

# Guru Gobind Singh College of Engineering & Research Centre, Nashik

## Department of Basic Engineering Science (First Year Engineering)

### Course Outcomes (2019 Pattern)

Subject: Engineering Mathematics I (107001)		
Sr. No	Course Objective	Course Outcome
1	To familiarize with concepts and techniques in Calculus.	To learn Mean value theorems and its generalizations leading to Taylors and Maclaurin's series useful in the analysis of engineering problems.
2	To familiarize with concepts and techniques in Fourier series.	To learn the Fourier series representation and harmonic analysis for design and analysis of periodic continuous and discrete systems.
3	To familiarize with concepts and techniques in Matrices	To deal with derivative of functions of several variables that are essential in various branches of Engineering.
4	To understand advanced level mathematics and its applications.	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
5	To enhance analytical thinking power, useful in their disciplines.	To learn 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

Subject: Engineering Physics (107002)		
Sr. No	Course Objective	Course Outcome
1	To teach students basic concepts and principles of physics, relate them to laboratory experiments and their applications.	Develop understanding of interference, diffraction and polarization; connect it to few engineering applications.
2	To teach students basic concepts and principles of physics, relate them to laboratory experiments and their applications.	Learn basics of lasers and optical fibers and their use in some applications.
3	To teach students basic concepts and principles of physics, relate them to laboratory experiments and their applications.	Understand concepts and principles in quantum mechanics. Relate them to some applications.
4	To teach students basic concepts and principles of physics, relate them to laboratory experiments and their applications.	Understand theory of semiconductors and their applications in some semiconductor devices.
5	To teach students basic concepts and principles of physics, relate them to laboratory experiments and their applications.	Summarize basics of magnetism and superconductivity. Explore few of their technological applications.
6	To teach students basic concepts and principles of physics, relate them to laboratory experiments and their applications.	Comprehend use of concepts of physics for Non-Destructive Testing. Learn some properties of nanomaterials and their application.

Subject: Engineering Chemistry (107009)		
Sr. No	Course Objective	Course Outcome
1	To understand technology involved in analysis and improving quality of water as commodity.	Apply the different methodologies for analysis of water and techniques involved in softening of water as commodity.
2	To acquire the knowledge of electro-analytical techniques that facilitates rapid and precise understanding of materials.	Select appropriate electro technique and method of material analysis.
3	To understand structure, properties and applications of speciality polymers and nano material.	Demonstrate the knowledge of advanced engineering materials for various engineering applications.
4	To study conventional and alternative fuels with respect to their properties and applications.	Analyze fuel and suggest use of alternative fuels.
5	To study spectroscopic techniques for chemical analysis.	Identify chemical compounds based on their structure.
6	To understand corrosion mechanisms and preventive methods for corrosion control.	Explain causes of corrosion and methods for minimizing corrosion.

Subject: Systems in Mechanical Engineering (102003)		
Sr. No	Course Objective	Course Outcome
1	To identify the sources of energy and their conversions	Describe and compare the conversion of energy from renewable and non-renewable energy sources
2	To explain the basic concept of engineering thermodynamics and its application	Explain basic laws of thermodynamics, heat transfer and their applications
3	To understanding the specifications of vehicles	List down the types of road vehicles and their specifications
4	To get acquainted with vehicle systems	Illustrate various basic parts and transmission system of a road vehicle
5	To introduce manufacturing processes applying proper method to produce components	Discuss several manufacturing processes and identify the suitable process
6	To be able to select and compare domestic appliances	Explain various types of mechanism and its application

Subject: Basic Electrical Engineering (103004)		
Sr. No	Course Objective	Course Outcome
1	To introduce fundamental concepts, various laws-principles and theorems associated with electrical systems. improve stability of power systems	Differentiate between electrical and magnetic circuits and derive mathematical relation for self and mutual inductance along with coupling effect.
2	To impart basic knowledge of all electrical quantities such as current, voltage, power, energy, frequency along with different types of fields	Calculate series, parallel and composite capacitor as well as characteristics parameters of alternating quantity and phasor arithmetic

3	To provide knowledge about fundamental parameters such as resistance, inductance and capacitance and magnetic circuits, AC and DC circuits.	Derive expression for impedance, current, power in series and parallel RLC circuit with AC supply along with phasor diagram.
4	To provide knowledge of the concepts of transformer, different energy conversions techniques.	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
5		Apply and analyze the resistive circuits using star-delta conversion KVL, KCL and different network theorems under DC supply.
6		Evaluate work, power, energy relations and suggest various batteries for different applications, concept of charging and discharging and depth of charge.

**Subject: Basic Electronics Engineering (104010)**

<b>Sr. No</b>	<b>Course Objective</b>	<b>Course Outcome</b>
1	The principle of electronics and working principle of PN junction diode and special purpose diodes.	Learner will be able to Explain the working of P-N junction diode and its circuits.
2	The functioning of transistors like BJT, MOSFETs and OPAMP.	Learner will be able to Identify types of diodes and plot their characteristics and also can compare BJT with MOSFET.
3	Basics of various logic gates, digital circuits and their applications.	Learner will be able to Build and test analog circuits using OPAMP and digital circuits using universal/basic gates and flip flops.
4	Working and functions of various electronic instruments.	Learner will be able to Use different electronics measuring instruments to measure various electrical parameters.
5	The operating principles and applications of various active and passive sensors.	Learner will be able to Select sensors for specific applications.
6	Basic principles of communication systems	Learner will be able to Describe basic principles of communication systems.

**Subject: Programming & Problem Solving (110005)**

<b>Sr. No</b>	<b>Course Objective</b>	<b>Course Outcome</b>
1	To understand problem solving, problem solving aspects, programming and to know about various program design tools.	Inculcate and apply various skills in problem solving.
2	To learn problem solving with computers	Choose most appropriate programming constructs and features to solve the problems in diversified domains.
3	To learn basics, features and future of Python programming.	Exhibit the programming skills for the problems those require the writing of well-documented programs including use of the logical constructs of language, Python.
4	To acquaint with data types, input output statements, decision making, looping and functions in Python	Demonstrate significant experience with the Python program development environment.

5	To learn features of Object-Oriented Programming using Python	
6	To acquaint with the use and benefits of files handling in Python	

**Subject: Engineering Mechanics (101011)**

<b>Sr. No</b>	<b>Course Objective</b>	<b>Course Outcome</b>
1	To impart knowledge about force systems and methods to determine resultant centroid and moment of inertia	Determine resultant of various force systems
2	To teach methods to calculate force of friction	Determine centroid, moment of inertia and solve problems related to friction
3	To impart knowledge to determine reaction of beams, calculate member forces in trusses, cables and frames using principles of equilibrium	Determine reactions of beams, calculate forces in cables using principles of equilibrium
4	To teach space force systems	Solve trusses, frames for finding member forces and apply principles of equilibrium to forces in space
5	To train students to solve problems related to particle mechanics using principles of kinematics, kinetics and work power energy	Calculate position, velocity and acceleration of particle using principles of kinematics
6		Calculate position, velocity and acceleration of particle using principles of kinetics and Work, Power, Energy

**Subject: Workshop Practice (111006)**

<b>Sr. No</b>	<b>Course Objective</b>	<b>Course Outcome</b>
1	To understand the construction and working of machine tools and functions of its parts	The student should be able to identify and use the different handy tools and power tools.
2	To develop the skill through hands-on practices using hand tools, power tools, machine tools in manufacturing and assembly shop leading to understanding of a production process	To manufacture a given carpentry job involving simple operations.
3	To understand workshop layout and safety norms.	To manufacture any sheet metal job by applying knowledge of various sheet metal operations.
4		To apply the knowledge of safety and harms while working in workshop.

**Subject: Audit Course - I (Environmental Studies-I 101007)**

<b>Sr. No</b>	<b>Course Objective</b>	<b>Course Outcome</b>
1	To explain the concepts and strategies related to sustainable development and various components of environment.	Demonstrate an integrative approach to environmental issues with a focus on sustainability.
2	To examine biotic and abiotic factors within an ecosystem, to identify food chains, webs, as well as energy flow and relationships	Explain and identify the role of the organism in energy transfers in different ecosystems.

3	To identify and analyze various conservation methods and their effectiveness in relation to renewable and non-renewable natural resources.	Distinguish between and provide examples of renewable and non-renewable resources & analyze personal consumption of resources
4	To gain an understanding of the value of biodiversity and current efforts to conserve biodiversity on national and local scale.	Identify key threats to biodiversity and develop appropriate policy options for conserving biodiversity in different settings.

Subject: Engineering Mathematics II (107008)

Sr. No	Course Objective	Course Outcome
1	To familiarize with Mathematical Modelling of physical systems using differential equations advanced techniques of integration.	To Learn 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.
2	To familiarize with Mathematical Modelling of physical systems using tracing of curve	To learn 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
3	To familiarize with Mathematical Modelling of physical systems using multiple integrals and their applications.	To Trace the curve for a given equation and measure arc length of various curves.
4	To understand advanced level mathematics and its applications	To Understand the concepts of solid geometry using equations of sphere, cone and cylinder in a comprehensive manner
5	To enhance analytical thinking power, useful in their disciplines.	To Evaluate of multiple integrals and its application to find area bounded by curves, volume bounded by surfaces, Centre of gravity and Moment of inertia.

Subject: Engineering Graphics (102012)

Sr. No	Course Objective	Course Outcome
1	To acquire basic knowledge about engineering drawing language, line types, dimension methods, and simple geometrical construction.	Draw the fundamental engineering objects using basic rules and able to construct the simple geometries.
2	To draw conic sections by various methods, involutes, cycloid and spiral.	Construct the various engineering curves using the drawing instruments.
3	To acquire basic knowledge about physical realization of engineering objects and shall be able to draw its different views.	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.
4	To visualize three-dimensional engineering objects and shall be able to draw their isometric views.	Apply the visualization skill to draw a simple isometric projection from given orthographic views precisely using drawing equipment.
5	To imagine visualization of lateral development of solids.	Draw the development of lateral surfaces for cut section of geometrical solids.

6	To acquire basic knowledge about the various CAD drafting software's and its basic commands required to construct the simple engineering objects.	Draw fully-dimensioned 2D, 3D drawings using computer aided drafting tools.
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Subject: Project Based Learning (110013)		
Sr. No	Course Objective	Course Outcome
1	To emphasizes learning activities that are long-term, interdisciplinary and student-centric.	Project based learning will increase their capacity and learning through shared cognition.
2	To inculcate independent learning by problem solving with social context.	Students able to draw on lessons from several disciplines and apply them in practical way.
3	To engages students in rich and authentic learning experiences.	Learning by doing approach in PBL will promote long-term retention of material and
	To provide every student the opportunity to get involved either individually or as a group so as to develop team skills and learn professionalism	

Subject: Environmental Studies-II (101014)		
Sr. No	Course Objective	Course Outcome
1	To provide a comprehensive overview of environmental pollution and the science and technology associated with the monitoring and control.	Have an understanding of environmental pollution and the science behind those problems and potential solutions.
2	To understand the evolution of environmental policies and laws.	Have knowledge of various acts and laws and will be able to identify the industries that are violating these rules.
3	To explain the concepts behind the interrelations between environment and the development.	Assess the impact of ever-increasing human population on the biosphere: social, economic issues and role of humans in conservation of natural resources.
4	To examine a range of environmental issues in the field, and relate these to scientific theory.	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.