RAJIV GANDHI COLLEGE OF ENGINEERING AND TECHNOLOGY
Pondy Cuddalore Main Road, Kirumampakkam, Puducherry – 607 403.
Affiliated to Pondicherry University and Approved by AICTE, New Delhi

FIRST YEAR ENGINEERING

Department of CSE/IT

ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(CSBS101- Mathematics - I) [Total no. of. Students: 155] [I/ODD Semester, Group 1]

Course Prerequisite: To comprehend the mathematical concepts of matrices, ordinary differential equations, multivariable calculus and problem-solving.

Course Objective:

1. To solve practical problems using Matrix algebra.
2. To solve varies types of ordinary differential equations, including higher order linear equations.
3. To compute partial derivatives, determine total derivatives, Jacobians, employ Taylor series
4. To demonstrate proficiency in evaluating double integration and triple integration

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Outline the fundamental concepts in automata theory and formal languages. (KNOWLEDGE)	L2
CO2	Explain context-free grammars, properties of languages, grammars and automata with rigorously formal mathematical method. (UNDERSTANDING)	L2
CO3	Differentiate and manipulate formal descriptions of push down automata, its applications and transducer machines. (ANALYZE)	L3
CO4	Illustrate the basic properties of Turing machines and computing the tractability and decidability with Turing machine. (APPLY)	L3
CO5	Analyze the limitations of computational models and possible methods of proving them. (ANALYZE)	L2

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Recognize the ideas and applications of mathematics
PSO2	Manage the sophisticated mathematical approaches.
PSO3	Utilize the principles of practical applications.

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	-	2	-	-	-	-	-	-	-	-	2	1	2
CO2	3	3	-	2	-	-	-	-	-	-	-	-	2	2	2
CO3	3	3	-	3	-	-	-	-	-	-	-	-	3	2	2
CO4	3	2	-	2	-	-	-	-	-	-	-	-	2	2	2
CO5	3	3	2	2	-	-	-	-	-	-	-	-	2	3	3
AVG	3	2.8	2	2.2	-	-	-	-	-	-	-	-	2.2	2	2.2

HEAD OF THE DEPARTMENT

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FIRST YEAR ENGINEERING

Department of CSE / IT

ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(CS/IT BS104-Physics for Engineers) [Total no. of. Students: 155] [I / ODD Semester, Group 1]

Course Prerequisite: Knowledge of Basic Science

Course Objective:

1. To learn the fundamental concepts of oscillations, waves, optics, applications of real-life optical systems,

communication and other applications.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	To understand physical characteristics of SHM and obtaining solution of the oscillator using differential equations	L1&L2
CO2	To gain knowledge on transverse and longitudinal waves in one dimension.	L1&L2
CO3	To acquire skills to identify and apply formulas of optics and wave physics.	L1&L3
CO4	To apply principles of interference, diffraction and polarization gain knowledge on interferometers.	L1&L3
CO5	To gain knowledge on lasers to engineering situations.	L1L2&L3

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Foundation of basic science
PSO2	Foundation of mathematical concept
PSO3	Foundation of Software and Business technology

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	1	-	-	3	-	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	2.2	0.6	-	0.6	-	-	-	-	-	-	-	-	-	-	-

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FIRST YEAR ENGINEERING

Department of CSE /IT

ACADEMIC YEAR 2023-2024

COURSE OBJECTIVES

(CSES103 - Basic Electronics Engineering) [Total no. of. Students: 155 [I/ODD Semester, Group 1]

Course Prerequisite: The necessary foundational knowledge to understand and engage with the concepts and principles taught in a basic Electronics course

Course Objective:

1. To understand and gain basic knowledge about Magnetic and electrical circuits.
2. To learn the concept of single phase and three phase circuit with power measurement.
3. To study the operating principles of Static machines.
4. To understand the basic operation, function and application of PN junction diode, logic gates and flipflops.
5. To gain knowledge on various communication system and network models and the use of ISDN.

COS	Upon successful completion of this course, students should be able to:	LEVEL
CO1	understand and gain basic knowledge about Magnetic and electrical circuits.	L2
CO2	Understand the concept of single phase and three phase circuit with power measurement.	L2
CO3	Understand the operating principles of Static machines	L2
CO4	Understand the basic operation, function and application of PN junction diode, logic gates and flipflops.	L6
CO5	To gain knowledge on various communication system and network models and the use of ISDN.	L2

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Understanding of Basic Concepts, Circuit Analysis Skills, Practical Skills.
PSO2	Problem-Solving Abilities, Knowledge of Semiconductors, Digital Electronics.
PSO3	Communication Skills, Ethical and Professional Responsibility

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	–	3	–	2	3	1	2	1	–	1	3	3	2	–
CO2	3	2	3	–	–	3	1	2	1	–	–	3	2	3	1
CO3	3	2	3	–	–	3	1	2	1	–	1	3	3	–	1
CO4	3	3	3	–	2	3	1	3	1	2	3	3	3	–	2
CO5	3	3	3	–	–	3	1	3	1	2	2	3	–	2	1
AVG	3	2.5	3	0	2	3	1	2.4	1	0.4	0.6	3	2.75	2.3	1.25

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FIRST YEAR ENGINEERING

Department of CSE / IT

ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(CS/IT BL102-Physics Lab for Engineers) [Total no. of. Students:155] [I / ODD Semester, Group 1]

Course Prerequisite: Proficiency in basic laboratory skills and techniques is often required.

Course Objective:

1. To understand the working principles of spectrometer, polarimeter, curvature of lens and determination of optical absorption.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	To understand and experiment Newtons rings.	L2&L4
CO2	To understand the principles, concepts abd comparison of results with theoretical calculations.	L2&L5
CO3	To understand measurement technology, usage of new instruments and real time applications in engineering studies.	L2&L3
CO4	To state various laws which they have studied through experiments.	L1&L4
CO5	To describe principles of optical fibre communication.	L1&L2

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Foundation of Optical concept
PSO2	Foundation of Experimental Skills
PSO3	Foundation of Data Analysis

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CO2	3	3	-	3	-	-	-	-	-	-	-	-	3	-	-
CO3	3	3	-	-	-	-	-	-	-	-	-	-	3	-	-
CO4	3	-	-	3	-	-	-	-	-	-	-	-	3	-	-
CO5	3	-	-	3	-	-	-	-	-	-	-	-	3	-	-
AVG	3	1.2	-	1.2	-	-	-	-	-	-	-	-	3	-	-

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FIRST YEAR ENGINEERING

Department of CSE / IT

ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(CSEL 102- Basic Electronics Engineering Lab)[Total no. of. Students: 155][I / ODD Semester, Group 1]

Course Prerequisite: Knowledge of Basic Electronics Engineering

Course Objective:

1.To understanding and hands-on experience with fundamental concepts and techniques.
2.To Provide a solid foundation in the behavior and characteristics of electrical and electronic components.
3. To Enable students to build, test, and troubleshoot basic electronic circuits.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Gain a fundamental understanding of electronic components, circuits, and systems.	L1&l3
CO2	Ability to analyze and construct basic electronic circuits. Develop skills to design simple electronic circuits using components like resistors, capacitors, inductors, diodes, and transistors.	L3
CO3	Proficiency in using electronic measuring instruments such as multimeters, oscilloscopes, function generators, and power supplies.	L3&L4
CO4	Develop hands-on skills in soldering, breadboarding, and creating circuit layouts. Conduct experiments to verify theoretical concepts learned in lectures	L1& L3
CO5	Improve teamwork skills through collaborative lab work. Develop communication skills by documenting experiments, writing reports, and presenting findings.	L1&L3

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Develop the ability to understand and apply fundamental principles of electronics engineering in practical scenarios
PSO2	Foundation of Accurately measure and interpret electrical quantities like voltage, current, resistance, and frequency
PSO3	Equip students with the necessary skills and knowledge to excel in industry or higher education programs

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of electrical and electronics engineering	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	-	1	-	_	1	_	_	3	_	_	_	_	_	3
CO2	3	-	1	-	_	1	_	_	3	_	_	_	_	_	3
CO3	3	-	1	-	_	1	_	_	3	_	_	_	_	_	3
CO4	3	-	1	-	_	1	_	_	3	_	_	_	_	_	3
CO5	3	-	1	-	_	1	_	_	3	_	_	_	_	_	3
AVG	3	-	1	-	_	1	_	_	3	_	_	_	_	_	3

HEAD OF THE DEPARTMENT

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FIRST YEAR ENGINEERING

Department of CSE/ IT
ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(ESC-102 – Engineering Graphics & design.) [Total no.of.Students:155] [1/ODD Semester, Group 1]

Course Objective:

1. To understand the fundamental concepts and importance of engineering graphics in the design process.
2. To develop skills in technical drawing, including geometric constructions, orthographic projections, and isometric views.
3. To become proficient in using CAD software for creating, modifying, and analyzing engineering drawings.
4. To apply engineering graphics principles to solve real-world design problems.
5. To understand Application of Engineering Graphics Principles.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Application of Engineering Graphics Principles.	L2
CO2	Create and interpret technical drawings, including geometric constructions, orthographic projections, isometric and oblique views, and sectional views.	L2
CO3	Implement standards and conventions for dimensioning and tolerance in engineering drawings.	L3
CO4	Utilize CAD software proficiently for creating, modifying, and analyzing 2D and 3D engineering drawings.	L2
CO5	Apply engineering graphics principles to develop comprehensive engineering drawing projects and solve real-world design problems.	L2

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Ability to create accurate technical drawings using standard drawing conventions, symbols, and notations.
PSO2	Competence in performing geometric constructions and generating views (orthographic, isometric, sectional) of engineering components.
PSO3	Ability to visualize and interpret complex 3D objects from 2D drawings and vice versa, ensuring accurate representation and communication of engineering designs.

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	2	3	2	-	3	-	-	-	-	-	-	-	-	-	-
CO5	3	3	3	-	3	2	-	-	3	2	3	3	3	-	-
AVG	3	2.7	2.6		3	2	-	-	3	2	3	3	3	-	-

HEAD OF THE DEPARTMENT

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Rajiv Gandhi College of
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Department of CSE / IT
ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(**CSHL104 & ITHL104-** DESIGN THINKING) [Total no. of. Students: 155] [I Year, ODD Semester] Group 1

Course Prerequisite: To understand the new ways of creative thinking and learn the innovation cycle of Design Thinking process for developing innovative products.

Course Objective:

1. To help students comprehend the memory process, identify problems in retention, and apply techniques to enhance memory.
2. To define design thinking and explain its importance and objectives.
3. To teach the stages of engineering product design, using a design thinking approach.
4. To promote the understanding, acceptance, and appreciation of individual differences through group discussions and activities.
5. To solve practical engineering problems through innovative product design and creative solutions.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Students can compare and classify the various learning styles and memory techniques and apply them in their engineering education.	L2 to L5
CO2	Students will analyze emotional experience and inspect emotional expressions to better understand users while designing innovative products.	L1 to L5
CO3	Students will develop new ways of creative thinking and learn the innovation cycle of Design Thinking process for developing innovative products.	L1 to L5
CO4	Students can explore real-time innovative engineering product designs and choose appropriate frameworks, strategies, techniques during prototype development.	L1To L5
CO5	Students can perceive individual differences, its impact on everyday decisions and create a better customer experience.	L1

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Understanding the Learning Process and remembering memory.
PSO2	Stages of Design Thinking Process and Creative Thinking and Problem Solving.
PSO3	Understanding Individual Differences and Solving Practical Engineering Problems.

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	2	3	-	2	-	-	-		-	-	1	-	-	-
CO2	1	3	3	-	-	-	-	-	2	3	-	1	-	-	-
CO3	2	2	3	-	2	-	-	-	2	3	-	2	-	-	-
CO4	2	1	3	-	2	-	-	-	-	-	-	-	-	-	-
CO5	3	3	3	-	2	-	-	-	2	3	-	2	-	-	-
AVG	2	2.2	3	-	2	-	-	-	2	3	-	1.5	-	-	-

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FIRST YEAR ENGINEERING

Department of CSE/IT
ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(AU-101 –Idea Lab Workshop.) [Total no.of.Students:155] [1/ODD Semester, Group 1]

Course Objective:

1. To learn all the skills associated with the tools and inventory associated with the IDEA Lab.
2. Learn useful mechanical and electronic fabrication processes.
3. Develop proficiency in using digital design software CAD (Computer-Aided Design).
4. Learn necessary skills to build useful and standalone system/project with enclosures.
5. Learn necessary skills to create point and electronic documentation for the system/project.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Develop innovative solutions through creative thinking.	L2
CO2	Select 3D printing process for an applications.	L2
CO3	Utilize modern tools and techniques for electronic design and simulation.	L3
CO4	Utilize CAD software proficiently for creating, modifying, and analyzing 2D and 3D engineering drawings.	L2
CO5	Manage projects from inception to completion, ensuring effective resource management.	L2

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Ability to use computer aided design software
PSO2	Understanding of 3D printing technologies
PSO3	Graduates will be able to design, analyze, and implement analog and digital circuits using standard tools and methodologies.

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO3	PO4	P O5	P O6	PO 7	P O8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	2	-	-	3	3	-	-	-	-	3	-	-	-
CO2	3	2	3	3	-	3	2	-	-	-	-	3	-	-	-
CO3	2	2	3	-	-	-	-	-	3	-	-	-	-	-	-
CO4	2	3	2	3	2	-	-	3	-	-	-	-	-	-	-
CO5	3	3	-	-	3	2	-	-	3	-	-	3	-	-	-
AVG	2.6	2.6	2	3	2.5	2.6	2.5	3	3	-	-	3	-	-	-

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FIRST YEAR ENGINEERING

Department of ECE / BME

ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(BSCT 101- Chemistry) [Total no. of. Students: 75] [I / ODD Semester, Group 2]

Course Prerequisite: Knowledge of Basic Mathematics and General Science

Course Objective:

1. To acquaint the students with basic concepts of chemistry in understanding the atomic & molecular structure and its nanoscale applications.
2. To understand the fundamental concepts of various spectroscopic techniques and applications.
3. To understand the basic electrochemical properties such as thermodynamic functions, cell potentials, lead storage batteries, corrosion and phase rule.
4. To describe and explain the observed trends in atomic size, ionization energy, and electron affinity of the elements.
5. To identify various types, preparation and applications of polymer used in industrial processes.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Get an understanding of the theoretical principles understanding molecular structure, bonding and properties.	L2
CO2	Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.	L2
CO3	Understand and explain the thermodynamic functions and cell potentials for different applications.	L2
CO4	Rationalize specific models and processes for better understanding of material properties and applications.	L3
CO5	Learn the synthesis of various industrially important polymer and its applications.	L2

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Foundation of maths and basic science concepts
PSO2	Foundation of Electrochemistry
PSO3	Foundation of Spectroscopy

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	3	3	–	2	–	–	–	–	–	3	3	3	3
CO2	3	3	3	–	–	–	–	–	–	–	–	3	3	3	3
CO3	3	3	3	3	–	2	–	–	–	–	–	3	3	3	3
CO4	3	3	2	2	–	–	–	–	–	–	–	3	1	1	3
CO5	3	2	2	2	–	2	3	–	–	–	–	3	3	3	3
AVG	**3**	**2.8**	**2.6**	**2**	**0**	**1.2**	**0.6**	**0**	**0**	**0**	**0**	**3**	**2.6**	**2.6**	**3**

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FIRST YEAR ENGINEERING

Department of ECE/BME

ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(CSBS101- Mathematics - I) [Total no. of. Students: 75] [I/ODD Semester, Group 2]

Course Prerequisite: To comprehend the mathematical concepts of matrices, ordinary differential equations, multivariable calculus and problem-solving.

Course Objective:

1. To solve practical problems using Matrix algebra.
2. To solve varies types of ordinary differential equations, including higher order linear equations.
3. To compute partial derivatives, determine total derivatives, Jacobians, employ Taylor series
4. To demonstrate proficiency in evaluating double integration and triple integration

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Outline the fundamental concepts in automata theory and formal languages. (KNOWLEDGE)	L2
CO2	Explain context-free grammars, properties of languages, grammars and automata with rigorously formal mathematical method. (UNDERSTANDING)	L2
CO3	Differentiate and manipulate formal descriptions of push down automata, its applications and transducer machines. (ANALYZE)	L3
CO4	Illustrate the basic properties of Turing machines and computing the tractability and decidability with Turing machine. (APPLY)	L3
CO5	Analyze the limitations of computational models and possible methods of proving them. (ANALYZE)	L2

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Recognize the ideas and applications of mathematics
PSO2	Manage the sophisticated mathematical approaches.
PSO3	Utilize the principles of practical applications.

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	-	2	-	-	-	-	-	-	-	-	2	1	2
CO2	3	3	-	2	-	-	-	-	-	-	-	-	2	2	2
CO3	3	3	-	3	-	-	-	-	-	-	-	-	3	2	2
CO4	3	2	-	2	-	-	-	-	-	-	-	-	2	2	2
CO5	3	3	2	2	-	-	-	-	-	-	-	-	2	3	3
AVG	3	2.8	2	2.2	-	-	-	-	-	-	-	-	2.2	2	2.2

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FIRST YEAR ENGINEERING

Department of ECE / BME

ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(ESCT102 Programming for Problem Solving) [Total no. of. Students: 75] [I / ODD Semester, Group 2]

Course Prerequisite: Knowledge of Basic C-Programming, Writing of C-Programming.

Course Objective:

1. To introduce the basics of computers and information technology.
2. To educate problem solving techniques.
3. To impart programming skills in C language.
4. To practice structured programming to solve real life problems.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Understand basics of computers and information technology, concepts of C-Program as sequences and basics of computers.	L2
CO2	Understand different ways of program development cycle and I/O functions.	L2
CO3	Understand the basics of branching and looping and functions	L2
CO4	Understand arrays, structures and basics of Pointers.	L6
CO5	Understand the basic file operations and pre-processor.	L2

PO AND PSO OVERVIEW

Programme Outcomes		Program Specific Outcomes	
PO1	Engineering knowledge	PSO1	Foundation of mathematical concept
PO2	Problem analysis		
PO3	Design / development of solutions		
PO4	Conduct investigations of complex problem		
PO5	Modern tool usage	PSO2	Foundation of computer system
PO6	Engineer and Society		
PO7	Environment and sustainability		
PO8	Ethics		
PO9	Individual and team work	PSO3	Foundation of software development
PO10	Communication		
PO11	Project management and finance		
PO12	Life-long Learning		

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	–	–	–	–	–	–	–	–	–	2	3	1	–
CO2	3	2	3	–	1	–	–	–	–	–	–	2	2	1	–
CO3	2	3	–	–	1	–	–	–	–	–	–	2	3	1	–
CO4	3	3	2	–	1	–	–	–	–	–	–	2	2	1	–
CO5	–	3	–	–	1	–	–	–	–	–	–	1	3	1	–
AVG	2.2	2.8	1	0	0.8	0	0	0	0	0	0	1.8	2.6	1	0

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DEPARTMENT OF FIRST YEAR ENGINEERING

ACADEMIC YEAR 2023-24

Department of ECE/BME

COURSE OBJECTIVES

(BSCT 103- Biology for Engineers) [Total no. of. Students: 75] [I / ODD Semester, Group 2]

Course Prerequisite: Knowledge of Basic Science

Course Objective:

1. To familiarize the students with the basic biological concepts and their engineering applications.
2. To develop the interdisciplinary vision of biological engineering.
3. Familiarize engineering students with the principles of microbiology, including the structure and function of microorganisms, their significance in various engineering applications, and techniques for microbial analysis and identification

COS	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Describe how biological observations of 18th Century lead to major discoveries.	L2
CO2	Highlight the concepts of decisiveness and dominance during the passage of genetic material from parent to offspring	L2
CO3	Classify enzymes and distinguish between different mechanisms of enzyme action.	L2
CO4	Identify DNA as a genetic material in the molecular basis of information transfer.	L2
CO5	Identify and classify single celled microorganisms	L2

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Foundation of basic science
PSO2	Foundation of Genetics
PSO3	Foundation of Microorganism

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	-	-	-	-	-	3	-	-	1	-	2	-	-	-
CO2	3	-	-	-	-	-	3	-	-	1		2	-	-	-
CO3	3	-	-	-	-	-	3	-	-	1		2	-	-	-
CO4	3	-	-	-	-	-	3	-	-	1		2	-	-	-
CO5	3	-	-	-	-	-	3	-	-	1		2	-	-	-
AVG	**3**	-	-	-	-	-	**3**	-	-	**1**		**2**	-	-	-

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Department of ECE / BME

ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(BSCP 101- Chemistry Lab) [Total no. of. Students: 75] [I / ODD Semester, Group 2]

Course Prerequisite: Knowledge of Basic Mathematics and General Science

Course Objective:

1. To enable students to get a hands-on experience of determining various analysis parameters learnt in the theory course using different methods/techniques prevalent in analytical chemistry
2. To experiment various methods of volumetric analysis - Redox, Iodometric, complexometric, Neutralization etc.
3. To experiment use of conductivity meter for measurement of conductance of water sample.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	To illustrate principles of physical chemistry relevant to study of rate of reactions.	L2
CO2	To estimate rate constants of reactions from concentration of reactants/products as a function of time.	L3
CO3	To measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.	L3
CO4	To understand the changes in matter and acquire scientific skills in the laboratory	L3
CO5	To synthesize a small drug molecule and analyze a salt sample	L3

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Foundation of maths and basic science concepts
PSO2	Foundation of chemical principles in handling instruments/techniques
PSO3	Foundation of Salt analysis and synthesis of drug molecules

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	3	3	2	2	2	_	3	3	_	3	3	3	3
CO2	3	3	3	3	2	2	2	_	3	3	_	3	3	3	3
CO3	3	3	3	3	2	2	3	_	3	3	_	3	3	3	3
CO4	3	3	3	3	1	2	3	2	3	3	_	3	1	2	3
CO5	3	2	2	3	1	2	3	2	3	3	_	3	2	2	3
AVG	3	2.8	2.8	3	1.6	2	2.6	0.8	3	3	0	3	2.4	2.6	3

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FIRST YEAR ENGINEERING

Department of ECE/BME
ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(ESCP-101 – Engineering Graphics & design.) [Total no.of.Students:75] [1/ODD Semester, Group 2]

Course Objective:

1. To understand the fundamental concepts and importance of engineering graphics in the design process.
2. To develop skills in technical drawing, including geometric constructions, orthographic projections, and isometric views.
3. To become proficient in using CAD software for creating, modifying, and analyzing engineering drawings.
4. To apply engineering graphics principles to solve real-world design problems.
5. To understand Application of Engineering Graphics Principles.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Application of Engineering Graphics Principles.	L2
CO2	Create and interpret technical drawings, including geometric constructions, orthographic projections, isometric and oblique views, and sectional views.	L2
CO3	Implement standards and conventions for dimensioning and tolerance in engineering drawings.	L3
CO4	Utilize CAD software proficiently for creating, modifying, and analyzing 2D and 3D engineering drawings.	L2
CO5	Apply engineering graphics principles to develop comprehensive engineering drawing projects and solve real-world design problems.	L2

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Ability to create accurate technical drawings using standard drawing conventions, symbols, and notations.
PSO2	Competence in performing geometric constructions and generating views (orthographic, isometric, sectional) of engineering components.
PSO3	Ability to visualize and interpret complex 3D objects from 2D drawings and vice versa, ensuring accurate representation and communication of engineering designs.

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	2	3	2	-	3	-	-	-	-	-	-	-	-	-	-
CO5	3	3	3	-	3	2	-	-	3	2	3	3	3	-	-
AVG	3	2.7	2.6		3	2	-	-	3	2	3	3	3	-	-

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FIRST YEAR ENGINEERING

Department of ECE / BME

ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(ESCP102 Programming for Problem Solving Lab) [Total no. of. Students: 75] [I / ODD Semester, Group 2]

Course Prerequisite: Knowledge of Basic C-Programming, Writing of C-Programming.

Course Objective:

1. To introduce the basics of computers and information technology.
2. To educate problem solving techniques.
3. To impart programming skills in C language.
4. To practice structured programming to solve real life problems.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Understand basics of computers and information technology, concepts of C-Program as sequences and basics of computers.	L2
CO2	Understand different ways of program development cycle and I/O functions.	L2
CO3	Understand the basics of branching and looping and functions	L2
CO4	Understand arrays, structures and basics of Pointers.	L6
CO5	Understand the basic file operations and pre-processor.	L2

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Foundation of mathematical concept
PSO2	Foundation of computer system
PSO3	Foundation of software development

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	–	–	–	–	–	–	–	–	–	2	3	1	–
CO2	3	2	3	–	1	–	–	–	–	–	–	2	2	1	–
CO3	2	3	–	–	1	–	–	–	–	–	–	2	3	1	–
CO4	3	3	2	–	1	–	–	–	–	–	–	2	2	1	–
CO5	–	3	–	–	1	–	–	–	–	–	–	1	3	1	–
AVG	2.2	2.8	1	0	0.8	0	0	0	0	0	0	1.8	2.6	1	0

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FIRST YEAR ENGINEERING

Department of BME/ECE
ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(**ESCP103**- DESIGN THINKING) [Total no. of. Students: 75] [I Year, ODD Semester] Group 2

Course Prerequisite: To understand the new ways of creative thinking and learn the innovation cycle of Design Thinking process for developing innovative products.

Course Objective:

1. To help students comprehend the memory process, identify problems in retention, and apply techniques to enhance memory.
2. To define design thinking and explain its importance and objectives.
3. To teach the stages of engineering product design, using a design thinking approach.
4. To promote the understanding, acceptance, and appreciation of individual differences through group discussions and activities.
5. To solve practical engineering problems through innovative product design and creative solutions.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Students can compare and classify the various learning styles and memory techniques and apply them in their engineering education.	L2 to L5
CO2	Students will analyze emotional experience and inspect emotional expressions to better understand users while designing innovative products.	L1 to L5
CO3	Students will develop new ways of creative thinking and learn the innovation cycle of Design Thinking process for developing innovative products.	L1 to L5
CO4	Students can explore real-time innovative engineering product designs and choose appropriate frameworks, strategies, techniques during prototype development.	L1To L5
CO5	Students can perceive individual differences, its impact on everyday decisions and create a better customer experience.	L1

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Understanding the Learning Process and remembering memory.
PSO2	Stages of Design Thinking Process and Creative Thinking and Problem Solving.
PSO3	Understanding Individual Differences and Solving Practical Engineering Problems.

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	2	3	-	2	-	-	-		-	-	1	-	-	-
CO2	1	3	3	-	-	-	-	-	2	3	-	1	-	-	-
CO3	2	2	3	-	2	-	-	-	2	3	-	2	-	-	-
CO4	2	1	3	-	2	-	-	-	-	-	-	-	-	-	-
CO5	3	3	3	-	2	-	-	-	2	3	-	2	-	-	-
AVG	2	2.2	3	-	2	-	-	-	2	3	-	1.5	-	-	-

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FIRST YEAR ENGINEERING

Department of ECE/BME
ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(AU-101 –Idea Lab Workshop.) [Total no.of.Students:75] [1/ODD Semester, Group 2]

Course Objective:

1. To learn all the skills associated with the tools and inventory associated with the IDEA Lab.
2. Learn useful mechanical and electronic fabrication processes.
3. Develop proficiency in using digital design software CAD (Computer-Aided Design).
4. Learn necessary skills to build useful and standalone system/project with enclosures.
5. Learn necessary skills to create point and electronic documentation for the system/project.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Develop innovative solutions through creative thinking.	L2
CO2	Select 3D printing process for an applications.	L2
CO3	Utilize modern tools and techniques for electronic design and simulation.	L3
CO4	Utilize CAD software proficiently for creating, modifying, and analyzing 2D and 3D engineering drawings.	L2
CO5	Manage projects from inception to completion, ensuring effective resource management.	L2

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Ability to use computer aided design software
PSO2	Understanding of 3D printing technologies
PSO3	Graduates will be able to design, analyze, and implement analog and digital circuits using standard tools and methodologies.

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO3	PO4	P O5	P O6	PO 7	P O8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	2	-	-	3	3	-	-	-	-	3	-	-	-
CO2	3	2	3	3	-	3	2	-	-	-	-	3	-	-	-
CO3	2	2	3	-	-	-	-	-	3	-	-	-	-	-	-
CO4	2	3	2	3	2	-	-	3	-	-	-	-	-	-	-
CO5	3	3	-	-	3	2	-	-	3	-	-	3	-	-	-
AVG	2.6	2.6	2	3	2.5	2.6	2.5	3	3	-	-	3	-	-	-

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Department of CSE / IT
ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(**CSHS101 & ITHS101**- ENGLISH) [Total no. of. Students: 155] [I Year, EVEN Semester] Group I

Course Prerequisite: To provide learning environment to practice listening, speaking, reading and writing skills and assist the students to carry on the tasks and activities through guided instructions and materials.

Course Objective:

1. Aware of correct usage of English grammar in writing and speaking.
2. Increase their reading speed and comprehension of academic articles.
3. Improve their reading fluency skills through extensive reading.
4. Speaking ability in English both in terms of fluency and comprehensibility.
5. Oral presentations and receive feedback on their performance.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Students will develop active listening and speaking skills, including the ability to give full attention, understand, respond thoughtfully, and provide feedback. (UNDERSTAND)	L5
CO2	Students will be able to write clear, concise, and well-organized emails, reports, and other professional documents.(APPLY)	L4
CO3	Students will demonstrate the ability to use newly learned words accurately and effectively in both spoken and written communication.(EVALUATE)	L2
CO4	Students will gain confidence and competence in delivering speeches and presentations to an audience.(UNDERSTAND)	L5
CO5	Students will learn to avoid ambiguity and ensure that their writing is easily understood by the target audience.(CREATE)	L1

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Foundation of Basic Grammar
PSO2	LSRW skills
PSO3	Speaking Practices and Presentation skills

FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	-	-	-	-	-	-	-	2	-	3	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	2	3	-	-	-	-	-
CO3	-	-	-	-	-	-	-	2	-	3		-	-	-	-
CO4	-	-	-	-	-	-	-	3	-	3		-	-	-	-
CO5	-	-	-	-	-	-	-	2	2	3		-	-	-	-
AVG	-	-	-	-	-	-	-	2.25	2	**3**		-	-	-	-

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FIRST YEAR ENGINEERING

Department of CSE/IT

ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(ITBS202- Mathematics - II) [Total no. of. Students: 155] [I/EVEN Semester, Group 1]

Course Prerequisite: To formulate and solve partial differential equations, Laplace ,Fourier transforms within the Engineering domain.

Course Objective:

1.To formulate and solve various types of partial differential equations.
2.To understand the Laplace, transform and its properties,
3.To apply Laplace, transform to solve ODE with constant coefficients and simultaneous ordinary differential equations.
4.To understand and apply Fourier transform techniques.
5.To apply Fourier series and harmonic analysis.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Learn how to use Partial differential equations to evaluate certain proper and improper integrals by being familiar with special functions.	L2
CO2	Capable of resolving differentiation problems involving two variables and knowledgeable about maximizing and minimizing functions involving many variables.	L2
CO3	Learn how to calculate Laplace transform.	L3
CO4	Students are taught about order differential equations, including strategies for solving them and their transformations.	L3
CO5	Students are proficient in solving a variety of differential equations.	L2

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Recognize the ideas and applications of mathematics
PSO2	Manage the sophisticated mathematical approaches.
PSO3	Utilize the principles of practical applications.

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	-	2	-	-	-	-	-	-	-	-	3	2	2
CO2	3	3	-	2	-	-	-	-	-	-	-	-	3	2	2
CO3	3	3	-	2	-	-	-	-	-	-	-	-	3	2	2
CO4	3	2	-	2	-	-	-	-	-	-	-	-	2	2	2
CO5	3	3	-	3	-	-	-	-	-	-	-	-	3	2	3
AVG	3	2	-	2	-	-	-	-	-	-	-	-	2	2	2

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FIRST YEAR ENGINEERING

Department of CSE / IT

ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(CSBS/ ITBS 203- Chemistry) [Total no. of. Students: 155]] [I / EVEN Semester, Group I]

Course Prerequisite: Knowledge of Basic Mathematics and General Science

Course Objective:

1. To acquire basic concepts of chemistry in atomic & molecular structure and its nano scale applications.
2. To understand the fundamental concepts of various spectroscopic techniques and applications.
3. To understand basic electrochemical properties like thermodynamic functions, cell potentials.
4. To describe and explain the observed trends in atomic size, ionization energy, and electron affinity of the elements.
5. To understand the fundamental concepts of stereo chemistry and applications in drug synthesis.

COS	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Get an understanding of the theoretical principles understanding molecular structure, bonding and properties	L2
CO2	Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques	L2
CO3	Understand and explain the thermodynamic functions and cell potentials for different applications.	L2
CO4	Rationalize specific models and processes for better understanding of material properties and applications.	L3
CO5	Learn the concepts of stereochemistry and synthesis of various industrially important drugs and its applications.	L2

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Foundation of maths and basic science concepts
PSO2	Foundation of Electrochemistry
PSO3	Foundation of Spectroscopy

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	3	3	_	2	_	_	_	_	_	3	3	3	3
CO2	3	3	3	_	_	_	_	_	_	_	_	3	3	3	3
CO3	3	3	3	3	_	2	_	_	_	_	_	3	3	3	3
CO4	3	3	2	2	_	_	_	_	_	_	_	3	1	1	3
CO5	3	2	2	2	_	2	3	_	_	_	_	3	3	3	3
AVG	**3**	**2.8**	**2.6**	**2**	**0**	**1.2**	**0.6**	**0**	**0**	**0**	**0**	**3**	**2.6**	**2.6**	**3**

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FIRST YEAR ENGINEERING

Department of CSE / IT

ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(CSES204 Programming for Problem Solving) [Total no. of. Students: 155] [I /EVEN Semester, Group 1]

Course Prerequisite: Knowledge of Python Programming, Writing of Python Programming.

Course Objective:

1. To acquire the knowledge of programming in Python.
2. To learn the concepts, principles, functions and develop an application.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	To understand the basic concepts and working principles of Python Programming.	L2
CO2	To develop algorithmic solutions to simple computational problems.	L2
CO3	To understand the structure of solving problems using programming.	L2
CO4	To explore the concepts of compound data using Python lists, tuples, dictionaries.	L6
CO5	To explore the various multimedia features using python.	L2

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Foundation of mathematical concept
PSO2	Foundation of computer system
PSO3	Foundation of software development

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	3	3	2	–	–	–	–	–	2	2	3	–	–
CO2	3	3	3	3	2	–	–	–	–	–	2	–	3	–	–
CO3	2	2	–	2	2	–	–	–	–	–	1	–	3	–	–
CO4	1	2	–	–	1	–	–	–	–	–	1	–	2	–	–
CO5	2	2	–	–	2	–	–	–	–	–	1	–	2	–	–
AVG	2.2	2.4	3	1.6	1.8	0	0	0	0	0	1.4	0.4	2.6	0	0

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FIRST YEAR ENGINEERING

Department of CSE / IT

ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(CSHS205- UNIVERSAL HUMAN VALUES) [Total no.of. Students:155] [I /EVEN Semester, Group 1]

Course Prerequisite: To understand about harmony in self, family and society

Course Objective:

1. To have holistic vision of life.
2. To enhance a socially responsible behavior.
3. To understand the responsibility of an environmental work.
4. To understand the competence and capabilities for maintaining health and hygiene.
5. To appreciate the aspiration for excellence (merit) and gratitude for all.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Understand and analyse the essentials of human values and skills, self exploration, happiness and prosperity.	L2
CO2	Evaluate coexistence of the "I" with the body.	L4
CO3	Identify and evaluate the role of harmony in family, society and universal order.	L4
CO4	Understand and associate the holistic perception of harmony at all levels of existence.	L4
CO5	Develop appropriate technologies and management patterns to create harmony in professional and personal lives.	L3

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Foundation of basic science
PSO2	Foundation of Genetics
PSO3	Foundation of Microorganism

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	-	-	-	-	-	-	-	3	-	-	-	1	-	-	-
CO2	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	2	1	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	2	2	-	-	-	-	1	-	-	-
CO5	-	-	-	-	-	2	2	3	-	-	-	1	-	-	-
AVG	-	-	-	-	-	2	1.5	3	-	-	-	1	-	-	-

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FIRST YEAR ENGINEERING

Department of CSE / IT

ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(CSBL/ ITBL 201- Chemistry Lab) [Total no. of. Students: 155] [I / EVEN Semester, Group 1]

Course Prerequisite: Knowledge of Basic Mathematics and General Science

Course Objective:

1. To experiment various methods of volumetric analysis - Redox, Iodometric, complexometric, Neutralization etc.
2. To experiment use of conductivity meter for measurement of conductance of water sample.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	To illustrate the principles of physical chemistry relevant to the study of rate of reactions.	L2
CO2	To estimate rate constants of reactions from concentration of reactants/products as a function of time.	L3
CO3	To measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.	L3
CO4	To understand the changes in matter and acquire scientific skills in the laboratory	L3
CO5	To synthesize a small drug molecule and analyze a salt sample	L3

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Foundation of maths and basic science concepts
PSO2	Foundation of chemical principles in handling instruments/techniques
PSO3	Foundation of Salt analysis and synthesis of drug molecules

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	3	3	2	2	2	_	3	3	_	3	3	3	3
CO2	3	3	3	3	2	2	2	_	3	3	_	3	3	3	3
CO3	3	3	3	3	2	2	3	_	3	3	_	3	3	3	3
CO4	3	3	3	3	1	2	3	2	3	3	_	3	1	2	3
CO5	3	2	2	3	1	2	3	2	3	3	_	3	2	2	3
AVG	**3**	**2.8**	**2.8**	**3**	**1.6**	**2**	**2.6**	**0.8**	**3**	**3**	**0**	**3**	**2.4**	**2.6**	**3**

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COURSE OBJECTIVES

(CSEL202 Programming for Problem Solving Lab) [Total no. of. Students: 155] [I/EVEN Semester, Group 1]

Course Prerequisite: Knowledge of Python Programming, Writing of Python Programming.

Course Objective:

1. To acquire the knowledge of programming in Python.
2. To learn the concepts, principles, functions and develop an application.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	To understand the basic concepts and working principles of Python Programming.	L2
CO2	To develop algorithmic solutions to simple computational problems.	L2
CO3	To understand the structure of solving problems using programming.	L2
CO4	To explore the concepts of compound data using Python lists, tuples, dictionaries.	L6
CO5	To explore the various multimedia features using python.	L2

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Foundation of mathematical concept
PSO2	Foundation of computer system
PSO3	Foundation of software development

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	3	3	2	–	–	–	–	–	2	2	3	–	–
CO2	3	3	3	3	2	–	–	–	–	–	2	–	3	–	–
CO3	2	2	–	2	2	–	–	–	–	–	1	–	3	–	–
CO4	1	2	–	–	1	–	–	–	–	–	1	–	2	–	–
CO5	2	2	–	–	2	–	–	–	–	–	1	–	2	–	–
AVG	2.2	2.4	3	1.6	1.8	0	0	0	0	0	1.4	0.4	2.6	0	0

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Department of CSE/ IT
ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(ESC-202 –Workshop/Manufacturing Practice. [Total no.of. Students: 155] [1/EVEN Semester, Group 1]

Course Prerequisite: To effectively engage in hands-on activities and understand the principles behind various manufacturing processes

Course Objective:

1. Learn and adhere to safety protocols and procedures within a workshop setting.
2. Gain hands-on experience with a variety of hand tools, power tools, and machine tools.
3. Master fundamental manufacturing processes such as welding, casting, machining, and forming.
4. Master essential carpentry techniques such as cutting, shaping, joining, and finishing wood.
5. Acquire basic skills in the use of fitting tools and equipment, including files, hacksaws, chisels, and vices

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Develop fundamental skills in the use of various hand tools, power tools, and machine tools.	L2,L3
CO2	Understand the properties and appropriate applications of different engineering materials.	L2,L1
CO3	Implement safety standards and procedures in a workshop setting.	L3
CO4	Accurately interpret technical drawings and use precise measurement techniques.	L2,L1
CO5	Apply practical skills and theoretical knowledge to complete hands-on projects in fitting, carpentry, welding, and machining.	L2

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Ability to understand and perform fundamental manufacturing processes such as machining, welding, casting, forging, and forming
PSO2	Competence in operating, maintaining, and troubleshooting common workshop tools
PSO3	Knowledge of various materials used in manufacturing

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	-	-	-	3	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	2	-	-	-	-	3	-	3	-	-	-	-	-	-	-
CO4	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	3	2	-	2	-	3	-	3	2	3	3	-	-	-
AVG	2.6	3	2	-	2.5	3	3	3	3	2	3	3	-	-	-

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FIRST YEAR ENGINEERING

Department of CSE / IT

ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(CSAU/ ITAU-204 – Sports and Yoga) [Total no. of. Students: 155]] [I / EVEN Semester, Group 1]

Course Prerequisite: Knowledge of Basic Human body, Health and Environment

Course Objective:

1. To expose the students in variety of physical, yogic activities and stimulating their continued inquiry about Yoga, physical education, health and fitness.
2. To make the students understand the importance of sound health and fitness principles as they relate to better health.
3. To create a safe, progressive, methodical and efficient activity based plan to enhance improvement and minimize risk of injury.
4. To develop among students an appreciation of physical activity as a lifetime pursuit and a means to better health.

COS	Upon successful completion of this course, students should be able to:	LEVEL
CO1	To practice physical activities and Hatha Yoga focusing on yoga for strength, flexibility, and relaxation	L1
CO2	To learn techniques for increasing concentration and decreasing anxiety which leads to stronger academic performance.	L3
CO3	To learn breathing exercises and healthy fitness activities.	L2
CO4	To understand basic skills associated with yoga and physical activities including strength and flexibility, balance and coordination.	L3
CO5	To perform yoga movements in various combination and forms..	L3

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Importance of Sports and Yoga
PSO2	Physical Fitness , Wellness and Life Style
PSO3	Psychology in Physical Education & yoga

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	_	2	_	_	_	2	3	2	3	2	_	3	2	_	_
CO2	_	2	_	_	_	2	3	2	3	2	_	3	2	_	_
CO3	_	2	_	_	_	2	3	2	3	2	_	3	2	_	_
CO4	_	2	_	_	_	2	3	2	3	2	_	3	2	_	_
CO5	_	2	_	_	_	2	3	2	3	2	_	3	2	_	_
AVG	_	2	_	_	_	**2**	**3**	**2**	**3**	**2**	**0**	**3**	**2**	_	_

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FIRST YEAR ENGINEERING

Department of ECE / BME

ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(BSCT 104-Physics for Engineers) [Total no. of. Students: 75] [I / EVEN Semester, Group 2]

Course Prerequisite: Knowledge of Basic Science

Course Objective:

1. To understand the physics of simple harmonic motion (SHM) and its applications in various fields.
2. To understand the characteristics and behaviour of non-dispersive transverse and longitudinal waves in one dimension and to introduce the concept of dispersion in waves and its implications.
3. To understand the behaviour and propagation of light and to study the principles of geometric optics and their applications.
4. To understand the wave nature of light and its interactions with matter and study the principles of wave optics and their applications.
5. To understand the principles and applications of lasers and study the properties and behaviour of laser light.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Solve engineering problems dealing with simple, damped, or forced harmonic oscillation and perform Fourier analysis of wave phenomena.	L3&L4
CO2	Differentiate between transverse and longitudinal waves and explain their properties.	L3&L4
CO3	Understand the generation and propagation of light and explain the principles of geometric optics, including reflection and refraction	L2
CO4	Understand the wave nature of light and its properties, such as interference and diffraction.	L2
CO5	Understand the basic principles of laser operation, including population inversion and stimulated emission	L2

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Foundation of basic science
PSO2	Foundation of mathematical concept
PSO3	Foundation of Software and Business technology

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-	3	-	-
CO4	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-
AVG	3	1.2	-	-	-	-	-	-	-	-	-	-	1.2	-	-

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FIRST YEAR ENGINEERING

Department of ECE /BME

ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(ITBS202- Mathematics - II) [Total no. of. Students: 75] [I/EVEN Semester, Group 2]

Course Prerequisite: To formulate and solve partial differential equations, Laplace ,Fourier transforms within the Engineering domain.

Course Objective:

1. To formulate and solve various types of partial differential equations.
2. To understand the Laplace, transform and its properties,
3. To apply Laplace, transform to solve ODE with constant coefficients and simultaneous ordinary differential equations.
4. To understand and apply Fourier transform techniques.
5. To apply Fourier series and harmonic analysis.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Learn how to use Partial differential equations to evaluate certain proper and improper integrals by being familiar with special functions.	L2
CO2	Capable of resolving differentiation problems involving two variables and knowledgeable about maximizing and minimizing functions involving many variables.	L2
CO3	Learn how to calculate Laplace transform.	L3
CO4	Students are taught about order differential equations, including strategies for solving them and their transformations.	L3
CO5	Students are proficient in solving a variety of differential equations.	L2

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Recognize the ideas and applications of mathematics
PSO2	Manage the sophisticated mathematical approaches.
PSO3	Utilize the principles of practical applications.

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	-	2	-	-	-	-	-	-	-	-	3	2	2
CO2	3	3	-	2	-	-	-	-	-	-	-	-	3	2	2
CO3	3	3	-	2	-	-	-	-	-	-	-	-	3	2	2
CO4	3	2	-	2	-	-	-	-	-	-	-	-	2	2	2
CO5	3	3	-	3	-	-	-	-	-	-	-	-	3	2	3
AVG	3	2	-	2	-	-	-	-	-	-	-	-	2	2	2

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FIRST YEAR ENGINEERING

Department of ECE/ BME

ACADEMIC YEAR 2023-2024

COURSE OBJECTIVES

(ESE-101 Basic Electrical Engineering) [Total no. of. Students: 75 [I/EVEN Semester, Group 2]

Course Prerequisite: The necessary foundational knowledge to understand and engage with the concepts and principles taught in a basic electrical course

Course Objective:

1. To understand and gain basic knowledge about Magnetic and electrical circuits.
2. To learn the concept of single phase and three phase circuit with power measurement.
3. To study the operating principles of Static machines.
4. To understand the basic operation, function and application of PN junction diode, logic gates and flipflops.
5. To gain knowledge on various communication system and network models and the use of ISDN.

COS	Upon successful completion of this course, students should be able to:	LEVEL
CO1	understand and gain basic knowledge about Magnetic and electrical circuits.	L2
CO2	Understand the concept of single phase and three phase circuit with power measurement.	L2
CO3	Understand the operating principles of Static machines	L2
CO4	Understand the basic operation, function and application of PN junction diode, logic gates and flipflops.	L6
CO5	To gain knowledge on various communication system and network models and the use of ISDN.	L2

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Understanding of Basic Concepts, Circuit Analysis Skills, Practical Skills.
PSO2	Problem-Solving Abilities, Knowledge of Semiconductors, Digital Electronics.
PSO3	Communication Skills, Ethical and Professional Responsibility

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	–	3	–	2	3	1	2	1	–	1	3	3	2	–
CO2	3	2	3	–	–	3	1	2	1	–	–	3	2	3	1
CO3	3	2	3	–	–	3	1	2	1	–	1	3	3	–	1
CO4	3	3	3	–	2	3	1	3	1	2	3	3	3	–	2
CO5	3	3	3	–	–	3	1	3	1	2	2	3	–	2	1
AVG	3	2.5	3	0	2	3	1	2.4	1	0.4	0.6	3	2.75	2.3	1.25

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FIRST YEAR ENGINEERING

Department of ECE / BME
ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(BSCP 104-Physics Lab for Engineers) [Total no. of. Students: 75] [I / EVEN Semester, Group 2]

Course Prerequisite: Proficiency in basic laboratory skills and techniques is often required.

Course Objective:

1. To observe and study the diffraction pattern produced by a single slit.
2. To observe and study the interference pattern produced by double slits.
3. To verify the wave nature of light and measure the wavelength of light.
4. To measure the speed of light using a Michelson interferometer setup.
5. To measure the speed of light on a tabletop using the modulation technique.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Comprehend the concept of interference and how waves combine constructively and destructively to produce varying amplitudes.	L4
CO2	Understand the single-slit diffraction pattern and calculate the angles of diffraction for different wavelengths and slit sizes.	L2&L5
CO3	Understand the double-slit interference pattern and calculate fringe spacing and angles of interference for various setups.	L2&L5
CO4	Develop skills to analyses and interpret interference patterns resulting from different light sources and experimental configurations.	L6&L4
CO5	Develop a comprehensive understanding of the fundamental principles of laser operation, including stimulated emission, population inversion, and optical gain.	L6&L2

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Foundation of Optical concept
PSO2	Foundation of Experimental Skills
PSO3	Foundation of Data Analysis

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of electrical and electronics engineering	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	-	1	-	_	1	_	_	3	_	_	_	_	_	3
CO2	3	-	1	-	_	1	_	_	3	_	_	_	_	_	3
CO3	3	-	1	-	_	1	_	_	3	_	_	_	_	_	3
CO4	3	-	1	-	_	1	_	_	3	_	_	_	_	_	3
CO5	3	-	1	-	_	1	_	_	3	_	_	_	_	_	3
AVG	3	-	1	-	_	1	_	_	3	_	_	_	_	_	3

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FIRST YEAR ENGINEERING

Department of BME/ ECE

ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(ESCP 104- Basic Electrical Engineering Lab) [Total no. of. Students: 75] [I / EVEN Semester, Group 2]

Course Prerequisite: Knowledge of Basic Electrical Engineering

Course Objective:

1.To understanding and hands-on experience with fundamental concepts and techniques.
2.To Provide a solid foundation in the behavior and characteristics of electrical components.
3. To Enable students to build, test, and troubleshoot basic electrical circuits.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Gain a fundamental understanding of electrical components, circuits, and systems. Understand the principles of Ohm's Law, Kirchhoff's Laws, and basic network theorems.	L1&l3
CO2	Ability to analyze and construct basic electrical circuits. Develop skills to design simple electronic circuits using components like resistors, capacitors, inductors, diodes, and transistors.	L3
CO3	Proficiency in using electrical and electronic measuring instruments such as multimeters, oscilloscopes, function generators, and power supplies.	L3&L4
CO4	Develop hands-on skills in soldering, breadboarding, and creating circuit layouts. Conduct experiments to verify theoretical concepts learned in lectures	L1& L3
CO5	Improve teamwork skills through collaborative lab work. Develop communication skills by documenting experiments, writing reports, and presenting findings.	L1&L3

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Develop the ability to understand and apply fundamental principles of electrical engineering in practical scenarios
PSO2	Foundation of Accurately measure and interpret electrical quantities like voltage, current, resistance, and frequency
PSO3	Equip students with the necessary skills and knowledge to excel in industry or higher education programs

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of electrical engineering .	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	-	1	-	–	1	–	–	3	–	–	–	–	–	3
CO2	3	-	1	-	–	1	–	–	3	–	–	–	–	–	3
CO3	3	-	1	-	–	1	–	–	3	–	–	–	–	–	3
CO4	3	-	1	-	–	1	–	–	3	–	–	–	–	–	3
CO5	3	-	1	-	–	1	–	–	3	–	–	–	–	–	3
AVG	**3**	**-**	**1**	**-**	**–**	**1**	**–**	**–**	**3**	**–**	**–**	**–**	**–**	**–**	**3**

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FIRST YEAR ENGINEERING

Department of ECE/ BME
ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(ESCP105 –Digital Fabrication. [Total no. of. Students: 75] [I / EVEN Semester, Group 2]

Course Prerequisite: learn to design, prototype, and produce physical objects using digital tools and techniques.

Course Objective:

1. Develop proficiency in using digital design software such as CAD (Computer-Aided Design).
2. To understand of digital fabrication principles, including additive and subtractive manufacturing, 3D printing, CNC machining.
3. Learn to create accurate and functional prototypes using digital fabrication methods, from concept to final product.
4. To understand the real-world applications of digital fabrication across various industries, including architecture, engineering, and product design.
5. To Comparison of additive manufacturing and conventional machining process

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Develop CAD models for 3D printing.	L2,L1
CO2	Import and Export CAD data and generate .STL file.	L2,L3
CO3	Select a specific material for the Additive manufacturing	L3
CO4	Select 3D printing process for an applications.	L2,L3
CO5	Produce a product using 3D printing or additive manufacturing.	L2,L1

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Ability to use computer aided design software
PSO2	Understanding of 3D printing technologies
PSO3	Competence in using laser cutting and engraving machines

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3		3		3							3			
CO2	3	3	3	3	3							3			
CO3	3	3	2	2	2		3					3			
CO4	3	2	3	3	3							3			
CO5	3	3	3	3	3				3	3	2	3			
AVG	3	2.75	2.8	2.75	2.8		3		3	3	2	3			

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FIRST YEAR ENGINEERING

Department of ECE / BME
ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(**HSMC101**- ENGLISH FOR TECHNICAL WRITING) [Total no. of. Students: 75] [I Year, EVEN Semester] Group II

Course Prerequisite: To provide learning environment to practice listening, speaking, reading and writing skills and assist the students to carry on the tasks and activities through guided instructions and materials.

Course Objective:

1. Aware of correct usage of English grammar in writing and speaking.
2. Increase their reading speed and comprehension of academic articles.
3. Improve their reading fluency skills through extensive reading.
4. Speaking ability in English both in terms of fluency and comprehensibility.
5. Oral presentations and receive feedback on their performance.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Students will develop active listening and speaking skills, including the ability to give full attention, understand, respond thoughtfully, and provide feedback. (UNDERSTAND)	L5
CO2	Students will be able to write clear, concise, and well-organized emails, reports, and other professional documents.(APPLY)	L4
CO3	Students will demonstrate the ability to use newly learned words accurately and effectively in both spoken and written communication.(EVALUATE)	L2
CO4	Students will gain confidence and competence in delivering speeches and presentations to an audience.(UNDERSTAND)	L5
CO5	Students will learn to avoid ambiguity and ensure that their writing is easily understood by the target audience.(CREATE)	L1

PO AND PSO OVERVIEW

Programme Outcomes			Program Specific Outcomes	
PO1	Engineering knowledge		PSO1	Foundation of Basic Grammar
PO2	Problem analysis			
PO3	Design / development of solutions			
PO4	Conduct investigations of complex problem			
PO5	Modern tool usage		PSO2	LSRW skills
PO6	Engineer and Society			
PO7	Environment and sustainability			
PO8	Ethics			
PO9	Individual and team work		PSO3	Speaking Practices and Presentation skills
PO10	Communication			
PO11	Project management and finance			
PO12	Life-long Learning			

FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	-	-	-	-	-	-	-	2	-	3	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	2	3	-	-	-	-	-
CO3	-	-	-	-	-	-	-	2	-	3		-	-	-	-
CO4	-	-	-	-	-	-	-	3	-	3		-	-	-	-
CO5	-	-	-	-	-	-	-	2	2	3		-	-	-	-
AVG	-	-	-	-	-	-	-	2.25	2	3		-	-	-	-

HEAD OF THE DEPARTMENT

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RAJIV GANDHI COLLEGE OF ENGINEERING AND TECHNOLOGY
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FIRST YEAR ENGINEERING

Department of ECE / BME

ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(HSMC 102- UNIVERSAL HUMAN VALUES -LAB)[Total no.of. Students:75] [I/EVEN Semester, Group 2]

Course Prerequisite: To understand about harmony in self, family and society

Course Objective:

1. To have holistic vision of life.
2. To enhance a socially responsible behavior.
3. To understand the responsibility of an environmental work.
4. To understand the competence and capabilities for maintaining health and hygiene.
5. To appreciate the aspiration for excellence (merit) and gratitude for all.

COs	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Understand and analyse the essentials of human values and skills, self exploration, happiness and prosperity.	L2
CO2	Evaluate coexistence of the "I" with the body.	L4
CO3	Identify and evaluate the role of harmony in family, society and universal order.	L4
CO4	Understand and associate the holistic perception of harmony at all levels of existence.	L4
CO5	Develop appropriate technologies and management patterns to create harmony in professional and personal lives.	L3

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Foundation of basic science
PSO2	Foundation of Genetics
PSO3	Foundation of Microorganism

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	-	-	-	-	-	-	-	3	-	-	-	1	-	-	-
CO2	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	2	1	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	2	2	-	-	-	-	1	-	-	-
CO5	-	-	-	-	-	2	2	3	-	-	-	1	-	-	-
AVG	-	-	-	-	-	2	1.5	3	-	-	-	1	-	-	-

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FIRST YEAR ENGINEERING

Department of ECE / BME

ACADEMIC YEAR 2023-24

COURSE OBJECTIVES

(AU-102 – Sports and Yoga) [Total no. of. Students: 75]] [I / EVEN Semester, Group 2]

Course Prerequisite: Knowledge of Basic Human body, Health and Environment

Course Objective:

1. To make the students understand the importance of sound health and fitness principles as they relate to better health.
2. To expose the students to a variety of physical and yogic activities aimed at stimulating their continued inquiry about Yoga, physical education, health and fitness.
3. To create a safe, progressive, methodical and efficient activity based plan to enhance improvement and minimize risk of injury.
4. To develop among students an appreciation of physical activity as a lifetime pursuit and a means to better health.

COS	Upon successful completion of this course, students should be able to:	LEVEL
CO1	Discuss the physical education needs & history with reference to awards given in promotion of the sports in India.	L1
CO2	Practice Physical activities and Hatha Yoga and Breathing techniques focusing on yoga for strength, flexibility, and relaxation,	L3
CO3	Learn techniques for increasing concentration and decreasing anxiety which leads to stronger academic performance	L2
CO4	Develop understanding of health-related fitness components: cardio respiratory endurance, flexibility and bodycomposition etc.	L3
CO5	Develop understanding of psychological problems with the age and lifestyle. understanding of sound nutritional practices to health and physical performance.	L3

PO AND PSO OVERVIEW

Programme Outcomes	
PO1	Engineering knowledge
PO2	Problem analysis
PO3	Design / development of solutions
PO4	Conduct investigations of complex problem
PO5	Modern tool usage
PO6	Engineer and Society
PO7	Environment and sustainability
PO8	Ethics
PO9	Individual and team work
PO10	Communication
PO11	Project management and finance
PO12	Life-long Learning

Program Specific Outcomes	
PSO1	Importance of Sports and Yoga
PSO2	Physical Fitness , Wellness and Life Style
PSO3	Psychology in Physical Education & yoga

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FIRST YEAR ENGINEERING

CO Mapping with PO and PSO

	Engineering knowledge	Problem analysis	Design/development of solutions	Conduct investigations of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project management and finance	Life-long learning	Foundation of mathematical concept	Foundation of computer system	Foundation of software development
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
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CO2	_	2	_	_	_	2	3	2	3	2	_	3	2	_	_
CO3	_	2	_	_	_	2	3	2	3	2	_	3	2	_	_
CO4	_	2	_	_	_	2	3	2	3	2	_	3	2	_	_
CO5	_	2	_	_	_	2	3	2	3	2	_	3	2	_	_
AVG	_	2	_	_	_	**2**	**3**	**2**	**3**	**2**	**0**	**3**	**2**	_	_

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