B.Tech

Program Outcomes

- **PO I: Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **PO II: Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- **PO III: Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- **PO IV: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- **PO V: Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- **PO VI: The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- **PO VII: Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of and need for sustainable development.
- **PO VIII: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **PO IX: Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **PO X: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO XI: Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- **PO XII: Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

B.Tech-CIVIL ENGINEERING:

Program Educational Objectives

- **PEO 1:** Graduates will utilize the foundation in Engineering and Science to improve lives and lively hoods through a successful career in Civil Engineering or other fields.
- **PEO 2:** Graduates will become effective collaborators and innovators, leading or participating in efforts to address Social, Technical and Business challenges.
- **PEO 3:** Graduates will engage in Life-Long Learning and professional development through Self-Study, continuing education or graduate and professional studies in engineering & Business.

Program Specific Outcomes

- **PSO 1:** Educating students with fundamental mathematical, scientific, and engineering knowledge to have a significant and positive long-term impact on the field of civil engineering.
- **PSO 2:** Emphasizing the importance of working in a team effectively and to communicate properly within the team to achieve the desired outcome.
- **PSO 3:** Motivatestudentsinlearningtolearnandtheabilitytokeeplearningforalifetime to increase their professionalism, update and deepen their knowledge through the development of the profession.

B.Tech- Electrical and Electronics Engineering:

Program Educational Objectives

- **PEO 1:** Apply knowledge and skills to provide solutions to Electrical and Electronics Engineering problems in industry and governmental organizations or to enhance student learning in educational institutions.
- **PEO 2:** Work as a team with a sense of ethics and professionalism, and communicate effectively to manage cross-cultural and multidisciplinary teams.
- **PEO 3:** Update their knowledge continuously through lifelong learning that contributes to personal, global and organizational growth.

Program Specific Outcomes

- **PSO 1:** Apply the engineering fundamental knowledge to identify, formulate, design and investigate complex engineering problems of electric circuits, power electronics, electrical machines and power systems and to succeed in competitive exams like GATE, IES, GRE, TOEFL, GMAT, etc.
- **PSO 2:** Apply appropriate techniques and modern engineering hardware and software tools in power systems and power electronics to engage in life-long learning and to get an employment in the field of Electrical and Electronics Engineering.
- **PSO 3:** Understand the impact of engineering solutions in societal and environmental context, commit to professional ethics and communicate effectively.

B.Tech- Mechanical Engineering :

Program Educational Objectives

- **PEO 1:** To apply deep working knowledge of technical fundamentals in areas related to thermal, production, design, materials, system engineering areas of Mechanical Engineering.
- **PEO 2:** To develop innovative ideas and fine solutions to various mechanical engineering problems.
- **PEO 3:** To communicate effectively as members of multidisciplinary teams.
- **PEO 4:** To be sensitive to professional and societal context and committed to ethical action.
- **PEO 5:** To lead in the conception, design and implementation of new products, processes, services and systems.

Program Specific Outcomes

- **PSO 1:** Apply the knowledge in the domain of engineering mechanics, thermal and fluid sciences to solve engineering problems utilizing advanced technology.
- **PSO 2:** Successfully evaluates the principle of design, analysis and implementation of mechanical systems / processes which have been learned as a part of the curriculum.
- **PSO 3:** Develop and implement new ideas on product design and development with the help of modern CAD / CAM tools, while ensuring best manufacturing practices.

B.Tech-Electronics and Communication Engineering:

Program Educational Objectives

- **PEO 1:** To be equipped with skills for solving complex real-world problems related to VLSI, Embedded Systems, Signal/Image processing, and Digital and Wireless Communication.
- **PEO 2:** To develop professional skills that will equip them to succeed in their careers and encourage lifelong learning in advanced areas of Electronics and communications and related fields.
- **PEO 3:** To communicate effectively, work collaboratively and exhibit high levels of professionalism, moral and ethical responsibility.
- **PEO 4:** To develop the ability to understand and analyze engineering issues in a broader perspective with ethical responsibility towards sustainable development.

Program Specific Outcomes

- **PSO 1: Problem Solving Skills –** Graduates will be able to apply their knowledge in emerging electronics and communication engineering techniques to design solutions and solve complex engineering problems.
- **PSO 2: Professional Skills –** Graduate will be able to think critically, communicate effectively, and collaborate in teams through participation in co and extra-curricular activities.

- **PSO 3: Successful Career** – Graduates will possess a solid foundation in Electronics and Communications engineering that will enable them to grow in their profession and pursue lifelong learning through post-graduation and professional development.
- **PSO 4: Society Impact** – Graduate will be able to work with the community and collaborate to develop technological solutions that would promote sustainable development in the society.

B.Tech-Computer Science and Engineering:

Program Educational Objectives

- **PEO 1:** Graduates will provide solutions to difficult and challenging issues in their profession by applying computer science and engineering theory and principles.
- **PEO 2:** Graduates have successful careers in computer science and engineering fields or will be able to successfully pursue advanced degrees.
- **PEO 3:** Graduates will communicate effectively, work collaboratively and exhibit high levels of professionalism, moral and ethical responsibility.
- **PEO 4:** Graduates will develop the ability to understand and analyse engineering issues in a broader perspective with ethical responsibility towards sustainable development.

Program Specific Outcomes

- **PSO 1: Problem Solving Skills** – Graduate will be able to apply computational techniques and software principles to solve complex engineering problems pertaining to software engineering.
- **PSO 2: Professional Skills** – Graduate will be able to think critically, communicate effectively, and collaborate in teams through participation in co and extra-curricular activities.
- **PSO 3: Successful Career** – Graduates will possess a solid foundation in computer science and engineering that will enable them to grow in their profession and pursue lifelong learning through post-graduation and professional development.

Master Of Business Administration

Program Outcomes

- **PO 1 :** Apply knowledge of management theories and practices to solve business problems.
- **PO 2 :** Foster analytical and critical thinking abilities for data-based decision making.
- **PO 3 :** Ability to develop Value based Leadership ability.
- **PO 4 :** Ability to understand, analyze and communicate global, economic, legal, and ethical aspects of business.
- **PO 5 :** Ability to lead themselves and others in the achievement of organizational goals, contributing effectively to a team environment.
- **PO 6 :** Analyze the alternative solutions using quantitative methods and logical arguments.
- **PO 7 :** Identify and analyze the business opportunities in diverse business contexts.
- **PO 8 :** Develop a habit of knowing and understanding the latest developments taking place in the field of business management.

Program Educational Objectives

- **PEO 1:** After the completion of the course the students can have knowledge of different functions of business like Marketing, Finance, Human Resources and Systems.
- **PEO 2:** Students will understand the techniques and tools useful for Financial Analysis and Control develop leadership skills, team work, social, legal and ethical aspects in business and society.
- **PEO 3:** Students will be ready to analyze markets and design customer driven strategies and communicate business decisions by delivering superior customer value.
- **PEO 4:** Students achieve better communication skills and higher levels of proficiency for successful career in various fields and will be ready for having highest regard for personal& institutional integrity, social responsibility, teamwork and continuous learning of new environments.

Program Specific Outcomes

- **PSO 1:** The students will be ready to formulate an integrative business plan through the plan through the application of multidisciplinary knowledge comprising of marketing, finance, Human Resources, Entrepreneurship & systems.
- **PSO 2:** The students will be able to analyze the possible alternative solutions for a problem by applying various quantitative techniques for decision making.

KG Reddy College of Engineering and Technology

(Affiliated to JNTU Hyderabad)

Chillukur (V), Moinabad Mandal, R. R. Dist. T.S.

	COURSE OUTCOMES COMPUTER SCIENCE ENGINEERING
	MATHEMATICS-I
CO 1:-	write the matrix representation of a set of linear equations and to analyze the solution of the system of equations
CO 2:-	find the Eigen values and Eigen vectors which come across under linear transformations
CO 3:-	find the extreme values of functions of two variables with/ without constraints.·
CO 4:-	Identify whether the given first order DE is exact or not·
CO 5:-	solve higher order DE's and apply them for solving some real world problems
	ENGINEERING CHEMISTRY
CO 1:-	Students will gain the basic knowledge of electrochemical procedures related to corrosion and its control
CO 2:-	They can understand the basic properties of water and its usage in domestic and industrial purposes
CO 3:-	They learn the use of fundamental principles to make predictions about the general properties of materials.
CO 4:-	They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.
	ENGINEERING PHYSICS – I
CO 1:-	Learn principle, working of various laser systems and light propagation
CO 2:-	Learn principle, working of various laser systems and light propagation through optical fibers.
CO 3:-	Distinguish various crystal systems and understand atomic packing factor.
CO 4:-	Know the various defects in crystals.
	PROFESSIONAL COMMUNICATION IN ENGLISH
CO 1:-	Use English Language effectively in spoken and written forms.
CO 2:-	Comprehend the given texts and respond appropriately.
CO 3:-	Communicate confidently in formal and informal contexts.
	ENGINEERING MECHANICS
CO 1:-	To understand the resolving forces and moments for a given force system
CO 2:-	To analyze the types of friction for moving bodies and problems related to friction.
CO 3:-	To determine the centroid and second moment of area

	BEEE
CO 1:-	To analyze and solve problems of electrical circuits using network laws and theorems.
CO 2:-	To identify and characterize diodes and various types of transistors
	ENGLISH LANGUAGE COMMUNICATION SKILLS (ELCS) LAB
CO 1:-	Better understanding of nuances of English language through audio- visual experience and group activities
CO 2:-	Neutralization of accent for intelligibility
CO 3:-	Speaking skills with clarity and confidence which in turn enhances their employability skills.
	ENGINEERING WORKSHOP
CO 1:-	Study and practice on machine tools and their operations
CO 2:-	Practice on manufacturing of components using workshop trades including pluming, fitting, carpentry, foundry, house wiring and welding
CO 3:-	Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
CO 4:-	Apply basic electrical engineering knowledge for house wiring practice.
	ENGINEERING PHYSICS – II
CO 1:-	Realize the importance of behavior of a particle quantum mechanically.
CO 2:-	Learn concentration estimation of charge carriers in semi conductors.
CO 3:-	Learn various magnetic dielectric properties and apply them in engineering applications.
CO 4:-	Know the basic principles and applications of super conductors.
	MATHEMATICS – II
CO 1:-	use Laplace transform techniques for solving DE's
CO 2:-	Evaluate integrals using Beta and Gamma functions
CO 3:-	evaluate the multiple integrals and can apply these concepts to find areas, volumes, moment of inertia etc of regions on a plane or in space
CO 4:-	evaluate the line, surface and volume integrals and converting them from one to another
	Mathematics – III
CO 1:-	differentiate among random variables involved in the probability models which are useful for all branches of engineering
CO 2:-	calculate mean, proportions and variances of sampling distributions and to make important decisions s for few samples which are taken from a large data
CO 3:-	solve the tests of ANOVA for classified data
CO 4:-	find the root of a given equation and solution of a system of equations
CO 5:-	fit a curve for a given data
CO 6:-	find the numerical solutions for a given first order initial value problem

	COMPUTER PROGRAMMING IN C
CO 1:-	Demonstrate the basic knowledge of computer hardware and software.
CO 2:-	Ability to write algorithms for solving problems.
CO 3:-	Ability to draw flowcharts for solving problems.
CO 4:-	Ability to code a given logic in C programming language.
CO 5:-	Gain knowledge in using C language for solving problems.
	ENGINEERING GRAPHICS
CO 1:-	Ability to prepare working drawings to communicate the ideas and information.
CO 2:-	Ability to read, understand and interpret engineering drawings.
	DLD
CO 1:-	Students will be aware of theory of Boolean algebra & the underlying features of various number systems.
CO 2:-	Students will be able to use the concepts of Boolean algebra for the analysis & design of various combinational & sequential logic circuits.
CO 3:-	Students will be able to design various logic gates and design of counters, multipliers, encoders, decoders, comparators.
CO 4:-	Students will have knowledge about RAM, PAL, PLA, different types of memories.
	DATA STRUCTURE
CO 1:-	Illustrate the concepts of data structure, data type and array data structure.
CO 2:-	Analyze algorithms and determine their time complexity.
CO 3:-	Develop linked list data structure to solve various problems.
CO 4:-	Apply various data structure such as stacks, queues, trees and graphs to solve various computing problems using C-programming language.
CO 5:-	Choose the data structure that efficiently models the information in a problem.
CO 6:-	Develop standard algorithms for Searching and sorting.
CO 7:-	Develop graphs – DFS, BFS.
	M-IV
CO 1:-	Analyze the complex functions with reference to their analyticity, integration using Cauchy's integral theorem
CO 2:-	Evaluate the Taylor's and Laurent's series expansion of complex functions
CO 3:-	Express any periodic function in term of sine and cosines
CO 4:-	Analyze one dimensional wave and heat equation.
	MFCS
CO 1:-	Illustrate by examples on the basic terminology of sets functions, relations and predicate logic.
CO 2:-	Demonstrate knowledge on operations associated with sets, relations and functions.
CO 3:-	Demonstrate in practical applications the use of basic counting, principles of
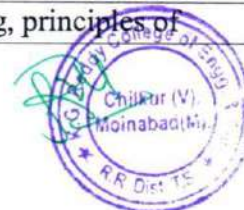
	permutations, and combinations, inclusion and exclusion principles
CO 4:-	Solve the problems those involve the concept of recursion and recursively defined structures.
CO 5:-	Apply graph theory in solving computer science problems and other related problems.
	COMPILER DESIGN
CO 1:-	Have an appreciation of the fundamentals of Compiler design
CO 2:-	Get broad exposure to and understanding of various applications of compiler design
CO 3:-	Learn the phases of the compilation
CO 4:-	Acquire an appreciation for the different parsing techniques. Be able to conduct independent study and analysis of compiler design problems
CO 5:-	Have the skill base necessary to further explore advanced topics of optimization techniques.
	Computer Networks
CO 1:-	Explore the basic of computer networks and various protocols.
CO 2:-	Be in a position to understand the World Wide Web concepts.
CO 3:-	Be in a position to administrate a network and flow of information further.
CO 4:-	Explain easily the concepts of network security, mobile and ad hoc networks.
	Operating Systems
CO 1:-	Understand the difference between different types of modern operating systems, virtual machines and their structure of implementation and applications.
CO 2:-	Understand the difference between process & thread, issues of scheduling of user level processes/ threads and their issues.
CO 3:-	Discuss various process management concepts including scheduling, synchronization, and deadlocks.
CO 4:-	Identify the rationale behind various memory management techniques along with issues and challenges of main memory, virtual memory and file system.
CO 5:-	Explain the concepts of memory management including virtual memory.
CO 6:-	Classify protection and security mechanisms.
	SE
CO 1:-	Apply techniques, skills, and modern engineering tools necessary for engineering practice.
CO 2:-	Analyze design, verify, validate, implement, apply, and maintain software systems.
CO 3:-	Outline the impact of engineering solutions in a global, economic, environmental, and societal context.
CO 4:-	**Illustrate** social, political, ethical, health and safety, manufacturing, and sustainability
	Explain
CO 5:-	the professional and ethical responsibilities of a software engineer.

	INTELLECTUAL PROPERTY RIGHTS
CO 1:-	Identify different types of Intellectual Properties (IPs), the right of ownership, scope of protection as well as the ways to create and to extract value from IP
CO 2:-	Recognize the crucial role of IP in organizations of different industrial sectors for the purposes of product and technology development
CO 3:-	Identify activities and constitute IP infringements and the remedies available to the IP owner and describe the precautious steps to be taken
CO 4:-	Be familiar with the processes of Intellectual Property Management (IPM) and various approaches for IPM and conducting IP and IPM auditing and explain how IP can be managed as a strategic resource and suggest IPM strategy
	PPL
CO 1:-	Explain concepts of Programming Language.
CO 3:-	Explain of programming categories
CO 4:-	Discuss fundamentals of sub programs
CO 5:-	Design abstract data types
CO 6:-	Explain Functional programming, logic programming and Object oriented programming.
	LP
CO 1:-	Describe and use the LINUX operating system.
CO 2:-	Describe and use the fundamental LINUX system tools and Utilities.
CO 3:-	Describe and write shell scripts in order to perform basic shell programming.
CO 4:-	Describe and understand the LINUX file system
	DWDM
CO 1:-	**Identify** the importance of data warehousing in addition to the database systems.
CO 2:-	**Outline** the process of knowledge discovery in database.
CO 3:-	**Apply** various mining techniques such as association rule, classification and clustering to extract desired knowledge.
CO 4:-	**Classify** the clustering and classification methods.
CO 5:-	**Choose** a data mining system for an organization by
CO 6:-	**Solve** real world problems in business and scientific information using data mining.
	CLOUD COMPUTING
CO 1:-	**Identify** the services of various levels in cloud computing.
CO 2:-	cloud computing and related concepts
CO 3:-	the key dimensions of the challenges of Cloud Computing
CO 4:-	the assessment of the economics, financial, and technological implications for selecting cloud computing for an organization.
CO 5:-	the benefits of cloud computing.
CO 6:-	the challenges of cloud computing.

	DESIGN PATTERN
CO 1:-	List various design patterns.
CO 2:-	Explain how design patterns solve design problems in object oriented application.
CO 3:-	Use design patterns in object oriented software solutions.
CO 4:-	Apply common design patterns to incremental/iterative development.
CO 5:-	Organize the design pattern catalog
CO 6:-	Choose correct pattern to apply on different scenarios
	SPM
CO 1:-	create a project plan and schedule for a small-scale software project
CO 2:-	discuss about different kinds of software project types (customer specific, product development and distributed project) rotor speed of an impulse turbine.
CO 3:-	Understand the working of different types of steam nozzles and its applications, conditions for maximum discharge of steam through it
CO 4:-	Calculate the thermal efficiency of Rankine Cycle and methods to improve the efficiency of a steam power plant
CO 5:-	Understand the working of different types of condensers, performance parameters and its applications in steam power plants.
CO 6:-	Understanding the working phenomenon of chimney and condition for maximum discharge of mass through it
	Machine Tools& Metrology lab
CO 1:-	Apply the procedures to measure length, width, depth, bore diameters, internal and external tapers, tool angles, and surface roughness by using different instruments.
CO 2:-	Measure effective diameter of Thread profile using different methods
CO 3:-	Conduct different machine alignment tests
CO 4:-	Demonstrate knowledge of different machine tools used in machine shop.
CO 5:-	Perform step, taper turning, knurling and threading.
CO 6:-	Produce stepped surface using shaper and keyway using milling machine
\	
	COURSE OUTCOMES – CIVIL ENGINEERING
	MATHEMATICS-I
CO 1:-	write the matrix representation of a set of linear equations and to analyze the solution of the system of equations
CO 2:-	find the Eigen values and Eigen vectors which come across under linear transformations
CO 3:-	find the extreme values of functions of two variables with/ without constraints.·
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	MATHEMATICS – II
CO 1:-	use Laplace transform techniques for solving DE's
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CO 3:-	evaluate the multiple integrals and can apply these concepts to find areas, volumes, moment of inertia etc of regions on a plane or in space
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ENGINEERING PHYSICS – I

CO 1:-	Learn principle, working of various laser systems and light propagation
CO 2:-	Learn principle, working of various laser systems and light propagation through optical fibers.
CO 3:-	Distinguish various crystal systems and understand atomic packing factor.
CO 4:-	Know the various defects in crystals.

ENGINEERING GRAPHICS

CO 1:-	Ability to prepare working drawings to communicate the ideas and information.
CO 2:-	Ability to read, understand and interpret engineering drawings.

COMPUTER PROGRAMING IN C LAB

CO1:-	Ability to design and test programs to solve mathematical and scientific problems.
CO2:-	Ability to write structured programs using control structures and functions.

APPLIED PHYSICS

CO 1:-	CO1:-Realize the importance of elastic behavior of materials.
CO 2:-	CO2:-Learn Sabine's formula for reverberation time and apply in architecture of buildings.
CO 3:-	CO3:-Learn various methods of producing ultrasonics and their uses.
CO 4:-	CO4:-Learn magnetic, dielectric and superconducting properties of materials and their applications.

ENGINEERING CHEMISTRY

CO 1:-	CO1:-Students will gain the basic knowledge of electrochemical procedures related to corrosion and its control.
CO 2:-	CO2:-They can understand the basic properties of water and its usage in domestic and Industrial purposes.
CO 3:-	CO3:-They learn the use of fundamental principles to make predictions about the general properties of materials.
CO 4:-	CO4:-They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs

MATHEMATICS-III

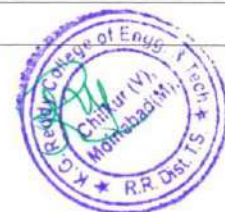|	
CO 1:-	CO1:-differentiate among random variables involved in the probability models which are useful for all branches of engineering
CO 2:-	CO2:-calculate mean, proportions and variances of sampling distributions and to make

	important decisions s for few samples which are taken from a large data
CO 3:-	CO3:-solve the tests of ANOVA for classified data
CO 4:-	CO4:-find the root of a given equation and solution of a system of equations
CO 5:-	CO5:-fit a curve for a given data
CO 6:-	CO6:-find the numerical solutions for a given first order initial value problem
	PROFESSIONAL COMMUNICATION IN ENGLISH
CO1:-	Use English Language effectively in spoken and written forms.
CO2:-	Comprehend the given texts and respond appropriately.
CO3:-.	Communicate confidently in formal and informal contexts
	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
CO1:-	To analyze and solve electrical circuits using network laws and theorems.
CO2:-.	To identify and characterize diodes and various types of transistors
	ENGLISH LANGUAGE COMMUNICATION SKILLS LAB
CO1:-	Better understanding of nuances of English language through audio- visual experience and group activities
CO2:-	Neutralization of accent for intelligibility
CO3:-	Speaking skills with clarity and confidence which in turn enhances their employability skills.
	ENGINEERING WORKSHOP
CO1:-	Study and practice on machine tools and their operations
CO2:-	Practice on manufacturing of components using workshop trades including pluming, fitting, carpentry, foundry, house wiring and welding.
CO3:-	Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
CO4:-	Apply basic electrical engineering knowledge for house wiring practice
	Mathematics –IV
	After learning the contents of this paper, the student must be able to
CO1:-	Analyze the complex functions with reference to their analyticity, integration using Cauchy's integral theorem
CO 2:-	Find the Taylor's and Laurent's series expansion of complex functions
CO 3:-	The bilinear transformation
CO 4:-	Express any periodic function in term of sines and cosines
CO 5:-	Express a non-periodic function as integral representation
CO 6:-	Analyze one dimensional wave and heat equation
	CE302ES

	Strength of Materials – I
	At the end of the course, the student will be able to:
CO 1:-	Analyze the statically determinate and indeterminate problems.
CO 2:-	Determine the stresses and strains in the members subjected to axial, bending.
CO 3:-	Evaluate the slope and deflection of beams subjected to loads.
CO 4:-	Determine the principal stresses and strains in structural members
	CE303ES
	Fluid Mechanics – I
	At the end of the course, the student will be able to:
CO 1:-	Apply conservation laws to derive governing equations of fluid flows.
CO 2:-	Compute hydrostatic and hydrodynamic forces.
CO 3:-	Analyze and design simple pipe systems.
CO 4:-	Apply principles of dimensional analysis to design experiments.
CO 5:-	Compute drag and lift coefficients
	CE304ES
	Building Material, Construction and Planning
CO 1:-	At the end of the course, the student will be able to identify various building materials required for construction & planning
	CE305ES
	Surveying
	At the end of the course, the student will be able to:
CO 1:-	Calculate angles, distances and levels
CO 2:-	Identify data collection methods and prepare field notes
CO 3:-	Understand the working principles of survey instruments
CO 4:-	Estimate measurement errors and apply corrections
CO 5:-	Interpret survey data and compute areas and volumes
	CE306ES
	Strength of Material Lab
	At the end of the course, the student will be able to:
CO 1:-	Conduct tension test on Materials like steel etc.
CO 2:-	Conduct compression tests on spring, wood and concrete
CO 3:-	Conduct flexural and torsion test to determine elastic constants
CO 4:-	Determine hardness of metals
	CE307ES
	Computer Aided Design – I Lab
	At the end of the course, the student will be able to:
CO 1:-	Master the usage of AutoCAD commands for drawing 2D & 3D building drawings

	required for different civil engineering applications.
	CE308ES
	Surveying lab – I
CO 1:-	To impart the practical knowledge in the field, it is essential to introduce in curriculum. Drawing of Plans and Maps and determining the area are pre-requisites before taking up any Civil Engineering works.
	MC300HS
	Gender Sensitization Lab
CO 1:-	Students will have developed a better understanding of critical issues related to gender in contemporary India.
CO 2:-	Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
CO 3:-	Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
CO 4:-	Students will acquire insight into the gendered division of labour and its relation to politics and economics.
CO 5:-	Men and women students and professionals will be better equipped to work and live together as equals.
CO 6:-	will develop a sense of appreciation of women in all walks of life.
CO 7:-	Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.
	CE401ES
	Strength of Materials – II
	At the end of the course, the student will be able to
CO 1:-	Determine stresses in the member subjected to Torsion
CO 2:-	Analyze columns and struts
CO 3:-	Understand the concept of direct and bending stresses
CO 4:-	Analyze and design springs, thin and thick cylinders
CO 5:-	Understand the concept of unsymmetrical bending
	CE402ES
	Fluid Mechanics – II
	At the end of the course, the student will be able to:
CO 1:-	Understand the concepts o channel flows.
CO 2:-	Compute flow profiles in channel transitions and analyze hydraulic transients
CO 3:-	Design the working proportions of hydraulic machines

	CE403ES
	Structural Analysis
	At the end of the course, the student will be able to:
CO 1:-	Analyze Perfect, Imperfect and Redundant Frames
CO 2:-	Formulate Equilibrium and compatibility equations for structural members
CO 3:-	Analyze one dimensional and two-dimensional problems using classical methods
CO 4:-	Analyze indeterminate structures
CO 5:-	Analyze structures for gravity loads, moving loads and lateral loads
	CE404ES
	Engineering Geology
	At the end of the course, the student will be able to:
CO 1:-	Understand weathering process and mass movement
CO 2:-	Distinguish geological formations
CO 3:-	Identify geological structures and processes for rock mass quality
CO 4:-	Identify subsurface information and groundwater potential sites through geophysical investigations
CO 5:-	Apply geological principles for mitigation of natural hazards and select sites for dams and tunnels
	SM405
	MS Business Economic and Financial Analysis
CO 1:-	The students will understand the various Forms of Business and the impact of economic variables on the Business.
CO 2:-	The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt.
CO 3:-	The Students can study the firm's financial position by analyzing the Financial Statements of a Company
	CE406ES
	Fluid Mechanics Lab
	At the end of the course, the student will be able to:
CO 1:-	Determine coefficient of discharge for orifice and mouthpiece.
CO 2:-	Calibrate notches venturimeter orifice meters
CO 3:-	Determine miner losses in pipes
	CE408ES
	Surveying - II Lab
CO 1:-	Perform surveying on any civil engineering work
	CV407ES
	Engineering Geology Lab
	At the end of the course, the student will be able to

CO 1:-	Identify the various rocks, minerals depending on geological classifications
	MC400ES
	Environmental Science and Technology
CO 1:-	Based on this course, the Engineering graduate will understand /evaluate / develop technologies based on ecological principles and environmental regulations which in turn helps in sustainable development
	Concrete technology
	At the end of the course, the student will be able to:
CO 1:-	Identify Quality Control tests on concrete making materials
CO 2:-	Understand the behavior of fresh and hardened concrete
CO 3:-	Design concrete mixes as per IS and ACI codes
CO 4:-	Understand the durability requirements of concrete
CO 5:-	Understand the need for special concretes
	Reinforced Concrete Structures Design and Drawing
	At the end of the course, the student will be able to:
CO 1:-	Design the Reinforced Concrete beams using limit state and working stress methods
CO 2:-	Design Reinforced Concrete slabs
CO 3:-	Design the Reinforced Concrete Columns and footings
CO 4:-	Design structures for serviceability
CO 5:-	Analyze one dimensional and two-dimensional structures using matrix methods of structural analysis
CO 6:-	Analyze structures up to three degrees of indeterminacy
	Engineering Geology
	At the end of the course, the student will be able to:
CO 1:-	Understand weathering process and mass movement
CO 2:-	Distinguish geological formations
CO 3:-	Identify geological structures and processes for rock mass quality
CO 4:-	Identify subsurface information and groundwater potential sites through geophysical investigations
CO 5:-	Apply geological principles for mitigation of natural hazards and select sites for dams and tunnels
	Geotechnical Engineering
	At the end of the course, the student will be able to:
CO 1:-	Characterize and classify soils
CO 2:-	Identify shear strength parameters for field conditions
CO 3:-	Compute and analyze the consolidation settlements
CO 4:-	Understand the principles of compaction and its control

	Water Resources Engineering-I
	At the end of the course, the student will be able to:
CO 1:-	Analyze hydro-meteorological data
CO 2:-	Estimate abstractions from precipitation
CO 3:-	Compute yield from surface and subsurface basin
CO 4:-	Develop rainfall-runoff models
CO 5:-	Formulate and solve hydrologic flood routing models
	Intellectual Property Rights
	At the end of the course, the student will be able to:
CO 1:-	Intellectual Property Rights
CO 2:-	Trade marks
CO 3:-	Laws of copy rights
CO 4:-	Law of patents
CO 5:-	Trade secrets
	Human Values and Professional Ethics
CO 1:-	Identifies the multiple ethical interests at stake in a real-world situation or practice
CO 2:-	Articulate what makes a particular course of action ethically defensible
CO 3:-	Assess their own ethical values and the social context of problems
CO 4:-	Identifies ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective
	presentation of data, and the treatment of human subjects
CO 5:-	Demonstrates knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work
	Disaster Management
	On successful completion of this course, it is expected that students should be able to
CO 1:-	Acquire the knowledge disaster Management
CO2:-	Understand the vulnerability of ecosystem and infrastructure due to a disaster
CO3 :-	Acquire the knowledge of Disaster Management Phases
CO 4:-	Understand the hazard and vulnerability profile of India
	Fluid Mechanics & Hydraulic Machinery Lab
	At the end of the course, the student will be able to:
CO 1:-	Understand the concepts of channel flows.
CO 2:-	Design the working proportions of hydraulic machines
CO 3:-	Test the performance of pumps and turbines
CO 4:-	Determine Manning's and Chezy's coefficients for smooth and rough channels
CO 5:-	Determine Energy loss in Hydraulic jump and Calibrate standing wave flume
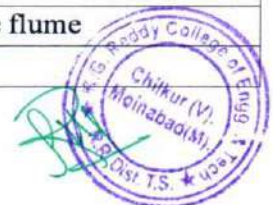
	Engineering Geology Lab
	At the end of the course, the student will be able to:
CO 1:-	Determines the physical properties of the minerals
CO 2:-	Identifies the megascopic and microscopic properties of the rocks and minerals
CO 3:-	Works on structural geological problems
CO 4:-	Works on simple strike and dip problems
	At the end of the course, the student will be able to:
CO 1:-	Design tension and compression members
CO 2:-	Design beams and beam columns
CO 3:-	Design bolt and weld connections
CO 4:-	Design built up members and column base
CO 5:-	Designs optimum depth of main section
	Environmental Engineering
	At the end of the course, the student will be able to:
CO 1:-	Analyze characteristics of water and wastewater
CO 2:-	Estimate the quantity of drinking water and domestic wastewater generated
CO 3:-	Design components of water supply systems
CO 4:-	Design sewerage system
	Transportation Engineering –I
	At the end of the course, the student will be able to:
CO 1:-	Plan highway networks
CO 2:-	Design highway geometrics.
CO 3:-	Design Intersections and prepare traffic management plans.
CO 4:-	Estimate basic characteristics of traffic stream
CO 5:-	Conduct traffic studies and analyze traffic data
CO 6:-	Design traffic signal systems
CO 7:-	Determine the capacity of highways
	Foundation Engineering
	At the end of the course, the student will be able to:
CO 1:-	Determine the earth pressures on foundations and retaining structures
CO 2:-	Analyze shallow and deep foundations
CO 3:-	Calculate the bearing capacity of soils and foundation settlements
CO 4:-	Understand soil exploration
CO 5:-	Understand the behavior of problematic soil
CO 6:-	Analyze the lateral stability of piles and wells
	Structural Analysis –II
	At the end of the course, the student will be able to:

CO 1:-	Works on slope deflection method
CO 2:-	Analyze structures for gravity loads, moving loads and lateral loads
CO 3:-	Works on stiffness method, portal method, cantilever method
CO 4:-	Analyze one dimensional and two-dimensional structures using matrix methods of structural analysis
CO 5:-	Analyze structures up to three degrees of indeterminacy

Elements of Earthquake Engineering

CO 1:-	Applies the basics of Earthquake Engineering
CO 2:-	Demonstrate the dynamics of structural system under earthquake load
CO 3:-	Demonstrate the principles of earthquake loading
CO 4:-	Quantify earthquake intensity and ground motion estimate seismic soil design parameters
CO 5:-	Analyze and design seismic resistant foundation for buildings
CO 6:-	Prepares soil risk and micro zonation maps

Ground Water Hydrology

	At the end of the course, the student will be able to:
CO 1:-	Evaluate groundwater resources using geophysical methods
CO 2:-	Estimate aquifer parameters
CO 3:-	Model regional groundwater flow and design water wells
CO 4:-	Design water wells

Environmental impact assessment

	At the end of the course, the student will be able to:
CO 1:-	Identify the environmental attributes to be considered for the EIA study
CO 2:-	Formulate objectives of the EIA studies
CO 3:-	Identifies the methodology to prepare rapid EIA
CO 4:-	Prepares EIA reports and environmental management plans
CO 5:-	Identifies the environmental attributes to be considered for the EIA study
CO 6:-	Formulate objectives of the EIA studies
CO 7:-	Identify the suitable methodology and prepare Rapid EIA
CO 8:-	Prepares EIA reports and environmental management plans

Principles of Entrepreneurship

	At the end of the course, the student will be able to:
CO 1:-	Understand entrepreneurship and entrepreneurial process and its significance in economic development.
CO 2:-	Develop an idea of the support structure and promotional agencies assisting ethical entrepreneurship.
CO 3:-	Identify entrepreneurial opportunities, support and resource requirements to launch a new venture within legal and formal frame work.

CO 4:-	Develop a framework for technical, economic and financial feasibility.
CO 5:-	Evaluate an opportunity and prepare a written business plan to communicate business ideas effectively.
CO 6:-	Understand the stages of establishment, growth, barriers, and causes of sickness in industry to initiate appropriate strategies for operation, stabilization and growth
	Ground Improvement Techniques
	At the end of the course, the student will be able to:
CO 1:-	Identify ground conditions and suggest method of improvement
CO 2:-	Design and assess the degree of improvement
CO 3:-	Understand the principles of soil reinforcement and confinement in engineering constructions
CO 4:-	Design reinforced soil structures
	Geotechnical Engineering Lab
	At the end of the course, the student will be able to:
CO 1:-	Estimates the liquid and plastic limits of the soil
CO 2:-	Finds the compactor factor of the soil by compaction factor test
CO 3:-	Estimates the shear strength of the soils by various equipment's
CO 4:-	Understand soil exploration methods
CO 5:-	Classifies the soil type based on grain size analysis
	Advanced Communication Skills Lab
CO 1:-	Train students to use language effectively in everyday conversations, to participate in group discussions, to help them face interviews, and sharpen public speaking skills
CO 2:-	Exposes the students to a varied blend of self-instructional learner-friendly modes of language learning through computer-aided multi-media instruction.
CO 3:-	Enable them to learn better pronunciation through stress on word accent, intonation, and rhythm
CO 4:-	To help the second language learners to acquire fluency in spoken English and neutralize mother tongue influence
CO 5:-	Trains students to use language appropriately for interviews, group discussion and public speaking Speaking with clarity and confidence thereby enhancing employability skills of the students
	Remote Sensing and GIS
	At the end of the course, the student will be able to:
CO 1:-	Retrieve the information content of remotely sensed data
CO 2:-	Interpret the images for preparation of thematic maps
CO 3:-	Apply problem specific remote sensing data for civil engineering applications
CO 4:-	Understand the GPS components

CO 5:-	Preparation of geospatial features in computing environment
CO 6:-	Create GIS and cartographic outputs for presentation
CO 7:-	Understand the software/hardware requirements for implementing a GIS Project
	Transportation Engineering –II
	At the end of the course, the student will be able to:
CO 1:-	Understand the importance of railway infrastructure planning and design
CO 2:-	Identify the factors governing design of railway infrastructures
CO 3:-	Design and analyze the railway track system
CO 4:-	fix the orientation of the runways
CO 5:-	Carryout the geometrical design of the airport infrastructure
CO 6:-	Prepare structural designs of runway, taxiway, and apron-grate area
CO 7:-	Prepare a plan of the sea port
CO 8:-	Provide solution to protect coastal erosion
	Estimating & Costing
	On completion of the course, the students will be able to:
CO 1:-	Apply diverse types of estimates in different situations
CO 2:-	Carry out analysis of rates and bill preparation at various locations
CO 3:-	Demonstrate the concepts of specification writing
CO 4:-	Carries out valuation of assets
	Water Resources Engineering-II
	At the end of the course, the student will be able to:
CO 1:-	Design irrigation canals and canal network
CO 2:-	Plan and design diversion head works
CO 3:-	Design irrigation canal structures
CO 4:-	Analyze gravity and earth dams
CO 5:-	Design spillways and energy dissipations works
	Finite Element Methods
	At the end of the course, the student will be able to:
CO 1:-	Develop shape functions and stiffness matrices for spring and bar elements
CO 2:-	develop global stiffness matrices and global load vectors
CO 3:-	Apply natural and arial coordinate systems to constant strain triangle and linear strain triangle elements
	Analyze planar structural systems using finite element modeling
	Air Pollution and Control
	At the end of the course, the student will be able to:
CO 1:-	Identify sampling and analysis techniques for air quality assessment
CO 2:-	Design air pollution controlling devices

CO 3:-	Analyze the effects of pollutants on the environment.
CO 4:-	Understand meteorological aspects of air pollution
CO 5:-	Understand air pollution control methods
CO6:-	Select treatment technologies for water/wastewater/solid waste.
	Advanced Foundation Engineering
	At the end of the course, the student will be able to:
CO 1:-	Understand the behavior of problematic soil
CO 2:-	Design foundations on expansive soils
CO 3:-	Analyze the lateral stability of piles and wells
CO 4:-	Determine the earth pressures on foundations and retaining structures
CO 5:-	Calculate the bearing capacity of soils and foundation settlements
	Watershed Management
	After completion of the course, student will be able to:
CO 1:-	Identify the causes of soil erosion
CO 2:-	Plan and design soil conservation measures in a watershed
CO 3:-	Plan and design water harvesting and groundwater recharging structures
CO 4:-	Plan measures for reclamation of saline soils
CO 5:-	Plan irrigation systems and command area development programs
	Advanced Structural Design
	At the end of the course, the student will be able to:
CO 1:-	Formulate Equilibrium and compatibility equations for structural members
CO 2:-	Analyse structures for gravity loads, moving loads and lateral loads
CO 3:-	Analyze cables and suspension bridges
CO 4:-	Design steel gantry girders and portal frames
CO 5:-	Design connections for different loading conditions
CO 6:-	Design storage structures, bunkers and silos
CO 7:-	Design light weight metal structures
	Earth and Rock Fill Dams and Slope Stability
	At the end of the course, the student will be able to:
CO 1:-	Identify the problems associated with underground excavations
CO 2:-	Classify the rock mass using the reference data
CO 3:-	Understand the failure criteria of rock
CO 4:-	Apply seismic coefficient and response spectrum methods for analysis of multi storied buildings
CO 5:-	Understand the concepts of base isolation
	Water Resources Systems Analysis
	At the end of the course, the student will be able to:

CO 1:-	Understands the texhniques of water resources system analysis
CO 2:-	Evaluate the performance of an irrigation system
CO 3:-	Plan measures for reclamation of water logged lands
CO 4:-	Identify the characteristics and objectives of water resources systems
CO 5:-	Perform basic economic analysis to evaluate the economic feasibility of water resources projects
CO 6:-	Formulate and solve deterministic optimization models for design and operation of water resources systems
CO 7:-	Formulate and solve stochastic and fuzzy optimization problems for decision making under uncertainty

Industrial Waste Water Treatment

At the end of the course, the student will be able to:

CO 1:-	Identify the characteristics of industrial wastewaters
CO 2:-	Describe pollution effects of disposal of industrial effluent
CO 3:-	Identify and design treatment options for industrial wastewater
CO 4:-	Formulate environmental management plan

Concrete & Highway Materials Lab

At the end of the course, the student will be able to:

CO 1:-	Conduct Quality Control tests on concrete making materials
CO 2:-	Conduct Quality Control tests on fresh & hardened concrete
CO 3:-	Design and test concrete mix
CO 4:-	Conduct Non-destructive tests on concrete

Environmental Engineering Lab

CO 1:-	Determine physical, chemical and biological characteristics of water and wastewater
CO 2:-	Determine optimum dosage of coagulant
CO 3:-	Determine break - point chlorination
CO 4:-	Assess the quality of water and wastewater

Rehabilitation and Retrofitting of Structures

CO 1:-	1. Solving the causes and prevention of deterioration in structures.
CO 2:-	2. Interpret the types of damages and understand their mechanisms.
CO 3:-	3. Categorize the causes and prevention mechanisms of corrosion in steel reinforcement and fire induced damages.
CO 4:-	4. Able to Examine to inspect and assess the structures using techniques of visual inspection and NDT.

COURSE OUTCOMES – MECHANICAL ENGINEERING

MATHEMATICS-I

CO 1:-	write the matrix representation of a set of linear equations and to analyze the solution of

	the system of equations
CO 2:-	find the Eigen values and Eigen vectors which come across under linear transformations
CO 3:-	find the extreme values of functions of two variables with/ without constraints.·
CO 4:-	Identify whether the given first order DE is exact or not·
CO 5:-	solve higher order DE's and apply them for solving some real world problems

MATHEMATICS – II

CO 1:-	use Laplace transform techniques for solving DE's
CO 2:-	Evaluate integrals using Beta and Gamma functions
CO 3:-	evaluate the multiple integrals and can apply these concepts to find areas, volumes, moment of inertia etc of regions on a plane or in space
CO 4:-	evaluate the line, surface and volume integrals and converting them from one to another

ENGINEERING PHYSICS - I

CO 1:-	Learn principle, working of various laser systems and light propagation
CO 2:-	Learn principle, working of various laser systems and light propagation through optical fibers.
CO 3:-	Distinguish various crystal systems and understand atomic packing factor.
CO 4:-	Know the various defects in crystals.

C- PROGRAMMING LANGUAGE

CO 1:-	Demonstrate the basic knowledge of computer hardware and software.
CO 2:-	Ability to write algorithms for solving problems.
CO 3:-	Ability to draw flowcharts for solving problems.
CO 4:-	Ability to code a given logic in C programming language.
CO 5:-	Gain knowledge in using C language for solving problems.

ENGINEERING DRAWING

CO 1:-	Ability to prepare working drawings to communicate the ideas and information.
CO 2:-	Ability to read, understand and interpret engineering drawings.

COMPUTER PROGRAMING IN C LAB

CO1:-	Ability to design and test programs to solve mathematical and scientific problems.
CO2:-	Ability to write structured programs using control structures and functions.

APPLIED PHYSICS

CO1:-	Realize the importance of elastic behavior of materials.
CO2:-.	Learn Sabine's formula for reverberation time and apply in architecture of buildings
CO3:-	Learn various methods of producing ultrasonics and their uses.
CO4:-	Learn magnetic, dielectric and superconducting properties of materials and their applications