

**COURSE OUTCOMES - Regulation- 2021 – UG**

<b>YEAR/SEMESTER: I/I</b>	
<b>C101/HS3151 PROFESSIONAL ENGLISH - I</b>	
<b>C101.1</b>	To listen and comprehend complex academic texts
<b>C101.2</b>	To read and infer the denotative and connotative meaning of technical texts
<b>C101.3</b>	To write definitions, descriptions, narrations and essays on various topics
<b>C101.4</b>	To speak fluently and accurately in formal and informal communicative contexts
<b>C101.5</b>	To express their opinions effectively in both oral and written medium of communication

<b>C102/MA3151 - MATRICES AND CALCULUS</b>	
<b>C102.1</b>	Use the matrix algebra methods for solving practical problems
<b>C102.2</b>	Apply differential calculus tools in solving various application problems
<b>C102.3</b>	Able to use differential calculus ideas on several variable functions
<b>C102.4</b>	Apply different methods of integration in solving practical problems
<b>C102.5</b>	Apply multiple integral ideas in solving area, volumes and other practical problems

<b>C104/CY3151 - ENGINEERING CHEMISTRY</b>	
<b>C104.1</b>	To infer the quality of water from quality parameter data and propose suitable treatment methodologies to treat water
<b>C104.2</b>	To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications
<b>C104.3</b>	To apply the knowledge of phase rule and composites for material selection requirements
<b>C104.4</b>	To recommend suitable fuels for engineering processes and applications
<b>C104.5</b>	To recognize different forms of energy resources and apply them for suitable applications in energy sectors.

<b>C105/GE3151 - PROBLEM SOLVING AND PYTHON PROGRAMMING</b>	
<b>C105.1</b>	Develop algorithmic solutions to simple computational problems.
<b>C105.2</b>	Develop and execute simple Python programs.
<b>C105.3</b>	Write simple Python programs using conditionals and looping for solving problems.
<b>C105.4</b>	Decompose a Python program into functions.
<b>C105.5</b>	Represent compound data using Python lists, tuples, dictionaries etc.
<b>C105.6</b>	Read and write data from/to files in Python programs.

<b>C106/GE3171 - PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY</b>	
<b>C106.1</b>	Develop algorithmic solutions to simple computational problems
<b>C106.2</b>	Develop and execute simple Python programs.
<b>C106.3</b>	Implement programs in Python using conditionals and loops for solving problems.
<b>C106.4</b>	Deploy functions to decompose a Python program.
<b>C106.5</b>	Process compound data using Python data structures.
<b>C106.6</b>	Utilize Python packages in developing software applications.

<b>C107/ BS3171- PHYSICS AND CHEMISTRY LABORATORY</b>	
<b>CHEMISTRY LABORATORY</b>	
<b>C107.1</b>	To analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO
<b>C107.2</b>	To determine the amount of metal ions through volumetric and spectroscopic techniques
<b>C107.3</b>	To analyse and determine the composition of alloys.
<b>C107.4</b>	To learn simple method of synthesis of nanoparticles
<b>C107.5</b>	To quantitatively analyze the impurities in solution by electroanalytical techniques

<b>PHYSICS LABORATORY</b>	
<b>C107.1</b>	To learn the proper use of various kinds of physics laboratory equipment.
<b>C107.2</b>	To learn how data can be collected, presented and interpreted in a clear and concise manner.
<b>C107.3</b>	To learn problem solving skills related to physics principles and interpretation of experimental data.
<b>C107.4</b>	To determine error in experimental measurements and techniques

	used to minimize such error
<b>C107.5</b>	To make the student an active participant in each part of all lab exercises.

<b>C108/ GE3172- ENGLISH LABORATORY</b>	
<b>C108.1</b>	To listen and comprehend complex academic texts
<b>C108.2</b>	To speak fluently and accurately in formal and informal communicative contexts
<b>C108.3</b>	To express their opinions effectively in both oral and written medium of communication

<b>YEAR/SEMESTER: II/III</b>	
<b>C301/MA3351-TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS</b>	
<b>C301.1</b>	Understand how to solve the given standard partial differential equations.
<b>C301.2</b>	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications.
<b>C301.3</b>	Appreciate the physical significance of Fourier series techniques in solving one-and two-dimensional heat flow problems and one-dimensional wave equations.
<b>C301.4</b>	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering.
<b>C301.5</b>	Use the effective mathematical tools for the solutions of partial differential equations by using Z transform techniques for discrete time systems

<b>C302/ME3351-ENGINEERING MECHANICS</b>	
<b>C302.1</b>	Illustrate the vector and scalar representation of forces and moments
<b>C302.2</b>	Analyze the rigid body in equilibrium
<b>C302.3</b>	Evaluate the properties of distributed forces
<b>C302.4</b>	Determine the friction and the effects by the laws of friction

<b>C302.5</b>	Calculate dynamic forces exerted in rigid body
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<b>C303/ME3391-ENGINEERING THERMODYNAMICS</b>	
<b>C303.1</b>	Apply the zeroth and first law of thermodynamics by formulating temperature scales and calculating the property changes in closed and open engineering systems.
<b>C303.2</b>	Apply the second law of thermodynamics in analyzing the performance of thermal devices through energy and entropy calculations.
<b>C303.3</b>	Apply the second law of thermodynamics in evaluating the various properties of steam through steam tables and Mollier chart
<b>C303.4</b>	Apply the properties of pure substance in computing the macroscopic properties of ideal and real gases using gas laws and appropriate thermodynamic relations.
<b>C303.5</b>	Apply the properties of gas mixtures in calculating the properties of gas mixtures and applying various thermodynamic relations to calculate property changes.

<b>C304/CE3391-FLUID MECHANICS AND MACHINERY</b>	
<b>C304.1</b>	Understand the properties and behavior in static conditions. Also, to understand the conservation laws applicable to fluids and its application through fluid kinematics and dynamics
<b>C304.2</b>	Estimate losses in pipelines for both laminar and turbulent conditions and analysis of pipes connected in series and parallel. Also, to understand the concept of boundary layer and its thickness on the flat solid surface.
<b>C304.3</b>	Formulate the relationship among the parameters involved in the given fluid phenomenon and to predict the performances of prototype by model studies
<b>C304.4</b>	Explain the working principles of various turbines and design the various types of turbines.
<b>C304.5</b>	Explain the working principles of centrifugal, reciprocating and rotary pumps and design the centrifugal and reciprocating pumps
<b>C305/ME3392-ENGINEERING MATERIALS AND METALLURGY</b>	
<b>C305.1</b>	Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification.
<b>C305.2</b>	Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes.
<b>C305.3</b>	Clarify the effect of alloying elements on ferrous and non-ferrous

	metals.
<b>C305.4</b>	Summarize the properties and applications of non-metallic materials.
<b>C305.5</b>	Explain the testing of mechanical properties.

<b>C306/ME3393-MANUFACTURING PROCESSES</b>	
<b>C306.1</b>	Explain the principle of different metal casting processes.
<b>C306.2</b>	Describe the various metal joining processes.
<b>C306.3</b>	Illustrate the different bulk deformation processes.
<b>C306.4</b>	Apply the various sheet metal forming process.
<b>C306.5</b>	Apply suitable molding technique for manufacturing of plastics components.

<b>C307/ME3381-COMPUTER AIDED MACHINE DRAWING</b>	
<b>C307.1</b>	Prepare standard drawing layout for modelled assemblies with BoM.
<b>C307.2</b>	Model orthogonal views of machine components.
<b>C307.3</b>	Prepare standard drawing layout for modelled parts

<b>C308/ME3382-MANUFACTURING TECHNOLOGY LABORATORY</b>	
<b>C308.1</b>	Demonstrate the safety precautions exercised in the mechanical workshop and jointwo metals using GMAW.
<b>C308.2</b>	The students able to make the work piece as per given shape and size using machining process such as rolling, drawing, turning, shaping, drilling and milling.
<b>C308.3</b>	The students become make the gears using gear making machines and analyze the defects in the cast and machined components

<b>YEAR/SEMESTER: II/III</b>	
<b>C301/ MA3354-DISCRETE MATHEMATICS</b>	
<b>C301.1</b>	Have knowledge of the concepts needed to test the logic of a program
<b>C301.2</b>	Have an understanding in identifying structures on many levels

<b>C301.3</b>	Be aware of a class of functions which transform a finite set into another finite set which relate to input and output functions in computer science.
<b>C301.4</b>	Be aware of the counting principles
<b>C301.5</b>	Be exposed to concepts and properties of algebraic structures such as groups, rings and fields.

<b>C302/CS3352 - DIGITAL PRINCIPLES AND COMPUTER ORGANIZATION</b>	
<b>C302.1</b>	Design various combinational digital circuits using logic gates
<b>C302.2</b>	Design sequential circuits and analyze the design procedures
<b>C302.3</b>	State the fundamentals of computer systems and analyze the execution of an instruction
<b>C302.4</b>	Analyze different types of control design and identify hazards
<b>C302.5</b>	Identify the characteristics of various memory systems and I/O communication

<b>C303/ CS3352 FOUNDATIONS OF DATA SCIENCE</b>	
<b>C303.1</b>	Define the data science process
<b>C303.2</b>	Understand different types of data description for data science process
<b>C303.3</b>	Gain knowledge on relationships between data
<b>C303.4</b>	Use the Python Libraries for Data Wrangling
<b>C303.5</b>	Apply visualization Libraries in Python to interpret and explore data

<b>C304/ CS3301 DATA STRUCTURES</b>	
<b>C304.1</b>	Define linear and non-linear data structures.
<b>C304.2</b>	Implement linear and non-linear data structure operations
<b>C304.3</b>	Use appropriate linear/non-linear data structure operations for solving a given problem.
<b>C304.4</b>	Apply appropriate graph algorithms for graph applications.
<b>C304.5</b>	Analyze the various searching and sorting algorithms.

<b>C305/ CS3391 OBJECT ORIENTED PROGRAMMING</b>	
<b>C305.1</b>	Apply the concepts of classes and objects to solve simple problems
<b>C305.2</b>	Develop programs using inheritance, packages and interfaces

<b>C305.3</b>	Make use of exception handling mechanisms and multithreaded model to solve real world problems
<b>C305.4</b>	Build Java applications with I/O packages, string classes, Collections and generics concepts
<b>C305.5</b>	Integrate the concepts of event handling and JavaFX components and controls for developing GUI based applications

<b>C306/ CS3311 DATA STRUCTURES LABORATORY</b>	
<b>C306.1</b>	Implement Linear data structure algorithms.
<b>C306.2</b>	Implement applications using Stacks and Linked lists
<b>C306.3</b>	Implement Binary Search tree and AVL tree operations
<b>C306.4</b>	Implement graph algorithms
<b>C306.5</b>	Analyze the various searching and sorting algorithms.

<b>C307/ CS3381 OBJECT ORIENTED PROGRAMMING LABORATORY</b>	
<b>C307.1</b>	Design and develop java programs using object oriented programming concepts
<b>C307.2</b>	Develop simple applications using object oriented concepts such as package, exceptions
<b>C307.3</b>	Implement multithreading, and generics concepts
<b>C307.4</b>	Create GUIs and event driven programming applications for real world problems
<b>C307.5</b>	Implement and deploy web applications using Java

<b>C308/ CS3361 DATA SCIENCE LABORATORY</b>	
<b>C308.1</b>	Make use of the python libraries for data science
<b>C308.2</b>	Make use of the basic Statistical and Probability measures for data science
<b>C308.3</b>	Perform descriptive analytics on the benchmark data sets
<b>C308.4</b>	Perform correlation and regression analytics on standard data sets
<b>C308.5</b>	Present and interpret data using visualization packages in Python.

<b>C309/ GE3361 PROFESSIONAL DEVELOPMENT</b>	
<b>C308.1</b>	Use MS Word to create quality documents, by structuring and organizing content for their day to day technical and academic requirements
<b>C308.2</b>	Use MS EXCEL to perform data operations and analytics, record, retrieve data as per requirements and visualize data for ease of understanding
<b>C308.3</b>	Use MS PowerPoint to create high quality academic presentations

	by including common tables, charts, graphs, interlinking other elements, and using media objects.
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<b>YEAR/SEMESTER: II/IV</b>	
<b>C401/ CS3452 THEORY OF COMPUTATION</b>	
<b>C401.1</b>	Construct automata theory using Finite Automata
<b>C401.2</b>	Write regular expressions for any pattern
<b>C401.3</b>	Design context free grammar and Pushdown Automata
<b>C401.4</b>	Design Turing machine for computational functions
<b>C401.5</b>	Differentiate between decidable and undecidable problems

<b>C402/CS3491 ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING</b>	
<b>C402.1</b>	Use appropriate search algorithms for problem solving
<b>C402.2</b>	Apply reasoning under uncertainty
<b>C402.3</b>	Build supervised learning models
<b>C402.4</b>	Build ensembling and unsupervised models
<b>C402.5</b>	Build deep learning neural network models

<b>C403/ CS3492 DATABASE MANAGEMENT SYSTEMS</b>	
<b>C403.1</b>	Explain the basic concepts of machine learning.
<b>C403.2</b>	Design database using ER model and normalize the database
<b>C403.3</b>	Construct queries to handle transaction processing and maintain consistency of the database
<b>C403.4</b>	Compare and contrast various indexing strategies and apply the knowledge to tune the performance of the database
<b>C403.5</b>	Appraise how advanced databases differ from Relational Databases and find a suitable database for the given requirement.

<b>C404/ CS3401 ALGORITHMS</b>	
<b>C404.1</b>	Analyze the efficiency of algorithms using various frameworks
<b>C404.2</b>	Apply graph algorithms to solve problems and analyze their efficiency
<b>C404.3</b>	Make use of algorithm design techniques like divide and conquer, dynamic programming and greedy techniques to solve problems
<b>C404.4</b>	Use the state space tree method for solving problems
<b>C404.5</b>	Solve problems using approximation algorithms and randomized algorithms



<b>C405/ CS3451 INTRODUCTION TO OPERATING SYSTEMS</b>	
<b>C405.1</b>	Analyze various scheduling algorithms and process synchronization.
<b>C405.2</b>	Explain deadlock prevention and avoidance algorithms.
<b>C405.3</b>	Compare and contrast various memory management schemes
<b>C405.4</b>	Explain the functionality of file systems, I/O systems, and Virtualization
<b>C405.5</b>	Compare iOS and Android Operating Systems.

<b>C406/ GE3451 ENVIRONMENTAL SCIENCES AND SUSTAINABILITY</b>	
<b>C406.1</b>	Study the scope and importance of the environment and biodiversity.
<b>C406.2</b>	Gain knowledge on causes, effects, and preventive measures for environmental pollution and environmental protection.
<b>C406.3</b>	Apply the concepts of energy management and conservation using renewable sources of energy.
<b>C406.4</b>	Develop practices for sustainable development and climate change mitigation.
<b>C406.5</b>	Plan an environmental impact assessment and apply green engineering concepts for environmental management.

<b>C407/ CS3461 OPERATING SYSTEMS LABORATORY</b>	
<b>C407.1</b>	Define and implement UNIX Commands.
<b>C407.2</b>	Compare the performance of various CPU Scheduling Algorithms
<b>C407.3</b>	Compare and contrast various Memory Allocation Methods.
<b>C407.4</b>	Define File Organization and File Allocation Strategies.
<b>C407.5</b>	Implement various Disk Scheduling Algorithms.

<b>C408/ CS3481 DATABASE MANAGEMENT SYSTEMS LABORATORY</b>	
<b>C408.1</b>	Create databases with different types of key constraints
<b>C408.2</b>	Construct simple and complex SQL queries using DML and DCL commands.
<b>C408.3</b>	Use advanced features such as stored procedures and triggers and incorporate in GUI based application development
<b>C408.4</b>	Create an XML database and validate with meta-data (XML schema)
<b>C408.5</b>	Create and manipulate data using NOSQL database.