J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY
(UGC AUTONOMOUS)

Bhaskar Nagar, Moinabad Mandal, R.R. District, Hyderabad -500075

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B. Tech - COMPUTER SCIENCE AND ENGINEERING (CSE): R-24

COURSE STRUCTURE (2024-2025)

I Year - I Semester						
S. No	**Code**	**Course Title**	**L**	**T**	**P**	**C**
1	M110A	Matrices And Calculus	3	1	0	4
2	M110D	Engineering Chemistry	3	1	0	4
3	M110C	English For Skill Enhancement	3	0	0	3
4	M115A	Elements of Computer Science and Engineering	2	0	0	1
5	M115B	Programming for Problem Solving	3	0	0	3
6	M1102	Chemistry Lab	0	0	2	1
7	M1103	English Language and Communication Skills Lab	0	0	2	1
8	M1151	Programming for Problem Solving Lab	0	0	2	1
9	M1132	Computer Aided Engineering Graphics	1	0	3	2.5
10	M11AC2	Human Values and Professional Ethics	2	0	0	0
Total			17	2	9	20.5

I Year - II Semester						
S. No	**Code**	**Course Title**	**L**	**T**	**P**	**C**
1	M120A	Differential Equations and Vector Calculus	3	1	0	4
2	M120B	Applied Physics	3	1	0	4
3	M122A	Basic Electrical Engineering	3	0	0	3
4	M125A	Data Structure	3	0	0	3
5	M1201	Physics Lab	0	0	2	1
6	M1221	Basic Electrical Engineering Lab	0	0	2	1
7	M1252	Data Structure Lab	0	0	2	1
8	M1233	Engineering & IT Workshop	1	0	3	2.5
9	M12AC1	Linguaskill for Professionals -B1	2	0	0	0
Total			15	2	9	19.5

B. Tech - COMPUTER SCIENCE AND ENGINEERING (CSE): R-24
COURSE STRUCTURE (2024-2025)

II Year - I Semester						
S. No	**Code**	**Course Title**	**L**	**T**	**P**	**C**
1	M210A	Probability and Statistics	3	1	0	4
2	M214E	Digital Logic Design	3	0	0	3
3	M215C	Design and Analysis of Algorithms	3	0	0	3
4	M215B	Python Programming	3	0	0	3
5	M216D	Database Management Systems	3	0	0	3
6	M2151	Python Programming Lab	0	0	3	1.5
7	M2162	Database Management Systems Lab	0	0	3	1.5
8	M2153	Internship	0	0	2	1
9	M21MC1	Environmental Science	2	0	0	0
Total			17	1	8	20

II Year - II Semester						
S. No	**Code**	**Course Title**	**L**	**T**	**P**	**C**
1	M225B	Computer Organization and Architecture	3	0	0	3
2	M225A	Mathematical Foundations of Computer Science	3	1	0	4
3	M226A	Object Oriented Programming through Java	3	0	0	3
4	M225F	Operating Systems	3	0	0	3
5	M225E	Computer Networks	3	0	0	3
6	M2261	Object Oriented Programming through Java Lab	0	0	3	1.5
7	M2252	Operating Systems Lab	0	0	3	1.5
8	M2253	Node JS/ React JS/ Django	0	0	2	1
9	M22MC2	Gender Sensitization	2	0	0	0
10	M22AC1	Linguaskill for Professionals –B2	2	0	0	0
Total			19	1	8	20

III Year - I Semester						
S. No	**Code**	**Course Title**	**L**	**T**	**P**	**C**
1	M32EA	Business Economics and Financial Analysis	3	1	0	4
2	BTCSEE1	Professional Elective - I	3	0	0	3
3	BTCSEO1	Open Elective - I	3	0	0	3
4	M315A	DevOps	3	0	0	3
5	M316C	Software Engineering	3	0	0	3
6	M3152	DevOps Lab	0	0	2	1
7	M3163	Software Engineering Lab	0	0	2	1
8	M3154	Data visualization	0	0	2	1
9	M3153	Internship	0	0	2	1
10	M31MC4	Cyber Security	2	0	0	0
11	M31AC4	Foundations of Entrepreneurship	2	0	0	0
Total			19	1	8	20

III Year - II Semester						
S. No	**Code**	**Course Title**	**L**	**T**	**P**	**C**
1	BTCSEE2	Professional Elective - II	3	0	0	3
2	BTCSEE3	Professional Elective - III	3	0	0	3
3	BTCSEO2	Open Elective - II	3	0	0	3
4	M325A	Formal Languages and Automata Theory	3	1	0	4
5	M32AB	Machine Learning	3	0	0	3
6	M32A2	Machine Learning Lab	0	0	2	1
7	M3251	UI Design - Flutter	0	0	2	1
8	M3201	Life Skills and Professional Skills Lab	0	0	4	2
9	M32MC3	Artificial Intelligence	2	0	0	0
10	M32AC3	Indian Constitution	2	0	0	0
Total			22	1	8	20

IV Year - I Semester						
S. No	**Code**	**Course Title**	**L**	**T**	**P**	**C**
1	BTCSEE4	Professional Elective - IV	3	0	0	3
2	BTCSEE5	Professional Elective - V	3	0	0	3
3	BTCSEO3	Open Elective - III	3	0	0	3
4	M415D	Compiler Design	3	0	0	3
5	M41DA	Cryptography and Network Security	3	0	0	3
6	M4152	Industry Oriented Mini Project	0	0	4	2
7	M4153	Major Project Phase-I	0	0	4	2
8	M41DF	Cryptography and Network Security Lab	0	0	2	1
9	M41MC5	Computer Forensics	2	0	0	0
Total			17	0	10	20
IV Year - II Semester						
S. No	**Code**	**Course Title**	**L**	**T**	**P**	**C**
1	BTCSEE6	Professional Elective - VI	3	0	0	3
2	BTCSEO4	Open Elective - IV	3	0	0	3
3	M425A	Organizational Behaviour	3	0	0	3
4	M4251	Major Project Phase-II	0	0	20	10
5	M4252	Seminar	0	0	2	1
Total			9	0	22	20

Professional Elective-I (III-I)						
S. No	**Code**	**Course Title**	**L**	**T**	**P**	**C**
1	M316A	Data Warehousing and Data Mining	3	0	0	3
2	M315C	Computer Vision	3	0	0	3
3	M315D	Principles of Programming Languages	3	0	0	3

Professional Elective-II (III-II)						
S. No	**Code**	**Course Title**	**L**	**T**	**P**	**C**
1	M32DB	Big Data Analytics	3	0	0	3
2	M32AA	Deep Learning	3	0	0	3
3	M325I	Software Testing Methodology	3	0	0	3

Professional Elective-III (III-II)						
S. No	**Code**	**Course Title**	**L**	**T**	**P**	**C**
1	M325G	Cloud computing	3	0	0	3
2	M41DC	Reinforcement Learning	3	0	0	3
3	M32AG	Software Architecture and Design Patterns	3	0	0	3

Professional Elective-IV (IV-I)						
S. No	**Code**	**Course Title**	**L**	**T**	**P**	**C**
1	M417A	Internet of Things	3	0	0	3
2	M42AD	Generative Adversarial Networks	3	0	0	3
3	M415G	Blockchain Technology	3	0	0	3

Professional Elective-V (IV-I) (Mandatory MOOC)						
S. No	**Code**	**Course Title**	**L**	**T**	**P**	**C**
1	M31DOK	Data Science for Health Care	3	0	0	3
2	M415I	Quantum Computing	3	0	0	3
3	M416G	Software Project Management	3	0	0	3

Professional Elective-VI (IV-II)						
S. No	**Code**	**Course Title**	**L**	**T**	**P**	**C**
1	M42AB	Augmented and Virtual Reality	3	0	0	3
2	M425H	Edge Computing	3	0	0	3
3	M425J	Android Application Development	3	0	0	3

List of Open Elective Courses offered by CSE						
S. No	Code	Course Title	L	T	P	Credits
1	M315OE	Introduction to Computer Networks	3	0	0	3
2	M325OE	Principles of Operating Systems	3	0	0	3
3	M415OE	Introduction to Java Programming	3	0	0	3
4	M425OE	Introduction to Python Programming	3	0	0	3

AY: 2024-25 Onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B. Tech - CSE I Year-I Sem			
Course Code: M110A	MATRICES AND CALCULUS (COMMON TO: CE, EEE, ME, ECE, CSE, IT, ECM,CSE(DS), CSE(AIML), AIML, AIDS)	L	T	P	C
		3	1	0	4

Pre-Requisites: Mathematical Knowledge at pre-university level

Course Outcomes

1. Types of matrices and their properties.
2. Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
3. Concept of eigenvalues and eigenvectors and to reduce the quadratic form to canonical form Geometrical approach to the mean value theorems and their application to the mathematical problems
4. Evaluation of surface areas and volumes of revolutions of curves.
5. Evaluation of improper integrals using Beta and Gamma functions.
6. Partial differentiation, concept of total derivative
7. Finding maxima and minima of function of two and three variables.
8. Evaluation of multiple integrals and their applications

Module 1: Matrices and system of equations [10L]

Types of Matrices, Symmetric, Skew-symmetric, rank of a matrix by Echelon form and Normal form, Gauss elimination, Inverse of non-singular matrices by Gauss-Jordan method. System of linear equations, solving system of Homogeneous and Non-Homogeneous equations.

Module 2: Eigen values, Eigen Vectors [8 L]

Eigen values, Eigen vectors and their properties, Diagonalization of matrix. Calculation of powers of Matrix, Cayley - Hamilton theorem (without proof), Inverse and powers of a matrix using Cayley - Hamilton theorem.

Module 3: Quadratic Forms [8 L]

Definitions of Hermitian, Skew-Hermitian, orthogonal matrices, Unitary Matrices, Linear Transformation and Orthogonal Transformation, Quadratic forms, rank and nature of the quadratic forms, index and signature, reduction of quadratic forms into canonical form using Linear Transformation and Orthogonal Transformations.

Module 4: Mean value theorems and Functions of Multi variables [12L]

Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem. Taylor's Series

Functions of Multi variables: Limits, Continuity, Partial differentiation, partial derivatives of first and

second order, Jacobian, Taylor's theorem of two variables (without proof). Maxima and

Module 5: Improper and Multiple Integrals **[12L]**

Minima of two variables, Lagrange's method of undetermined Multipliers.

Definition of Improper Integrals, Beta functions: Properties and other forms of beta functions (statements only) and problems, Gamma functions: Properties of Gamma functions (statements only), Relation between the Beta and Gamma functions (without proofs) and Evaluation of improper integrals using Beta and Gamma functions

Evaluation of double integrals, change of order of integration, change of variables, evaluation of triple integrals, change of variables.

Text Books

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 2015
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006.
3. R.K.Jain & S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Edition, 2019.

Reference Books

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi,11thRepr

E-Resources

1. https://nptel.ac.in/courses/111/108/111108098/
2. https://en.wikipedia.org/wiki/Eigenvalues_and_eigenvectors
3. https://nptel.ac.in/courses/111/107/111107108/
4. https://www.cheric.org/files/education/cyberlecture/e200303/e200303-301.pdf

Course Outcomes

After Completion of Course, Student will able to

1. Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations
2. Find the Eigenvalues and Eigen vectors
3. Reduce the quadratic form to canonical form using orthogonal transformations.
4. Solve the applications on the mean value theorems.
5. Evaluate the improper integrals using Beta and Gamma functions
6. Find the extreme values of functions of two variables with/ without constraints.

A.Y: 2024-25 Onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B. Tech - CSE I Year-I Sem			
Course Code: M110D	**ENGINEERING CHEMISTRY** (COMMON TO: ECE, CSE, IT & ECM)	L	T	P	C
		3	**1**	**0**	**4**

Pre-Requisites:

Course Objectives:

The students should be able

1. To know the suitablility of water for domestic and industrial purposes.
2. To acquire knowledge about different types of batteries and to understand the concepts of corrosion.
3. To facilitate successful pursuit of advanced degrees to support interdisciplinary ideas in engineering or other related fields
4. Gain the knowledge of chemical reactions those are used in the synthesis of molecules.

Module 1: Water and Its Treatment [11L]

Introduction – hardness of water – Causes of hardness - Types of hardness- temporary and permanent hardness – Units of hardness of water - Numerical problems – Estimation of hardness of water by complexometric method. Boiler troubles: scale and sludge, causes and effects. Potable water and Industrial water its specifications. Softening of water -Internal treatment of boiler feed water– Calgon conditioning, Phosphate conditioning and Colloidal conditioning. External treatment of water – Ion exchange process. Desalination of brackish water – Reverse osmosis. Steps involved in potable water treatment – Disinfection of water by chlorination, Breakpoint chlorination and Ozonization.

Module 2: Battery and Corrosion 12L

Batteries [7L]

Introduction– Classification of batteries - Primary (Li-MnO_2 cell) and secondary batteries (Lithium ion battery)- Applications

Fuel cells – Methanol - Oxygen fuel cell – Engineering applications

Solar cells –Principle and applications of solar cells

Corrosion[5L]

Causes and effects of corrosion–chemical and electrochemical corrosion – mechanism of electrochemical corrosion by hydrogen evolution method, types of corrosion-galvanic and waterline corrosion. Factors influencing rate of corrosion - Corrosion control methods- Cathodic protection – Sacrificial anodic and impressed current cathodic methods - Hot dipping (Galvanizing and Tinning).

Module 3: Chemical Fuels [9L]

Fuels: Definition, Classification, Characteristics of a good fuel - Types of Calorific value (CV) – Calculationof CV using Dulong's formula, Numericals.P**oild Fuels:** Coal - Composition - Proximate & Ultimate Analysis - Significance.

Liquid Fuels: Gasoline and its Composition, Cracking: Fixed bed catalytic cracking method – Knocking, Anti- Knocking agents and its significance, Octane number, Cetane number. **Gaseous Fuels:** Composition, characteristics and applications of natural gas, LPG and CNG

Module 4: Polymers [10L]

Polymers: Definition–Monomer, Polymer, Polymerization. Types of polymerization – addition and condensation polymerization with examples.

Plastics: Definition - thermoplastic and thermosetting plastics, compounding and fabrication of plastics (compression and injection moulding). Preparation, Properties and Engineering Applications of PVC. Urea-Formaldehyde.

Fibers: Preparation, Properties and engineering applications of Nylon-6, 6.
Conducting Polymers- Definition, Classification, Applications.

Module 5: Engineering Materials & Drugs 8L

Nanomaterials

Introduction, Synthesis of Sol-gel method, General Applications of Nanomaterials.
Carbon Nanotubes - Properties and applications.
Portland Cement: Chemical constituents, Manufacturing of Portland cement, Setting and Hardening and applications of cement.

Drugs: Antipyretic (Paracetamol) – Medicinal Applications

Text Books

1. Engineering Chemistry: Prof. Jaya Shree Anireddy, Wiley Publications.
2. Engineering Chemistry: P. C. Jain & M. Jain, Dhanpat Rai Publications, New Delhi.
3. Engineering Chemistry: Shashi Chawla, Dhanpat Rai Publications (2019), New Delhi.

Reference Books

1. Engineering Chemistry by M. Thirumalachary and E. Laxminarayana, Scitech Publications.
2. Text Book of Engineering Chemistry by Cengage Learning, B. Rama Devi, Ch. Venkata Ramana Reddy and Prasanth Rath.
3. Engineering Chemistry (NPTEL Web-book) by B.L. Tembe, Kamaluddin and M.S.Krishnan

E-Resources

1. https://www.imnh.isu.edu/digitalatlas/hydr/basics/main/chmtxt.
2. https://chem.libretexts.org/Core/.../Electrochemistry/Basics_of_Electrochemistry
3. https://www2.chemistry.msu.edu/faculty/reusch/virttxtjml/polymers.htm
4. https://www.youtube.com/watch?v=W0-CvvAGtEM
5. https://sengerandu.wordpress.com/tutorials/physical-metallurgy/engineering-materials

Course Outcomes

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

CO1. Recognize and select the domestic and industrial problems caused by hard water and also learn about the municipal water treatment using various methods.

CO2. Understand and interpret the important fundamental concepts of electrochemical procedures related to corrosion and its control.

CO3. Rate the fuels and suggest methods for enhancement of the quality of fuels for the required output.

CO4. Identify & recognize the role of polymers in everyday life.

CO5. Apply the Knowledge of engineering materials and drugs in daily life.

AY: 2024-25 Onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B. Tech - CSE I Year-I Sem.			
Course Code: M110C	**ENGLISH FOR SKILL ENHANCEMENT** (COMMON TO CSE, IT, ECM, ECE, EEE)	L	T	P	C
		3	**0**	**0**	**3**

Pre-Requisites: NIL

Course Objectives:

The students should be able

1. Enhancing understanding of key concepts related to language structures and language usage.
2. Ensuring the ability to write grammatically correct and diverse sentences, free from punctuation and spelling errors.
3. Improving students' proficiency in English required for technical education.
4. Building academic competence and confidence to use language effectively.
5. Developing life skills to tackle different challenges.

Module 1 (10L)

Lesson: 'Toasted English' by R. K. Narayan

Vocabulary: The Concept of Word Formation -The Use of Prefixes and Suffixes - Acquaintance with Prefixes and Suffixes from Foreign Languages to form Derivatives - Synonyms and Antonyms

Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.

Reading: Reading and Its Importance- Techniques for Effective Reading.

Writing: Sentence Structures -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for writing precisely – Paragraph Writing – Types, Structures And Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

Module 2(9L)

Lesson: 'Appro JRD' by Sudha Murthy

Vocabulary: Words Often Misspelt - Homophones, Homonyms and Homographs

Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.

Reading: Sub-Skills of Reading – Skimming and Scanning – Exercises for Practice

Writing: Nature and Style of Writing- Defining /Describing People, Objects, Places and Events – Classifying- Providing Examples or Evidence.

Module 3 **(8L)**

Lesson: Elon Musk

Vocabulary: Words Often Confused - Words from Foreign Languages and their Use in English.

Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.**Reading:** Sub-Skills of Reading – Intensive Reading and Extensive Reading – Exercises for Practice.

Writing: Format of a Formal Letter-Writing Formal Letters E.g.., Letter of Complaint, Letter of Requisition, Email Etiquette, Job Application with CV/Resume.

Module 4 **(8L)**

Lesson: Art and Literature by Dr. Abdul Kalam

Vocabulary: Standard Abbreviations in English

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Survey, Question, Read, Recite and Review (SQ3R Method) - Exercises for Practice

Writing: Writing Practices- Essay Writing-Writing Introduction and Conclusion -Précis Writing.

Module 5 **(8L)**

Lesson: Go, Kiss the World' by Subroto Bagchi

Vocabulary: Technical Vocabulary and their Usage

Grammar: Common Errors in English (Covering all the other aspects of grammar which were not covered in the previous units)

Reading: Reading Comprehension-Exercises for Practice

Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.

Text Books

1. *"English: Language, Context and Culture"* by Orient BlackSwan Pvt. Ltd, Hyderabad. 2022. Print.

Reference Books

1. Swan, M. (2016). Practical English Usage. Oxford University Press.
2. Kumar, S and Lata, P. (2018). Communication Skills. Oxford University Press.
3. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
4. Zinsser, William. (2001). On Writing Well. Harper Resource Book.
5. Hamp-Lyons, L. (2006). Study Writing. Cambridge University Press.
6. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.

E-Resources

1. https://sharmadkm.wordpress.com/2022/12/11/toasted-english-by-r-k-narayan/
2. https://sharmadkm.wordpress.com/2022/12/20/apro-jrd-summary/
3. Cambridge English
4. BBC Learning English - Learn English with BBC Learning English - Homepage

Course Outcomes

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

CO1. Expand their vocabulary through mastery of word roots, prefixes, and suffixes.

CO2. Demonstrate proficiency in grammar fundamentals, including sentence structure and parts of speech.

CO3. Exhibit competence in reading and writing skills for effective communication in diverse contexts.

CO4. Apply critical thinking and analytical skills to analyse texts and synthesize information.

CO5. Express themselves confidently and coherently through oral presentations, discussions, and written compositions.

CO-PO/PSO Mapping

Course Outcomes	Program Outcomes (POs)/Program Specific Outcomes (PSOs)													
	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**
CO1	-	-	-	-	-	-	-	-	2	2	-	3	-	-
CO2	-	-	-	-	-	-	-	-	2	2	-	3	-	-
CO3	-	-	-	-	-	-	-	-	2	2	-	3	-	-
CO4	-	-	-	-	-	-	-	-	2	2	-	3	-	-
CO5	-	-	-	-	-	-	-	-	2	2	-	3	-	-
Average	-	-	-	-	-	-	-	-	**2**	**2**	-	**3**	-	-

Correlation: 3–Strong; 2–Medium; 1-Weak

AY: 2024-25 Onwards	J.B.INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC Autonomous)	B. Tech-CSE I Year- I Sem			
Course Code: M115A	ELEMENTS OF COMPUTER SCIENCE AND ENGINEERING	L	T	P	C
		2	0	0	1

Course Objectives:

The students should be able to provide an overview of the subjects of computer science and engineering

Module 1:

Basics of a Computer – Hardware, Software, Generations of computers. Hardware - functional units, Components of CPU, Memory – hierarchy, types of memory, disks, primary and secondary memory,

processor, operating system, compilers, compiling and executing a program etc., Number systems. Input and output devices.

Software –systems software, application software, packages, frameworks, IDEs.

Module 2:

Software development – waterfall model, Agile, Types of computer languages – Programming, markup, scripting Program Development – steps in program development, flowcharts, algorithms, data structures – definition, types of data structures

Module 3:

Operating systems: Functions of operating systems, types of operating systems, Device & Resource Management

Database Management Systems: Data models, RDBMS, SQL, Database Transactions, data centers, cloud services

Module 4:

Computer Networks: Advantages of computer networks, LAN, WAN, MAN, internet, WiFi, sensor networks, vehicular networks, 5G communication.

World Wide Web – Basics, role of HTML, CSS, XML, Tools for web designing, Social media, Online social networks. Security – information security, cyber security, cyber laws

Module 5:

Autonomous Systems: IoT, Robotics, Drones, Artificial Intelligence – Learning, Game Development, natural language processing, image and video processing. Cloud Basics, Blockchain Technology, Quantum Computing.

Textbooks

1. Invitation to Computer Science, G. Michael Schneider, Macalester College, Judith L. Gersting University of Hawaii, Hilo, Contributing author: Keith Miller University of Illinois, Springfield.
2. Elements of computer science, Cengage

Reference Books

1. Fundamentals of Computers, Reema Thareja, Oxford Higher Education, Oxford University Press.
2. Introduction to computers, Peter Norton, 8th Edition, Tata McGraw Hill.

Course Outcomes

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

CO1. Know the working principles of functional units of a basic Computer

CO2. Understand program development, the use of data structures and algorithms in problem solving.

CO3 Know the need and types of operating system, database systems. **CO4**.Understand the significance of networks, internet, WWW and cyber security. **CO5** Understand Autonomous systems, the application of artificial intelligence

AY: 2024-25 Onwards	J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC Autonomous)	B. Tech - CSE I Year- I Sem			
Course Code: M115B	**PROGRAMMING FOR PROBLEM SOLVING** (Common to all)	L	T	P	C
		3	**0**	**0**	**3**

Pre-Requisites:

1. Mathematical Knowledge.
2. Analytical Skills.

Course objectives:

The Student will:

1. Learn the fundamentals of computers.
2. Understand the various steps in program development.
3. Understand the syntax and semantics of C programming language.
4. Learn the usage of structured programming approach in solving problems.
5. Gain the knowledge on searching and sorting methods.

Module 1:

Unit-1

Introduction to Algorithms: steps to solve logical and numerical problems. Representation of Algorithm, Flowchart/Pseudo code with examples, Program design and structured programming. **Introduction to C Programming Language**: Basic concepts of a C program, Declaration, Assignment & Print statement, Types of operators and expressions, Programming examples and exercise. variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code, expressions and precedence, Expression evaluation, Storage classes (auto, extern, static and register), type conversion, The main method and command line arguments.

Unit-2

Bitwise operations: Bitwise AND, OR, XOR and NOT operators Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switchcase, ternary operator, goto, Iteration with for, while, do- while loops.I/O: Simple input and output with scanf and printf, formatted I/O, Introduction to stdin, stdout and stderr.

.

Module 2:

Unit-1

ARRAYS, STRINGS, STRUCTURES AND PREPROCESSOR:

Arrays: one and two dimensional arrays, creating, accessing and manipulating elements of arrays.

Unit-2

Strings: Introduction to strings, handling strings as array of characters, basic string functions available in C (strlen, strcat, strcpy, strstr etc.), arrays of strings Structures: Defining structures, initializing structures, unions, Array of structures.

Preprocessor: Commonly used Preprocessor commands like include, define, undef, If, ifdef, ifndef.

Module 3:

POINTERS AND FILE HANDLING IN C:

Unit-1

Pointers: Idea of pointers, defining pointers, Pointers to Arrays and Structures, Use of Pointers in self-referential structures, usage of self-referential structures in linked list (no implementation) Enumeration data type. Array of pointers,

Unit-2

Files: Text and Binary files, Creating and Reading and writing text and binary files, appending data to existing files, Writing and reading structures using binary files, Random access using fseek, ftell and rewind functions.

Module 4:

FUNCTION AND DYNAMIC MEMORY ALLOCATION:

Unit-1

Functions: Designing structured programs, declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, passing arrays to functions, passing pointers to functions, idea of call by reference, Some C standard functions and libraries.

Unit-2

Recursion: Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions.

Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays of different data types. Dynamic allocations methods- malloc(), calloc(), realloc(), free().

Module 5:

INTRODUCTION TO ALGORITHMS:

Unit-1

Basic searching algorithms (linear and binary search techniques),

Unit-2

Basic sorting algorithms (Bubble, Insertion, Quick, Merge and Selection sort algorithms) Basic concept of order of complexity through the example programs

Textbooks

1. Ream Thareja, Programming in C, Oxford university press.
2. B.A. Forouzan and R.F. Gilberg, C Programming and Data Structures, Cengage Learning, (3rdEdition).

Reference Books

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.

2. R.G. Dromey, How to solve it by Computer, Pearson (16thImpression)
3. Stephen G. Kochan, Programming in C, Fourth Edition, PearsonEducation.
4. Herbert Schildt, C: The Complete Reference, McGraw Hill, 4thEdition
5. Byron Gottfried, Schaum‟sOutline of Programming with C,McGraw-Hil

E - Resources:

1. https://fresh2refresh.com/c-programming/
2. https://www.studytonight.com/c/
3. https://beginnersbook.com/2014/01/c-tutorial-for-beginners-with examples/
4. https://www.programiz.com/c-programming

5.http://www.gtucampus.com/uploads/studymaterials/Degree%20EngineeringSandipFundaments_of_C.pdf

.http://cs.indstate.edu/~cbasavaraj/cs559/the_c_programming_language_2.pdf

Course Outcomes

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

CO1. Design the algorithms/flowcharts of C-programs

CO2 . Write the Code and test a given logic in C programming language

CO3 Decompose a problem into functions and to develop modular reusable code.

CO4. Make Use of arrays, pointers, strings and structures to write C Programs.

CO5 Apply searching and sorting algorithms.

AY: 2024-25 Onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B. Tech - CSE I Year-I Sem			
Course Code: M1102	CHEMISTRY LABORATORY (COMMON TO: EEE, ECE, CSE, IT & ECM)	L	T	P	C
		0	0	2	1

Pre-Requisites:

List of experiments (Any 10-12 experiments)

Volumetric Analysis:

1. Preparation of standard solution of oxalic acid and standardisation of NaOH.
2. Determination of total hardness of water by complexometric method using EDTA.
3. Determination of chloride content of water by Argentometry.
4. Estimation of Ferrous ion in Mohr's salt using Permanganomerty.
5. Estimation of ferrous ion in Mohr's salt by dichrometry.

Determination of Physico-Chemical Properties:

6. Determination of viscosity of a given liquid by using Ostwald's viscometer.
7. Determination of surface tension of a given liquid using stalagmometer.
8. Determination of partition coefficient of acetic acid between n-butanol and water.

Instrumental methods of Analysis:

9. Estimation of strength of HCl by Conductometric titrations using NaOH.
10. Estimation of strength of HCl by Potentiometric titrations using NaOH.
11. Estimation of Cu^{+2} in a given sample by colorimetry.
12. Estimation of Mn^{+2} in given sample by colorimetry.

Synthesis of Nanomaterials, Polymers and drug molecules:

13. Synthesis of Iron Nanoparticles
14. Synthesis of Polymer-Bakelite.
15. Synthesis of drug molecule Aspirin.

Text Books

1. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg, (R. Chand & Co., Delhi)
2. An introduction to practical chemistry, K.K. Sharma & D.S. Sharma, (Vikas publishing, N. Delhi)
3. "Text book of practical organic chemistry", Vogel's ,5th edition.
4. "Text book on Experiments and calculations in engineering chemistry", S.S. Dara

Course Outcomes

At the end of the course, the students will be able to:

1. Identify the basic chemical methods to analyse the substances quantitatively & qualitatively.
2. Calculate the concentration and amount of various substances using instrumental techniques.
3. Synthesize the engineering materials like nanomaterials, polymers and drug molecules.
4. Determine the physic-chemical properties like partition co-efficient, surface tension and viscosity.
5. Determine the partition coefficient of organic compound in two immiscible liquids.

A.Y: 2024-25 Onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B. Tech - CSE I Year-I Sem.			
Course Code: M1103	**ENGLISH LANGUAGE & COMMUNICATION SKILLS LAB** (COMMON TO CSE, IT, ECM, ECE, EEE)	L	T	P	C
		0	**0**	**2**	**1**

Pre-Requisites: NIL

COURSE OBJECTIVES

1. To use accurate and appropriate pronunciation through the practice of phonetic sounds, symbols, word accent and into nation.
2. To improve their fluency in spoken English and neutralize their mother tongue influence through JAM Sessions, Role-play, etc.
3. To comprehend the speech of people of various regions through Listening practice exercises.

   To enable students to transfer information verbally with the right usage of Body language through individual and group activities.
4. To understand nuances of English language by practicing various exercises at Multi-media lab.

English Language and Communication Sills Lab (ELCS) will have two divisions:

a) **Computer Assisted Language Learning Lab (CALL)**

b) **Interactive Communication Skills Lab (ICS)**

Module 1: (9L)

CALL Lab:

General Indian English (GIE) and Interference of Mother Tongue (MTI) -Differences in British and American Pronunciation.

Introduction to Phonetics – Speech Sounds – Vowels and Consonants; Minimal Pairs

ICS Lab:

Ice-Breaking Activity and JAM Session- Situational Dialogues -Greetings-Taking Leave - Introducing Oneself and Others.

Module 2: (9L)

CALL Lab:

The Phoneme: The Syllable.

ICS Lab: Features of Good Conversation - Non-verbal Communication- Telephone Etiquette- Role Plays.

Module 3: (9L)

CALL Lab:

Stress-Word and Sentence Stress- Stress Shift- Strong and Weak Forms.

ICS Lab:

Introduction to a structured talk, Presentations Skills-Formal Presentations.

Module 4: (9L)

CALL Lab:

Intonation-Errors in Pronunciation- Neutralizing MTI

ICS Lab: Introduction to Group Discussion - Mock GD.

Module 5: (9L)

CALL Lab: Listening for Specific Details-Listening Comprehension Tests.

ICS Lab: Introduction to Interview Skills-Mock Interviews.

Text Books

1. ELCS Lab Manual: A Workbook for CALL & ICS Lab Activities; Orient Black Swan.

Reference Books

1. Balasubramanian. T (2009), A Textbook of English Phonetics for Indian Students. Macmillan.
2. Bansal. R.K, Harrison J.B. (2008). Spoken English. Orient Black Swan.
3. Ashraf Rizvi M (2010). Effective Technical Communication. McGraw-Hill.

E-Resources

1. https://bbamantra.com/listening/
2. https://en.wikipedia.org/wiki/Phonetics#:~:text=Phonetics%20is%20a%20branch%20of,th e%20physical%20properties%20of%20speech.
3. https://www.innovativeteachingideas.com/blog/10-great-activities-to-break-the-ice-with- your-students

Course Outcomes

Upon successful completion of the course, student will be able to

CO1. Differentiate the speech sounds in English and demonstrate accurate pronunciation

CO2. Comprehend and respond to the given texts appropriately.

CO3. Improve their effective and empathetic listening ability

CO4. Communicate confidently and effectively in various contexts and different cultures.

CO5. Listen actively, speak fluently and write accurately.

A.Y: 2024-25 Onwards	J.B.INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC Autonomous)	B. Tech-CSE I Year- I Sem			
Course Code: M1151	**PROGRAMMING FOR PROBLEM SOLVING LAB** (Common to all)	L	T	P	C
		0	**0**	**2**	**1**

Pre-Requisites:

1. Mathematical Knowledge.

2 Analytical Skills.

Course objectives:

The Student will:

1. Work with an IDE to create, edit, compile, run and debug programs
2. Analyse the various steps in program development.
3. Develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
4. Develop modular, reusable, and readable C Programs using the concepts like functions, arrays etc.
5. Write programs using the Dynamic Memory Allocation concept, files

Lab Experiments:

1. a) Write a program to find the max and min from the three numbers.

b) Write a program to read marks from keyboard and your program should display equivalent grade according to following table (if else ladder)

Marks Grade

100 – 80 Distinction

79 – 60 First Class

59 – 40 Second Class

< 40 Fail

2. Write a C program, which takes two integer operands and one operator from the user, performs the operation, and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)
3. Write a program that finds if a given number is a prime number
4. Write a C program to generate the first n terms of the sequence
5. Write a C program to find the minimum, maximum and average in an array of integers.
6. Write a C program to find Addition and Multiplication of Two Matrices
7. Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command line arguments.
8. Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abcba, etc.)

9. a) Write a C program to implement binary search algorithm.

b) Write a C program to implement linear search algorithm.

10. a) Write a C program that implements the Bubble sort method.

b) Write a C program that implements the Insertion sort method.

11. Write a C program that implements the Quick sort method.

12. Write a C program that implements the Merge sort method.

13. Recursion: factorial, Fibonacci, GCD.

Case Studies:

1. Implement Hotel Management system in C with the following requirements.

Requirements:

-Provide the information on reserving rooms, book an event, check the features

- Give the login for both admin and user for proper login validation

-Add/View/Edit/Delete user records

-Calculate the bill after checkout of customers

2. Implement Library management system in C with the following requirements.

Requirements:

-To add Book Information

- Display Book Information

-List all the books of the given author

-List the title of the specified Book

-List the count of books in the library

Course Outcomes

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

CO1 Formulate the algorithms for simple problems

CO2 Examine syntax errors as reported by the compilers

CO3 Define and manipulate data with arrays, strings, and structures

CO4 Make use of pointers with different function types

CO5 Create, read, and write to and from simple text and binary files

AY: 2024-25 Onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B. Tech - CSE I Year – I Sem			
Course Code: M1132	COMPUTER AIDED ENGINEERING GRAPHICS (COMMON TO: EEE, ECE, CSE, IT & ECM)	L	T	P	C
		1	0	3	2.5

Pre-Requisites: Engineering Mathematics.

Module 1: Principles of Engineering Drawing, Conic Sections, Curves, Scales [12L]

Unit-I: [3L] Introduction to Engineering Graphics: Principles of Engineering Graphics and their Significance. Construction of Plane, Diagonal Scales.

Unit-II: [6L] Conic Sections including the Rectangular Hyperbola – General method only, Cycloid, Epicycloid and Hypocycloid.

Unit-III: [3L] Introduction to Computer aided drafting – views, commands and conics.

Module 2: Orthographic Projections [12L]

Unit-I: [3L] Principles of Orthographic Projections – Conventions.

Unit-II: [3L] Projections of Points and Lines, Projections of Plane regular geometric figures – Circle, Square, Rectangle, Triangle, Pentagon, Hexagon.

Unit-III: [6L] Computer aided orthographic projections – points, lines and planes.

Module 3: Projections of Solids [12L]

Unit-I: [6L] Projections of Right Regular Solids – Prisms and Pyramids of Square, Pentagon, Hexagon;

Unit-II: [6L] Projections of Generated Solids – Cone, Cylinder. Computer aided projections of solids.

Module 4: Sections of Solids, Development of Surfaces of Solids [12L]

Unit-I: [3L] Sectional View of Right Regular Solids – Prisms and Pyramids of Pentagon, Hexagon; Generated solids – Cylinder and Cone.

Unit-II: [6L] Development of Surfaces of Right Regular solids – Prism, cylinder pyramid and cone.

Unit-III: [3L] Computer aided sectional views, Development of surfaces.

Module 5: Isometric Projections, Orthographic Views [12L]

Unit-I: [9L] Principles of Isometric Projections, Isometric Scale, Isometric Views of Simple and Compound Solids; Conversion of Orthographic Views of simple objects to Isometric Views and Vice-versa.

Unit-II: [3L] Conversion of orthographic projection into isometric view using computer aided drafting.

Text Books

1. Bhatt N.D., Panchal V.M. & Ingle P.R., "Engineering Drawing", Charotar Publishing 2014.
2. Engineering Drawing and graphics Using AutoCAD Third Edition, T. Jeyapoovan, Vikas: S. Chand and company Ltd.
3. K. Venugopal & V. Prabhu Raja, "Engineering Drawing + Auto CAD", New Age International Publishers. Fifth Edition, 2011.

Reference Books

1. Narayana, K.L. & P Kannaiah, "Text book on Engineering Drawing", Scitech Publish, 2008
2. Agrawal B. & Agrawal C. M., "Engineering Graphics", TMH Publn, 2012.

E-Resources

1. https://nptel.ac.in/courses/112/103/112103019/
2. https://urlzs.com/fLJ3T
3. https://urlzs.com/zky46

Course Outcomes

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

CO1. Apply computer aided drafting tools to create 2D and 3D objects

CO2. Sketch conics and different types of solids

CO3. Appreciate the need of Sectional views of solids and Development of surfaces of solids

CO4. Read and interpret engineering drawings

CO5. Conversion of orthographic projection into isometric view and vice versa manually and by using computer aided drafting.

CO-PO/PSO Mapping

Course Outcomes	Program Outcomes(POs)/Program Specific Outcomes(PSOs)													
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO 1**	**PSO 2**
CO1	3	3	2	1	2	-	-	-	-	-	-	3	1	1
CO2	3	3	2	1	2	-	-	-	-	-	-	3	2	1
CO3	3	3	2	1	2	-	-	-	-	-	-	3	2	1
CO4	3	3	3	1	2	-	-	-	-	-	-	3	2	2
CO5	3	3	3	1	2	-	-	-	-	-	-	3	2	3
Average	3	3	2.4	1	2	-	-	-	-	-	-	3	1.8	1.6

Correlation: 3–Strong; 2–Medium; 1-Weak

AY: 2024-25 Onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B. Tech - CSE I Year – I Sem			
Course Code: M11AC2	HUMAN VALUES AND PROFESSIONAL ETHICS (COMMON TO: EEE, ECE, CSE, IT & ECM)	L	T	P	C
		2	0	0	0

Pre-Requisites

1. Positive bent of mind.
2. Zeal to know the essence of human existence and Nature.
3. Interest to know the Scientific and philosophical approach for identification of 'I'.
4. Sensitivity towards social and environmental issues.

COURSE OBJECTIVES:

1. To enable students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Value based living in a natural way.
3. To highlight plausible implications of the above Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.

Module I:

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education. Self Exploration–what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration. Continuous Happiness and Prosperity- A look at basic Human Aspirations. Right understanding, Relationship and Physical Facilities- the basicrequirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

Module II:

Understanding Harmony in the Human Being - Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I'.Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

Module III:

Understanding Harmony in the Family and Society- Harmony in Human - Human Relationship : Understanding harmony in the Family- the basic unit of human interaction. Understanding values

in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship. Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals. Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha)- from family to world family!

Module IV:

Understanding Harmony in the Nature and Existence - Whole existence as Co- existence:
Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature-recyclability and self- regulation in nature. Understanding Existence as Co- existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

Module V:

Implications of the above Holistic Understanding of Harmony on Professional Ethics : Natural acceptance of human values. Definitiveness of Ethical Human Conduct. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:
Ability to utilize the professional competence for augmenting universal human order, Ability to identify the scope and characteristics of people-friendly andeco- friendly production systems, Ability to identify and develop appropriate technologies and management patterns for above production systems.
Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order: At the level of individual: associally and ecologically responsible engineers, technologists and managers At the level of society: as mutually enriching institutions and organizations.

TEXT BOOKS

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.
2. Prof. KV Subba Raju, 2013, Success Secrets for EngineeringStudents, Smart Student Publications,3rd Edition.

AY: 2024-25 Onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B. Tech - CSE I Year-II Sem			
Course Code: M120A	**DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS** (COMMON TO: CE, EEE, ME, ECE, CSE, IT, ECM, CSE(DS), CSE(AIML), AIML & AIDS)	L	T	P	C
		3	**1**	**0**	**4**

Pre-Requisites: Mathematical Knowledge at pre-university level

Module 1: First Order, First Degree ODE and its Applications [10L]

Differential equations of first order and first degree - Exact differential equation, Linear and Bernoulli differential equation, applications of differential equations of first order and first degree - Newton's law of cooling, Law of natural growth and decay, orthogonal trajectories.

Module 2: Second and Higher order ODE with Constant Coefficients: [10L]

Second order linear differential equations with constant coefficients: Solution of Homogenous, nonhomogeneous differential equations, non-Homogeneous terms of the type e^{ax}, sin(ax), cos (ax), polynomials in x^k, e^{ax} V(x), xV(x). Method of variation of parameters; Equations reducible to linear ODE with constant Coefficients: Euler-Cauchy equation, Legendre's equation

Module 3: Laplace Transforms: [10L]

Laplace transforms, Existence condition, Laplace transform of Elementary functions, Properties of Laplace transforms (Without Proofs), Laplace transform of special functions (Unit step function, Dirac delta function and Periodic function). Inverse Laplace transform and its properties, Convolution theorem (without proof) and its applications, solving linear differential equations with constant coefficients using Laplace transform.

Module 4: Vector differential calculus: [9L]

Scalar and vector fields, vector differentiation, level surfaces, gradient of a scalar field, directional derivative, divergence and curl of a vector field, Scalar potential energy, Tangent plane and normal line. Vector Identities (without proofs).

Module 5: Vector integral calculus: [9L]

Line, surface and volume integrals. Green's theorem in a plane, Gauss-Divergence theorem and Stokes theorem(without proofs).

Text Books

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5 th Edition, 2019.

Reference Books

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002
3. H. K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, New Delhi.
4. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

E-Resources

1. https://nptel.ac.in/courses/111108098
2. https://www.math.hkust.edu.hk/~machas/differential-equations.pdf
3. https://engineeringmath.online
4. https://www.cheric.org
5. https://www.whitman.edu/mathematics/calculus_online

Course Objectives:

1. Methods of solving the differential equations of first and higher order.
2. Concept, properties of Laplace transforms
3. Solving ordinary differential equations using Laplace transforms techniques.
4. The physical quantities involved in engineering field related to vector valued functions

Course Outcomes:

5. The basic properties of vector valued functions and their applications to line, surface and volume integrals.

After learning the contents of this paper, the student must be able to

1. Identify whether the given differential equation of first order is exact or not
2. Solve higher differential equation and apply the concept of differential equation to real world problems. Use the Laplace transforms techniques for solving ODE's.
3. Evaluate the line, surface and volume integrals and converting them from one to another.

CO-PO/PSO Mapping

Course Outcomes	Program Outcomes (POs)/Program Specific Outcomes(PSOs)													
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO 1**	**PSO 2**
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Correlation: 3–Strong; 2–Medium; 1-Weak

AY: 2024-25 Onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B. Tech - CSE I Year-II Sem			
Course Code: M120B	**APPLIED PHYSICS** (COMMON TO: CE, EEE, ME, ECE, CSE, IT, ECM, CSE(AIML), CSE(DS), AIDS, AIML, CSC)	L	T	P	C
		3	**1**	**0**	**4**

Pre-Requisites: 10+2 Physics Course

Objectives:

The students should be able to

1. Study the characteristics of lasers and optical fibres.
2. Understand the basic principles of quantum mechanics and band theory of solids.
3. Understand the underlying mechanism involved in construction and working principles of various semiconductor devices.
4. Study the fundamental concepts related to the dielectric, magnetic and energy materials.
5. Identify the importance of nanoscale, quantum confinement and various fabrications techniques.

Module 1: LASERs and Optical fibers [10L]

Unit I: LASERs [5L]

Introduction, Properties of laser beam- Monochromaticity, coherence, directionality and brightness; Einstein co-efficients, Population inversion, Types of Lasers: Ruby laser, He-Ne laser, Semiconductor laser, Applications of lasers.

Unit II: Optical fibers [5L]

Introduction, Principle and construction of an optical fiber, Total Internal reflection, Acceptance angle, Numerical aperture, Types of optical fibers (Single mode, multimode, step index, graded index), losses in optical fibers, Optical fiber communication system with block diagram and Applications of optical fibres.

Module-2: Fundamentals of Quantum Mechanics and Band theory of solids [10L]

Unit I: Fundamentals of Quantum Mechanics [6L]

Introduction to quantum physics, Black body radiation, Planck's radiation law, Photoelectric effect, de-Broglie hypothesis, Davisson and Germer's experiment, Concept of wave function, Heisenberg uncertainty principle, Time independent Schrödinger wave equation, Particle in one dimensional infinite potential well

Unit II: Band theory of solids: [4L]

Free electron theory (Drude & Lorentz, Sommerfeld) (Qualitative), Bloch's theorem, Kronig-Penney model (Qualitative), E-K diagram, Effective mass of electron, Origin of energy bands-

classification of solids.

Module 3: Semiconductor Physics and Devices [9L]

Unit I: Semiconductor Physics [5L]

Density of states, Intrinsic semiconductor, Intrinsic carrier concentration, Extrinsic semiconductors (Qualitative), Fermi level and its temperature dependence, Hall effect-Hall coefficient, Applications of Hall effect.

Unit II: Semiconductor Devices [4L]

Direct and indirect bandgap semiconductor, Formation of PN junction, Working of PN junction diode in forward and reverse bias, V-I Characteristics, Zener diode, LED, Photo diode and Solar cell, their structure, working principle and characteristics.

Module 4: Dielectric, Energy and Magnetic materials [10L]

Unit I: Dielectric and Energy materials [5L]

Introduction, Types of polarizations-electronic, ionic and orientation polarizations; Internal field and Clausius-Mossotti, Piezoelectricity, Pyroelectricity and Ferroelectricity and their applications. Energy materials-Materials and electrolytes for super capacitors-Rechargeable ion batteries- Lithium ion and sodium ion batteries, solid fuel cells.

Unit II: Magnetic materials [5L]

Introduction, Origin of magnetic moment, Bohr magneton, Classification of dia, para and ferro magnetic materials on the basis of magnetic moment, Hysteresis curve based on domain theory, Soft and hard magnetic materials, Properties of antiferro and ferri magnetic materials.

Module 5:Nanoscience and Characterization techniques [9L]

Unit I: Nanoscience [5L]

Introduction of nanomaterials, Surface area to Volume ratio, Quantum confinement, Top-down fabrication: Ball milling and Chemical Vapor Deposition (CVD) methods, Bottom-up fabrication: Sol-Gel and Combustion methods.

Unit II: Characterization techniques [4L]

X-Ray Diffraction (XRD), Scanning Electron Microscope (SEM), Transmission Electron Microscope (TEM), Scanning Tunnelling Microscope (STM), Applications of nanomaterials.

Text Books

1. M.N. Avadhanulu and P.G. Kshirsagar, TVS Aruna Murthy "A Text Book Engineering Physics", S. Chand, 2019.
2. P. K. Palanisamy, "Engineering Physics", Scitech Publications.
3. Essentials of Nanoscience & Nanotechnology by Narasimha Reddy Katta, Typical Creatives NANO DIGEST, 1st Edition, 2021.

4. Wahab M A, 'Solid state physics-Structure and properties of materials' Narosa publication.
5. R.L.Singhal, " Solid state physics", KNRN publication.
6. Elementary Solid State Physics , S.L. Gupta and V. Kumar, pragati prakashan, 2019.
7. A.K. Bhandhopadhya-Nano materials, New age international, 1 st edition, 2007.

Reference Books

1. P. Bhattacharya, "Semiconductor Optoelectronic Devices", Prentice Hall of India (1997).
2. S.O. Pillai, "Solid State Physics", New Age International Publishers
3. J. Singh, "Semiconductor Optoelectronics", Physics and Technology, McGraw-Hill Inc. (1995).
4. Introduction to Solid State Physics, Charles Kittel, Wiley Eastern, 2019.

E-Resources

1. http://nptel.ac.in/courses/113104012/
2. http://www.springer.com/physics/journal/340 .
3. https://www.researchgate.net/publication/259574083 Lecture Notes on Engineering Physics
4. https://www.researchgate.net/publication/292607115_Applied Physics.

Course Outcomes

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

CO1. Describe the working of various types of lasers and explain the fundamentals of fiber optics.

CO2. Apply Schrodinger time independent wave equation to show energy of a particle in 1D potential box is quantized.

CO3. Explain the working of p-n junction diode in forward bias and reverse bias. **CO4**. Classify the magnetic materials into hard and soft magnetic materials based on hysteresis loop area.

CO5. Prepare nanomaterials for applications in various fields of engineering.

CO-PO/PSO Mapping

Course Outcomes	Program Outcomes(POs)/Program Specific Outcomes(PSOs)												
	PO 1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO 1**	**PSO 2**
CO1	2	2	1	-	-	-	-	-	-	-	-	-	1	-
CO2	3	1	2	-	-	-	-	-	-	-	-	-	1	-
CO3	2	1	2	-	-	-	-	-	-	-	-	-	1	-
CO4	2	2	1	-	-	-	-	-	-	-	-	-	1	-
CO5	2	2	1	-	-	-	-	-	-	-	-	-	2	-
Average	-	-	-	-	-	-	-	-	-	-	-	-		-

Correlation: 3–Strong; 2–Medium; 1-Weak

AY: 2024-25 Onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B. Tech - CSE I Year-II Sem			
Course Code: M122A	BASIC ELECTRICAL ENGINEERING (Common to CSE, IT, ECE, ECM & EEE)	L	T	P	C
		3	0	0	3

Pre-Requisites: Mathematics and Physics

COURSE OBJECTIVES

The students will

COB1: Apply Kirchhoff's laws to analyse complex DC circuits, demonstrating comprehension and application skills in electrical engineering.

COB2: Analyse the behaviour of AC circuits, showcasing evaluation skills in understanding electrical phenomena, including resonance.

COB3: Explain the principles of transformer operation and analyse their behaviour, applying concepts of electromagnetic induction.

COB4: Select and operate suitable DC motors and three-phase induction motors for various industrial applications, synthesizing motor principles effectively.

COB5: Demonstrate proficiency in basic electrical installations and the use of fundamental measurement instruments for practical electrical applications, ensuring strict adherence to safety protocols and standards.

UNIT 1: DC CIRCUITS AND CIRCUIT ELEMENTS [10 L]

MODULE -I: D.C CIRCUIT CONCEPTS AND CIRCUIT ELEMENTS

Voltage – current – power and energy – active and passive elements – voltage and current sources – source conversions – open circuit – short circuit – statement of Ohm's law - Kirchhoff's Laws – loop current method – node voltage method of solving the electrical network – resistance – laws of resistance – temperature coefficient of resistance – resistors in series and parallel – uses of resistor. **MODULE -II: ENERGY STORING ELEMENTS**

Inductor – inductance – V-I relation – power – energy stored in inductor – inductors in series and parallel – uses of Inductors – capacitor – capacitance – V-I relation – power – energy stored in capacitor – capacitor in series and parallel – uses of capacitor.

UNIT 2: AC CIRCUITS [10 L]

MODULE -I: SINGLE PHASE AC CIRCUITS

Alternating quantity – cycle – time period – frequency – Amplitude – RMS – average value – form and peak factors – phase and phase difference – AC through R, L, C, RL, RC and RLC series circuits – resonance in series RLC circuit.

MODULE -II: THREE PHASE AC CIRCUITS

Phase sequence – three phase connections – relationship between line and phase value of voltage and current in star and delta connections – power in three phase circuit.

UNIT 3: STATIC ELECTRIC MACHINE [8 L]

MODULE -I: FUNDAMENTALS OF SINGLE-PHASE TRANSFORMER

Single phase transformer – Principle – constructional details – parts – types (core and shell type) – equivalent circuit - EMF equation.

MODULE -II: TRANSFORMER PERFORMANCE AND APPLICATIONS

Losses – efficiency – regulation – applications.

UNIT 4: DC AND AC MACHINES [8 L]

MODULE -I: DC MOTOR

D.C Motor – principle – constructional details – DC series – DC shunt motor – torque current and speed current characteristics – applications.

MODULE -II: THREE-PHASE INDUCTION MOTOR

Three-phase induction motor – principle – construction – generation of rotating magnetic field – torque slip characteristics.

UNIT 5: ELECTRICAL INSTALLATIONS AND MEASURING INSTRUMENTS [9 L]

MODULE -I: ELECTRICAL INSTALLATIONS: Components of LT switchgear: Switch fuse unit (SFU) – MCB – MCCB – earthing.

MODULE -II: MEASURING INSTRUMENTS: Construction – working principle of PMMC and MI type instruments – advantages – disadvantages – applications.

TEXT BOOKS

T1: D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition, 2019.

T2: V.K. Mehta and Rohit Mehta, "Principles of Electrical Engineering and Electronics", S. Chand & Company Ltd, 2012.

T3: L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.

T4: A.K.Sawhney, "A course in Electrical and Electronics Measurements and Instrumentation", Dhanapath Rai and Sons., 10th Edition, 2007.

REFERENCE BOOKS

R1: Dr. Ramana Pilla, Dr. M. Suryakalavathi, "Basic Electrical Engineering", S. Chand & Company Ltd, 2018.

R2: V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

E-RESOURCES

E1: https://onlinecourses.swayam2.ac.in/nou21_ee02/preview

E2: https://nptel.ac.in/courses/108/108/108108076/

E3: https://www.electrical4u.com

COURSE OUTCOMES

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

CO1: Analyse and solve complex DC circuits using Kirchhoff's laws.

CO2: Calculate and analyse the behaviour of single-phase and three-phase AC circuits, including resonance phenomena.

CO3: Understand the principles of operation and applications of transformers in electrical systems.

CO4: Expertise in the principles and applications of DC motors and three-phase induction motors, enabling them to select and operate suitable machines for various industrial purposes.

CO5: Develop foundational skills in basic electrical installations and using fundamental measurement instruments for practical electrical applications.

A.Y: 2024-25 Onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B. Tech - CSE I Year-II Sem			
Course Code: M125A	**DATA STRUCTURES** (Common to CSE, IT)	L	T	P	C
		3	**0**	**0**	**3**

Pre-Requisites:

1. C programming language.

Course objectives:

The Student will:

1. Define the basic data structures like linked list.
2. Understand the fundamentals and applications of linked list, stacks and queues.
3. Classify different types of tree data structures
4. Understand the concepts of graph data structures.
5. Know the fundamentals of basic searching, sorting and pattern matching algorithms.

Module 1:

Basic concepts - Algorithm Specification, Performance analysis - time complexity and space complexity, Asymptotic Notation - Big O, Omega and Theta notations, Introduction to Linear and Non Linear data structures.

Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, circular linked list implementation, doubly linked list implementation, insertion, deletionand searching operations. Applications of linked lists.

Module 2:

Stacks-Operations, array and linked representations of stacks, stack applications-infix to postfixconversion, postfix expression evaluation, recursion implementation.

Queues-operations, array and linked representations. Circular Queue operations, Dequeue,applications of queue.

Module 3:

Trees – Terminology, Representation of Trees, Binary tree ADT, Properties of Binary Trees, Binary Tree Representations-array and linked representations, Binary Tree traversals, Threaded binary trees, Binary Heap-Properties, Max and Min Heap, Operations-Insertion and Deletion, Heap sort.

Search Trees-Binary Search tree, Tree traversals, AVL tree – operations, B-tree – operations, B+ trees, Red Black tree.

Module 4:

Graphs-Terminology, sequential and linked representation, graph traversals: Depth First Search &Breadth First Search implementation. Minimum spanning trees, Prims and Kruskals method.

Searching and Sorting: Linear Search and Binary Search, Bubble sort, Insertion sort, Quick and Merge sort.

Module 5:

Hashing-Hash table, Hash table representations, hash functions, collision resolution techniques-separate chaining, open addressing-linear probing, quadratic probing, double hashing, Re hashing, Extendible hashing,

Pattern matching: Introduction, Brute force, the Boyer –Moore algorithm, Knuth-Morris-Pratt algorithm.

Textbooks:

1. Data Structures Using C, ReemaThareja, Oxford University Press, 2011 Learning.
2. Introduction to Algorithms, TH Cormen, PHI

Reference Books:

1. Data Structures & Algorithm Analysis in C++, Mark Allen Weiss, Pearson Education.
2. Design methods and analysis of Algorithms, SK Basu, PHI.
3. Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, SartajSahni, Sanguthevar Rajasekaran, Universities Press.

E - Resources:

1. http://masterraghu.com/subjects/Datastructures/ebooks/rema%20thareja.pdf.
2. https://www.slideshare.net/adisesha12/data-structure-ppt-138483078
3. https://lecturenotes.in/subject/81/data-structure-using-c-ds
4. http://www.tutorialspoint.com/data_structures_algorithms
4. http://www.geeksforgeeks.org/data-structures/
5. http://www.coursera.org/specializations/data-structures-algorithms

Course outcomes:

The student will be able to:

1. Demonstrate operations like searching, insertion, deletion, traversing mechanism using linkedlist.
2. Use linear and non-linear data structures like stacks, queues etc.
3. Implement different types of tree data structures.
4. Implement the concepts of graph data structures.
5. Apply the basic searching, sorting and pattern matching Techniques.

A. Y: 2024-25 Onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B. Tech - CSE I Year- II Sem			
Course Code: M1201	PHYSICS LABORATORY (COMMON TO: All branches)	L	T	P	C
		0	0	2	1

Pre-Requisites: 10+2 Physics basic concepts.

List of Experiments:

1:Energy gap of P-N junction diode

To determine the energy gap of a semiconductor diode.

2. Solar Cell:

To study the V-I Characteristics of solar cell.

3. Light emitting diode and Laser Diode:

Plot V-I characteristics of light emitting diode and Laser diode.

4. Optical fiber:

Determination of Numerical Aperture of an optical fibre.

5. Hall effect:

To determine Hall co-efficient of a given semiconductor.

6. Photoelectric effect

To determine work function of a given material.

7. Dielectric Constant

To determine the Dielectric constant of the given material.

8. LCR Circuit

To determine the Quality factor of LCR Circuit (Series & Parallel).

9. R-C Circuit

To determine the time constant of R-C circuit (Growth and Decay).

10. Melde's Experiment

To determine the frequency of a vibrating bar or turning fork using Melde's arrangement.

11. Torsional Pendulum

To determine the rigidity modulus of the material of the given wire using torsional pendulum.

12. Sonometer

To determine the frequency of AC Supply sonometer.

Note: Any 10 experiments are to be performed.

Text Books

1. Dr. Narendra, L. Mathakari,"Experiments in Applied Physics" (Physics Lab Manual 4th edition)
2. "Engineering Physics Lab Resources" By Department of Physics JBIET.

Course Outcomes

At the end of the course, students will be able to

1. Learn the experimental concepts on in LED, Electric and Electronics materials.
2. Get the knowledge of fundamentals of Semiconductor physics.
3. Design, characterization and study of properties of material help the students to prepare new materials for various engineering applications.
4. Be exposed to the phenomena of waves, oscillations and optics.
5. Lasers and fiber optics enable the students to apply to various systems like communications, solar cell, photo cells and so on.

AY: 2024-25 Onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B. Tech - CSE I Year-II Sem			
Course Code: M1221	**BASIC ELECTRICAL ENGINEERING LAB** (Common to CSE, IT, ECE, ECM & EEE)	L	T	P	C
		0	**0**	**2**	**1**

Pre-Requisites: Mathematics and Physics

COURSE OBJECTIVES

The students will

COB1: Proficiently apply fundamental electrical principles, including Ohm's Law and circuit analysis techniques, to determine the values of unknown resistances.

COB2: Demonstrate mastery in validating circuit behaviours through the application of Kirchhoff's Voltage Law and Kirchhoff's Current Law.

COB3: Showcase understanding of time-dependent behaviour in electrical components by investigating the transient responses of series RL and RC circuits to DC excitation.

COB4: Explore resonance phenomena in series RLC circuits, identifying the frequency at which impedance is minimized and current is maximized, thus exhibiting proficiency in frequency-domain analysis.

COB5: Equip students to evaluate the performance characteristics of DC shunt motors and single-phase transformers, enabling them to assess their suitability for specific applications in electrical systems.

List of Experiments

1. Verification of Ohms Law.
2. Determination of unknown resistance.
3. Verification of KVL and KCL.
4. Transient response of series RL and RC circuits using DC excitation.
5. Transient response of RLC series circuit using DC excitation.
6. Resonance in series RLC circuit.
7. Calculations and verification of impedance and current of RL, RC and RLC series circuits.
8. Measurement of voltage, current and real power in primary and secondary circuits of a single phase transformer.
9. Performance Characteristics of a DC Shunt Motor.
10. Load test on single phase transformer (Calculate Efficiency and Regulation)

COURSE OUTCOMES

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

CO1: Apply Ohm's Law and circuit analysis techniques to determine the value of unknown resistances, showcasing proficiency in fundamental electrical principles.

CO2: Validate principles of circuit behaviour using Kirchhoff's Voltage Law and Kirchhoff's Current Law.

CO3: Investigate the transient responses of series RL and RC circuits to DC excitation, demonstrating an understanding of time-dependent behaviour in electrical components.

CO4: Explore resonance phenomena in series RLC circuits, identifying the frequency at which impedance is minimized and current is maximized, showcasing proficiency in frequency-domain analysis.

CO5: Evaluate the performance characteristics of DC shunt motors and single-phase transformers, to assess their suitability for specific applications in electrical systems.

AY: 2024-25 Onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B. Tech - CSE I Year-II Sem			
Course Code: M1252	**DATA STRUCTURES LAB (Common to CSE, IT)**	L	T	P	C
		0	**0**	**2**	**1**

Pre-Requisites:

1. C programming language.

Course objectives:

The Student will:

1. Implement the basic data structures like linked list.
2. Implement the operations of stacks and queues.
3. Classify different types of tree data structures
4. Understand the concepts of graph data structures.
5. Apply hashing and pattern matching techniques.

Experiment 1:
Write a C program that uses functions to perform the following operations on singly linked list:
I) Creation II) Insertion III) Deletion IV) Traversal V) merge two single linked lists

Experiment 2:
Write a C program that uses functions to perform the following operations on doubly linked list.
I) Creation II) Insertion III) Deletion IV) Traversal

Experiment 3:
Write a C program that implement stack operations using
I) Arrays II) Linked Lists

Experiment 4:
I) Write a C program to convert infix expression to postfix expression using stack
II) Write a C program to evaluate postfix expression

Experiment 5:
Write a C program to convert infix expression to prefix expression using stack

Experiment 6:
Write a C program to implement linear queue using
I) Arrays II) Linked Lists

Experiment 7:
Write a C program to perform following operations on a circular Queue
I) Insertion II) deletion III) search and count

Experiment 8:
Write a C Program to implement binary tree traversals

Experiment 9:
Write a C Program to implement AVL tree operations

Experiment 10:
Implementation of a Graph representation using Adjacency Matrix

Experiment 11:
I) Write a program to implement Linear Search technique.
II) Write a program to implement Binary Search technique.

Experiment 12:
I) Write a program to implement Bubble sort technique.
II) Write a program to implement Insertion sort technique.

Experiment 13:
I) Write a program to implement Quick sort technique.
II) Write a program to implement Merge sort technique.

Textbooks:

1. Data Structures Using C, ReemaThareja, Oxford University Press, 2011 Learning.
2. Introduction to Algorithms, TH Cormen, PHI

E - Resources:

1. http://masterraghu.com/subjects/Datastructures/ebooks/rema%20thareja.pdf.
2. https://www.slideshare.net/adisesha12/data-structure-ppt-138483078
3. https://lecturenotes.in/subject/81/data-structure-using-c-ds
4. http://www.tutorialspoint.com/data_structures_algorithms
5. http://www.geeksforgeeks.org/data-structures/
6. http://www.coursera.org/specializations/data-structures-algorithms

Course outcomes:

The student will be able to:

1. Demonstrate operations like searching, insertion, deletion, traversing mechanism using linkedlist.
2. Use linear and non-linear data structures like stacks, queues etc.
3. Implement different types of tree data structures.
4. Implement the concepts of graph data structures.
5. Apply the basic searching, sorting and pattern matching Techniques.

A.Y: 2024-25 Onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B. Tech - CSE I Year- II Sem			
Course Code: M1233	ENGINEERING AND IT WORKSHOP (COMMON TO CSE, IT)	L	T	P	C
		1	0	3	2.5

Pre-Requisites: Basic knowledge about tools and different trades

List Of Experiments

Engineering Workshop

1. To make a Half Lap joint from the given Wooden pieces.
2. To make a Dovetail joint from the given Wooden pieces.
3. To make a Rectangular Scoop using the given Sheet metal.
4. To make a Hooper using the given Sheet metal.
5. To perform Parallel and Series wiring connection.
6. To perform Stair case wiring connection.
7. To make a Square rod from a given round rod.
8. To make a S- hook from a given round rod.
9. To prepare a sand mould for the given single piece pattern.
10. To prepare a sand mould for the given Split-piece pattern.

IT Workshop

1. a. Computer Hardware: Identification of Peripherals
   b. Study of UPS and SMPS
2. a. Assembling and disassembling of a PC
   b. Simple diagnostic exercises – Related to hardware
3. a. Installation of Windows Operating System
   b. Installation of Linux Operating System
4. a. Basic Windows and Linux Commands
   b. Simple diagnostic exercises –Related to Operating System.

Text Books

1. K. C. John, “Mechanical Workshop Practice”, PHI Publishers, 2nd Edition,2010.

Course Outcomes

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

CO1. know the importance of general safety precautions on different shop floors.

CO2. identify the basic tools and equipments used in fitting, carpentry, sheet metal, machine shop, welding and smithy.

CO3. Familiarize with the production of simple models in carpentry, sheet metal, machine, welding and smithy trades.

CO4. Install the operating system in the given configuration of a computer
CO5: Execute commands for LINUX Operating System

CO-PO/PSO Mapping

Course Outcomes	Program Outcomes (POs)/Program Specific Outcomes (PSOs)													
	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**
CO1	-	-	-	-	-	-	-	-	2	2	2	3	3	3
CO2	-	-	-	-	-	-	-	-	2	2	2	3	3	1
CO3	-	-	-	-	-	-	-	-	2	2	2	3	3	3
CO4	-	-	-	-	-	-	-	-	2	2	2	3	3	3
CO5	-	-	-	-	-	-	-	-	2	2	2	3	3	2
Average	-	-	-	-	-	-	-	-	2	2	2	3	3	2.4

Correlation: 3–Strong; 2–Medium; 1-Weak

A.Y: 2024-25 Onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B. Tech - CSE I Year-II Sem			
Course Code: M12AC1	**Lingua skill for Professionals-B1** (COMMON TO CSE, IT, ECM, ECE)	L	T	P	C
		2	**0**	**0**	**0**

Pre-Requisites: NIL COURSE

OBJECTIVES:

To enable students

1. Acquire an extensive range of vocabulary related to diverse topics.
2. Enhance pronunciation skills, focusing on specific sounds and intonation patterns
3. Improve the use of various grammar concepts
4. Strengthen listening, speaking, reading, and writing skills across different proficiency levels
5. Develop practical language skills for everyday communication scenarios

Module 1(6L)

UNIT-1

Grammar: Subject-Object, Present Tense

Vocabulary: Words about friendship, communication, work and technology

Pronunciation: Word stress, sentence stress

UNIT-2

Everyday English: Opinions and suggestions

- **Listening:** Listening Activity 1, Listening Activity 2
- **Reading:** Reading Activity 1, Reading Activity 2
- **Speaking:** Speaking Activity 1, Speaking Activity 2

Writing: Guide, Email giving news

Module 2 (6L)

UNIT-1

Grammar: Modals, Phrases of ability, Articles, *used to* and *usually*

Vocabulary: Words about relationship and ability **Pronunciation:**

Linking sounds, Intonation in question tags

UNIT -2

Everyday English: Telling a story; Offering and asking for help

- **Listening:** Listening Activity 1, Listening Activity 2
- **Reading:** Reading Activity 1, Reading Activity 2
- **Speaking:** Speaking Activity 1, Speaking Activity 2

Writing: About someone's life, online advertisement

Module 3 (6L)

UNIT-1

Grammar: Future forms, zero and first conditionals, comparatives and superlatives

Vocabulary: Words about the natural world, environmental issues and food

Pronunciation: Sound and spelling 'a', /ʃ/, /tʃ/

UNIT-2

Everyday English: Giving reasons, results and examples; Asking and giving recommendations

- **Listening:** Listening Activity 1, Listening Activity 2
- **Reading:** Reading Activity 1, Reading Activity 2
- **Speaking:** Speaking Activity 1, Speaking Activity 2

Writing: Discussion essay, Review of a restaurant or cafe

Module 4 (6L)

UNIT-1

Grammar: Quantifiers, Reported speech

Vocabulary: Words about buildings and sharing information

Pronunciation: Sounds */t//d//k//g//h//w/*

UNIT-2

Everyday English: Offers, request, permission; generalising and being vague

- **Listening:** Listening Activity 1, Listening Activity 2
- **Reading:** Reading Activity 1, Reading Activity 2
- **Speaking:** Speaking Activity 1, Speaking Activity 2

Writing: A note with useful information, an email summary of a news story

Module 5 (6L)

UNIT-1

Grammar: Passive, Relative clause, Second and third conditionals

Vocabulary: Words about music and sport; expressions with *do*, *make* and *take*

Pronunciation: -ed ending words, mostly confused words

UNIT-2

Everyday English: Recommending, Discussing problems and reassuring

- **Listening:** Listening Activity 1, Listening Activity 2
- **Reading:** Reading Activity 1, Reading Activity 2
- **Speaking:** Speaking Activity 1, Speaking Activity 2

Writing: Article, Email with advice

Text Books

1. Doff, Adrian, et al. *Empower Second Edition Student's Book with Digital Pack: B1+ Intermediate*. Cambridge University Press, 2022.

Reference Books

1. Cullen, Pauline, et al. The Official Cambridge Guide to IELTS for Academic and General

Training: Student's Book with Answers. with DVD-ROM. Cambridge Univ. Press, 2014.

E-Resources

1. Cambridge English
2. English with Cambridge - YouTube
3. BBC Learning English - Learn English with BBC Learning English -Homepage
4. https://englishonline.britishcouncil.org/

Course Outcomes

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

CO1. Demonstrate a diverse vocabulary repertoire, facilitating better expression and comprehension.

CO2. Exhibit inteligible pronunciation skills, ensuring clearer oral communication.

CO3. Utilise various grammar concepts accurately and coherently.

CO4. Strengthened language skills across listening, speaking, reading, and writing.

CO5. Apply practical language skills effectively in everyday communication scenarios.

AY: 2024-25 Onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B. Tech II Year-I Sem			
Course Code: **M210A**	**PROBABILITY AND STATISTICS**	L	T	P	C
		3	**1**	**0**	**4**

Pre-Requisites: Mathematical Knowledge at the pre-university level

Module 1: Single Random Variables: [12L]

Introduction to Probability, Random Variables, Discrete and Continuous, Probability distributions, mass function/ density function of a probability distribution, mathematical expectation, moments about the origin, central moments.

Module 2: Probability Distributions: [12L]

Binomial, Poisson, Normal, and Exponential distributions and their properties moment generating functions of the above distributions and hence finds the mean and variance.

Module 3: Sampling and Testing of Hypothesis for Large Samples: [15L]

Sampling: Definition of population, sampling, statistic, parameter, Types of sampling, sample mean and Variance, sampling distribution, standard error, sampling distributions of means and variance.

Testing of Hypothesis: Null and Alternative hypothesis, Type I and Type II errors, Critical region, confidence interval, Level of significance, One tailed and Two tailed test.

Large sample tests: Test of hypothesis for single mean and difference between the means, Test of hypothesis for single proportion and difference between the proportions, Tests of significance of difference between sample S.D and population S.D.

Module 4: Testing of Hypothesis for Small Samples: [9L]

Test of significance-t distribution, paired t-test, confidence interval for the t- distribution, test for ratio of variances (F-test), Chi- square test for goodness of fit and independence of attributes.

Module 5: Correlation and Regression: [9L]

Correlation: Types of correlation, Coefficient of correlation, the rank correlation, Covariance of two random variables.

Regression: Regression Coefficient, the lines of Regression.

Text Books

1. S.C Gupta and V.K. Kapoor: Fundamentals of Mathematical Science, 2006.
2. Sheldon M.Ross: Introduction to Probability and Statistics for Engineers and Scientists.

Reference Books

1. R.A Johnson: Miller and Freund's Probability and Statistics for Engineers, Pearson Publishers, 9th Edition, 2017.

2. B.S.Grewal: Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
3. John E. Freund, Benjamin M. Perles: Modern elementary statistics, Pearson, 2014.

Course Objectives:

- To learn elementary ideas in basic probability.
- To learn different types of probability distribution functions.
- To learn various methods to test the hypothesis.
- To learn methods of calculating correlation and regression.

Course Outcomes:

After completion of the course, the student should be able to

CO-1: Solve problems involving basic probability.

CO-2: Evaluate statistical parameters of probability distributions.

CO-3: Assess the importance of sampling distribution of a given statistic of a random sample.

CO-4: Apply the knowledge of different probability distributions to Test of Hypothesis.

CO-5: Calculate correlation, regression, rank correlation coefficients.

AY: 2024-25 Onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B. Tech II Year-I Sem			
Course Code: **M214E**	**DIGITAL LOGIC DESIGN**	L	T	P	C
		3	**0**	**0**	3

Pre-Requisites: **NIL**

Module 1:

Boolean Algebra and Logic Gates: Digital Systems, Binary Numbers, Number base conversions, Octal and Hexadecimal Numbers, complements, Signed binary numbers, Binary codes, Binary Storage and Registers, Binary logic.

Basic Definitions, Axiomatic definition of Boolean Algebra, Basic theorems and properties of Boolean algebra, Boolean functions, canonical and standard forms, other logic operations, Digital logic gates.

Module 2:

Gate Level Minimization: The map method, Four-variable map, Five-Variable map, product of sums simplification Don't-care conditions, NAND and NOR implementation other Two-level implementations, Exclusive – Or function.

Module 3:

Combinational Logic: Combinational Circuits, Analysis procedure Design procedure, Binary Adder-Subtractor Decimal Adder, Binary multiplier, magnitude comparator, Decoders, Encoders, Multiplexers, HDL for combinational circuits.

Module 4:

Sequential Logic: Sequential circuits, latches, Flip-Flops Analysis of clocked sequential circuits, state Reduction and Assignment, Design Procedure. Registers, shift Registers, Ripple counters, synchronous counters, other counters.

Module 5:

Memories and Asynchronous Sequential Logic: Introduction, Random-Access Memory, Memory Decoding, Error Detection and correction Read-only memory, Programmable logic Array programmable Array logic, Sequential Programmable Devices.

Introduction, Analysis Procedure, Circuits with Latches, Design Procedure, Reduction of state and Flow Tables, Race-Free state Assignment Hazards, Design Example.

Text Books

1. Digital Design – Third Edition, M. Morris Mano, Pearson Education/PHI.
2. Digital Principles and Applications Albert Paul Malvino Donald P. Leach TATA McGraw Hill Edition.
3. Fundamentals of Logic Design, Roth, 5th Edition, Thomson.

Reference Books

1. Switching and Finite Automata Theory by Zvi. Kohavi, Tata McGraw Hill.
2. Switching and Logic Design, C.V.S. Rao, Pearson Education
3. Digital Principles and Design – Donald D.Givone, Tata McGraw Hill, Edition.
4. Fundamentals of Digital Logic and Microcomputer Design, 5TH Edition, M. Rafiquzzaman John Wiley.

E-Resources

1. https://nptel.ac.in/courses/117106086
2. https://www.youtube.com/playlist?list=PLDVWzw0WSIX6sIZo1WiVFooEFOV3d0LNx

Course Outcomes:

Upon completion of the Course Students will be able to

CO-1: Apply Boolean algebra and number systems to analyze basic digital logic functions.
CO-2: Design optimized logic circuits using Karnaugh maps and minimization techniques.
CO-3: Implement and evaluate combinational circuits like adders, multiplexers, and encoders.
CO-4: Analyze and design sequential circuits including flip-flops, counters, and registers.
CO-5: Understand memory types and programmable devices; address issues in asynchronous circuits.

AY 2024-25 onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B.Tech CSE II Year – I Sem			
Course Code: M215C	DESIGN AND ANALYSIS OF ALGORITHMS	L	T	P	C
		3	0	0	3

Pre-Requisites:

1. Knowledge on data structures.

Course objectives:

The Student will:

1. Know about on time and space complexity and learning asymptotic notations
2. Understand union and find algorithms, connected components and bi-connected components.
3. Gain knowledge in divide and conquer methods
4. Familiar with greedy method and dynamic programming
5. Understand the back tracking and can application

Module 1:

Introduction to algorithms

Algorithm, Pseudo Code for expressing Algorithms, Performance Analysis: Space Complexity, Time Complexity, asymptotic Notations: Big-oh Notation, Omega Notation, Theta Notation, Little-oh Notation.

Disjoint Sets: Disjoint Set Operations, Union and Find Algorithms, Spanning Trees, Connected Components and Biconnected Components.

Module 2:

Divide and Conquer

General Method, Applications: Binary Search, Quick Sort, Merge Sort, Stassen's Matrix Multiplication.

Greedy Method

General Method Applications: Job Sequencing with Deadlines, 0/1 Knapsack Problem, Minimum Cost Spanning Trees: Prim's and Kruskal's Algorithms, Single Source Shortest Path Problem, Huffman Codes.

Module 3:

Dynamic Programming

General Method, Principle of Optimality, Applications: Multistage Graphs, Matrix Chain Multiplication, Optimal Binary Search Trees, 0/1 Knapsack Problem, All Pairs Shortest Path Problem, Travelling Sales Person Problem, Reliability Design.

Module 4:

Backtracking

General Method, Applications: Nqueen Problem, Recursive Permutation Generator, Sum of Subsets Problem, Graph Coloring, Hamiltonian Cycles.

Module 5:

Branch and Bound

General Method, Applications: Travelling Sales Person Problem, 0/1 Knapsack Problem, LC Branch and Bound Solution, FIFO Branch and Bound Solution.

NP-Hard and NP-Complete Problems: Basic Concepts, Non-Deterministic Algorithms, NP-Hard and NP-Complete Classes, Cook's Theorem.

Text Books:

1. Fundamentals of Computer Algorithms-Ellis Horowitz, SatrajSahni and Rajasekharam, Galgotia Publications Pvt. Ltd.
2. Introduction to Algorithms-T.H.Cormen, C.E.Leiserso, R.L.Rivest and C.Stein, 2nd Edition, Pearson Education, PHI Pvt. Ltd.

Reference Books:

1. Algorithm Design: Foundations, Analysis and Internet Examples-M.T.Goodrich and R.Tomassia, John Wiley and Sons.
2. Introduction to Design and Analysis of Algorithms A strategic Approach-R.C.T.Lee, S.S.Tseng, R.C.Chang and T.Tsai, Mc-Graw Hill.
3. Design and analysis of Algorithms-S. Sridhar, Oxford Higher Education.

E - Resources:

1. https://nptel.ac.in/courses/106/106/106106131/
2. https://onlinecourses.nptel.ac.in/noc19_cs47/preview
3. http://www.cse.iitd.ernet.in/~ssen/csl356/notes/root.pdf
4. https://www.tutorialspoint.com/design_and_analysis_of_algorithms/design_and_analysis_of_algorithms_tutorial.pdf

Course outcomes:

The Student will be able to:

1. Analyze time complexity and space complexity as well as asymptotic notations for a given algorithm, union and find algorithms, connected components and bi-connected components.
2. Apply divide and conquer method for solving sorting and searching problems and greedy method to solve variety of problems.
3. Make use of dynamic programming to solve a collection of problems.
4. Utilize back tracking to solve different types of problems.
5. Choose branch and bound to unravel diverse forms of predicaments.

AY 2024-25 onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B.Tech CSE II Year – I Sem			
Course Code: M215B	PYTHON PROGRAMMING	L	T	P	C
		3	0	0	3

Pre-Requisites:

1. Need basic knowledge about computer.
2. Need Basic understanding of Programming language.

Course objectives:

The Student will:

1. Design and program Python applications.
2. Use lists, tuples, and dictionaries in Python programs.
3. Learn to identify Python object types, Components, decision statements, pass arguments in Python.
4. Build and package Python modules for reusability, design object oriented programs with Python classes, use class inheritance in Python for reusability.
5. Use exception handling in Python applications for error handling.

Module 1:

Programming paradigms; Structured programming vs object oriented programming, OOPs fundamentals- class, object, abstraction, encapsulation, polymorphism, and inheritance;

Introduction to Python: Getting started to Python- an interpreted high level language, interactive mode and script mode. Variables, Expressions and Statements Values and types, Variables and keywords, statements, evaluating expressions, operators and operands, order of operations, composition.

Functions: Function calls, type conversion, type coercion, pre-defined functions, composition, user define functions, flow of execution, passing parameters, function parameters and scope. Conditionals and recursion modulus operator, Boolean expression, logical operators, conditional execution, alternative execution, chained and nested conditionals, return statement; Recursion, infinite recursion.

Module 2:

Python data structures: Strings Creating, initializing and accessing the elements; String operators, comparing strings using relational operators; String functions and methods. **Lists:** Concept of mutable lists, creating, initializing and accessing the elements, traversing, appending,

updating and deleting elements; List operations; List functions and Methods, list parameters, nested lists, Matrices.

Dictionaries

Concept of key-value pair, creating, initializing and accessing the elements in a dictionary, dictionary operations traversing, appending, updating and deleting elements, Dictionary functions and methods.

Tuples

Mutability and tuples, Immutable concept, creating, initializing and accessing the elements in a tuple, Tuple functions.

Set: operations and methods**, Frozenset**: operations and methods

Module 3:

Object oriented programming using Python: creating python classes, classes and objects: user defined compound types, objects are mutable, copying; Access modifiers, classes and functions: pure function, modifiers, Classes and methods: object oriented features, optional arguments, initialization method, operator overloading and polymorphism.

Inheritance: Basic Inheritance: extending built-ins, overriding and super; Multiple inheritance: the diamond problem.

Module 4:

Exceptions: raising exceptions, handling exceptions, exception hierarchy.

Regular Expressions, match, search & replace function, Regular Expression modifiers, Special Character Classes, Repetition Cases, Non-greedy repetition grouping with Parentheses Back-references Anchors.

Module 5:

Files handling and Exceptions: Text files, writing variables, Directories, Pickling;

Database Programming in Python: Connection module, connect MySQL Data base, perform DDL, DML and DQL operations.

Introduction to Machine Learning With Python ,Tasks in Machine Learning Using Python, Applications of Python Machine Learning.

Text Books:

1. Python 3 Object Oriented Programming, Dusty Phillips, Packet Publishing, 2010.
2. Programming in Python 3 - A complete Introduction to the Python Language- Second Edition, Mark Summerfield, Addison-Wesley 2010.
3. Introduction to Machine Learning with Python: A Guide for Data Scientists Book by Andreas C. Müller and Sarah Guido Publisher(s): O'Reilly Media, Inc.

Reference Books:

1. Programming Python- 4th Edition, Mark Lutz, O'Reilly, 2011.
2. Object-Oriented Programming in Python, Michael H, Goldwasser, David Letscher, Pearson Prentice Hall, 2008.

E - Resources:

1. https://www.youtube.com/watch?v=MLP1v80yU14
2. https://pythonprogramming.net/functions-python-3-basics-tutorial/
3. https://www.youtube.com/watch?v=QGLNQwfTO2w
4. https://www.youtube.com/watch?v=ZDa-Z5JzLYM
5. https://www.youtube.com/watch?v=M-t4ILRHnxE

Course outcomes:

The Student will be able to:

1. Identify basic principles of Python programming language.
2. Analyze the use of lists, tuples, and dictionaries in Python programs.
3. Apply the concepts of object-oriented programming using Python.
4. Use exception handling in Python applications for error handling.
5. Evaluate different database operations using Python.

AY 2024-25 onwards	J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC Autonomous)	B. Tech-CSE II Year- I Sem			
Course Code: M216D	DATABASE MANAGEMENT SYSTEMS	L	T	P	C
		3	0	0	3

Pre-Requisites: NIL

Course objectives:

The Student will:

1. Understand the architecture and functioning of database management systems as well as associated tools and techniques.
2. Understand and apply the principles of data modeling using entity relationship and develop a good database design.
3. Understand the use of structured query language (SQL) and its syntax.
4. Apply normalization techniques to normalize a database.
5. Understand the need of database processing and learn techniques for controlling the consequences of concurrent data access.

Module 1:

Unit 1: Introduction

Purpose of DBMS, Database System Applications, Database Systems Vs File Systems, View of Data- Data Abstraction, Instances and Schemas. Data Models – The ER Model, Relational Model, Other Data Models. Database Languages, Data Base System Architecture , Types of Data Base Users ,Storage Manager, The Query Processor.

Unit 2: Introduction To Database Design.

Database Design and ER diagrams, Beyond ER Design, Entities, Attributes and Entity Sets, Relationships and Relationship Sets, Additional Features of ER Model: Key Constraints, Participation Constraints, Weak Entities, Class Hierarchies, Aggregation, Conceptual Design with the ER Model.

Module 2:

Unit 1: The Relational Model

Introduction to the Relational Model, Integrity Constraints Over Relations, Enforcing Integrity Constraints, Querying Relational Data, Logical Database Design, Introduction to Views, Destroying / Altering Tables and Views.

Unit 2: Relational Algebra and Calculus

Relational Algebra - Selection and Projection, Set Operations, Renaming, Joins, Division, More Examples of Algebra Queries. Relational Calculus – Tuple Relational Calculus, Domain Relational Calculus, Expressive Power of Algebra and Calculus.

Module 3:

Unit 1: SQL Queries

Form of Basic SQL Query, Examples of Basic SQL Queries, Union, Intersect and Except. Introduction to Nested Queries, Correlated Nested Queries, Set-Comparison Operators. Aggregative Operators, Null Values, Comparison Using Null Values, Logical Connectives AND, OR and NOT, Impact on SQL Constructs, Outer Joins, Disallowing Null Values. Complex Integrity Constraints in SQL, Triggers and Active Databases.

Unit 2: Schema Refinement

Problems Caused by Redundancy, Decompositions, Problem Related to Decomposition, . Lossless Join Decomposition – Dependency Preserving Decomposition ,Functional dependencies, Reasoning about FDs, Normal Forms-First, Second, Third Normal Forms, BCNF, Multi Valued Dependencies, Forth Normal Form.

Module 4:

Unit 1: Transaction Management

Transaction Concept, Acid Properities , Transaction State , Implementation of Atomicity and Durability, Implementation of Isolation, Concurrent Executions, Serializability, testing for Serializability. Lock – Based Protocols, Timestamp – Based Protocols, Validation – Based Protocols, Multiple Granularity.

Unit 2: Recovery System

Failure Classification, Storage Structure, Recovery and Atomicity, Log – Based Recovery, Recovery with Concurrent Transactions, Buffer Management, Failure with Loss of Nonvolatile Storage, Advance Recovery Techniques, Remote Backup Systems.

Module 5:

Unit 1: Storage and Indexing

Data On External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index Data Structures, Hash Based Indexing, Tree Base Indexing, Comparison of File Organizations, Indexes and Performance.

Unit 2: Tree -Structured Indexing

Intuitions for Tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

Textbooks

Text Books:

1. Data Base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGraw-Hill 3rd Edition
2. Data base System Concepts, Silberschatz, Korth, McGraw hill, V edition.

Reference Books:

1. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.

2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
3. Introduction to Database Systems, C.J.Date Pearson Education.

E - Resources:

- https://nptel.ac.in/noc/courses/noc18/SEM1/noc18-cs15/
- https://www.alljntuworld.in/download/database-management-system-dbms-materials-notes/

Course Outcomes

The Students will be able to:

1. Describe basic concepts of database system.
2. Design a data model and schemas in RDBMS.
3. Use RDBMS for developing industry applications.
4. Apply Structured Query Language (SQL) to perform database operations.
5. Analyze functional dependencies for designing a robust database.

AY 2024-25 onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B.Tech CSE II Year – I Sem			
Course Code: M2151	PYTHON PROGRAMMING LAB	L	T	P	C
		0	0	3	1.5

Pre-Requisites:

- Knowledge of basic programming

Course objectives:

The Student will:

1. Implement Basic input /output operations with various Data Types supported by python.
2. Develop functions for code reusability and experiment string manipulation operations with the use of inbuilt functions.
3. Create a python program for experimenting list, tuple and dictionary.
4. Demonstrate Class and objects to make use of object-oriented programming concepts.
5. Implement File handling operations to access the contents of file.

EXPERIMENT 1

i. Write a python program to obtain user input data (int, float, string) and display.

ii. Write a python program to find the roots of a quadratic equation.

iii. Write a python program to perform arithmetic operations (+, -, *, /, %) for given input values and printout the result values.

EXPERIMENT 2

i. Write a python program that use both recursive and non-recursive functions to find the factorial of a given integer

ii. Operators and Operands in Python: (Arithmetic, relational and logical operators), operator precedence, Expressions and Statements.

iii. (Assignment statement); Taking input (using raw input () and input ()) and displaying output (print statement); Putting Comments.

EXPERIMENT 3

i. Write python programs to perform operation on Strings using following functions: len, capitalize, find, isalnum, isalpha, isdigit, lower, islower, isupper, upper, lstrip, rstrip, isspace, istitile, partition, replace, join, split, count, decode, encode, swap case.

ii. Enter the details of 5 Student and display the details sequentially.

EXPERIMENT 4

i. Write python programs to perform List operators: (joining, list slices

ii. Write python programs to perform List functions: len, insert, append, extend, sort, remove, and reverse, pop.

iii. Write python programs to check whether the string is palindrome or not?

EXPERIMENT 5

i. Write python programs to perform Tuple functions: cmp(), len(), max(), min(), tuple()

ii. Write python programs to check whether the word is present in the tuple or not?

iii. Write python programs to take a string as (“1234567890”) and create a pair{(1,2),(3,4),(5,6),(7,8),(9,0)} using tuple.

EXPERIMENT 6

i. Write python programs to perform Dictionary functions & Methods: cmp, len, clear (), get(), has_key(), items(),keys(), update(), values() .

ii. Write python programs to Create a list of animal using dictionary variable "animal" and find out if the specific animal present in the list or not?

EXPERIMENT 7

i. Write a python program to create a class, its objects and accessing attributes.

ii. Create a Customer class and check the balance and withdraw and deposit some amount.

EXPERIMENT 8

Write a python script to implement robust exception handling.

i. Verify whether the input number is a float or not

ii. Handle exceptions that occur during file operations such as opening a nonexistent file

EXPERIMENT 9

Write a python script to demonstrate polymorphism

EXPERIMENT 10

Write a python program to list the files in a directory in python

EXPERIMENT 11

Write a python script to perform file handling operations. open,close,read,append,move

EXPERIMENT12.

Write a GUI program to create a window wizard having two text fields and two buttons as submit and reset.

Text Books:

1. **Programming in Python 3**- A complete Introduction to the Python Language- Second Edition, Mark Summerfiels, Addison-Wesley 2010.
2. **Programming Python**- 4th Edition, Mark Lutz, O'Reilly, 2011.

Reference books:

1. **Object-Oriented Programming in Python**, Michael H, Goldwasser, David Letscher, Pearson Prentice Hall, 2008.

E - Resources:

1. https://www.tutorialspoint.com/python3/python_strings.htm
2. https://www.youtube.com/watch?v=yCH9CUiXrP0
3. https://www.youtube.com/watch?v=RSl87lqOXDE
4. https://www.youtube.com/watch?v=bSZtsYYwFS0

Course outcomes:

The Student will be able to:

1. Apply Basic input /output operations for working with different data types in python.
2. Design functions for achieving code reusability and string manipulations.
3. Create a python program for implementing list, tuple dictionary.
4. Demonstrate Class and objects
5. Implement File handling operation

AY 2024-25 onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B.Tech CSE II Year – I Sem			
Course Code: M2162	DATABASE MANAGEMENT SYSTEMS LAB	L	T	P	C
		0	0	3	1.5

Pre-Requisites: Nil

Course objectives:

The Student will:

1. Familiarize with the nuances of database environments towards an information- oriented data-processing oriented framework.
2. Gain a good formal foundation on the relational model of data present SQL and procedural interfaces to SQL comprehensively.
3. Gain an introduction to systematic database design approaches covering conceptual design, logical design and an overview of physical design and to motivate the Student to relate all these to one or more commercial product environments as they relate to the developer tasks.
4. Present the concepts and techniques relating to query processing by SQL engines and present the concepts and techniques relating to ODBC and its implementations.
5. Introduce the concepts of transactions and transaction processing and to present the issues and

EXPERIMENT 1.

E-R Model Road way Travels

EXPERIMENT 2.

Concept design with ER Model for Roadway Travels

EXPERIMENT 3.

Relational Model for Roadway Travels

EXPERIMENT 4.

Normalization techniques for Roadway Travels

EXPERIMENT 5.

Installation of My SQL and practicing DDL and DML commands

EXPERIMENT 6.

Querying using Aggregate functions, GROUPBY, HAVING and creation and dropping of views

EXPERIMENT 7.

Create tables for the following schema.

Student(snum:integer ,sname:string ,age:integer)

Class (name: string ,fid: integer)

Enrolled(snum :integer ,cname:string)

Faculty(fid:integer ,fname:string , deptid: integer)

EXPERIMENT 8.

Queries:

Write the following queries in SQL. No duplicates should be printed in any of the answers.

1. Find the names of all juniors (level=Jr) who are enrolled for class taught by professor Harshith.
2. Find the names of all classes that either meet in room128 or have 5 or more students enrolled.
3. Find the names of all students who are enrolled in two classes that meet at same time.
4. Find the names of faculty members who teach in every room in which some class is taught.
5. Find the names of the faculty members for who me the combined enrolment of the classes that they Teach is less than five.

EXPERIMENT 9.

Creation of stored procedures, execution of procedures and modification of procedures.

EXPERIMENT 10.

CASE STUDYE-R MODEL: HOSPITAL MANAGEMENT SYSTEM

The aim of this case study is to design and develop a database for the hospital to maintain the records of various departments, rooms, and doctors in the hospital. As part of the case student shall create E-R diagram, Relational database Schema. Write the necessary SQL Queries and record the results.

Course outcomes:

The student will be able to:

1. Acquire the underlying concepts of database technologies.
2. Design and implement a database schema for a given problem-domain.
3. Apply Normalization to a database.
4. Populate and query a database using SQL DML/DDL commands.
5. Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS.

AY 2024-25 onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B.Tech CSE II Year – I Sem			
Course Code: M21MC1	ENVIRONMENTAL SCIENCE	L	T	P	C
		2	0	0	0

Pre-Requisites: Nil.

Course Objectives:

This course will enable students to:

1. Study about the different natural resources available and how to use them.
2. Explain about biodiversity.
3. Discuss about Global Environmental Problems and Global Efforts.
4. Identify the global environmental problems.
5. Explain about sustainable development.

Module 1:

Unit-I: Ecosystem And Natural Resources

Concept, Classification of Resources: Water resources, Land resources, land degradation, Forest resources, Mineral resources, Energy resources. Concept of ecosystem, Classification of ecosystem, Functions of ecosystem. Biodiversity, Level, values, hotspots of biodiversity, Threats to Biodiversity, Conservation of Biodiversity.

Module 2:

Unit-I: Global Environmental Problems and Global Efforts

Deforestation, Greenhouse effect, Global Warming, Sea level rise, Ozone depletion. International conventions/protocols: green-belt-development, Concept of Green Building, Clean Development Mechanism (CDM).

Unit-2: Environmental Impact Assessment (EIA) And Environmental Management Plan Definition of Impact, classification of impacts, methods of baseline data acquisition. Impacts on different components: such as human health resources, air, water, flora, fauna and society, impact assessment methodologies. Environmental management plan (EMP).

Module 3:

Unit-1: Environmental Policy, Legislation, Rules and Regulations

Environmental Protection Act: Air (Prevention and control of pollution) Act-1981, Water (Prevention and control of pollution) Act-1974, Forest Conservation Act.

Unit-2: Towards Sustainable Future:

Concept of Sustainable Development, Threats to Sustainability, Strategies for achieving Sustainable development, Environmental Ethics, Environmental Economics, Concept of Green Computing.

Text Books:

1. "Textbook of Environmental Science And Technology" by M Anji Reddy, BS Publications, 2007.
2. "Principles of Environmental Science and Engineering" by Rao P. Venugopala, Prentice Hall India Learning Private Limited (1 January 2006)

Reference Books:

1. "Environmental Studies" by Benny Joseph, McGraw Hill Education 2008.
2. "Textbook of Environmental Studies for Undergraduate Courses" by Erach Bharucha 2005, University Grants Commission, University Press

E-Resources

1. https://nptel.ac.in/courses/120/108/120108004/#

Course Outcomes:

On completion of the course, the students will be able to:

1. Compare the different natural resources available and how to use them.
2. Describe about biodiversity.
3. Analyze the Global Environmental Problems and Global Efforts.
4. Categorize the global environmental problems.
5. Prioritize the Sustainable development

AY 2024-25 onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B.Tech: II Year – II Sem			
Course Code: M225B	COMPUTER ORGANIZATION AND ARCHITECTURE	L	T	P	C
		3	0	0	3

Pre-Requisites: NIL

Course objectives:

The student will:

1. The purpose of the course is to introduce principles of computer organization and the basic architectural concepts.
2. It begins with basic organization, design, and programming of a simple digital computer and introduces simple register transfer language to specify various computer operations.
3. Topics include computer arithmetic, instruction set design, microprogrammed control unit, pipelining and vector processing, memory organization and I/O systems, and multiprocessors

MODULE - I

Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization and Computer Architecture. Central Processing Unit: General Register Organization.

Basic Computer Organization and Design: Instruction codes, Computer instructions, Timing and Control, Instruction cycle, Formats, Memory Reference Instructions, Addressing modes, Data Transfer and Manipulation.

MODULE - II

Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro-operations, shift micro-operations, Arithmetic logic shift unit.

Microprogrammed Control: Control memory, Address sequencing, micro program example, design of control unit.

MODULE - III

Data Representation: Data types, Complements, Fixed Point Representation, Floating Point Representation. Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic unit, Decimal Arithmetic operations.

MODULE - IV

Input-Output Organization: Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt Direct memory Access.

Concept of Memory, RAM, ROM memories, memory hierarchy, cache memory and Mapping, secondary storage.

MODULE - V

Reduced Instruction Set Computer: CISC Characteristics, RISC Characteristics.

Pipelining: Basic Concepts, Data Hazards, Instruction Hazards, Influence on Instruction sets, Data path and control considerations, Super Scalar Operation.

TEXT BOOK:

1. Computer System Architecture – M. Morris Mano, Third Edition, Pearson/PHI.

REFERENCE BOOKS:

1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, V th Edition, McGraw Hill.
2. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.
3. Structured Computer Organization – Andrew S. Tanenbaum, 4 th Edition, PHI/Pearson.

Course outcomes:

The student will be able to:

1. Understand the basics of instruction sets and their impact on processor design.
2. Demonstrate an understanding of the design of the functional units of a digital computer system.
3. Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.
4. Design a pipeline for consistent execution of instructions with minimum hazards.
5. Recognize and manipulate representations of numbers stored in digital computers

AY 2024-25 onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B.Tech CSE II Year – II Sem			
Course Code: M225A	MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE	L	T	P	C
		3	1	0	4

Pre-Requisites:

Module 1:

Mathematical Logic
Statements and notations, Connectives, Well-formed formulas, Truth Tables, tautology, equivalence implication, Normal forms, Quantifiers, universal quantifiers.
Predicates:
Predicative logic, Free & Bound variables, Rules of inference, Consistency, proof of contradiction, Automatic Theorem Proving.

Module 2:

Relations:
Properties of Binary Relations, equivalence, transitive closure, compatibility and partial ordering relations, Lattices, Hasse diagram.
Functions:
Inverse Function Composition of functions, recursive Functions, Lattice and its Properties.
Algebraic structures:
Algebraic systems Examples and general properties, Semi groups and monoids, groups, sub groups, homomorphism, Isomorphism.

Module 3:

Elementary Combinatorics:

Basis of counting, Combinations & Permutations, with repetitions, Constrained repetitions, Binomial Coefficients, Binomial Multinomial theorems**,**

The principles of Inclusion – Exclusion: The principles of Inclusion ,Exclusion**.** Pigeon hole principles and its application.

Module 4: Logic

Generating Functions: Generating Functions, Function of Sequences Calculating Coefficient of generating function,

Recurrence relations: solving recurrence relation by substitution and Generating functions. Characteristics roots solution of Inhomogeneous Recurrence Relation.

Module 5:

Graph Theory:
Representation of Graph, DFS, BFS, Spanning Trees, planar Graphs.
Applications of Graph Theory: Basic Concepts Isomorphism and Sub graphs, Multi graphs and Euler circuits, Hamiltonian graphs, Chromatic Numbers.

Text Books

1. Elements of DISCRETE MATHEMATICS- A computer Oriented Approach- C L Liu, D P Mohapatra. Third Edition, Tata McGraw Hill.
2. Discrete Mathematics by RK Bisht,HS Dhami, Oxford University Press.

Reference Books

1. Discrete Mathematics for Computer Scientists & Mathematicians, J.L. Mott, A. Kandel, T.P. Baker, PHI.
2. Discrete and Combinational Mathematics- An Applied Introduction-5th Edition – Ralph. P.Grimaldi.Pearson Education
3. Discrete Mathematics and its Applications, Kenneth H. Rosen, Fifth Edition.TMH.

E-Resources

1. https://www.smartzworld.com/notes/mfcs-notes-pdf-mathematical-foundation-of-computer-science/
2. https://www.pdfdrive.com/elements-of-discrete-mathematics-liu-mohapatra-3rd-e136110192.html
3. https://www.iare.ac.in/sites/default/files/PPT/MFCS%20PPT.pdf
4. https://nptel.ac.in/courses/111/107/111107058/

Course Outcomes

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

CO1.Use the notions of propositions and predicate formulae, satisfiability and formal proof.
CO2.Identify the properties of relations, functions and algebraic structures.
CO3. Apply the Permutations and combinations in problem solving
CO4. Solve recurrence relations using different methods.
CO5.Apply graph theory in solving computer science problems.

AY 2024-25 onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B.Tech CSE II Year – II Sem			
Course Code: M226A	OBJECT ORIENTED PROGRAMMING THROUGH JAVA	L	T	P	C
		3	0	0	3

Pre-Requisites:

1. C Programming Knowledge.

Course objectives:

The Student will:

1. Familiar with OOPs, constructors and string handling functions
2. Understand inheritance and polymorphism
3. Gain knowledge of with packages and interfaces
4. Understand the with exception handling and multithreading
5. Know the applet programming, event handling and scripting.

Module 1:

Introduction: OOP concepts, history of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program.

Classes and Objects: concepts of classes, objects, constructors, methods, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion.

String handling: String, String Buffer, String Tokenize.

Module 2:

Inheritance: base class object, subclass, member access rules, super uses, using final with inheritance, method overriding, abstract classes

Interfaces: defining an interface, implementing interface, differences between classes and interfaces and extending interfaces.

Module 3:

Packages: Defining, creating and accessing a package, importing packages, access control, exploring package - java.io

Exception handling: concepts of exception handling, benefits of exception handling, exception hierarchy, checked and unchecked exceptions, usage of-try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.

Module 4:

Multithreading: differences between multi-threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups.

Event Handling: events, event sources, event classes, event listeners, delegation event model, handling mouse and key board events, adapter classes. The AWT class hierarchy, user interface components-labels, buttons, canvas, scrollbars, text components, checkbox, checkbox groups, choices, lists.

Module 5:

Layout manager: layout manager types-border, grid, flow, card and grid bag. Swing: Introduction, limitations of AWT, components, containers.

Exploring swing- JFrame and JComponent, Icons and Labels, Text fields, buttons – The JButton class, Checkboxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees and Tables.

Text Books:

1. Java The complete reference, 8th edition, Herbert Schildt, TMH.
2. Understanding OOP with Java, up dated edition, T.Budd, Pears on education.

Reference Books:

1. An Introduction to programming and OO design using Java, J. Nino and F.A. Hosch, John Wiley & sons.
2. An Introduction to OOP, second edition, T. Budd, pearson education.
3. Introduction to Java programming 6th edition, Y. Daniel Liang, pearson education.

E - Resources:

1. www.javasoft.com
2. www.w3schools.com
3. www.tutorialpoint.com
4. www.oracle.com

Course outcomes:

The Student will be able to:

1. Use OOP concepts in problem solving.
2. Demonstrate Inheritance and Polymorphism
3. Create user defined Packages and Interfaces
4. Illustrate the concept of Exception handling and Multithreading
5. Design GUI based applications using Applet Programming and Event Handling.

AY 2024-25 onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B.Tech CSE II Year – II Sem			
Course Code: M225F	OPERATING SYSTEMS	L	T	P	C
		3	0	0	3

Pre-Requisites:

1. Programming for Problem solving, Data structures and Algorithms (not mandatory).
2. Computer Organization

Course objectives:

The Student will:

1. Understand the basic concepts and functions of computer operating systems.
2. Apply the concurrency control among the operating system programs execution.
3. Demonstrate the techniques used to manage the memory during program execution.
4. Explain the various storage management methods and functions of operating systems.
5. Design the security features against attacks on operating system.

Module 1:

Basic Concepts

Overview: OS Introduction, Computer Systems Organization, Computer System Architecture, Operating System Architecture, Resource Management, Virtualization, Distributed Systems, Open-source operating system.

Operating System Structures: Systems Calls, System services, Linkers and Loaders, Operating System Design and Implementation, Operating System structure, Building and Booting an Operating System.

Module 2:

Process Management

Process Concepts: Introduction, Process Scheduling, Interprocess Communication, Communication in Client- Server systems, Thread concepts, Multithreading Model, Scheduling Criteria, Scheduling Algorithms, Algorithm Evaluation.

Process Synchronization: Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Mutex Locks, Semaphores, Monitors, Classic Problems of Synchronization, System Model, Deadlock Characterization, Deadlock Prevention, Detection and Avoidance, Recovery from Deadlock

Module 3:

Memory Management

Main Memory: Background, Contiguous Memory Allocation, Paging, Page-Table Structure, Swapping, Segmentation.

Virtual Memory: Background, Demand Paging, Page Replacement Algorithms, Frames Allocation, Thrashing.

Module 4:

Storage Management

File system Management: File Concepts, Access Methods and Directory Structure, File Protection, File System Structure, File System Operations, Directory Implementation, Allocation Methods, Free-Space Management, Efficiency and Performance, Recovery

Mass-Storage Structure: Overview, Disk Scheduling, Storage Device Management, Swap-Space Management, Storage Attachment, RAID Structure.

Module 5:

Security and Protection

Security: Security Problem, Program Threats, System and Network Threats, Cryptography as a Security Tool, User Authentication, Implementing Security Defenses, Case Studies: Windows 10.

Protection: Goals of Protection, Principles of Protection, Protection Rings, Domain of Protection, Access Matrix, Implementation of Access Matrix, Revocation of Access Rights, Role-based Access Control, Capability-Based Systems, Language Based Protection.

Text Books:

1. **Operating System Concepts-Abraham Silberchatz**, Peter B. Galvin, Greg Gagne, 7th Edition, John Wiley.
2. **-Operating Systems a Concept based Approach**-D.M.Dhamdhere, 2nd Edition, TMH.

Reference Books:

1. **Principles of Operating Systems-NareshChauhan,** Oxford Higher Education.
2. **Operating System A Design Approach**-Crowley, TMH.
3. **Modern Operating Systems**-Andrew S Tanenbaum, 2nd Edition Pearson, PHI.

E - Resources:

1. https: // www.tutorialspoint .com/operating_system/
2. https: // www.studytonight.com/operating-system/
3. https: // learn.saylor.com/course/view.php?id=948&sectioned=967
4. https: //nptel.ac.in/courses/106/105/106105214/

Course outcomes:

The student will be able to:

1. Compare differing structures of operating systems including process management.
2. Apply different CPU scheduling algorithms and various Memory management techniques.
3. Illustrate the use of Bankers algorithm for deadlock avoidance and File system organization.
4. Demonstrate various mass storage management techniques.
5. Analyze different aspects of protection and security concepts.

AY 2024-25 onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B.Tech CSE II Year – II Sem			
Course Code: M225E	COMPUTER NETWORKS	L	T	P	C
		3	0	0	3

Pre-Requisites:

- Knowledge on Data Structures.

Course objectives:

The Student will:

1. Recognize various layering approaches for networking and understand the functionalities of physical layer.
2. Identify the data link layer protocols, multi access protocols, Ethernet technologies and various internetworking devices.
3. Examine design issues of network layer, services provided to above layer and routing, and congestion control protocols.
4. Examine IP protocol, addressing, various protocols like CIDR, ICMP, ARP and RARP of internet Layer and examination of transport layer services.
5. Examine Transport layer protocols like TCP, UDP, RPC and various congestion controlling mechanisms, including application layer services, protocols like HTTP, FTP, and E-Mail etc.

Module 1:

Overview of the Internet: Protocol, Layering Scenario, TCP/IP Protocol Suite: The OSI Model, Internet history standards and administration; Comparison of the OSI and TCP/IP reference model.

Physical Layer: Guided transmission media, wireless transmission media.

Module 2:

Data Link Layer: design issues, Framing, Error Detection and Error Correction, Block Coding, Hamming Distance, CRC, Flow control and error Control, Stop and wait , Sliding window Protocols.

Connecting Devices: Repeaters, Hubs, Switches, Gateways and Bridges - Learning and Spanning tree bridges.

Multi Access protocols- Random access - ALOHA, CSMA, CSMA/CD and CSMA/CA, Ethernet IEEE 802.11

Module 3:

Network Layer: Network layer design issues, Store and forward packet switching, connection less and connection oriented network services.

Internetworking: Protocols-IPV4 and IPV6**,** Logical Addressing-IPV4, IPV6, Tunneling and Packet Fragmentation.

Address Mapping: Address Resolution Protocol (ARP), Reverse Address Resolution Protocol (RARP), Dynamic Host Configuration Protocol (DHCP), Internet Control Message Protocol (ICMP) and Internet Group Management Protocol (IGMP).

Routing Algorithms: Shortest Path Finding and Distance Vector Routing Algorithms.

Module 4:

Transport Layer: Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), The TCP Connection Establishment, The TCP Connection Release.

Crash recovery, The TCP sliding window, The TCP congestion control, Improving Quality of Service Techniques: Leaky Bucket Algorithm.

Module 5:

Application Layer: Introduction, services, Application layer paradigms.

Applications: Domain Name System (DNS), World Wide Web (WWW), Hypertext Transfer Protocol (HTTP), File Transfer Protocol(FTP),Electronic Mail(E-MAIL), TELNET, Simple Network Management Protocol(SNMP), Secure Shell(SSH).

Text Books:

1. Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH, 2013.
2. Computer Networks - Andrew S Tanenbaum, 4th Edition, Pearson Education.

Reference Books:

1. ComputerNetworks, 5E, Peterson, Davie, Elsevier
2. Introduction to Computer Networks and Cyber Security, Chawan-HwaWu, Irwin, CRC Publications.
3. Computer Networks and Internets with Internet Applications, Comer.

E - Resources:

2. https://lecturenotes.in/subject/2234/Computer_Network
3. http://nptel.ac.in/courses/106102234/
4. https://www.iitg.ernet.in/dgoswami/CN-Notes.pdf
5. http://ocw.mit.edu/index.htm.

Course outcomes:

The Student will be able to:

1. Demonstrate the networking concepts, various Layering approaches, functionalities and some protocols of Link layer.
2. Operate with Data link Layers.
3. Apply fragmentation, assigning of logical address and judge on routing and congestion.
4. Apply the working of IP Protocol, other protocols of internet layer and services of transport layer.
5. Demonstrate the services of Application Layer while using popular applications

AY 2024-25 onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B.Tech CSE II Year – II Sem			
Course Code: M2261	OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB	L	T	P	C
		0	0	3	1.5

The Student will:

1. Learn the concepts of operators, control statements, type conversion, constructors and string handling
2. Understand the implementation of inheritance and polymorphism
3. Gain the knowledge of creation of user defined packages and interfaces
4. Familiar with exception handling, multithreading and event handling
5. Understand the concepts of applets, Swings in Java.

Experiment 1:

Write java programs that implement the following

a) Constructor b) Parameterized constructor

c) Method overloading d) Constructor overloading.

Experiment 2:

a) Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.

b) Write a Java program for sorting a given list of names in ascending order.

c) Write a Java Program that reads a line of integers, and then displays each integer and the sum of all the integers (Use String Tokenizer class of java. util

Experiment 3:

Write java programs that uses the following keywords

a) this b) super c) static d) final

Experiment 4:

a) Write a java program to implement method overriding

b) Write a java program to implement dynamic method dispatch.

c) Write a Java program to implement multiple inheritance.

d) Write a java program that uses access specifiers

Experiment 5:

a) Write a Java program that reads a file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.

b) Write a Java program that reads a file and displays the file on the screen, with a line number before each line.

c) Write a Java program that displays the number of characters, lines and words in a text file

Experiment 6:

a) Write a Java program for handling Checked Exceptions.

b) Write a Java program for handling Unchecked Exceptions

Experiment 7:

a) Write a Java program that creates three threads. First thread displays “Good Morning” every one second, the second thread displays “Hello” every two seconds and the third thread displays

"Welcome" every three seconds.

b) Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication

Experiment 8:

Write a Java program that works as a simple calculator. Use a grid layout to arrange button for the digits and for the +, -, *, % operations. Add a text field to display the result

Experiment 9:

a) Write a Java program for handling mouse events.

b) Write a Java program for handling key events.

Experiment 10:

1. Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields Num1 and Num 2.

The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1or Num2 were not an integer, the program would throw Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception and display the exception in a message dialog box.

Experiment 11:

a) Write a java program that simulates traffic light. The program lets the user select one of three lights: red, yellow or green. When a radio button is selected, the light is turned on, and only one light can be on at a time No l Light is on when the program starts.

b) Write a Java program that allows the user to draw lines, rectangles and ovals

Experiment 12:

Create a table in Table.txt file such that the first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using JTable component

TEXT BOOKS:

1. Java; the complete reference,8th editon, Herbert Scheldt, TMH.
2. Java How to Program, Sixth Edition, H.M. Dietel and P.J. Dietel, Pearson Education/PHI.
3. Introduction to Java programming, Sixth edition, Daniel Liang, Pearson Education.
4. Big Java, 2nd edition, Cay Horstmann, Wiley Student Edition, Wiley India Private Limited

AY 2024-25 onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B.Tech: CSE II Year – II Sem			
Course Code: M2252	OPERATING SYSTEMS LAB	L	T	P	C
		0	0	3	1.5

Pre-Requisites:

1. C Programming

Course objectives:

1. This course will introduce the basic principles in Operating System
2. It will cover all the management modules present in the OS like process management, Memory management, File management, Disk management, Network management, I/O management.

Experiment 1: Simulate the following CPU scheduling algorithms

a) FCFS b) SJF

Experiment 2: Simulate the following CPU scheduling algorithms

a) Priority b) Round Robin

Experiment 3: Simulate Bankers Algorithm for Dead Lock Avoidance

Experiment 4: Simulate Bankers Algorithm for Dead Lock Prevention

Experiment 5 Simulate all file allocation strategies

a) Sequential b) Indexed c) Linked

Experiment 6 Simulate MVT and MFT

Experiment 7: Simulate all File Organization Techniques

a) Single level directory b) Two level

Experiment 8: Simulate all File Organization Techniques

a) Hierarchical b) DAG

Experiment 9: Simulate all page replacement algorithms

a) FIFO b) LRU c) Optimal

Experiment 10: Simulate disk scheduling algorithms.

a) FCFS. b) SSTF

Experiment 11: Simulate disk scheduling algorithms.

a) CSCAN. b) CLOOK

Experiment 12: Experiments on fork, shared memory and semaphores.

Text Books:

1. Principles of Operating Systems-NareshChauhan, Oxford Higher Education.
2. Operating Systems A Design Approach-Crowley, TMH.

E - Resources:

1. https://www.tutorialspoint.com/web_developers_guide/web_basic_concepts.htm
2. https://courses.lumenlearning.com/computerapps/chapter/reading-the-internet /
3. https: // www.tutorialspoint .com/operating_system/
4. https: // www.studytonight.com/operating-system/
5. https: // learn.saylor.com/course/view.php?id=948&sectioned=967
6. https://www.edx.org/course/computer-hardware-and-operating-systems

AY 2024-25 onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B.Tech: CSE II Year – II Sem			
Course Code: M2253	NODE JS/ REACT JS/ DJANGO	L	T	P	C
		0	0	2	1

Pre-Requisites: Object Oriented Programming through Java, HTML Basics

Course objectives:

The student will:

1. To implement the static web pages using HTML and do client side validation using JavaScript.
2. To design and work with databases using Java
3. To develop an end to end application using java full stack.
4. To introduce Node JS implementation for server side programming.
5. To experiment with single page application development using React

Exercises:

1. Build a responsive web application for shopping cart with registration, login, catalog and cart pages using CSS3 features, flex and grid.
2. Make the above web application responsive web application using Bootstrap framework.
3. Use JavaScript for doing client – side validation of the pages implemented in experiment 1 and experiment 2.
4. Explore the features of ES6 like arrow functions, callbacks, promises, async/await. Implement an application for reading the weather information from openweathermap.org and display the information in the form of a graph on the web page.
5. Develop a java stand-alone application that connects with the database mySql and perform the CRUD operation on the database tables.
6. Create an xml for the bookstore. Validate the same using both DTD and XSD.
7. Design a controller with servlet that provides the interaction with application developed in experiment 1 and the database created in experiment 5.
8. Maintaining the transactional history of any user is very important. Explore the various session tracking mechanism (Cookies, HTTP Session)
9. Create a custom server using http module and explore the other modules of Node JS like OS, path, event.
10. Develop an express web application that can interact with REST API to perform CRUD operations on student data. (Use Postman)
11. For the above application create authorized end points using JWT (JSON Web Token).
12. Create a react application for the student management system having registration, login, contact, about pages and implement routing to navigate through these pages.
13. Create a service in react that fetches the weather information from openweathermap.org and the display the current and historical weather information using graphical representation using chart.js
14. Create a TODO application in react with necessary components and deploy it into github.

REFERENCE BOOKS:

1. Jon Duckett, Beginning HTML, XHTML, CSS, and JavaScript, Wrox Publications, 2010
2. Bryan Basham, Kathy Sierra and Bert Bates, Head First Servlets and JSP, O'Reilly Media, 2nd Edition, 2008.
3. Vasan Subramanian, Pro MERN Stack, Full Stack Web App Development with Mongo, Express, React, and Node, 2nd Edition, A Press.

Course outcomes:

The student will be able to:

1. Build a custom website with HTML, CSS, and Bootstrap and little JavaScript.
2. Demonstrate Advanced features of JavaScript and learn about JDBC
3. Develop Server – side implementation using Java technologies like
4. Develop the server – side implementation using Node JS.
5. Design a Single Page Application using React.

AY: 2025-26 Onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B. Tech CSE II Year-II Sem			
Course Code: M22MC2	GENDER SENSITIZATION (Mandatory Course)	L	T	P	C
		2	0	0	0

Pre-Requisites: NIL

Course Objectives:

- To develop students' sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.

Module 1: UNDERSTANDING GENDER

Gender: Why Should We Study It? (Towards a World of Equals: Unit -1)

Socialization: Making Women, Making Men (Towards a World of Equals: Unit -2)

Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.

Module 2: GENDER AND BIOLOGY

Missing Women: Sex Selection and Its Consequences (Towards a World of Equals: Unit -4)

Declining Sex Ratio. Demographic Consequences.

Gender Spectrum: Beyond the Binary (Towards a World of Equals: Unit -10)

Two or Many? Struggles with Discrimination.

Module 3: GENDER AND LABOUR

Housework: The Invisible Labour (Towards a World of Equals: Unit -3)

"My Mother doesn't Work." "Share the Load."

Women's Work: Its Politics and Economics (Towards a World of Equals: Unit -7)

Fact and Fiction. Unrecognized and Unaccounted work. Additional Reading: Wages and Conditions of Work.

Module 4: ISSUES OF VIOLENCE-I

Sexual Harassment: Say No! (Towards a World of Equals: Unit -6)

Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: "Chupulu".

Domestic Violence: Speaking Out (Towards a World of Equals: Unit -8)

Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Additional Reading: New Forums for Justice.

Module 5: Module 5ISSUES OF VIOLENCE-II

Thinking about Sexual Violence (Towards a World of Equals: Unit -11)

Blaming the Victim- "I Fought for my Life…."

Additional Reading: The Caste Face of Violence

TextBooks:

1. "Towards a World of Equals: A Bilingual Textbook on Gender" written by A.Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, GoguShyamala, DeepaSreenivas and Susie Tharu.

Reference Books:

1. Raj Paul Singh, Anupama Singh. Gender Sensitization: Issues and Challenges: Raj Publications: 2019.

E-Resources:

1. https://www.medicalnewstoday.com/articles/232363
2. https://web.stanford.edu/~eckert/PDF/Chap1.pdf
3. https://open.lib.umn.edu/sociology/chapter/11-1-understanding-sex-and-gender/

Course Outcomes:

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

CO-1: Develop a better understanding of important issues related to gender in contemporary India.

CO-2: Sensitize to basic dimensions of the biological, sociological, psychological, and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature, and film.

CO-3: Attain a finer grasp of how gender discrimination works in our society and how to counter it.

CO-4: Acquire insight into the gendered division of labour and its relation to politics and economics.

CO-5: Equipped to work and live together as equals.

AY: 2024-25 Onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B. Tech II Year II Sem			
Course Code: M22AC2	LINGUASKILL FOR PROFESSIONALS-B2 (Audit Course) (COMMON TO ALL)	L	T	P	D
		2	0	0	0

Pre-Requisites: A1-B1 levels (CEFR)

COURSE OBJECTIVES:

To enable students

1. Acquire an extensive range of vocabulary related to diverse topics.
2. Enhance pronunciation skills, focusing on specific sounds and intonation patterns
3. Improve the use of various grammar concepts
4. Strengthen listening, speaking, reading, and writing skills across different proficiency levels
5. Develop practical language skills for everyday communication scenarios

Module 1 **(6L)**

UNIT-1

Grammar: Tenses, Clauses and Conditionals, Questions

Vocabulary: Character adjectives, Words connected with 'get', trying and succeeding

Pronunciation: Letter 'e' and 'g'; Rapid speech, Intonation in Question tags

UNIT-2

Everyday English: Breaking off a conversation; Explaining and checking understanding; Agreeing; giving compliments and responding

- **Listening:** Listening Activity 1, Listening Activity 2 (A1 Level)
- **Reading:** Reading Activity 1, Reading Activity 2 (A1 Level)
- **Speaking:** Speaking Activity 1, Speaking Activity 2 (A1 Level)

Writing: Articles, Guidelines

Module 2 **(6L)**

UNIT-1

Grammar: Multi-word verbs; *used to* and *would*

Vocabulary: Words related to ability, achievements and sports; cause and result

Pronunciation: Constant sounds; sound 'u'; word stress

UNIT -2

Everyday English: Making suggestions; describing photos; expressing disagreement

- **Listening:** Listening Activity 1, Listening Activity 2 (A2 Level)
- **Reading:** Reading Activity 1, Reading Activity 2 (A2 Level)
- **Speaking:** Speaking Activity 1, Speaking Activity 2 (A2 Level)

Writing: Job Application, For and against essay

Module 3 **(6L)**

UNIT-1

Grammar: Infinitives and -ing forms; passives

Vocabulary: Attitude adjectives; words related to natural world and travel

Pronunciation: Sound 'th'; consonant clusters; intonation

UNIT-2

Everyday English: Responding to an idea; Discussing advantages and disadvantages

- **Listening:** Listening Activity 1, Listening Activity 2 (B1 Level)
- **Reading:** Reading Activity 1, Reading Activity 2 (B1 Level)
- **Speaking:** Speaking Activity 1, Speaking Activity 2 (B1 Level)

Writing: Travel blog, Complaint email

Module 4 **(6L)**

UNIT-1

Grammar: *too, enough, so/such*

Vocabulary: Words related to life in cities, money and finance, crime and film

Pronunciation: Sound 'o', 'l'

UNIT-2

Everyday English: Imagining, vague language, encouraging

- **Listening:** Listening Activity 1, Listening Activity 2 (B1+ Level)
- **Reading:** Reading Activity 1, Reading Activity 2 (B1+ Level)
- **Speaking:** Speaking Activity 1, Speaking Activity 2 (B1+ Level)

  Writing: Review, Opinion essay

Module 5 **(6L)**

UNIT-1

Grammar: Relative clause, reported speech

Vocabulary: Words related to health, thought and knowledge

Pronunciation: Sound 'ui'; linking

UNIT-2

Everyday English: Expressing uncertainty, clarifying a misunderstanding, interrupting and announcing a news

- **Listening:** Listening Activity 1, Listening Activity 2 (B2 Level)
- **Reading:** Reading Activity 1, Reading Activity 2 (B2 Level)
- **Speaking:** Speaking Activity 1, Speaking Activity 2 (B2 Level)

  Writing: Story

Text Books

1. Doff, Adrian, et al. *Empower Second Edition Student's Book with Digital Pack: B2 Upper Intermediate*. Cambridge University Press, 2022.

Reference Books

1. Cullen, Pauline, et al. The Official Cambridge Guide to IELTS for Academic and General Training: Student's Book with Answers. with DVD-ROM. Cambridge Univ. Press, 2014.

E-Resources

1. Cambridge English
2. English with Cambridge - YouTube
3. BBC Learning English - Learn English with BBC Learning English - Homepage
4. https://englishonline.britishcouncil.org/

Course Outcomes

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

CO1. Demonstrate a diverse vocabulary repertoire, facilitating better expression and comprehension.

CO2. Exhibit intelligible pronunciation skills, ensuring clearer oral communication.

CO3. Utilise various grammar concepts accurately and coherently.

CO4. Strengthened language skills across listening, speaking, reading, and writing.

CO5. Apply practical language skills effectively in everyday communication scenarios.

AY: 2024-25 Onwards	J. B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC Autonomous)	B. Tech-CSE III Year- I Sem			
Course Code: M32EA	BUSINESS ECONOMICS AND FINANCIAL ANALYSIS	L	T	P	C
		3	1	0	4

Pre-Requisites:NIL

Course objectives:

The Student will:

1. Understand the market dynamics namely Business, economics, trends in market.
2. Understand the demand elasticity of demand and supply in different market conditions.
3. Learn how organisations make important investment and financing decisions respective to production, cost, and pricing in different markets.
4. Analyze a company's financial statements and come to a reasoned conclusion about the financial situations of the company.
5. Acquire the basics of how to analyze and interpret the financial statements through ratio analysis.

UNIT 1:

Introduction to Business and Economics:

Business: Structure of Business Firm, Theory of Firm, Types of Business Entities, Limited Liability Companies, Sources of Capital for a Company, Non-Conventional Sources of Finance.

Economics: Significance of Economics, Micro and Macro Economic Concepts, Concepts and Importance of National Income, Inflation, Money Supply in Inflation, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist, Multidisciplinary nature of Business Economics.

UNIT 2:

Demand and Supply Analysis:

Elasticity of Demand: Elasticity, Types of Elasticity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making, Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting.

Supply Analysis: Determinants of Supply, Supply Function & Law of Supply.

UNIT 3:

Production, Cost, Market Structures & Pricing:

Production Analysis: Factors of Production, Production Function, Production Function with one variable input, two variable inputs, Returns to Scale, Different Types of Production Functions.

Cost analysis: Types of Costs, Short run and Long run Cost Functions.

Market Structures: Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, Monopolistic Competition.

Pricing: Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis, Cost Volume Profit Analysis.

UNIT 4:

Financial Accounting: Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance, Elements of Financial Statements, Preparation of Final Accounts.

UNIT 5:

Financial Analysis through Ratios: Concept of Ratio Analysis, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios (simple problems).
Introduction to Fund Flow and Cash Flow Analysis (simple problems).

Text Books:

1. D.D.Chaturvedi,S.L.Gupta,BusinessEconomics-TheoryandApplications,International Book House Pvt. Ltd. 2013.
2. DhaneshKKhatri,FinancialAccounting,TataMcGrawHill,2011.
3. Geethika Ghosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e, Tata McGraw Hill Education Pvt. Ltd. 2012.

Reference Books:

1. Paresh Shah, Financial Accounting for Management 2e, OxfordPress,2015.
2. S.N.Maheshwari,SunilKMaheshwari, Sharad KMaheshwari, Financial Accounting, 5e,Vikas Publications, 2013.

Web Resources:

1. https://nptel.ac.in/courses/110/101/110101005/
2. https://sites.google.com/site/economicsbasics/

Course Outcomes

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

CO 1: Understand the Business Environment of the Economy.

CO 2: Understand microeconomic factors in related to demand analysis and its forecasting

CO 3: Apply the theory of production function and Cost concepts to determine the Break Even Analysis.

CO 4: Remember different market structures, pricing strategies and different forms business organization

CO 5: Interpret the financial statement by using Fundamental accounting concepts and Ratio analysis.

CO-PO/PSO Mapping

Course Outcomes	Program Outcomes(POs)/Program Specific Outcomes(PSOs)													
	PO 1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO 1**	**PSO 2**
CO1	-	1	-	-	-	-	-	-	-	-	3	-	-	-
CO2	-	1	-	-	-	-	-	1	-	-	-	-	-	1
CO3	-	-	-	-	-	-	-	1	-	-	-	-	-	1
CO4	-	1	-	-	-	-	-	-	3	-	3	-	-	1
CO5	-	1	-	-	-	-	-	-	-	-	3	-	-	-
Average	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Correlation: 3–Strong; 2–Medium; 1-Weak

AY: 2024-25 Onwards	J. B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC Autonomous)	B. Tech-CSE III Year- I Sem			
Course Code: M316A	DATA WAREHOUSING AND DATA MINING (Professional Elective –I)	L	T	P	C
		3	0	0	3

Pre-Requisites:

Basic knowledge in **DBMS**

Course Objectives:

The students should be able to

1. Introduce the basic concepts and techniques in building a Data Warehouse.
2. Apply pre-processing techniques for any given raw data.
3. Implement and apply basic algorithms for finding frequent patterns in transactionaldatabases.
4. Implement and apply basic algorithms for supervised and unsupervised learning.
5. Discuss an overview of mining complex types of data.

Module 1:

Introduction:

Fundamentals of data mining, Data Mining Functionalities, Classification of Data Miningsystems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data Warehouse System, Major issues in Data Mining.

Data Preprocessing:

Need for preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

Module 2:

Data Warehouse and OLAP Technology for Data Mining:

Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehousing to Data Mining.

Data Cube Computation and Data Generalization:

Efficient Methods for Data Cube Computation and Data Generalization, Attribute-Oriented Induction.

Module 3:

Mining Frequent Patterns:

Basic Concepts, Efficient and Scalable Frequent Item set Mining Methods

Associations and Correlations:

Mining various kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint-Based Association Mining

Module 4:

Classification:

Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back propagation, Support

Vector Machines.
Prediction:
Simple linear regression, Logistic Regression, Accuracy and Error measures, evaluating the accuracy of a Classifier or a Predictor, Ensemble Methods.

Module 5:

Cluster Analysis Introduction:

Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods,Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.
Mining Complex Types of Data:
Mining Spatial Databases, Mining Multimedia Databases, Mining Time-Series andSequence Data, Mining Text Data and Mining the World Wide Web.
Applications and Trends in Data Mining: Data Mining Applications, Data MiningSystem Products and Research Prototypes

Text Books

1. Data Mining – Concepts and Techniques - Jiawei Han & Micheline Kamber, MorganKaufmann Publishers, Elsevier,2nd Edition, 2006.
2. Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar,Pearson education

Reference Books

1. Data Mining Techniques – Arun K Pujari,2nd edition, Universities Press.
2. Data Warehousing in the Real World – Sam Aanhory & Dennis Murray Pearson EdnAsia.
3. Insight into Data Mining, K.P.Soman, S.Diwakar, V.Ajay, PHI, 2008.

E-Resources

1. https://drive.google.com/file/d/1KwbqsxdL-R3PoRyf8o4Ewdjm98MOKFJv/view
2. https://onlinecourses.nptel.ac.in/noc18
3. www.vssut.ac.in/lecture_notes/lecture1428550844.pdf
4. www.vssut.ac.in/lecture_notes/lecture1428550844.pdf

Course Outcomes

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

CO1. Assess raw input data and process it to provide suitable input for a range of datamining algorithms.
CO2. Identify a data warehouse for an organization.
CO3. Apply Data mining techniques such as characterization, comparison, association.
CO4. Apply an appropriate data Mining algorithms for classification and clusteringfrom large databases.
CO5. Demonstrate knowledge on mining complex types of data.

AY: 2024-25 Onwards	J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC Autonomous)	B. Tech-CSE III Year- I Sem			
Course Code: M315C	COMPUTER VISION (Professional Elective-I)	L	T	P	C
		3	0	0	3

Pre-Requisites:

1. Linear Algebra, Calculus, Probability and Statistics
2. Data Structures

Course Objectives:

The students should be able to

1. Review image processing techniques for computer vision.
2. Understand multicamera views.
3. Understand Hough Transform and its applications to detect lines, circles, ellipses.
4. Understand three-dimensional image analysis techniques.
5. Understand motion analysis and study some applications of computer vision algorithms.

Module 1:

Introduction to Computer Vision:

Computer Imaging Systems, Digital Image Formation and Low-Level Processing, Overview and State-of-the-art, Fundamentals of Image Formation.

Transformation: Orthogonal, Euclidean, Affine, Projective, etc. Fourier Transform, Convolution and Filtering, Image Enhancement, Restoration, Histogram Processing.

Module 2:

Depth Estimation and Multi-Camera Views:

Perspective, Binocular Stereopsis: Camera and Epipolar Geometry; Homography, Rectification, DLT, RANSAC, 3-D Reconstruction Framework; Auto-Calibration

Module 3:

Feature Extraction:

Edges - Canny, LOG, DOG; Line Detectors (Hough Transform), Corners - Harris and Hessian Affine, Orientation Histogram, SIFT, SURF, HOG, GLOH, Scale-Space Analysis- Image Pyramids and Gaussian Derivative Filters, Gabor Filters and DWT.

Module 4:

Image Segmentation:

Region Growing, Edge Based Approaches to Segmentation, Graph-Cut, Mean-Shift, MRFs, Texture Segmentation; Object Detection.

Module 5:

Motion Analysis:

Background Subtraction and Modelling, Optical Flow, KLT, Spatio-Temporal Analysis, Dynamic Stereo; Motion parameter estimation.

Shape from X:
Light at Surfaces; Phuong Model; Reflectance Map; Albedo Estimation; Photometric Stereo; Use of Surface Smoothness Constraint; Shape from Texture, Colour, Motion and Edges.

Text Books

1. Richard Szeliski, "Computer Vision: Algorithms and Applications", Springer
2. D. A. Forsyth, J. Ponce, "Computer Vision: A Modern Approach", Pearson Education.

Reference Books

1. Richard Hartley and Andrew Zisserman, "Multiple View Geometry in Computer Vision", Second Edition, Cambridge University Press
2. K. Fukunaga, "Introduction to Statistical Pattern Recognition", Second Edition, Academic Press, Morgan Kaufmann
3. R.C. Gonzalez and R.E. Woods, "Digital Image Processing", Addison- Wesley

E-Resources

1. https://www.mygreatlearning.com/blog/what-is-computer-vision-the-basics/
2. https://www.geeksforgeeks.org/computer-vision/

Course Outcomes

At the end of the course, the student will be able to:
CO1. Identify Computer Vision and Image Processing Basics
CO2. Differentiate the functionalities of different types of Cameras and Lenses
CO3. Extract the Features from the image using Feature Extraction Algorithms
CO4. Apply the Image Segmentation Techniques
CO5. Analyse the Motion and shape of the object.

AY: 2024-25 Onwards	J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC Autonomous)	B. Tech-CSE III Year- I Sem			
Course Code: M315D	PRINCIPLES OF PROGRAMMING LANGUAGES (Professional Elective-I)	L	T	P	C
		3	0	0	3

Pre-Requisites:

1. A course on "Mathematical Foundations of Computer Science"
2. A course on "Computer Programming and Data Structures"

Course Objectives:

The students should be able to

1. Introduce important paradigms of programming languages
2. To provide conceptual understanding of high-level language design and implementation
3. Topics include programming paradigms; syntax and semantics; data types, expressions and statements; subprograms and blocks; abstract data types; concurrency; functional and logic programming languages; and scripting languages

Module 1:

Preliminary Concepts: Reasons for Studying Concepts of Programming Languages, Programming Domains, Language Evaluation Criteria, Influences on Language Design, Language Categories, Language Design Trade-Offs, Implementation Methods, Programming Environments Syntax and Semantics: General Problem of Describing Syntax and Semantics, Formal Methods of Describing Syntax, Attribute Grammars, Describing the Meanings of Programs.

Module 2:

Names, Bindings, and Scopes: Introduction, Names, Variables, Concept of Binding, Scope, Scope and Lifetime, Referencing Environments, Named Constants Data Types: Introduction, Primitive Data Types, Character String Types, User Defined Ordinal Types, Array, Associative Arrays, Record, Union, Tuple Types, List Types, Pointer and Reference Types, Type Checking, Strong Typing, Type Equivalence Expressions and Statements: Arithmetic Expressions, Overloaded Operators, Type Conversions, Relational and Boolean Expressions, Short Circuit Evaluation, Assignment Statements, Mixed-Mode Assignment Control Structures – Introduction, Selection Statements, Iterative Statements, Unconditional Branching, Guarded Commands.

Module 3:

Feature Extraction:

Subprograms and Blocks: Fundamentals of Sub-Programs, Design Issues for Subprograms, Local Referencing Environments, Parameter Passing Methods, Parameters that Are Subprograms, Calling Subprograms Indirectly, Overloaded Subprograms, Generic Subprograms, Design Issues for Functions, User Defined Overloaded Operators, Closures, Coroutines Implementing Subprograms: General Semantics of Calls and Returns, Implementing Simple Subprograms, Implementing Subprograms with Stack-Dynamic Local Variables, Nested Subprograms, Blocks, Implementing Dynamic Scoping Abstract Data Types: The Concept of Abstraction, Introductions to Data Abstraction, Design Issues, Language Examples, Parameterized ADT, Encapsulation Constructs, Naming Encapsulations

Module 4:

Concurrency: Introduction, Introduction to Subprogram Level Concurrency, Semaphores, Monitors, Message Passing, Java Threads, Concurrency in Function Languages, Statement Level Concurrency. Exception Handling and Event Handling: Introduction, Exception Handling in Ada, C++, Java, Introduction to Event Handling, Event Handling with Java and C#.

Module 5:

Functional Programming Languages: Introduction, Mathematical Functions, Fundamentals of Functional Programming Language, LISP, Support for Functional Programming in Primarily Imperative Languages, Comparison of Functional and Imperative Languages Logic Programming Language: Introduction, an Overview of Logic Programming, Basic Elements of Prolog, Applications of Logic Programming. Scripting Language: Pragmatics, Key Concepts, Case Study: Python – Values and Types, Variables, Storage and Control, Bindings and Scope, Procedural Abstraction, Data Abstraction, Separate Compilation, Module Library.

Text Books

1. Concepts of Programming Languages Robert. W. Sebesta 10/E, Pearson Education.
2. Programming Language Design Concepts, D. A. Watt, Wiley Dreamtech, 2007.

Reference Books

1. Programming Languages, 2nd Edition, A.B. Tucker, R. E. Noonan, TMH.
2. 2. Programming Languages, K. C. Louden, 2nd Edition, Thomson, 2003

Course Outcomes

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

CO1: Explain the fundamental concepts, design, and evaluation of programming languages.
CO2: Analyze syntax, semantics, data types, expressions, statements, and control structures.
CO3: Design and implement subprograms, blocks, and abstract data types with proper encapsulation.
CO4: Implement concurrency constructs and handle exceptions and events in programming languages.
CO5: Apply functional, logic, and scripting programming paradigm.

AY 2024-25 onwards	J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC Autonomous)	B. Tech-CSE III Year- I Sem			
Course Code: M315A	DEVOPS	L	T	P	C
		3	0	0	0

Pre-Requisites:

Software Engineering

Course objectives:

The Student will:

- Understand the skill sets and high-functioning teams involved in Agile, DevOps and related
- methods to reach a continuous delivery capability Implement automated system update and DevOps lifecycle.

Module 1:

Introduction to DevOps: Introduction, Agile development model, DevOps and ITIL. DevOps process and Continuous Delivery, Release management, Scrum, Kanban, delivery pipeline, identifying bottlenecks.

Module 2:

Software development models and DevOps: DevOps Lifecycle for Business Agility, DevOps, and Continuous Testing. DevOps influence on Architecture: Introducing software architecture, The monolithic scenario, Architecture rules of thumb, The separation of concerns, Handling database migrations, Micro services and the data tier, DevOps, architecture, and resilience

Module 3:

Introduction to project management: The need for source code control, the history of source code management, Roles and code, source code management system and migrations, shared authentication, Hosted Git servers, Different Git server implementations, Docker intermission, Gerrit, The pull request model, GitLab.

Module 4:

Integrating the system: Build systems, Jenkins build server, Managing build dependencies, Jenkins plugins, and file system layout, The host server, Build slaves, Software on the host, Triggers, Job chaining and build pipelines, Build servers and infrastructure as code, Building by dependency order, Build phases, Alternative build servers, Collating quality measures

Module 5:

Testing Tools and Deployment: Various types of testing, Automation of testing Pros and cons, Selenium - Introduction, Selenium features, JavaScript testing, Testing backend integration points, Test-driven development, REPL-driven development. Deployment of the system: Deployment systems, Virtualization stacks, code execution at the client, Puppet master and agents, Ansible, Deployment tools: Chef, Salt Stack and Docker.

Text Books:

1. Joakim Verona., Practical DevOps, Packt Publishing, 2016.

Reference Books:

1. Deepak Gaikwad, Viral Thakkar. DevOps Tools from Practitioner's Viewpoint. Wiley publications.
2. Len Bass, Ingo Weber, Liming Zhu. DevOps: A Software Architect's Perspective. Addison Wesley

Course Outcomes

The Students will be able to:

1. Understand the various components of DevOps environment.
2. Identify Software development models and architectures of DevOps
3. Use different project management and integration tools.
4. Select an appropriate testing tool and deployment model for project.

AY: 2024-25 Onwards	J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC Autonomous)	B. Tech CSE III Year-I Sem			
Course Code: M316C	SOFTWARE ENGINEERING	L	T	P	C
		3	0	0	3

Pre-Requisites:

Course Objectives:

1. The aim of the course is to provide an understanding of the working knowledge of the techniques for estimation, design, testing and quality management of large software development projects.
2. Topics include process models, software requirements, software design, software testing, software process/product metrics, risk management, quality management and UML diagrams

UNIT 1: [10L]

Introduction to Software Engineering: The evolving role of software, changing nature of software, software myths. A Generic view of process: Software engineering- a layered technology, a process framework, the capability maturity model integration (CMMI). Process models: The waterfall model, Spiral model, Incremental Process Models, Concurrent Models, Component based development and Agile Development.

UNIT 2: [8 L]

Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management

UNIT 3: [8 L]

Design Engineering: Design process and design quality, design concepts, the design model.

Creating an architectural design: software architecture, data design, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modeling, use case diagrams, class diagrams, sequence diagrams, collaboration diagrams, activity diagrams and component diagrams.

UNIT 4: [12 L]

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, black-box and white-box testing, validation testing, system testing, the art of debugging. Metrics for Process and Products: Software measurement, metrics for software quality.

UNIT 5: [12L]

Risk management: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM. Quality Management: Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

Text Book

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, McGraw Hill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.
3. The unified modeling language user guide, Grady Booch, James Rumbaugh, Ivar Jacobson, Pearson Education.

Reference Books

1. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.
2. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies.
3. Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education.
4. Fundamentals of Software Engineering-Rajib Mall, PHI.

Course outcomes:

CO1: Explain the fundamentals of software engineering, software processes, and various process models.

CO2: Elicit, analyze, and document functional and non-functional software requirements.

CO3: Design software architectures and develop UML-based models for system representation.

CO4: Apply testing strategies and software metrics to ensure quality and reliability.

CO5: Manage software risks and implement quality assurance practices to achieve high-quality software products.

AY 2024-25 onwards	J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC Autonomous)	B.Tech CSE III Year-I Sem			
Course Code: M3152	DEVOPS LAB	L	T	P	C
		0	0	2	1

Pre-Requisites:

Course objectives:

The student will:

- Develop a sustainable infrastructure for applications and ensure high scalability. DevOps aims to shorten the software development lifecycle to provide continuous delivery with high-quality.

List of Experiments:

1. Write code for a simple user registration form for an event.
2. Explore Git and GitHub commands.
3. Practice Source code management on GitHub. Experiment with the source code in exercise 1.
4. Jenkins installation and setup, explore the environment.
5. Demonstrate continuous integration and development using Jenkins.
6. Explore Docker commands for content management.
7. Develop a simple containerized application using Docker.
8. Integrate Kubernetes and Docker
9. Automate the process of running containerized application for exercise 7 using Kubernetes.
10. Install and Explore Selenium for automated testing.
11. Write a simple program in JavaScript and perform testing using Selenium.
12. Develop test cases for the above containerized application using selenium.

Text Books:

1. Joakim Verona., Practical DevOps, Packt Publishing, 2016

Reference Books:

1. Deepak Gaikwad, Viral Thakkar. DevOps Tools from Practitioner's Viewpoint. Wiley publications.
2. Len Bass, Ingo Weber, Liming Zhu. DevOps: A Software Architect's Perspective. Addison Wesley.

Course outcomes:

The students will be able to:

1. Understand the need of DevOps tools
2. Understand the environment for a software application development
3. Apply different project management, integration and development tools
4. Use Selenium tool for automated testing of application

AY: 2024-25 Onwards	J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC Autonomous)	B. Tech CSE III Year-I Sem			
Course Code: M3163	SOFTWARE ENGINEERING LAB	L	T	P	C
		0	0	2	1

Course Objectives:

To have hands-on experience in developing a software project by using various software engineering principles and methods in each of the phases of software development. multithreaded programs.

List of Experiments:

Do the following seven exercises for any two projects given in the list of sample projects or any other Projects:

1. Development of problem statements.
2. Preparation of Software Requirement Specification Document, Design Documents and Testing Phase related documents.
3. Preparation of Software Configuration Management and Risk Management related documents.
4. Study and usage of any Design phase CASE tool
5. Performing the Design by using any Design phase CASE tools.
6. Develop test cases for unit testing and integration testing
7. Develop test cases for various white box and black box testing techniques.

Sample Projects:

1. Passport automation System
2. Book Bank
3. Online Exam Registration
4. Stock Maintenance System
5. Online course reservation system
6. E-ticketing
7. Software Personnel Management System
8. Credit Card Processing
9. E-book management System.

10. Recruitment system

Text Book

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, McGraw Hill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.
3. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.

Reference Books

1. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.
2. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill.

Course outcomes:

CO1: Develop problem statements and structured software documents.
CO2: Prepare software requirement, design, and testing documents.
CO3: Create software configuration and risk management documents.
CO4: Utilize CASE tools to perform software design.
CO5: Design test cases for unit, integration, white-box, and black-box testing.

AY: 2024-25 Onwards	J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC Autonomous)	B. Tech CSE III Year-I Sem			
Course Code: M3153	DATA VISUALIZATION	L	T	P	C
		0	0	2	1

COURSE OBJECTIVES

Students will be able to

1. Know approaches to understand visual perception
2. Learn about categories of visualization and application areas
3. Familiarize with the data visualization tools
4. Gain knowledge of effective data visuals to solve workplace problems
5. Understand the importance of data visualization for business intelligence and decision making

Experiments:

1. a) Using R program to add, sub, mul, divn. (calculator)
   b) To check given no is even or odd
   c) While and for loops
2. a) Using R program execute a) switch b) find a factorial using Recursion
3. Execute R demo Programs a) array B) matrix and C) list
4. Execute R demo program on a) Data frames b) Common functions used with factor
5. Execute R demo program to read and write csv, excel data, basic plots.
6. Execute R programs Pie chart, histogram, line plot
7. Introduction to various Data Visualization tools
8. Basic Visualization in R
9. Connecting to Data and preparing data for visualization in R
10. Data Aggregation and Statistical functions in R
11. Data Visualizations in R
12. Creating custom charts, cyclical data and circular area charts, Dual Axis charts.

REFERENCE BOOKS:

1. Microsoft Power BI cookbook, Brett Powell, 2nd edition.
2. R Programming for Data Science by Roger D. Peng (References)
3. The Art of R Programming by Norman Matloff Cengage Learning India

Data Visualization with R: 111 Examples by Thomas Rahlf, Springer, 2020

COURSE OUTCOMES:

At the end of the course, Students will be able to:

CO1: Describe the fundamentals of R programming.
CO2: Use R to create basic and advanced data visualizations.
CO3: Apply visualizations to interpret trends and patterns in data.
CO4: Construct effective visualizations to address real-world problems.
CO5: Explore and implement various plotting libraries for enhanced data representation

AY: 2024-25 Onwards	J. B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC Autonomous)	B. Tech-CSE III Year- I Sem			
Course Code M31MC4	CYBER SECURITY	L	T	P	C
		2	0	0	0

Pre-Requisites: NIL

Course Objectives:

The students should be able to

1. Recognize cybercrimes and how they are planned.
2. Identify the vulnerabilities of mobile and wireless devices.
3. Examine the crimes in mobile and wireless devices and Acts.
4. Understand about Computer Forensics
5. Explored to Cyber Security- Organizational Implications

Module 1:

Introduction to Cyber Security: Basic Cyber Security Concepts, layers of security, Vulnerability, threat, Harmful acts, Internet Governance – Challenges and Constraints, Computer Criminals, CIA Triad, Assets and Threat, motive of attackers, active attacks, passive attacks, Software attacks, hardware attacks, Spectrum of attacks, Taxonomy of various attacks, IP spoofing, Methods of defence, Security Models, risk management, Cyber Threats-Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage, etc., Comprehensive Cyber Security Policy .

Module 2:

Cyberspace and the Law & Cyber Forensics: Introduction, Cyber Security Regulations, Roles of International Law. The INDIAN Cyberspace, National Cyber Security Policy.

Introduction, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital evidence, Forensics Analysis of Email, Digital Forensics Lifecycle, Forensics Investigation, Challenges in Computer Forensics, Special Techniques for Forensics Auditing.

Module 3:

Cybercrime: Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and WirelessComputing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

Module 4:

Cyber Security: Organizational Implications: Introduction cost of cybercrimes and IPR issues, web threats for organizations, security and privacy implications, social media marketing: security risks and perils for organizations, social computing and the associated challenges for organizations.

Cybercrime and Cyber terrorism: Introduction, intellectual property in the cyberspace, the ethical dimension of cybercrimes the psychology, mindset and skills of hackers and other cyber criminals.

Module 5:

Privacy Issues: Basic Data Privacy Concepts: Fundamental Concepts, Data Privacy Attacks, Data linking and profiling, privacy policies and their specifications, privacy policy languages, privacy in different domains- medical, financial, etc.

Cybercrime: Examples and Mini-Cases Examples: Official Website of Maharashtra Government Hacked, Indian Banks Lose Millions of Rupees, Parliament Attack, Pune City Police Bust Nigerian Racket, e-mail spoofing instances.

Mini-Cases: The Indian Case of online Gambling, An Indian Case of Intellectual Property Crime, Financial Frauds in Cyber Domain.

Text Books

1. Nina Godbole and Sunit Belpure, Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley.
2. B. B. Gupta, D. P. Agrawal, Haoxiang Wang, Computer and Cyber Security: Principles, Algorithm, Applications, and Perspectives, CRC Press, ISBN 9780815371335, 2018.

Reference Books

1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson,CRC Press.
2. Introduction to Cyber Security, Chwan-Hwa(john) Wu,J. David Irwin, CRC PressT&F Group

E-Resources

1. https://lecturenotes.in/subject/611/cyber-security .
2. https://www.slideshare.net/AvaniPatel61/ppt-on-cyber-security .
3. https://onlinecourses.swayam2.ac.in/ugc19_hs25/preview

Course Outcomes

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

CO1. Demonstrate cybercrimes and how they are planned.
CO2. Develop a framework to secure Mobile and wireless devices.
CO3. Interpret crimes and Acts related to mobile and wireless devices.
CO4. Memorize Computer Forensics and its related matters.
CO5. Identify Cyber Security-Organizational Implications

AY: 2024-25 Onwards	J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC Autonomous)	B. Tech-CSE III Year- I Sem			
Course Code: M31AC4	FOUNDATIONS OF ENTREPRRENEURSHIP	L	T	P	C
		2	0	0	0

Pre-Requisites:

NIL

Course Objectives:

The students should be able to

1. To implore an understanding of the dimensions and traits required to become an entrepreneur.
2. To understand the Entrepreneurial process and also inspire them to be Entrepreneurs.
3. To understand the Entrepreneurship and its role in the society
4. To understand the process of Entrepreneurship & preparing business plans
5. To gain knowledge about the Entrepreneurship Development Institutions of Government

MODULE I:

Understanding Entrepreneurial Mindset- The revolution impact of entrepreneurship- The evolution of entrepreneurship - Functions of Entrepreneurs – types of entrepreneurs – Approaches to entrepreneurship- Process approach- Role of entrepreneurship in economic development- Twenty first century trends in entrepreneurship.

MODULE:II

The Individual Entrepreneurial Mind-Set and Personality- The entrepreneurial journey-Stress and the entrepreneur - the entrepreneurial ego - Entrepreneurial motivations- **Motivational cycle** – Entrepreneurial motivational behaviour – Entrepreneurial competencies. Corporate Entrepreneurial Mindset, the nature of corporate entrepreneur- conceptualization of corporate entrepreneurship Strategy-sustaining corporate entrepreneurship.

MODULE: III

Launching Entrepreneurial Ventures - opportunities identification- Finding gaps in the marketplace – techniques for generating ideas- entrepreneurial Imagination and Creativity- the nature of the creativity process - Innovation and entrepreneurship.

Methods to initiate Ventures- Creating new ventures-Acquiring an Established entrepreneurial venture- Franchising- advantage and disadvantages of Franchising.

MODUL IV:

Legal Challenges of Entrepreneurship - Intellectual property protection - Patents, Copyrights - Trademarks and Trade secrets - Avoiding trademark pitfalls Feasibility Analysis - Industry and competitor analysis - Formulation of the entrepreneurial Plan. The challenges of new venture start-ups, developing an effective business model – Sources of finance - Critical factors for new venture development - The Evaluation process.

MODULE: V

Strategic Perspectives in Entrepreneurship - Strategic planning - Strategic actions-strategic positioning- Business stabilization - Building the adaptive firms. Understanding the growth stage – Internal growth strategies and external growth strategies, Unique managerial concern of growing ventures. Initiatives by the Government of India to promote entrepreneurship, Social and women entrepreneurship -T-hub, J-hub.

Text Books

1. S.S. Khanka, Entrepreneurship Development, S. Chand Publications, 2015. Stuart Read, Effectual Entrepreneurship, Routledge, 2013.
2. Rajeev Roy, Entrepreneurship, 2e, Oxford publications, 2012

Reference Books

1. D F Kuratko and T V Rao, Entrepreneurship- A South-Asian Perspective, Cengage Learning, 2012.
2. Bruce R. Barringer/ R. Duane Ireland, Entrepreneurship Successfully launching new ventures, 4e, Pearson, 2015
3. Nandan .H, Fundamentals of Entrepreneurship, PHI, 2013
4. Madhurima Lal Shikha Sahai – Entrepreneurship, Excel Books.

E-Resources

1. https://nptel.ac.in/courses/127105007

Course Outcomes

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

CO1. Understand the need and significance of Entrepreneurship in the Economy

CO2. Develop Entrepreneurial Competencies

CO3. Develop Business Plan with the required contents.

CO4. Understand contribution of family business and Social Entrepreneurship in the Economy.

CO5. Plan Strategic perspectives in entrepreneurship.

AY: 2024-25 Onwards	J. B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC Autonomous)	B. Tech-CSE III Year- II Sem			
Course Code: M32DB	BIG DATA ANALYTICS (Professional Elective-II)	L	T	P	C
		3	0	0	3

Pre-Requisites:

Database Management Systems, Cloud Computing.

Course Objectives:

The students should be able to

1. Understand the basics of Big Data and Big data Platform.
2. Attain the knowledge of Big Data analytics, Approaches and Tools
3. Describe Map Reduce fundamentals and HDFC File system.
4. Differentiate between Hadoop and RDBMS concepts.
5. Apply analytics on Structured and Unstructured Data

Module 1:

Big Data Analytics: What is big data, History of Data Management; Structuring Big Data ; Elements of Big Data ; Big Data Analytics; Distributed and Parallel Computing for Big Data; **Big Data Analytics**: What is Big Data Analytics, What Big Data Analytics Isn't, Why this sudden Hype Around Big Data Analytics, Classification of Analytics, Greatest Challenges that Prevent Business from Capitalizing Big Data; Top Challenges Facing Big Data; Why Big Data Analytics Important; Data Science; Data Scientist; Terminologies used in Big Data Environments; Basically Available Soft State Eventual Consistency (BASE); Open source Analytics Tools

Module 2:

Understanding Analytics and Big Data: Comparing Reporting and Analysis, Types of Analytics; Points to Consider during Analysis; Developing an Analytic Team; Understanding Text Analytics; **Analytical Approach and Tools to Analyze Data**: Analytical Approaches; History of Analytical Tools; Introducing Popular Analytical Tools; Comparing Various Analytical Tools.

Module 3:

Understanding MapReduce Fundamentals and HBase : The MapReduce Framework; Techniques to Optimize MapReduce Jobs; Uses of MapReduce; Role of HBase in Big Data Processing; Storing Data in Hadoop
Introduction of HDFS: Architecture, HDFC Files, File system types, commands, org.apache.hadoop.io package, HDF, HDFS High Availability; Introducing HBase, Architecture, Storing Big Data with HBase , Interacting with the Hadoop Ecosystem; HBase in Operations-Programming with HBase; Installation, Combining HBase and HDFS

Module 4:

Big Data Technology Landscape and Hadoop : NoSQL, Hadoop; RDBMS versus Hadoop; Distributed Computing Challenges; History of Hadoop; Hadoop Overview; Use Case of Hadoop; Hadoop Distributors;
HDFC (Hadoop Distributed File System): HDFC Daemons, read,write, Replica Processing of Data with Hadoop; Managing Resources and Applications with Hadoop YARN

Module 5:

Social Media Analytics and Text Mining: Introducing Social Media; Key elements of Social Media; Text mining; Understanding Text Mining Process; Sentiment Analysis, Performing Social Media Analytics and Opinion Mining on Tweets;
Mobile Analytics: Introducing Mobile Analytics; Define Mobile Analytics; Mobile Analytics and Web Analytics; Types of Results from Mobile Analytics; Types of Applications for Mobile Analytics; Introducing Mobile Analytics Tools

Text Books

1. BIG DATA and ANALYTICS, Seema Acharya, Subhasinin Chellappan, Wiley publications.
2. BIG DATA, Black Book™ , DreamTech Press, 2015 Edition.
3. BUSINESS ANALYTICS 5e , BY Albright |Winston

Reference Books

1. Rajiv Sabherwal, Irma Becerra- Fernandez," Business Intelligence –Practice, Technologies and Management", John Wiley 2011.
2. Lariss T. Moss,ShakuAtre, " Business Intelligence Roadmap", Addison-Wesley It Service.
3. Yuli Vasiliev, " Oracle Business Intelligence : The Condensed Guide to Analysis and Reporting", SPD Shroff, 2012.

E-Resources

1. https://www.coursera.org/learn/big-data-introduction
2. https://www.tutorialspoint.com/big_data_analytics/index.htm
3. www.upgrad.com/Big-Data
4. https://www.javatpoint.com/what-is-big-data

Course Outcomes

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

CO1. Identify the basics of Big Data and its environment.

CO2. Use Big Data analytics Tools and its Approaches.

CO3. Define Map Reduce fundamentals and HDFC Architecture

CO4. Distinguish between Hadoop and RDBMS concepts.

CO5. Illustrate analytics on Structured and Unstructured Data.

AY: 2024-25 Onwards	J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC Autonomous)	B. Tech-CSE III Year- II Sem			
Course Code: M32AA	DEEP LEARNING (Professional Elective-II)	L	T	P	C
		3	0	0	3

Pre-Requisites:

Probability Statistics, linear algebra. Machine learning.

Course Objectives:

The students should be able to

1. Get introduced to various learning techniques of machine learning and understand differences between machine learning and deep learning.
2. Understand and analyse optimization techniques and improvements in learning methods.
3. Appreciate, understand, and apply neural networks as tools for complete learning problems.
4. Investigate and deploy/club multi-layer neural networks for learning related to images, text and speech sequences.
5. Appreciate, understand and implement Deep learning in real world practical problems.

Module 1:

Introduction to Deep Learning: Introduction to Deep Learning, Brief History of Deep Learning, AI, Machine Learning and Deep Learning, Statistical Learning. Bayesian Learning, Decision Surfaces, Success stories of Deep Learning

Module 2:

Linear Classifiers : Linear Classifiers, Linear Machines with Hinge Loss, Optimization Techniques, Gradient Descent, Batch Optimization, Revisiting Gradient Descent, Momentum Optimizer, RMSProp, Adam.

Module 3:

Neural Network: Introduction to Neural Network, Multilayer Perceptron, Back Propagation Learning, Unsupervised Learning with Deep Network, Autoencoders, Convolutional Neural Network, Building blocks of CNN, Transfer Learning, LSTM Networks, NN in python.

Module 4:

Deep Neural Net: Effective training in Deep Net- early stopping, Dropout, Batch Normalization, Instance Normalization, Group Normalization, Recent Trends in Deep Learning Architectures, Residual Network, Skip Connection Network, Fully Connected CNN, CNN in Python

Module 5:

Applications of Deep Learning

Classical Supervised Tasks with Deep Learning, Image Denoising, Semantic Segmentation, Object Detection, Generative Modelling with Deep Learning, Variation Auto encoder, Generative Adversarial Network, Object recognition with Python.

Text Books

1. Deep Learning- Ian Goodfelllow, YoshuaBenjio, Aaron Courville, The MIT Press
2. Pattern Classification- Richard O. Duda, Peter E. Hart, David G. Stork, John Wiley & Sons Inc.

Reference Books

1. Deep Learning: A Practitioner's Approach by Josh Patterson & Adam Gibson, OReilly Press
2. Python Deep Learning: Exploring deep learning techniques and neural network architectures with PyTorch, Keras, and TensorFlow, 2nd Edition by Ivan Vasilev, Pakt Publication.

E-Resources

1. https://nptel.ac.in/courses/106/105/106105215/
2. https://www.slideshare.net/LuMa921/deep-learning-a-visual-introduction
3. https://yiqiaoyin.files.wordpress.com/2018/02/deep-learning-notes.pdf

Course Outcomes

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

CO1. Identify tools of machine learning and deep learning, appropriate to any problems
CO2. Apply optimization techniques to improve the quality of various learning solutions.
CO3. Apply neural network for complete learning problems.
CO4. Deploy deep learning methods to multidimensional and sequential inputs.
CO5. Investigate the scope of implementation of various deep learning techniques for real world problems.

AY: 2024-25 Onwards	J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC Autonomous)	B. Tech-CSE III Year- II Sem			
Course Code: M325I	SOFTWARE TESTING METHODOLOGY (Professional Elective –II)	L	T	P	C
		3	0	0	3

Pre-Requisites:

A course on "Software Engineering".

Course Objectives:

The students should be able to

1. Explain various software testing issues and solutions in software unit test, Integration, regression, and system testing.
2. Discuss how to planning a test project, design test cases and data, conduct testing Operations, manage software problems and defects and generate a testing report.
3. Explain the advanced software testing topics, such as object-oriented software, testing methods, and component-based software testing issues, challenges, and Solutions.
4. Recognize software test automation problems and solutions.
5. Identify how to write software-testing documents, and communicate with Engineers in various forms.

Module 1:

Introduction: Purpose of testing, Dichotomies, model for testing, consequences of bugs, Taxonomy of bugs. Basics concepts of path testing, predicates, path predicates and Achievable paths, path sensitizing, path instrumentation, application of path testing.

Module 2:

Transaction Flow Testing: Transaction flows, transaction flow testing techniques.
Dataflow testing: - Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing. Domain Testing: domains and paths, Nice & ugly domains, domain Testing, domain and interface testing, domains and testability.

Module 3:

Paths, Path products and Regular expressions: Path products & path expression, Reduction procedure, applications, regular expressions & flow anomaly detection.

Module 4:

Logic Based Testing: Overview, decision tables, path expressions, kv charts, Specifications. State, State Graphs and Transition testing: State graphs, good & bad state Graphs, state testing, Testability tips.

Module 5:

Graph Matrices and Application: Motivational overview, matrix of graph, relations, Power of a matrix, node reduction algorithm, building tools. Regression testing, Rapid testing, Performance testing of a data base application and HTTP connection for website access.

Text Books

1. Software Testing techniques - Baris Beizer, Dreamtech, second edition.
2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.

Reference Books

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing Techniques – SPD (Oreille)
3. Software Testing in the Real World – Edward Kit, Pearson.

E-Resources

1. https://www.guru99.com/testing-methodology.html
2. www.ieeexplore.ieee.org
3. www.tutorialspoint.com

Course Outcomes

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

CO1: Design test cases using black box testing technique, which includes decision tables domain testing and transition testing.

CO2: Design test cases for a white box testing technique, which includes path testing, data flow graphs and matrix representation for a given problem.

CO3: Compute the path product and construct regular expression, which is used to identify the alternate paths from source node to destination node for any Application.

CO4: Conduct Performance testing using testing tools.

CO5: Identify the importance of testing and its role in software development.

AY: 2024-25 Onwards	J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC Autonomous)	B. Tech-CSE III Year- II Sem			
Course Code: M325G	CLOUD COMPUTING (Professional Elective-III)	L	T	P	C
		3	0	0	3

Pre-Requisites:

1. A course on "Computer Networks".

2. A course on "Operating Systems".

3. A course on "Data base management systems

Course Objectives:

The students should be able to

1. Understand the fundamentals of the Cloud Computing and strategies in the New Economy.

2. Provide a fundamental understanding of different types of cloud computing applications.

3. Provide insights to implement virtualization techniques.

4. Understand the design of cloud and its architecture.

5. Outlines the security and legal issues in Cloud Computing

Module 1:

Principles of Parallel and Distributed Computing, Introduction to cloud computing, Cloud computing Architecture,

Cloud concepts and technologies, cloud services and platforms, Cloud models, cloud as a service, cloud solutions, cloud offerings, introduction to Hadoop and MapReduce.

Module 2:

Cloud Platforms in the Industry, Understanding Scientific Applications for Cloud Environments, cloud applications. Healthcare and education, Scientific Applications, Business and Consumer Applications

Module 3:

Virtualization, cloud virtualization technology, deep dive: cloud virtualization, migrating in to cloud computing. Virtual Machines Provisioning and Virtual Machine Migration Services, On the Management of Virtual Machines for cloud Infrastructure, Comet cloud, T-Systems.

Module 4:

Enterprise cloud computing Paradigm, Federated cloud computing Architecture,

SLA Management in Cloud Computing, Developing the cloud: cloud application Design.

Module 5:

Cloud management, Organizational Readiness and change management in the cloud age, Cloud Security, Data security in the cloud, Legal Issues in the Cloud, Achieving Production Readiness for the cloud Services.

Text Books

1. Cloud Computing: Raj Kumar Buyya , James Broberg, andrzej Goscinski, 2013 Wiley.
2. Cloud computing: Dr Kumar Saurab Wiley India 2011.

Reference Books

1. Cloud Computing: Arshdeep Bahga, Vijay Madisetti, 2014, University Press.
2. Mastering Cloud Computing: Raj Kumar buyya, Christian Vecchiola,selvi-2013.

E-Resources

1. https://nptel.ac.in/courses/106/105/106105167/
2. https://sjceodisha.in/wp-content/uploads/2019/09/CLOUD-COMPUTINGPrinciples-and-Paradigms.pdf
3. https://www.alljntuworld.in/download/cloud-computing-cc-materials-notes/
4. https://www.slideshare.net/jeetraj17/cloud-computing-it703-unit-1-5

Course Outcomes

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

CO1. Identify different elements of cloud computing.

CO2. Analyze the impact of Cloud Computing on organizations and strategy.

CO3. . Analyze the different types of virtualization.

CO4. . Design cloud based application.

CO5. Identify security and legal issues in the cloud management.

AY: 2024-25 Onwards	J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC Autonomous)	B. Tech-CSE III Year- II Sem			
Course Code: M41DC	REINFORCEMENT LEARNING (Professional Elective-III)	L	T	P	C
		3	0	0	3

Pre-Requisites: Mathematics for Machine Learning, Deep Learning.

Course objectives:

The Student will:

1. Learn about Basics of Reinforcement Learning
2. Achieve knowledge in Tabular based solutions.
3. Expand their knowledge in Function approximation solutions.
4. Familiar with Model based Reinforcement Learning.
5. Realize the Meta learning.

Module 1:

Introduction to Reinforcement Learning: Introduction to Reinforcement Learning- Examples- Elements of Reinforcement Learning- Limitations and Scope- Case study: Tic Tac Toe- Early history of reinforcement learning.
Multi armed bandits: A K armed bandit Problem- Action Value Methods- The 10-armed testbed- incremental implementation- tracking a non-stationary problem.

Module 2:

Finite Markov Decision Processes: The Agent & Environment interface- goals and rewards- returns and episodes- Policies and Value functions- Optimality and Approximation.
Dynamic Programming: Policy Evaluation- Policy Improvement- Policy Iteration- Value Iteration- Asynchronous Dynamic Programming

Module 3:

Monte Carlo Methods: Monte Carlo Prediction- Monte Carlo estimation of action values- Monte Carlo control- Monte Carlo control without exploring starts- off policy monte Carlo control.

Temporal Difference Learning: TD Prediction- optimality of TD(0)-SARSA-Q-Learning- Expected SARSA- Maximization Bias and Double learning

Module 4:

Model-based reinforcement learning: Model-based reinforcement learning, Imitation learning - behavioral cloning, inverse RL, generative adversarial imitation learning.

Function approximation solutions: Function approximation solutions - Deep Q-networks**,** Policy gradient from basic –REINFORCE, towards advanced topics - proximal policy optimization, deep deterministic policy gradient, etc.

Module 5:

Meta-learning: Meta-learning, Multi-agent learning, partial observable environments
Recent advances and applications: Code standards and libraries used in RL(python/karas/TensorFlow)- safety in RL- TD Gammon- Samuel's Checkers players- Watson's Daily double wagering

Text Books:

1. Richard S. Sutton and Andrew G. Barto, "Reinforcement learning: An introduction", Second Edition,MIT Press, 2019
2. Li, Yuxi. "Deep reinforcement learning." arXiv preprint arXiv:1810.06339 (2018).
3. Wiering, Marco, and Martijn Van Otterlo. "Reinforcement learning." Adaptation, learning, and optimization 12 (2012): 3.

Reference Books:

1. Russell, Stuart J., and Peter Norvig. "Artificial intelligence: a modern approach."Pearson Education Limited, 2016.
2. Goodfellow, Ian, YoshuaBengio, and Aaron Courville. "Deep learning." MIT press, 2016.
3. David Silver's course on Reinforcement Learning (link)

E-Resources:

1. https://www.geeksforgeeks.org/what-is-reinforcement-learning/
2. https://en.wikipedia.org/wiki/Reinforcement_learning
3. https://www.javatpoint.com/reinforcement-learning
4. https://deepsense.ai/what-is-reinforcement-learning-the-complete-guide/

Course outcomes:

1. Design Reinforcement Learning concepts for solving different types of problems.
2. Identify Tabular based solutions for cracking glitches.
3. Apply Function approximation solutions for resolving complications.
4. Implement Model based Reinforcement Learning to unravel variety of issues.
5. Apply Meta learning to work out distinctive varieties of setbacks.

AY: 2024-25 Onwards	J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC Autonomous)	B. Tech-CSE III Year- II Sem			
Course Code: M32AG	SOFTWARE ARCHITECTURE AND DESIGN PATTERNS (Professional Elective-III)	L	T	P	C
		3	0	0	3

Pre-Requisites:

- Knowledge of Software Engineering

Course Objectives:

The students should be able to

1. Understand that design patterns are standard solutions to common software design problems.
2. Discuss to know how to use systematic approach that focus and describe that describe abstract systems of interaction between classes, objects and communication flow.
3. Understand the architecture evaluation and design decision making.
4. Understand how to apply these patterns on various platforms.
5. Understand the responsibilities for developing software.

Module 1:

Envisioning Architecture The Architecture Business Cycle, What is Software Architecture, Architectural patterns, reference models, reference architectures, architectural structures and views. Creating an Architecture Quality Attributes, Achieving qualities, Architectural styles and patterns, designing the Architecture, Documenting software architectures, Reconstructing Software Architecture.

Module 2:

Analyzing Architectures Architecture Evaluation, Architecture design decision making, ATAM, CBAM. Moving from one system to many Software Product Lines, Building systems from off the shelf components, Software architecture in future

Module 3:

Patterns Pattern Description, Organizing catalogs, role in solving design problems, Selection and usage. Creational and Structural patterns Abstract factory, builder, factory method, prototype, singleton, adapter, bridge, composite, façade, fly weight.

Module 4:

Behavioral patterns Chain of responsibility, command, Interpreter, iterator, mediator, memento, observer, state, strategy, template method, visitor.

Module 5:

Case Studies A-7E –A case study in utilizing architectural structures, The World Wide Web -a case study in interoperability, Air Traffic Control –a case study in designing for high availability, Celsius Tech –a case study in product line development

Text Books

1. Software Architecture in Practice, second edition, Len Bass, Paul Clements & Rick Kazman, Pearson Education, 2003.
2. Design Patterns, Erich Gamma, Pearson Education, 1995

Reference Books

1. Architecture in Practice, Len Bass, Paul Clements, Rick Kazman.
2. Software Documenting Software Architectures: Views and Beyond Paul Clements, Felix Bachmann, Len Bass, David Garlen, James Ivers, Reed Little, Robert Nord, Judith Stafford

E-Resources

1. http://en.wikibooks.org/wiki/Introduction_to_Software_Engineering/Architecture/Design_Patterns

Course Outcomes

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

CO1. Apply a deeper knowledge of the principles of Object-Oriented Design.

CO2. Analyse the Software architectures in terms of performance, availability, security and cost benefit analysis.

CO3. Illustrate the knowledge of various patterns that are related to object-oriented design.

CO4. Analyse behavioural architectural patterns

CO5. Apply the Knowledge of Design Patterns for developing a software.

AY 2024-25 onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B.Tech: CSE III Year – II Sem			
Course Code: M325A	FORMAL LANGUAGES AND AUTOMATA THEORY	L	T	P	C
		3	0	0	3

Pre-Requisites:

1. Knowledge on "Mathematical Foundations of Computer Science":.

Course objectives:

The Student will:

1. Classify machines by their power to recognize languages.
2. Describe the concepts of regular languages and regular grammars.
3. Discuss the concepts of context free grammars and minimization of CFG.
4. Recognize deterministic and non-deterministic push down automata.
5. Determine the decidability and intractability of computational problems.

Module 1:

Fundamentals and Finite Automata: Strings, Alphabet, Language, Operations, Finite state machine, definitions, finite automaton model, acceptance of strings, and languages, DFA and NFA, transition diagrams and Language recognizers.
NFA with Î transitions - Significance, acceptance of languages. Equivalence between NFA with and without Î transitions, NFA to DFA conversion, minimization of FSM, equivalence between two FSM's, Finite Automata with output- Moore and Mealy machines.

Module 2:

Regular Languages: Regular sets, regular expressions, identity rules, constructing finite Automata for a given regular expression, Conversion of Finite Automata to Regular expressions. Regular grammars-right linear and left linear grammars, equivalence between regular linear grammar and FA, inter conversion, Pumping lemma of regular sets, closure properties of regular sets (proofs not required).

Module 3:

Context Free Grammars: Context free grammar, derivation trees, sentential forms, Right most and leftmost derivation of strings. Ambiguity in context free grammars. Minimization of Context Free Grammars. Chomsky normal form, Greibach normal form, Pumping Lemma for Context Free Languages. Enumeration of properties of CFL (proofs omitted).

Module 4:

Push Down Automata: Push down automata, definition, model, acceptance of CFL, Acceptance by final state and acceptance by empty state and its equivalence. Equivalence of CFL and PDA, inter conversion. (Proofs not required). Introduction to DCFL and DPDA.

Module 5:

Turing Machine and Computability Theory: Turing Machine, definition, model, design of TM, Computable functions, recursively enumerable languages. Church's hypothesis, counter machine, types of Turing machines (proofs not required). Chomsky hierarchy of languages, linear bounded automata and context sensitive language, LR(0) grammar, decidability of, problems, Universal Turing Machine, undecidability of posts. Correspondence problem, Turing reducibility, Definition of P and NP problems, NP complete and NP hard problems.

Text Books:

1. "Introduction to Automata Theory Languages and Computation". Hopcroft H.E. and Ullman J. D. Pearson Education
2. Theory of Computer Science – Automata languages and computation -Mishra and Chandrasekaran, 2nd edition, PHI

Reference Books:

1. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
2. Formal Language and Automata Theory,K V N Sunitha, NKalayani, TMH
3. Introduction to languages and the Theory of Computation, John C Martin, TMH.

E - Resources:

1. https://www.youtube.com/watch?v=58N2N7zJGrQ
2. https://nptel.ac.in/courses/111/103/111103016/
3. https://nptel.ac.in/courses/106/106/106106049
4. https://www.youtube.com/playlist?list=PLEbnTDJUr_IdM_FmDFBJBz0zCsOFxf
5. https://www.tutorialspoint.com/automata_theory/index.htm
6. https://books.google.co.in/booksd?i =oBqh1G17tokC&printsec =frontcover

Course outcomes:

1. Differentiate different types of machines and their power to recognize the Languages.
2. Demonstrate Regular Languages and Regular Grammars.
3. Design of Context free grammars for formal languages.
4. Design a PDA for given CFL.
5. Distinguish between decidability and undecidability problems.

AY 2024-25 onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B.Tech: CSE III Year – II Sem			
Course Code: M325A	ARTIFICIAL INTELLIGENCE AND ITS APPLICATIONS	L	T	P	C
		3	0	0	3

Pre-Requisites:

1. A solid understanding of mathematics, including calculus, linear algebra, probability, and statistics.
2. Basic programming skills in at least one language, such as Python, Java, or C++.
3. Familiarity with Data structures and algorithms.

Course Objectives:

The students should be able to

1. To introduce students to the fundamental concepts of Artificial Intelligence (AI) and its applications in various domains, including business.
2. To provide students with a comprehensive understanding of AI problem-solving techniques, search algorithms, and knowledge representation and reasoning.
3. To help students gain knowledge and experience in developing AI systems that can solve problems efficiently and effectively.
4. To expose students to advanced topics in AI, including reasoning under uncertainty, learning, and expert systems.

Module 1:

Introduction: AI problems, Agents and Environments, Structure of Agents, Problem Solving Agents
Basic Search Strategies: Problem Spaces, Uninformed Search (Breadth-First, Depth-First Search, Depth-first with Iterative Deepening),Heuristic Search(Hill Climbing, Generic Best-First, A*),Constraint Satisfaction (Backtracking, Local Search)

Module 2:

Advanced Search: Constructing Search Trees, Stochastic Search, A* Search Implementation, Minimax Search, Alpha-Beta Pruning
Basic Knowledge Representation and Reasoning: Propositional Logic, First-Order Logic, Forward Chaining and Backward Chaining, Introduction to Probabilistic Reasoning, Bayes Theorem.

Module 3:

Advanced Knowledge Representation and Reasoning: Knowledge Representation Issues, Rule, Nonmonotonic Reasoning, Other Knowledge Representation Schemes.
Reasoning Under Uncertainty: Basic probability, Acting Under Uncertainty, Bayes' Representing Knowledge in an Uncertain Domain, Bayesian Networks.

Module 4:

Learning: What Is Learning? Rote Learning, Learning by Taking Advice, Learning in Problem n Trees.
Expert Systems: Representing and Using Domain Knowledge. Shell, Explanation,

Module 5:

Introduction to AI in Business and its impact: Common business applications of AI- Chatbots, including their definition, applications, and design and implementation- Personalized Recommendations, including their definition, applications, and design and implementation
Fraud Detection: Definition, Applications, and Design and Implementation of Fraud Detection Systems Other Applications of AI in Business:- Predictive Analytics- Supply Chain Optimization- Customer Relationship Management- Human Resource Management- Ethical Considerations in AI Applications in Business: Bias in AI Applications- Data Privacy Concerns- Responsibility and Accountability.

Text Books

1. Russell, S. and Norvig, P, Artificial Intelligence: A Modern Approach, Third Edition, Prentice-Hall,2010

Reference Books

1. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivashankar B. Nair, The McGraw Hill publications, Third Edition,2009.
2. George F. Luger, Artificial Intelligence: Structures and Strategies for Complex Problem Solving, Pearson Education, 6th ed.,2009.

E-Resources

1. https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_pdf_version.htm
2. https://www.alljntuworld.in/download/artificial-intelligence-ai-materials-notes/
3. https://drive.google.com/file/d/1mPiI4jy6YkJRDiCT21xgzN0VDNkrW23X/view
4. https://nptel.ac.in/courses/106/105/106105077/

Course Outcomes

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

CO1: Identify AI problems and apply suitable search algorithms to solve them.
CO2: Construct and analyze search trees; implement A*, minimax, and alpha-beta pruning.
CO3: Represent knowledge using propositional and first-order logic; apply forward and backward chaining for reasoning.
CO4: Handle uncertain knowledge using probability and Bayesian Networks.
CO5: Design AI systems for real-world applications like fraud detection, CRM, supply chain, and HR management.

AY 2024-25 onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B.Tech: CSE III Year – II Sem			
Course Code: M32AB	MACHINE LEARNING	L	T	P	C
		3	0	0	3

Pre-Requisites:

1. A course on Linear Algebra and Advanced Calculus.
2. A course on "Probability and Statistics."
3. A course on "Data structures

Course Objectives:

The students should be able to

1. Use Models, methods and tools to solve regression, classification, feature selection, dimensionality reduction and density estimation problems.
2. Learn and adapt in supervised, unsupervised and semi-supervised modes of learning.
3. Gain knowledge of recognition, decision-making and statistical learning problems.
4. Understand current research topics and issues in machine learning.
5. Conduct and present a literature review on a research topic

Module 1:

Introduction - Well-posed learning problems, designing a learning system, Perspectives and issues in machine learning

Concept learning and the general to specific ordering – Introduction, A concept-learning task, Concept learning as search, Find-S: finding a maximally specific hypothesis, Version spaces and the candidate elimination algorithm, Remarks on version spaces and candidate elimination, Inductive bias

Decision Tree learning – Introduction, Decision tree representation, Appropriate problems for decision tree learning, The basic decision tree learning algorithm, Hypothesis space search in decision tree learning, Inductive bias in decision tree learning, Issues in decision tree learning

Module 2:

Artificial Neural Networks – Introduction, Neural network representation, Appropriate problems for neural network learning, Perceptions, Multilayer networks and the back propagation algorithm, Remarks on the back propagation algorithm, An illustrative example face recognition, Advanced topics in artificial neural networks.

Evaluation Hypotheses – Motivation, Estimation hypothesis accuracy, Basics of sampling theory, general approach for deriving confidence intervals, Difference in error of two hypotheses, Comparing-learning algorithms.

Module 3:

Bayesian learning – Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum likelihood and least squared error hypotheses, Maximum likelihood hypotheses for predicting probabilities, Minimum description length principle, Bayes optimal classifier, Gibs algorithm, Naïve Bayes classifier, an example learning to classify text, Bayesian belief networks The EM algorithm,

Computational learning theory – Introduction, Probability learning an approximately correct hypothesis, Sample complexity for Finite Hypothesis Space, Sample Complexity for infinite Hypothesis Spaces, the mistake bound model of learning

Instance-Based Learning- Introduction, k -Nearest Neighbour Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning,

Genetic Algorithms –Motivation, Genetic Algorithms, an illustrative Example, Hypothesis Space Search, Genetic Programming, Models of Evolution and Learning, Paralleling Genetic Algorithms

Module 4:

Learning Sets of Rules –Introduction, Sequential Covering Algorithms, Learning Rule Sets: Summary, Learning First Order Rules, Learning Sets of First Order Rules: FOIL, Induction as Inverted Deduction, Inverting Resolution

Analytical Learning - Introduction, Learning with Perfect Domain Theories: Prolog- EBG Remarks on Explanation-Based Learning, Explanation-Based Learning of Search Control Knowledge

Module 5:

Combining Inductive and Analytical Learning –Motivation, Inductive-Analytical Approaches to Learning, Using Prior Knowledge to Initialize the Hypothesis, Using Prior Knowledge to Alter the Search Objective, Using Prior Knowledge to Augment Search Operators,

Reinforcement Learning –Introduction, The Learning Task, Q Learning, Non- Deterministic, Rewards and actions, Temporal Difference Learning, Generalizing from Examples, Relationship to Dynamic Programming.

Text Books

1. Machine Learning – Tom M.Mitchell, - MGH
2. Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis (CRC).

Reference Books

1. Machine Learning Methods in the Environmental Sciences, Neural Networks, William whsieh, Cambridge Univ Press.
2. Richard O. Duda. Peter E. Hart and David G. Stork, Pattern classification, John Wiley & Sons Inc., 2001.
3. Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Presss, 1995.

E-Resources

1. https://www.slideshare.net/darshanharry/machine-learning-46440299
2. https://news.vidyaacademy.ac.in/
3. https://nptel.ac.in/courses/106/106/106106202/

Course Outcomes

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

CO1. Summaries on well-posed problem, concept learning and various perspectives of machine learning
CO2. Apply machine-learning algorithms such as Decision tree, Artificial Neural Networks to solve real world problems and formulate evaluation hypotheses.
CO3. Compare and contrast various machine-learning methodologies such as Bayesian Learning, Computational learning theory, instance based learning and Genetic algorithms.
CO4. Implement rule based learning and analytical learning strategies to solve complex problems.
CO5. Combine inductive learning with analytical learning and deploy Reinforcement learning which supports dynamic programming.

AY 2024-25 onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B.Tech: CSE III Year – II Sem			
Course Code: M32A2	MACHINE LEARNING LAB	L	T	P	C
		0	0	2	1

Pre-Requisites:

1. Linear Algebra
2. Python
3. DAA

Course Objectives:

The students should be able to

1. Familiarize with ANACONDA framework and JUPYTER IDE.
2. Learn Python Packages like numpy, pandas and Matplotlib for data pre-processing and visualization.
3. Practice inductive learning algorithms using python.
4. Understand the applications of neural networks and back propagation algorithm.
5. Apply machine-learning concepts for Text mining.

Experiment 1:

Familiarizing with Anaconda and Jupiter, for importing modules and dependencies for ML

Experiment 2:

Familiarization with numpy, Panda and Matplotlib by Loading Dataset in Python.

Experiment 3:

Find S algorithm in Python.

Experiment 4:

Candidate Elimination Algorithm in Python

Experiment 5:

ID3 algorithm for Decision Tree in Python

Experiment 6:

Demonstration of Logistic Regression using Python.

Experiment 7:

Demonstration of Classification using Python

Experiment 8:

Demonstration of Clustering using Python.

Experiment 9:

Implementation of SVM using Python.

Experiment 10:

Implementation of XOR function using NN and Python.

Experiment 11:

Implementation of Back propagation using Python

Experiment 12:

Sentiment Analysis using “Bag of Words” in Python

Experiment 13:

Recommender System in Python.

Course Outcomes

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

CO1. Effectively use ANACONDA framework and JUPYTER IDE.
CO2. Use Python Packages like NumPy, pandas and Matplotlib for data pre-processing and visualization.
CO3. Implement inductive learning algorithms using python.
CO4. Implement the applications of neural networks and back propagation algorithm.
CO5. Use machine-learning concepts for Text mining.

AY 2024-25 onwards	J. B. Institute of Engineering and Technology (UGC Autonomous)	B.Tech: CSE III Year – II Sem			
Course Code: M3251	UI DESIGN-FLUTTER	L	T	P	C
		0	0	2	1

Pre-Requisites:

Course Objectives:

The students should be able to

1. Learns to Implement Flutter Widgets and Layouts
2. Understands Responsive UI Design and with Navigation in Flutter
3. Knowledge on Widges and customize widgets for specific UI elements, Themes
4. Understand to include animation apart from fetching data

List of Experiments: Students need to implement the following experiments

1. a) Install Flutter and Dart SDK.

   b) Write a simple Dart program to understand the language basics.
2. a) Explore various Flutter widgets (Text, Image, Container, etc.).

   b) Implement different layout structures using Row, Column, and Stack widgets.
3. a) Design a responsive UI that adapts to different screen sizes.

   b) Implement media queries and breakpoints for responsiveness.
4. a) Set up navigation between different screens using Navigator.

   b) Implement navigation with named routes.
5. a) Learn about stateful and stateless widgets.

   b) Implement state management using set State and Provider.
6. a) Create custom widgets for specific UI elements.

   b) Apply styling using themes and custom styles.
7. a) Design a form with various input fields.

   b) Implement form validation and error handling.
8. a) Add animations to UI elements using Flutter's animation framework.

   b) Experiment with different types of animations (fade, slide, etc.).

9. a) Fetch data from a REST API.

   b) Display the fetched data in a meaningful way in the UI.

10. a) Write unit tests for UI components.

    b) Use Flutter's debugging tools to identify and fix issues.

Text Books

1. Marco L. Napoli, Beginning Flutter: A Hands-on Guide to App Development

Course Outcomes

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

1. Implements Flutter Widgets and Layouts
2. Responsive UI Design and with Navigation in Flutter
3. Create custom widgets for specific UI elements and also Apply styling using themes and custom styles.
4. Design a form with various input fields, along with validation and error handling
5. Fetches data and write code for unit Test for UI components and also animation.

AY: 2024-25 Onwards	J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC Autonomous)	B. Tech-CSE III Year- II Sem			
Course Code: M3201	LIFE SKILLS AND PROFESSIONAL SKILLS LAB	L	T	P	C
		0	0	4	2

Pre-Requisites: NIL

Course Objectives:

The students should be able to

1. Understand importance of self-assessment and awareness.
2. Recognize the emotional needs of themselves and others.
3. Define social skills and need of positive vibe.
4. Employ Leadership Traits and skills in day-to-day life.
5. Quantify the importance of Thinking out of Box, Creativity, and Innovation.

Module 1:

Self-Introduction and Practice Session-Importance of Communication Skills-Advance communication skills needed for effective communication-Self-assessment and self-awareness with required tools and Activity based approach.

Module 2:

Empathy Practice Sessions & Role-plays -Assertive Behaviour-Emotional Intelligence Conflict Resolution and Anger Management.

Module 3:

Social skills and how to handle criticism-Social Interaction Skills – Role-plays-Diversity & Social Responsibility- Positive Attitude- Power of Positive Energy.

Module 4:

Leadership-Traits & skill-Activities – Case Studies-Assessments - Team Building skills – Activities –Case studies on Interaction with industry people.

Module 5:

Thinking Out-of-the Box – Case-study & Activity Based- Creativity & Innovation Developing a Vision & Action-plan - Thinking Skills – Various Types of Thinking - Power of Questioning Skills– Practice Sessions & Role plays

Text Books

1. Butterfield, Jeff. Soft Skills for Everyone. Delhi: Cenege., 2010.
2. Raman, Meenakshi and Sangeeta Sharma. Technical Communication-Principles

and Practice. Third Edition, New Delhi: UP., 2015.

3. Rizvi, M Ashraf. Effective Technical-Communication. New Delhi: Tata McGraw-Hill., 2005.

AY: 2024-25 Onwards	J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC Autonomous)	B. Tech-CSE III Year- II Sem			
Course Code: **M32MC3**	**ARTIFICIAL INTELLIGENCE**	L	T	P	C
		2	**0**	**0**	**0**

Pre-Requisites:

1. Mathematics, Probability and statistics
2. Knowledge in programming Language

Course objectives:

The Student will:

1. Know the AI based problems.
2. Illustrate AI techniques for representing the basic problem.
3. Illustrate Advanced AI techniques to solve the problem.
4. Define Learning and explain various learning techniques.
5. Understand the usage expert system.

Module 1:

Introduction: AI problems, Agents and Environments, Structure of Agents, Problem Solving Agents

Basic Search Strategies: Problem Spaces, Uninformed Search (Breadth-First, DepthFirst Search, Depth-first with Iterative Deepening), Heuristic Search (Hill Climbing, Generic Best-First, A*), Constraint Satisfaction (Backtracking, Local Search)

Module 2:

Advanced Search: Constructing Search Trees, Stochastic Search, A* Search Implementation, Minimax Search, Alpha-Beta Pruning

Basic Knowledge Representation and Reasoning: Propositional Logic, First-Order Logic, Forward Chaining and Backward Chaining, Introduction to Probabilistic Reasoning, Bayes Theorem.

Module 3:

Advanced Knowledge Representation and Reasoning: Knowledge Representation Issues, Non- monotonic Reasoning, Other Knowledge Representation Schemes. Reasoning Under Uncertainty: Basic probability, Acting Under Uncertainty, Bayes' **Rule, Representing** Knowledge in an Uncertain Domain, Bayesian Networks.

Module 4:

Learning: What Is Learning? Rote Learning, Learning by Taking Advice, Learning in Problem Solving, Learning from Examples, Winston's Learning Program, Decision Trees.

Module 5:

Expert Systems: Representing and Using Domain Knowledge, Shell, Explanation, Knowledge Acquisition.

Text Books:

1. Russell, S. and Norvig, P, Artificial Intelligence: A Modern Approach, Third Edition, Prentice- Hall, 2010

References Books:

1. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivasankar B. Nair, The McGraw Hill publications, Third Edition, 2009.
2. George F. Luger, Artificial Intelligence: Structures and Strategies for Complex Problem Solving, Pearson Education, 6th ed., 2009.

E - Resources:

1.https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_pdf_version.htm
2. https://www.alljntuworld.in/download/artificial-intelligence-ai-materials-notes/
3. https://drive.google.com/file/d/1mPiI4jy6YkJRDiCT21xgzN0VDNkrW23X/view
4. https://nptel.ac.in/courses/106/105/106105077/

Course outcomes:

The Student will be able to:

1. Identify the AI based problems.
2. Apply AI techniques for representing the basic problem.
3. Apply Advanced AI techniques to solve the problem.
4. Analyze Learning and explain various learning techniques.
5. Illustrate the use of expert system.

AY: 2024-25 Onwards	J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (UGC Autonomous)	B. Tech-CSE III Year- II Sem			
Course Code: M32AC3	INDIAN CONSTITUTION	L	T	P	C
		2	0	0	0

Module 1: Evolution of the Indian Constitution

1909 Act, 1919 Act end 1935 Act. Constituent Assemtily Composition and Functions Fundamentals features of the Indian Constitution.

Module 2: Union Government

Executive: President. Prime Minister,
Council of Minister Executive: Governor,
Chief Minister, Council of Minister
Local Government: Panchayat Raj Institutions, Urban Government.

Module 3: Rights and Duties

Fundamental Rights. Directive principles. Fundamental Duties.

Module 4: Relation between Federal and provincial units

Union State relations. Administrative, legislative and Financial. Inter State council. NITI Ayog Finance Commission of India

Module 5: Statutory Institutions.

Elections-Election Commission of India, National Human Rights Commission National Commission for Women.

Text Books:

1 D.D. Basu, Introduction to the constitution of India. Lexis Nexis. Now Delhi

2. Subhash Kashyap, Our Parliament, National Book Trust. New Delhi.

Reference Books:

1. Peu Ghosh Indian Government & Polities. Prentice Hell of India, New Delhi

2 B.Z. Fadia & Kuldeep Fadia, Indian Government & Polices, LexisNexis. New Delhi

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

COI: Know the background of the present constitution of India

CO2: Understand the working of the union, state and local levels.

CO3. Gain consciousness on the fundamental rights and duties

CO4. Understand the functioning and distribution of financial resources between center and states.

CO5: Exposed to the realty of hierarchical Indian social structure and the way the grievances the deprived sections can be addressed to raise human dignity in a democratic way