



Rajgad Dnyanpeeth's
Shri Chhatrapati Shivajiraje College of Engineering
S.No.237, Dhangwadi, Tal-Bhor, Dist-Pune

VISION & MISION OF INSTITUTE

VISION

Excellent Institution for Education, Training and Research in Engineering.

MISSION

1. Develop competent engineers along with professional skill and responsible citizen.
2. Foster knowledge and technical skill of the highest standards to develop sustainable engineering solution.
3. Prepare engineers to respond to needs if the industry, higher studies and research through industry and institute interaction.





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S.No.237, Dhangwadi, Tal-Bhor, Dist-Pune

DEPARTMENT OF ELECTRONICS & TELECOMMUNICATION ENGINEERING

VISION & MISION OF DEPARTMENT

VISION

Excellence in Electronics and Telecommunication Engineering to fulfill expectation of Industries and Society.

MISSION

1. Develop zealous Electronics and Telecommunications engineer with good communication skill, social and ethical values for development of society.
2. Promote quality technical education to reach at the highest standard.
3. Prepare and nurture the mind for civil services, higher studies and research activity.
4. Endorse exposure to advanced network standards for sustainable developments.





Rajgad Dnyanpeeth's
SHRI CHHATRAPATI SHIVAJIRAJE COLLEGE OF ENGINEERING
S. No. 237, Satara-Pune, NH-4, Dhangawadi, Tal: Bhore, Dist: Pune -412205 (MS), India.

DEPARTMENT OF MECHANICAL ENGINEERING

Vision

Excellence in Mechanical Engineering to accept the global challenges.

Mission

1. Develop spirited Mechanical Engineers with good communication skill, social and ethical values for development of society.
2. Impart continuously quality technical education of the highest standards.
3. Prepare and nurture the mind set for civil services, higher studies and research activity.
4. Promote exposure to green technology for sustainable development.





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S. No. 237, Satara-Pune, NH-4, Dhangawadi, Tal: Bhore, Dist: Pune -412205 (MS), India

DEPARTMENT OF COMPUTER ENGINEERING

VISION AND MISSION OF DEPARTMENT

Vision

- Excellence in Computer Engineering to meet Industrial and societal needs.

Mission

- Develop competent Computer Engineers with good communication skill, social and ethical values for development of society.
- Cultivate quality technical education to reach at the highest standard.
- Prepare and nurture the mind set for all civil services, higher studies and research activity.
- Promote exposure to green computing for developing sustainability standards.





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SHRI CHHATRAPATI SHIVAJIRAJE COLLEGE OF ENGINEERING

Gat No. 237, Pune Bangalore Highway, Dhangawadi, Tal – Bhor, Dist- Pune (Maharashtra)

Department of Civil Engineering

VISION:

Excellence in Civil Engineering to develop smarter and sustainable infrastructure.

MISSION:

1. Develop passionate Civil Engineers with good communication skill, social and ethical values for development of society.
2. Inculcate quality technical education of the highest standards.
3. Prepare and nurture the mind set for civil services, higher studies and research activity.
4. Promote exposure to green technology for eco-friendly environment.





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DEPARTMENT OF ELECTRONICS & TELECOMMUNICATION ENGINEERING

Programme Outcomes (PO's)

Graduate will be able to:

PO1: Apply knowledge of mathematics, science and engineering with focus on electronics and telecommunication engineering.

PO2: Design and conduct experiments, analyze and interpret data and document the result.

PO3: To identify, formulate and solve the electronics and telecommunication engineering problems.

PO4: Lead and manage multidisciplinary teams by applying engineering management and finance principles to handle the projects.

PO5: Realize and follow the ethical principles, responsibilities and norms of engineering practice.

PO 6: Communicate effectively and present technical information in oral and written forms.

PO7: Apply engineering solution in society and global contest and evaluate the impact of engineering solution on society, health, safety, legal, cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO8: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO9: Make use of modern engineering software and equipments to apply in electronics and telecommunication.

PO10: Have knowledge of contemporary issue.

PO11: To engage in lifelong learning this maintains continuous professional development.

PO12: Participate and succeed in competitive examinations.





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DEPT. OF ELECTRONICS AND TELECOMMUNICATION ENGG.

Program Specific Outcomes (PSO'S) of Department

PSO 1: Should be able to understand the fundamental concepts in electronics circuit/ product design, networking techniques, IC design, embedded systems, and signal processing.

PSO 2: Should be able to apply the learning, analyze the communication systems with the help of hardware and software design tools.

PSO 3: Should be able to handle the project work and prepare engineering project module.





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DEPARTMENT OF MECHANICAL ENGINEERING

Programme Specific Outcomes (PSO's)

PSO 1: Apply their knowledge in the domain of engineering Design, Production and Thermal fluid sciences to solve engineering problems utilizing advanced technology.

PSO 2: Successfully apply the principles of design, analysis and implementation of mechanical systems 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/CAE tools ensuring best practices.





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DEPARTMENT OF COMPUTER ENGINEERING

Program Specific Outcomes:

PSO1: Professional Skills-The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying.

PSO2: Problem-Solving Skills- The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.

PSO3: Successful Career and Entrepreneurship- The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an entrepreneur, and a zest for higher studies





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Department of Civil Engineering

PROGRAM SPECIFIC OUTCOMES (PSOs)

- PSO 1:** The ability to create innovative designs with new materials of minimum embodied energy through research and development focusing on global quality of life by observing professional ethics.
- PSO 2:** The ability to recognize the need of the hour like housing, sanitation, transportation, waste management, irrigation, use of renewable energy etc. for a sustainable environment.
- PSO 3:** Function effectively in multi-disciplinary teams.





Rajgad Dnyanpeeth's
SHRI CHHATRAPATI SHIVAJIRAJE COLLEGE OF ENGINEERING

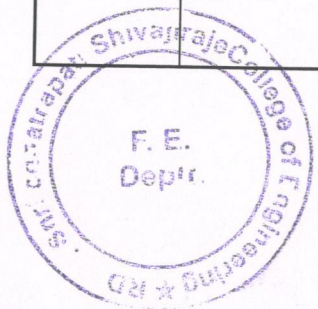
Gat No. 237, Satara-Pune, NH-4, Dhangawadi, Tal: Bhor, Dist: Pune

Department of First Year Engineering

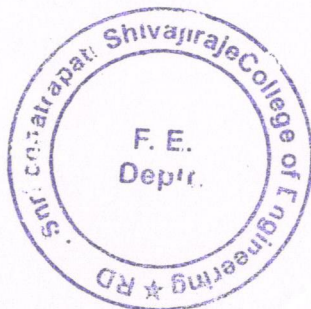
Course Outcomes (COs) SEM-I

FE - 2019 Pattern

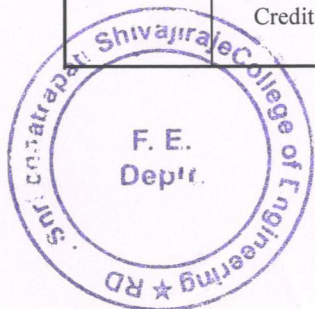
Course Code	Name of Subject/ Course	Course Outcome (COs)
107001	Engineering Mathematics – I	CO1: Mean value theorems and its generalizations leading to Taylors and Maclaurin's series useful in the analysis of engineering problems.
		CO2: the Fourier series representation and harmonic analysis for design and analysis of periodic continuous and discrete systems.
		CO3: to deal with derivative of functions of several variables that are essential in various branches of Engineering.
		CO4: to apply the concept of Jacobian to find partial derivative of implicit function and functional dependence. Use of partial derivatives in estimating error and approximation and finding extreme values of the function.
		CO5: the essential tool of matrices and linear algebra in a comprehensive manner for analysis of system of linear equations, finding linear and orthogonal transformations, Eigen values and Eigen vectors applicable to engineering problems
107002	Engineering Physics	CO1: Develop understanding of interference, diffraction and polarization; connect it to few engineering applications.
		CO2: Learn basics of lasers and optical fibers and their use in some applications.
		CO3: Understand concepts and principles in quantum mechanics. Relate them to some applications.
		CO4: Understand theory of semiconductors and their applications in some semiconductor devices.
		CO5: Summarize basics of magnetism and superconductivity. Explore few of their technological applications.
		CO6: Comprehend use of concepts of physics for Non Destructive Testing. Learn some properties of nanomaterials and their application.
102003	Systems in Mechanical Engineering	CO1: Describe and compare the conversion of energy from renewable and non-renewable energy sources
		CO2: Explain basic laws of thermodynamics, heat transfer and their applications
		CO3: List down the types of road vehicles and their specifications
		CO4: Illustrate various basic parts and transmission system of a road vehicle
		CO5: Discuss several manufacturing processes and identify the suitable process
		CO6: Explain various types of mechanism and its application

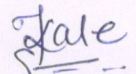


Course Code	Name of Subject/ Course	Course Outcome (COs)
103004	Basic Electrical Engineering	CO1: Differentiate between electrical and magnetic circuits and derive mathematical relation for self and mutual inductance along with coupling effect.
		CO2: Calculate series, parallel and composite capacitor as well as characteristics parameters of alternating quantity and phasor arithmetic
		CO3: Derive expression for impedance, current, power in series and parallel RLC circuit with AC supply along with phasor diagram.
		CO4: Relate phase and line electrical quantities in polyphase networks, demonstrate the operation of single phase transformer and calculate efficiency and regulation at different loading conditions
		CO5: Apply and analyze the resistive circuits using star-delta conversion KVL, KCL and different network theorems under DC supply.
		CO6: Evaluate work, power, energy relations and suggest various batteries for different applications, concept of charging and discharging and depth of charge.
110005	Programming and Problem Solving	CO1: Inculcate and apply various skills in problem solving.
		CO2: Choose most appropriate programming constructs and features to solve the problems in diversified domains.
		CO3: Exhibit the programming skills for the problems those require the writing of well- documented programs including use of the logical constructs of language, Python.
		CO4: Demonstrate significant experience with the Python program development environmen
111006	Workshop Practice	CO1: Familiar with safety norms to prevent any mishap in workshop.
		CO2: Able to handle appropriate hand tool, cutting tool and machine tools to manufacture a job.
		CO3: Able to understand the construction, working and functions of machine tools and their parts.
		CO4: Able to know simple operations (Turning and Facing) on a centre lathe.
101007	Environmental Studies-I (Mandatory Non-Credit Course)	CO1: Demonstrate an integrative approach to environmental issues with a focus on sustainability.
		CO2: Explain and identify the role of the organism in energy transfers in different ecosystems.
		CO3: Distinguish between and provide examples of renewable and nonrenewable resources & analyze personal consumption of resources.
		CO4: Identify key threats to biodiversity and develop appropriate policy options for conserving biodiversity in different settings
Course Outcomes (COs) SEM-II		
FE - 2019 Pattern		
107008	Engineering Mathematics – II	CO1: the effective mathematical tools for solutions of first order differential equations that model physical processes such as Newton's law of cooling, electrical circuit, rectilinear motion, mass spring systems, heat transfer etc.
		CO2: advanced integration techniques such as Reduction formulae, Beta functions, Gamma functions, Differentiation under integral sign and Error functions needed in evaluating multiple integrals and their applications.
		CO3: to trace the curve for a given equation and measure arc length of various curves.
		CO4: the concepts of solid geometry using equations of sphere, cone and cylinder in a comprehensive manner.
		CO5: evaluation of multiple integrals and its application to find area bounded by curves, volume bounded by surfaces, Centre of gravity and Moment of inertia.



Course Code	Name of Subject/ Course	Course Outcome (COs)
107009	Engineering Chemistry	CO1: Apply the different methodologies for analysis of water and techniques involved in softening of water as commodity.
		CO2: Select appropriate electro-technique and method of material analysis.
		CO3: Demonstrate the knowledge of advanced engineering materials for various engineering applications.
		CO4: Analyze fuel and suggest use of alternative fuels.
		CO5: Identify chemical compounds based on their structure.
		CO6: Explain causes of corrosion and methods for minimizing corrosion.
104010	Basic Electronics Engineering	CO1: Explain the working of P-N junction diode and its circuits.
		CO2: Identify types of diodes and plot their characteristics and also can compare BJT with MOSFET.
		CO3: Build and test analog circuits using OPAMP and digital circuits using universal/basic gates and flip flops.
		CO4: Use different electronics measuring instruments to measure various electrical parameters.
		CO5: Select sensors for specific applications.
		CO6: Describe basic principles of communication systems.
101011	Engineering Mechanics	CO1: Determine resultant of various force systems
		CO2: Determine centroid, moment of inertia and solve problems related to friction
		CO3: Determine reactions of beams, calculate forces in cables using principles of equilibrium
		CO4: Solve trusses, frames for finding member forces and apply principles of equilibrium to forces in space
		CO5: Calculate position, velocity and acceleration of particle using principles of kinematics
		CO6: Calculate position, velocity and acceleration of particle using principles of kinetics and Work, Power, Energy
102012	Engineering Graphics	CO1: Draw the fundamental engineering objects using basic rules and able to construct the simple geometries.
		CO2: Construct the various engineering curves using the drawing instruments.
		CO3: Apply the concept of orthographic projection of an object to draw several 2D views and its sectional views for visualizing the physical state of the object.
		CO4: Apply the visualization skill to draw a simple isometric projection from given orthographic views precisely using drawing equipment.
		CO5: Draw the development of lateral surfaces for cut section of geometrical solids.
		CO6: Draw fully-dimensioned 2D, 3D drawings using computer aided drafting tools.
110013	Project Based Learning	CO1: Project based learning will increase their capacity and learning through shared cognition.
		CO2: Students able to draw on lessons from several disciplines and apply them in practical way.
		CO3: Learning by doing approach in PBL will promote long-term retention of material and replicable skill, as well as improve teachers' and students' attitudes towards learning.
101014	Environmental Studies-II (Mandatory Non-Credit Course)	CO1: Have an understanding of environmental pollution and the science behind those problems and potential solutions.
		CO2: Have knowledge of various acts and laws and will be able to identify the industries that are violating these rules.
		CO3: Assess the impact of ever increasing human population on the biosphere: social, economic issues and role of humans in conservation of natural resources.
		CO4: Learn skills required to research and analyze environmental issues scientifically and learn how to use those skills in applied situations such as careers that may involve environmental problems and/or issues.




Head of Department
 First Year Engineering
 Shri Chh. Shivajiraje College of Engg.
 Dhangawadi, Pune-412206

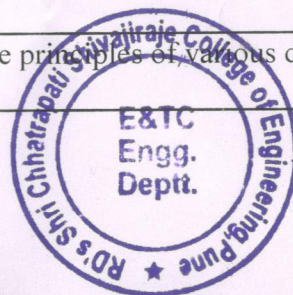


Rajgad Dnyanpeeth's

SHRI CHHATRAPATI SHIVAJI RAJE COLLEGE OF ENGINEERING
S.No 237, Pune-Banglore Highway,Dhangwadi,Tal-Bhor Dist:Pune(Maharashtra)

Department of Electronics and Telecommunication
Course Outcomes (COs) SEM-I
SE (Electronics and Telecommunication) -2019 Pattern

Course Code	Name of Subject/ Course	Course Outcome (COs)
207005	Engineering Mathematics III	CO1:Solve higher order linear differential equation using appropriate techniques for modelling, analyzing of electrical circuits and control systems.
		CO2: Apply concept of Fourier transform & Z-transform and its applications to continuous & discrete systems, signal & image processing and communication systems.
		CO3: Obtain Interpolating polynomials, numerically differentiate and integrate functions, numerical solutions of differential equations using single step and multi-step iterative methods used in modern scientific computing.
		CO4: Perform vector differentiation & integration, analyze the vector fields and apply to electromagnetic fields & wave theory.
		CO5: Analyze Complex functions, Conformal mappings, Contour integration applicable to electrostatics, digital filters, signal and image processing.
204181	Electronic Circuits	CO1: Assimilate the physics, characteristics and parameters of MOSFET towards its application as
		CO2: Design MOSFET amplifiers, with and without feedback, & MOSFET oscillators, for given
		CO3:Analyze and assess the performance of linear and switching regulators, with their variants, towards applications in regulated power supplies.
		CO4: Explain internal schematic of Op-Amp and define its performance parameters.
		CO5:Design, Build and test Op-amp based analog signal processing and conditioning circuits towards various real time applications.
		CO6: Understand and compare the principles of various data conversion techniques and PLL with their applications.



204182	Digital Circuits	CO1: Identify and prevent various hazards and timing problems in a digital design.
		CO2: Use the basic logic gates and various reduction techniques of digital logic circuit.
		CO3: Analyze, design and implement combinational logic circuits.
		CO4: Analyze, design and implement sequential circuits.
		CO5: Differentiate between Mealy and Moore machines.
		CO6: Analyze digital system design using PLD.
204183	Electrical Circuits	CO1: Analyze the simple DC and AC circuit with circuit simplification techniques.
		CO2: Formulate and analyze driven and source free RL and RC circuits.
		CO3: Formulate & determine network parameters for given network and analyze the given network using Laplace Transform to find the network transfer function.
		CO4: Explain construction, working and applications of DC Machines / Single Phase & Three Phase AC Motors.
		CO5: Explain construction, working and applications of special purpose motors & understand motors used in electrical vehicles.
		CO6: Analyze and select a suitable motor for different applications.
204184	Data structures	CO1: Solve mathematical problems using C programming language.
		CO2: Implement sorting and searching algorithms and calculate their complexity.
		CO3: Develop applications of stack and queue using array.
		CO4: Demonstrate applicability of Linked List.
		CO5: Demonstrate applicability of nonlinear data structures - Binary Tree with respect to its time complexity.
		CO6: Apply the knowledge of graph for solving the problems of spanning tree and shortest path algorithm.
204190	Mandatory Audit Course 3 (Science, Technology and Society)	CO1: Analyze relationships among science, technology, and society using critical perspectives or examples from historical, political, or economic disciplines.
		CO2: Analyze the role of science and technology in shaping diverse fields of study over time
		CO3: Articulate in writing a critical perspective on issues involving science, technology, and society using evidence as support.

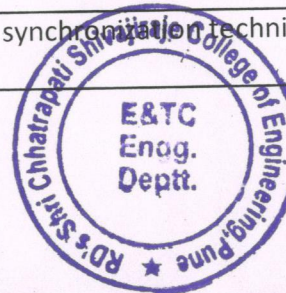


Course Outcomes (COs)

SEM-II

SE (Electronics and Telecommunication) -2019 Pattern

204191	Signals & Systems	CO1: Identify, classify basic signals and perform operations on signals.
		CO2: Identify, Classify the systems based on their properties in terms of input output relation and in terms of impulse response and will be able to determine the convolution between to signals.
		CO3: Analyze and resolve the signals in frequency domain using Fourier series and Fourier Transform.
		CO4: Resolve the signals in complex frequency domain using Laplace Transform, and will be able to apply and analyze the LTI systems using Laplace Transforms.
		CO5: Define and Describe the probability, random variables and random signals. Compute the probability of a given event, model, compute the CDF and PDF.
		CO6: Compute the mean, mean square, variance and standard deviation for given random variables using PDF.
204192	Control Systems	CO1: Determine and use models of physical systems in forms suitable for use in the analysis and design of control systems.
		CO2: Determine the (absolute) stability of a closed-loop control system.
		CO3: Perform time domain analysis of control systems required for stability analysis.
		CO4: Perform frequency domain analysis of control systems required for stability analysis.
		CO5: Apply root-locus, Frequency Plots technique to analyze control systems.
		CO6: Express and solve system equations in state variable form.
		CO7: Differentiate between various digital controllers and understand the role of the controllers in Industrial automation.
204193	Principles of Communication Systems	CO1: To compute & compare the bandwidth and transmission power requirements by analyzing time and frequency domain spectra of signal required for modulation schemes under study.
		CO2: Describe and analyze the techniques of generation, transmission and reception of Amplitude Modulation Systems.
		CO3: Explain generation and detection of FM systems and compare with AM systems.
		CO4: Exhibit the importance of Sampling Theorem and correlate with Pulse Modulation technique (PAM, PWM, and PPM).
		CO5: Characterize the quantization process and elaborate digital representation techniques (PCM, DPCM, DM and ADM).
		CO6: Illustrate waveform coding, multiplexing and synchronization techniques and articulate their importance in baseband digital transmission.

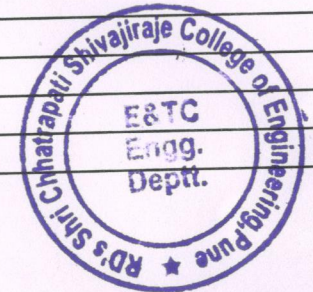


204194	Object Oriented Programming	CO1: Describe the principles of object oriented programming.
		CO2: Apply the concepts of data encapsulation, inheritance in C++.
		CO3: Understand Operator overloading and friend functions in C++.
		CO4: Apply the concepts of classes, methods inheritance and polymorphism to write programs C++.
		CO5: Apply Templates, Namespaces and Exception Handling concepts to write programs in C++.
		CO6: Describe and use of File handling in C++.
204199	Employability Skill Development	CO1: Define personal and career goals using introspective skills and SWOC assessment. Outline and evaluate short-term and long-term goals.
		CO2: Develop effective communication skills (listening, reading, writing, and speaking), self- management attributes, problem solving abilities and team working & building capabilities in order to fetch employment opportunities and further succeed in the workplace.
		CO3: Be a part of a multi-cultural professional environment and work effectively by enhancing inter-personal relationships, conflict management and leadership skills.
		CO4: Comprehend the importance of professional ethics, etiquettes & morals and demonstrate sensitivity towards it throughout certified career.
		CO5: Develop practically deployable skill set involving critical thinking, effective presentations and leadership qualities to hone the opportunities of employability and excel in the professional environment.
204200	Project Based Learning	CO1: Identify the real-world problem (possibly of interdisciplinary nature) through a rigorous literature survey and formulate / set relevant aim and objectives.
		CO2: Contribute to society through proposed solution by strictly following professional ethics and safety measures.
		CO3: Propose a suitable solution based on the fundamentals of electronics and communication engineering by possibly the integration of previously acquired knowledge.
		CO4: Analyze the results and arrive at valid conclusion.
		CO5: Use of technology in proposed work and demonstrate learning in oral and written form.
		CO6: Develop ability to work as an individual and as a team member.
204201:	Mandatory Audit Course - 4 (Enhancing Soft Skills and Personality)	CO1: Will enhancing Soft Skills knowlege
		CO2: will able to known, how to improve personality.



TE (Electronics and Telecommunication) -2015 Pattern

Course Code	Name of Subject/ Course	Course Outcome (COs)
304181	Digital Communication	CO1: Understand working of waveform coding techniques and analyse their performance.
		CO2: Analyze the performance of a baseband and pass band digital communication system in terms of error rate and spectral efficiency.
		CO3: Perform the time and frequency domain analysis of the signals in a digital communication system.
		CO4: Design of digital communication system.
		CO5: Understand working of spread spectrum communication system and analyze its performance.
304182	Digital Signal Processing	CO1: Analyze the discrete time signals and system using different transform domain techniques.
		CO2: Know the concept of digital signal processing, sampling and aliasing
		CO3: Design and implement LTI filters for filtering different real world signals.
		CO4: Develop different signal processing applications using DSP processor
304183	Electromagnetics	CO1: Understand the basic mathematical concepts related to electromagnetic vector fields
		CO2: Apply the principles of electrostatics to the solutions of problems relating to electric field and
		CO3: Apply the principles of magnetostatics to the solutions of problems relating to magnetic field and magnetic potential, boundary conditions and magnetic energy density.
		CO4: Understand the concepts related to Faraday's law, induced emf and Maxwell's equations.
		CO5: Apply Maxwell's equations to solutions of problems relating to transmission lines and uniform
304184	Microcontrollers	CO1: Learn importance of microcontroller in designing embedded application.
		CO2: Learn use of hardware and software tools.
		CO3: Develop interfacing to real world devices.
304185	Mechatronics	CO1: Identification of key elements of mechatronics system and its representation in terms of block diagram
		CO2: Understanding basic principal of Sensors and Transducer.
		CO3: Able to prepare case study of the system given.
304193	Electronics System Design	CO1: Have skills and preparedness for aptitude tests.
		CO2: Be equipped with essential communication skills (writing, verbal and non-verbal)
		CO3: Master the presentation skill and be ready for facing interviews.
		CO4: Build team and lead it for problem solving

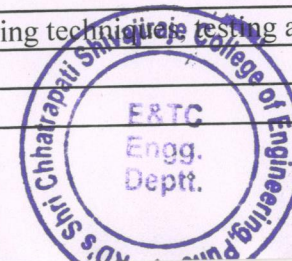


Audit Course 3 Cyber and Information Security	CO1: Will increase the awareness about cyber security
	CO2: Will increase the awareness about information and network security

Course Outcomes (COs) SEM-II

TE (Electronics and Telecommunication) -2015 Pattern

Course Code	Name of Subject/ Course	Course Outcome (COs)
304186	Power Electronics	CO1: Design & implement a triggering / gate drive circuit for a power device
		CO2: Understand, perform & analyze different controlled converters
		CO3: Evaluate battery backup time & design a battery charger
		CO4: Design & implement over voltage / over current protection circuit.
304187 I	Information Theory, Coding and Communication Networks	CO1: Perform information theoretic analysis of communication system.
		CO2: Design a data compression scheme using suitable source coding technique.
		CO3: Design a channel coding scheme for a communication system.
		CO4: Understand and apply fundamental principles of data communication and networking.
		CO5: Apply flow and error control techniques in communication networks.
304188	Business Managemen	CO1: Get overview of Management Science aspects useful in business.
		CO2: Get motivation for Entrepreneurship
		CO3: Get Quality Aspects for Systematically Running the Business
		CO4: To Develop Project Management aspect and Entrepreneurship Skills.
306189	Advanced Processors	CO1: Describe the ARM microprocessor architectures and its feature.
		CO2: Interface the advanced peripherals to ARM based microcontroller
		CO3: Design embedded system with available resources.
		CO4: Use of DSP Processors and resources for signal processing applications.
304190	System Programming and Operating Systems	CO1: Demonstrate the knowledge of Systems Programming and Operating Systems
		CO2: Formulate the Problem and develop the solution for same.
		CO3: Compare and analyse the different implementation approach of system programming operating system abstractions.
		CO4: Interpret various OS functions used in Linux / Ubuntu
		CO5: Design embedded system with available resources.
		CO6: Use of DSP Processors and resources for signal processing applications.
304196	Employability Skills and Mini Project	CO1: Understand, plan and execute a Mini Project with team.
		CO2: Implement electronic hardware by learning PCB artwork design, soldering techniques testing and troubleshooting etc.
		CO3: Prepare a technical report based on the Mini project.
		CO4: Deliver technical seminar based on the Mini Project work carried out.

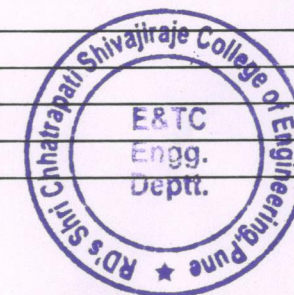


Audit Course 4 Embedded System Design using	CO1: Embedded C programming techniques for 16-bit platform
	CO2: Embedded protocols and its interfacing techniques
	CO3: Embedded Wireless networking concepts and its implementation with application oriented projects and case studies.

Course Outcomes (COs) SEM-I

BE (Electronics and Telecommunication) -2015 Pattern

Course Code	Name of Subject/ Course	Course Outcome (COs)
404181	VLSI Design & Technology	CO1: Write effective HDL coding for digital design.
		CO2: Apply knowledge of real time issues in digital design.
		CO3: Model digital circuit with HDL, simulate, synthesis and prototype in PLDs.
		CO4: Design CMOS circuits for specified applications.
		CO5: Analyze various issues and constraints in design of an ASIC
		CO6: Apply knowledge of testability in design and build self test circuit.
404182	Computer Networks & Security	CO1: Understand fundamental underlying principles of computer networking
		CO2: Describe and analyze the hardware, software, components of a network and their interrelations.
		CO3: Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies
		CO4: Have a basic knowledge of installing and configuring networking applications
		CO5: Specify and identify deficiencies in existing protocols, and then go onto select new and better protocols.
		CO6: Have a basic knowledge of the use of cryptography and network security.
404183	Radiation & Microwave Techniques	CO1: Differentiate various performance parameters of radiating elements.
		CO2: Analyze various radiating elements and arrays.
		CO3: Apply the knowledge of waveguide fundamentals in design of transmission lines.
		CO3: Design and set up a system consisting of various passive microwave components.
		CO4: Analyze tube based and solid state active devices along with their applications.
404184	Elective I IOT	CO5: Measure various performance parameters of microwave components.
		CO1: Understand the various concepts, terminologies and architecture of IoT systems.
		CO2: Use sensors and actuators for design of IoT.
		CO3: Understand and apply various protocols for design of IoT systems
		CO4: Use various techniques of data storage and analytics in IoT
404185	Elective II EDP	CO5: Understand various applications of IoT
		CO1: Understand various stages of hardware, software and PCB design.
		CO2: Importance of product test & test specifications.
		CO3: Special design considerations and importance of documentation.

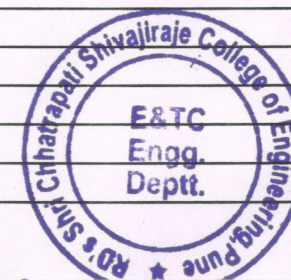


404188	Project Stage I	CO2: Develop confidence for self-education and ability for lifelong learning
	Audit Course 5 Green Energy	CO1: List and generally explain the main sources of energy and their primary applications in the India, and the world.
		CO2: Describe the challenges and problems associated with the use of various energy sources, including fossil fuels, with regard to future supply and the environment.
		CO3: Discuss remedies/potential solutions to the supply and environmental issues associated with fossil fuels and other energy resources.
		CO4: List and describe the primary renewable energy resources and technologies.
		CO5: Describe/illustrate basic electrical concepts and system components
		CO6: Convert units of energy to quantify energy demands and make comparisons among energy uses, resources, and technologies.
		CO7: Collect and organize information on renewable energy technologies as a basis for further analysis and evaluation.

Course Outcomes (COs) SEM-II

BE (Electronics and Telecommunication) -2015 Pattern

Course Code	Name of Subject/ Course	Course Outcome (COs)
404189	Mobile Communication	CO1: Apply the concepts of switching technique and traffic engineering to design multistage networks. CO2: Explore the architecture of GSM. CO3: Differentiate thoroughly the generations of mobile technologies.
404190	Broadband Communication	CO1: Perform Link power budget and Rise Time Budget by proper selection of components and check its viability CO2: Perform Satellite Link design for Up Link and Down Link
404191	Elective III Audio video Engineering	CO1: Apply the fundamentals of Analog Television and Colour Television standards. CO2: Explain the fundamentals of Digital Television, DTV standards and parameters. CO3: Study and understand various HDTV standards and Digital TV broadcasting systems and acquainted with different types of analog, digital TV and HDTV systems. CO4: Understand acoustic fundamentals and various acoustic systems.
404192	Elective IV Wireless Sensor Networks	CO1: Explain various concepts and terminologies used in WSN CO2: Describe importance and use of radio communication and link management in WSN CO3: Describe importance and use of radio communication and link management in WSN CO4: Explain various wireless standards and protocols associated with WSN CO5: Recognise importance of localisation and routing techniques used in WSN CO6: Understand techniques of data aggregation and importance of security in WSN CO7: Examine the issues involved in design and deployment of WSN



404195	Project Stage II	CO2: demonstrate knowledge of professional and ethical responsibilities.
		CO3: show the understanding of impact of engineering solutions on the society and also will be aware of contemporary issues
		CO4: communicate effectively in both verbal and written form
		CO5: develop confidence for self-education and ability for lifelong learning
	Audit Course 6 Environment and Disater Management	CO1: To learn the different environmental issues and disasters.
		CO2: To deal with problems associated with environment and effectively handle the disasters.



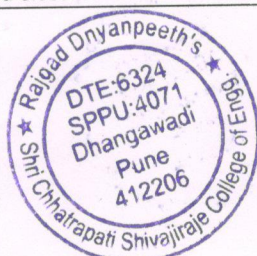
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Department of Mechanical Engineering
Course Outcomes (COs) SEM-I
SE (Mechanical Engineering) -2019 Pattern

Course Code	Name of Subject/ Course	Course Outcome (COs)
202041	Solid Mechanics	CO1-Define various types of stresses and strain Developed on determinate and indeterminate members.
		CO2-Draw Shear force and bending moment diagram for various types of transverse loading and support.
		CO3- Compute the slope & deflection, bending stresses and shear stresses on a beam.
		CO4- Calculate torsional shear stress in shaft and buckling on the column.
		CO5- Apply the concept of principal stresses and theories of failure to Determine stresses on a 2-D element.
		CO6- Utilize the concepts of SFD & BMD, torsion and principal stresses to Solve combined loading application based problems.
202042	Solid Modeling and Drafting	CO1 - Understand basic concepts of CAD system, need and scope in Product Lifecycle Management.
		CO2 - Utilize knowledge of curves and surfacing features and methods to create complex solid geometry.
		CO3 - Construct solid models, assemblies using various modeling techniques & Perform mass property analysis, including creating and using a coordinate system.
		CO4 - Apply geometric transformations to simple 2D geometries.
		CO5 - Use CAD model data for various CAD based engineering applications viz. production drawings, 3D printing, FEA, CFD, MBD, CAE, CAM, etc.
		CO6 - Use PMI & MBD approach for communication
202043	Engineering Thermodynamics	CO1 - Describe the basics of thermodynamics with heat and work interactions.
		CO2 - Apply laws of thermodynamics to steady flow and non-flow processes.
		CO3 - Apply entropy, available and non available energy for an Open and Closed System.
		CO4 - Determine the properties of steam and their effect on Performance of vapour power cycle.
		CO5 - Analyse the fuel combustion process and products of combustion.
		CO6 - Select various instrumentations required for safe and efficient operation of steam generator.
202044	Engineering Materials and Metallurgy	CO1 - Compare crystal structures and ASSESS different lattice parameters.
		CO2 - Correlate crystal structures and imperfections in crystals with mechanical behaviour of materials.
		CO3 - Differentiate and Determine mechanical properties using destructive and nondestructive testing of materials.
		CO4 - Identify & Estimate different parameters of the system viz., phases, variables, component, grains, grain boundary, and degree of freedom. etc.
		CO5 - Analyse effect of alloying element & heat treatment on properties of ferrous & nonferrous alloy.
		CO6 - Select appropriate materials for various applications.
203156	Electrical and Electronics Engineering	CO1 - Apply programming concepts to Understand role of Microprocessor and Microcontroller in embedded systems.
		CO2 - Develop interfacing of different types of sensors and other hardware devices with Atmega328 based Arduino Board.
		CO3 - Understand the operation of DC motor, its speed control methods and braking.
		CO4 - Distinguish between types of three phase induction motor and its characteristic features.
		CO5 - Explain about emerging technology of Electric Vehicle (EV) and its modular subsystems.
		CO6 - Choose energy storage devices and electrical drives for Evs.



202045	Geometric Dimensioning and Tolerancing Lab	CO1 - Select appropriate IS and ASME standards for drawing.
		CO2 - Read & Analyse variety of industrial drawings.
		CO3 - Apply geometric and dimensional tolerance, surface finish symbols in drawing.
		CO4 - Evaluate dimensional tolerance based on type of fit, etc.
		CO5 - Select an appropriate manufacturing process using DFM, DFA, etc.

Course Outcomes (COs) SEM-II

SE (Mechanical Engineering) -2019 Pattern

Course Code	Name of Subject/ Course	Course Outcome (COs)
207002	Engineering Mathematics - III	CO1 - Solve higher order linear differential equations and its applications to model and Analyze mass spring systems.
		CO2 - Apply Integral transform techniques such as Laplace transform and Fourier transform to Solve differential equations involved in vibration theory, heat transfer and related mechanical engineering applications.
		CO3 - Apply Statistical methods like correlation, regression in analyzing and interpreting experimental data applicable to reliability engineering and probability theory in testing and quality control.
		CO4 - Perform Vector differentiation & integration, Analyze the vector fields and Apply to fluid flow problems.
		CO5 - Solve Partial differential equations such as wave equation, one and two dimensional heat flow equations.
202047	Kinematics of Machinery	CO1 - Apply kinematic analysis to simple mechanisms.
		CO2 - Analyze velocity and acceleration in mechanisms by vector and graphical method.
		CO3 - Synthesize a four bar mechanism with analytical and graphical methods.
		CO4 - Apply fundamentals of gear theory as a prerequisite for gear design.
		CO5 - Construct cam profile for given follower motion.
202048	Applied Thermodynamics	CO1 - Determine COP of refrigeration system and Analyze psychrometric processes.
		CO2 - Discuss basics of engine terminology, air standard, fuel air and actual cycles.
		CO3 - Identify factors affecting the combustion Performance of SI and CI engines.
		CO4 - Determine Performance parameters of IC Engines and emission control.
		CO5 - Explain working of various IC Engine systems and Use of alternative fuels.
		CO6 - Calculate Performance of single and multi stag.
202049	Fluid Mechanics	CO1 - Determine various properties of fluid.
		CO2 - Apply the laws of fluid statics and concepts of buoyancy.
		CO3 - Identify types of fluid flow and terms associated in fluid kinematics.
		CO4 - Apply principles of fluid dynamics to laminar flow.
		CO5 - Estimate friction and minor losses in internal flows and Determine boundary layer formation over an external surface.
		CO6 - Construct mathematical correlation considering dimensionless parameters, also ABLE to predict the Performance of prototype using model laws.
202050	Manufacturing Processes	CO1 - Select appropriate moulding, core making and melting practice and Estimate pouring time, solidification rate and DESIGN riser size and location for sand casting process.
		CO2 - Understand mechanism of metal forming techniques and Calculate load required for flat rolling.
		CO3 - Demonstrate press working operations and Apply the basic principles to DESIGN dies and tools for forming and shearing operations.
		CO4 - Classify and Explain different welding processes and Evaluate welding characteristics.
		CO5 - Differentiate thermoplastics and thermosetting and Explain polymer processing techniques.
		CO6 - Understand the principle of manufacturing of fibre-reinforce composites and metal matrix composites.



202051	Machine Shop	CO1 - Perform welding using TIG/ MIG/ Resistance/Gas welding technique
		CO2 - Make Fibre-reinforced Composites by hand lay-up process or spray lay-up techniques.
		CO3 - Perform cylindrical/surface grinding operation and Calculate its machining time.
		CO4 - Determine number of indexing movements required and acquire skills to PRODUCE a spur gear on a horizontal milling machine.
		CO5 - Prepare industry visit report.
		CO6 - Understand procedure of plastic processing.
202052	Project Based Learning - II	CO1 - Identify the real-world problem (possibly of interdisciplinary nature) through a rigorous literature survey and formulate / set relevant aims and objectives.
		CO2 - Analyze the results and arrive at valid conclusions.
		CO3 - Propose a suitable solution based on the fundamentals of mechanical engineering by possibly integration of previously acquired knowledge.
		CO4 - Contribute to society through Proposed solutions by strictly following professional ethics and safety measures.
		CO5 - Use of technology in Proposed work and Demonstrate learning in oral and written form.
		CO6 - Develop ability to work as an individual and as a team member.

Course Outcomes (COs) SEM-I

TE (Mechanical Engineering) -2015 Pattern

Course Code	Name of Subject/ Course	Course Outcome (COs)
302041	Design of Machine Elements-I	CO1 -Ability to Identify and Understand failure modes for mechanical elements and design of machine elements based on strength.
		CO2 -Ability to design Shafts, Keys and Coupling for industrial applications.
		CO3 -Ability to design machine elements subjected to fluctuating loads.
		CO4 -Ability to design Power Screws for various applications.
		CO5 -Ability to design fasteners and welded joints subjected to different loading conditions.
		CO6 -Ability to design various springs for strength and stiffness.
302042	Heat Transfer	CO1 - Analyze the various modes of heat transfer and implement the basic heat conduction equations for steady one dimensional thermal system.
		CO2 - Implement the general heat conduction equation to thermal systems with and without internal heat generation and transient heat conduction.
		CO3 - Analyze the heat transfer rate in natural and forced convection and Evaluate through experimentation investigation.
		CO4 - Interpret heat transfer by radiation between objects with simple geometries.
		CO5 - Analyze the heat transfer equipment and investigate the Performance.
		CO6 - Analyze the heat exchanger and design heat exchanger based on practical consideration
302043	Theory of Machines-II	CO1 - Student will be able to Understand fundamentals of gear theory which will be the prerequisite for gear design.
		CO2 - Student will be able to Perform force analysis of Spur, Helical, Bevel, Worm and Worm gear.
		CO3 - The student will be able to Analyze speed and torque in epi-cyclic gear trains which will be the prerequisite for gear box design.
		CO4 - Student will be able to design cam profile for given follower motions and Understand cam Jump phenomenon, advance cam curves.
		CO5 - The student will Synthesize a four bar mechanism with analytical and graphical methods.
		CO6 - The student will Analyze the gyroscopic couple or effect for stabilization of Ship Aero plane and Four wheeler vehicles.
302044	Turbo Machines	CO1 - Apply thermodynamics and kinematics principles to turbo machines.
		CO2 - Analyze the Performance of turbo machines.
		CO3 - Ability to Select turbo machine for given application.
		CO4 - Predict Performance of turbo machine using model analysis.
		CO5 - Understand mechanisms behind working of Turbines.
		CO6 - Apply knowledge of Turbo machines to optimize the efficiencies of turbines.



302045	Metrology and Quality Control	CO1 - Understand the methods of measurement and Selection of measuring instruments ,standards of measurement
		CO2 - Identify and Apply various measuring instruments
		CO3 - Explain tolerance, limits of size, fits, geometric and position tolerances and gauge design
		CO4 - Recommend the Quality Control Techniques and Statistical Tools appropriately
		CO5 - Analyze the Data collected
		CO6 - Develop an ability of problem solving and decision making by Identifying and analyzing the caUse for variation and recommend suitable corrective actions for quality improvement
Course Outcomes (COs) SEM-II		
TE (Mechanical Engineering) -2015 Pattern		
Course Code	Name of Subject/ Course	Course Outcome (COs)
302047	Numerical Methods and Optimization	CO1- Use appropriate Numerical Methods to Solve complex mechanical engineering problems.
		CO2 - Formulate algorithms and programming.
		CO3 - Use Mathematical Solver.
		CO4 - Generate Solutions for real life problem using optimization techniques
		CO5 - Analyze the research problem
		CO6 - To Develop logical skills
302048	Design of Machine Elements-II	CO1 - To Understand and Apply principles of gear design to spur gears and industrial spur gear boxes.
		CO2 - To become proficient in Design of Helical and Bevel Gear
		CO3 - To Develop capability to Analyze Rolling contact bearing and its Selection from manufacturer's Catalogue.
		CO4 - To learn a skill to design worm gear box for various industrial applications.
		CO5 - To inculcate an ability to design belt drives and Selection of belt, rope and chain drives
		CO6 - To achieve an expertise in design of Sliding contact bearing in industrial applications.
302049	Refrigeration and Air Conditioning	CO1 - Illustrate the fundamental principles and applications of refrigeration and air conditioning system
		CO2 - Obtain cooling capacity and coefficient of Performance by conducting test on vapour compression refrigeration systems
		CO3 - Present the properties, applications and environmental issues of different refrigerants
		CO4 - Calculate cooling load for air conditioning systems Used for various
		CO5 - Operate and Analyze the refrigeration and air conditioning systems.
302050	Mechatronics	CO1 - Identification of key elements of mechatronics system and its representation in terms of block diagram
		CO2 - Understanding the concept of signal processing and Use of interfacing systems such as ADC, DAC, digital I/O
		CO3 - Interfacing of Sensors, Actuators using appropriate DAQ micro-controller
		CO4 - Time and Frequency domain analysis of system model (for control application)
		CO5 - PID control implementation on real time systems
		CO6 - Development of PLC ladder programming and implementation of real life system.
302051	Manufacturing - Process-II	CO1 - Student should be able to Apply the knowledge of various manufacturing processes
		CO2 - Student should be able to Identify various process parameters and their effect on processes.
		CO3 - Student should be able to design and Analyze various manufacturing processes and tooling.
		CO4 - Student should be able to figure out application of modernization in machining.
		CO5 - Students should get the knowledge of Jigs and Fixtures so as to utilize machine capability for variety of operations.
		CO6 - Students should be able to Understand the CNC technology and should be able to Prepare CNC program
302052	MACHINE SHOP - II	CO1 - Ability to Develop knowledge about the working and programming techniques for various machines and tools
302053	Seminar	CO1 - Establish motivation for any topic of interest and Develop a thought process for technical presentation.
		CO2 - Organize a detailed literature survey and build a document with respect to technical publications.
		CO3 - Analysis and comprehension of proof-of-concept and related data.
		CO4 - Effective presentation and.improve soft skills.
		CO5 - Make Use of new and recent technology (e.g. Latex) for creating technical reports



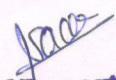
Course Outcomes (COs) SEM-I
BE (Mechanical Engineering) -2015 Pattern

Course Code	Name of Subject/ Course	Course Outcome (COs)
402041	Hydraulics and Pneumatics	CO1 -Understand working principle of components Used in hydraulic & pneumatic systems
		CO2 - Identify various applications of hydraulic & pneumatic systems
		CO3 - Selection of appropriate components required for hydraulic and pneumatic systems
		CO4 -Analyse hydraulic and pneumatic systems for industrial/mobile applications
		CO5 - Design a system according to the requirements
		CO6- Develop and Apply knowledge to various applications
402042	CAD CAM Automation	CO1 - Apply homogeneous transformation matrix for geometrical transformations of 2D CAD entities for basic geometric transformations.
		CO2 - Use analytical and synthetic curves and surfaces in part modeling
		CO3 - Do real times analysis of simple mechanical elements like beams, trusses, etc. and comment on safety of engineering components using analysis software
		CO4 -Generate CNC program for Turning / Milling and generate tool path using CAM software
		CO5 - Demonstrate Understanding of various rapid manufacturing techniques and Develop competency in designing and Developing products using rapid manufacturing technology
		CO6 -Understand the robot systems and their applications in manufacturing industries.
402043	Dynamics of Machinery	CO1 - Apply balancing technique for static and dynamic balancing of multi cylinder inline and radial engines
		CO2 - Estimate natural frequency for single DOF undamped & damped free vibratory systems
		CO3 -Determine response to forced vibrations due to harmonic excitation, base excitation and excitation due to unbalance forces.
		CO4- Estimate natural frequencies, mode shapes for 2 DOF undamped free longitudinal and torsional vibratory systems.
		CO5 -Describe vibration measuring instruments for industrial / real life applications along with suitable method for vibration control.
		CO6- Explain noise, its measurement & noise reduction techniques for industry and day today life problems.
402044 A	Elective-I Finite Element Analysis	CO1 - Understand the different techniques Used to Solve mechanical engineering problems.
		CO2 - Derive and Use 1-D and 2-D element stiffness matrices and load vectors from various methods to Solve for displacements and stresses.
		CO3 - Apply mechanics of materials and machine design topics to provide preliminary results Used for testing the reasonableness of finite element results.
		CO4 - Explain the inner workings of a finite element code for linear stress, displacement, temperature and modal analysis.
		CO5 - Use commercial finite element analysis software to Solve complex problems in solid mechanics and heat transfer.
		CO6 - Interpret the results of finite element Analyses and Make an assessment of the results in terms of modeling (physics assumptions) errors, discretization
		(mesh density and refinement toward convergence) errors, and numerical (round-off) errors.
402044 C	Elective-I Heating Ventilation and Air Conditioning	CO1 - Determine the Performance parameters of trans-critical & ejector refrigeration systems
		CO2 - Estimate thermal Performance of compressor, evaporator, condenser and cooling tower
		CO3 - Describe refrigerant piping design, capacity & safety controls and balancing of vapour compressor system.
		CO4 - Explain importance of indoor and outdoor design conditions, IAQ, ventilation and air distribution system.
		CO5 - Estimate heat transmission through building walls using CLTD and decrement factor &time lag methods with energy-efficient and cost-effective measures for building envelope
		CO6 -Explain working of types of desiccant, evaporative, thermal storage, radiant cooling, clean room and heat pump air-conditioning systems.



402045 A	Elective-II Automobile Engineering	CO1 - To Compare and Select the proper automotive system for the vehicle.
		CO2 - To Analyse the Performance of the vehicle.
		CO3 - To diagnose the faults of automobile vehicles.
		CO4 - To Apply the knowledge of EVs, HEVs and solar vehicles.
Course Outcomes (COs) SEM-II		
BE (Mechanical Engineering) -2015 Pattern		
402047	Energy Engineering	CO1-Describe the power generation scenario, the layout components of thermal power plant and Analyze the improved Rankin cycle, Cogeneration cycle
		CO2 - Analyze the steam condensers, recognize the an environmental impacts of thermal power plant and method to control the same
		CO3 -Recognize the layout, component details of hydroelectric power plant and nuclear power plant
		CO4 -Realize the details of diesel power plant, gas power plant and Analyze gas turbine power cycle
		CO5 -Emphasize the fundamentals of non-conventional power plants
		CO6 -Describe the different power plant electrical instruments and basic principles of economics of power generation.
402048	Mechanical System Design	CO1-Understand the difference between component level design and system level design.
		CO2 - Design various mechanical systems like pressure vessels, machine tool gear boxes, material handling systems, etc. for the specifications stated/formulated.
		CO3 -Learn optimum design principles and Apply it to mechanical components.
		CO4 -Handle system level projects from concept to product.
402049 B	Elective-III Industrial Engineering	CO1-Apply the Industrial Engineering concept
		CO2 - Understand, Analyze and implement different concepts involved in method study.
		CO3 -Design and Develop different aspects of work system and facilities.
		CO4 -Understand and Apply Industrial safety standards, financial management practices.
		CO5 - Undertake project work based on modeling & simulation area.
402050 A	Elective-IV Advanced Manufacturing Processes	CO1- Classify and Analyze special forming processes
		CO2 -Analyze and Identify applicability of advanced joining processes
		CO3 - Understand and Analyze the basic mechanisms of hybrid non-conventional machining techniques
		CO4 -Select appropriate micro and nano fabrication techniques for engineering applications
		CO5 -Understand and Apply various additive manufacturing technology for product Development
		CO6 - Understand material characterization techniques to Analyze effects of chemical composition, composition variation, crystal structure, etc.




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Department of Computer Engineering
Course Outcomes (COs) SEM-I
SE (Computer Engineering) -2019 Pattern

Course Code	Name of Subject/ Course	Course Outcome (COs)
210241	Discrete Mathematics	Formulate problems precisely, solve the problems, apply formal proof techniques, and explain the reasoning clearly
		Apply appropriate mathematical concepts and skills to solve problems in both familiar and unfamiliar situations including those in real-life contexts.
		Design and analyze real world engineering problems by applying set theory, propositional logic and to construct proofs using mathematical induction.
		Specify, manipulate and apply equivalence relations; construct and use functions and apply these concepts to solve new problems.
		Calculate numbers of possible outcomes using permutations and combinations; to model and analyze computational processes using combinatorics.
		Model and solve computing problem using tree and graph and solve problems using appropriate algorithms.
210242	Fundamentals of Data Structures	Analyze the properties of binary operations, apply abstract algebra in coding theory and evaluate the algebraic structures.
		Design the algorithms to solve the programming problems, identify appropriate algorithmic strategy for specific application, and analyze the time and space complexity
		Discriminate the usage of various structures, Design/Program/Implement the appropriate data structures; use them in implementations of abstract data types and Identify the appropriate data structure in approaching the problem solution.
		Demonstrate use of sequential data structures-Array and Linked lists to store and process data
		Understand the computational efficiency of the principal algorithms for searching and sorting and choose the most efficient one for the application.
		Compare and contrast different implementations of data structures (dynamic and static).
210243	Object Oriented Programming	Understand, Implement and apply principles of data structures-stack and queue to solve computational problems.
		Apply constructs-sequence, selection and iteration; classes and objects, inheritance, use of predefined classes from libraries while developing software.
		Design object-oriented solutions for small systems involving multiple objects.
		Use virtual and pure virtual function and complex programming situations.
		Apply object-oriented software principles in problem solving
210244	Computer Graphics	Analyze the strengths of object-oriented programming.
		Develop the application using object oriented programming language(C++)
		Identify the basic terminologies of Computer Graphics and interpret the mathematical foundation of the concepts of computer graphics.
		Apply mathematics to develop Computer programs for elementary graphic operations
		Illustrate the concepts of windowing and clipping and apply various algorithms to fill and clip polygons
		Understand and apply the core concepts of computer graphics, including transformation in two and three dimensions, viewing and projection.
210245	Digital Electronics and Logic Design	Understand the concepts of color models, lighting, shading models and hidden surface elimination
		Create effective programs using concepts of curves, fractals, animation and gaming
		Simplify Boolean Expressions using K Map.
		Design and implement combinational circuits.
		Design and implement sequential circuits
		Develop simple real-world application using ASM and PLD
210246	Data Structures Laboratory	Differentiate and Choose appropriate logic families IC packages as per the given design specifications.
		Explain organization and architecture of computer system
		Use algorithms on various linear data structure using sequential organization to solve real life problems.
		Analyze problems to apply suitable searching and sorting algorithm to various applications
210247	Object Oriented Programming Lab	Analyze problems to use variants of linked list and solve various real life problems.
		Designing and implement data structures and algorithms for solving different kinds of problems.
		Understand and apply the concepts like inheritance, polymorphism, exception handling and generic structures for
		Analyze the concept of file and apply it while storing and retrieving the data from secondary storages
		Analyze and apply computer graphics algorithms for line-circle drawing, scan conversion and filling with the help of object oriented programming concepts.
		Understand the concept of windowing and clipping and apply various algorithms to fill and clip polygons.
		Apply logic to implement, curves, fractals, animation and gaming programs.



Course Outcomes (COs) SEM-II
SE (Computer Engineering) -2019 Pattern

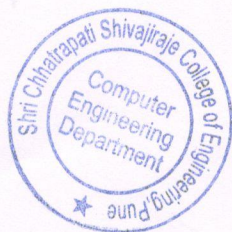
2107003	Engineering Mathematics III	Solve Linear differential equations, essential in modelling and design of computer-based systems
		Apply concept of Fourier transform and Z-transform and its applications to continuous and discrete systems and image processing.
		Apply Statistical methods like correlation and regression analysis and probability theory for data analysis and predictions in machine learning.
		Obtain Interpolating polynomials, numerical differentiation and integration, numerical solutions of ordinary differential equations used in modern scientific computing.
		Solve Algebraic and Transcendental equations and System of linear equations using numerical techniques.
210252	Data Structures	Identify and articulate the complexity goals and benefits of a good hashing scheme for real-world applications.
		Apply non-linear data structures for solving problems of various domain.
		Design and specify the operations of a nonlinear-based abstract data type and implement them in a high-level programming language.
		Analyze the algorithmic solutions for resource requirements and optimization
		Use appropriate modern tools to understand and analyze the functionalities confined to the secondary storage
210253	Software Engineering	Use efficient indexing methods and multiway search techniques to store and maintain data.
		Analyze software requirements and formulate design solution for a software.
		Design applicable solutions in one or more application domains using software engineering approaches that integrate ethical, social, legal and economic concerns
		Apply new software models, techniques and technologies to bring out innovative and novelistic solutions for the growth of the society in all aspects and evolving into their continuous professional development
		Model and design User interface and component-level
210254	Microprocessor	Identify and handle risk management and software configuration management
		Utilize knowledge of software testing approaches, approaches to verification and validation
		Construct software of high quality – software that is reliable, and that is reasonably easy to understand, modify and maintain efficient, reliable, robust and cost-effective software solutions
		Exhibit skill of assembly language programming for the application.
		Classify Processor architecture
210255	Principles of Programming Languages	Illustrate advanced features of 80386 Microprocessor.
		Compare and contrast different processor modes.
		Use interrupts mechanism in applications
		Differentiate between Microprocessors and Microcontrollers.
		Identify and analyze the tools and techniques used to design, implement, and debug microprocessor-based systems.
210256	Data Structures and Algorithms Laboratory	Make use of basic principles of programming languages.
		Develop a program with Data representation and Computations
		Develop programs using Object Oriented Programming language : Java.
		Develop application using inheritance, encapsulation, and polymorphism
		Demonstrate Multithreading for robust application development
210257	Microprocessor Laboratory	Develop a simple program using basic concepts of Functional and Logical programming paradigm.
		Understand the ADT/libraries, hash tables and dictionary to design algorithms for a specific problem.
		Choose most appropriate data structures and apply algorithms for graphical solutions of the problems.
		Apply and analyze non linear data structures to solve real world complex problems.
		Apply and analyze algorithm design techniques for indexing, sorting, multi-way searching, file organization and compression.
210258	Project Based Learning II	Analyze the efficiency of most appropriate data structure for creating efficient solutions for engineering design situations.
		Understand and apply various addressing modes and instruction set to implement assembly language programs
		Apply logic to implement code conversion
		Analyze and apply logic to demonstrate processor mode of operation
		Identify the real life problem from societal need point of view
210259	Code of Conduct	Choose and compare alternative approaches to select most feasible one
		Analyze and synthesize the identified problem from technological perspective
		Design the reliable and scalable solution to meet challenges
		Evaluate the solution based on the criteria specified
		Inculcate long life learning attitude towards the societal problems
210259	Code of Conduct	Understand the basic perception of profession, professional ethics, various moral and social issues, industrial standards, code of ethics and role of professional ethics in engineering field
		Aware of professional rights and responsibilities of an engineer, responsibilities of an engineer for safety and risk benefit analysis.
		Understand the impact of the professional Engineering solutions in societal and Environmental contexts, and demonstrate the knowledge of, and need for sustainable development
		Acquire knowledge about various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their professional lives.



210248	Digital Electronics Laboratory	Understand the working of digital electronic circuits Apply the knowledge to appropriate IC as per the design specifications Design and implement Sequential and Combinational digital circuits as per the specifications.
210249	Business Communication Skills	Effectively communicate through verbal/oral communication and improve the listening skills Write precise briefs or reports and technical documents Prepare for group discussion / meetings / interviews and presentations Explore goal/target setting, self-motivation and practicing creative thinking relationships, conflict management and leadership qualities
210250	Humanity and Social Science	Aware of the various issues concerning humans and society Aware about their responsibilities towards society. Sensitized about broader issues regarding the social, cultural, economic and human aspects, involved in social changes. Able to understand the nature of the individual and the relationship between self and the community. Able to understand major ideas, values, beliefs, and experiences that have shaped human history and cultures
210251	Audit Course 2	Comprehend the importance of ecosystem and biodiversity Identify different types of environmental pollution and control measures To correlate the exploitation and utilization of conventional and non-conventional resources

Course Outcomes (COs) SEM-I
TE (Computer Engineering) -2015 Pattern

Course Code	Name of Subject/ Course	Course Outcome (COs)
310241	Theory of Computation	design deterministic Turing machine for all inputs and all outputs subdivide problem space based on input subdivision using constraints apply linguistic theory
310242	Database Management Systems	Design E-R Model for given requirements and convert the same into database tables Use database techniques such as SQL & PL/SQL Use modern database techniques such as NOSQL Describe different database architecture and analyses the use of appropriate architecture in real time environment Explain transaction Management in relational database System
310243	Software Engineering and Project Management	Decide on a process model for a developing a software project Classify software applications and Identify unique features of various domains Design test cases of a software system Understand basics of IT Project management Apply quality attributes in software development life cycle Plan, schedule and execute a project considering the risk management
310244	Information Systems and Engineering Economics	Understand the need, usage and importance of an Information System to an organization. Understand the activities that are undertaken while managing, designing, planning, implementation, and deployment of computerized information system in an organization. Further the student would be aware of various Information System solutions like ERP, CRM, Data warehouses and the issues in successful implementation of these technology solutions in any organizations Outline the past history, present position and expected performance of a company engaged in engineering practice or in the computer industry. Perform and evaluate present worth, future worth and annual worth analyses on one of more economic alternatives Be able to carry out and evaluate benefit/cost, life cycle and breakeven analyses on one or more economic alternatives.
310245	Computer Networks	Analyze the requirements for a given organizational structure to select the most appropriate networking architecture, topologies, transmission mediums, and technologies Demonstrate design issues, flow control and error control Analyze data flow between TCP/IP model using Application, Transport and Network Layer Protocols. Illustrate applications of Computer Network capabilities, selection and usage for various sectors of user community Illustrate Client-Server architectures and prototypes by the means of correct standards and technology. Demonstrate different routing and switching algorithms
310246	Skill Development Lab	Evaluate problems and analyze data using current technologies in a wide variety of business and organizational contexts Create data-driven web applications Incorporate best practices for building applications Employ Integrated Development Environment (IDE) for implementing and testing of software solution Construct software solutions by evaluating alternate architectural patterns.
310247	Database Management System Lab	Develop the ability to handle databases of varying complexities Use advanced database Programming concepts
310248	Computer Networks Lab	Demonstrate LAN and WAN protocol behavior using Modern Tools Analyze data flow between peer to peer in an IP network using Application, Transport and Network Layer Protocols Demonstrate basic configuration of switches and routers Develop Client-Server architectures and prototypes by the means of correct standards and technology.



210260	Audit Course 4	Students understanding of philosophy and religion as well as daily life issues will be challenged and enhanced
		Enhances the immune system
		Intellectual and philosophical understanding of the theory of yoga and basic related Hindu scriptures will be developed
		Powers of concentration, focus, and awareness will be heightened

Course Outcomes (COs) SEM-II

TE (Computer Engineering) -2015 Pattern

Course Code	Name of Subject/ Course	Course Outcome (COs)
310250	Design and Analysis of Algorithms	Formulate the problem
		Analyze the asymptotic performance of algorithms
		Decide and apply algorithmic strategies to solve given problem
		Find optimal solution by applying various methods
310251	Systems Programming and Operating System	Analyze and synthesize system software
		Use tools like LEX & YACC.
		Implement operating system functions
310252	Embedded Systems and Internet of Things	Implement an architectural design for IoT for specified requirement
		Solve the given societal challenge using IoT
		Choose between available technologies and devices for stated IoT challenge
310253	Software Modeling and Design	Analyze the problem statement (SRS) and choose proper design technique for designing web-based/ desktop application
		Design and analyze an application using UML modeling as fundamental tool
		Apply design patterns to understand reusability in OO design
		Decide and apply appropriate modern tool for designing and modeling
		Decide and apply appropriate modern testing tool for testing web-based/desktop application
310254	Web Technology	analyze given assignment to select sustainable web development and design methodology
		develop web based application using suitable client side and server side web technologies
		develop solution to complex problems using appropriate method, technologies, frameworks, web services and content
310255	Seminar and Technical Communication	be able to be familiar with basic technical writing concepts and terms, such as audience analysis, jargon, format, visuals, and
		be able to improve skills to read, understand, and interpret material on technology
		improve communication and writing skills
310256	Web Technology Lab	develop web based application using suitable client side and server side web technologies
		develop solution to complex problems using appropriate method, technologies, frameworks, web services and content management
310257	System Programming & Operating System Lab	Understand the internals of language translators
		Handle tools like LEX & YACC
		Understand the Operating System internals and functionalities with implementation point of view
310258	Embedded Systems & Internet of Things Lab	Design the minimum system for sensor based application
		Solve the problems related to the primitive needs using IoT
		Develop full fledged IoT application for distributed environment
310259	Audit Course 4	Understand the concept of green IT and relate it to sustainable development.
		Apply the green computing practices to save energy
		Discuss how the choice of hardware and software can facilitate a more sustainable operation
		Use methods and tools to measure energy consumption

Course Outcomes (COs) SEM-II

BE (Computer Engineering) -2015 Pattern

Course Code	Name of Subject/ Course	Course Outcome (COs)
410250	Machine Learning	Distinguish different learning based applications
		Apply different preprocessing methods to prepare training data set for machine learning
		Design and implement supervised and unsupervised machine learning algorithm
		Implement different learning models
		Learn Meta classifiers and deep learning concepts
410251	Information and Cyber Security	Gauge the security protections and limitations provided by today's technology
		Identify information security and cyber security threats
		Analyze threats in order to protect or defend it in cyberspace from cyber-attacks
		Build appropriate security solutions against cyber-attacks
410252 ©	Elective III Embedded and Real Time Operating System	Recognize and classify embedded and real-time systems
		Explain communication bus protocols used for embedded and real-time systems
		Classify and exemplify scheduling algorithms
		Apply software development process to a given RTOS application
		Design a given RTOS based application
410253©	Cloud Computing	To install cloud computing environments
		To develop any one type of cloud



310249	Audit Course 3	Compare the interrelationships among security roles and responsibilities in a modern information-driven enterprise—to include interrelationships across security domains
		Assess the role of strategy and policy in determining the success of information security
		Estimate the possible consequences of misaligning enterprise strategy, security policy, and security plans

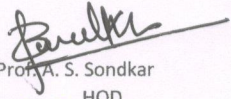
Course Outcomes (COs) SEM-I

BE (Computer Engineering) -2015 Pattern

Course Code	Name of Subject/ Course	Course Outcome (COs)
410241	High Performance Computing	Describe different parallel architectures, inter-connect networks, programming models
		Develop an efficient parallel algorithm to solve given problem
		Analyze and measure performance of modern parallel computing systems
		Build the logic to parallelize the programming task
410242	Artificial Intelligence and Robotics	Identify and apply suitable Intelligent agents for various AI applications
		Design smart system using different informed search / uninformed search or heuristic approaches
		Identify knowledge associated and represent it by ontological engineering to plan a strategy to solve given problem.
410243	Data Analytics	Apply the suitable algorithms to solve AI problems
		Write case studies in Business Analytic and Intelligence using mathematical models
		Present a survey on applications for Business Analytic and Intelligence
410244(D)	Data Mining and Warehousing	Provide problem solutions for multi-core or distributed, concurrent/Parallel environments
		Apply basic, intermediate and advanced techniques to mine the data
		Analyze the output generated by the process of data mining
		Explore the hidden patterns in the data
410245(B)	Software Testing and Quality Assurance	Optimize the mining process by choosing best data mining technique
		Describe fundamental concepts in software testing such as manual testing, automation testing and software quality assurance
		Design and develop project test plan, design test cases, test data, and conduct test operations
		Apply recent automation tool for various software testing for testing software
410246	Laboratory Practice I	Apply different approaches of quality management, assurance, and quality standard to software system
		Apply and analyze effectiveness Software Quality Tools
		Practical hands on is the absolute necessity as far as employability of the learner is concerned
410247	Laboratory Practice II	The presented course is solely intended to enhance the competency by undertaking the laboratory assignments of the core courses
		Practical hands on is the absolute necessity as far as employability of the learner is concerned
		The presented course is solely intended to enhance the competency by undertaking the laboratory assignments of the core courses
410248	Project Work Stage I	Enough choice is provided to the learner to choose an elective of one's interest.
		Solve real life problems by applying knowledge
		Analyze alternative approaches, apply and use most appropriate one for feasible solution
		Write precise reports and technical documents in a nutshell
410249	Audit Course 5	Participate effectively in multi-disciplinary and heterogeneous teams exhibiting team work, Inter-personal relationships, conflict management and leadership quality
		Understand the legalities in product development
		Undertake the process of IPR, Trademarks, Copyright and patenting
		Understand and apply functional plans
		Manage Entrepreneurial Finance



		To explore future trends of cloud computing
410254	Laboratory Practice III	Practical hands on is the absolute necessity as far as employability of the learner is concerned The presented course is solely intended to enhance the competency by undertaking the laboratory assignments of the core courses
410255	Laboratory Practice IV	Practical hands on is the absolute necessity as far as employability of the learner is concerned. The presented course is solely intended to enhance the competency by undertaking the laboratory assignments of the elective courses
410256	Project Work Stage II	Show evidence of independent investigation Critically analyze the results and their interpretation Report and present the original results in an orderly way and placing the open questions in the right perspective Link techniques and results from literature as well as actual research and future research lines with the research Appreciate practical implications and constraints of the specialist subject
410257	Audit Course 6	Apply the concepts of Business Intelligence in real world applications Explore and use the data warehousing wherever necessary Design and manage practical BI systems


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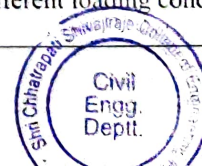
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Department of Civil Engineering

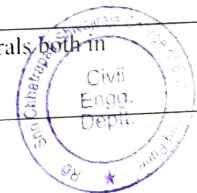
Course Outcomes (COs) SEM-I

SE (Civil Engineering) -2019 Pattern

Course Code	Name of Subject/ Course	Course Outcome (COs)
201001	Building Technology & Materials	CO1 - Identify types of building and basic requirements of building components.
		CO2 -Make use of Architectural Principles and Building byelaws for building construction.
		CO3 - Plan effectively various types of Residential Building forms according to their utility,functions with reference to National Building Code.
		CO4 - Plan effectively various types of Public Buildings according to their utility functions with reference to National Building Code.
		CO5 - Make use of Principles of Planning in Town Planning, Different Villages and Safety aspects
		CO6 - Understand different services and safety aspects
		CO1 - Understand concept of stress-strain and determine different types of stress, strain in determinate, indeterminate homogeneous and composite structures.
		CO2 - Calculate shear force and bending moment in determinate beams for different loading conditions and illustrate shear force and bending moment diagram.



201002	Mechanics Of Structure	<p>CO3 - Explain the concept of shear and bending stresses in beams and demonstrate shear and bending stress distribution diagram.</p> <p>CO4 -Use theory of torsion to determine the stresses in circular shaft and understand concept of Principal stresses and strains.</p> <p>CO5 - Analyze axially loaded and eccentrically loaded column.</p> <p>CO6 - Determine the slopes and deflection of determinate beams and trusses.</p>
201003	Fluid Mechanics	<p>CO1 -Understand the use of Fluid Properties, concept of Fluid statics, basic equation of Hydrostatics, measurement of fluid pressure, buoyancy & floatation and its application for solving practical problems.</p> <p>CO2 - Understand the concept of fluid kinematics with reference to Continuity equation and fluid dynamics with reference to Modified Bernoulli's equation and its application to practical problems of fluid flow</p> <p>CO3 - Understand the concept of Dimensional analysis using Buckingham's π theorem, Similarity & Model Laws and boundary layer theory and apply it for solving practical problems of fluid flow.</p> <p>CO4 -Understand the concept of laminar and turbulent flow and flow through pipes and its application to determine major and minor losses and analyze pipe network using Hardy Cross method.</p> <p>CO5 - Understand the concept of open channel flow, uniform flow and depth-Energy relationships in open channel flow and make the use of Chezy's and Manning's formulae for uniform flow computation and design of most economical channel section</p> <p>CO6 - Understand the concept of gradually varied flow in open channel and fluid flow around submerged objects, compute GVF profile and calculate drag and lift force on fully submerged body.</p>
207001	Engg Mathematics-III	<p>CO1 - Solve Higher order linear differential equations and its applications to modelling and analysing Civil engineering problems such as bending of beams, whirling of shafts and mass spring systems</p> <p>CO2 - Solve System of linear equations using direct & iterative numerical techniques and develop solutions for ordinary differential equations using single step & multistep methods applied to hydraulics, geotechnics and structural systems.</p> <p>CO3 - Apply Statistical methods like correlation, regression and probability theory in data analysis and predictions in civil engineering.</p> <p>CO4 - Perform Vector differentiation & integration, analyze the vector fields and apply to fluid flow problems.</p> <p>CO5 -Solve Partial differential equations such as wave equation, one and two dimensional heat flow equations.</p>
		<p>CO1 - Explain about the basic concepts of engineering geology, various rocks, and minerals both in lab and on the fields and their inherent characteristics and their uses in civil engineering constructions.</p>



207009	Engineering Geology	CO2 - Exploring the importance of mass wasting processes and various tectonic processes that hampers the design of civil engineering projects and its implications on environment and sustainability.
		CO3 - Recognize effect of plate tectonics, structural geology and their significance and utility in civil engineering activities.
		CO4 - Incorporate the various methods of survey, to evaluate and interpret geological nature of the rocks present at the foundations of the dams, percolation tanks, tunnels and to infer site / alignment/ level free from geological defects.
		CO5 - Assess the Importance of geological nature of the site, precautions and treatments to improve the site conditions for dams, reservoirs, and tunnels.
		CO6 - Explain geological hazards and importance of ground water and uses of common building stones.

Course Outcomes (COs) SEM-II

SE (Civil Engineering) -2019 Pattern

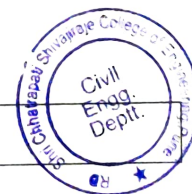
201008	Geotechnical Engineering	CO1 - Identify and classify the soil based on the index properties and its formation process
		CO2 - Explain permeability and seepage analysis of soil by construction of flow net.
		CO3 - Illustrate the effect of compaction on soil and understand the basics of stress distribution.
		CO4 - Express shear strength of soil and its measurement under various drainage conditions
		CO5 - Evaluate the earth pressure due to backfill on retaining structures by using different theories.
		CO6 - Analysis of stability of slopes for different types of soils.
201009	Survey	CO1 - Define and Explain basics of plane surveying and differentiate the instruments used for it.
		CO2 - Express proficiency in handling surveying equipment and analyse the surveying data from these equipment
		CO3 - Describe different methods of surveying and find relative positions of points on the surface of earth
		CO4 - Execute curve setting for civil engineering projects such as roads, railways etc.
		CO5 - Articulate advancements in surveying such as space based positioning systems
		CO6 - Differentiate map and aerial photographs, also interpret aerial photographs.
201010	Concrete	CO1 - Able to select the various ingredients of concrete and its suitable proportion to achieved desired strength.
		CO2 - Able to check the properties of concrete in fresh and hardened state.
		CO3 - Get acquainted to concreting equipments, techniques and different types of special concrete.



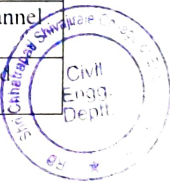
201010	Technology	CO4 - Able to predict deteriorations in concrete and get acquainted to various repairing methods and techniques. CO5 - Design Concrete mix desired grade CO6 - Predict deteriorations in concrete and repair it with appropriate methods and techniques.
201011	Structural Analysis	CO1 - Understand the basic concept of static and kinematic indeterminacy and analysis of indeterminate beams. CO2 - Analyze redundant trusses and able to perform approximate analysis of multi-story multi-bay frames. CO3 - Implement application of the slope deflection method to beams and portal frames. CO4 - Analyze beams and portal frames using moment distribution method. CO5 - Determine response of beams and portal frames using structure approach of stiffness matrix method. CO6 -.Apply the concepts of plastic analysis in the analysis of steel structures
201012	Project management	CO1 - Describe project life cycle and the domains of Project Management CO2 -Explain networking methods and their applications in planning and management CO3 - Categorize the materials as per their annual usage and also Calculate production rate of construction equipment CO4 -Demonstrates resource allocation techniques and apply it for manpower planning. CO5 - Understand economical terms and different laws associated with project management CO6 - Apply the methods of project selection and recommend the best economical project.
201017	Project Based Learning	CO1 - To engage students in constructive learning environment and develop self-learning abilities. CO2 - To develop critical thinking and solving civil engineering problems by exploring and proposing sustainable solutions CO3 - To integrate knowledge and skills from civil and other engineering areas. CO4 - To develop professional skills and project management. Course Outcomes:

**Course Outcomes (COs) SEM-I
TE (Civil Engineering) -2015 Pattern**

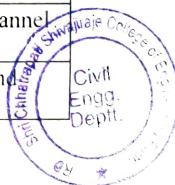
Course Code	Name of Subject/ Course	Course Outcome (COs)
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301001	Hydrology & Water Resources Engineering	<p>CO1 - Measure as well as analyze precipitation, evaporation, discharge etc. with the use of different methods and/or equipments.</p> <p>CO2 - Explain the methods of irrigation and assess the canal revenue.</p> <p>CO3 - Describe the ground water hydrology and study of different types of well.</p> <p>CO4 - Analyze the flood frequency and runoff hydrograph.</p> <p>CO5 - Characterize the various terms related to reservoir planning.</p> <p>CO6 - Explain the participatory irrigation management and process of water logging.</p>
301002	Infrastructure Engineering & Construction Techniques	<p>CO1 - To understand the meaning and importance of Infrastructure Engineering</p> <p>CO2 - To study railway systems and its construction techniques</p> <p>CO3 - To study tunnels and docks and harbours along with their importance</p> <p>CO4 - To study different construction equipments</p> <p>CO5 - To study different construction Techniques</p> <p>CO6 - To study geometric design of Railway track</p>
301003	Structural Design-I	<p>CO1 - Students come up with the basic of design philosophy and its application for design of different structures.</p> <p>CO2 - Students are capable to use steel table, different IS codes etc.</p> <p>CO3 - Students are able to design different steel structural elements on their own.</p> <p>CO4 - Students are well prepared to execute the design structural component through project works.</p> <p>CO5 - Students are get aware the importance of steel structures through site visits.</p> <p>CO6 - Makes the students capable so that they always should have alternative option for the site situation.</p>
301004	Structural Analysis-II	<p>CO1 - Ability to idealized & analyze statically determinate and indeterminate structures by slope-deflection method</p> <p>CO2 - Ability to analysis of indeterminate beams and frames without and with sway by using moment distribution method.</p> <p>CO3 - Evaluate statically indeterminate structures using flexibility method</p> <p>CO4 - Analyze statically indeterminate structures using stiffness method</p> <p>CO5 - Analyze 2D frame structures for horizontal and vertical loads by approximate methods such as cantilever, portal and substitute frame methods</p> <p>CO6 - An ability to identify and solve engineering problem using finite element method</p>
301005	Fluid Mechanics-II	<p>CO1 - Understand and describe the basic fundamentals of fluid flow around submerged objects, open channel flow, hydraulic machinery, hydropower generation and gradually varied flow.</p> <p>CO2 - Apply the knowledge of basics for designing the objects submerged in fluid flow, open channel and hydraulic machinery in field.</p>



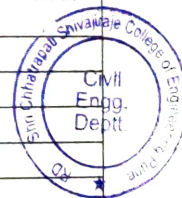
301001	Hydrology & Water Resources Engineering	CO1 - Measure as well as analyze precipitation, evaporation, discharge etc. with the use of different methods and/or equipments.
		CO2 - Explain the methods of irrigation and assess the canal revenue.
		CO3 - Describe the ground water hydrology and study of different types of well.
		CO4 - Analyze the flood frequency and runoff hydrograph.
		CO5 - Characterize the various terms related to reservoir planning.
		CO6 - Explain the participatory irrigation management and process of water logging.
301002	Infrastructure Engineering & Construction Techniques	CO1 - To understand the meaning and importance of Infrastructure Engineering
		CO2 - To study railway systems and its construction techniques
		CO3 - To study tunnels and docks and harbours along with their importance
		CO4 - To study different construction equipments
		CO5 - To study different construction Techniques
		CO6 - To study geometric design of Railway track
301003	Structural Design-I	CO1 - Students come up with the basic of design philosophy and its application for design of different structures.
		CO2 - Students are capable to use steel table, different IS codes etc.
		CO3 - Students are able to design different steel structural elements on its own.
		CO4 - Students are well prepared to execute the design structural component through project works.
		CO5 - Students are get aware the importance of steel structures through site visits.
		CO6 - Makes the students capable so that they always should have alternative option for the site situation.
301004	Structural Analysis-II	CO1 - Ability to idealized & analyze statically determinate and indeterminate structures by slope-deflection method
		CO2 - Ability to analysis of indeterminate beams and frames without and with sway by using moment distribution method.
		CO3 - Evaluate statically indeterminate structures using flexibility method
		CO4 - Analyze statically indeterminate structures using stiffness method
		CO5 - Analyze 2D frame structures for horizontal and vertical loads by approximate methods such as cantilever, portal and substitute frame methods
		CO6 - An ability to identify and solve engineering problem using finite element method
301005	Fluid Mechanics-II	CO1 - Understand and describe the basic fundamentals of fluid flow around submerged objects, open channel flow, hydraulic machinery, hydropower generation and gradually varied flow.
		CO2 - Apply the knowledge of basics for designing the objects submerged in fluid flow, open channel and hydraulic machinery in field.



		CO3 -Conduct the experiments in the laboratory to verify the designs and derive the equations.
		CO4 -Evaluate and inspect the execution, performance and functioning of the open channel and hydraulic machinery.
301006	Employability Skills Development	CO1 - Ability to understand need of technical competence required for problem solving.
		CO2 - Ability to understand professional and group behavioural ethics.
		CO3 - Ability to understand employers requirements.
		CO4- Ability to Understand the importance of teamwork and group discussions skills.
		CO5- Ability to Develop time management

Course Outcomes (COs) SEM-II
TE (Civil Engineering) -2015 Pattern

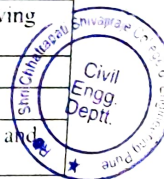
301007	Advance Surveying	CO1 - Understand geodetic and triangulation surveying and apply SBPS in solving engineering problems
		CO2 -Know objects, applications of Hydrographic Surveying.
		CO3 - Plan and execute triangulation survey, Know the triangulation adjustments, Identify and correct errors in field measurements
		CO4 - Make measurements on RS images and aerial photographs using photogrammetric concepts
		CO5 - Know trigonometric leveling and setting out construction works.
301008	Project Management and Engineering Economics	CO1 - Able to explain the importance, objective, and functions of project management.
		CO2 - Able to analyze the network for planning and scheduling of project
		CO3 - Able to apply project monitoring, resource allocation as well as basic knowledge of project management software for controlling of project.
		CO4 - Able to apply a basic project economics in construction industry.
		CO5 - Able to apply different methods of analysis for project resource management and safety norms to the construction project
		CO6 - Able to evaluate conditions for project appraisal and preparation of project feasibility report as well as detailed project report.
301009	Foundation Engineering	CO1 - Understand soil exploration methods.
		CO2 - Analyze shallow foundations and bearing capacity.
		CO3 - Compute and analyze the consolidation settlements.
		CO4 - Analyze deep foundations.
		CO5 - Analyze cofferdams, foundations andn expansive soils.
		CO6 - Study of Earthquake and soil reinforcements.
		CO1 - Students come up with the basics of design philosophy and is application for design of various RCC member.



301010	Structural Design-II	CO2 - Students are capable to use different IS codes such as IS 456-2000, IS 13920 & SP 34.
		CO3 - Students are able to design different RCC structural elements on its own.
		CO4 - Students are well prepared to execute the design RCC members through project works.
		CO5 - Students are get aware about design & construction of RCC structures/members through site visits.
		CO6 - Makes the students capable so that they always shuld have alternative option for the site situation.
301011	Environmental Engineering-I	CO1 - Ability to analyze air, noise pollution and its remedies of control.
		CO2 - Ability to describe Water Supply Scheme and Population Forecasting.
		CO3 - Ability to understand Physical Treatments of potable water.
		CO4 - Ability to understand Chemical treatments on water to purify.
		CO5 - Ability to explain improvement of water quality by advanced treatment.
		CO6 - Ability to get knowledge of design of water treatment plant, water distribution and rainwater Harvesting.
301012	Seminar	CO1 - Analysis and comprehension of proof-of-concept and related data.
		CO2 - Establish motivation for any topic of interest and develop a thought process for technical presentation.
		CO3 - Organize a detailed literature survey and build a document with respect to technical publications.
		CO4 - Make use of new and recent technology for creating technical reports
		CO5 - Effective presentation and improve soft skills.

**Course Outcomes (COs) SEM-I
BE (Civil Engineering) -2015 Pattern**

Course Code	Name of Subject/ Course	Course Outcome (COs)
401001	Environmental Engineering-II	CO1 - To know and comprehend concepts of waste water quility and standards, propogation & wastewater collection system
		CO2 -To determine the methods for design of sewerage system components
		CO3 - To know about characteristics of solid waste and problems associated with solid waste disposal.
		CO4 - To know about various methods of solid waste treatment
		CO5 - To understand the sources and characteristics, Effects of Discharges of Industrial Waste on receiving bodies of water.
		CO6 - To understand the methods of treatment of Industrial Wastewater.
		CO1 - Classify the roads, design the alignments and study of 20 year road development plans.
		CO2 - Design the road geometry such as cross section elements, SSD, OSD, Horizontal, Vertical curves and intersections.



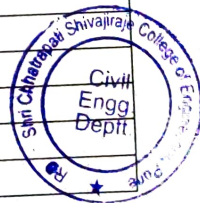
401002	Transportation Engineering	CO3 - Understand various traffic characteristics & analysis and use the data for road design CO4 - Explain the properties of soil, aggregates and bitumen for road construction and design of Flexible and Rigid pavement. CO5 - Explain the construction of roads, suggest the remedial measures for the road failure and design the drainages. CO6 - Explain the modern trends in Highway materials, constructions techniques & maintenance of roads.
401003	Structural Design and Drawing-III	CO1 - Understand prestressing method and Evaluate stress - loss calculation CO2 - Analyse and Design prestressing girder and prestressing slab. CO3 - Design of flat slab by using direct design method. CO4 - Design of different type of retaining wall for different surcharge condition. CO5 - Understand and design of resting on ground water tank by using working stress method. CO6 - Explain type of vibration and Identify various methods of earthquake analysis and design for frame type structure under lateral and vertical loading condition
401004	Architecture & Town Planning (ELE-I)	CO1 - Awareness of the role of an urban planner and architect in planning, designing and landscaping. CO2 - Able to identify significance of built environment, urban design, renewal for quality of life and livability. CO3 - Able to explain the importance of Sustainable development. CO4 - Able to define stages of town planning and development through study of planning of new towns. CO5 - Able to explain the importance of surveys and hierarchy of planning. CO6 - Aware of the acts related to the planning of a region and a town.
401005	TQM & MIS in Civil Engineering (ELE-II)	CO1 - To study the importance of quality in construction. CO2 - To study MIS and its application in construction. CO3 - To identify defects and its prevention and TQM philosophy of Six Sigma. CO4- Importance of Total Quality Management and ISO in construction. CO5 - To study applications of TQM and different philosophies like Kaizen, Benching and Supply chain management. CO6 - To study ERP system and its importance.
401006A	Project Phase -I	CO1 - Identify, formulate and solve problems related to civil engineering. CO2 - Work in a group as a part of multidisciplinary team with professional responsibility CO3 - Analysis and design of structure to meet desired needs within realistic constraints CO4 - Review literature and finalize problem statement. CO5 - Plan activity schedule and implementation in a given time span. CO6 - Prepare and present technical report.



CO7 - Apply modern design and analysis tools.

**Course Outcomes (COs) SEM-II
BE (Civil Engineering) -2015 Pattern**

401007	Dam and Hydraulics Structure	CO1 - Understand the various types of dams and select a particular type considering technical, economic, environmental, climatic, topographic and social factors
		CO2 - Understand the importance of dam safety and instrumentation required to assess the health of dam.
		CO3 - Understand the construction & maintenance of gravity dam, earth dam, arch dam, buttress dam and Carry out stability analysis of gravity dam, earth dam & weir.
		CO4 - Acquire knowledge about components, classification, significance and selection of spillway, energy dissipating devices, spillway gates, diversion head works, canal, canal structures, cross drainage works and River training structures
		CO5 - Design of Ogee spillway, weir on permeable foundation, lined canal, cross drainage works.
		CO6 - Acquire knowledge about components, classification and layout of hydropower plants.
401008	Quantity Surveying Contracts & Tenders	CO1 - Able to find out Estimates for given construction work.
		CO2 - Able to analyse the rate of materials of labours while estimating as per the given specification.
		CO3 - Able to apply basics of valuation to find out value of a property.
		CO4 - Able to Understand and apply the procedure of Tendering, Contract and Arbitration including work of statutory bodies like PWD etc.
401009	Hydro Power Engineering (ELE-III)	CO1 - Understand and discuss energy resources and energy systems available for production of electric power in India and world.
		CO2 - Explain the types of hydro power plants.
		CO3 - Explain the load assessment and estimation of hydro power potential.
		CO4 - Explain the planning of layout of hydro power plant.
		CO5 - Design of the penstocks and surge shaft.
		CO6 - Discuss the economic conditions, legal conditions and consequences of hydro power.
401010	Construction Management (ELE-IV)	CO1 - Understand the roles and responsibilities of a project manager
		CO2 - Prepare schedule of activities in a construction project.
		CO3 - Prepare tender and contract document for a construction project.
		CO4 - Understand safety practices in construction industry.
		CO5 - Identify the equipment used in construction.
		CO1 - Identify, formulate and solve problems related to civil engineering.
		CO2 - Work in a group as a part of multidisciplinary team with professional responsibility



401006B Project Phase -II

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|---|
| CO3 - Analysis and design of structure to meet desired needs within realistic constraints |
| CO4 - Review literature and finalize problem statement |
| CO5 - Plan activity schedule and implementation in a given time span. |
| CO6 - Prepare and present technical report. |
| CO7 - Apply modern design and analysis tools. |



HOD

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