



Sinhgad Institutes

SINHGAD TECHNICAL EDUCATION SOCIETY'S SINHGAD INSTITUTE OF TECHNOLOGY

(Affiliated to SPPU Pune and Approved by, AICTE, New Delhi.)
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Department of Engineering Sciences

Course Outcomes (COs)

FE 2019 Pattern Semester I			
SN	Course Code	Course Name	Course Outcomes (COs)
01	107001	Engineering Mathematics-I	<p>The students will be able to learn</p> <p>CO1: Mean value theorems and its generalizations leading to Taylors and Maclaurin's series useful in the analysis of engineering problems.</p> <p>CO2: the Fourier series representation and harmonic analysis for design and analysis of periodic continuous and discrete systems.</p> <p>CO3: to deal with derivative of functions of several variables that is essential in various branches of Engineering.</p> <p>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.</p> <p>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</p>
02	107002	Engineering Physics	<p>On completion of the course, learner will be able to–</p> <p>CO1: Develop understanding of interference, diffraction and polarization; connect it to few engineering applications.</p> <p>CO2: Learn basics of lasers and optical fibers and their use in some applications.</p> <p>CO3: Understand concepts and principles in quantum mechanics. Relate them to some applications.</p> <p>CO4: Understand theory of semiconductors and their applications in some semiconductor devices.</p> <p>CO5: Summarize basics of magnetism and superconductivity. Explore few of their technological applications.</p> <p>CO6: Comprehend use of concepts of physics for Non Destructive Testing. Learn some properties of nanomaterials and their application.</p>
03	107009	Engineering	<p>On completion of the course, learner will be able</p>

		Chemistry	<p>to–</p> <p>CO1: Apply the different methodologies for analysis of water and techniques involved in softening of water as commodity.</p> <p>CO2: Select appropriate electro-technique and method of material analysis.</p> <p>CO3: Demonstrate the knowledge of advanced engineering materials for various engineering applications.</p> <p>CO4: Analyze fuel and suggest use of alternative fuels.</p> <p>CO5: Identify chemical compounds based on their structure.</p> <p>CO6: Explain causes of corrosion and methods for minimizing corrosion.</p>
04	102003	Systems in Mechanical Engineering	<p>On completion of the course, learner will be able to</p> <p>CO1: Describe and compare the conversion of energy from renewable and non-renewable energy sources</p> <p>CO2: Explain basic laws of thermodynamics, heat transfer and their applications</p> <p>CO3: List down the types of road vehicles and their specifications</p> <p>CO4: Illustrate various basic parts and transmission system of a road vehicle</p> <p>CO5: Discuss several manufacturing processes and identify the suitable process</p> <p>CO6: Explain various types of mechanism and its application</p>
05	103004	Basic Electrical Engineering	<p>At the end of course students will be able to</p> <p>CO1: Differentiate between electrical and magnetic circuits and derive mathematical relation for self and mutual inductance along with coupling effect.</p> <p>CO2: Calculate series, parallel and composite capacitor as well as characteristics parameters of alternating quantity and phasor arithmetic</p> <p>CO3: Derive expression for impedance, current, power in series and parallel RLC circuit with AC supply along with phasor diagram.</p> <p>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</p> <p>CO5: Apply and analyze the resistive circuits using star-delta conversion KVL, KCL and different network theorems under DC supply.</p> <p>CO6: Evaluate work, power, and energy relations and suggest various batteries for different</p>

			applications, concept of charging and discharging and depth of charge.
06	104010	Basic Electronics Engineering	<p>On completion of the course, learner will be able to–</p> <p>CO1: Explain the working of P-N junction diode and its circuits.</p> <p>CO2: Identify types of diodes and plot their characteristics and also can compare BJT with MOSFET.</p> <p>CO3: Build and test analog circuits using OPAMP and digital circuits using universal/basic gates and flip flops.</p> <p>CO4: Use different electronics measuring instruments to measure various electrical parameters.</p> <p>CO5: Select sensors for specific applications.</p> <p>CO6: Describe basic principles of communication systems.</p>
07	110005	Programming and Problem Solving	<p>On completion of the course, learner will be able to–</p> <p>CO1: Inculcate and apply various skills in problem solving.</p> <p>CO2: Choose most appropriate programming constructs and features to solve the problems in diversified domains.</p> <p>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.</p> <p>CO4: Demonstrate significant experience with the Python program development environment.</p>
08	101011	Engineering Mechanics	<p>On completion of the course, learner will be able to–</p> <p>CO1: Determine resultant of various force systems</p> <p>CO2: Determine centroid, moment of inertia and solve problems related to friction</p> <p>CO3: Determine reactions of beams, calculate forces in cables using principles of equilibrium</p> <p>CO4: Solve trusses, frames for finding member forces and apply principles of equilibrium to forces in space</p> <p>CO5: Calculate position, velocity and acceleration of particle using principles of kinematics</p> <p>CO6: Calculate position, velocity and acceleration of particle using principles of kinetics and Work, Power, Energy</p>
09	111006	Workshop	CO1: Familiar with safety norms to prevent any mishap in workshop.

			<p>CO2: Able to handle appropriate hand tool, cutting tool and machine tools to manufacture a job.</p> <p>CO3: Able to understand the construction, working and functions of machine tools and their parts.</p> <p>CO4: Able to know simple operations (Turning and Facing) on a centre lathe.</p>
10	101007	Audit Course 1 Environmental Studies-I	<p>On completion of the course, learner will be able to–</p> <p>CO1: Demonstrate an integrative approach to environmental issues with a focus on sustainability.</p> <p>CO2: Explain and identify the role of the organism in energy transfers in different ecosystems.</p> <p>CO3: Distinguish between and provide examples of renewable and nonrenewable resources & analyze personal consumption of resources.</p> <p>CO4: Identify key threats to biodiversity and develop appropriate policy options for conserving biodiversity in different settings.</p>
FE 2019 Pattern Semester II			
01	107008	Engineering Mathematics-II	<p>The students will be able to learn</p> <p>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.</p> <p>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.</p> <p>CO3: to trace the curve for a given equation and measure arc length of various curves.</p> <p>CO4: the concepts of solid geometry using equations of sphere, cone and cylinder in a comprehensive manner.</p> <p>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.</p>
02	107002	Engineering Physics	<p>On completion of the course, learner will be able to–</p> <p>CO1: Develop understanding of interference, diffraction and polarization; connect it to few engineering applications.</p> <p>CO2: Learn basics of lasers and optical fibers and their use in some applications.</p>

			<p>CO3: Understand concepts and principles in quantum mechanics. Relate them to some applications.</p> <p>CO4: Understand theory of semiconductors and their applications in some semiconductor devices.</p> <p>CO5: Summarize basics of magnetism and superconductivity. Explore few of their technological applications.</p> <p>CO6: Comprehend use of concepts of physics for Non Destructive Testing. Learn some properties of nanomaterials and their application.</p>
03	107009	Engineering Chemistry	<p>On completion of the course, learner will be able to–</p> <p>CO1: Apply the different methodologies for analysis of water and techniques involved in softening of water as commodity.</p> <p>CO2: Select appropriate electro-technique and method of material analysis.</p> <p>CO3: Demonstrate the knowledge of advanced engineering materials for various engineering applications.</p> <p>CO4: Analyze fuel and suggest use of alternative fuels.</p> <p>CO5: Identify chemical compounds based on their structure.</p> <p>CO6: Explain causes of corrosion and methods for minimizing corrosion.</p>
04	103004	Basic Electrical Engineering	<p>At the end of course students will be able to</p> <p>CO1: Differentiate between electrical and magnetic circuits and derive mathematical relation for self and mutual inductance along with coupling effect.</p> <p>CO2: Calculate series, parallel and composite capacitor as well as characteristics parameters of alternating quantity and phasor arithmetic</p> <p>CO3: Derive expression for impedance, current, power in series and parallel RLC circuit with AC supply along with phasor diagram.</p> <p>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</p> <p>CO5: Apply and analyze the resistive circuits using star-delta conversion KVL, KCL and different network theorems under DC supply.</p> <p>CO6: Evaluate work, power, and energy relations and suggest various batteries for different applications, concept of charging and discharging and depth of charge.</p>
05	104010	Basic Electronics	<p>On completion of the course, learner will be able</p>

		Engineering	<p>to–</p> <p>CO1: Explain the working of P-N junction diode and its circuits.</p> <p>CO2: Identify types of diodes and plot their characteristics and also can compare BJT with MOSFET.</p> <p>CO3: Build and test analog circuits using OPAMP and digital circuits using universal/basic gates and flip flops.</p> <p>CO4: Use different electronics measuring instruments to measure various electrical parameters.</p> <p>CO5: Select sensors for specific applications.</p> <p>CO6: Describe basic principles of communication systems.</p>
06	110005	Programming and Problem Solving	<p>On completion of the course, learner will be able to–</p> <p>CO1: Inculcate and apply various skills in problem solving.</p> <p>CO2: Choose most appropriate programming constructs and features to solve the problems in diversified domains.</p> <p>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.</p> <p>CO4: Demonstrate significant experience with the Python program development environment.</p>
07	101011	Engineering Mechanics	<p>On completion of the course, learner will be able to–</p> <p>CO1: Determine resultant of various force systems</p> <p>CO2: Determine centroid, moment of inertia and solve problems related to friction</p> <p>CO3: Determine reactions of beams, calculate forces in cables using principles of equilibrium</p> <p>CO4: Solve trusses, frames for finding member forces and apply principles of equilibrium to forces in space</p> <p>CO5: Calculate position, velocity and acceleration of particle using principles of kinematics</p> <p>CO6: Calculate position, velocity and acceleration of particle using principles of kinetics and Work, Power, Energy</p>
08	102012	Engineering Graphics	<p>On completion of the course, learner will be able to</p> <p>CO1: Draw the fundamental engineering objects using basic rules and able to construct the simple geometries.</p>

			<p>CO2: Construct the various engineering curves using the drawing instruments.</p> <p>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.</p> <p>CO4: Apply the visualization skill to draw a simple isometric projection from given orthographic views precisely using drawing equipment.</p> <p>CO5: Draw the development of lateral surfaces for cut section of geometrical solids.</p> <p>CO6: Draw fully-dimensioned 2D, 3D drawings using computer aided drafting tools.</p>
09	110013	Project Based Learning	<p>CO1: Project based learning will increase their capacity and learning through shared cognition.</p> <p>CO2: Students able to draw on lessons from several disciplines and apply them in practical way.</p> <p>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.</p>
10	101014	Audit Course 2 Environmental Studies-II	<p>On completion of the course, learner will be able to–</p> <p>CO1: Have an understanding of environmental pollution and the science behind those problems and potential solutions.</p> <p>CO2: Have knowledge of various acts and laws and will be able to identify the industries that are violating these rules.</p> <p>CO3: Assess the impact of ever increasing human population on the biosphere: social, economic issues and role of humans in conservation of natural resources.</p> <p>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.</p>
	107015	Audit Course 2 Physical Education- Exercise and Field Activities	--

FE 2015 Pattern Semester I

SN	Course Code	Course Name	Course Outcomes (COs)
1	107002	Engineering Physics	CO1: Develop understanding of interference, diffraction; connect it to few engineering applications.
			CO2: Comprehend use of concepts in acoustics and relate them some applications. Learn basics of ultrasonic waves and their use in some applications
			CO3: Develop understanding of polarisation; connect it to few engineering applications. Learn basics of lasers and their use in some applications.
			CO4: Understand theory of semiconductors and their applications in some semiconductor devices.
			CO5: Understand concepts and principles in quantum mechanics; relate them to some applications.
			CO6: Summarize basics of superconductivity and explore few of their technological applications. Leran some properties of nanomaterials and their applications.
2	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 analytical-technique and Identify various electronic transitions of chemical compounds based on their structure.
			CO3: Demonstrate the knowledge of advanced engineering materials along with basics of polymer for various engineering applications.
			CO4: Analyze fuel and suggest use of alternative fuels.
			CO5: Understand and apply the nanomaterials for engineering applications.
			CO6: Explain causes of corrosion and methods for minimizing corrosion.
3	107001	Engineering Mathematics-I	CO1: Analysis of linear equations, eigen values and eigen vectors in engineering.
			CO2: Familiarize with parameters of complex numbers and find logarithm of complex numbers.
			CO3: Know the test for convergence, absolute & conditional convergence, range of convergence and apply basics of

			<p>successive differentiation.</p> <p>CO4: To apply the concept of Taylor's and Maclaurin's series useful in the analysis of engineering problems.</p> <p>CO5: Derivative of the function of several variables, apply the concept of Jacobian and partial derivatives in errors and approximations.</p>
4	101005	Basic Civil and Environmental Engineering	<p>CO1: Describe basic area of Civil Engineering and their use in interdisciplinary projects.</p> <p>CO2: Identify material required for construction, Explain types of construction and differentiate between substructure and superstructure.</p> <p>CO3: Learn basics of surveying and levelling and calculate reduced levels.</p> <p>CO4: Explain types of ecosystems, Enlist natural resources and Describe solid waste management</p> <p>CO5: Describe use of building planning principles and building byelaws for building construction.</p> <p>CO6: Distinguish and provide examples of conventional and nonconventional energy, Have an understanding of environmental pollution</p>
5	103004	Basic Electrical Engineering	<p>CO1: Understand and apply the basic laws of electric circuits to solve problems on basic terminologies of electrical engineering. Evaluate work, power and energy relations electrical, mechanical and thermal systems.</p> <p>CO2: Understand and solve the problems on basic concepts of electromagnetism. Differentiate between electrical and magnetic circuits and derive mathematical relation for self and mutual inductance along with coupling effect.</p> <p>CO3: Understand and remember the need, construction, working principle, types and applications of single phase transformer & determine the power losses/efficiency and voltage drop/voltage regulation. Understand the fundamentals of electrostatics. Calculate series, parallel and composite capacitor and remember concept of capacitor charging and discharging.</p> <p>CO4: Analyze and interpret the sinusoidal electrical quantities mathematically,</p>

			graphically and in terms of phasor arithmetic. Understand behavior of R, L, C circuit elements with AC.
			CO5: Derive expression for impedance, current, power in series and parallel RLC circuit with AC supply along with phasor diagram. Relate phase and line electrical quantities in polyphase networks. Understand and solve the problems on single phase and polyphase star and delta connected circuits.
			CO6: Understand and apply star-delta conversion technique, Kirchhoff's laws and different network theorems to analyze complex DC circuits.
6	104012	Basic Electronics Engineering	CO1: Study of Different Electronic components and devices & Explain the working of P-N junction diode and its circuits.
			CO2: Explain the working of transistors like BJT, MOSFETs and also can compare BJT with MOSFET.
			CO3: Build and test analog circuits using OPAMP, regulated power supply & Study of IC 555 timer circuit.
			CO4: Build and test digital circuits using universal/basic gates and flip flops and their applications.
			CO5: Describe basic of power device & Study and select of sensors for specific applications.
			CO6: Describe basic principles of communication systems.
7	110003	Fundamental of Programming Languages-I	CO1: Use modular programming approach in diversified problem domains
			CO2: Apply programming logic to solve real world problems
			CO3: Decide effectiveness of computer based solutions
8	102006	Engineering Graphics-I	CO1: Draw the fundamental engineering objects using basic rules and able to construct the projection of lines
			CO2: Draw projection of planes like circle, polygons, etc
			CO3: Draw projection of various solids like cone, cylinder, prism and pyramid
			CO4: Construct the various engineering curves using the drawing instruments.
			CO5: Draw the orthographic projection of

			<p>various mechanical components</p> <p>CO6: Apply the visualization skill to draw a simple isometric projection from given orthographic views precisely using drawing equipment</p>
FE 2015 Pattern Semester II			
1	107008	Engineering Mathematics-II	<p>CO1: 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.</p> <p>CO2: The Fourier series representation and the Harmonic analysis for the design and analysis of periodic continuous and discrete system. Advanced integration techniques such as Reduction formulae, Beta functions, Gamma functions</p> <p>CO3: Differentiation under integral sign and Error functions needed in evaluating multiple integrals and their applications. To trace the curve for a given equation and measure arc length of various curves.</p> <p>CO4: Concepts of solid geometry using equations of sphere, cone and cylinder in a comprehensive manner.</p> <p>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.</p>
2	107002	Engineering Physics	<p>CO1: Develop understanding of interference, diffraction; connect it to few engineering applications.</p> <p>CO2: Comprehend use of concepts in acoustics and relate them some applications. Learn basics of ultrasonic waves and their use in some applications</p> <p>CO3: Develop understanding of polarisation; connect it to few engineering applications. Learn basics of lasers and their use in some applications.</p> <p>CO4: Understand theory of semiconductors and their applications in some semiconductor devices.</p> <p>CO5: Understand concepts and principles in quantum mechanics; relate them to some</p>

			applications.
			CO6: Summarize basics of superconductivity and explore few of their technological applications. Learn some properties of nanomaterials and their applications.
3	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 analytical-technique and Identify various electronic transitions of chemical compounds based on their structure.
			CO3: Demonstrate the knowledge of advanced engineering materials along with basics of polymer for various engineering applications.
			CO4: Analyze fuel and suggest use of alternative fuels.
			CO5: Understand and apply the nanomaterials for engineering applications.
			CO6: Explain causes of corrosion and methods for minimizing corrosion.
4	103004	Basic Electrical Engineering	CO1: Understand and apply the basic laws of electric circuits to solve problems on basic terminologies of electrical engineering. Evaluate work, power and energy relations electrical, mechanical and thermal systems.
			CO2: Understand and solve the problems on basic concepts of electromagnetism. Differentiate between electrical and magnetic circuits and derive mathematical relation for self and mutual inductance along with coupling effect.
			CO3: Understand and remember the need, construction, working principle, types and applications of single phase transformer & determine the power losses/efficiency and voltage drop/voltage regulation. Understand the fundamentals of electrostatics. Calculate series, parallel and composite capacitor and remember concept of capacitor charging and discharging.
			CO4: Analyze and interpret the sinusoidal electrical quantities mathematically, graphically and in terms of phasor arithmetic. Understand behavior of R, L, C circuit elements with AC.
			CO5: Derive expression for impedance,

			<p>current, power in series and parallel RLC circuit with AC supply along with phasor diagram. Relate phase and line electrical quantities in polyphase networks. Understand and solve the problems on single phase and polyphase star and delta connected circuits.</p> <p>CO6: Understand and apply star-delta conversion technique, Kirchhoff's laws and different network theorems to analyze complex DC circuits.</p>
5	104012	Basic Electronics Engineering	<p>CO1: Study of Different Electronic components and devices & Explain the working of P-N junction diode and its circuits.</p> <p>CO2: Explain the working of transistors like BJT, MOSFETs and also can compare BJT with MOSFET.</p> <p>CO3: Build and test analog circuits using OPAMP , regulated power supply & Study of IC 555 timer circuit.</p> <p>CO4: Build and test digital circuits using universal/basic gates and flip flops and their applications.</p> <p>CO5: Describe basic of power device & Study and select of sensors for specific applications.</p> <p>CO6: Describe basic principles of communication systems.</p>
6	102013	Subject: Basic Mechanical Engineering	<p>Describe and compare the conversion of energy from renewable and non-renewable energy sources</p> <p>Explain various types of mechanism and its application</p> <p>Discuss several manufacturing processes and identify the suitable process</p> <p>Explain basic laws of thermodynamics, heat transfer and their applications</p> <p>Illustrate various basic parts and transmission system of a road vehicle</p> <p>List down the types of road vehicles and their specifications</p>
7	101011	Engineering Mechanics	<p>CO1: Determine resultant of various force systems and centroid</p> <p>CO2: Calculate position, velocity and acceleration of particle in rectilinear motion using principles of kinematics and apply newtons second law to rectilinear motion</p> <p>CO3: Calculate position, velocity and</p>

			<p>acceleration of particle in curvilinear motion using principles of kinematics and apply newtons second law to curvilinear motion</p> <p>CO4: Solve problems of kinematics using work,power,energy</p> <p>CO5: Determine reactions of beams, calculate forces in cables using principles of equilibrium and apply principles of equilibrium to forces in space</p> <p>CO6: Solve trusses, frames for finding member forces and solve problems related to friction</p>
8	110010	Fundamental of Programming Languages-II	<p>CO1: Develop programs using object oriented concepts</p> <p>CO2: Design and develop web pages</p> <p>CO3: Design and develop mobile application</p> <p>CO4: Design and develop simple application using Embedded Programming</p>
9	102014	Engineering Graphics- I	<p>CO1: Draw the fundamental engineering objects using basic rules and able to construct the simple geometries.</p> <p>CO2: Construct the various engineering curves using the drawing instruments.</p> <p>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.</p> <p>CO4: Apply the visualization skill to draw a simple isometric projection from given orthographic views precisely using drawing equipment</p> <p>CO5: Draw the development of lateral surfaces for cut section of geometrical solids.</p> <p>CO6: Draw fully-dimensioned 2D, 3D drawings using computer aided drafting tools.</p>
10	110010	Fundamental of Programming Languages-II	<p>CO1: Develop programs using object oriented concepts</p> <p>CO2: Design and develop web pages</p> <p>CO3: Design and develop mobile application</p> <p>CO4: Design and develop simple application using Embedded Programming</p>