

SCHOOL OF ENGINEERING
Department of Computer Science & Engineering

OP JINDAL UNIVERSITY
Raigarh-Chhattisgarh



Scheme and Syllabus
Of
B. Tech. (01UG020)
Department of
Computer Science and Engineering
School of Engineering
Batch 2023-2027

SCHOOL OF ENGINEERING

Department of Computer Science & Engineering

Scheme for B. Tech (CSE) Programme

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Department of Computer Science & Engineering

Computer Science and Engineering
L: Lecture, T: Tutorial, P: Practical, C: Credit

Scheme of Teaching and Examination
B. Tech (Computer Science and Engineering)

Academic Semester I

Subject Code	SUBJECT	Periods per week			Scheme of Examination and Marks				Credit
		L	P	T	PRE**		ESE*	Total Marks	L+(T+P)/2
					Mid Sem	TA			
SOS-B-MAT-23-101	Engg. Mathematics-1 (Matrices and Linear Algebra)	3	0	0	30	20	50	100	3
SOE-B-CSE-23-102	Digital System Design	2	0	0	15	10	25	50	2
SOE-B-EE-23-103	Basic Electrical & Electronics	3	0	0	30	20	50	100	3
SOE-B-CSE-23-104	Basic Computation SKills (C-Programming)	3	0	0	30	20	50	100	3
SOE-B-CSE-23-105	Computer Fundamentals	2	0	0	15	10	25	50	2
SOS-B-HUM-23-106	Communicative English	2	0	0	15	10	25	50	2
SOE-B-CIV-23-107	Environmental Sc.	2	0	0	15	10	25	50	2
SOE-B-EE-23-108	Basic Electrical & Electronics Lab	0	2	0	0	30	20	50	1
SOE-B-CSE-23-109	Basic Computation SKills (C-Programming) Lab	0	2	0	0	30	20	50	1
SOE-B-CSE-23-110	Digital System Design Lab	0	2	0	0	30	20	50	1
SOE-B-CSE-23-111	Computer Fundamentals Lab	0	4	0	0	30	20	50	2
	Total	17	10	0	150	220	330	700	22

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Programme	: B. Tech.	Semester	: I
Name of the Course	: Matrices and Linear Algebra	Course Code	: SOS-B-MAT-23-101
Credits	: 3	No of Hours	: 3 Hrs/week
Max Marks	: 100		

Course Description:

The course will introduce basic concepts and techniques from linear algebra that will be required in later courses in areas such as machine learning, computer graphics, quantum computing. Also, to expose student to understand the basic importance of matrices.

Course Outcomes:

At the end of this course, the student will be able to:

CO Number	Course Outcome
CO1	find basis of finite dimensional vector spaces.
CO2	learn about inner product, and how to transform a set of non-zero vectors into an orthonormal set.
CO3	learn to solve systems of linear equations, and to find inverse of a matrix by using Gauss-Jordan elimination method.
CO4	find rank/nullity and eigenvalues/eigenvectors of a matrix and learn about the diagonalization of a matrix.
CO5	understand the properties of linear transformation

Syllabus:

Unit-I:

Matrix operations. Rank of a matrix. Inverse of matrix. The Gauss-Jordan method. Solvability of systems of linear equations, Gaussian elimination. Row echelon form. Homogeneous and nonhomogeneous systems of linear equations.

Unit-II:

Eigen values, Eigen vectors, Diagonalization of matrices, Reduction of a quadratic form to canonical form. Vector in two and three dimensions. Algebraic properties. Dot products and properties.

Unit-III:

Vector space, subspace, linear span, linear dependence and independence, Basis and dimension of vector space, Row and column spaces. Linear Transformation.

Unit-IV:

Orthogonal vectors, norm of a vector, Inner product spaces, Gram-Schmidt Orthogonalization, Ortho-normalization, Rank and nullity, Rank-Nullity Theorem, Matrix representation of Linear Transformations.

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Unit-V:

Application to the intersection of lines and planes, Properties and composition of linear transformations. Rotations, reflections and stretches. Translations using homogeneous coordinates. One-to-one and onto transformations.

Text Book

- Gilbert Strang, “Introduction to Linear Algebra”, Wellesley-Cambridge press.
- J. Defranza and D. Gagliardi, “Introduction to Linear Algebra with Applications”, McGraw-Hill

Reference Book

- Serge Lang, “Introduction to Linear Algebra”, (2nd edition), Springer
- Seymour Lipschutz, Marc Lipson, “Schaum’s outlines of Linear Algebra”, McGraw-Hill Education (India) Private Limited, New Delhi
- K. Hoffman and R. Kunze, “Linear Algebra”, Prentice Hall

CO-PO & PSO Correlation

Course Name: Engineering Mathematics - I												
Course Outcomes	Program Outcomes								PSOs			
	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	1	1										
CO2:	1	2										
CO3:	1	1	1									
CO4:	1		1									
CO5:	1											

Note: 1.: Low 2.: Moderate 3.: High

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Programme	: B.Tech.	Semester	: I
Name of the Course	: Digital System Design	Course Code:	SOS-B-CSE-23-102
Credits	: 2	No of Hours	: 2
Max Marks	: 50		

Course Description

Digital circuits are the basic blocks of modern electronic devices like mobile phones, digital cameras, microprocessors and several other devices. In this course, we will learn the fundamentals of digital circuits and how to engineer the building blocks that go into digital subsystems. We will learn the basics of combinational as well as sequential logic. We will also have a thorough treatment of sequential circuits and state machines. We will also learn how to analyze the performance of digital circuits. The course will emphasize on the design philosophy as well as good design practices used. Students will also get an exposure to Verilog, a popular hardware modeling language.

Course Outcomes

At the end of this course, the student will be able to:

CO Number	Course Outcome
CO1	Introduce basic digital circuit, electronics and system design concepts and get hands on with basic digital system design using standard ICs.
CO2	Basics of Boolean algebra, logic minimization techniques, combination circuits design.
CO3	Basics of flip-flops and different sequential circuits design, etc.
CO4	Acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.
CO5	Prepare students to perform the analysis and design of various digital electronic circuits.

Syllabus:

Unit-I: Number system and Logic Gates

Binary number system, Octal, Hexa decimal, base conversions, signed and unsigned numbers, complements, addition, subtraction using complements, Different Binary codes, operation, Truth tables of different logic gates.

Unit-II: Boolean Algebra and K-maps

Basic Theorems and postulates, properties of Boolean algebra, Boolean functions, standard and canonical forms, 2,3,4- variable K-map methods of simplification, NAND/NOR implementations, other two level implementations, Multi-level implementations, 2-3 variable XOR function, Logic Simplification using Tabular method, etc.

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Unit-III: Combinational Circuit Design

Design procedure, Different Adders and Subtractors-Half Adder, Full Adder, Half Subtractor, Full Subtractor, 4-bit Ripple Carry Adder, Carry Look Ahead Adder, Decoder, Encoders, Multiplexers, De-Multiplexers, Magnitude Comparator, etc.

Unit-IV: Sequential Circuit Design

Basics, Latches and Flip-flops, conversion from one FF to another, Designing of serial and Parallel Registers, Synchronous and Asynchronous Counter Designing, Mealy and Moore Machine.

Unit-V: Programmable Logic Devices

Simple and Complex PLDs (SPLD and CPLD), Field-programmable gate array (FPGA), Programmable array logic (PAL), Programmable logic array (PLA), Generic array logic (GAL) Designing. Logic Families: Basic concept, designing of basic logic families like Resistor Transistor Logic (RTL), Direct Coupled Transistor Logic (DCTL), Transistor Transistor Logic (TTL), Emitter Coupled Logic (ECL), etc. M OS Logic families like NAND and NOR using NMOSFET and PMOSFET, CMOS Logic family, etc.

Text Books:

- R.P. Jain, “Modern Digital Electronics”, 3rd Edition, Tata McGraw Hill.
- T.L. Floyd, “Digital Fundamentals”, 10th Edition, Pearson education.
- M. Morris Mano, Michael D. Ciletti, "Digital Design- with an Introduction to the Verilog HDL", 5th Ed, Pearson.

Reference Books:

- Schaum's Outline of Digital Electronics, Second Edition (Schaum's Outline Series) by Jimmie.
- Brian Holdsworth, Clive Woods, "Digital Logic Design", Elsevier India Pvt. Ltd., 2005.
- A.P. Malvino and D.P. Leach, “Digital Principles and Applications”, 6th Edition, Tata McGraw-Hill, 2008

CO-PO & PSO Correlation

Course Name: Digital System Design												
Course Outcomes	Program Outcomes								PSOs			
	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	2								2			
CO2:	2	1							1			
CO3:	2	1									2	
CO4:	1	1									2	
CO5:		2	2							2	2	

Note: 1.: Low 2.: Moderate 3.: High

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Programme:	B.Tech.	Semester :	I
Name of the Course:	Basic Electrical and Electronics Engineering	Course Code:	SOE-B-EE-23-103
Credits :	3	No of Hours :	3 Hrs/Week
Max Marks:	100		

Course Description:

The subject curriculum focuses on fundamentals of electrical and electronic circuits. It covers the DC and AC electrical circuit analysis, magnetic circuit analysis and description of basic electronics components and their applications.

Course Outcomes:

At the end of this course, the student will be able to:

CO Number	Course Outcome
CO1	Ability to define and explain the meaning/function of charge, current, voltage, power
CO2	Understand the behavior of inductance (L) and capacitance (C) in AC circuit
CO3	To analyze magnetic materials and their characteristics.
CO4	To understand semiconductors and their applications.
CO5	Understand the basics of analog and digital logics

Course Contents:

UNIT-1: DC Electrical Circuit Analysis:

Voltage and current sources, dependent and independent sources, Source Conversion, Star-delta and delta-star conversions, Ohm's Law, Kirchhoff's Laws & their limitations, Nodal analysis, loop analysis and Mesh current methods, Superposition principle, Thevenin's and Norton's theorems, Maximum power transfer theorem.

UNIT-2: AC Circuits:

Single- phase AC Circuits: Single phase emf generation, average and effective values of sinusoids, R.M.S. value, form factor and peak factor of AC quantity, Concept of phasor diagram, Concept of Power factor, impedance and admittance, Active, reactive and apparent power, analysis of R-L, R- C, R-L-C series, parallel and series-parallel circuit and Resonance condition.

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UNIT-3: Magnetic Circuits:

Basic definitions, magnetization characteristics of Ferro magnetic materials, self-inductance and mutual inductance, energy in linear magnetic systems, coils connected in series, AC excitation in magnetic circuits, magnetic field produced by current carrying conductor, Force on a current carrying conductor. Induced voltage, fundamental laws of electromagnetic Induction, direction of induced E.M.F.

UNIT-4: Semiconductor Diodes:

Introduction to semiconductor, Formation of P-N Junction, P-N Junction Diodes; Semiconductor Diodes, V-I Characteristics, Effect of Temperature on V-I Characteristics, Ideal Diode, Diode equation, Diode Resistance, Transition and Diffusion Capacitance. Light Emitting Diode, Zener Diode, Photodiode. Applications of Diodes.

UNIT-5: Transistors:

Transistor: Introduction, Construction, Types: npn and pnp, Current components. Transistor as amplifier, Transistor Characteristics. Digital logic fundamentals, Boolean Algebra, truth table, Logic Gates.

Text Books:

- E. Hughes, Electrical Technology, ELBS, 1997.
- B L Theraja, Electrical technology, Basic Electrical Engineering, Volume 1, S Chand.
- Integrated Electronics: Analog & Digital Circuit Systems – Jacob Millman & Halkias, TMH.
- Electronic Devices and Circuit Theory – Boylestad & Nashelsky

Reference Books:

- Charles & Sadiku, Fundamentals of Electric circuits, TMH, Third Edition.
- V. D. Toro, Basic Electrical Engineering, PHI, 2000.

CO-PO & PSO Correlation:

Course Name: Basic Electrical & Electronics Engineering												
Course Outcomes	Program Outcomes								PSOs			
	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	2	2	2			2						
CO2:	3	3	2									
CO3:	3	3	3									
CO4:	3	3	3									
CO5:	3	1	3			2						

Note: 1.: Low 2.: Moderate 3.: High

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Programme	: B.Tech.	Semester	: I
Name of the Course	: Basic Computation Skills	Course Code:	SOE-B-CSE-23-104
Credits	: 3	No of Hours :	3 Hrs/Week
Max Marks	: 100		

Course Description:

This course offers lecture, laboratory, and case studies to impart teaching and learning to develop problem solving approaches to systematic represent identified problem into design using flowcharts, algorithms and pseudocode leading towards programming through systemic refinements. This course focus on fundamental concepts of elementary c programming including Arrays, Strings, Pointers, Functions, Structures, Unions, Enum, Storage classes, Dynamic memory allocation and File Handling.

Course Outcomes:

At the end of this course, the student will be able to:

CO Number	Course Outcome
CO1	Understand the semantics and syntax of C programming language.
CO2	Analyze problem domain, formulate solution and implement it using C programming language.
CO3	Learn the syntax, semantics and language constructs to write efficient code using C.
CO4	Appreciate the importance and use of pointers and dynamic memory allocation.

Syllabus:

Unit- 01: Fundamentals of C Programming

Algorithm & Flowchart: Three construct of Algorithm and flowchart: Sequence, Decision (Selection) and Repetition.

Character Set, Identifiers and keywords, Data types, Constants, Variables. Operators: Arithmetic, Relational and logical, Assignment, Unary, Conditional, Bitwise, Comma, other operators. Expression, statements, Library Functions, Preprocessor. Data Input and Output: getchar (), putchar (), scanf (), printf (), gets (), puts (), Structure of C program .

Unit- 02: Control Structures

Branching: If statement, If-else Statement, Multiway decision. Looping: while do-while, for. Nested control structure: Switch statement, Continue statement Break statement, goto statement.

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Unit- 03: Functions and Parameters

Function: Introduction of Function, Function Main, Defining a Function, Accessing a Function, Function Prototype, Passing Arguments to a Function, Recursion. Storage Classes: Auto, Extern, Static, Register

Unit- 04: Arrays, String, Structure and Union

Array: Concepts, Declaration, Definition, Accessing array element, One-dimensional and Multidimensional array. String: Basic of String, Array of String, Functions in String.h Structure: Declaration, Initialization, structure within structure, Operation on structures, Array of Structure. Union: Definition, Difference between structure and union, Operations on a union

Unit- 05: Pointer and File

Pointer: Introduction, Definition and uses of Pointers, Address Operator, Pointer Variables, Dereferencing Pointer, Void Pointer, Pointer Arithmetic, Pointers to Pointers, Pointers and Array, Passing Arrays to Function, Pointers and Function, Pointers and two-dimensional Array, Array of Pointers, Dynamic Memory Allocation.

Files: Types of Files, File operation- Opening, Closing, Creating, Reading, Processing File.

Text Books:

- Yashavant Kanetkar ,Let Us C: Authentic guide to C programming language , 19th Edition ,Paperback 2022.
- E Balagurusamy, Programming in ANSI C, 8/e, McGraw-Hill India, 2019.
- Herbert Schildt, C: The Complete Reference, Fourth Edition, McGraw Hill Education, 2017.

References Books:

- A. B. Chaudhuri, Flowchart and Algorithm Basics: The Art of Programming, Mercury Learning & Information, 2020.
- Brajendra Singh, Jignesh Rawal, Pathik Rawal, Algorithm, Pseudocode and Flowchart: Learn Algorithm in Simple Steps,BeITReady, 2015
- Laxmi Publications,The Art of Programming Through Flowcharts & Algorithms (First edition), Anil Bikas Chaudhuri, 2018.
- Kamthane, Ashok N., "Programming in C," 2/e. Pearson Education India, 2011.
- Sumitabha Das, "Computer Fundamental and C Programming," McGraw Hill Education, 1st edition.

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CO-PO&PSO Correlation

Course Name: Programming with C													
Course Outcomes	Program Outcomes								PSOs				
	1	2	3	4	5	6	7	8	1	2	3	4	
C01:	1									3			
C02:	2	2								3			
C03:	3									2			
C04:		2	1			1						1	2
C05:								2					

Note: 1.: Low 2.: Moderate 3.: High

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Programme	: B.Tech.	Semester	: I
Name of the Course	: Computer Fundamentals	Course Code:	COE-B-CSE-23-105
Credits	: 2	No of Hours :	2 Hrs / week
Max Marks	: 50		

Course Description:

The course will expose the students to basics of computing and it will further help them to understand the workings of a modern computer. Course contents Basics of computer and number representation, various hardware like CPU, Memory, Bus etc. and Operating system, programming languages and their evolution.

Course Outcomes:

At the end of this course, the student will be able to:

CO Number	Course Outcome
CO1	Acquire knowledge about computers and computational problem solving
CO2	Solve computational problems in different number systems.
CO3	Design the solutions of computational problems using iterative and recursive methods using flowcharts and pseudo-codes.
CO4	Analyze the importance of different types of memory and evaluate the impact of different algorithms on memory.
CO5	Understands about system software and features of good programming language.

Syllabus:

Unit-I: Introduction to Computers and its Architecture

Introduction and Characteristics, Computer Architecture, Generations, Classifications, Applications, Central Processing Unit and Memory, Communication between various Units, Processor Speed, Multiprocessor System, Peripheral Buses, Motherboard Demonstration

Unit-II: Computer Arithmetic

Introduction and type of Number System, Conversion between Number System, Arithmetic Operations in different Number System, Signed and Unsigned Number System, Binary addition, binary subtraction, binary multiplication, binary division; Computer codes: BCD, EBCDIC, ASCII, Unicode

Unit-III: Computational Problem Solving

Program Development Cycle, Pseudocode, Flowchart, Representing Information as Bits, Binary System, Storing Integers, Storing Fractions, Examples of Computational Problems, Iterative and

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Recursive Approaches to Solve Computational Problems, Easy and Hard Computational Problems

Unit-IV: Memory and Various Input/Output Devices

Introduction to Memory, Input and Output Devices, Memory Hierarchy, Primary Memory and its Types, Secondary Memory, Classification of Secondary Memory, Various Secondary Storage Devices and their Functioning.

Unit-V: Introduction to System Softwares and Programming Languages

Classification of Computer Languages, Introduction of Operating System, Evolution, Type and Function of OS, Unix Commands, Evolution and Classification of programming Language, Feature and Selection of good Programming Language, Development of Program, Algorithm and Flowchart, Program Testing and Debugging, Program Documentation and Paradigms, Characteristics of good Program.

Text Books:

- Introduction to Computer Science”, Fourth Impression, Pearson Education, IITL Education Solutions Limited, 2009.
- Pradeep K. Sinha and Priti Sinha, “Computer Fundamentals”, eighth edition, BPB Publication
- Raja Raman V., "Fundamental of Computers" (4th edit, Prentice Hall of India, New Delhi.

Reference Books:

- Nell Dale and John Lewis, “Computer Science Illuminated”, Jones and Bartlett Publishers.
- Robert Sedgewick and Kevin Wayne, “ComputerScience”, Addison-Wesley.

CO-PO & PSO Correlation

Course Name: Computer Fundamentals												
Course Outcomes	Program Outcomes								PSOs			
	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	2	3	2						2		1	2
CO2:	3	2	3						2		1	2
CO3:	2	2	3						2		1	2
CO4:	1		3						1		1	2
CO5:		2		1					1	2	1	

Note: 1.: Low 2.: Moderate 3.: High

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Programme:	B.Tech.	Semester:	I
Name of the Course:	Communicative English	Course Code:	SOS-B-HUM-23-106
Credits:	2	No of Hours:	2 Hrs./ Week
Max Marks:	50		

Course Description

This course is formulated to give students a perfect view of communication its scope and importance in business world. It is designed to study principles, elements, and practices of effective business communication. The course focuses on approaches for planning, creating, and transmitting business information within a variety of business situations found in the global perspective. This provides opportunities for improving academic and workplace language proficiency also.

Course Outcomes

After completion of the course students will be able to:

CO Number	Course Outcome
CO1	Know the various elements, media and principles of effective business communication.
CO2	Demonstrate effective business drafting for the various situations.
CO3	Achieve good presentation skills.
CO4	Analyze a problem and devise a solution in a group.
CO5	Communicate business ideas in a public forum and interview.

Syllabus:

Unit I: Introduction to Business Communication & Listening Skill

Basic Forms of Communication, Process of Communication, Principles of Effective Business Communication, 7Cs of Communication, Types of Communication, Barriers of Communication, Verbal & Non-Verbal Communication, Listening, Types of Listening, Barriers to Listening, Overcoming Listening Barriers.

Unit II: Business Letter Writing & Resume Writing

Need, Functions and Kinds of letters, Structure of Letter Writing and Presentation Styles, Quotation Letters, Complaints and Adjustment letters, Sales letters. Resume / CV writing, Report Writing.

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Unit III: Presentation Skill

Characteristics of Presentation, Planning, structuring and Delivery of presentation, use of visual aids

Unit IV: Group Communication

Group Communication, Group discussion, Methodology of Group Discussions, Guidelines of Group Discussion, Role Function in Group Discussions, Types of Non- functional Behaviour, Dealing with Abstract topics; Meetings: notice, agenda & minutes of Meeting.

Unit V: Personal Interview

Introduction to Interviews, Types of interviews, Interview questions, Success in an interview, Important non-verbal aspect, Interview- Dos and Don'ts.

Text Books:

- Meenakshi Raman and Prakash Singh, Business Communication, Oxford University Press.
- R. C. Sharma and Krishna Mohan, Business Correspondence and Report Writing, Tata McGraw Hill.

Reference Books:

- A. Bovee, Thill, J. Business Communication Today, Pearson publication, New Delhi.
- Sanjay Kumar and Pushplata, Communication Skills, New Delhi: Oxford University Press, 2011.

CO-PO Correlation

Course Name: Communicative English												
Course Outcomes	Program Outcomes								PSOs			
	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	1				2	1						
CO2:	2	3			3	1						
CO3:			2		3	2		1				
CO4:	2			1			2					
CO5:		2	2		2	2	2	1				

Note: 1: Low 2.: Moderate 3: High

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Program:	B.Tech.	Semester :	I
Name of the Course	Environmental Science	Course Code:	SOE-B-CIV-23-107
Credits	: 2	No of Hours :	2 Hrs/Week
Max Marks	: 50		

Course Description:

The course will empower the undergraduate students by helping them to Gain in-depth knowledge of natural processes and resources that sustain life. Develop critical thinking for shaping strategies for environmental protection, conservation of biodiversity, environmental equity, and sustainable development. Acquire values and attitudes towards understanding complex environmental-economic-social challenges and active participation in solving current environmental problems and preventing future ones. Adopt sustainability as a practice in life, society, and industry.

Course Outcomes:

At the end of this course, the student will be able to:

CO Number	Course Outcome
CO1	Gain in-depth knowledge of natural processes and resources that sustain life.
CO2	Develop critical thinking for shaping strategies for environmental protection, conservation of biodiversity, environmental equity, and sustainable development.
CO3	Adopt sustainability as a practice in life, society, and industry.

Syllabus:

Unit-I: Ecology, Environment & Natural Resources

Ecology, Environment & Ecosystem, Bio-diversity: Concept, Importance, and Threats & Conservation, Environmental degradation and its causes; Natural resources, Renewable and Non-renewable Resources & associated problems; Green Revolution & Organic farming, Population Forecasting.

Unit-II: Water and Wastewater Pollution

Point & non-point source; Water pollutants & types, sources, and effects; Water Quality measurement, Coagulant, Dissolved Oxygen, BOD & COD; Water & Wastewater Management, Primary, Secondary & Tertiary stages: Objective, Process overview and Equipment used. Solid Waste Management: Objective, Process & Disposal Techniques.

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Unit-III: Unit III: Air Pollution

Classification of air pollutants, sources and effects of CO, SO_x, NO_x, Hydrocarbons, PM, Acid Rain, Ozone, Photochemical Smog & Peroxy Acetyl Nitrate (PAN). Earth's energy balance, Green House Effect, Global warming; Lapse rate & Temperature Inversion; Ambient Air Quality Standard; Air pollution Control Techniques for Gaseous and Particulate air pollutants & equipment used.

Unit-IV: Sustainability and Technology-Driven Solution

Application of Artificial Intelligence and Machine Learning in Agriculture, Smart Farming Technology: Controlled Environment Farming, Hydroponics, Aeroponics; Chemical farming vs Sustainable Natural Farming, Bio-Fertilizer; Develop a smart sustainable technology-driven Project.

Text Books:

- Joseph, K. & Nagendran, R., "Essentials of Environmental Studies", 1st Edition, Pearson Education, 2004.
- Dey, A. K., "Environmental Chemistry" New Age International Publishers.
- Srivastava, S., "Environment & Ecology" S.K. Kataria & Sons, New Delhi.

Reference Books:

- Keerthinarayana & Yesudian, D., "Environmental Science and Engineering", 1st Edition, Hi-Tech publications, 2004.
- Bharucha, E., "A Text Book for Environmental Studies", Text Book of University Grants Commission, 2004.
- Peavy, H.S. et. al., "Environmental Engineering", New York: Mc Graw Hill, 1987.
- Metcalf & Eddy, "Wastewater Engineering: Treatment and Reuse", New Delhi, Tata McGraw Hill, 2003.
- Principles of Environmental Science Inquiry & Applications by W.P. Cunningham & Mary Ann Cunningham (Tata Mc Graw Hill Publishing Company Ltd.).

CO-PO & PSO Correlation

Course Name:												
Course Outcomes	Program Outcomes								PSOs			
	1	2	3	4	5	6	7	8	1	2	3	4
CO1:												
CO2:												
CO3:												

Note: 1.: Low 2.: Moderate 3.: High

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Programme:	B.Tech.	Semester :	I
Name of the Course:	Basic Electrical and Electronics Engineering Lab	Course Code:	SOE-B-EE-23-108
Credits :	1	No of Hours :	2 Hrs/Week
Max Marks:	50		

Course Description:

The response of Electrical Circuit can be verified practically by applying different theorems and fundamental techniques. The students will become sure that the theoretical tricks which they have learned from books are true. The students will become competent in the field of circuit analysis

Course Outcomes:

At the end of this course, the student will be able to:

CO Number	Course Outcome
CO1	Understand the basic circuit concepts and verification of network theorems.
CO2	Understand the application of different tools and electrical meters
CO3	The knowledge about the component of electronic and electrical circuit.

The following concepts will be covered in the lab:

- Study of Electrical Safety precautions.
- Study of CRO, DSO, Function Generator, Multimeter, Power supply.
- To verify KCL and KVL.
- To verify Thevenin's and Norton's Theorem.
- To verify Superposition Theorem.
- Determine resonant frequency of series R-L-C circuit.
- To measure Current, Power, Voltage and Power Factor of series R-L-C Circuit.
- To measure the armature and field resistance using Ohm's law.
- Determine the VI Characteristics of PN junction Diode
- Design and study the characteristics of Common Emitter configuration of NPN transistor
- Design and Study the characteristics of Common Collector Configuration of NPN transistor
- Study Different logic gates and verify their truth table.

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Reference Books & Manuals:

- Basic Practical in Electrical Engineering: P. S. Dhogal (Author), Standard Publishers Distributors (2004).

Equipment's/Machine/Software required

- Different types of meters, resistors, DC supply, variance, transformers, rheostat. Some experiments can be done by MATLAB.

CO-PO & PSO Correlation:

Course Name: Basic Electrical and Electronics Engineering Lab												
Course Outcomes	Program Outcomes								PSOs			
	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	2	2	2			2						
CO2:	3	3	2									
CO3:	3	3	3									

Note :1: Low, 2: Moderate, 3: High

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Programme	: B.Tech.	Semester :	I
Name of the Course:	Basic Computation Skills Lab	Course Code:	SOE-B-CSE-23-109
Credits	: 1	No of Hours :	2 Hrs/Week
Max Marks	: 50		

Course Descriptions:

This course offers lecture, laboratory, and case studies to impart teaching and learning to develop problem solving approaches to systematic represent identified problem into design using flowcharts, algorithms and pseudocode leading towards programming through systemic refinements. This course focus on fundamental concepts of elementary c programming including Arrays, Strings, Pointers, Functions, Structures, Unions, Enum, Storage classes, Dynamic memory allocation and File Handling

Course Outcomes:

At the end of the course, a student will be able to:

CO Number	Course Outcome
CO1	Write, debug, resolve syntax & logical errors and execute the programs.
CO2	Make the comparisons and limitations of the various programming constructs and choose the right one for the task in hand.
CO3	Use the concepts of functions and dynamic memory allocations for better and cleaner programs
CO4	Develop programs using various features like control statements, Functions, Arrays Strings, File, Pointer, Structure etc.

The following concepts will be covered in the lab:

- Structure of c program, character set, identifiers and keywords, data types, Constants, variables and development environment.
- Operator and expressions, decision making (if , if else , nested if else , switch case ,Break and continue etc .)
- Iterative construct (for, while, do-while), Arrays and Strings.

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- Functions, User defined functions, build-in/library functions, Recursion, pointers, header files.
- Structures, unions, enum, Storage classes, dynamic memory allocation, file management.

Text Books:

- Herbert Schildt, C: The Complete Reference, Fourth Edition, McGraw Hill Education, 2017.
- E Balagurusamy, Programming in ANSI C, 8/e, McGraw-Hill India, 2019.
- A. B. Chaudhuri, Flowchart and Algorithm Basics: The Art of Programming, Mercury Learning & Information, 2020.

CO-PO&PSO Correlation

Course Name: Programming with C													
Course Outcomes	Program Outcomes								PSOs				
	1	2	3	4	5	6	7	8	1	2	3	4	
C01:	1									3			
C02:	2	2								3			
C03:	3									2			
C04:		2	1			1						1	2
C05:								2					

- **Note:**1: Low 2.: Moderate 3: High

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Programme	: B.Tech.	Semester	: I
Name of the Course	: Digital System Design Lab	Course Code:	SOE-B-CSE-23-110
Credits	: 1	No of Hours	: 2 Hrs/Week
Max Marks	: 50		

Course Descriptions:

This laboratory will enable the undergraduate students to learn the basic concepts and techniques in digital electronic circuits and systems. This laboratory also provides adequate introduction to both combinatorial and sequential logic circuits, such as, adders, subtractors, comparator, multiplexer/demultiplexer, encoders/decoders, 7-segment display and decoder/driver, flip-flop, register, counter, etc. and various combinations of these.

Course Outcomes:

At the end of the course, a student will be able to:

CO Number	Course Outcome
CO1	Understand the basics of any digital systems such as logic gates, Boolean logic simplification, Flip Flops.
CO2	Analyze and design combinational circuits using basic concepts of Digital Electronics.
CO3	Analyze and design sequential circuits using basic concepts of Digital Electronics.
CO4	Perform simple course projects using above design techniques.

The following concepts will be covered in the lab:

Familiarization with basic gates and implementation by universal NAND and NOR.

- Odd and Even Parity generator and checker, binary to gray and gray to binary converters.
- Implementation of Half Adder, Full Adder, Half Subtractor and Full Subtractor circuits.
- Implementation of Ripple carry adder and Carry look ahead adder.
- Implement and verify 3x8 Decoder, Binary to 7-segment Decoder.

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- Design and verify Multiplexer and Demultiplexer circuits.
- Design and verify S-R, J-K and D Latch and Flip-Flop using logic gates.
- Design and verify Left and Right Shift Registers.
- Design and verify 4-bit asynchronous up/down counters.
- Design and verify 4-bit synchronous up/down counters.

Text Books :

- R.P. Jain, "Modern Digital Electronics", 3rd Edition, Tata McGraw Hill.
- T.L. Floyd, "Digital Fundamentals", 10th Edition, Pearson education.
- M. Morris Mano, Michael D. Ciletti, "Digital Design- with an Introduction to the Verilog HDL", 5th Ed, Pearson.

CO-PO & PSO Correlation

Course Name: Digital System Design Lab													
Course Outcomes	Program Outcomes								PSOs				
	1	2	3	4	5	6	7	8	1	2	3	4	
CO1:	3									2			
CO2:	2	2	2	1							2	2	
CO3:	2	2	2	1							2	2	
CO4:	1	2	2	1									1

Note: 1.: Low 2.: Moderate 3.: High

SCHOOL OF ENGINEERING

Department of Computer Science & Engineering

Programme	:	B.Tech.	Semester :	I
Name of the Course:	:	Computer Fundamentals Lab	Course Code:	SOE-B-CSE-23-111
Credits	:	2	No of Hours :	4 Hrs/Week
Max Marks	:	50		

Course Descriptions:

This course gives exposure on develop working knowledge of Information and Communication Technology to students. This course also introduces how to effectively use and work with Microsoft office tools, office Google Workspace and basics of linux operating system

Course Outcomes:

At the end of the course, a student will be able to:

CO Number	Course Outcome
CO1	Students will be able to understand the basic tools and shortcuts of Microsoft word and excel.
CO2	Students will be able to understand how to format the file.
CO3	Students will be able to design presentations in Microsoft Power Point.
CO4	Students will be able to understand the basic of Linux OS.

The following concepts will be covered in the lab:

Word Processing- MS-Word

Introduction to word processing, Objectives, Features, Creating, Saving and Opening Documents in Word, Interface, Toolbars, Ruler, Menus, Editing, Previewing, Printing, & Formatting a Document, Find & Replace, Using Thesaurus, Using Auto- Multiple Functions, Mail Merge, Handling Graphics, Tables, Table Manipulations, & Charts, Macros.

Worksheet- MS-Excel

Introduction to Worksheet, creating worksheet, entering into worksheet, heading information, data, text, dates, alphanumeric values, Toolbars and Menus, working with single and multiple workbook, working with formulae & cell referencing, Auto sum, Coping formulae, Previewing & Printing worksheet, Graphs and Charts.

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MS Power Point

Introduction, Creation of Presentation (Creating a Presentation Using a Template , Creating a Blank Presentation), Entering and Editing Text, Inserting And Deleting Slides in a Presentation, Preparation of Slides, Inserting Word Table or an Excel Worksheet, Adding Clip Art Pictures, Inserting Other Objects, Using hyperlinks, Adding Movie and Sound, Adding Headers and Footers, Presentation of Slides, Choosing a Set Up for Presentation, Printing Slides and Hand-outs, Running a Slide Show, Transition and Slide Timings, Animating a Slide Show

Introduction to Linux OS

Configuration, Setup, Commands – Navigating File System, File Permissions (R/W/X), Access control and super user (sudo) privileges, Scripting basics, Bash Shell : Input, Output, Comparison Operators, File Handling Operators, Functions, Variables, Control Flow, Loops, Arrays

Text Books :

- Susan. H Cooperman, “Professional Office Procedure”, PHI.
- Suresh Basandra, “Computers Today” , Galgotia Publications.
- Bott Ed , “Microsoft Office Inside Out”,2013 edition, PHI.

CO-PO & PSO Correlation

Course Name: Computer Fundamentals Lab												
Course Outcomes	Program Outcomes								PSOs			
	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	2	3		2					2			
CO2:		1								1	1	
CO3:		3	3		3				2	2	2	
CO4:	2	2							1	1		

Note: 1.: Low 2.: Moderate 3.: High