their Characteristics
CO2	To distinguish between 1 phase and 3 phase controlled converters
CO3	Analyze the operation of AC voltage controllers and different types of DC-DC converters
CO4	Analyze the operation of cycloconverter
CO5	Illustrate the operation of Inverters and application of power electronics



  
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### EE T55-MEASUREMENTS AND INSTRUMENTATION

CO1	To understand the knowledge about the basic Generalized measurement system, Methods of measurement & Types of error
CO2	To understand the effects of electromechanical instruments
CO3	Develop the suitable bridge for the measurement of electrical parameter
CO4	To understand the concept of display & recording devices.
CO5	To Understand the concept of transducer & its applications.

### EE E04-ENERGY ENGINEERING

CO1	Analyse the national and international energy scenario of renewable energy Sources
CO2	To gain adequate knowledge on Conventional Energy Sources
CO3	To outline about the Hydro and Ocean Energy Electric Technologies
CO4	To provide knowledge on Wind, Solar Energy and DG Technologies.
CO5	To provide knowledge on Energy Conservation And Management

### EE P51-ELECTRONICS LAB-III

CO1	To demonstrate all types of analog electronic circuits like voltage regulators, amplifiers, oscillators, filters and multivibrators.
CO2	To develop the circuits like encoder, decoder, multiplexer and digital to analog converters.


### EE P52-MEASUREMENT AND CONTROL LAB

CO1	Realize the advantages and the necessity of measurement systems in all Engineering and Scientific works.
CO2	Measure Resistance, Inductance and capacitance using AC and DC bridges.
CO3	Determine the magnetization characteristics and hysteresis loss of iron specimen using BH curve
CO4	Calibrate single phase and three phase energy meters used in domestic and commercial applications
CO5	Simulate modelling parameters of electrical machines

### HS P53-GENERAL PROFICIENCY-1

CO1	To understand and practice the art of communication
CO2	able to practice and showcase soft skills.
CO3	To understand the importance of writing.
CO4	To practice speaking skill.



  
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CO5	To practice verbal, non verbal and numerical aptitude.
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### SEMESTER VI

EE T61-Power System Analysis	
CO 1	To analyze the various operation of power system Components & to determine per unit diagram and bus admittance matrix.
CO 2	To analyze the Formulation of various types of load flow equations & line voltages and real and reactive powers.
CO 3	Ability to learn about various types of faults in sequence networks.
CO 4	Compute the fault currents for L-G, L-L, and L-L-G faults by analyzing a power system's sequence network.
CO 5	To analyze and understand about classification of Power System Stability Model and System Equivalent problems.

EE T62-Utilization of Electrical Energy	
CO 1	To have a basic engineering knowledge in Illumination models and its working.
CO 2	To have a knowledge in electric heating & welding and its types.
CO 3	To analyse the characteristics of a motor load and power factor improvement.
CO 4	To understand about A.C traction and about recent trend in Metro rails.
CO 5	To determine and analyse about the electrolytic process and about energy auditing-Energy Conservation techniques or domestic and industrial applications.

EE T63-Microprocessors and Microcontrollers	
CO 1	Illustrate the architecture of microprocessor and to develop skills in writing assembly language program.
CO 2	Have a clear understanding of microcontroller architecture with functional details of each pin.
CO 3	Write and debug Assembly and C programs for 8 bit Microcontroller.
CO 4	Interface input/output peripheral devices and to implement the advanced communication protocol like DC and SPI using PIC Microcontroller.
CO 5	Design and develop microcontroller based real-time applications.



  
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EE T64-Electrical Machine Design	
CO 1	To understand about the basic concepts of electric design & to analyse the concepts.
CO 2	Ability to solve and design the parts of electric machine.
CO 3	Ability to solve and design the parts of transformer.
CO 4	Ability to solve and design the three phase induction motor.
CO 5	Ability to solve and design the synchronous machine and to understand the basic knowledge of computer aided design.

EE T65 Digital Signal Processing	
CO 1	Analyze the classifications of signals and systems in the time and frequency domains
CO 2	Perform the stability analysis of discrete time system.
CO 3	Acquire knowledge on spectral analysis of signals.
CO 4	Design, analyse and compare digital filters for processing of discrete time signals.
CO 5	Acquire knowledge on DSP architecture and implement DFT and FFT Algorithms in DSP.

EE E06 SPECIAL ELECTRICAL MACHINES	
CO 1	Understand the constructional features, principle of operation, Modes of operation of Stepper motor Classify the Types of motors, Drive system and circuit control of Stepper motor Analyze Static and Dynamic Characteristics Explain its Applications.
CO 2	Understand Constructional details, principles of operation of switched reluctance motor. Analyze its characteristics, torque, drive and its regulation. Explain the control and Applications.
CO 3	Understand Constructional features and principle of synchronous reluctance motor and vernier motor. Classify its Types Reluctance and analyze the Phasor diagram and its Characteristics.
CO 4	Remember the Commutation in DC motors. Differentiate between mechanical and electronic commutators. Understand Principle of operation, Construction and drive circuits. Analyze Torque and emf equation, Torque and Speed characteristics. Explain sensors and sensor less systems, controllers and applications.
CO 5	Understand principles of operation constructional features, characteristics and application of permanent magnet synchronous motor and doubly fed



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	induction generator. Analyze phasor diagram, torque speed characteristic and applications.
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EE P61-POWER ELECTRONICS LABORATORY	
CO 1	Understand the operation of power electronic devices and its applications
CO 2	Analyze the I-V characteristics of SCR, DIAC and TRIAC.
CO 3	Analyze the characteristics of IGBT and UJT
CO 4	Illustrate the functioning of rectifiers and firing circuits.
CO 5	Distinguish the speed control of DC motor using converters.

EE P62-MICROPROCESSOR AND MICROCONTROLLER LAB	
CO 1	Develop assembly language program for microprocessor 8085.
CO 2	Analyze various platforms for programming by knowing the complete hardware configurations
CO 3	Analyze abstract problems and apply a combination of hardware and software to address the problem.
CO 4	Design a control algorithm various applications using microcontrollers.
CO 5	Design and generate pulses for real time electrical applications.

HS P63-GENERAL PROFICIENCY-II	
CO 1	Understand the composition analysis.
CO 2	Developing letter and resume writing skills.
CO 3	Understand and practice oral skills through group discussions and negotiation activities.
CO 4	Practice corporate etiquette, grooming and dressing.
CO 5	Practice verbal, non-verbal and numerical aptitude.

### SEMESTER VII

EE T71 INDUSTRIAL MANAGEMENT	
CO 1	To understand the concepts of engineering economics.
CO 2	Ability to understand key managerial decisions method like make or buy decision and some examples in all methods.
CO 3	Ability to learn the administrative capabilities.



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CO 4	To understand the principles of management and types of management
CO 5	To impart knowledge in financial management and about accounting.

### EE T72-SOLID STATE DRIVES

CO 1	To understand the fundamentals of electric drive and converter fed DC motor drives.
CO 2	To examine the operation of chopper fed dc drives.
CO 3	To impart the knowledge in control methods for the induction motor drives.
CO 4	To analyse the performance of induction motor drive.s
CO 5	To know about the control of synchronous motor and basic knowledge about vector control.

### EE T73-POWER SYSTEM OPERATION AND CONTROL

CO 1	To analyse and control the P-F and Q-V loop disturbances & about SCADA system.
CO 2	To know about the load forecast, unit commitment & dynamic programming method.
CO 3	To impart about the real power-frequency and Reactive power.
CO 4	To know about the dispatch schedule solving through iteration method.
CO 5	To know about the voltage controller and its characteristics and basic knowledge in compensating equipment.

### EE E12-RENEWABLE ENERGY SOURCES

CO 1	To know in detail about the importance and limitations of renewable energies in present Indian and International energy scenario.
CO 2	To learn about the solar energy harnessing methods.
CO 3	To understand the working of different types of wind power plants and blade design.
CO 4	To understand about the working of several renewable energy systems such as tidal energy, ocean thermal energy.
CO 5	To get a knowledge about the Bio-energy & Energy from the Agricultural wastes Applications.

### EE E16-POWER SYSTEM RESTRUCTURING AND DEREGULATION

CO 1	Understand the structure of an electricity market in either regulated or deregulated market conditions.
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CO 2	Describe the operational activities in Generation, Transmission and Distribution system in the restructured environment.
CO 3	Interpret the impact of open access in distribution system.
CO 4	To understand the need for restructured power system along with electricity market models.
CO 5	Outline the Indian power sector.

### EE-P71-POWER SYSTEM SIMULATION LAB

CO 1	To get familiar with the Finite Element (FE) modelling of structural elements with loading and boundary conditions
CO 2	To understand and apply the structural and dynamic analysis of structural elements
CO 3	To understand and apply the types thermal and dynamic analysis of structural elements.
CO 4	To learn and solve core mechanical engineering problems using MATLAB computational package.
CO 5	Explain Verification and Validation of simulation model.

### EE PW7-PROJECT PHASE I

CO 1	Motivate students to select application related projects.
CO 2	Students study the reference papers from various domain and select domain of their wish.
CO 3	Students have detailed survey on selected domain and identify base paper and give presentation.
CO 4	Students identified problem formulation of their existing work.
CO 5	Students performed survey, identified the base paper, problem formulation and gave presentation.

### EE P72-SEMINAR

CO 1	Students must be able to make critical review of literature.
CO 2	Preparation of report on the topic.

### EE P73-INDUSTRIAL VISIT/TRAINING

CO 1	Student can gain knowledge through visiting industry.
CO 2	Student can gain practical knowledge through internship.



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### SEMESTER VIII

EE T81-PROTECTION AND SWITCHGEAR	
CO 1	To understand the different protection zones and protection schemes in power system.
CO 2	Analyse the different applications of the relays in power system.
CO 3	To impart knowledge on protection schemes for generator, transformer, motor, feeder and transmission lines
CO 4	To acquaint the various types of surge protection and earthing.
CO 5	Comprehend the various circuit breakers (AC and DC) used in power system.

EE T82-Professional Ethics Practice	
CO 1	Define and Identify different life skills required in personal and professional life.
CO 2	Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress.
CO 3	Explain the basic mechanics of effective communication and demonstrate these through presentations and take part in group discussions.
CO 4	Use appropriate thinking and problem solving techniques to solve new problems.
CO 5	Understand the basics of teamwork and leadership.

EE E15-HVDC TRANSMISSION	
CO 1	Distinguish between the usage of EHVAC and HVDC transmission systems
CO 2	Judge when and where to use EHVAC/HVDC transmission systems in practice.
CO 3	Design implementation circuitry for various controllers used in HVDC transmission systems.
CO 4	Plan appropriate electric power transmission system between two destinations.
CO 5	To satisfy the pre-defined load requirement without compromising the technical performance.

EE E19-SMART GRID	
CO 1	Compare the conventional electrical grid concepts with smart grid.
CO 2	Outline about the protocols and networks used in Smart grid.
CO 3	Explain the importance of WAM and energy storage technologies used in smart grid.



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CO 4	Acquire knowledge on distributed generation and micro grids in smart grid.
CO 5	Analyze the power quality issues in smart grid.

EE PW8-Project Phase II	
CO 1	Identify the problem statement for the project work through the literature survey.
CO 2	Choose the proper components as per the requirements of the design/system.
CO 3	Apply the acquainted skills to develop final model/system.
CO 4	Estimate, plan and execute the project as a team.
CO 5	Explore the possibility of publishing papers in peer reviewed journals/conference proceedings.

EE P81-Comprehensive Viva	
CO 1	Demonstrate the knowledge the program domain.
CO 2	Present the views suitable for career progression.
CO 3	Exhibit the strength in previous semester subjects.
CO 4	To demonstrate on new innovation topics.
CO 5	Ability to understand the depth knowledge in core industries.



  
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### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

### DISSEMINATION OF PO, PEO & PSO TO STUDENTS

## RAAK COLLEGE OF ENGINEERING & TECHNOLOGY

### DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

PROGRAM EDUCATIONAL OBJECTIVES (PEO)		PROGRAM OUTCOMES		PROGRAM OBJECTIVES	
PEO-1	Graduate Engineers should be able to analyze, design and synthesize engineering systems.	PO-1	ENGINEERING KNOWLEDGE	PO-7	MANAGEMENT AND LEADERSHIP SKILLS
PEO-2	Graduate Engineers should be able to identify, analyze and solve problems.	PO-2	PROBLEM ANALYSIS	PO-8	ETHICS
PEO-3	Graduate Engineers should be able to select and apply appropriate engineering tools and techniques.	PO-3	DESIGN DEVELOPMENT OF SOLUTIONS	PO-9	ENVIRONMENTAL AND SUSTAINABILITY
PEO-4	Graduate Engineers should be able to communicate effectively in writing and orally.	PO-4	ENGINEERING CALCULATION	PO-10	COMMUNICATION SKILLS
PROGRAM SPECIFIC OBJECTIVES (PSO)		PO-5	ENGINEERING DESIGN	PO-11	PROJECT MANAGEMENT AND LEADERSHIP
PSO-1	Apply design, analysis and synthesis to design and develop systems.	PO-6	THE ENGINEERING ECONOMY	PO-12	LEARNING TO LEARN

GPS MAP CAMERA

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### ELECTRONICS AND COMMUNICATION ENGINEERING

#### PROGRAM OUTCOMES (PO):

##### **PO1 – ENGINEERING KNOWLEDGE:**

Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to solve complex problems in electronics and communication engineering.

##### **PO2 – PROBLEM ANALYSIS:**

Identify, formulate, review research literature, and analyze complex electronics and communication engineering problems to reach substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

##### **PO3 – DESIGN/DEVELOPMENT OF SOLUTIONS:**

Design solutions for complex electronics and communication problems and design system components or processes to meet specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.

##### **PO4 – CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS:**

Use research-based knowledge and methods, including the design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions in electronics and communication engineering.

##### **PO5 – MODERN TOOL USAGE:**

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex engineering activities in electronics and communication with an understanding of the limitations.

##### **PO6 – THE ENGINEER AND SOCIETY:**

Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice in electronics and communication.

##### **PO7 – ENVIRONMENT AND SUSTAINABILITY:**

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

##### **PO8 – ETHICS:**

Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice in electronics and communication engineering.



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### PO9 – INDIVIDUAL AND TEAM WORK:

Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings in electronics and communication engineering.

### PO10 – COMMUNICATION:

Communicate effectively on complex engineering activities with the engineering community and with society at large, including the ability to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### PO11 – PROJECT MANAGEMENT AND FINANCE:

Demonstrate knowledge and understanding of 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 in electronics and communication engineering.

### PO12 – LIFE-LONG LEARNING:

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

### PROGRAM EDUCATIONAL OBJECTIVES (PEO):

- **Technical Foundation:** Provide a solid foundation in electronics and communication engineering principles.
- **Career Readiness:** Prepare graduates for successful careers in industry and academia.
- **Ethical Practices:** Instill ethical values and professional responsibilities.
- **Lifelong Learning:** Promote lifelong learning and adaptation to emerging technologies.

### PROGRAM SPECIFIC OUTCOMES (PSO):

- **System Design:** Design and develop integrated electronic systems.
- **Technical Adaptability:** Adapt to technological advancements in electronics and communication engineering.
- **Research and Development:** Conduct research and develop innovative solutions in the field.



  
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SUBJECT WISE COURSE OUTCOME (2022 – 2023)

SUBJECT LIST

(2013 -2014)

S. No.	Course Code	Course Name
1.	T101	Mathematics - I
2.	T102	Physics
3.	T103	Chemistry
4.	T110	Basic Civil and Mechanical Engineering
5.	T111	Engineering Mechanics
6.	T112	Communicative English
7.	P104	Physics Laboratory
8.	P105	Chemistry Laboratory
9.	P106	Workshop Practice
10.	T107	Mathematics - II
11.	T108	Material Science
12.	T109	Environmental Science
13.	T104	Basic Electrical and Electronics Engineering
14.	T105	Engineering Thermodynamics
15.	T106	Computer Programming
16.	P101	Computer Programming Laboratory
17.	P102	Engineering Graphics
18.	P103	Basic Electrical and Electronics Laboratory
19.	P107	NSS/NCC
20.	MA T31	Mathematics - III
21.	EC T32	Electrical Engineering
22.	EC T33	Data Structures and object oriented programming
23.	EC T34	Electronic Devices and Circuits
24.	EC T35	Circuit Theory
25.	EC T36	Engineering Electromagnetics
26.	EC P31	Electrical Engineering Laboratory
27.	EC P32	Data Structures and object oriented programming Laboratory



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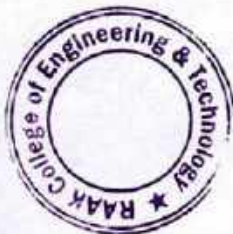


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28.	EC P33	Electronic Devices and Circuits Laboratory
29.	MA T41	Mathematics - IV
30.	EC T42	Electronic Circuit and Analysis
31.	EC T43	Signals and Systems
32.	EC T44	Linear and digital control system
33.	EC T45	Digital circuits
34.	EC T46	Electronic communication systems
35.	EC P41	Electronic circuit design laboratory
36.	EC P42	Digital circuits laboratory
37.	EC P43	Communication laboratory - I
38.	SP P44	Physical Education
39.	MA T51	Probability and Random Processes
40.	EC T52	Data Communication Network
41.	EC T53	Microprocessors and Microcontrollers
42.	EC T54	System design using integrated circuits
43.	EC T55	Transmission lines and wave guides
44.	EC E02	Consumer Electronics
45.	EC P51	Microprocessors and Microcontroller Laboratory
46.	EC P52	System design using integrated circuits Laboratory
47.	EC P53	Networks and Transmission Lines Laboratory
48.	HS P 54	General Proficiency - I
49.	EC T61	Digital Communication
50.	EC T62	Wireless communication
51.	EC T63	Digital Signal Processing
52.	EC T64	Antennas and wave propagation
53.	EC E06	VLSI design
54.	EC P61	Communication laboratory - II
55.	EC P62	Computer Networks laboratory
56.	EC P63	Digital Signal Processing laboratory
57.	HS PS4	General Proficiency – II
58.	EC T71	Microwave and Optical Engineering
59.	EC T72	Embedded Systems
60.	EC E14	Cryptography and Network Security
61.	EC E15	Spread Spectrum Communication
62.	EC P71	Communication laboratory – III
63.	EC P72	Embedded Systems laboratory
64.	EC P73	Seminar
65.	EC P74	Industrial Visit/Training
66.	EC PW7	Project Work - I



  
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67.	EC T81	Professional Ethics
68.	EC T82	Industrial Management and Engineering Economics
69.	EC E16	Satellite Communication systems
70.	EC E20	Cellular Mobile Communication
71.	EC P81	Advanced Communication Laboratory
72.	EC P82	Comprehensive Viva
73.	EC PW8	Project Work - II



  
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#### SUBJECT WISE COURSE OUTCOME (2022 – 2023)

T101 Mathematics – I	
CO1	Apply knowledge of mathematics to solve functions of several variables
CO2	Identify, formulate and solve engineering problems like multiple integrals and their usage
CO3	To solve differential equation that model physical processes using effective mathematical tools
CO4	Able to find equation of straight line of shortest distance, equation of plane, angle between straight lines
CO5	Gain the knowledge to solve first order differential equation arising in engineering

T102 Physics	
CO1	Apply knowledge of science and engineering to understand physics and its significant contribution in the advancement of technology and invention of new products that dramatically transform modern day society
CO2	Identify different areas of physics which have direct relevance and application to different engineering disciplines
CO3	Apply fundamental knowledge to understanding applications of ultrasonics, optics and some optical devices, lasers and fiber optics, nuclear energy sources and wave mechanics
CO4	Understanding the basic operating principles of laser, its applications, optical fiber and its types, transmission characteristics, applications of optical fibers
CO5	Understanding the basic operating principles of laser, its applications, optical fiber and its types, transmission characteristics, applications of optical fibers

T103 Chemistry	
CO1	Apply knowledge of science and engineering to understand the importance of chemistry in engineering domain
CO2	Identify different electrochemical cells and their usage for industrial process
CO3	Apply fundamental knowledge of chemistry and build an interface of theoretical concepts with industrial applications engineering applications.
CO4	Guide the students to gain the knowledge about the cooling curves, phase diagrams, alloys and their practical importance



  
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CO5	Strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with then industrial engineering applications
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T110-Basic Civil and Mechanical Engineering	
CO1	Understand the building classification as per National building code
CO2	Get the idea about construction procedure for various components of the building Students understand the principles of surveying, construction procedure for roads, bridges and dams
CO3	Student will be able know about the working of fraternal and external combustion Systems
CO4	Student will be able know about Non-Conventional Energy Systems
CO5	Student will be able to know about manufacturing process

T111-Engineering Mechanics	
CO1	Understand the basics law of mechanics and resolution of forces using different methods
CO2	Learn and apply the knowledge on analysis of forces acting on the trusses and effect of friction force on bodies
CO3	Learn about the centroid and moment of inertia for plane and solid figures
CO4	Understand the three laws of motion, principles of dynamics for particles
CO5	Students will able to analyse the laws of motion for rigid bodies

T112-Communicative English	
CO1	Learnt about the definition of communication, importance, concept. Sender, ideation, the levels in communication, channels, oral and return way of communication , body language and non- verbal communication, accuracy, brevity and clarity, difference barriers for communication, techniques in making effective communication, listening importance and types of listening
CO2	Students learnt about the types of letters, report writing, notices and memo and also develop the skill in writing
CO3	Understands the comprehension, identifies the difference between skimming and scanning, guess the meaning of the words, indentify to make notes.
CO4	Students learn the writing skills, how to write a paragraph in a proper manner four modes of writing and how to bibliographical entries
CO5	Students were able to develop their spoken skills by making many activities related to it



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### P104 Physics Lab

CO1	Able to understand how to find the thickness of specimen and also to find the radius of curvature of glass using the phenomenon of two interference of light
CO2	Able to understand the specific rotary power of an optical active solution using the principle of polarization
CO3	To understand about the thermal conductivity of bad conductor and rubber tube
CO4	Ability to understand about the optical properties like dispersive power, resolving power by applying the knowledge of optics

### P105 – Chemistry Lab

CO1	Students will become well acquainted to test amount of hardness present in samples of water
CO2	Students will be efficient in estimating acidity/alkalinity in given samples
CO3	Students will have knowledge about estimating amount of dissolved oxygen in water
CO4	Students will become well acquainted to estimate copper in brass
CO5	Students will have knowledge about determination of viscosity of sucrose using Ostwald's viscometer
CO6	To develop an understand on chemicals

### T107 Mathematics - II

CO1	Apply knowledge of mathematics to solve matrix algebra technique for practical applications and curl, divergence and integration of vectors in vector calculus
CO2	Identify, formulate and solve engineering problems like laplace transform and to solve differential and integral equations
CO3	Apply formulae and analyze problems of fourier transform techniques
CO4	Determine the fourier transform, Fourier cosine and sine transform of elementary functions, properties of transforms and its application in engineering
CO5	Acquire knowledge of matrix algebra techniques, vector calculus, laplace and Fourier Transform

### T108 Material Science



  
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CO1	Apply core concept in material science to solve engineering problems
CO2	Knowledgeable of contemporary issues relevant to material science and engineering
CO3	Understand about ferrites and its application to magnetic materials
CO4	Select materials for design and construction
CO5	Understand the importance and properties of materials

### T109 Environmental Science

CO1	Apply fundamental knowledge to understand about the environment
CO2	Identify environmental pollution through science
CO3	Apply basic knowledge to solve various environmental issues and problems
CO4	Ability to consider issues of environment and sustainable development in his personal and professional undertakings
CO5	Provide a comprehensive knowledge in environmental science, environmental issues and the management from an interdisciplinary perspective

### T104 - Basic Electrical and Electronics Engineering

CO1	Will learn the fundamentals of rotational and stationary machine operation, single-phase and three-phase power measurement, magnetic and electrical circuits and these topics
CO2	Will learn the fundamentals of measuring devices, communication systems and networks models
CO3	Knowledge about non-conventional energy systems will be available to students
CO4	The varieties of metal joining will be known by the students
CO5	Students will learn about numerous engines, energies and joints as well construction and building components offered with diverse principles

### T105 - Engineering Thermodynamics

CO1	Apply knowledge of mathematics, science and engineering to understand the basics of thermodynamics
CO2	Understand the importance of laws of thermodynamics applied to energy systems
CO3	Understanding refrigeration, heat pump and their physical mechanism
CO4	Understand the laws of motion for rigid bodies
CO5	Understand the effects of forces acting on the bodies in practical situation



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<b>T106 – Computer Programming</b>	
CO1	Know concepts in problem solving
CO2	To do programming in C language
CO3	To write diversified solutions using the C language
CO4	To know about structures, pointers and its manipulations
CO5	To know about the evaluation of computers, components and its applications. Basic knowledge on the internet, information technology, word processing and worksheets.

<b>P101– Computer Programming laboratory</b>	
CO1	Students can work with command line interface OS's like MS-Dos
CO2	Students can solve most of the real time problems with C Program
CO3	Students can interact with computer using C program, through various input and output functions.
CO4	Students can make a use of various keywords constants, variables, data types operators, type conversion in C programs.
CO5	Students will have knowledge about arrays functions structures and pointers in C Program.

<b>P102-Engineering Graphics</b>	
CO1	Perform freehand sketching of basic geometrical constructions and multiple views of objects.
CO2	Project orthographic projections of lines and plane surfaces.
CO3	Draw projections and solids and development of surfaces.
CO4	Visualize and to project isometric and perspective sections of simple solids
CO5	Students will be able to draw orthographic projections and isomeric projections.

<b>P103- Basic Electrical and electronics Laboratory</b>	
CO1	Know about basic electrical tools ,applications and precautions
CO2	Perform different types of wiring used in domestic and industrial applications
CO3	Measurements of voltage and phase using CRO, basic operations and applications of devices such as PN junction diode and transistors.
CO4	Understand the function and application of basic logic gates and flip flops
CO5	Gain knowledge in domestic wiring and application of electronics devices in the field of electrical engineering



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PI03 – NSS/NCC	
CO1	To create awareness in social and environmental issues
CO2	To participate in relief and rehabilitation work during natural calamities
CO3	To develop some proposals for local slum area development and waste disposal
CO4	To create team work among students and produce efficient results
CO5	To operate scientific instruments or advanced software

### III – SEMESTER & SECOND YEAR

MA T31 – Mathematics – III	
CO1	Familiarize with the concept of analytic function, C-R equations and its uses
CO2	Learn about Cauchy's theorem and its uses in complex integration. Taylor's and Laurent's series in complex form
CO3	Learn about Cauchy's Residues theorem and contour integrations
CO4	Gain knowledge of Finite and Infinite Fourier Transforms and applications
CO5	To introduce the route means first value and parallel theorem on Fourier for practical applications

T32 – Electrical Engineering	
CO1	Emphasis the basic concept of electromechanical energy conservation through energy and co energy
CO2	To know about the elementary concepts of rotating machines (DC generator)
CO3	To gain knowledge in the performance characteristics of DC motor
CO4	To understand the principles the equivalent circuit various characteristics and efficiency of Transformers
CO5	To gain knowledge in polyphase transformer ,special transformer and testing of various types of Transformers



  
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### EC T33 – Data structures and object oriented programming

CO1	Discuss about programming principles and analyzing the problems and about types of arrays
CO2	To gain knowledge about linear data Structure, representation of stack, operation of stack and its application
CO3	To describe about the nonlinear data structures
CO4	To discuss about the structures oriented of objective programming with C++
CO5	To solve various computing problems using C++ languages

### EC T34 – Electronic Devices and Circuits

CO1	Students are able to know basic of biasing and stabilization of transistor low and high frequency models
CO2	Able to design and analyze multistage amplifier and feedback amplifier
CO3	Student able to analyze and study the different types of oscillators and multivibrators
CO4	Student able to analyze and study the different types of wave amplifiers shaping circuits and time base generates
CO5	Students can able to design the basic electronic circuits and different types of

### EC T35 – Circuit Theory

CO1	Understand the concept of embedded systems the importance of architecture revision in ARM processors and its impact on performance and features
CO2	Understand the sinusoidal steady-state response of RL, RC and RLC circuits including the calculation of currents and voltages
CO3	Understand the concept of transient response in circuits including natural and forced responses
CO4	Understand the concepts of self inductance and mutual inductance in circuits
CO5	Understand and construct the graph representation of a network which illustrate the connections between nodes and branches

### EC T36 – Engineering Electromagnetics

CO1	Gain proficiency in solving complex electromagnetic problems using analytical and numerical methods
CO2	Develop a thorough understanding of electric and magnetic fields, including Coulomb's law, Gauss's law, Ampère's law, and Faraday's law
CO3	Apply electromagnetic theory to real-world engineering problems, such as designing



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	circuits, communication systems, and understanding electromagnetic interference.
CO4	Learn to use vector calculus to describe electromagnetic fields and solve Maxwell's equations in both differential and integral forms.
CO5	Understand the generation, propagation, and reflection of electromagnetic waves, including concepts of waveguides, transmission lines, and antennas.

### EC P31 – Electrical Engineering Laboratory

CO1	Knowledge on performance of DC shunt and series motor and on speed control behaviour of DC shunt motor
CO2	Knowledge on the characteristics of DC shunt generator on OC and load conditions
CO3	Knowledge on performance of single phase transformer
CO4	Knowledge on performance of synchronous machine
CO5	Knowledge on performance and speed control behaviour of an induction motor

### EC P32 – Data Structures and Object Oriented Programming

CO1	To implement the linear and nonlinear data Structure concept in c languages
CO2	To implement and understand the object oriented programming concept in C++

### EC P33 – Electronic Devices and Circuits Lab

CO1	Analyze the VI characteristics of the diode and transistor
CO2	Analysis the application of slipper and switching circuits

### MA T41 – Mathematics - IV

CO1	Formulated solved partial differential equation
CO2	Derive and obtain the solution of wave equation and boundary value problems
CO3	Derive and obtain the solution of heat equation and boundary value problems
CO4	Apply least square method to fit various curves for the given data investigate the validity of hypothesis by z distribution techniques
CO5	Calculation of analysis of variance and explain the use of chi-squared test and its calculation



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### EC T42 – Electronic Circuit and Analysis

CO1	Students are able to know basic of biasing and stabilization of transistor low and high frequency models
CO2	Able to design and analyze multistage amplifier and feedback amplifier
CO3	Student able to analyze and study the different types of oscillators and multivibrators
CO4	Student able to analyze and study the different types of wave shaping circuits and time base generates
CO5	Students can able to design the basic electronic circuits and different types of amplifiers

### EC T43 – Signals and Systems

CO1	Apply knowledge of mathematics to understand the discrete time signals systems including their classification and properties
CO2	Identify formulate and solve engineering problems like frequency domain representation of continuous time signals and discrete time signals
CO3	Apply formula and solve problem in discrete time signals
CO4	Apply formula and solve problems in continuous time LTI system and display time LTI systems
CO5	The students will be able to do discrete fourier transform and finite Fourier transform analysis for any system

### EC T44 – Linear Digital and Control System

CO1	Express a translational and rotational mechanical system into its equivalent electrical system using free body diagrams and force-voltage, force-current, torque voltage and torque-current analogies. solve for the transfer function for a given block diagram using block diagram reduction techniques and Mason's gain formula
CO2	Determine the output response and time domain specification of first and second order closed loop system through Laplace transform method and apply the positional, integral and derivative controller for reducing the steady state errors and transient response of first and second order control systems
CO3	Synthesize the frequency response from the transfer function using bode plot and polar plot and analyses the stability of the given system
CO4	Diagnose the stability of a given system from its transfer function with the help of Routh-Hurwitz criteria and root locus techniques
CO5	To analyze model and design controller for linear dynamic system



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### EC T45- Digital Circuits

CO1	Understand the fundamentals of number systems
CO2	Understand the concepts of Boolean algebra, simplification of boolean function
CO3	Understand the concept of combinational logic design, programmable logic device
CO4	Conceptualize the working of sequential circuits synchronous sequential circuits
CO5	Gain the knowledge in different types of semiconductor memories

### EC T46 – Electronics Communication Systems

CO1	Understand the need for modulation in communication system and the advantages of using amplitude modulation over other modulation techniques.
CO2	Understand the principles of frequency modulation and phase modulation in angle modulation
CO3	Understand the concept of additive white Gaussian noise and its relevance in communication system analysis
CO4	Understand the basic principles of radar systems including the concept of transmission reflection and reception of electromagnetic waves.
CO5	Understand the fundamentals of television technology including the principles of image and sound transmission.

### EC P41 Electronic Design Circuits Lab

CO1	Ability to design the circuits in electronics like CE amplifiers FET amplifiers and filters.
CO2	Student can able to check the circuits like amplifiers and filter circuits etc using PSPICE

### EC P42 Digital Circuits Lab

CO1	Ability to understand and design the implementation of combination and sequential logic circuits
CO2	Student can able to check the circuits by using hardware kit and also by Modelsim software by using verilog HDL language

### EC P43 Communication Laboratory - I

CO1	Ability to understand and design the implementation of AM, FM, PWM, PPM, TDM
CO2	Student can able to check the circuits by using MATLAB software



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SP P44 Physical Education	
CO1	Understanding the opportunities of students physical, cognitive, social and emotional development
CO2	Understanding of individual and group motivation and behaviour
CO3	To create teamwork among students and produce efficient result
CO4	The students were taught to operate advanced playing kits
CO5	To motivate the students to prepare the professional and scientific reports

### V – SEMESTER & THIRD YEAR

MA T51 – Probability and Random Processes	
CO1	Explain and illustrate the concept of discrete random variable and its probability distribution
CO2	Explain and illustrate the concept of continuous random variable and its probability distribution
CO3	Understand the concept of random process in both deterministic and non-deterministic types
CO4	Familiar with Markov chain in discrete time with respect to state diagram, able to calculate transition probabilities
CO5	To expose the basic characteristics features of a queuing system and acquire skills in analysing queuing models

EC T52 – Data Communication Networks	
CO1	Apply knowledge of science and Engineering to understand and analyze different network models networking protocols, various network standards and architecture
CO2	Understand the data link control and medium access mechanism along with the types of error, Error detection and error correction strategies. Generate various non sinusoidal signals using multi vibrators and time base circuits
CO3	Able to identify, formulate and analyze IPV4 and IPV6 protocols and to understand various network routing protocols
CO4	Examine different transport protocol element, congestion control schemes and traffic management schemes for UDP and TCP
CO5	To make the students have dipped understanding and security aspects of data communication networks through different authentication protocols



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### EC T53 – Microprocessors and Microcontrollers

CO1	Apply logical thinking to create assembly language programs and interfacing of peripheral devices
CO2	Apply fundamental knowledge of science and Engineering to understand architecture of microprocessor
CO3	To design and analyze microcontroller based system
CO4	To design and analyze peripheral interfaces
CO5	To design microcontroller based system

### EC T54 – System Design using Integrated Circuits

CO1	To impart knowledge on linear IC operational amplifier IC 741 in designing various circuits in the field of electronics Engineering
CO2	Implement the different ICS like IC regulators IC 555 and PLL565 and its applications in the field of Engineering and the design concepts of analogue to digital and digital to analog converters
CO3	To understand the different digital integrated circuit families and its comparisons
CO4	Design system and demonstrate state diagram and state mission using synchronous and asynchronous sequential logic circuits
CO5	To understand the concept of processor and control unit with processor and its bus organization

### EC T55- Transmission Lines and Waveguides

CO1	To understand about two port networks and to use them to analyze important two port networks like filters, attenuator, equalizer.
CO2	understand the concept of transmission lines and the losses associated with them and to use inductive loading to minimize the losses.
CO3	give thorough understanding about impedance transformation and matching and to use the Smith chart in problem solving.
CO4	study about the types of wave propagation between metallic planes, and to understand about the attenuation and wave velocity and wave length.
CO5	understand the wave propagation through cylindrical metallic surfaces and generate microwave signals through cavity resonators.



  
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### EC EO2-Consumer Electronics

CO1	Understand the working principles and characteristics of different types of loudspeakers and loudspeakers
CO2	Understand the structure and characteristics of composite video signals, including synchronization signals and color encoding.
CO3	Understand the Principles and components involved in optical recording and reproduction system.
CO4	Understand the architecture and operation of Public Switched Telephone Networks (PSTN), including the roles of central offices Exchanges and subscriber lines.
CO5	Understand the basic principles of operation and block diagrams of microwave ovens, including the generation of microwaves, control systems, and safety features.

### EC P51-Microprocess and microcontroller laboratory

CO1	Ability to understand the logic of the program and execute the program in the Microprocessor Kit
CO2	Apply the knowledge of the program through Hardware in real time applications

### EC P52 - System Design using Integrated Circuits Laboratory

CO1	Study the operation, performance and applications of Op amp 741 by designing various circuits
CO2	To design the signal generators using IC 555 for defined time constant and analyze its performance

### EC P53- Networks And Transmission Lines Laboratory

CO1	Analyze the different types of two port network and study their characteristics
CO2	Study the properties of low frequency and high frequency transmission lines

### HS P54 - General Proficiency – I

CO1	To hone the communication and non-verbal skills of the students
CO2	To improve their Listening, Speaking, Reading and writing skills of students
CO3	To help the students to get rid of the inhibitions and communicate with ease.
CO4	To enhance the employability prospects of students



  
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CO5	To ensure the personality development of the students by sharpening their Soft skills
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### VI-SEMESTERS & THIRD YEAR

EC T61-Digital Communication	
CO1	Apply fundamental knowledge of engineering to understand and analyze various filter receiver and basic type baseband modulated schemes.
CO2	Apply fundamental knowledge of engineering to understand and analyze various filter receiver and basic type Band pass modulation
CO3	Design and conduct experiments, as well as to analyze and interpret data about Spread spectrum technologies, frequency hopping and CDMA.
CO4	Apply fundamental knowledge of engineering to understand and analyze various filters, receivers and basic types of Base Band modulation schemes
CO5	Apply fundamental knowledge of engineering to understand and analyze various filters, receivers and basic types of Band Pass modulation

EC T62 - Wireless Communication	
CO1	Understand the concepts of wireless communication using cellular environment.
CO2	Acquire knowledge on different program models and multi access techniques.
CO3	Analyze about diversity and equalizers.
CO4	Analyze the wireless network systems.
CO5	Understand various wireless network system.

EC T63-Digital Signal Processing	
CO1	Analyzing The Classification Of Signals And Systems In The Time And Frequency Domains.
CO2	Perform The Stability Analysis Of Discrete Time System.
CO3	Acquire Knowledge On Spectral Analysis Of System.
CO4	Design Analyze And Compare Digital Filters For Processing Of Discrete Time Signals.
CO5	Acquire Knowledge On Dsp Architecture And Implement Dft And Fft Algorithms In Dsp.



  
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### EC T64 - Antennas and Wave Propagation

CO1	Able to analyze the radiation characteristics of fundamental antennas like dipoles and monopoles. Able to understand the concepts of pattern multiplication and Array antennas.
CO2	Understand the radiation principles of aperture, slot and micro strip antenna and its application.
CO3	Understand the radiation principles of travelling wave, broadband antennas and its application.
CO4	Understand the radiation principles of special antennas and their application. Able to understand and apply different antenna measurement techniques
CO5	Learn factors influencing the propagation of radio waves, types of fading and diversity schemes.

### EC E06- VLSI Design

CO1	Understand the principles and operation of MOS transistors in VLSI fabrication including NMOS, PMOS, CMOS, and Bi CMOS technologies
CO2	Understand the principles and design methodologies of combinational and sequential circuits.
CO3	Understand various circuit families used in digital subsystem design, including Dynamic CMOS logic, Domino CMOS logic and Pseudo NMOS logic.
CO4	Understand the importance of testing in CMOS technology and the need for ensuring the reliability and functionality of integrated circuits
CO5	Understand the basics of Verilog hardware description language (HDL), including its syntax and structure.

### EC P61- Communication Laboratory- IJ

CO1	Analyze the generation of various baseband and pass band modulation schemes and perform the time domain analysis.
CO2	Analyze the performance of various digital modulation schemes in terms of error rate and spectral efficiency using MATLAB.



  
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EC P62- Computer Networks Laboratory	
CO1	Analyze the generation of traffic models of voice, data, video and ISDN model using MATLAB.
CO2	Analyze the performance of various encryption, decryption, flow control algorithms, error control algorithms, shortest routing algorithms using MATLAB.

EC P63-Digital Signal Processing Laboratory	
CO1	Ability to model and analyze the DSP processing techniques using MATLAB.
CO2	Ability to model and analyze the DSP processing techniques using TI DSP processor kit.

HS P64 - General Proficiency – II	
CO1	To develop the students' critical thinking and analytical skills
CO2	To help the students to equip themselves with the necessary skill sets.
CO3	To improve the students' problem solving skill
CO4	To help the students to prepare for interviews and face them with confidence.
CO5	To make a students industry ready and employable

### VII-SEMESTER & FINAL YEAR

EC T71- Microwave And Optical Engineering	
CO1	Apply fundamental knowledge of engineering to understand and analyze the principles, operation, performance, applications of various microwave tubes, semiconductor devices, to concept of S-parameter.
CO2	Apply fundamental knowledge of engineering to understand and analyze the concepts S-parameter.
CO3	Design, analyze various types of antenna and measure the light propagation, signal degradation in optical fibers.
CO4	Apply fundamental knowledge of engineering to understand and analyze the concepts optical sources, detectors and amplifiers.
CO5	Demonstrate the working principle of optical fiber link, WDM and optical network.



  
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EC T72 Embedded Systems	
CO1	Understand the fundamental concepts of embedded systems and their design metrics.
CO2	Understand and utilize various C program elements including macros, functions, data types, structures, pointers, and function calls.
CO3	Understand the fundamental concepts of real-time systems, including issues specific to real-time computing.
CO4	Understand the importance of reliability evaluation in designing dependable systems.
CO5	Analyze architectural power minimization strategies focusing on architectural-level optimizations to reduce power consumption.

EC T83 - Spread Spectrum Communication	
CO1	analyze the basic concepts of spread spectrum technology
CO2	Acquire knowledge on different types of jamming techniques and how they improve performance for mobile radio channels
CO3	Characterize the trade-offs among different spread spectrum techniques and identify the pros and cons.
CO4	Design and conduct experiments, as well as to analyze and interpret data about Spread spectrum technologies, frequency hopping and CDMA.
CO5	Understand the basic concept of applications.

EC E14- Cryptography And Network Security	
CO1	To understand the fundamental concepts of Security Services Attacks and Mechanisms
CO2	To comprehend the mathematical concepts related to Symmetric key Cryptography
CO3	To understand Public Key Cryptography and its types
CO4	To learn about different Authentication and Signature techniques
CO5	To understand the importance of Network Security



  
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An ISO 9001:2015 Certified Institution

### EC P71 - Communication Laboratory- III

CO1	Ability to understand the Microwave Communication Engineering concepts and Students will get practical exposure in 111.h frequency hardware experiments.
CO2	Ability to understand the optical communication Engineering concepts using trainer kits.

### EC P72- Embedded Systems Laboratory

CO1	Ability to understand the logic of the program and execute the program in the Software
CO2	Apply the knowledge of the program through Hardware in real time applications

### EC P73-seminar

CO1	An ability to write technical documents and give oral presentations related to the work completed and improve personality development and communication skills
CO2	Train the students to approach ethically any multidisciplinary engineering challenges with economic, environmental and social contexts and to set them for future recruitment by the potential employers .
CO3	Identify and apply appropriate well-rehearsed note-taking interactive and time management strategies to their academic studies.
CO4	Develop audience centered presentation meeting concrete professional objectives and integrating ethical and legal visual aids.
CO5	Identify and critically evaluate the quality of claims, explanation, support and delivery in public and professional discourse, understand the factors influencing a speakers, credibility.

### EC P74 Industrial Visit/Training

CO1	Industrial visits provide an excellent opportunity to interact with industries and know more about industrial environment. Industrial visit helos to combine theoretical knowledge with industrial knowled2e
CO2	Industrial visit provides students with an opportunity to learn practically through interaction, working methods and employment practices



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ECPW7 Project Work-I	
CO1	Select a suitable project making use of the technical and engineering knowledge gained from previous courses with the awareness impact of technology on the Society and their ethical responsibilities.
CO2	Collect and disseminate information related to selected project
CO3	Identify the modern tools required for the implementation of the project
CO4	Form a team and distribute the work among themselves.
CO5	Communicate technical and general information by means of oral as well as written presentation skills with professionalism.

### VIII-SEMESTER & FINAL YEAR

EC T81-professional ethics	
CO1	Have a fundamental understanding of the objectives of ethics in engineering.
CO2	Apply the self ethically beliefs and those inside to the area of involvement.
CO3	Will be more responsible to the society, environment and to the involved area. Must stand for uplift of the country without seeking personal benefits.
CO4	Make assessment and knowledge on their right and duties in the specialized area.
CO5	Identify and classify threats and security issues to the environment and to country, and will stand as perfect leaders.

EC T82 - Industrial Management and Engineering Economics	
CO1	Understand the flow of goods, services, and resources in an economy
CO2	Understand various methods for comparing alternatives in engineering economic analysis
CO3	Understand the concept of depreciation and its importance in financial accounting and engineering economics.
CO4	Understanding the fundamental principles and areas of focus within the discipline of management
CO5	Understanding the distinction between fixed costs (expenses that do not change regardless of production or sales volume)



  
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### EC E16- Satellite Communication Systems

CO1	Understand the basic concept of satellite communication.
CO2	Understand the basic concept and features of Satellite communication link design model and parameters to maintain the wireless networks.
CO3	Understand the basic of Satellite Access
CO4	Acquire knowledge on Laser Satellite Communication and link design model.
CO5	Acquire knowledge on various applications and services of Satellite Communication

### EC E20 Cellular Mobile Communication

CO1	An introduction to the fundamentals of cellular communications and Characterizes the trade-off among frequency reuse, signal to interference ratio, capacity and spectral efficiency.
CO2	Acquire the knowledge of Handoff detection and Authentication for Roaming management with Radio link transfer and Assessment techniques.
CO3	Gain better understanding of GSM signaling, Services and its real time application and Voice over Internet Protocol.
CO4	To explore the students with the structure of various protocols involved in wireless communication Model, Gateway and Developer tool kits for mobile environment.
CO5	To understand the wireless communication systems and standards by various Wireless Techniques like Wireless Local Loon and different cellular Generations

### EC PSI -Advanced Communication Laboratory

CO1	I Study the characteristics of microwave and optical link and analyze the spectrum of various band pass signal.
CO2	I Analyze the performance of various communication link in terms of error rate and spectral efficiency using MATLAB

### EC P82 - Comprehensive Viva

CO1	Students understand the fundamentals of all the subjects studied in the entire program
CO2	Students gets ability to face interview both at the academic and the industrial sector



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EC PW8 - Project Phase II	
CO1	Define and complete the selected project making use of the technical and engineering knowledge which meets the expected outcome.
CO2	Work with the modern tools required for the implementation of the project.
CO3	Achieve the results within in the stipulated time
CO4	To well as written presentation skills with professionalism
CO5	Acquire problem solving system integration, project management documentation skills,



  
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