

## Course Outcomes (CO)

### Important Note

**In case of combine CO's for Theory & Practical Course include:**

**Course Name:** Complete Course Name (T/P), **Course Code:** Code of Theory /Code of Practical

**In case of Exclusive CO's for Theory Course include:**

**Course Name:** Complete Course Name (T), **Course Code:** Code of Theory Course

**In case of exclusive CO's for Practical Course (eg. Project etc.) include:**

**Course Name:** Complete Course Name (P), **Course Code:** Code of Practical/Project Course

### First Year: Semester I:

Course Name: Engineering Mathematics-I		Course Code: GE-2101
GE-2101 CO-1	Apply the knowledge of differentiation to develop the Mathematical equations and compute geometrical measures	
GE-2101 CO-2	Determine the expansion and derivatives of functions of Multiple variables and use it to find extreme values of functions.	
GE-2101 CO-3	Evaluate the integrals of single, multiple variables and use it to measure the dimensions of various geometrical figures.	
GE-2101 CO-4	Discuss Calculus of Scalar and vector point function and use appropriate theorems to evaluate integrals of functions of single, multiple variables.	

Course Name: Engineering Mathematics-II		Course Code: GE-2102
GE-2102 CO-1	Use appropriate Methods to solve first order and higher order differential equations and apply it to find solutions of engineering problems	
GE-2102 CO-2	Analyse the functions of complex numbers and variables, prove Mathematical equations and evaluate the complex integrals	
GE-2102 CO-3	Use Matrix method to solve linear equations , evaluate eigen values - eigen vectors and its applications.	
GE-2102 CO-4	Measure the statistical parameters and derive the equations of best fit curves	

Course Name: Communication Skill		Course Code: GE-2107
GE-2107 CO-1	Explain the basics of communication process as well as identify the barriers in communication.	

<b>GE-2107 CO-2</b>	Classify and describe the different Speech Sounds of English Language.
<b>GE-2107 CO-3</b>	Apply different strategies and techniques of presentations, interviews and group communication.
<b>GE-2107 CO-4</b>	Drafting reports, memos and emails, considering the professional etiquettes and ethics with appropriate content and context.

<b>Course Name: Social Science</b>		<b>Course Code: GE-2108</b>
<b>GE-2108 CO-1</b>	Explain the basic concepts of Social Sciences.	
<b>GE-2108 CO-2</b>	Describe the development of various Civilizations and their Culture.	
<b>GE-2108 CO-3</b>	Analyze the Impact of Industrialization on society and discuss the Fundamental Concepts of Society.	
<b>GE-2108 CO-4</b>	Explain Industrial Organization and Management.	

<b>Course Name: Engineering Physics</b> <b>Course Name: Engineering Physics (Lab.)</b>	<b>Course Code: GE-2105 and GE 2106</b>
<b>GE 2105 &amp; GE2106 CO1</b>	Examine the intensity variation of light due to interference, diffraction and its applications.
<b>GE 2105 . CO2</b>	Explain fundamentals of quantum mechanics and its application to problems dealing with quantum particle.
<b>GE 2105 &amp; GE2106 CO3</b>	Develop ability to classify and analyze the characteristics of semiconductor materials in terms of crystal structures, charge carriers and energy bands for device applications.
<b>GE 2105 &amp; GE2106 CO4</b>	Analyze the motion of charged particle in electric and magnetic fields and its applications to electron optic devices.
<b>GE 2105 &amp; GE2106 CO1</b>	Illustrate working principle of lasers, ultrasonic waves and its properties for useful applications in the field of industry.

<b>Course Name: Engineering Chemistry</b> <b>Course Name : Engineering Chemistry (Lab.)</b>	<b>Course Code: GE2103 and GE 2104</b>
<b>GE2103 and GE 2104 CO1</b>	1. Assess qualitative and quantitative aspects of water as a conventional material for industrial and domestic applications.
<b>GE2103 and GE 2104 CO2</b>	2. Apply the knowledge of basic electrochemistry to understand battery technology, corrosion process and preventive techniques.
<b>GE2103 and GE 2104 CO3</b>	2. Know the basics and assess analytical aspects of industrial materials like fuels and lubricants for efficient utilization.
<b>GE2103 and GE 2104 CO4</b>	3. Recognize the significance of cement and advanced engineering materials in technological applications.
<b>GE2103 and GE 2104 CO5</b>	4. Analyze and generate analytical and instrumental techniques.

<b>Course Name: Engineering Mechanics Engineering Mechanics (Lab.)</b>	<b>Course Code: CV-2101 - CV2102</b>
<b>CV-2101- CO 1</b>	An ability to apply the concept of applied mechanics and can solve problems on planar force system for friction as well as frictionless surfaces.
<b>CV-2101- CO 2</b>	An ability to analyze pin jointed truss frame structure and beam structure analytically and graphic
<b>CV-2101- CO 3</b>	An ability to understand centroid, moment of inertia, product of inertia and mass moment of inertia and can find properties of surfaces.
<b>CV-210- 1CO 4</b>	An ability to determine the dynamic variables of moving body, understand working principle of simple lifting machine.

<b>Course Name: Basic Electronics</b>	<b>Course Code: EE 2101</b>
<b>EE 2101 CO1</b>	Characterize Number systems, semiconductors, diodes, transistors and operational amplifiers.
<b>EE 2101 CO2</b>	Design simple analog circuits
<b>EE 2101 CO3</b>	Design simple combinational and sequential logic circuits
<b>EE 2101 CO4</b>	Identify functions of digital multimeter, Bridges and transducers in the measurement of physical variables

<b>Course Name: Introduction to Computer Programming Introduction to Computer Programming (Lab.)</b>	<b>Course Code: IT2101 Course Code: IT-2102</b>
<b>IT2101, IT2102 CO1</b>	Understand computer system, basics of algorithm & flowchart, and demonstrate straight line program using basic 'C' programming language constructs.
<b>IT2101 IT2102 CO2</b>	Design & Develop programs using different loop control structures, user defined functions, and Pointers.
<b>IT2101 IT2102 CO3</b>	Analyze and apply concepts of different dimensional Arrays as a data structure & development of programs using the same.
<b>IT2101 IT2102 CO4</b>	Design and develop programs using basics of Strings, Structures, union and Files in 'C' language.

<b>Course Name:Electrical Engineering Elect. Eng. Lab</b>	<b>Course Code: EL 2101 EL-2102 (Lab.)</b>
<b>EL 2101 &amp; EL 2102- CO-1</b>	Reproduce fundamentals of dc circuits, single phase, and three phase ac circuits.
<b>EL 2101 &amp; EL 2102- CO-2</b>	Analyse dc circuits, single phase and three phase ac circuits for basic electrical quantities such as current, voltage, power etc.
<b>EL 2101 &amp; EL 2102- CO-3</b>	Explain construction, working, testing, and applications of various electrical machines.

EL 2101 & EL 2102- CO-4	Analyse performance of various electrical machines.
EL 2101 & EL 2102- CO-5	Perform laboratory experiments and demonstrate competency in collecting, interpreting, analysing data, communicate and present effectively through laboratory journals.

<b>Course Name: Engineering Graphics Engineering Graphics Lab.</b>		<b>Course Code: ME2101 ME-2102</b>
ME2101 ME-2102 CO1	Transform orthographic projections into isometric projections and vice versa.	
ME2101 ME-2102 CO2	Evaluate Projections of various One Dimensional, Two dimensional, Three dimensional objects.	
ME2101 ME-2102 CO3	Built the development of lateral surfaces of various solids and their cut section.	
ME2101 ME-2102 CO4	Predict the intersections and intersections of various solid objects.	
ME2101 ME-210 2CO5	Justify the use of software tools used for Two dimensional drawings.	

<b>Course Name: Workshop Practice</b>		<b>Course Code: ME 2103</b>
CO1	Understand the carpentry tools, joints, machineries and its applications	
CO2	Understand the fitting tools, measuring instruments, machineries and its applications	
CO3	Understand the smithy tools furnaces and hand and power forging equipment's	
CO4	Understand Gas and Electric welding processes, utility, tools and its applications	

### Second Year: Semester III:

<b>Engineering Mathematics III</b>		<b>GE2201</b>
CO1	1. Estimate the Calculus of Numerical Function.	
CO2	2. Determine the transforms and inverse transforms of various functions of variables and use it to solve Mathematical equations.	
CO3	3. Discuss the nature of periodic function and express it in terms of series.	
CO4	4. Use appropriate method/s to solve partial differential equations.	

<b>Digital Circuits &amp; Microprocessors(T/P)</b>		<b>IT2201/IT2202</b>
CO1	1. Demonstrate the understanding of Digital Circuits and Microprocessor.	

<b>CO2</b>	2. Apply the concepts of digital circuits and microprocessor in switching theory and ARM processor.
<b>CO3</b>	3. Able to analyze problem statement and interface the various programmable ICs.
<b>CO4</b>	4. Design and implement programs to simulate the functioning of 8086 processor.

<b>Object Oriented Programming(T/P)</b>		<b>IT2203/IT2204</b>
<b>CO1</b>	1. Demonstrate the understanding of Object oriented concepts.	
<b>CO2</b>	2. Apply the programming language JAVA efficiently in object oriented software development	
<b>CO3</b>	3. Able to analyze problem statement and identify appropriate objects and methods	
<b>CO4</b>	4. Design and implement a small programs using classes	

<b>Data Structures and Program Design-I(T/P)</b>		<b>IT2205/IT2206</b>
<b>CO1</b>	1. Understand basic data structures like list, stack, queue, tree, graph and hash table.	
<b>CO2</b>	2. Apply appropriate data structures in problem solving.	
<b>CO3</b>	3. Analyze the performance of sorting and searching algorithms based on data structures.	
<b>CO4</b>	4. Design application by using data structures and algorithms for real world problems	

<b>Computer Architecture &amp; Organization</b>		<b>IT2207</b>
<b>CO1</b>	1. Describe fundamentals of computer architecture and organization and able to design control sequence for instructions.	
<b>CO2</b>	2. Apply mathematical techniques and perform computer arithmetic operations along with the understanding of processor design.	
<b>CO3</b>	3. Design memory organization and understand the concept of cache mapping techniques, Input/output subsystem interfaces and buses	

<b>Software Lab(P)</b>	<b>IT2208</b>
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<b>CO1</b>	1. explain the basic data types, built in data structures, control statements and loops in Python
<b>CO2</b>	2. explain the concepts of functions and modules and write simple programs in Python
<b>CO3</b>	3. demonstrate use of classes, modules and packages by writing useful programs.
<b>CO4</b>	4. develop a useful application in Python

**Second Year: Semester IV:**

<b>Discrete Mathematics and Probability Theory</b>		<b>GE2206</b>
<b>CO1</b>	1. Explain the basic concept of classical sets, fuzzy sets, Relations, functions and logical methods.	
<b>CO2</b>	2. Identify the nature of different algebraic structures such as Group, Ring, field	
<b>CO3</b>	3. Determine the probability functions of one and two random variables	
<b>CO4</b>	4. Measure the Statistical parameters for random variables	

<b>Data Structures and Program Design-II(T/P)</b>		<b>IT2251/IT2252</b>
<b>CO1</b>	1. Understand data structures like Tree, Graph, Set, Hash table.	
<b>CO2</b>	2. Apply appropriate data structures in problem solving.	
<b>CO3</b>	3. Analyze the performance of operations performed on data structures.	
<b>CO4</b>	4. Design application by using data structures for real world problems.	

<b>Computer Networks(T/P)</b>		<b>IT2253/IT2254</b>
<b>CO1</b>	1. explain and <b>visualize</b> the different aspects of networks, protocols and network design models.	
<b>CO2</b>	2. <b>illustrate</b> the different of hardware, software and types of transmission media used in computer networks.	
<b>CO3</b>	3. <b>analyze</b> various Data Link layer design issues and select appropriate routing algorithms for a network.	
<b>CO4</b>	4. <b>analyze</b> the important aspects and functions of transport layer, application layer and Cryptography in computer networking.	

<b>Operating Systems(T/P)</b>		<b>IT2255/IT2256</b>
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<b>CO1</b>	1. explain fundamental concepts of operating system and its functions.
<b>CO2</b>	2. explain various algorithms and techniques for managing OS resources
<b>CO3</b>	3. apply and evaluate the performance of algorithms for managing various OS resources based on the given data about processes and resources.
<b>CO4</b>	4. simulate algorithms/techniques for managing various OS resources using computer programs.

<b>Theory of Computation</b>		<b>IT2257</b>
<b>CO1</b>	1. Demonstrate the understanding of basic properties and concepts of formal languages, and Recursive Language,	
<b>CO2</b>	2. Apply formal mathematical methods to prove properties of languages, grammars and automata.	
<b>CO3</b>	3. Analyze and design finite automata, pushdown automata, Turing machines, formal languages, and grammars.	

**Third Year: Semester V:**

<b>Data Base Management Systems(T/P)</b>		<b>IT2301/IT2302</b>
<b>CO1</b>	1) To obtain sound knowledge in the theory, principles and applications of database management system concepts, its structures and query language.	
<b>CO2</b>	2) Apply various techniques of SQL Query writing, Normalization techniques, query processing and techniques involved in query optimization useful in transaction.	
<b>CO3</b>	3) To Analyse the given problem statement and give robust and cost effective solution.	
<b>CO4</b>	4) To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modelling, designing, and implementing a DBMS	

<b>Software Engineering</b>		<b>IT2303</b>
<b>CO1</b>	1. Understand different software process, models and appropriate architectural style in software development cycle	
<b>CO2</b>	2. Analyze the different software process model and appropriate architectural style to develop software	
<b>CO3</b>	3. Apply the software testing techniques in a variety of ways to test the software.	
<b>CO4</b>	4. Design and analyze software development process with the help of UML.	

<b>PE I: Web Programming(T/P)</b>		<b>IT2311/IT2312</b>
<b>CO1</b>	1.Understand the internet communication technologies & Web browser tools, XML application and ASP.NET.	
<b>CO2</b>	2. Apply all the above concepts of web programming for creating a dynamic web site.	
<b>CO3</b>	3. Design & develop of web sites by using html and dynamic web sites by using DHTML and design JavaScript WebPages through HTML.	
<b>CO4</b>	4. Design interactive websites & promote it online	

<b>PE I: Data Analysis and Statistics(T/P)</b>		<b>IT2313/IT2314</b>
<b>CO1</b>	1.Demonstrate an understanding of fundamental concepts of statistics and probability	
<b>CO2</b>	2. Apply probability concepts and appropriate statistical methods on simple datasets for data analysis	
<b>CO3</b>	3.Formulate and solve problems in a systematic manner and Interpret output obtained from statistical analysis on datasets.	
<b>CO4</b>	4. Obtain hands on experience with some popular software ( like R)for analysis and visualization of data	

<b>PE I: Customer Relationship Management</b>		<b>IT2315/IT2316</b>
<b>CO1</b>	1. Understand Features of Salesforce CRM(T/P)	
<b>CO2</b>	2. Apply the Advanced Features in Salesforce CRM for development of software	
<b>CO3</b>	3. Analyze and Evaluate the security concepts, Automated Business Process and Approval Process of Salesforce CRM	
<b>CO4</b>	4. Develop modules using Salesforce CRM	

### **Third Year: Semester VI:**

<b>Design &amp; Analysis of Algorithms(T/P)</b>		<b>IT2351/IT2352</b>
<b>CO1</b>	1. Understand asymptotic analysis of iterative and recursive algorithms, complexity of algorithms	
<b>CO2</b>	2. Apply important algorithmic design techniques for problem solving	
<b>CO3</b>	3. Analyze the performance of algorithms	
<b>CO4</b>	4. Synthesize and design efficient algorithms for real world problems	



<b>Principles of Compiler Design(T/P)</b>		<b>IT2353/IT2354</b>
<b>CO1</b>	1. Understand different phases of compilation process, lexical analyzer tool “Lex” OR “Flex” and YACC or Bison tool	
<b>CO2</b>	2. Apply parsing techniques, Syntax directed translation schemes and optimization techniques for recognition of programming language statements	
<b>CO3</b>	3. Design and Implement a Compiler for a Small Programming Language Source Program	

<b>PE II::Machine Learning(T/P)</b>		<b>IT2361/IT2362</b>
<b>CO1</b>	1. explain and compare supervised and unsupervised learning .	
<b>CO2</b>	2. explain various machine learning algorithms.	
<b>CO3</b>	3. identify appropriate machine learning algorithm to solve the given problem.	
<b>CO4</b>	4. construct a machine learning model to meet desired outcomes and apply identified machine learning algorithm to solve the problem.	
<b>CO4</b>	5. Implement the machine learning algorithms for solving the given problem.	

<b>PE II: Business Intelligence(T/P)</b>		<b>IT2363/IT2364</b>
<b>CO1</b>	1. Students will be able to : ★Assemble BI as a Process, identify its application in various domains and functional area, its roles and responsibilities. ★Identify functions of building blocks in N_tier BI ecosystem ★Identify different stages in Lifecycle of a BI project. ★Differentiate between traditional BI and self service BI	
<b>CO2</b>	2. Apply SQL as a universal language for BI	
<b>CO3</b>	3. Model a business scenario; identify the metrics, indicators, various dimensions, and aggregation strategies and make recommendations to achieve the business goal	
<b>CO4</b>	4.Obtain hands on experience with some popular BI software for analysis, reporting on datasets and visualization of results.	

<b>PE II: Internet of Things(T/P)</b>		<b>IT2365/IT2366</b>
<b>CO1</b>	1. Describe IoT as a Process, its architecture and Management, compare and contrast old and new challenges in IoT.	

<b>CO2</b>	2. Apply various communication protocol and its building blocks in IoT applications.
<b>CO3</b>	3. Illustrate relevance of IoT with cloud and Web and analyze various security challenges and also evaluate various control strategies for the same.
<b>CO4</b>	4. Create, Design and Develop various applications based on IoT concepts.

**Fourth Year: Semester VII:**

<b>Data Mining(T/P)</b>		<b>IT1427/IT1428</b>
<b>CO1</b>	1. Understand basic concepts in data mining, Identify the scope and necessity of Data Mining for the society and for business applications.	
<b>CO2</b>	2. Apply different data mining algorithms on given data set.	
<b>CO3</b>	3. Analyze alternative data mining implementations and what might be most appropriate for a given data mining task.	
<b>CO4</b>	4. Develop algorithm for mining application specific data.	
<b>CO5</b>	5. Use popular data mining tool and apply the principle algorithms and techniques used in data mining, on different types of dataset, analyze their results, interpret the results using different visualization techniques.	

<b>Principle Of Compiler Design(T/P)</b>		<b>IT1403</b>
<b>CO1</b>	1. Understand different phases of compilation process, lexical analyzer tool “Lex” OR “Flex” and YACC or Bison tool	
<b>CO2</b>	2. Apply parsing techniques, Syntax directed translation schemes and optimization techniques for recognition of programming language statements	
<b>CO3</b>	3. Design and Implement a Compiler for a Small Programming Language Source Program	

<b>Cloud Computing</b>		<b>IT1432</b>
<b>CO1</b>	1. Understand the different computing paradigm, analyze and apply cloud computing services, deployment model for building cloud	
<b>CO2</b>	2. Apply the concepts and techniques in cloud computing	
<b>CO3</b>	3. Analyze the problems and apply design considerations for cloud application	
<b>CO4</b>	4. Provide the appropriate cloud computing solutions for building cloud application	

<b>Real Time Systems</b>		<b>IT1407</b>
<b>CO1</b>	1. Enumerate the need and the challenges in the design of hard and soft real time systems.	
<b>CO2</b>	2. Compare different scheduling algorithms and the schedulability criteria.	
<b>CO3</b>	3. Determine schedulability of a set of periodic tasks given a scheduling algorithm.	
<b>CO4</b>	4. Devise algorithms to decide the admission criterion of sporadic jobs and the schedule of aperiodic jobs.	

<b>Network Security</b>		<b>IT1422</b>
<b>CO1</b>	1. Understand different security techniques of network security	
<b>CO2</b>	2. Analyze the vulnerabilities in any computing system and identify the security issues	
<b>CO3</b>	3. Apply security mechanisms using rigorous approaches in the network and resolve it.	
<b>CO4</b>	4. Design a security solution by Comparing different security standards for electronic mail	

<b>Neural Network and Fuzzy Logic(T/P)</b>		<b>IT1415/IT1416</b>
<b>CO1</b>	1. To understand the working of Neural Networks as pattern classifier	
<b>CO2</b>	2. Comprehend the Neural Networks as means for computational learning and to analyze the basic network architectures and algorithms	
<b>CO3</b>	3. Effectively use existing software tools to solve real problems using a neural network approach	
<b>CO4</b>	4. Apply the basics of fuzzy sets, its operations, fuzzy logic and fuzzy relation to model linguistic knowledge in human experts and To build systems based on fuzzy control and to understand the basics of fuzzy inference and reasoning	

<b>Distributed Systems(T/P)</b>		<b>IT1421/IT1440</b>
<b>CO1</b>	1. Identify the advantages and challenges in designing distributed algorithms for different primitives like mutual exclusion, deadlock detection, agreement, etc.	
<b>CO2</b>	2. Differentiate between different types of faults and fault handling techniques in order to implement fault tolerant systems.	

<b>CO3</b>	3. Analyze different algorithms and techniques for the design and development of distributed systems subject to specific design and performance constrain
<b>CO4</b>	4. Design and develop distributed programs using sockets and RPC/RMI.

<b>Network Programming(T/P)</b>		<b>IT1417/IT1418</b>
<b>CO1</b>	1. Understand the main protocols comprising the Internet.	
<b>CO2</b>	2. Apply the client-server model in networking applications.	
<b>CO3</b>	3. Analyze the network services such as packages and protocol that communicate through the Internet.	
<b>CO4</b>	4. Develop skills in network programming techniques for Network Management .	

**Fourth Year: Semester VIII:**

<b>Major Project/ INTERNSHIP</b>		<b>IT2451</b>
<b>CO1</b>	1:Understand the knowledge gained from the various courses undergone in earlier years.	
<b>CO2</b>	2: Able to work in team and adapt professional ethics and practice and how to write technical documents in professional style, and to demonstrate the product/software to technical audience.	
<b>CO3</b>	3: able to evaluate and analyze critically different sources of data available in the literature and apply the knowledge of tools/Technology.	
<b>CO4</b>	4:able to design and develop a system/Software for community or professional use	