SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF CSE

I B.Tech CSE (AIML) COURSE STRUCTURE (R23)

I-I SEMESTER

S. No	Subject Code	SUBJECT	Cat. Code	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	L	T	P	CREDITS
1		Engineering Physics	BS&H	30	70	100	3	0	0	3
2		Linear Algebra & Calculus	BS&H	30	70	100	3	0	0	3
3		Basic Electrical & Electronics Engineering	ES	30	70	100	3	0	0	3
4		Engineering Graphics	ES	30	70	100	1	0	4	3
5		Introduction to Programming	ES	30	70	100	3	0	0	3
6		IT Workshop	ES	30	70	100	0	0	2	1
7		Engineering Physics Lab	BS&H	30	70	100	0	0	2	1
8		Electrical & Electronics Engineering Workshop	ES	30	70	100	0	0	3	1.5
9		Computer Programming Lab	ES	30	70	100	0	0	3	1.5
10		NSS/NCC/Scouts &	BS&H				-	-	1	0.5
Total				**240**	**560**	**800**	**13**	**0**	**15**	**20.5**

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I-II SEMESTER

S.No.	Subject Code	SUBJECT	Cat.Code	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	L	T	P	CREDITS
1		Communicative English	BS&H	30	70	100	2	0	0	2
2		Chemistry	BS & H	30	70	100	3	0	0	3
3		Differential Equations & Vector Calculus	ES	30	70	100	3	0	0	3
4		Basic Civil & Mechanical Engineering	ES	30	70	100	3	0	0	3
5		Data structures	PC	30	70	100	3	0	0	3
6		Communicative English Lab	BS&H	30	70	100	0	0	2	1
7		Chemistry Lab	BS&H	30	70	100	0	0	2	1
8		Engineering Workshop	ES	30	70	100	0	0	3	1.5
9		Data structures Lab	PC	30	70	100	0	0	3	1.5
10		Health and wellness, Yoga and Sports					-	-	1	0.5
Total				**240**	**560**	**800**	**14**	**0**	**11**	**19.5**

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I B.TECH SEMISTER-I

S. No	Subject Code	SUBJECT	Cat. Code	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	L	T	P	CREDITS
1		Engineering Physics	BS&H	30	70	100	3	0	0	3
2		Linear Algebra & Calculus	BS&H	30	70	100	3	0	0	3
3		Basic Electrical & Electronics Engineering	ES	30	70	100	3	0	0	3
4		Engineering Graphics	ES	30	70	100	1	0	4	3
5		Introduction to Programming	ES	30	70	100	3	0	0	3
6		IT Workshop	ES	30	70	100	0	0	2	1
7		Engineering Physics Lab	BS&H	30	70	100	0	0	2	1
8		Electrical & Electronics Engineering Workshop	ES	30	70	100	0	0	3	1.5
9		Computer Programming Lab	ES	30	70	100	0	0	3	1.5
10		NSS/NCC/Scouts &	BS&H				-	-	1	0.5
Total				**240**	**560**	**800**	**13**	**0**	**15**	**20.5**

I B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE:	**ENGINEERING PHYSICS**						

COURSE OBJECTIVES:

To bridge the gap between the Physics in school at 10+2 level and UG level engineering courses by identifying the importance of the optical phenomenon like interference, diffraction etc, enlightening the periodic arrangement of atoms in crystalline solids and concepts of quantum mechanics, introduce novel concepts of dielectric and magnetic materials, physics of semiconductors.

COURSE OUTCOMES:

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

CO1: Analyze the intensity variation of light due to polarization, interference and diffraction.
CO2: Familiarize with the basics of crystals and their structures.
CO3: Explain fundamentals of quantum mechanics and apply it to one dimensional motion of particles.
CO4: Summarize various types of polarization of dielectrics and classify the magnetic materials.
CO5: Explain the basic concepts of Quantum Mechanics and the band theory of solids.
CO6: Identify the type of semiconductor using Hall effect.

SYLLABUS:

UNIT- I

Wave Optics **12Hours**

Interference: Introduction - Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) & applications - Colours in thin films- Newton's Rings, Determination of wavelength and refractive index. Diffraction: Introduction - Fresnel and Fraunhofer diffractions - Fraunhofer diffraction due to single slit, double slit & N-slits (Qualitative) – Diffraction Grating - Dispersive power and resolving power of Grating (Qualitative). Polarization: Introduction -Types of polarization - Polarization by reflection, refraction and Double refraction - Nicol's Prism -Half wave and Quarter wave plates.

UNIT- II

Crystallography and X-ray diffraction **11Hours**

Crystallography: Space lattice, Basis, Unit Cell and lattice parameters – Bravais Lattices – crystal systems (3D) – coordination number - packing fraction of SC, BCC & FCC - Miller indices – separation between successive (hkl) planes.ray diffraction: Bragg's law - X-ray Diffractometer – crystal structure determination byLaue's and

powder methods

UNIT- III

Dielectric and Magnetic Materials **13Hours**

Dielectric Materials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility, Dielectric constant and Displacement Vector – Relation between the electric vectors - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field - Clausius-Mossotti equation - complex dielectric constant – Frequency dependence of polarization – dielectric loss Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization- Magnetic susceptibility and permeability – Atomic origin of magnetism - Classification of magnetic materials: Dia, para, Ferro, anti-ferro & Ferri magnetic materials - Domain concept for Ferromagnetism & Domain walls (Qualitative) - Hysteresis - soft and hard magnetic materials and its Applications.

UNIT- IV

Quantum Mechanics and Free electron Theory **10Hours**

Quantum Mechanics: Dual nature of matter – Heisenberg's Uncertainty Principle – Significance and properties of wave function – Schrodinger's time independent and dependent wave equations– Particle in a one-dimensional infinite potential well.
Free Electron Theory: Classical free electron theory (Qualitative with discussion of merits and demerits) – Fermi-Dirac distribution - Density of states - Fermi energy- Quantum free electron theory – electrical conductivity based on quantum free electron theory.

UNIT- V

Semiconductors **9Hours**

Semiconductors: Formation of energy bands – classification of crystalline solids - Intrinsic semiconductors: Density of charge carriers – Electrical conductivity – Fermi level – Extrinsic semiconductors: density of charge carriers – dependence of Fermi energy on carrier concentration and temperature - Drift and diffusion currents – Einstein's equation – Hall effect and its applications.

TEXTBOOKS:

1. A Text book of Engineering Physics, M. N. Avadhanulu, P.G.Kshirsagar & TVS Arun Murthy, S. Chand Publications, 11th Edition 2019.
2. Engineering Physics - Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018
3. Engineering Physics – P.K.Palani Samy

REFERENCE BOOKS:

1. Engineering Physics - B.K. Pandey and S. Chaturvedi, Cengage Learning 2021.
2. Engineering Physics" - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press.2010
3. Engineering Physics - M.R. Srinivasan, New Age international publishers (2009).

Web Resources: https://www.loc.gov/rr/scitech/selected-internet/physics.html

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I B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE:	**LINEAR ALGEBRA & CALCULUS**						

COURSE OBJECTIVES:

To equip the students with standard concepts and tools at an intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real-world problems and their applications.

COURSE OUTCOMES:

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

CO1: Develop and use of matrix algebra techniques that are needed by engineers for practical applications.
CO2: Utilize mean value theorems to real life problems.
CO3: Familiarize with functions of several variables which is useful in optimization.
CO4: Learn important tools of calculus in higher dimensions.
CO5: Familiarize with double and triple integrals of functions of several variables in two dimensions using Cartesian and polar coordinates and in three dimensions using cylindrical and spherical coordinates.

SYLLABUS:

UNIT-I

Matrices

Rank of a matrix by echelon form, normal form. Cauchy–Binet formulae (without proof). Inverse of Non- singular matrices by Gauss-Jordan method, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Jacobi and Gauss Seidel Iteration Methods.

UNIT-II

Eigenvalues, Eigenvectors and Orthogonal Transformation

Eigenvalues, Eigenvectors and their properties, Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT-III

Calculus

Mean Value Theorems: Rolle's Theorem, Lagrange's mean value theorem with their geometrical interpretation, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof), Problems and applications on the above theorems.

UNIT-IV

Partial differentiation and Applications (Multi variable calculus) Functions of several variables: Continuity and Differentiability, Partial derivatives, total derivatives, chain rule, Directional derivative, Taylor's and Maclaurin's series expansion of functions of two variables. Jacobians, Functional dependence, maxima and minima of functions of two variables,

method of Lagrange multipliers.

UNIT-V

Multiple Integrals (Multi variable Calculus)

Double integrals, triple integrals, change of order of integration, change of variables to polar, cylindrical and spherical coordinates. Finding areas (by double integrals) and volumes (by double integrals and triple integrals).

TEXTBOOKS:

1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 2017, 44th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10th Edition.

REFERENCE BOOKS:

1. Thomas Calculus, George B. Thomas, Maurice D. Weir and Joel Hass, Pearson Publishers, 2018, 14th Edition.
2. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Alpha Science International Ltd., 2021 5th Edition(9th reprint).
3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018, 5th Edition.
4. Advanced Engineering Mathematics, Micheael Greenberg, , Pearson publishers, 9th edition
5. Higher Engineering Mathematics, H. K Das, Er. Rajnish Verma, S. Chand Publications, 2014, Third Edition (Reprint 2021)

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I SEMESTER				MARKS	MARKS	MARKS	
	3	-	-	30	70	100	3
SUBCODE:	**INTRODUCTION TO PROGRAMMING**						

COURSE OBJECTIVES:

- To introduce students to the fundamentals of computer programming.
- To provide hands-on experience with coding and debugging.
- To foster logical thinking and problem-solving skills using programming.
- To familiarize students with programming concepts such as data types, control structures, functions, and arrays.
- To encourage collaborative learning and teamwork in coding projects.

COURSE OUTCOMES:

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

CO1: Understand basics of computers, the concept of algorithm and algorithmic thinking.
CO2: Analyze a problem and develop an algorithm to solve it.
CO3: Implement various algorithms using the C programming language.
CO4: Understand more advanced features of C language.
CO5: Develop problem-solving skills and the ability to debug and optimize the code.

SYLLABUS:

UNIT-I
Introduction to Programming and Problem Solving
History of Computers, Basic organization of a computer: ALU, input-output units, memory, program counter, Introduction to Programming Languages, Basics of a Computer Program- Algorithms, flowcharts (Using Dia Tool), pseudo code. Introduction to Compilation and Execution, Primitive Data Types, Variables, and Constants, Basic Input and Output, Operations, Type Conversion, and Casting.

Problem solving techniques: Algorithmic approach, characteristics of algorithm, Problem solving strategies: Top-down approach, Bottom-up approach, Time and space complexities of algorithms.

UNIT-II
Control Structures
Simple sequential programs Conditional Statements (if, if-else, switch), Loops (for, while, do-while) Break and Continue.

UNIT-III
Arrays and Strings
Arrays indexing, memory model, programs with array of integers, two dimensional arrays, Introduction to Strings.

UNIT-IV

Pointers & User Defined Data types

Pointers, dereferencing and address operators, pointer and address arithmetic, array manipulation using pointers, User-defined data types-Structures and Unions.

UNIT-V

Functions & File Handling

Introduction to Functions, Function Declaration and Definition, Function call Return Types and Arguments, modifying parameters inside functions using pointers, arrays as parameters. Scope and Lifetime of Variables, Basics of File Handling

Note: The syllabus is designed with C Language as the fundamental language of implementation**.**

TEXTBOOKS:

1. "The C Programming Language", Brian W. Kernighan and Dennis M. Ritchie, Prentice- Hall, 1988
2. Schaum's Outline of Programming with C, Byron S Gottfried, McGraw-Hill Education, 1996

REFERENCE BOOKS:

1. Computing fundamentals and C Programming, Balagurusamy, E, McGraw-Hill Education, 2008.
2. Programming in C, Rema Theraja, Oxford, 2016, 2nd edition
3. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad,
4. CENGAGE, 3rd edition

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I B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	-	-	2	30	70	100	1
SUBCODE:	**IT WORKSHOP**						

COURSE OBJECTIVES:

- To introduce the internal part sofa computer, peripherals, I/O ports, connecting cables
- TodemonstrateconfiguringthesystemasDualbootbothWindowsandotherOperatingSystemsViz. Linux, BOSS
- To teach basic command line inter face command son Linux.
- To teach the usage of Internet for productivity and self-paced life-long learning
- To introduce Compression, Multimedia and Antivirus tools and Office Tools such as Word processors, Spreadsheets and Presentation tools.

COURSEOUTCOMES:

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

CO1:Demonstrate Hardware troubleshooting
CO2: Identify Hardware components and inter dependencies.
CO3:Describe usage of web browsers, email, news groups and discussion forums.
CO4: Design word documents and create presentations using different styles.
CO5:Prepare spreadsheets with calculations

SYLLABUS:

PC Hardware & Software Installation

Task-1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task-2: Every student should disassemble and assemble the PC back to working condition.Labinstructorsshouldverifytheworkandfollowitupwitha Viva.Alsostudents needtogothroughthe video which shows the process of assembling a PC. A video would be given as part of the course content.

Task 3: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Task 4: Every student should install Linux on the computer. This computer should havewindowsinstalled.Thesystemshouldbeconfiguredasdualboot(VMWare) withbothWindowsandLinux.Labinstructorsshouldverifytheinstallationandfollowitup withaViva

Task5: EverystudentshouldinstallBOSSonthecomputer.Thesystemshouldbeconfigur edas dual boot (VMW are) with both Windows and BOSS. Lab instructors should verify the installation and follow it up with a Viva

Internet & World Wide Web

Task1: Orientation & Connectivity Boot Camp: Students should get connected to their Local area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Task-2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and popup blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Task3: Search Engines & Netiquette: Students should know what search engine s are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsers to block pop ups, block active downloads to avoid viruses and/or worms.

LaTeX and WORD

Task 1 – Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft(MS)officeorequivalent(FOSS)toolword:ImportanceofLaTeXandMSofficeorequivalent(FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using LaTeX and word–Accessing, over view of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 2: Using LaTeX and Word to create a project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

Task 3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table,BulletsandNumbering,ChangingTextDirection,Cellalignment,Footnote,Hyperlink,Symbols,SpellCheck, Track Changes.

Task4: CreatingaNewsletter:Featurestobecovered:-TableofContent,Newspapercolumns,Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

EXCEL

Excel Orientation: The mentor needs to tell the importance of MS office or Equivalent (FOSS)tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel–Accessing, over view of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

Task 2: Calculating GPA -. Features to be covered:- Cell Referencing, Formulae in excel –average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function,

LOOKUP/VLOOKUP

Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

POWERPOINT

Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, WordArt, Formatting Text, Bullets and Numbering ,Auto Shapes, Lines and Arrows in PowerPoint.

Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting–Background, textures, Design Templates, Hidden slides.

AITOOLS –Chat GPT

Task1: Prompt Engineering: Experiment with different types of prompt stoseehowthemodelresponds.Tryaskingquestions,startingconversations,orevenprovidingin completesentencestoseehow the model completes them.

- Ex:Prompt:"YouareaknowledgeableAI.Pleaseanswerthefollowingquestion: Whatisthecapital of France?"

Task2: Creative writing: Use the model as a writing assistant. Provide the beginning of a story or a description of a scene, and let the model generate the rest of the content. This can be a fun way to brainstorm creative ideas

- Ex: Prompt: "In a world where gravity suddenly stopped working, people started floating upwards. Write as story about how society adapted to this new reality."

Task 3: Language Translation: Experiment with translation tasks by providing a sentence in one language and asking the model to translate it in to another language .Compare the output to see how accurate and fluent the translations are.

- Ex: Prompt: "Translate the following English sentence to French: 'Hello, how are you doing today?'"

REFERENCEBOOKS:

1. Comdex Information Technology course tool kit, Vikas Gupta, WILEY Dreamtech,2003
2. TheCompleteComputerupgradeandrepairbook,CherylASchmidt,WILEYDreamtech,2013,3rd edition
3. IntroductiontoInformationTechnology,ITLEducationSolutionslimited,PearsonEducation,2012, 2nd edition
4. PC Hardware-A Handbook, Kate J.Chase, PHI(Microsoft)
5. LaTeX Companion, Leslie Lamport, PHI/Pearson.
6. IT Essentials PC Hardware and Software Companion Guide, David Anfinson and Ken Quamme.– CISCO Press, Pearson Education,3rd edition
7. ITEssentialsPCHardwareandSoftwareLabsandStudyGuide,PatrickRegan– CISCOPress,Pearson Education,3rd edition

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I B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	-	-	2	30	70	100	1
SUBCODE:	**ENGINEERING PHYSICS LAB**						

COURSE OBJECTIVES:

To study the concepts of optical phenomenon like interference, diffraction etc., recognize the importance of energy gap in the study of conductivity and Hall effect in semiconductors and study the parameters and applications of dielectric and magnetic materials by conducting experiments.

COURSE OUTCOMES:

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

CO1: Operate optical instruments like travelling microscope and spectrometer.
CO2: Estimate the wavelengths of different colors using diffraction grating.
CO3: Plot the intensity of the magnetic field of circular coil carrying current with distance.
CO4: Evaluate dielectric constant and magnetic susceptibility for dielectric and Magnetic materials respectively.
CO5: Calculate the band gap of a given semiconductor.
CO6: Identify the type of semiconductor using Hall effect.

SYLLABUS:

List of Experiments:

1. Determination of radius of curvature of a given Plano-convex lens by Newton's rings.
2. Determination of wavelengths of different spectral lines in mercury spectrum using diffraction grating in normal incidence configuration.
3. Verification of Brewster's law
4. Determination of dielectric constant using charging and discharging method.
5. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
6. Determination of wavelength of Laser light using diffraction grating.
7. Estimation of Planck's constant using photoelectric effect.
8. Determination of the resistivity of semiconductors by four probe methods.

9. Determination of energy gap of a semiconductor using p-n junction diode.
10. Magnetic field along the axis of a current carrying circular coil by Stewart Gee'sMethod.
11. Determination of Hall voltage and Hall coefficient of a given semiconductor using Halleffect.
12. Determination of temperature coefficients of a thermistor.
13. Determination of acceleration due to gravity and radius of Gyration by using a compound pendulum.
14. Determination of magnetic susceptibility by Kundt's tube method.
15. Determination of rigidity modulus of the material of the given wire using Torsionalpendulum.
16. Sonometer: Verification of laws of stretched string.
17. Determination of young's modulus for the given material of wooden scaleby non-uniform bending (or double cantilever) method.
18. Determination of Frequency of electrically maintained tuning fork byMelde's experiment.

Note: Any TEN of the listed experiments are to be conducted. Out of which any TWO experiments may be conducted in virtual mode.

REFERENCES:

- A Textbook of Practical Physics - S. Balasubramanian, M.N. Srinivasan, S. ChandPublishers, 2017.

Web Resources

- www.vlab.co.in
  https://phet.colorado.edu/en/simulations/filter?subjects=physics&type=html,prototype

I B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	-	-	3	30	70	100	1.5
SUBCODE:	**COMPUTER PROGRAMMING LAB**						

COURSE OBJECTIVES:

The course aims to give students hands – on experience and train them on the concepts of the C- programming language.

COURSE OUTCOMES:

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

CO1: Read, understand, and trace the execution of programs written in C language.
CO2: Select the right control structure for solving the problem.
CO3: Develop C programs which utilize memory efficiently using programming Constructs like pointers.
CO4: Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.

SYLLABUS:

UNIT-I

WEEK 1
Objective: Getting familiar with the programming environment on the computer and writing the first program.

Suggested Experiments/Activities:
Tutorial 1: Problem-solving using Computers.
Lab1: Familiarization with programming environment
i) Basic Linux environment and its editors like Vi, Vim & Emacs etc.
ii) Exposure to Turbo C, gcc
iii) Writing simple programs using printf (), scanf()

WEEK 2
Objective: Getting familiar with how to formally describe a solution to a problem in a series of finite steps both using textual notation and graphic notation.
Suggested Experiments /Activities:
Tutorial 2: Problem-solving using Algorithms and Flow charts.
Lab 1: Converting algorithms/flow charts into C Source code.
Developing the algorithms/flowcharts for the following sample programs
i) Sum and average of 3 numbers
ii) Conversion of Fahrenheit to Celsius and vice versa
iii) Simple interest calculation

WEEK 3
Objective: Learn how to define variables with the desired data-type, initialize

them with appropriate values and how arithmetic operators can be used with variables and constants.

Suggested Experiments/Activities:
Tutorial 3: Variable types and type conversions:

Lab 3: Simple computational problems using arithmetic expressions.

i) Finding the square root of a given number
ii) Finding compound interest
iii) Area of a triangle using heron's formulae
iv) Distance travelled by an object

UNIT-II

WEEK 4
Objective: Explore the full scope of expressions, type-compatibility of variables & constants and operators used in the expression and how operator precedence works.

Suggested Experiments/Activities:
Tutorial4: Operators and the precedence and as associativity:
Lab4: Simple computational problems using the operator' precedence and associativity

i) Evaluate the following expressions.
    a. A+B*C+(D*E) + F*G
    b. A/B*C-B+A*D/3
    c. A+++B---A
    d. J= (i++) + (++i)
ii) Find the maximum of three numbers using conditional operator
iii) Take marks of 5 subjects in integers, and find the total, average in float

WEEK 5
Objective: Explore the full scope of different variants of "if construct" namely if-else, null- else, if-else if*-else, switch and nested-if including in what scenario each one of them can be used and how to use them. Explore all relational and logical operators while writing conditionals for "if construct".

Suggested Experiments/Activities:
Tutorial 5: Branching and logical expressions:
Lab 5: Problems involving if-then-else structures.

i) Write a C program to find the max and min of four numbers using if-else.
ii) Write a C program to generate electricity bill.
iii) Find the roots of the quadratic equation.
iv) Write a C program to simulate a calculator using switch case.
v) Write a C program to find the given year is a leap year or not.

WEEK 6
Objective: Explore the full scope of iterative constructs namely while loop, do-while loop and for loop in addition to structured jump constructs like break and continue including when each of these statements is more appropriate to use.

Suggested Experiments/Activities:

Tutorial 6: Loops, while and for loops
Lab 6: Iterative problems e.g., the sum of series

i) Find the factorial of given number using any loop.
ii) Find the given number is a prime or not.
iii) Compute sine and cos series
iv) Checking a number palindrome
v) Construct a pyramid of numbers.

UNIT-III

WEEK 7:
Objective: Explore the full scope of Arrays construct namely defining and initializing 1-D and 2-D and more generically n-D arrays and referencing individual array elements from the defined array. Using integer 1-D arrays, explore search solution linear search.

Suggested Experiments/Activities:
Tutorial 7: 1 D Arrays: searching.
Lab 7:1D Array manipulation, linear search

i) Find the min and max of a 1-D integer array.
ii) Perform linear search on1D array.
iii) The reverse of a 1D integer array
iv) Find 2's complement of the given binary number.
v) Eliminate duplicate elements in an array.

WEEK 8:
Objective: Explore the difference between other arrays and character arrays that can be used as Strings by using null character and get comfortable with string by doing experiments that will reverse a string and concatenate two strings. Explore sorting solution bubble sort using integer arrays.

Suggested Experiments/Activities:
Tutorial 8: 2 D arrays, sorting and Strings.
Lab 8: Matrix problems, String operations, Bubble sort

i) Addition of two matrices
ii) Multiplication two matrices
iii) Sort array elements using bubble sort
iv) Concatenate two strings without built-in functions
v) Reverse a string using built-in and without built-in string functions

UNIT- IV

WEEK 9:
Objective: Explore pointers to manage a dynamic array of integers, including memory allocation & value initialization, resizing changing and reordering the contents of an array and memory de-allocation using malloc (), calloc (), realloc () and free () functions. Gain experience processing command-line arguments received by C

Suggested Experiments/Activities:
Tutorial 9: Pointers, structures and dynamic memory allocation

Lab 9: Pointers and structures, memory dereference.

i) Write a C program to find the sum of a 1D array using mal loc()
ii) Write a C program to find the total, average of n students using structures
iii) Enter n students data using cal loc () and display failed students list
iv) Read student name and marks from the command line and display the student details along with the total.
v) Write a C program to implement real loc()

WEEK 10:

Objective: Experiment with C Structures, Unions, bit fields and self-referential structures (Singly linked lists) and nested structures

Suggested Experiments/Activities:

Tutorial 10: Bit fields, Self-Referential Structures, Linked lists

Lab10 : Bit fields, linked lists

Read and print a date using dd/mm/yyyy format using bit-fields and differentiate the same without using bit- fields

i) Create and display a singly linked list using self-referential structure.
ii) Demonstrate the differences between structures and unions using a C program.
iii) Write a C program to shift/rotate using bit fields.
iv) Write a C program to copy one structure variable to another structure of the same type.

UNIT-V

WEEK 11:

Objective: Explore the Functions, sub-routines, scope and extent of variables, doing some experiments by parameter passing using call by value. Basic methods of numerical integration

Suggested Experiments/Activities:

Tutorial 11: Functions, call by value, scope and extent,

Lab 11: Simple functions using call by value, solving differential equations using Euler theorem.

i) Write a C function to calculate NCR value.
ii) Write a C function to find the length of a string.
iii) Write a C function to transpose of a matrix.
iv) Write a C function to demonstrate numerical integration of differential equations using Euler's method

WEEK 12:

Objective: Explore how recursive solutions can be programmed by writing recursive functions that can be invoked from the main by programming at-least five distinct problems that have naturally recursive solutions.

Suggested Experiments/Activities:

Tutorial 12: Recursion, the structure of recursive calls

Lab 12: Recursive functions

i) Write a recursive function to generate Fibonacci series.
ii) Write a recursive function to find the lcm of two numbers.
iii) Write a recursive function to find the factorial of a number.
iv) Write a C Program to implement Ackermann function using recursion.

v) Write a recursive function to find the sum of series.

WEEK 13:
Objective: Explore the basic difference between normal and pointer variables, Arithmetic operations using pointers and passing variables to functions using pointers

Suggested Experiments/Activities:

Tutorial 13: Call by reference, dangling pointers
Lab 13: Simple functions using Call by reference, Dangling pointers.

i) Write a C program to swap two numbers using call by reference.
ii) Demonstrate Dangling pointer problem using a C program.
iii) Write a C program to copy one string into another using pointer.
iv) Write a C program to find no of lowercase, uppercase, digits and other characters using pointers.

WEEK14:
Objective: To understand data files and file handling with various file I/O functions. Explore the differences between text and binary files.

Suggested Experiments/Activities:
Tutorial 14: File handling
Lab 14: File operations

i) Write a C program to write and read text into a file.
ii) Write a C program to write and read text into a binary file using fread() andf write()
iii) Copy the contents of one file to another file.
iv) Write a C program to merge two files into the third file using command-line arguments.
v) Find no. of lines, words and characters in a file
vi) Write a C program to print last n characters of a given file.

TEXTBOOKS:

1. Ajay Mittal, Programming in C: A practical approach, Pearson.
2. Byron Gottfried, Schaum ' s Outline of Programming with C, McGraw Hill

REFERENCE BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice- Hall of India
2. C Programming, A Problem-Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF CSE

I B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	-	-	1	30	70	100	0.5
SUBCODE:	**NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVICE**						

COURSE OBJECTIVES:

The objective of introducing this course is to impart discipline, character, fraternity, teamwork, social consciousness among the students and engaging them in selfless service.

COURSE OUTCOMES:

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

CO1: Understand the importance of discipline, character and service motto.
CO2: Solve some societal issues by applying acquired knowledge, facts, and techniques.
CO3: Explore human relationships by analyzing social problems.
CO4: Determine to extend their help for the fellow beings and downtrodden people.
CO5: Develop leadership skills and civic responsibilities.

SYLLABUS:

UNIT-I

Orientation

General Orientation on NSS/NCC/ Scouts & Guides/Community Service activities, careerguidance.

Activities:

i) Conducting –ice breaking sessions-expectations from the course-knowing personaltalents and skills
ii) Conducting orientations programs for the students –future plans-activities- releasingroad map etc.
iii) Displaying success stories-motivational biopics- award winning movies on societal issues etc.
iv) Conducting talent show in singing patriotic songs-paintings- any other contribution.

UNIT-II

Nature &Care

Activities:

i) Best out of waste competition.

ii) Poster and signs making competition to spread environmental awareness.
iii) Recycling and environmental pollution article writing competition.
iv) Organising Zero-waste day.
v) Digital Environmental awareness activity via various social media platforms.

vi) Virtual demonstration of different eco-friendly approaches for sustainable living.
vii) Write a summary on any book related to environmental issues.

UNIT-III

Community Service Activity:

i) Conducting One Day Special Camp in a village contacting village-area leaders-Survey in the village, identification of problems- helping them to solve via media-authorities-experts-etc.

ii) Conducting awareness programs on Health-related issues such as General Health, Mental health, Spiritual Health, HIV/AIDS,
iii) Conducting consumer Awareness. Explaining various legal provisions etc.
iv) Women Empowerment Programmes- Sexual Abuse, Adolescent Health and Population Education.
v) Any other programmes in collaboration with local charities, NGOs etc.

REFERENCE BOOKS:

1. Nirmalya Kumar Sinha & Surajit Majumder, A Text Book of National Service Scheme
Vol;.I, Vidya Kutir Publication, 2021 (ISBN 978-81-952368-8-6)
2. Red Book - National Cadet Corps – Standing Instructions Vol I & II, Directorate General of NCC, Ministry of Defence, New Delhi
3. Davis M. L. and Cornwell D. A., "Introduction to Environmental Engineering", McGraw Hill, New York 4/e 2008
4. Masters G. M., Joseph K. and Nagendran R. "Introduction to Environmental Engineering and Science", Pearson Education, New Delhi. 2/e 2007
5. Ram Ahuja. Social Problems in India, Rawat Publications, New Delhi.

General Guidelines:

1. Institutes must assign slots in the Timetable for the activities.
2. Institutes are required to provide instructor to mentor the students.

Evaluation Guidelines:

- Evaluated for a total of 100 marks.
- A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totaling to 90 marks.
- A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF CSE

I B.TECH SEMISTER-II

S.No.	Subject Code	SUBJECT	Cat.Code	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	L	T	P	CREDITS
1		Communicative English	BS&H	30	70	100	2	0	0	2
2		Chemistry	BS & H	30	70	100	3	0	0	3
3		Differential Equations & Vector Calculus	ES	30	70	100	3	0	0	3
4		Basic Civil & Mechanical Engineering	ES	30	70	100	3	0	0	3
5		Data structures	PC	30	70	100	3	0	0	3
6		Communicative English Lab	BS&H	30	70	100	0	0	2	1
7		Chemistry Lab	BS&H	30	70	100	0	0	2	1
8		Engineering Workshop	ES	30	70	100	0	0	3	1.5
9		Data structures Lab	PC	30	70	100	0	0	3	1.5
10		Health and wellness, Yoga and Sports					-	-	1	0.5
Total				**240**	**560**	**800**	**14**	**0**	**11**	**19.5**

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF CSE

I B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	2	-	-	30	70	100	2
SUBCODE:	**COMMUNICATIVE ENGLISH**						

COURSE OBJECTIVES:

The main objective of introducing this course, *Communicative English,* is to facilitate effective listening, Reading, Speaking and Writing skills among the students. It enhances the same in their comprehending abilities, oral presentations, reporting useful information and providing knowledge of grammatical structures and vocabulary. This course helps the students to make them effective in speaking and writing skills and to make them industry ready.

COURSE OUTCOMES:

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

CO1: Understand the context, topic, and pieces of specific information from social or Transactional dialogues.
CO2: Apply grammatical structures to formulate sentences and correct word forms.
CO3: Analyze discourse markers to speak clearly on a specific topic in informal discussions.
CO4: Evaluate reading / listening texts and to write summaries based on global comprehension of these texts.
CO5: Create a coherent paragraph, essay, and resume.

SYLLABUS:

UNIT-I

Lesson: HUMAN VALUES: Gift of Magi **(Short Story)**

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.
Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.
Reading: Skimming to get the main idea of a text; scanning to look for specific pieces of information.
Writing: Mechanics of Writing-Capitalization, Spellings, Punctuation-Parts of Sentences.
Grammar: Parts of Speech, Basic Sentence Structures-forming questions
Vocabulary: Synonyms, Antonyms, Affixes (Prefixes/Suffixes), Root words.

UNIT-II

Lesson: NATURE: The Brook by Alfred Tennyson (Poem)

Listening: Answering a series of questions about main ideas and supporting ideas after listening to audio texts.
Speaking: Discussion in pairs/small groups on specific topics followed by short structure talks.

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.
Writing: Structure of a paragraph - Paragraph writing (specific topics)
Grammar: Cohesive devices - linkers, use of articles and zero article; prepositions.
Vocabulary: Homonyms, Homophones, Homographs.

UNIT-III

Lesson: BIOGRAPHY: Elon Musk

Listening: Listening for global comprehension and summarizing what is listened to.
Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed
Reading: Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension.
Writing: Summarizing, Note-making, paraphrasing
Grammar: Verbs - tenses; subject-verb agreement; Compound words, Collocations
Vocabulary: Compound words, Collocations

UNIT-IV

Lesson: INSPIRATION: The Toys of Peace by Saki

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.
Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.
Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data.
Writing: Letter Writing: Official Letters, Resumes
Grammar: Reporting verbs, Direct & Indirect speech, Active & Passive Voice
Vocabulary: Words often confused, Jargons

UNIT-V

Lesson: MOTIVATION**:** The Power of Intrapersonal Communication (An Essay)

Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension.
Speaking: Formal oral presentations on topics from academic contexts
Reading: Reading comprehension.
Writing: Writing structured essays on specific topics.
Grammar: Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)
Vocabulary: Technical Jargons

TEXTBOOKS:

1. Pathfinder: Communicative English for Undergraduate Students, 1st Edition, Orient Black Swan, 2023 (Units 1,2 & 3)
2. Empowering with Language by Cengage Publications, 2023 (Units 4 & 5)

REFERENCE BOOKS:

1. Dubey, Sham Ji & Co. English for Engineers, Vikas Publishers, 2020
2. Bailey, Stephen. Academic writing: A Handbook for International Students. Routledge, 2014.
3. Murphy, Raymond. English Grammar in Use, Fourth Edition, Cambridge University Press, 2019.
4. Lewis, Norman. Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary. Anchor, 2014.

Web Resources:

GRAMMAR:

1. www.bbc.co.uk/learningenglish
2. https://dictionary.cambridge.org/grammar/british-grammar/
3. www.eslpod.com/index.html
4. https://www.learngrammar.net/
5. https://english4today.com/english-grammar-online-with-quizzes/
6. https://www.talkenglish.com/grammar/grammar.aspx

VOCABULARY

1. https://www.youtube.com/c/DailyVideoVocabulary/videos
2. https://www.youtube.com/channel/UC4cmBAit8i_NJZE8qK8sfpA

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF CSE

I B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE:	**CHEMISTRY**						

COURSE OBJECTIVES:

- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry andpolymers
- To introduce instrumental methods, molecular machines and switches.

COURSE OUTCOMES:

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

CO1: Compare the materials of construction for battery and electrochemical sensors.
CO2: Explain the preparation, properties, and applications of thermoplastics & thermosetting &elastomers conducting polymers.
CO3: Explain the principles of spectrometry, slc in separation of solid and liquid mixtures.
CO4: Apply the principle of Band diagrams in the application of conductors and Semi conductors.
CO5: Summarize the concepts of Instrumental methods.

SYLLABUS:

UNIT- I

Structure and Bonding Models:

Fundamentals of Quantum mechanics, Schrodinger Wave equation, significance of Ψ and Ψ^2, particle in one dimensional box, molecular orbital theory – bonding in homo- and heteronucleardiatomic molecules – energy level diagrams of O2 and CO, etc. π-molecular orbitals of butadiene and benzene, calculation of bond order.

UNIT- II

Modern Engineering materials

Semiconductors – Introduction, basic concept, application Super conductors-
Introduction basic concept, applications.
Super capacitors: Introduction, Basic Concept-Classification – Applications.
Nano materials: Introduction, classification, properties and applications of Fullerenes, carbon nano tubes and Graphines nanoparticles.

UNIT- III

Electrochemistry and Applications

Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, potentiometry- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations). Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples.Primary cells – Zinc-air battery, Secondary cells –lithium-ion batteries- working of the batteries including cell reactions; Fuel cells, hydrogen-oxygenfuel cell– working of the cells. Polymer Electrolyte Membrane Fuel cells (PEMFC).

UNIT- IV

Polymer Chemistry

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, with specific examples and mechanisms of polymer formation.

Plastics –Thermo and Thermosetting plastics, Preparation, properties and applications of – PVC, Teflon, Bakelite, Nylon-6,6, carbon fibres.

Elastomers–Buna-S, Buna-N–preparation, properties and applications.
Conducting polymers – polyacetylene, polyaniline, – mechanism of conduction and applications. Bio-Degradable polymers - Poly Glycolic Acid (PGA), Polyl Lactic Acid (PLA).

UNIT- V

Instrumental Methods and Applications

Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. UV-Visible Spectroscopy, electronic transition, Instrumentation, IR spectros copies, fundamental modes and selection rules, Instrumentation. Chromatography-Basic Principle, Classification-HPLC: Principle, Instrumentation and Applications.

TEXTBOOKS:

1. Jain and Jain, Engineering Chemistry, 16/e, Dhanpat Rai, 2013.
2. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e,Oxford University Press, 2010.

REFERENCE BOOKS:

1. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.
2. J.D. Lee, Concise Inorganic Chemistry, 5th Edition, Wiley Publications, Feb.2008
3. Textbook of Polymer Science, Fred W. Billmayer Jr, 3rd Edition

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF CSE

I B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE:	**DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS**						

COURSE OBJECTIVES:

- To enlighten the learners in the concept of differential equations and multivariable calculus.
- To furnish the learners with basic concepts and techniques at plus two level to lead them into advanced level by handling various real-world applications.

COURSE OUTCOMES:

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

CO1: Solve the differential equations related to various engineering fields.
CO2: Identify solution methods for partial differential equations that model physical processes.
CO3: Interpret the physical meaning of different operators such as gradient, curl and divergence.
CO4: Estimate the work done against a field, circulation and flux using vector calculus.

SYLLABUS:

UNIT-I

Differential equations of first order and first degree

Linear differential equations – Bernoulli's equations- Exact equations and equations reducible to exact form. Applications: Newton's Law of cooling – Law of natural growth and decay- Electrical circuits.

UNIT-II

Linear differential equations of higher order (Constant Coefficients)

Definitions, homogenous and non-homogenous, complimentary function, general solution, particular integral, Wronskian, Method of variation of parameters. Simultaneous linear equations, Applications to L-C-R Circuit problems and Simple Harmonic motion.

UNIT-III

Partial Differential Equations

Introduction and formation of Partial Differential Equations by elimination of arbitrary constants and arbitrary functions, solutions of first order linear equations using Lagrange's method. Homogeneous Linear Partial differential equations with constant coefficients.

UNIT-IV

Vector differentiation

Scalar and vector point functions, vector operator Del, Del applies to scalar point functions-Gradient, Directional derivative, del applied to vector point functions-Divergence and Curl, vector identities.

UNIT-V

Vector integration

Line integral-circulation-work done, surface integral-flux, Green's theorem in the plane (without proof), Stoke's theorem (without proof), volume integral, Divergence theorem (without proof) and related problems.

TEXTBOOKS:

1. Higher Engineering Mathematics, B. S. Grewal, Khanna Publishers, 2017, 44th Edition
2. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, 2018, 10th Edition.

REFERENCE BOOKS:

1. Thomas Calculus, George B. Thomas, Maurice D. Weir and Joel Hass, Pearson Publishers, 2018, 14th Edition.
2. Advanced Engineering Mathematics, Dennis G. Zill and Warren S. Wright, Jones and Bartlett, 2018.
3. Advanced Modern Engineering Mathematics, Glyn James, Pearson publishers, 2018,5th Edition.
4. Advanced Engineering Mathematics, R. K. Jain and S. R. K. Iyengar, Alpha Science International Ltd., 2021 5th Edition (9th reprint).
5. Higher Engineering Mathematics, B. V. Ramana, , McGraw Hill Education, 2017

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF CSE

I B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE:	**DATA STRUCTURES**						

COURSE OBJECTIVES:

- To illustrate various sorting techniques and analyze the order of complexities of algorithms
- To develop algorithms to implement various linked lists operations.
- To demonstrate operations of linear data structures like stacks and queues and their applications
- To demonstrate operations of non-linear data structures, trees and graphs.

COURSEOUTCOMES:

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

CO1: Choose the appropriate data structure and algorithm for a specified application and evaluate algorithms and data structures in terms of Time and Space complexity.
CO2: Analyze and implement operations on linked lists and demonstrate their applications.
CO3: Solve problems using data structures such as stacks and queues and writing programs for these solutions.
CO4: Invent novel solutions to small scale programming challenges involving data structures such as Trees.
CO5: Summarize the operations on Graphs and apply Graph Traversals Techniques and outline Hashing Techniques.

SYLLABUS:

UNIT-I

Introduction to Linear Data Structures:
Definition and importance of linear data structures, Abstract data types (ADTs),Analysis of time and space complexities.
Searching Techniques: Linear & Binary Search.
Sorting Techniques: Bubble sort, Selection sort, Insertion sort.

UNIT-II

Linked Lists:
Operations on Singly linked list, doubly linked lists and circular linked lists, Applications of linked lists.

UNIT-III

Stacks: Introduction, operations on stacks, implementing stacks using arrays and linked lists, Applications of stacks in expression evaluation.
Queues: Introduction, operations on queues, implementing queues using arrays and linked lists.
De-queues: Introduction, Operations on de-queues

UNIT-IV

Trees: Introduction to Trees, **Binary Trees**- Properties, Representation of Binary Treesusing Arrays and Linked List, Binary Tree Traversals.

Binary Search Trees: Basic concepts, BST operations: Search, insertion, deletion and traversals, Height Balanced Trees (AVL).

UNIT-V

Graphs: Basic concepts, representations of graphs, Graph Traversals-Breadth First Search and Depth First Search techniques.

Hashing: Basic concepts, Hashing Functions (Division Method, Multiplication Method), Collision Resolution Techniques- Open Hashing and Closed Hashing

TEXTBOOKS:

1. Data Structures and algorithm analysis in C,Mark AllenWeiss,Pearson,2nd Edition.
2. FundamentalsofdatastructuresinC,EllisHorowitz,SartajSahni,SusanAnderson-Freed,Silicon Press, 2008

REFERENCEBOOKS:

1. AlgorithmsandDataStructures:TheBasicToolboxbyKurtMehlhornandPeterSanders
2. CDataStructuresandAlgorithmsbyAlfredV.Aho,JeffreyD.Ullman,andJohnE. Hopcroft
3. ProblemSolvingwithAlgorithmsandDataStructures"byBradMillerandDavidRanum
4. IntroductiontoAlgorithmsbyThomasH.Cormen,CharlesE.Leiserson,RonaldL.Rivest,and Clifford Stein
5. AlgorithmsinC,Parts15(Bundle):Fundamentals,DataStructures,Sorting,Searching,andGraph Algorithms" by Robert Sedgewick

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF CSE

I B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	-	-	2	30	70	100	1
SUBCODE:	**COMMUNICATIVE ENGLISH LAB**						

COURSE OBJECTIVES:

The main objective of introducing this course, Communicative English Laboratory, is to expose the students to a variety of self-instructional, learner friendly modes of language learning. The students will get trained in basic communication skills and also make them ready to face job interviews.

COURSE OUTCOMES:

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

CO1: Understand the different aspects of the English language proficiency with emphasis on LSRW skills.
CO2: Apply communication skills through various language learning activities.
CO3: Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
CO4: Evaluate and exhibit professionalism in participating in debates and group discussions. CO5: Create effective Course Objectives:

SYLLABUS:

List of Topics:

1. Vowels & Consonants
2. Neutralization/Accent Rules
3. Communication Skills & JAM
4. Role Play or Conversational Practice
5. E-mail Writing
6. Resume Writing, Cover letter, SOP
7. Group Discussions-methods & practice
8. Debates - Methods & Practice
9. PPT Presentations/ Poster Presentation
10. Interviews Skills

Suggested Software:

- Walden Infotech
- Softx Communicative English lab software
- Young India Films

REFERENCE BOOKS:

1. Raman Meenakshi, Sangeeta-Sharma. *Technical Communication*. Oxford Press.2018.
2. Taylor Grant: *English Conversation Practice*, Tata McGraw-Hill Education India, 2016
3. Hewing's, Martin. Cambridge *Academic English* (B2). CUP, 2012.
4. J. Sethi & P.V. Dhamija. *A Course in Phonetics and Spoken English*, (2nd Ed),Kindle, 2013

Web Resources:

Spoken English:

1. www.esl-lab.com
2. www.englishmedialab.com
3. www.englishinteractive.net
4. https://www.britishcouncil.in/english/online
5. http://www.letstalkpodcast.com/
6. https://www.youtube.com/c/mmmEnglish_Emma/featured
7. https://www.youtube.com/c/ArnelsEverydayEnglish/featured
8. https://www.youtube.com/c/engvidAdam/featured
9. https://www.youtube.com/c/EnglishClass101/featured
10. https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists
11. https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw

Voice & Accent:

1. https://www.youtube.com/user/letstalkaccent/videos
2. https://www.youtube.com/c/EngLanguageClub/featured
3. https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc
   https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_

I B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	-	-	2	30	70	100	1
SUBCODE:	**CHEMISTRY LAB**						

COURSE OBJECTIVES:

Verify the fundamental concepts with experiments.

COURSE OUTCOMES:

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

CO1: Determine the cell constant and conductance of solutions.
CO2: Prepare advanced polymer Bakelite materials.
CO3: Measure the strength of an acid present in secondary batteries.
CO4: Analyze the IR spectra of some organic compounds.
CO5: Calculate strength of acid in Pb-Acid battery.

SYLLABUS:

List of Experiments:

1. Measurement of 10Dq by spectrophoto metric method
2. Conduct metric titration of strong acid vs. strong base
3. Conduct metric titration of weak acid vs. strong base
4. Determination of cell constant and conductance of solutions
5. Potentiometry - determination of redox potentials and emfs
6. Determination of Strength of an acid in Pb-Acid battery
7. Preparation of a Bakelite
8. Verify Lambert-Beer's law
9. Wavelength measurement of sample through UV-Visible Spectroscopy
10. Identification of simple organic compounds by IR
11. Preparation of nano materials by precipitation method
12. Estimation of Ferrous Iron by Dichrometry

REFERENCE:

- "Vogel's Quantitative Chemical Analysis 6th Edition 6th Edition" Pearson Publications by J. Mendham, R.C.Denney, J.D.Barnes and B. Sivasankar

I B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	-	-	3	30	70	100	1.5
SUBCODE:	**DATA STRUCTURES LAB**						

COURSE OBJECTIVES:

The course aims to strengthen the ability of the students to identify and apply the suitable data structure for the given real-world problem. It enables them to gain knowledge in practical applications of data structures.

COURSE OUTCOMES:

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

CO1: Explain the role of linear data structures in organizing and accessing data efficiently in algorithms.
CO2: Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.
CO3: Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.
CO4: Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues and apply them appropriately to solve data management challenges.
CO5: Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.

SYLLABUS:

List of Experiments:

Exercise 1: Array Manipulation

i) Write a program to reverse an array.
ii) C Programs to implement the Searching Techniques – Linear & Binary Search
iii) C Programs to implement Sorting Techniques – Bubble, Selection and Insertion Sort

Exercise 2: Linked List Implementation

i) Implement a singly linked list and perform insertion and deletion operations.
ii) Develop a program to reverse a linked list iteratively and recursively.
iii) Solve problems involving linked list traversal and manipulation.

Exercise 3: Linked List Applications

i) Create a program to detect and remove duplicates from a linked list.
ii) Implement a linked list to represent polynomials and perform addition.
iii) Implement a double-ended queue (deque) with essential operations.

Exercise 4: Double Linked List Implementation

i) Implement a doubly linked list and perform various operations to understand its properties and applications.
ii) Implement a circular linked list and perform insertion, deletion, and traversal.

Exercise 5: Stack Operations

i) Implement a stack using arrays and linked lists.
ii) Write a program to evaluate a postfix expression using a stack.
iii) Implement a program to check for balanced parentheses using a stack.

Exercise 6: Queue Operations

i) Implement a queue using arrays and linked lists.
ii) Develop a program to simulate a simple printer queue system.
iii) Solve problems involving circular queues.

Exercise 7: Stack and Queue Applications

i) Use a stack to evaluate an infix expression and convert it to postfix.
ii) Create a program to determine whether a given string is a palindrome or not.
iii) Implement a stack or queue to perform comparison and check for symmetry.

Exercise 8: Binary Search Tree

i) Implementing a BST using Linked List.
ii) Traversing of BST.

Exercise 9: Hashing

i) Implement a hash table with collision resolution techniques.
ii) Write a program to implement a simple cache using hashing.

TEXTBOOKS:

1. Data Structures and algorithm analysis in C, Mark Allen Weiss, Pearson, 2nd Edition.
2. Fundamentals of data structures in C, Ellis Horowitz, Sartaj Sahni, Susan Anderson- Freed, Silicon Press, 2008

REFERENCE BOOKS:

1. Algorithms and Data Structures: The Basic Toolbox by Kurt Mehlhorn and PeterSanders
2. C Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman, and John E.Hopcroft
3. Problem Solving with Algorithms and Data Structures" by Brad Miller and David Ranum
4. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L.Rivest, and Clifford Stein
5. Algorithms in C, Parts 1-5 (Bundle): Fundamentals, Data Structures, Sorting, Searching, and Graph Algorithms by Robert Sedgewick.

I B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	-	-	1	30	70	100	0.5
SUBCODE:	**HEALTH AND WELLNESS, YOGA AND SPORTS FOR IB.TECH I SEMESTER**						

COURSE OBJECTIVES:

The main objective of introducing this course is to make the students maintain their mental and physical wellness by balancing emotions in their life. It mainly enhances the essential traits required for the development of the personality.

COURSE OUTCOMES:

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

CO1: Understand the importance of yoga and sports for Physical fitness and sound health.
CO2: Demonstrate an understanding of health-related fitness components.
CO3: Compare and contrast various activities that help enhance their health.
CO4: Assess current personal fitness levels.
CO5: Develop Positive Personality

SYLLABUS:

UNIT- I

Concept of health and fitness, Nutrition and Balanced diet, basic concept of immunity Relationship between diet and fitness, Globalization and its impact on health, Body Mass Index(BMI) of all age groups.

Activities:

i) Organizing health awareness programmes in community
ii) Preparation of health profile
iii) Preparation of chart for balance diet for all age groups

UNIT- II

Concept of yoga, need for and importance of yoga, origin and history of yoga in Indian context, classification of yoga, Physiological effects of Asanas-Pranayama and meditation, stress management and yoga, Mental health and yoga practice.

Activities:

Yoga practices – Asana, Kriya, Mudra, Bandha, Dhyana, Surya Namaskar

UNIT- III

Concept of Sports and fitness, importance, fitness components, history of sports, Ancient and Modern Olympics, Asian games and Commonwealth games.

Activities:

i) Participation in one major game and one individual sport viz., Athletics, Volleyball, Basketball, Handball, Football, Badminton, Kabaddi, Kho-kho, Table tennis, Cricket etc. Practicing general and specific warm up, aerobics
ii) Practicing cardio respiratory fitness, treadmill, run test, 9 min walk, skipping and running.

REFERENCE BOOKS:

1. Gordon Edlin, Eric Golanty. Health and Wellness, 14th Edn. Jones & Bartlett Learning,2022
2. T.K.V.Desikachar. The Heart of Yoga: Developing a Personal Practice
3. Archie J.Bahm. Yoga Sutras of Patanjali, Jain Publishing Company, 1993
4. Wiseman, John Lofty, SAS Survival Handbook: The Ultimate Guide to Surviving Anywhere Third Edition William Morrow Paperbacks, 2014
5. The Sports Rules Book/ Human Kinetics with Thomas Hanlon. -- 3rded. Human Kinetics, Inc.2014

General Guidelines:

1. Institutes must assign slots in the Timetable for the activities of Health/Sports/Yoga.
2. Institutes must provide field/facility and offer the minimum of five choices of as many as Games/Sports.
3. Institutes are required to provide sports instructor / yoga teacher to mentor the students.

Evaluation Guidelines:

- Evaluated for a total of 100 marks.
- A student can select 6 activities of his/her choice with a minimum of 01 activity per unit. Each activity shall be evaluated by the concerned teacher for 15 marks, totaling to 90 marks.
- A student shall be evaluated by the concerned teacher for 10 marks by conducting viva voce on the subject.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF CSE-AIML

II B.Tech (CSE-AIML) COURSE STRUCTURE (R23)

1 SEMESTER

S. No	Subject Code	SUBJECT	Cat. Code	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	L	T	P	CREDITS
1		Discrete Mathematics & Graph Theory	BS&H	30	70	100	3	0	0	3
2		Universal human values – understanding harmony andEthical human conduct	BS&H	30	70	100	2	1	0	3
3		Artificial Intelligence	ES	30	70	100	3	0	0	3
4		Advanced Data Structures &Algorithms Analysis	PC	30	70	100	3	0	0	3
5		Object Oriented Programming Through Java	PC	30	70	100	3	0	0	3
6		Advanced Data Structures and Algorithms Analysis Lab	PC	30	70	100	0	0	3	1.5
7		Object Oriented Programming Through JavaLab	PC	30	70	100	0	0	3	1.5
8		Python programming	SEC	30	70	100	0	1	2	2
Total							**16**	**2**	**8**	**20**

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF CSE-AIML

II- SEMESTER

S.No.	Subject Code	SUBJECT	Cat. Code	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	L	T	P	CREDITS
1		Optimization Techniques	MC-1	30	70	100	2	0	0	2
2		Probability & Statistics	ES	30	70	100	3	0	0	3
3		Machine Learning	PC	30	70	100	3	0	0	3
4		Database Management Systems	PC	30	70	100	3	0	0	3
5		Digital Logic & Computer Organization	PC	30	70	100	3	0	0	3
6		Machine Learning Lab	PC	30	70	100	0	0	3	1.5
7		Database Management Systems Lab	PC	30	70	100	0	0	3	1.5
8		Full Stack Development - 1	SEC	30	70	100	0	1	2	2
9		Design Thinking &Innovation	BS&H	30	70	100	1	0	2	2
10		Environmental Science	AC	30	70	100	2	0	0	-
Total							**15**	**1**	**12**	**21**

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF CSE-AIML

II B.TECH SEMISTER-I

S. No	Subject Code	SUBJECT	Cat. Code	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	L	T	P	CREDITS
1		Discrete Mathematics & Graph Theory	BS&H	30	70	100	3	0	0	3
2		Universal human values – understanding harmony andEthical human conduct	BS&H	30	70	100	2	1	0	3
3		Artificial Intelligence	ES	30	70	100	3	0	0	3
4		Advanced Data Structures &Algorithms Analysis	PC	30	70	100	3	0	0	3
5		Object Oriented Programming Through Java	PC	30	70	100	3	0	0	3
6		Advanced Data Structures and Algorithms Analysis Lab	PC	30	70	100	0	0	3	1.5
7		Object Oriented Programming Through JavaLab	PC	30	70	100	0	0	3	1.5
8		Python programming	SEC	30	70	100	0	1	2	2
Total							**16**	**2**	**8**	**20**

II B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE:	**ARTIFICIAL INTELLIGENCE**						

Pre-requisite:

1. Knowledge in Computer Programming.
2. A course on "Mathematical Foundations of Computer Science".
3. Background in linear algebra, data structures and algorithms, and probability.

COURSE OBJECTIVES:

1. The student should be made to study the concepts of Artificial Intelligence.
2. The student should be made to learn the methods of solving problems using ArtificialIntelligence.
3. The student should be made to introduce the concepts of Expert Systems.
4. To understand the applications of AI, namely game playing, theorem proving, andmachine learning.
5. To learn different knowledge representation techniques

COURSE OUTCOMES:

At the end of the course students will be able to

CO1: Apply the characteristics of AI on the real-world problems
CO2: Experiment with the applications of search strategies and problem reductions
CO3: Analyze knowledge representation and symbolic reasoning using different rules
CO4: Apply the mathematical logic concepts on Decision trees, Reinforcement learning
CO5: Make use of the Knowledge about the Expert Systems in solving the complex problems

SYLLABUS:

UNIT-I

Introduction: AI problems, foundation of AI and history of AI intelligent agents: Agents and Environments, the concept of rationality, the nature of environments, structure of agents, problem solving agents, problem formulation.

UNIT-II

Searching- Searching for solutions, uniformed search strategies – Breadth first search, depth first Search. Search with partial information (Heuristic search) Hill climbing, A* ,AO* Algorithms, Problem reduction, Game Playing- Adversial search, Games, mini-max algorithm, optimal decisions in multiplayer games, Problem in Game playing, Alpha-Beta pruning, Evaluation functions.

UNIT-III

Representation of Knowledge: Knowledge representation issues, predicate logic-logic programming, semantic nets- frames and inheritance, constraint propagation, representing knowledge using rules, rules based deduction systems. Reasoning under uncertainty, review of probability, Bayes' probabilistic interferences and dempstershafer theory.

UNIT-IV

Logic concepts: First order logic. Inference in first order logic, propositional vs. first order inference, unification & lifts forward chaining, Backward chaining, Resolution, Learning from observation Inductive learning, Decision trees.

UNIT-V

Expert Systems: Architecture of expert systems, Roles of expert systems – Knowledge Acquisition Meta knowledge Heuristics. Typical expert systems – MYCIN, DART, XCON: Expert systems shells.

TEXTBOOKS:

1. S. Russel and P. Norvig, "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Education.
2. Kevin Night and Elaine Rich, Nair B., "Artificial Intelligence (SIE)", Mc Graw Hill

REFERENCE BOOKS:

1. David Poole, Alan Mack worth, Randy Goebel,"Computational Intelligence: a logicalapproach", Oxford University Press.
2. G. Luger, "Artificial Intelligence: Structures and Strategies for complex problem solving", Fourth Edition, Pearson Education.
3. J. Nilsson, "Artificial Intelligence: A new Synthesis", Elsevier Publishers.
4. Artificial Intelligence, Saroj Kaushik, CENGAGE Learning.

Online Learning Resources:

1. https://ai.google/
2. https://swayam.gov.in/nd1_noc19_me71/preview

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II B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE:	**ADVANCED DATA STRUCTURES & ALGORITHM ANALYSIS**						

COURSE OBJECTIVES:

The main objectives of the course is to

- provide knowledge on advance data structures frequently used in Computer Sciencedomain
- Develop skills in algorithm design techniques popularly used
- Understand the use of various data structures in the algorithm design

COURSE OUTCOMES:

At the end of the Course/Subject, the students will be able to:

CO1: Analyze the time and space complexity and generate AVL Trees and B-Trees
CO2: Analyze the Concept of Heap Trees, Graphs and Divide & Conquer Techniques
CO3: Apply Greedy method and dynamic programming Strategies for solving problems
CO4: Analyze Back tracking & Branch and Bound to determine Algorithms
CO5: Distinguish between P and NP classes of Problems and solve complex problem

SYLLABUS:

UNIT–I

Introduction to Algorithm Analysis, Space and Time Complexity analysis, Asymptotic Notations. AVL Trees – Creation, Insertion, Deletion operations and Applications B-Trees–Creation, Insertion, Deletion operations and Applications

UNIT–II

Heap Trees (Priority Queues)–Min and Max Heaps, Operations and Applications Graphs–Terminology, Representations, Basic Search and Traversals, Connected Components and Bi connected Components, applications Divide and Conquer: The General Method, Quick Sort, Merge Sort, Strassen's matrix multiplication, Convex Hull

UNIT–III

Greedy Method: General Method, Job Sequencing with deadlines, Knapsack Problem, Minimum cost spanning trees, Single Source Shortest Paths Dynamic Programming: General Method, All pairs shortest paths, Optimal Binary Search Trees, 0/1 Knapsack, String Editing, Travelling Sales person problem

UNIT–IV

Back tracking: General Method, 8-Queens Problem, Sum of Subsets problem, Graph Coloring, 0/1 Knapsack Problem Branch and Bound: The General Method, 0/1 Knapsack Problem, Travelling Sales person problem

UNIT–V

NP Hard and NP Complete Problems: Basic Concepts, Cook's theorem (Proof is not required) NP Hard Graph Problems: Clique Decision Problem (CDP), Traveling Salesperson Decision Problem (TSP) NP Hard Scheduling Problems: Job Shop Scheduling

TEXTBOOKS:

1. Fundamentals of Data Structures in C++, Horowitz, Ellis; Sahni, Sartaj; Mehta,Dinesh 2nd Edition Universities Press
2. Computer Algorithms/C++ Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran2nd Edition University Press

REFERENCE BOOKS:

1. Data Structures and program design in C, Robert Kruse, Pearson Education Asia
2. An introduction to Data Structures with applications, Trembley & Sorenson, McGrawHill
3. The Art of Computer Programming, Vol.1: Fundamental Algorithms, Donald E Knuth,Addison-Wesley, 1997.
4. Data Structures using C & C++: Langsam, Augenstein & Tanenbaum, Pearson, 1995
5. Algorithms + Data Structures & Programs:, N.Wirth, PHI
6. Fundamentals of Data Structures in C++: Horowitz Sahni & Mehta, Galgottia Pub.
7. Data structures in Java:, Thomas Standish, Pearson Education Asia

Online Learning Resources:

1. https://www.tutorialspoint.com/advanced_data_structures/index.asp
2. http://peterindia.net/Algorithms.html
3. Abdul Bari, 1. Introduction to Algorithms (youtube.com)

II B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE:	**OBJECT-ORIENTED PROGRAMMING THROUGH JAVA**						

COURSE OBJECTIVES:

The learning objectives of this course are to:

- Identify Java language components and how they work together in applications
- Learn the fundamentals of object-oriented programming in Java, including definingclasses, invoking methods, using class libraries.
- Learn how to extend Java classes with inheritance and dynamic binding and how touse exception handling in Java applications
- Understand how to design applications with threads in Java
- Understand how to use Java APIs for program development

COURSE OUTCOMES:

At the end of the Course/Subject, the students will be able to:

CO1: Realize Java Concepts
CO2: Make use of the OOP's concepts in solving real world problems.
CO3: Apply the concept of Arrays and Implement a solution using Inheritance for a given problem..
CO4: Realize packages and Exception handling concepts
CO5: Design GUI Applications with JAVAFX Scene Builder

SYLLABUS:

UNIT-I

Object Oriented Programming: Basic concepts, Principles, Program Structure in Java: Introduction, Writing Simple Java Programs, Elements or Tokens in Java Programs, Java Statements, Command Line Arguments, User Input to Programs, Escape Sequences Comments, Programming Style.

Data Types, Variables, and Operators :Introduction, Data Types in Java, Declaration of Variables, Data Types, Type Casting, Scope of Variable Identifier, Literal Constants, Symbolic Constants, Formatted Output with print f () Method, Static Variables and Methods, Attribute Final, **Introduction to Operators**, Precedence and Associativity of Operators, Assignment Operator (=), Basic Arithmetic Operators, Increment (++) and Decrement (- -) Operators, Ternary Operator, Relational Operators, Boolean Logical Operators, Bitwise Logical Operators.

Control Statements: Introduction, if Expression, Nested if Expressions, if–else Expressions, Ternary Operator?:, Switch Statement, Iteration Statements, while Expression, do–while Loop, for Loop, Nested for Loop, For– Each for Loop, Break Statement, Continue Statement.

UNIT-II

Classes and Objects: Introduction, Class Declaration and Modifiers, Class Members, Declaration of Class Objects, Assigning One Object to Another, Access Control for Class Members, Accessing Private Members of Class, Constructor Methods for Class, Overloaded Constructor Methods, Nested Classes, Final Class and Methods, Passing Arguments by Value and by Reference, Keyword this.

Methods: Introduction, Defining Methods, Overloaded Methods, Overloaded Constructor Methods, Class Objects as Parameters in Methods, Access Control, Recursive Methods, Nesting of Methods, Overriding Methods, Attributes Final and Static.

UNIT-III

Arrays: Introduction, Declaration and Initialization of Arrays, Storage of Array in Computer Memory, Accessing Elements of Arrays, Operations on Array Elements, Assigning Array to Another Array, Dynamic Change of Array Size, Sorting of Arrays, Search for Values in Arrays, Class Arrays, Two- dimensional Arrays, Arrays of Varying Lengths, Three-dimensional Arrays, Arrays as Vectors.

Inheritance: Introduction, Process of Inheritance, Types of Inheritances, Universal Super Class-Object Class, Inhibiting Inheritance of Class Using Final, Access Control and Inheritance, Multilevel Inheritance, Application of Keyword Super, Constructor Method and Inheritance, Method Overriding, Dynamic Method Dispatch, Abstract Classes, Interfaces and Inheritance.

Interfaces: Introduction, Declaration of Interface, Implementation of Interface, Multiple Interfaces, Nested Interfaces, Inheritance of Interfaces, Default Methods in Interfaces, Static Methods in Interface, Functional Interfaces, Annotations.

UNIT-IV

Packages and Java Library: Introduction, Defining Package, Importing Packages and Classes into Programs, Path and Class Path, Access Control, Packages in Java SE, Java. lang Package and its Classes, Class Object, Enumeration, class Math, Wrapper Classes, Auto-boxing and Auto-un boxing, Java util Classes and Interfaces, Formatter Class, Random Class, Time Package, Class Instant (java.time.Instant), Formatting for Date/Time in Java, Temporal Adjusters Class, Temporal Adjusters Class.

Exception Handling: Introduction, Hierarchy of Standard Exception Classes, Keywords throws and throw, try, catch, and finally Blocks, Multiple Catch Clauses, Class Throw able, Unchecked Exceptions, Checked Exceptions.

Java I/O and File: JavaI/OAPI, standard I/O streams, types, Byte streams, Character streams, Scanner class, Files in Java(Text Book 2)

UNIT-V

String Handling in Java: Introduction, Interface Char Sequence, Class String, Methods for Extracting Characters from Strings, Comparison, Modifying, Searching; Class String Buffer.

Multithreaded Programming: Introduction, Need for Multiple Threads

Multithreaded Programming for Multi-core Processor, Thread Class, Main Thread-Creation of New Threads, Thread States, Thread Priority-Synchronization, Deadlock and Race Situations, Inter-thread Communication - Suspending, Resuming, and Stopping of Threads.
Java FX GUI: Java FX Scene Builder, Java FX App Window Structure, displaying text and image, event handling, laying out nodes in scene graph, mouse events (Text Book 3)

TEXT BOOKS:

1. JAVA one step ahead, Anitha Seth, B.L.Juneja, Oxford.
2. Joy with JAVA, Fundamentals of Object Oriented Programming, DebasisSamanta,MonalisaSarma, Cambridge, 2023.
3. JAVA 9 for Programmers, Paul Deitel, Harvey Deitel, 4th Edition, Pearson.

REFERENCES BOOKS:

1. The complete Reference Java, 11thedition, Herbert Schildt,TMH
2. Introduction to Java programming, 7th Edition, Y Daniel Liang, Pearson

Online Resources:

a. https://nptel.ac.in/courses/106/105/106105191/
b. https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_012880464547618816347_shared/overview

II B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	-	-	3	30	70	100	1.5
SUBCODE:	**ADVANCED DATA STRUCTURES & ALGORITHM ANALYSIS LAB**						

COURSE OBJECTIVES:

The objectives of the course is to

- acquire practical skills in constructing and managing Data structures
- apply the popular algorithm design methods in problem-solving scenarios

COURSE OUTCOMES:

At the end of the course students will be able to

CO1: Analyze and Develop algorithms for AVL and B-Trees.
CO2: Develop Algorithms and programs for various sorting Techniques
CO3: Apply Graph search, Traversal algorithms.
CO4: Develop and apply the algorithm for Divide and Conquer & Greedy Method
CO5:Develop and apply the algorithm for dynamic programming and Back Tracking

SYLLABUS:

Experiments covering the Topics:

- Operations on AVL trees, B-Trees, Heap Trees
- Graph Traversals
- Sorting techniques
- Minimum cost spanning trees
- Shortest path algorithms
- 0/1 Knapsack Problem
- Travelling Salesperson problem
- Optimal Binary Search Trees
- N-Queens Problem
- Job Sequencing

Sample Programs:

1. Construct an AVL tree for a given set of elements which are stored in a file. And implement insert and delete operation on the constructed tree. Write contents of tree into a new file using in-order.
2. Construct B-Tree an order of 5 with a set of 100 random elements stored in array. Implement searching, insertion and deletion operations.
3. Construct Min and Max Heap using arrays, delete any element and display the content of the Heap.

4. Implement BFT and DFT for given graph, when graph is represented by
   a) Adjacency Matrix b) Adjacency Lists
5. Write a program for finding the bi-connected components in a given graph.

6. Implement Quick sort and Merge sort and observe the execution time for variousinput sizes (Average, Worst and Best cases).
7. Compare the performance of Single Source Shortest Paths using Greedy method whenthe graph is represented by adjacency matrix and adjacency lists.
8. Implement Job sequencing with deadlines using Greedy strategy.
9. Write a program to solve 0/1 Knapsack problem Using Dynamic Programming.
10. Implement N-Queens Problem Using Backtracking.
11. Use Backtracking strategy to solve 0/1 Knapsack problem.
12. Implement Travelling Sales Person problem using Branch and Bound approach.

REFERENCE BOOKS:

1. Fundamentals of Data Structures in C++, Horowitz Ellis, SahniSartaj, Mehta, Dinesh,2nd Edition, Universities Press
2. Computer Algorithms/C++ Ellis Horowitz, SartajSahni, SanguthevarRajasekaran,2nd Edition, University Press
3. Data Structures and program design in C, Robert Kruse, Pearson Education Asia
4. An introduction to Data Structures with applications, Trembley& Sorenson, McGrawHill

Online Learning Resources:

1. http://cse01-iiith.vlabs.ac.in/
2. http://peterindia.net/Algorithms.html

II B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	0	0	3	30	70	100	1.5
SUBCODE:	**OBJECT-ORIENTED PROGRAMMING THROUGH JAVA LAB**						

COURSE OBJECTIVES:

The aim of this course is to

- Practice object oriented programming in the Java programming language
- Implement Classes, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism
- Illustrate inheritance, Exception handling mechanism, JDBC connectivity
- Construct Threads, Event Handling, implement packages, Java FX GUI

COURSE OUTCOMES:

At the end of the course students will be able to

CO1: Develop searching and sorting techniques in Java
CO2: Make use of the OOP's methods and constructors for real time problems.
CO3: Apply the concept of Inheritance and polymorphism to solve real time problems
CO4: Develop threads and Exception handling
CO5: Design GUI Applications by using JAVAFX Scene Builder

SYLLABUS:

Experiments covering the Topics:

- Object Oriented Programming fundamentals- data types, control structures
- Classes, methods, objects, Inheritance, polymorphism,
- Exception handling, Threads, Packages, Interfaces
- Files, I/O streams, JavaFX GUI

Sample Experiments:

Exercise – 1:

a) Write a JAVA program to display default value of all primitive data type of JAVA

b) Write a java program that display the roots of a quadratic equation $ax^2+bx=0$. Calculate thediscriminate D and basing on value of D, describe the nature of root.

Exercise - 2

a) Write a JAVA program to search for an element in a given list of elements using binarysearch mechanism.

b) Write a JAVA program to sort for an element in a given list of elements using bubble sort

c) Write a JAVA program using StringBuffer to delete, remove character.

Exercise - 3

a) Write a JAVA program to implement class mechanism. Create a class, methods and invokethem inside main method.
b) Write a JAVA program implement method overloading.
c) Write a JAVA program to implement constructor.
d) Write a JAVA program to implement constructor overloading.

Exercise - 4

a) Write a JAVA program to implement Single Inheritance
b) Write a JAVA program to implement multi level Inheritance
c) Write a JAVA program for abstract class to find areas of different shapes

Exercise - 5

a) Write a JAVA program give example for "super" keyword.
b) Write a JAVA program to implement Interface. What kind of Inheritance can be achieved?
c) Write a JAVA program that implements Runtime polymorphism

Exercise - 6

a) Write a JAVA program that describes exception handling mechanism
b) Write a JAVA program Illustrating Multiple catch clauses

- Write a JAVA program for creation of Java Built-in Exceptions
- Write a JAVA program for creation of User Defined Exception

Exercise - 7

a) Write a JAVA program that creates threads by extending Thread class. First thread display "Good Morning "every 1 sec, the second thread displays "Hello "every 2 seconds and the third display "Welcome" every 3 seconds, (Repeat the same by implementing Runnable)
b) Write a program illustrating **is Alive** and **join ()**
c) Write a Program illustrating Daemon Threads.
d) Write a JAVA program Producer Consumer Problem

Exercise – 8

1. Write a JAVA program that import and use the user defined packages
2. Without writing any code, build a GUI that display text in label and image in anImageView (use JavaFX)
3. Build a Tip Calculator app using several JavaFX components and learn how to respond touser interactions with the GUI

Exercise – 9

a. Write a java program that connects to a database using JDBC
b. Write a java program to connect to a database using JDBC and insert values into it.
c. Write a java program to connect to a database using JDBC and delete values from it

II B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	0	1	2	30	70	100	2
SUBCODE:	**PYTHON PROGRAMMING (SEC)**						

COURSE OBJECTIVES:

The main objectives of the course are to

- Introduce core programming concepts of Python programming language.
- Demonstrate about Python data structures like Lists, Tuples, Sets and dictionaries
- Implement Functions, Modules and Regular Expressions in Python Programmingand to create practical and contemporary applications using these

COURSE OUTCOMES:

At the end of the course students will be able to

CO1: Develop Essential programming skills for python and be fluent in the use of python control flow statements
CO2: Solve coding tasks related to the handling of strings and functions
CO3: Make use of functions and represent compound data using Lists, Tuples and dictionaries
CO4: Apply the commonly used operations involving file systems and regular expressions
CO5: Analyze the functional programming using JSON and XML in python and utilization of packages Numpy and Pandas

SYLLABUS:

UNTI-I

History of Python Programming Language, Thrust Areas of Python, Installing Anaconda Python Distribution, Installing and Using Jupyter Notebook.

Parts of Python Programming Language: Identifiers, Keywords, Statements and Expressions, Variables, Operators, Precedence and Associativity, Data Types, Indentation, Comments, Reading Input, Print Output, Type Conversions, the type () Function and Is Operator, Dynamic and Strongly Typed Language.

Control Flow Statements: if statement, if-else statement, if...elif…else, Nested if statement, while Loop, for Loop, continue and break Statements, Catching Exceptions Using try and except Statement.

Sample Experiments:

1. Write a program to find the largest element among three Numbers.

2. Write a Program to display all prime numbers within an interval
3. Write a program to swap two numbers without using a temporary variable.
4. Demonstrate the following Operators in Python with suitable examples.

i) Arithmetic Operators ii) Relational Operators iii) Assignment Operatorsiv) LogicalOperators v) Bit wise Operators vi) Ternary Operator vii) Membership Operators
viii) Identity Operators

5. Write a program to add and multiply complex numbers
6. Write a program to print multiplication table of a given number.

UNIT-II

Functions: Built-In Functions, Commonly Used Modules, Function Definition and Calling the function, return Statement and void Function, Scope and Lifetime of Variables, Default Parameters, Keyword Arguments, *args and **kwargs, Command Line Arguments. **Strings:** Creating and Storing Strings, Basic String Operations, Accessing Characters in String by Index Number, String Slicing and Joining, String Methods, Formatting Strings.

Lists: Creating Lists, Basic List Operations, Indexing and Slicing in Lists, Built-In FunctionsUsed on Lists, List Methods, del Statement.

Sample Experiments:

1. Write a program to define a function with multiple return values.
2. Write a program to define a function using default arguments.
3. Write a program to find the length of the string without using any library functions.
4. Write a program to check if the substring is present in a given string or not.
5. Write a program to perform the given operations on a list:
   i. Addition ii. Insertion iii. slicing
6. Write a program to perform any 5 built-in functions by taking any list.

UNIT-III

Dictionaries: Creating Dictionary, Accessing and Modifying key: value Pairs in Dictionaries, Built-In Functions Used on Dictionaries, Dictionary Methods, del Statement.

Tuples and Sets: Creating Tuples, Basic Tuple Operations, tuple() Function, Indexing and Slicing in Tuples, Built-In Functions Used on Tuples, Relation between Tuples and Lists, Relation between Tuples and Dictionaries, Using zip() Function, Sets, Set Methods, Frozen set.

Sample Experiments:

1. Write a program to create tuples (name, age, address, college) for at least twomembers and concatenate the tuples and print the concatenated tuples.
2. Write a program to count the number of vowels in a string (No control flow

allowed).

3. Write a program to check if a given key exists in a dictionary or not.
4. Write a program to add a new key-value pair to an existing dictionary.
5. Write a program to sum all the items in a given dictionary.

UNIT-IV

Files: Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data, Reading and Writing Binary Files, Pickle Module, Reading and Writing CSV Files, Python os and os.path Modules.

Object-Oriented Programming: Classes and Objects, Creating Classes in Python, Creating Objects in Python, Constructor Method, Classes with Multiple Objects, Class Attributes Vs Data Attributes, Encapsulation, Inheritance, Polymorphism.

Sample Experiments:

1. Write a program to sort words in a file and put them in another file. The output file should have only lower-case words, so any upper-case words from source must be lowered.
2. Python program to print each line of a file in reverse order.
3. Python program to compute the number of characters, words and lines in a file.
4. Write a program to create, display, append, insert and reverse the order of the itemsin the array.
5. Write a program to add, transpose and multiply two matrices.
6. Write a Python program to create a class that represents a shape. Include methods to calculate its area and perimeter. Implement subclasses for different shapes like circle, triangle, and square.

UNIT-V

Introduction to Data Science: Functional Programming, JSON and XML in Python, NumPy with Python, Pandas.

Sample Experiments:

1. Python program to check whether a JSON string contains complex object or not.
2. Python Program to demonstrate NumPy arrays creation using array () function.
3. Python program to demonstrate use of ndim, shape, size, dtype.
4. Python program to demonstrate basic slicing, integer and Boolean indexing.
5. Python program to find min, max, sum, cumulative sum of array
6. Create a dictionary with at least five keys and each key represent value as a list where this list contains at least ten values and convert this dictionary as a pandas data frame and explore the data through the data frame as follows:
    a) Apply head () function to the pandas data frame
    b) Perform various data selection operations on Data Frame
7. Select any two columns from the above data frame, and observe the change

in one attribute with respect to other attribute with scatter and plot operations in matplotlib

REFERENCE BOOKS:

1. Gowrishankar S, Veena A., Introduction to Python Programming, CRC Press.
2. Python Programming, S Sridhar, J Indumathi, V M Hariharan, 2nd Edition, Pearson, 2024
3. Introduction to Programming Using Python, Y. Daniel Liang, Pearson.

ONLINE RESOURSE:

1. https://www.coursera.org/learn/python-for-applied-data-science-ai
2. https://www.coursera.org/learn/python?specialization=python#syllabus

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF CSE-AIML

II B.TECH SEMISTER-II

S.No.	Subject Code	SUBJECT	Cat. Code	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	L	T	P	CREDITS
1		Optimization Techniques	MC-1	30	70	100	2	0	0	2
2		Probability & Statistics	ES	30	70	100	3	0	0	3
3		Machine Learning	PC	30	70	100	3	0	0	3
4		Database Management Systems	PC	30	70	100	3	0	0	3
5		Digital Logic & Computer Organization	PC	30	70	100	3	0	0	3
6		Machine Learning Lab	PC	30	70	100	0	0	3	1.5
7		Database Management Systems Lab	PC	30	70	100	0	0	3	1.5
8		Full Stack Development - 1	SEC	30	70	100	0	1	2	2
9		Design Thinking &Innovation	BS&H	30	70	100	1	0	2	2
10		Environmental Science	AC	30	70	100	2	0	0	-
Total							**15**	**1**	**12**	**21**

II B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE:	**MACHINE LEARNING**						

COURSE OBJECTIVES

The objectives of the course is to

- Define machine learning and its different types (supervised and unsupervised) and understand their applications.
- Apply supervised learning algorithms including decision trees and k-nearest neighbours (k-NN).
- Implement unsupervised learning techniques, such as K-means clustering.

COURSE OUTCOMES:

At the end of the course students will be able to

CO1: Utilize different types of Machine Learning techniques and their application
CO2: Apply and Analyze supervised and un supervised Machine Learning Models
CO3: Analyze different classification Algorithms through Statistical learning Techniques
CO4: Examine the different clustering techniques
CO5: Develop an appreciation for what is involved in learning from data

SYLLABUS:

UNIT-I

Introduction to Machine Learning: Evolution of Machine Learning, Paradigms for ML, Learning by Rote, Learning by Induction, Reinforcement Learning, Types of Data, Matching, Stages in Machine Learning, Data Acquisition, Feature Engineering, Data Representation, Model Selection, Model Learning, Model Evaluation, Model Prediction, Search and Learning, Data Sets.

UNIT-II

Nearest Neighbor-Based Models: Introduction to Proximity Measures, Distance Measures, Non-Metric Similarity Functions, Proximity Between Binary Patterns, Different Classification Algorithms Based on the Distance Measures ,K-Nearest Neighbor Classifier, Radius Distance Nearest Neighbor Algorithm.

UNIT-III

Models Based on Decision Trees: Decision Trees for Classification, Impurity Measures, Properties, Regression Based on Decision Trees, Bias–Variance Trade-off, Random Forests for Classification and Regression.

The Bayes Classifier: Introduction to the Bayes Classifier, Bayes' Rule and Inference, The Bayes Classifier and its Optimality, Multi-Class Classification | Class Conditional Independence and Naive Bayes Classifier (NBC)

UNIT-IV

Linear Discriminants for Machine Learning: Introduction to Linear Discriminants, Linear Discriminants for Classification, Perceptron Classifier, Perceptron Learning Algorithm, Multi-Layer Perceptron (MLPs), Back propagation for Training an MLP, Support Vector Machines, Linearly Non-Separable Case, Non-linear SVM, Kernel Trick, Logistic Regression, Linear Regression.

UNIT-V

Clustering : Introduction to Clustering, Partitioning of Data, Matrix Factorization | Clustering of Patterns, Divisive Clustering, Agglomerative Clustering, Partitional Clustering, K-Means Clustering, Soft Partitioning, Soft Clustering, Fuzzy C-Means Clustering, Expectation Maximization-Base Clustering, Spectral Clustering.

TEXT BOOKS:

1. "Machine Learning Theory and Practice", M N Murthy, V S Ananthanarayana,Universities Press (India), 2024

REFERENCE BOOKS:

1. "Machine Learning", Tom M. Mitchell, McGraw-Hill Publication, 2017
2. "Machine Learning in Action",Peter Harrington, DreamTech
3. "Introduction to Data Mining", Pang-Ning Tan, Michel Stenbach, Vipin Kumar, 7thEdition, 2019.

II B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE:	**DATABASEMANAGEMENT SYSTEMS**						

COURSE OBJECTIVES:

The main objectives of the course is to

- Introduce database management systems and to give a good formal foundation on therelational model of data and usage of Relational Algebra
- Introduce the concepts of basic SQL as a universal Database language
- Demonstrate the principles behind systematic database design approaches by coveringconceptual design, logical design through normalization
- Provide an overview of physical design of a database system, by discussing Databaseindexing techniques and storage techniques

COURSE OUTCOMES:

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

CO1: Utilize various fundamentals of DBMS.
CO2: Apply different relational database using SQL.
CO3: Develop Queries in RDBMS.
CO4: Analyze different levels of normal forms and normalization.
CO5: Analyze various transaction properties and indexing techniques

SYULLABUS:

UNIT-I

Introduction: Database system, Characteristics (Database Vs File System), Database Users, Advantages of Database systems, Database applications. Brief introduction of different Data Models; Concepts of Schema, Instance and data independence; Three tier schema architecture for data independence; Database system structure, environment, Centralized and Client Server architecture for the database.

Entity Relationship Model: Introduction, Representation of entities, attributes, entity set, relationship, relationship set, constraints, sub classes, super class, inheritance, specialization, generalization using ER Diagrams.

UNIT-II

Relational Model: Introduction to relational model, concepts of domain, attribute, tuple, relation, importance of null values, constraints (Domain, Key constraints, integrity constraints) and their importance, Relational Algebra, Relational Calculus. BASIC SQL:Simple Database schema, data types, table definitions (create, alter), different DML operations (insert, delete, update).

UNIT-III

SQL: Basic SQL querying (select and project) using where clause, arithmetic & logical operations, SQL functions(Date and Time, Numeric, String conversion).Creating tables with relationship, implementation of key and integrity constraints, nested queries, sub queries, grouping, aggregation, ordering, implementation of different types of joins, view(updatable and non-updatable), relational set operations.

UNIT-IV

Schema Refinement (Normalization): Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency Lossless join and dependency preserving decomposition, (1NF, 2NF and 3 NF), concept of surrogate key, Boyce-Codd normal form(BCNF), MVD, Fourth normal form(4NF), Fifth Normal Form (5NF).

UNIT-V

Transaction Concept: Transaction State, ACID properties, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for Serializability, lock based, time stamp based, optimistic, concurrency protocols, Deadlocks, Failure Classification, Storage, Recovery and Atomicity, Recovery algorithm.

Introduction to Indexing Techniques: B+ Trees, operations on B+Trees, Hash Based Indexing:

TEXT BOOKS:

1. Database Management Systems, 3rd edition, Raghurama Krishnan, Johannes Gehrke,TMH (For Chapters 2, 3, 4)
2. Database System Concepts,5th edition, Silberschatz, Korth, Sudarsan,TMH (ForChapter 1 and Chapter 5)

REFERENCE BOOKS:

1. Introduction to Database Systems, 8thedition, C J Date, Pearson.
2. Database Management System, 6th edition, RamezElmasri, Shamkant B. Navathe,Pearson
3. Database Principles Fundamentals of Design Implementation and Management,Corlos Coronel, Steven Morris, Peter Robb, Cengage Learning.

Web-Resources:

1) https://nptel.ac.in/courses/106/105/106105175/
2) https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01275806667282022456_shared/overview

II B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE:	**DIGITAL LOGIC & COMPUTER ORGANIZATION**						

COURSEOBJECTIVES:

The main objectives of the course is to

- Provide students with a comprehensive understanding of digital logic design principles and computer organization fundamentals
- Describe memory hierarchy concepts
- Explain input/output(I/O)systems and their interaction with the CPU, memory, and peripheral devices

COURSE OUTCOMES:

Student should be able to:

CO1: Analyze Digital Circuits using Binary Number systems, Boolean Algebra, K-maps.

CO2: Analyze the design procedures of Sequential circuits and identify functional units of a computer and register transfer operations

CO3: Identify appropriate addressing modes for specifying the location of an operand and the design of Hardwired and Micro programmed control unit

CO4: Analyze the concepts of memory organization its impact on computer cost/performance.

CO5: Organize the different ways of communicating with I/O devices and standard I/O Interfaces.

SYLLABUS:

UNIT–I

Data Representation: Binary Numbers, Fixed Point Representation. Floating Point Representation. Number base conversions, Octal and Hexadecimal Numbers, components, Signed binary numbers, Binary codes

Digital Logic Circuits-I: Basic Logic Functions, Logic gates, universal logic gates, Minimization of Logic expressions. K-Map Simplification, Combinational Circuits, Decoders, Multiplexers

UNIT–II

Digital Logic Circuits-II: Sequential Circuits, Flip-Flops, Binary counters, Registers, Shift Registers, Ripple counters

Basic Structure of Computers: Computer Types, Functional units, Basic operational concepts, Bus structures, Software, Performance, multiprocessors and multi computers, Computer Generations, Von-Neumann Architecture

UNIT–III

Central Processing Unit: General Register Organization, STACK Organization. Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer.

Micro programmed Control unit: Control Memory, Address Sequencing, Micro Program example, Design of Control Unit.

UNIT–IV

The Memory Organization: Basic Concepts, Semiconductor RAM Memories, Read-Only Memories, Speed, Size and Cost, Cache Memories, Performance Considerations, Virtual Memories, Memory Management Requirements, Secondary Storage

UNIT–V

Input /Output Organization: Accessing I/O Devices, Interrupts, Processor Examples, Direct Memory Access, Buses, Interface Circuits, Standard I/O Interfaces

TEXTBOOKS

1. Computer Organization, Carl Hamacher, Zvonko Vranesic, Safwat Zaky, 6th edition, McGraw Hill
2. DigitalDesign,6th Edition, M.Morris Mano, Pearson Education.
3. Computer Organization and Architecture, William Stallings, 11th Edition, Pearson.

REFERENCEBOOKS

1. Computer Systems Architecture, M.Moris Mano, 3rd Edition, Pearson
2. Computer Organization and Design, DavidA. Paterson, JohnL. Hennessy, Elsevier
3. FundamentalsofLogicDesign,Roth,5th Edition, Thomson

ONLINELEARNINGRESOURCES:

1. https://nptel.ac.in/courses/106/103/106103068/

II B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	-	-	3	30	70	100	1.5
SUBCODE:	**MACHINELEARNING LAB**						

COURSE OBJECTIVES:

- TolearnaboutcomputingcentraltendencymeasuresandDatapreprocessing techniques
- To learn about classification and regression algorithms
- To apply different clustering algorithms for a problem.

COURSE OUTCOMES:

At the end of the course students will be able to

CO1: Build Python Programs for various learning Algorithms
CO2: Apply appropriate data sets to the Machine Learning Algorithms
CO3: Analyze the results Machine Learning Techniques
CO4: Apply Machine Learning Techniques of regression, classification and clustering

SYLLABUS:

Software Required: Python /R /Weka

Lab should cover the concepts studied in the course work, sample list of Experiments:

1. Compute Central Tendency Measures: Mean, Median, Mode Measure of Dispersion: Variance, Standard Deviation.
2. Apply the following Pre-processing techniques for a given dataset.
   a. Attribute selection
   b. Handling Missing Values
   c. Discretization
   d. Elimination of Outliers
3. Apply KNN algorithm for classification and regression
4. Demonstratedecisiontreealgorithmforaclassificationproblemandperformparamet er tuning for better results
5. Demonstrate decision tree algorithm for aregression problem
6. Apply Random Forest algorithm for classification and regression
7. Demonstrate Naïve Bayes Classification algorithm.
8. Apply Support Vector algorithm for classification
9. Demonstrate simple linear regression algorithm for a regression problem
10. Apply Logistic regression algorithm for a classification problem
11. DemonstrateMulti-layerPerceptronalgorithmforaclassificationproblem

12. Implement the K-means algorithm and apply it to the data you selected. Evaluate performance by measuring the sum of the Euclidean distance of each example from its class center. Test the performance of the algorithm as a function of the parameters K.
13. Demonstrate the use of Fuzzy C-Means Clustering
14. DemonstratetheuseofExpectationMaximizationbasedclusteringalgorithm

II B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	-	-	3	30	70	100	1.5
SUBCODE:	**DATABASE MANAGEMENT SYSTEMS LAB**						

COURSE OBJECTIVES:

This Course will enable students to

- Populate and query a database using SQL DDL/DML Commands
- Declare and enforce integrity constraints on a database
- Writing Queries using advanced concepts of SQL
- Programming PL/SQL including procedures, functions, cursors and triggers.

COURSE OUTCOMES:

At the end of the course students will be able to

CO1: Utilize SQL to execute queries for creating database and performing data manipulation operations
CO2: Examine integrity constraints to build efficient databases
CO3: Apply Queries using Advanced Concepts of SQL
CO4: Explain PL/SQL programs including stored procedures, functions, cursors and triggers
CO5: Construct Database connectivity- ODBC/JDBC

SYLLABUS:

Experiments covering the topics:

- DDL, DML, DCL commands
- Queries, nested queries, built-in functions,
- PL/SQL programming- control structures
- Procedures, Functions, Cursors, Triggers,
- Database connectivity- ODBC/JDBC

Sample Experiments:

1. Creation, altering and droping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.
2. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints. Example:- Select the roll number and name of the student who secured fourth rank in the class.
3. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.
4. Queries using Conversion functions (to_char, to_number and to_date),

string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date)

5.
   i. Create a simple PL/SQL program which includes declaration section, executable section and exception –Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found)
   ii. Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.

6. Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCE functions.
7. Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISE- APPLICATION ERROR.
8. Programs development using creation of procedures, passing parameters IN and OUTof PROCEDURES.
9. Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.
10. Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.
11. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers
12. Create a table and perform the search operation on table using indexing and non-indexing techniques.
13. Write a Java program that connects to a database using JDBC
14. Write a Java program to connect to a database using JDBC and insert values into it
15. Write a Java program to connect to a database using JDBC and delete values from it

TEXT BOOKS/SUGGESTED READING:

1. Oracle: The Complete Reference by Oracle Press
2. Nilesh Shah, "Database Systems Using Oracle", PHI, 2007
3. Rick F Vander Lans, "Introduction to SQL", Fourth Edition, Pearson Education, 20

II B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	-	1	2	30	70	100	2
SUBCODE:	**FULL STACK DEVELOPMENT–1 (SEC)**						

COURSE OBJECTIVES:

The main objectives of the course are to

1. Make use of HTML elements and their attributes for designing static web pages
2. Build a web page by applying appropriate CSS styles to HTML elements
3. Experiment with JavaScript to develop dynamic web pages and validate forms

COURSE OUTCOMES:

At the end of the course students will be able to

CO1: Develop responsive web pages using HTML and CSS
CO2: Implement client side script using Java script
CO3: Develop real world web application using varies technology
CO4: Develop server side script using PHP and node JS

SYLLABUS:

Experiments covering the Topics:

- Lists, Links and Images
- HTML Tables, Forms and Frames
- HTML 5 and Cascading Style Sheets, Types of CSS
- Selector forms
- CSS with Color, Background, Font, Text and CSS Box Model
- Applying JavaScript - internal and external, I/O, Type Conversion
- JavaScript Conditional Statements and Loops, Pre-defined and User-defined Objects
- JavaScript Functions and Events
- Node.js

Sample Experiments:

1. Lists, Links and Images

a. Write a HTML program, to explain the working of lists.
Note: It should have an ordered list, unordered list, nested lists and ordered list in an unordered list and definition lists.

b. Write a HTML program, to explain the working of hyperlinks using <a> tag and href, target Attributes.

c. Create a HTML document that has your image and your friend's image with a

specific height and width. Also when clicked on the images it should navigate to their respective profiles.

d. Write a HTML program, in such a way that, rather than placing large images on a page, the preferred technique is to use thumbnails by setting the height and width parameters to something like to 100*100 pixels. Each thumbnail image is also a link to a full sized version of the image. Create an image gallery using this technique

2. HTML Tables, Forms and Frames

- Write a HTML program, to explain the working of tables. (use tags: <table>, <tr>, <th>,
  <td> and attributes: border, row span, colspan)
- Write a HTML program, to explain the working of tables by preparing a timetable. (Note: Use <caption> tag to set the caption to the table & also use cell spacing, cell padding, border, row span, colspan etc.).
- Write a HTML program, to explain the working of forms by designing Registration form. (Note: Include text field, password field, number field, date of birth field, checkboxes, radio buttons, list boxes using <select>&<option> tags, <text area> and two buttons ie: submit and reset. Use tables to provide a better view).
- Write a HTML program, to explain the working of frames, such that page is to be divided into 3 parts on either direction. (Note: first frame image, second frame paragraph, third frame hyperlink. And also make sure of using "no frame" attribute such that frames to be fixed).

3. HTML 5 and Cascading Style Sheets, Types of CSS

a. Write a HTML program, that makes use of <article>, <aside>, <figure>, <figcaption>, <footer>, <header>, <main>, <nav>, <section>, , tags.
b. Write a HTML program, to embed audio and video into HTML web page.
c. Write a program to apply different types (or levels of styles or style specification formats) - inline, internal, external styles to HTML elements. (identify selector, property andvalue).

4. Selector forms

a. Write a program to apply different types of selector forms
   - Simple selector (element, id, class, group, universal)
   - Combinator selector (descendant, child, adjacent sibling, general sibling)
   - Pseudo-class selector
   - Pseudo-element selector
   - Attribute selector

5. CSS with Color, Background, Font, Text and CSS Box Model

a. Write a program to demonstrate the various ways you can reference a color in CSS.
b. Write a CSS rule that places a background image halfway down the page, tilting

ithorizontally. The image should remain in place when the user scrolls up or down.

c. Write a program using the following terms related to CSS font and text:
   i. font-size ii. font-weight iii. font-style
   iv. text-decoration v. text-transformation vi. text-alignment
d. Write a program, to explain the importance of CSS Box model using
   i. Content ii. Border iii. Margin iv. padding

6. Applying JavaScript - internal and external, I/O, Type Conversion

a. Write a program to embed internal and external JavaScript in a web page.
b. Write a program to explain the different ways for displaying output.
c. Write a program to explain the different ways for taking input.
d. Create a webpage which uses prompt dialogue box to ask a voter for his name and age.Display the information in table format along with either the voter can vote or not

7. JavaScript Pre-defined and User-defined Objects

a. Write a program using document object properties and methods.
b. Write a program using window object properties and methods.
c. Write a program using array object properties and methods.
d. Write a program using math object properties and methods.
e. Write a program using string object properties and methods.
f. Write a program using regex object properties and methods.
g. Write a program using date object properties and methods.
h. Write a program to explain user-defined object by using properties, methods, accessors,constructors and display.

8. JavaScript Conditional Statements and Loops

a. Write a program which asks the user to enter three integers, obtains the numbers from the user and outputs HTML text that displays the larger number followed by the words "LARGER NUMBER" in an information message dialog. If the numbers are equal, output HTML text as "EQUAL NUMBERS".
b. Write a program to display week days using switch case.
c. Write a program to print 1 to 10 numbers using for, while and do-while loops.
d. Write aprogram to print data in object using for-in, for-each and for-of loops
e. Develop a program to determine whether a given number is an 'ARMSTRONG NUMBER' or not. [Eg: 153 is an Armstrong number, since sum of the cube of the digits is equal to the number i.e.,13 + 53+ 33 = 153]
f. Write a program to display the denomination of the amount deposited in the bank in termsof 100's, 50's, 20's, 10's, 5's, 2's & 1's. (Eg: If deposited amount is Rs.163, the output should be 1-100's, 1-50's, 1- 10's, 1-2's & 1-1's)

9. Java script Functions and Events

a. Design a appropriate function should be called to display

- Factorial of that number
- Fibonacci series up to that number
- Prime numbers up to that number
- Is it palindrome or not

b. Design a HTML having a text box and four buttons named Factorial, Fibonacci, Prime,and Palindrome. When a button is pressed an appropriate function should be called to display
   4. Factorial of that number
   5. Fibonacci series up to that number
   6. Prime numbers up to that number
   7. Is it palindrome or not

c. Write a program to validate the following fields in a registration page
   i. Name (start with alphabet and followed by alphanumeric and the length should notbe less than 6 characters)
   ii. Mobile (only numbers and length 10 digits)
   iii. E-mail (should contain format like xxxxxxx@xxxxxx.xxx)

TEXT BOOKS:

1. Programming the World Wide Web, 7th Edition, Robet W Sebesta, Pearson, 2013.
2. Web Programming with HTML5, CSS and JavaScript, John Dean, Jones & BartlettLearning, 2019 (Chapters 1-11).
3. Pro MERN Stack: Full Stack Web App Development with Mongo, Express, React, andNode, Vasan Subramanian, 2nd edition, APress, O'Reilly.

WEB LINKS:

1. https://www.w3schools.com/html
2. https://www.w3schools.com/css
3. https://www.w3schools.com/js/
4. https://www.w3schools.com/nodejs
5. https://www.w3schools.com/typescript

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF CSE-AIML

III B.Tech (CSE-AIML) COURSE STRUCTURE (R23)

1 SEMESTER

S. No	Subject Code	SUBJECT	Cat. Code	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	L	T	P	CREDITS
1	B23AI51	Information Retrieval Systems	PC	30	70	100	3	0	0	3
2	B23CS52	Computer Networks	PC	30	70	100	3	1	0	3
3	B23AI52	Operating Systems	PC	30	70	100	3	0	0	3
4	B23AI53	**Professional Elective-I** 1. Software Engineering 2. Cloud Computing 3. Internet of Things 4. Exploratory Data Analysis with Python 5. Automata Theory & Compiler Design	PE	30	70	100	3	0	0	3
5	B23CC51	**Open Elective-I** (OR) Entrepreneurship Development & Venture Creation	OE	30	70	100	3	0	0	3
6	B23AI56	Information Retrieval Lab	PC	30	70	100	0	0	3	1.5
7	B23CS57	Computer Networks Lab	PC	30	70	100	0	0	3	1.5
8	B23CS58	Full Stack development -2 /SWAYAM Plus-Data Engineer/AI Engineer/	SOC	30	70	100	0	1	2	2
9	B23CS59	Tinkering Lab *(User Interface Design using Flutter)*	ES	30	70	100	0	0	2	1
10	B23CSP50	Evaluation of Community Service Project Intern ship	-	-	-	-	-	-		2
						Total	**15**	**1**	**10**	**23**

Dr. M.H.M Krishna Prasad
JNTUK Nominee

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II- SEMESTER

S.No.	Subject Code	SUBJECT	Cat. Code	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	L	T	P	CREDITS
1	B23AI61	Natural Language Processing	PC	30	70	100	3	0	0	3
2	B23AI62	Deep Learning	PC	30	70	100	3	0	0	3
3	B23AI63	Data Visualization	PC	30	70	100	3	0	0	3
4	B23CS64 B23AI64B B23AI64C B23AI64D	**Professional Elective-II** 1.Software Testing Methodology 2.Cryptography & Network Security 3.DevOps 4.Recommender Systems 5.Any of the 12-Week SWAYAM /NPTEL Course suggested by the BoS	PE	30	70	100	3	0	0	3
5	B23CS65A B23AI65B B23AI65C B23AI65D	**Professional Elective-III** 1. Software Project Management 2. Mobile Adhoc Networks 3. Computer Vision 4. NoSQL Databases Any of the 12-Week SWAYAM /NPTEL Course suggested by the BoS	PE	30	70	100	3	0	0	3
6	B23AIO	**Open Elective-II**	OE	30	70	100	3	0	0	3
7	B23AI66	Deep Learning Lab	PC	30	70	100	0	0	3	1.5
8	B23AI67	Data Visualization Lab	PC	30	70	100	0	0	3	1.5
9	B23SH61	Soft skills	SEC	30	70	100	0	1	2	2
10	B23CC6A	Technical Paper Writing & IPR					2	0	0	-
		Total					**20**	**1**	**08**	**23**

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III B.TECH SEMISTER-I

S. No	Subject Code	SUBJECT	Cat. Code	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	L	T	P	CREDITS
1	B23AI51	Information Retrieval Systems	PC	30	70	100	3	0	0	3
2	B23CS52	Computer Networks	PC	30	70	100	3	0	0	3
3	B23AI52	Operating Systems	PC	30	70	100	3	0	0	3
4	B23AI53	**Professional Elective-I** 1.Software Engineering 2.Cloud Computing 3.Internet of Things 4. Exploratory Data Analysis with Python 5.Automata Theory & Compiler Design	PE	30	70	100	3	0	0	3
5	B23CC51	**Open Elective-I** (OR) Entrepreneurship Development & Venture Creation	OE	30	70	100	3	0	0	3
6	B23AI56	Information Retrieval Lab	PC	30	70	100	0	0	3	1.5
7	B23CS57	Computer Networks Lab	PC	30	70	100	0	0	3	1.5
8	B23CS58	Full Stack development -2 /SWAYAM Plus-Data Engineer/AI Engineer/	SOC	30	70	100	0	1	2	2
9	B23CS59	Tinkering Lab *(User Interface Design using Flutter)*	ES	30	70	100	0	0	2	1
10	B23CSP50	Evaluation of Community Service Project Intern ship					-	-		2
						Total	**15**	**1**	**10**	**23**

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III B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE: **B23AI51**	**INFORMATION RETRIEVAL SYSTEMS**						

COURSE OUTCOMES:

At the end of the course students will be able to

CO1: Apply the foundational concepts of information retrieval (IR) systems, including domain analysis and system evaluation methods.
CO2: Apply data structures and algorithms such as inverted files and signature files for efficient information retrieval
CO3: Construct and analyze PAT trees, PAT arrays, and stop lists for optimized text indexing and lexical analysis
CO4: Evaluate different stemming algorithms and methods for thesaurus construction used in IR systems.
CO5: Implement and compare various string searching algorithms to enhance retrieval performance in text-based systems.

SYLLABUS:

UNIT-I
Introduction to Information storage and retrieval systems: Domain Analysis of IR systems, IR and other types of Information Systems, IR System Evaluation **Introduction to Data structures and algorithms related to Information Retrieval**: Basic Concepts, Data structures, Algorithms.

UNIT-II
Inverted Files and Signature Files: Introduction, Structures used in Inverted Files, building an Inverted file using a sorted array, Modifications to the Basic Techniques.
Signature Files: Concepts of Signature files, Compression, Vertical Partitioning, Horizontal Partitioning.

UNIT-III
New Indices for Text, Lexical Analysis and Stop lists: PAT Trees and PAT Arrays: Introduction, PAT Tree structure, Algorithms on the PAT Trees, Building PAT Trees as PATRICA Trees, PAT representation as Arrays. Stoplists.

UNIT-IV
Stemming Algorithms and Thesaurus Construction: Types of Stemming algorithms, Experimental Evaluations of Stemming, stemming to Compress Inverted Files.
Thesaurus Construction: Features of Thesauri, Thesaurus Construction, Thesaurus construction from Texts, Merging existing Thesauri.

UNIT-V

String Searching Algorithms: Introduction, Preliminaries, The Naive Algorithm, The Knutt-Morris-Pratt Algorithm, The Boyer-Moore Algorithm, The Shift-Or Algorithm, The Karp-Rabin Algorithm.

TEXT BOOKS

1. Modern Information Retrieval,Ricardo Baeza-Yates, Neto, PEA,2007.
2. Information Storage and Retrieval Systems: Theory and Implementation, Kowalski, Gerald, Mark Academic Press, 2000.

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III B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE: **B23CS52**	**COMPUTER NETWORKS**						

COURSE OBJECTIVES:

- To under stand the Fundamental Concepts related to sources, shadows and shading
- To under stand the Geometry of Multiple Views

COURSE OUTCOMES

At the end of the course students will be able to

CO1: Apply different network models & communication techniques, methods and protocol standards
CO2: Examine different transmission media for transferring error free data
CO3: Compare and Classify medium access control protocols Ethernet protocols
CO4: Examine the Network Layer Design Issues and internet protocols (IPV4 & IPV6).
CO5: Reflect application layer services and client server protocols working with the client server paradigms

SYLLABUS:

UNIT-I

Introduction: Types of Computer Networks, Reference Models- The OSI Reference Model, The TCP/IP Reference Model, A Critique of the OSI Model and Protocols, A Critique of the TCP/IP Reference Model. History of Internet.

UNIT-II

The Data Link Layer: Transmission Media, Guided and Un-guided media, Data Link Layer Design Issues, Services Provided to the Network Layer, Error detecting and Error Correcting codes, Elementary Data Link Protocols, Sliding Window Protocols, HDLC, PPP. Multiple Access Protocols Wired Lans: Ethernet, Fast Ethernet, Gigabit Ethernet

UNIT-III

The Network Layer: Network Layer Design Issues, Routing Algorithms, Congestion, Congestion control algorithms. The Network Layer in the Internet, The IP Version 4 Protocol, IP Addresses- Classful, CIDR, NAT, IP Version 6 Protocol, Transition from IPV4 to IPV6

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UNIT-IV

The Transport Layer: The Transport Layer Services, Transport Layer Protocols: UDP, TCP and SCTP

UNIT-V

The Application Layer: The World Wide Web, HTTP, Domain Name Space, Remote Loging, Electronic Mail and File Transfer

TEXT BOOKS:

1. "Computer Networks", Andrew S Tanenbaum, David J Wetherall, 5th Edition, Pearson
2. "Data Communications and Networking", Behrouz A Forouzan, 4th Edition, Tata McGraw Hill Education

REFERENCE BOOKS:

1. "Data and Computer Communication", William Stallings, Pearson
2. "TCP/IP Protocol Suite", Behrouz Forouzan, McGraw Hill.

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III B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE: **B23AI52**	**OPERATING SYSTEMS**						

COURSE OUTCOMES

At the end of the course students will be able to

CO1: Make use of different operating System services and implement system calls for the Services
CO2: Examine Different types of Algorithms for process Scheduling and Compare the Scheduling Criteria
CO3: Organize Different Synchronization Tools for Concurrency and use different Mechanisms for Deadlock free
CO4: Organize Different Memory Management Strategies and Operate Different Algorithms for Deadlock free
CO5: Organize File System management and Different File System protection Mechanisms

SYLLABUS:

UNIT-I

Operating Systems Overview: Introduction, operating system functions, operating systems operations, Computing environments, Free and Open-Source Operating Systems System Structures: Operating System Services, User and Operating-System Interface, system calls, Types of System Calls, system programs, operating system Design and Implementation, operating system structure, Building and Booting an Operating System, Operating system debugging

UNIT-II

Processes: Process Concept, Process scheduling, Operations on processes, Inter-process communication. Threads and Concurrency: Multithreading models, Thread libraries, Threading issues. CPU Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms, Multiple processor scheduling.

UNIT–III

Synchronization Tools: The Critical Section Problem, Peterson's Solution, Mutex Locks, semaphores, Monitors, Classic problems of Synchronization. Deadlocks: system Model, Deadlock characterization, Methods for handling Deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from Deadlock.

UNIT-IV

Memory- Management Strategies: Introduction, Contiguous memory allocation, Paging, Structure of the Page Table, Swapping. Virtual Memory Management: Introduction, Demand paging, Copy-on-write, Page replacement Allocation of frames, Thrashing Storage Management: Overview of Mass Storage Structure, HDD Scheduling.

UNIT-V

File System: File System Interface: File concept, Access methods, Directory Structure; File system Implementation: File-system structure, File-system Operations, Directory implementation, Allocation method, Free space management; File-System Internals: File-System Mounting, Partitions and Mounting, File Sharing. Protection: Goals of protection, Principles of protection, Protection Rings, Domain of protection, Access matrix

TEXT BOOKS:

1. Operating System Concepts, Silberschatz A, GalvinPB, GagneG,10th Edition, Wiley, 2018.
2. Modern Operating Systems, Tanenbaum AS,4th Edition, Pearson ,2016

REFERENCE BOOKS:

1. Operating Systems -Internals and Design Principles, Stallings W, 9thedition, Pearson, 2018
2. Operating Systems: A Concept Based Approach, D. M Dhamdhere, 3rd Edition, McGraw- Hill, 2013

Online Learning Resources:

1. https://nptel.ac.in/courses/106/106/106106144/
2. http://peterindia.net/OperatingSystems.html

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III B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE: **B23AI53A**	**SOFTWARE ENGINEERING**						

COURSE OBJECTIVES

The objectives of this course are to introduce

- Software life cycle models, Software requirements and SRS document.
- Project Planning, quality control and ensuring good quality software.
- Software Testing strategies, use of CASE tools, Implementation issues, validation &verification procedures.

COURSE OUTCOMES

At the end of the course students will be able to

CO1: Identify the suitable Software Life cycle models in Software Engineering
CO2: Analyze the software management and requirements specifications of the SRS Documents
CO3: Analyze various design and Development solutions for Software Project
CO4: Compare and assess Various Testing and Quality management techniques
CO5: Analyze the concepts of CASE and software maintenance concepts

SYLLABUS:

UNIT-I

Introduction: Evolution, Software development projects, Exploratory style of software developments, Emergence of software engineering, Notable changes in software development practices, Computer system engineering.

Software Life Cycle Models: Basic concepts, Waterfall model and its extensions, Rapid application development, Agile development model, Spiral model.

UNIT-II

Software Project Management: Software project management complexities, Responsibilities of a software project manager, Metrics for project size estimation, Project estimation techniques, Empirical Estimation techniques, COCOMO, Halstead's software science, risk management.

Requirements Analysis and Specification: Requirements gathering and analysis, Software Requirements Specification (SRS), Formal system specification, Axiomatic specification, Algebraic specification, Executable specification and 4GL.

UNIT-III

Software Design: Overview of the design process, how to characterize a good software design? Layered arrangement of modules, Cohesion and Coupling. approaches to software design.Agility: Agility and the Cost of Change, Agile Process, Extreme Programming (XP), Other Agile Process Models, Tool Set for the Agile Process (Text Book 2)

Function-Oriented Software Design: Overview of SA/SD methodology, Structured analysis, Developing the DFD model of a system, Structured design, Detailed design, and Design Review.

User Interface Design: Characteristics of a good user interface,Basic concepts, Types of user interfaces, Fundamentals of component-based GUI development, and user interface design methodology.

UNIT-IV

Coding and Testing: Coding, Code review, Software documentation, Testing, Black-box testing, White-Box testing, Debugging, Program analysis tools, Integration testing, testing object-oriented programs, Smoke testing, and Some general issues associated with testing.

Software Reliability and Quality Management: Software reliability. Statistical testing, Software quality Software quality management system, ISO9000.SEICapability maturity model. Few other Important quality standards, and SixSigma.

UNIT-V

Computer-Aided Software Engineering (Case): CASE and its scope, CASE environment, CASE support in the software life cycle, other characteristics of CASE tools, Towards second generation CASE Tool, and Architecture of a CASE Environment.

Software Maintenance: Characteristics of software maintenance, Software reverse engineering, Software maintenance process models and Estimation of maintenance cost.

Software Reuse: Reuse-definition,in troduction, reason behind no re uses ofar, Basic issues in any reuse program, A reuse approach, and Reuse at organization level.

TEXT BOOKS:

1.FundamentalsofSoftwareEngineering,RajibMall,5th Edition,PHI.
2.Software Engineering A Practitioner's Approach, Roger S. Pressman, 9th Edition, McGraw Hill International Edition.

REFERENCE BOOKS:

1.Software Engineering, Ian Sommerville,10th Edition,Pearson.
2.Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.

e-RESOURCES:

1) https://nptel.ac.in/courses/106/105/106105182/
2) https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_012605895063871488 27_shared/overview
3) https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01338269041100 3904735_shared/overview

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III B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE: **B23AI53B**	**CLOUD COMPUTING**						

COURSE OBJECTIVES:

- To explain the evolving utility computing model called cloud computing.
- To introduce the various levels of services offered by cloud.
- To discuss the fundamentals of cloud enabling technologies such as distributed computing, service-oriented architecture and virtualization.
- To emphasize the security and other challenges in cloud computing.
- To introduce the advanced concepts such as containers, serverless computing and cloud-centric Internet of Things.

COURSE OUTCOMES:

At the end of the course students will be able to

CO1: Understand the architecture and concept of different cloud models: IaaS, PaaS, SaaS.
CO2: Explain parallel and distributed computing
CO3: Examine taxonomy of virtualization techniques, virtualization and cloud Computing
CO4: Design and deploy cloud computing security and risk measures
CO5: Importance of Advanced concepts in cloud computing

SYLLABUS

UNIT -I

Introduction to Cloud Computing Fundamentals: Cloud computing at a glance, defining a cloud, cloud computing reference model, types of services (IaaS, PaaS, SaaS), cloud deployment models (public, private, hybrid), utility computing, cloud computing characteristics and benefits, cloud service providers (Amazon Web Services, Microsoft Azure, Google AppEngine).

UNIT-II

Cloud Enabling Technologies: Ubiquitous Internet, parallel and distributed computing, elements of parallel computing, hardware architectures for parallel computing (SISD, SIMD, MISD, MIMD), elements of distributed computing, Inter-process communication, technologies for distributed computing, remote procedure calls (RPC), service-oriented architecture (SOA), Web services, virtualization.

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UNIT-III

Virtualization and Containers: Characteristics of virtualized environments, taxonomy of virtualization techniques, virtualization and cloud Computing, pros and cons of virtualization, technology examples (XEN, VMware), building blocks of containers, container platforms (LXC, Docker), container orchestration, Docker Swarm and Kubernetes, public cloud VM (e.g. Amazon EC2) and container (e.g. Amazon Elastic Container Service) offerings.

UNIT-IV:

Cloud computing challenges: Economics of the cloud, cloud interoperability and standards, scalability and fault tolerance, energy efficiency in clouds, federated clouds, cloud computing security, fundamentals of computer security, cloud security architecture, cloud shared responsibility model, security in cloud deployment models.

UNIT -V

Advanced concepts in cloud computing: Server less computing, Function-as-a-Service, server less computing architecture, public cloud (e.g. AWS Lambda) and open-source (e.g. Open FaaS) server less platforms, Internet of Things (IoT), applications, cloud-centric IoT and layers, edge and fog computing, DevOps, infrastructure-as-code, quantum cloud computing.

TEXT BOOKS:

1. Mastering Cloud Computing, 2nd edition, Rajkumar Buyya, Christian Vecchiola, Thamarai Selvi, Shivananda Poojara, Satish N. Srirama, Mc Graw Hill, 2024.
2. Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.

REFERENCE BOOKS:

1. Cloud Computing, Theory and Practice, Dan C Marinescu, 2nd edition, MK Elsevier, 2018.
2. Essentials of cloud Computing, K. Chandrasekhran, CRC press, 2014.
3. Online documentation and tutorials from cloud service providers (e.g., AWS, Azure, GCP)

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III B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE: **B23AI53C**	**INTERNET OF THINGS**						

COURSE OBJECTIVES:

- Vision and Introduction to Internet of Things(IoT).
- Understand IoT Market perspective.
- Data and Knowledge Management and use of Devices in IoT Technology.
- Understand State of the Art – IoT Architecture.
- Understand Real World IoT Design Constraints, Industrial Automation and Commercial.

COURSE OUTCOMES:

At the end of the course students will be able to

CO1: Apply fundamental concepts and application protocols of the Internet of Things (IoT) including M2M communication
CO2: Analyze different IoT business models, market trends, and the role of standardizations in M2M/IoT system architecture.
CO3: Apply knowledge of device communication and protocols to design web connectivity and messaging systems
CO4: Organize and manage data acquisition, storage, and analytics in IoT/M2M
CO5: Evaluate real-world IoT systems considering technical constraints

SYLLABUS

UNIT-I

The Internet of Things: An Overview of Internet of things, Internet of Things Technology, behind IoTs Sources of the IoTs, M2M Communication, Examples of IoTs, Design Principles for Connected Devices Internet Connectivity Principles, Internet connectivity, Application Layer Protocols: HTTP, HTTPS, FTP, Telnet.

UNIT-II

Business Models for Business Processes in the Internet of Things,IoT/M2M systems LAYERS AND designs standardizations,Modified OSI Stack for the IoT/M2M Systems,ETSI M2M domains and High- level capabilities ,Communication Technologies, Data Enrichment and Consolidation and Device Management Gateway Ease of designing and affordability

UNIT-III

Design Principles for the Web Connectivity for Connected-Devices, Web Communication protocols for Connected Devices, Message Communication protocols for Connected Devices, Web Connectivity for Connected-Devices.

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UNIT-IV

Data Acquiring, Organizing and Analytics in IoT/M2M, Applications /Services /Business Processes, IOT/M2M Data Acquiring and Storage, Business Models for Business Processes in the Internet Of Things, Organizing Data, Transactions, Business Processes, Integration and Enterprise Systems.

UNIT-V

Data Collection, Storage and Computing Using a Cloud Platform for IoT/M2M Applications/Services, Data Collection, Storage and Computing Using cloud platform Everything as a service and Cloud Service Models, IOT cloud-based services using the Xively (Pachube/COSM), Nimbits and other platforms Sensor, Participatory Sensing, Actuator, Radio Frequency Identification, and Wireless, Sensor Network Technology, Sensors Technology, Sensing the World.

TEXT BOOKS:

1. Internet of Things: Architecture, Design Principles And Applications, Rajkamal, McGraw Hill Higher Education
2. Internet of Things, A.Bahgya and V.Madisetti, Univesity Press, 2015

REFERENCE BOOKS:

1. **Designing the Internet of Things, Adrian McEwen and Hakim Cassimally,Wiley**
2. Getting Started with the Internet of Things, CunoPfister ,Oreilly

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III B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE: **B23AI53D**	**EXPLORATORY DATA ANALYSIS WITH PYTHON**						

COURSE OBJECTIVES

The main objectives of the course are to

- Introduce the fundamentals of Exploratory Data Analysis
- Cover essential exploratory techniques for understanding multivariate data by
- summarizing it through statistical methods and graphical methods.
- Evaluate the Models and select the best model

COURSE OUTCOMES:

At the end of the course students will be able to

CO1: Understand the role of Exploratory Data Analysis (EDA) in the data science process and differentiate it from classical and Bayesian analysis.

CO2: Apply different chart types such as line, bar, scatter, bubble, and pie charts using libraries like mat plot lib and sea born.

CO3: Analyze the effects of mathematical operations involving NaNs and apply forward, backward, and index-based filling techniques.

CO4: Perform univariate, bivariate, and multivariate analysis to understand relationships among variables.

CO5: Select the best model based on comparative performance and prepare it for deployment

SYLLABUS

UNIT-I

Exploratory Data Analysis Fundamentals: Understanding data science, the significance of EDA, steps in EDA, Making sense of data, Numerical data, Categorical data, Measurement scales, Comparing EDA with classical and Bayesian analysis, Software tools available for EDA, Getting started with EDA.

Sample Experiments:

1. a) Download Dataset from Kaggle using the following link :
   https://www.kaggle.com/datasets/sukhmanibedi/cars4u
   b) Install python libraries required for Exploratory Data Analysis (numpy, pandas, matplotlib, seaborn)

2. Perform Numpy Array basic operations and Explore Numpy Built-in functions.
3. Loading Dataset into pandas dataframe
4. Selecting rows and columns in the dataframe

UNIT-II

Visual Aids for EDA: Technical requirements, Line chart, Bar charts, Scatter plot using seaborn, Polar chart, Histogram, Choosing the best chart

Case Study: EDA with Personal Email, Technical requirements, Loading the dataset, Data transformation, Data cleansing, Applying descriptive statistics, Data refactoring, Data analysis.

Sample Experiments:

1. Apply different visualization techniques using sample dataset
   a. Line Chart b. Bar Chart c. Scatter Plots d.Bubble Plot
2. Generate Scatter Plot using seaborn library for iris dataset
3. Apply following visualization Techniques for a sample dataset
   a. Area Plot b. Stacked Plot c. Pie chart d. Table Chart
4. Generate the following charts for a dataset.
   a. Polar Chart b. Histogram c.Lollipop chart
5. Case Study: Perform Exploratory Data Analysis with Personal Email Data

UNIT-III

Data Transformation: Merging database-style data frames, Concatenating along with an axis, Merging on index, Reshaping and pivoting, Transformation techniques, Handling missing data, Mathematical operations with NaN, Filling missing values, Discretization and binning, Outlier detection and filtering, Permutation and random sampling, Benefits of data transformation, Challenges.

Sample Experiments:

1. Perform the following operations
   a) Merging Dataframes b) Reshaping with Hierarchical Indexing
   c) Data Deduplication d) Replacing Values
2. Apply different Missing Data handling techniques
   a)NaN values in mathematical Operations b) Filling in missing data
   c) Forward and Backward filling of missing values d) Filling with index values
   e) Interpolation of missing values
3. Apply different data transformation techniques
   a) Renaming axis indexes b) Discretization and Binning
   c) Permutation and Random Sampling d) Dummy variables

UNIT-IV

Descriptive Statistics: Distribution function, Measures of central tendency, Measures of dispersion, Types of kurtosis, Calculating percentiles, Quartiles, Grouping Datasets, Correlation, Understanding univariate, bivariate, multivariate analysis, Time Series Analysis

Sample Experiments:

1. Study the following Distribution Techniques on a sample data
   a) Uniform Distribution b) Normal Distributionc) Gamma Distribution
   d) Exponential Distributione) Poisson Distribution f) Binomial Distribution
2. Perform Data Cleaning on a sample dataset.
3. Compute measure of Central Tendency on a sample dataset
   a) Mean b)Median c)Mode
4. Explore Measures of Dispersion on a sample dataset

a) Variance b) Standard Deviation c) Skewness d) Kurtosis

5. a) Calculating percentiles on sample dataset
   b) Calculate Inter Quartile Range(IQR) and Visualize using Box Plots
6. Perform the following analysis on automobile dataset.
   a) Bivariate analysis b)Multivariate analysis
7. Perform Time Series Analysis on Open Power systems dataset

UNIT-V

Model Development and Evaluation: Unified machine learning workflow, Data preprocessing, Data preparation, Training sets and corpus creation, Model creation and training, Model evaluation, Best model selection and evaluation, Model deployment

Case Study: EDA on Wine Quality Data Analysis

Sample Experiments:

1. Perform hypothesis testing using stats models library
   a) Z-Test b)T-Test
2. Develop model and Perform Model Evaluation using different metrics such as prediction score, R2 Score, MAE Score, MSE Score.
3. Case Study: Perform Exploratory Data Analysis with Wine Quality Dataset

TEXT BOOK:

1. Suresh Kumar Mukhiya, Usman Ahmed, Hands-On Exploratory Data Analysis with Python, Packt Publishing, 2020.

REFERENCE BOOKS:

1. Ronald K. Pearson, Exploratory Data Analysis Using R, CRC Press, 2020
2. RadhikaDatar, Harish Garg, Hands-On Exploratory Data Analysis with R: Become an expert in exploratory data analysis using R packages, 1st Edition, Packt Publishing, 2019

WEB REFERENCES:

1. https://github.com/PacktPublishing/Hands-on-Exploratory-Data-Analysis-with-Python
2. https://www.analyticsvidhya.com/blog/2022/07/step-by-step-exploratory-dataanalysis-eda-using-python/#h-conclusion
3. https://github.com/PacktPublishing/Exploratory-Data-Analysis-with-Python-Cookbook

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III B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE: **B23AI53E**	**AUTOMATA THEORY AND COMPILER DESIGN**						

COURSE OUTCOMES:

At the end of the course students will be able to

CO1: Understand the basic concepts of automata theory including alphabets, strings, languages, and problems
CO2: Construct parse trees and identify ambiguity in grammars and languages
CO3: Analyze the language accepted by a Turing Machine and its computational power.
CO4: Apply lexical analysis using tools such as Lex for token generation.
CO5: Analyze different evaluation orders for SDDs and apply translation schemes to annotated parse trees.

SYLLABUS

UNIT-I

Introduction to Finite Automata: Structural Representations, Automata and Complexity, the Central Concepts of Automata Theory – Alphabets, Strings, Languages, Problems. Nondeterministic Finite Automata: Formal Definition, an application, Text Search, Finite Automata with Epsilon-Transitions. **Deterministic Finite Automata:** Definition of DFA, How A DFA Process Strings, The language of DFA, Conversion of NFA with €-transitions to NFA without €-transitions. Conversion of NFA to DFA

UNIT-II

Regular Expressions: Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expressions, Conversion of Finite Automata to Regular Expressions. Pumping Lemma for Regular Languages: Statement of the pumping lemma, Applications of the Pumping Lemma. **Context-Free Grammars:** Definition of Context-Free Grammars, Derivations Using a Grammar, Leftmost and Rightmost Derivations, the Language of a Grammar, Parse Trees, Ambiguity in Grammars and Languages.

UNIT-III

Push Down Automata: Definition of the Pushdown Automaton, the Languages of a PDA, Equivalence of PDA's and CFG's, Acceptance by final state Turing Machines: Introduction to Turing Machine, Formal Description, Instantaneous description, The language of a Turing machine Un decidability: Un decidability, A Language that is Not Recursively Enumerable, An Un decidable Problem That is RE, Un decidable Problems about Turing Machines

UNIT-IV

Introduction: The structure of a compiler, Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Recognition of Tokens, The Lexical- Analyzer Generator Lex, Syntax Analysis: Introduction, Context-Free Grammars, Writing a Grammar, Top-Down Parsing, Bottom- Up Parsing, Introduction to LR Parsing: Simple LR, More Powerful LR Parsers R18 B.Tech. CS&D Syllabus JNTU Hyderabad

UNIT-V

Syntax-Directed Translation: Syntax-Directed Definitions, Evaluation Orders for SDD's, Syntax Directed Translation Schemes, Implementing L-Attributed SDD's. Intermediate-Code Generation: Variants of Syntax Trees, Three-Address Code Run-Time Environments: Stack Allocation of Space, Access to Nonlocal Data on the Stack, Heap Management

TEXT BOOKS:

1. Introduction to Automata Theory, Languages, and Computation, 3nd Edition, John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, Pearson Education.
2. Compilers: Principles, Techniques and Tools, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman, 2nd Edition, Pearson.
3. Theory of Computer Science – Automata languages and computation, Mishra and Chandrashekaran, 2nd Edition, PHI.

REFERENCE BOOKS:

1. Introduction to Formal languages Automata Theory and Computation, Kamala Krithivasan, Rama R, Pearson.
2. Introduction to Languages and The Theory of Computation, John C Martin, TMH.
3. lex&yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
4. Compiler Construction, Kenneth C. Louden, Thomson. Course Technology.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF CSE-AIML

III B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	0	0	30	70	100	3
SUBCODE: **B23CC51**	ENTREPRENEURSHIP						

COURSE OBJECTIVES:

1) To develop and strengthen entrepreneurial quality and motivation in students.
2) To impart basic entrepreneurial skills and understandings to run a business efficiently and effectively

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

- Study the concept of entrepreneurship , knowledge and skills of entreprenuer.
- Get the awareness on business environment
- Get the awareness on industrial policies
- Gain the competency on preparing business plan
- Study the impact of launching small business and understand resource planning for start up

SYLLABUS

UNIT-I

ENTREPRENEURAL COMPETENCE
Entrepreneurship concept – Entrepreneurship as a Career – Entrepreneurial Personality - Characteristics of Successful, Entrepreneur – Knowledge and Skills of Entrepreneur.

UNIT-II

ENTREPRENEURAL ENVIRONMENT
Business Environment - Role of Family and Society - Entrepreneurship Development Training and Other Support Organisational Services.

UNIT-III

INDUSTRIAL POLICIES
Central and State Government Industrial Policies and Regulations - International Business.

UNIT-IV

BUSINESS PLAN PREPARATION
Sources of Product for Business - Prefeasibility Study - Criteria for Selection of Product - Ownership - Capital - Budgeting Project Profile Preparation - Matching Entrepreneur with the Project - Feasibility Report Preparation and Evaluation Criteria.

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UNIT- V

LAUNCHING OF SMALL BUSINESS

Finance and Human Resource Mobilization Operations Planning - Market and Channel Selection - Growth Strategies - Product Launching – Incubation, Venture capital, IT start ups.
Monitoring and Evaluation of Business - Preventing Sickness and Rehabilitation of Business Units- Effective Management of small Business.

TEXT BOOKS

1. Hisrich, Entrepreneurship, Tata McGraw Hill, New Delhi, 2001.

2. S.S.Khanka, Entrepreneurial Development, S.Chand and Company Limited, NewDelhi, 2001.

REFERENCES

1. Mathew Manimala, Entrepreneurship Theory at the Crossroads, Paradigms &Praxis, Biztrantra ,2nd Edition ,2005
2. Prasanna Chandra, Projects – Planning, Analysis, Selection, Implementation and Reviews, Tata McGraw-Hill, 1996.
3. P.Saravanavel, Entrepreneurial Development, Ess Pee kay Publishing House, Chennai -1997.
4. Arya Kumar. Entrepreneurship. Pearson. 2012 5. Donald F Kuratko, T.V Rao. Entrepreneurship: A South Asian perspective. Cengage Learning. 2012

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DEPARTMENT OF CSE-AIML

III B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	0	0	3	30	70	100	1.5
SUBCODE: **B23AI56**	**INFORMATION RETRIEVAL LAB**						

COURSE OUTCOMES:

On completion of this course, the student will be able to

- Compute the similarity bet ween text documents
- Apply all pre-processing steps for text-data
- Implement classification of text documents.
- Perform document clustering using different algorithms.
- Implement Page Rank algorithm for any network.

Programming Language: Python/R

SYLLABUS

LAB EXPERIMENTS:

1. Representation of a Text Document in Vector Space Model and Computing Similarity between two documents.
2. Pre-processing of a Text Document: stop word removal and stemming
3. Construction of an Inverted Index for a given document collection comprising of at least 50 documents with a total vocabulary size of at least 1000 words.
4. Classification of a set of Text Documents into known classes (You may use any of the Classification algorithms like Naive Bayes, Max Entropy, Rochio's, Support Vector Machine). Standard Datasets will have to be used to show the results.
5. Text Document Clustering using K-means. Demonstrate with a standard dataset and compute performance measures- Purity, Precision, Recall and F-measure.
6. Crawling/ Searching the Web to collect news stories on a specific topic (based on user input). The program should have an option to limit the crawling to certain selected websites only.
7. To parse XML text, generate Web graph and compute topic specific page rank
8. Implement Matrix Decomposition and LSI for a standard dataset.
9. Mining Twitter to identify tweets for a specific period (and/or from a geographical location) and identify trends and named entities.
10. Implementation of PageRank on Scholarly Citation Network.

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DEPARTMENT OF CSE-AIML

III B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	0	0	3	30	70	100	1.5
SUBCODE: **B23CS57**	**COMPUTER NETWORKS LAB**						

SYLLABUS

LIST OF EXPERIMENTS:

1. Study of Network devices in detail and connect the computers in Local Area Network.
2. Write a Program to implement the data link layer farming methods such as
   i) Character stuffing ii) bit stuffing.
3. Write a Program to implement data link layer farming method checksum.
4. Write a program for Hamming Code generation for error detection and correction.
5. Write a Program to implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC CCIP.
6. Write a Program to implement Sliding window protocol for Goback N.
7. Write a Program to implement Sliding window protocol for Selective repeat.
8. Write a Program to implement Stop and Wait Protocol.
9. Write a program for congestion control using leaky bucket algorithm
10. Write a Program to implement Dijkstra's algorithm to compute the Shortest path through a graph.
11. Write a Program to implement Distance vector routing algorithm by obtaining routing table at each node (Take an example subnet graph with weights indicating delay between nodes).
12. Write a Program to implement Broadcast tree by taking subnet of hosts.
13. Wireshark
    i. Packet Capture Using Wire shark
    ii. Starting Wire shark
    iii. Viewing Captured Traffic
    iv. Analysis and Statistics & Filters.
14. How to run Nmap scan
15. Operating System Detection using Nmap
16. Do the following using NS2 Simulator
    i. NS2 Simulator-Introduction

ii. Simulate to Find the Number of Packets Dropped

iii. Simulate to Find the Number of Packets Dropped by TCP/UDP

iv. Simulate to Find the Number of Packets Dropped due to Congestion

v. Simulate to Compare Data Rate& Throughput.

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DEPARTMENT OF CSE-AIML

III B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	0	0	2	30	70	100	1
SUBCODE: **B23CS58**	**FULL STACK DEVELOPMENT- 2**						

COURSE OBJECTIVES

The main objectives of the course are to

- Make use of router, template engine and authentication using sessions to develop application in ExpressJS.
- Build a single page application using RESTful APIs in ExpressJS
- Apply router and hooksin designing ReactJS application
- Make use of MongoDB queries to perform CRUD operations on document database

SYLLABUS

Experiments covering the Topics:

- Typescript
- ExpressJS – Routing, HTTP Methods, Middleware, Templating, Form Data
- ExpressJS – Cookies, Sessions, Authentication, Database, RESTful APIs
- ReactJS – Render HTML, JSX, Components – function & Class, Props and States, Styles, Respond to Events
- ReactJS – Conditional Rendering, Rendering Lists, React Forms, React Router, Updating the Screen
- ReactJS – Hooks, Sharing data between Components, Applications – To-do list and Quiz
- MongoDB – Installation, Configuration, CRUD operations, Databases, Collections and Records

Sample Experiments:

1. Typescript

a. Write a program to understand simple and special types.
b. Write a program to understand function parameter and return types.
c. Write a program to show the importance with Arrow function. Use optional, default and REST parameters.
d. Write a program to understand the working of typescript with class, constructor, properties, methods and access specifiers.
e. Write a program to understand the working of namespaces and modules.
f. Write a program to understand generics with variables, functions and constraints.

2. Express JS – Routing, HTTP Methods, Middleware.

a. Write a program to define a route, Handling Routes, Route Parameters, Query Parameters and URL building.
b. Write a program to accept data, retrieve data and delete a specified resource using http methods.
c. Write a program to show the working of middleware.

3. Express JS – Templating, Form Data

a. Write a program using templating engine.
b. Write a program to work with form data.

4. Express JS – Cookies, Sessions, Authentication

a. Write a program for session management using cookies and sessions.
b. Write a program for user authentication.

5. ExpressJS – Database, RESTful APIs

a. Write a program to connect MongoDB database using Mangoose and perform CRUD operations.
b. Write a program to develop a single page application using RESTful APIs.

6. ReactJS – Render HTML, JSX, Components – function & Class

a. Write a program to render HTML to a web page.
b. Write a program for writing markup with JSX.
c. Write a program for creating and nesting components (function and class).

7. ReactJS – Props and States, Styles, Respond to Events

a. Write a program to work with props and states.
b. Write a program to add styles (CSS & Sass Styling) and display data.
c. Write a program for responding to events.

8. ReactJS – Conditional Rendering, Rendering Lists, React Forms

a. Write a program for conditional rendering.
b. Write a program for rendering lists.
c. Write a program for working with different form fields using react forms.

9. ReactJS – React Router, Updating the Screen

a. Write a program for routing to different pages using react router.
b. Write a program for updating the screen.

10. ReactJS – Hooks, Sharing data between Components

a. Write a program to understand the importance of using hooks.
b. Write a program for sharing data between components.

11. ReactJS Applications – To-do list and Quiz

a. Design to-do list application.

12. MongoDB – Installation, Configuration, CRUD operations

a. Install MongoDB and configure ATLAS
b. Write MongoDB queries to perform CRUD operations on document using insert(), find(), update(), remove()

13. MongoDB – Databases, Collections and Records

a. Write MongoDB queries to Create and drop databases and collections.
b. Write MongoDB queries to work with records using find(), limit(), sort(), createIndex(), aggregate().

14. Augmented Programs: (Any 2 must be completed)

a. Design a to-do list application using NodeJS and ExpressJS.
b. Design a Quiz app using ReactJS.
c. Complete the MongoDB certification from MongoDB University website.

TEXT BOOKS:

1. Programming the World Wide Web, 7th Edition, Robet W Sebesta, Pearson, 2013.
2. Pro MERN Stack: Full Stack Web App Development with Mongo, Express, React, and Node, Vasan Subramanian, 2nd edition, APress, O'Reilly.

Web Links:

1. ExpressJS - https://www.tutorialspoint.com/expressjs
2. ReactJS - https://www.w3schools.com/REACT (and) https://react.dev/learn#
3. MongoDB - https://learn.mongodb.com/learning-paths/introduction-to-mongodb

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III B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	0	0	3	30	70	100	1.5
SUBCODE: **B23CS59**	**TINKERING LAB** (USER INTERFACE DESIGN USING FLUTTER)						

COURSE OBJECTIVES:

- Learns to Implement Flutter Widgets and Layouts
- Understands Responsive UI Design and with Navigation in Flutter
- Knowledge on Widges and customize widgets for specific UI elements, Themes
- Understand to include animation apart from fetching data

SYLLABUS

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 BOOK:

1. Marco L. Napoli, Beginning Flutter: A Hands-on Guide to App Development.
2. Rap Payne, Beginning App Development with Flutter: Create Cross-Platform Mobile Apps 1st Edition, Apres.

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S.No.	Subject Code	SUBJECT	Cat. Code	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	L	T	P	CREDITS
1	B23AI61	Natural Language Processing	PC	30	70	100	3	0	0	3
2	B23AI62	Deep Learning	PC	30	70	100	3	0	0	3
3	B23AI63	Data Visualization	PC	30	70	100	3	0	0	3
4	B23CS64 B23AI64B B23AI64C B23AI64D	**Professional Elective-II** 1.Software Testing Methodology 2.Cryptography & Network Security 3.DevOps 4.Recommender Systems 5.Any of the 12-Week SWAYAM /NPTEL Course suggested by the BoS	PE	30	70	100	3	0	0	3
5	B23CS65A B23AI65B B23AI65C B23AI65D	**Professional Elective-III** 1.Software Project Management 2.Mobile Adhoc Networks 3.Computer Vision 4.NoSQL Databases 5.Any of the 12-Week SWAYAM /NPTEL Course suggested by the BoS	PE	30	70	100	3	0	0	3
6	B23AIO	**Open Elective-II**	OE	30	70	100	3	0	0	3
7	B23AI66	Deep Learning Lab	PC	30	70	100	0	0	3	1.5
8	B23AI67	Data Visualization Lab	PC	30	70	100	0	0	3	1.5
9	B23SH61	Soft skills	SEC	30	70	100	0	1	2	2
10	B23CC6A	Technical Paper Writing & IPR	AC	-	-	-	2	0	0	-
		Total					**20**	**1**	**08**	**23**

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DEPARTMENT OF CSE-AIML

III B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	0	0	30	70	100	3
SUBCODE: **B23AI61**	**NATURAL LANGUAGE PROCESSING**						

COURSE OBJECTIVES

- This course introduces the fundamental concepts and techniques of natural language
- processing (NLP).
- Students will gain an in-depth understanding of the computational properties of natural languages and the commonly used algorithms for processing linguistic information.
- The course examines NLP models and algorithms using both the traditional symbolic and the more recent statistical approaches.
- Enable students to be capable to describe the application based on natural language processing and to show the points of syntactic, semantic and pragmatic processing.

COURSE OUTCOMES:

At the end of the course students will be able to

CO1: Identify a given text with basic Language features
CO2: To design an innovative application using NLP components
CO3: Construct a rule based system to tackle morphology/syntax of a language
CO4: Design a tag set to be used for statistical processing for real-time applications
CO5: To compare and contrast the use of different statistical approaches for different types of NLP applications

SYLLABUS

UNIT-I

INTRODUCTION: Origins and challenges of NLP – Language Modeling: Grammar-based LM, Statistical LM – Regular Expressions, Finite-State Automata – English Morphology, Transducers for lexicon and rules, Tokenization, Detecting and Correcting Spelling Errors, Minimum Edit Distance.

UNIT-II

WORD LEVEL ANALYSIS: Unsmoothed N-grams, Evaluating N-grams, Smoothing, Interpolation and Back off – Word Classes, Part- of-Speech Tagging, Rule-based, Stochastic and Transformation-based tagging, Issues in PoS tagging – Hidden Markov and Maximum Entropy models.

UNIT-III

SYNTACTIC ANALYSIS: Context-Free Grammars, Grammar rules for English, Treebanks, Normal Forms for grammar – Dependency Grammar – Syntactic Parsing, Ambiguity, Dynamic Programming parsing – Shallow parsing Probabilistic CFG, Probabilistic CYK, Probabilistic Lexicalized CFGs – Feature structures, Unification of feature structures

UNIT-IV

SEMANTICS AND PRAGMATICS: Requirements for representation, First-Order Logic, Description Logics – Syntax-Driven Semantic analysis, Semantic attachments – Word Senses, Relations between Senses, Thematic Roles, selectional restrictions – Word Sense Disambiguation, WSD using Supervised, Dictionary & Thesaurus, Bootstrapping methods – Word Similarity using Thesaurus and Distributional methods.

UNIT-V

DISCOURSE ANALYSIS AND LEXICAL RESOURCES: Discourse segmentation, Coherence – Reference Phenomena, Anaphora Resolution using Hobbs and Centering Algorithm – Coreference Resolution – Resources: Porter Stemmer, Lemmatizer, Penn Treebank, Brill's Tagger, WordNet, Prop Bank, FrameNet, Brown Corpus, British National Corpus (BNC).

TEXT BOOKS:

1. Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech, 2nd Edition, Daniel Jurafsky, James H. Martin -Pearson Publication,2014.
2. Natural Language Processing with Python, First Edition, Steven Bird, Ewan Klein and Edward Loper, OReilly Media,2009.

REFERENCE BOOKS:

1. Language Processing with Java and Ling Pipe Cookbook, 1st Edition, Breck Baldwin, Atlantic Publisher, 2015.
2. Natural Language Processing with Java, 2nd Edition, Richard M Reese, OReilly Media,2015.
3. Handbook of Natural Language Processing, Second, Nitin Indurkhya and Fred J. Damerau, Chapman and Hall/CRC Press, 2010.Edition
4. Natural Language Processing and Information Retrieval, 3rd Edition, Tanveer Siddiqui, U.S. Tiwary, Oxford University Press,2008

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DEPARTMENT OF CSE-AIML

III B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	0	0	30	70	100	3
SUBCODE: **B23AI62**	**DEEP LEARNING**						

COURSE OBJECTIVES:

1. The objective of this course is to cover the fundamentals of neural networks as well as some advanced topics such as recurrent neural networks, long short-term memory cells and convolution neural networks.

COURSE OUTCOMES:

At the end of the course students will be able to

CO1: Choose the structure and function of a biological neuron and relate its features to artificial models like the McCulloch–Pitts unit and perceptron
CO2: Distinguish feed forward networks and Deep Neural networks
CO3: Mathematically choose the deep learning approaches and paradigms
CO4: Apply the deep learning techniques for various applications
CO5: Analyze and apply emerging deep learning architectures

SYLLABUS

UNIT-I

Basics- Biological Neuron, Idea of computational units, McCulloch–Pitts unit and Thresholding logic, Linear Perceptron, Perceptron Learning Algorithm, Linear separability, Convergence theorem for Perceptron Learning Algorithm.

UNIT-II

Feed forward Networks-Multilayer Perceptron, Gradient Descent,Back propagation, Empirical Risk Minimization, regularization, autoencoders.
Deep Neural Networks: Difficulty of training deep neural networks, Greedylayer wise training.

UNIT-III

Better Training of Neural Networks-Newer optimization methods for neural networks (Adagrad, adadelta, rmsprop, adam, NAG), second order methods for training,Saddle point problem in neural networks, Regularization methods (dropout, drop connect, batch normalization).

UNIT-IV

Recurrent Neural Networks- Back propagation through time, Long Short Term Memory, Gated Recurrent Units, Bidirectional LSTMs, Bidirectional RNNs.

Convolutional Neural Networks: LeNet, AlexNet. Generative models: Restrictive Boltzmann Machines (RBMs), Introduction to MCMC and Gibbs Sampling, gradient computations in RBMs, Deep Boltzmann Machines.

UNIT-V

Recent trends-Variational Auto encoders, Trans formers, GPT Applications: Vision, NLP, Speech

TEXTBOOKS:

1. Deep Learning, Ian Good fellow and Yoshua Bengio and Aaron Courville, MIT Press, 2016.

REFERENCEBOOKS:

1. NeuralNetworks:ASystematicIntroduction,RaúlRojas,1996
2. PatternRecognitionandMachineLearning,ChristopherBishop,2007
3. DeepLearningwithPython,FrançoisChollet,ManningPublications,2017

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DEPARTMENT OF CSE-AIML

III B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	0	0	30	70	100	3
SUBCODE: B23AI63	DATA VISUALIZATION						

COURSE OBJECTIVE

- Familiarize students with the basic and advanced techniques of information visualization and scientific visualization
- Learn key techniques of the visualization process
- A detailed view of visual perception, the visualized data and the actual visualization, interaction and distorting techniques

COURSE OUTCOMES:

At the end of the course students will be able to

CO1: Make use of the fundamentals of data visualization
CO2: Design effective visual representations by applying visualization models
CO3: Classify and apply appropriate visualization and interaction techniques for one-dimensional to multi-dimensional data
CO4: Develop visualizations for structured data types such as trees, graphs, clusters, and networks
CO5: Analyze and implement visualization strategies for complex datasets

SYLLABUS

UNIT-1
Introduction: What Is Visualization? History of Visualization, Relationship between Visualization and Other Fields the Visualization Process, Introduction of visual perception, visual representation of data, Gestalt principles, information overloads.

UNIT-II
Creating visual representations, visualization reference model, visual mapping, visual analytics, Design of visualization applications.

UNIT-III
Classification of visualization systems, Interaction and visualization techniques misleading, Visualization of one, two and multi-dimensional data, text and text documents.

UNIT-IV
Visualization of groups, trees, graphs, clusters, networks, software, Metaphorical visualization

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UNIT-V

Visualization of volumetric data, vector fields, processes and simulations, Visualization of maps, geographic information, GIS systems, collaborative visualizations, Evaluating visualizations

Recent trends in various perception techniques, various visualization techniques, data structures used in data visualization.

TEXTBOOK:

1. WARD, GRINSTEIN, KEIM.Interactive Data Visualization: Foundations, Techniques, and Applications. Natick : A K Peters, Ltd.
2. E. Tufte, The Visual Display of Quantitative Information, Graphics Press.

RESOURCES: https://kdd.cs.ksu.edu/Courses/CIS536/Lectures/Slides/Lecture-34-Main_6up.pdf

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III B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	0	0	30	70	100	3
SUBCODE: **B23CS64A**	**SOFTWARE TESTING METHODOLOGY**						

COURSE OBJECTIVES

- To provide knowledge of the concepts in software testing such as testing process, criteria, strategies, and methodologies.
- To develop skills in software test automation and management using the latest tools.

COURSE OUTCOMES:

At the end of the course students will be able to

CO1: Apply fundamental testing concepts and models to identify bugs and evaluate software reliability using path and flow graphs.
CO2: Analyze transaction flow, data flow, and domain testing techniques to assess software test coverage and effectiveness
CO3: Use logic-based testing strategies, such as decision tables and path expressions, to design effective test cases
CO4: Construct state graphs and perform transition testing to evaluate software behavior under different conditions
CO5: Implement software testing automation using tools like JMeter, Selenium, or Soap UI to validate software functionality and performance

SYLLABUS

UNIT-I

Introduction: Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs Flow graphs and Path testing: Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT-II

Transaction Flow Testing: transaction flows, transaction flow testing techniques.
Data Flow testing: Basics of data flow testing, strategies in data flow testing, application of data flow testing.
Domain Testing: domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

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DEPARTMENT OF CSE-AIML

UNIT-III

Paths, Path products and Regular expressions: path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

Logic Based Testing: overview, decision tables, path expressions, kv charts, specifications.

UNIT-IV

State, State Graphs and Transition testing: state graphs, good & bad state graphs, state testing, Testability tips.

UNIT-V:

Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like Jmeter/selenium/soapUI/Catalon).

TEXT BOOKS:

1. Software Testing techniques - BarisBeizer, 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.
4. Effective methods of Software Testing, Perry, John Wiley.
5. Art of Software Testing – Meyers, John Wiley.

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DEPARTMENT OF CSE-AIML

III B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	0	0	30	70	100	3
SUBCODE: **B23AI64B**	**CRYPTOGRAPHY & NETWORK SECURITY**						

COURSE OBJECTIVES:

1. Apply modular arithmetic in modern cryptography
2. Make use of Substitution and transposition transformations in Symmetric Encryption Algorithms.
3. Make use of number theory knowledge in Asymmetric Encryption algorithms.
4. Analyze various Hash functions and digital signatures for online authentication
5. Analyze network security protocols for providing better security

COURSE OUTCOMES

At the end of the course students will be able to

CO1: Apply modular arithmetic in modern cryptography

CO2: Make use of Substitution and transposition transformation Symmetric Encryption Algorithms

CO3: Make use of number theory knowledge in Asymmetric Encryption algorithms.

CO4: Analyze various Hash functions and digital signatures for online authentication

CO5: Analyze network security protocols for providing better security

SYLLABUS

UNIT-I

Security Concepts: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security Cryptography. Classical Encryption Techniques-symmetric cipher model, Substitution techniques, Transposition techniques, Rotor Machines, Steganography.

UNIT-II

Introduction to Symmetric Cryptography: Algebraic Structures-Groups, Rings, Fields, GF(2^n) fields, Polynomials.

Mathematics of Asymmetric cryptography: Primes, checkingfor Primness, Euler's phi-functions, Fermat's Little Theorem, Euler's Theorem, Generating Primes, Primality Testing, Factorization, Chinese Remainder Theorem, Quadratic Congruence, Exponentiation and Logarithm.

UNIT-III

Symmetric key Ciphers: Block Cipher principles, DES, AES, Blowfish, IDEA, Block cipher operation, Stream ciphers: RC4, RC5

Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, Diffie-Hellman Key Exchange, Elgamal Cryptographic system, Elliptic Curve Arithmetic, Elliptic Curve Cryptography.

UNIT-IV

Cryptographic Hash Functions: Applications of Cryptographic Hash Functions, Two Simple Hash Functions, Requirements and Security, Hash Functions Based on Cipher Block Chaining, Secure Hash Algorithms (SHA)

Message Authentication Codes: Message Authentication Requirements, Message Authentication Functions, Requirements for Message Authentication Codes, Security of MAC'S,MAC'S Based On Hash Functions: HMAC, MAC'S Based On Block Ciphers: DAA and CMAC

Digital Signatures: Digital Signatures, Elgamal Digital Signature Scheme, Elliptic Curve Digital Signature Algorithm, RSA-PSS Digital Signature Algorithm.

UNIT-V

Network and Internet Security: Transport-Level Security: Web Security Considerations, Transport Level Security, HTTPS, SSH.

IP Security: IP Security Overview, IP Security Policy, Encapsulating Security Payload, Authentication Header Protocol.

Electronic-Mail Security: Internet-mail Security, Email Format, Email Threats and Comprehensive Email Security, S/MIME, PGP.

TEXT BOOKS:

1. Cryptography and Network Security - Principles and Practice: William Stallings, Pearson Education, 7th Edition, 2017
2. Cryptography and Network Security: Behrouz A. ForouzanDebdeep, Mc Graw Hill, 3rd Edition, 2015

REFERENCE BOOKS:

1. Cryptography and Network Security: AtulKahate, Mc Graw Hill, 3rd Edition
2. Introduction to Cryptography with Coding Theory: Wade Trappe, Lawrence C. Washington, Pearson.
3. Modern Cryptography: Theory and Practice ByWenbo Mao. Pearson.

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DEPARTMENT OF CSE-AIML

III B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	0	3	30	70	100	4.5
SUBCODE: **B23AI64C**	**DEVOPS**						

COURSE OBJECTIVES:

The main objectives of this course are to:

1. Describe the agile relationship between development and IT operations.
2. Understand the skill sets and high-functioning teams involved in DevOps and related methods to reach a continuous delivery capability.
3. Implement automated system update and DevOps lifecycle.

COURSE OUTCOMES

At the end of the course students will be able to

CO1: Apply the principles of the DevOps lifecycle and architecture to integrate DevOps practices within Agile and traditional SDLC-based software projects

CO2: Apply version control operations using GIT and evaluate code quality through unit testing and tools like Sonar Qube

CO3: Develop and manage continuous integration pipelines using Jenkins, including job scheduling, user roles, and master-slave configurations.

CO4: Implement containerization and continuous deployment workflows using Docker and test applications using Selenium.

CO5: Deploy and manage applications using configuration management tools such as Ansible, Kubernetes/Open Shift, Puppet, and Chef.

SYLLABUS

UNIT-I

Introduction to DevOps: Introduction to SDLC, Agile Model. Introduction to DevOps. DevOps Features, DevOps Architecture, DevOps Lifecycle, Understanding Workflow and principles, Introduction to DevOps tools, Build Automation, Delivery Automation, Understanding Code Quality, Automation of CI/ CD. Release management, Scrum, Kanban, delivery pipeline, bottlenecks, examples

UNIT-II

Source Code Management(GIT): The need for source code control, The history of source code management, Roles and code, source code management system and migrations. What is Version Control and GIT, GIT Installation, GIT features, GIT workflow, working with remote repository, GIT commands, GIT branching, GIT staging and collaboration.

UNITTESTING-CODE COVERAGE: Junit, nUnit & Code Coverage with Sonar Qube, SonarQube - Code Quality Analysis.

UNIT-III

Build Automation - Continuous Integration (CI): Build Automation, what is CI Why Cl is Required, CI tools, Introduction to Jenkins (With Architecture), Jenkins workflow, Jenkins master slave architecture, Jenkins Pipelines, **PIPELINE BASICS** - Jenkins Master, Node, Agent, and Executor Freestyle Projects& Pipelines, Jenkins for Continuous Integration, Create and Manage Builds, User Management in Jenkins Schedule Builds, Launch Builds on Slave Nodes.

UNIT-IV

Continuous Delivery: Importance of Continuous Delivery, CONTINUOUS DEPLOYMENT CD Flow, Containerization with Docker: Introduction to Docker, Docker installation, Docker commands, Images & Containers, Docker File, running containers, working with containers and publish to DockerHub.

Testing Tools: Introduction to Selenium and its features, Java Script testing.

UNIT-V

Configuration Management - ANSIBLE: Introduction to Ansible, Ansible tasks Roles, Jinja2 templating, Vaults, Deployments using Ansible.

CONTAINERIZATION USING KUBERNETES(OPENSHIFT): Introduction to Kubernetes Namespace& Resources, CI/CD - On OCP, BC, DC&ConfigMaps, Deploying Apps on Open shift Container Pods. Introduction to Puppet master and Chef.

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 written 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 developed in 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. Developtestcasesfortheabovecontainerizedapplicationusingselenium.

TEXTBOOKS

1. Joyner, Joseph., Devops for Beginners: Devops Software Development Method Guide for Software Developers and It Professionals, 1st Edition MihailsKonoplows, 2015.
2. Alisson Machado de Menezes., Hands-on DevOps with Linux,1st Edition, BPB Publications, India, 2021.

REFERENCEBOOKS

1. Len Bass,Ingo Weber,Liming Zhu.DevOps: A software Architect's Perspective. Addison Wesley; ISBN-10
2. Gene Kim Je Humble, Patrick Debois, John Willis. The DevOps Handbook, 1st Edition, IT Revolution Press, 2016.
3. Verona,JoakimPracticalDevOps,1st Edition,PacktPublishing,2016.
4. JoakimVerona.Practical Devops,2nd Edition.Ingramshorttitle;2nd edition (2018). ISBN10: 1788392574
5. Deepak Gaikwad,Viral Thakkar.DevOpsToolsfrom Practitioner'sViewpoint.Wileypublications.ISBN:9788126579952

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III B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	0	0	30	70	100	3
SUBCODE: B23AI64D	**RECOMMENDER SYSTEMS**						

COURSE OBJECTIVES

- This course covers the basic concepts of recommender systems, including personalization algorithms, evaluation tools, and user experiences

COURSE OUTCOMES

At the end of the course students will be able to

CO1: Explain and apply basic linear algebra concepts in the context of recommender systems

CO2: Analyze potential vulnerabilities and evaluate attacks on collaborative recommender systems

CO3: Apply similarity-based retrieval methods for recommendation.

CO4: Compare and evaluate the effectiveness of different hybrid strategies

CO5: Examine social tagging and trust-based systems for enhancing recommendations.

SYLLABUS

UNIT-I

Introduction: Recommender system functions, Linear Algebra notation: Matrix addition, Multiplication, transposition, and inverses, covariance matrices, Understanding ratings, Applications of recommendation systems, Issues with recommender system.

UNIT-II

Collaborative Filtering: User-based nearest neighbour recommendation, Item-based nearest neighbour recommendation, Model based and pre-processing based approaches, Attacks on collaborative recommender systems.

UNIT-III

Content-based recommendation: High level architecture of content-based systems, Advantages and drawbacks of content based filtering, Item profiles, discovering features of documents, obtaining item features from tags, representing item profiles, Methods for learning user profiles, Similarity based retrieval, Classification algorithms.

Knowledge based recommendation: Knowledge representation and reasoning, Constraint based recommenders, Case based recommenders.

UNIT-IV

Hybrid approaches: Opportunities for hybridization, Monolithic hybridization design: Feature combination, Feature augmentation, Parallelized hybridization design: Weighted, Switching, Mixed, Pipelined hybridization design: Cascade Meta-level, Limitations of hybridization strategies.

UNIT-V

Evaluating Recommender System: Introduction, General properties of evaluation research, Evaluation designs, Evaluation on historical datasets, Error metrics, Decision-Support metrics, User-Centred metrics.

Recommender Systems and communities: Communities, collaboration and recommender systems in personalized web search, Social tagging recommender systems, Trust and recommendations

TEXT BOOKS:

1. Jannach D., Zanker M. and FelFering A., Recommender Systems: An Introduction, Cambridge University Press(2011), 1st ed.
2. Ricci F., Rokach L., Shapira D., Kantor B.P., Recommender Systems Handbook, Springer(2011), 1st ed.

REFERENCES:

1. Manouselis N., Drachsler H., Verbert K., Duval E., Recommender Systems For Learning, Springer (2013), 1st ed.

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DEPARTMENT OF CSE-AIML

III B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	0	0	30	70	100	3
SUBCODE: **B23CS65A**	**SOFTWARE PROJECT MANAGEMENT**						

COURSE OBJECTIVES:

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

- To describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project
- To compare and differentiate organization structures and project tructures
- To implement a project to manage project schedule, expenses and resources with the application of suitable project management tools

COURSE OUTCOMES

At the end of the course students will be able to

CO1: Apply the concepts to be followed in the conventional software management
CO2: Apply the process model to perform software life cycle phases
CO3: Implement the project architecture based on different techniques and plans
CO4: Make use of responsibilities and activities to complete software projects successfully
CO5: Apply concepts of Agility and DevOps to perform software projects

SYLLABUS

UNIT-I
Conventional Software Management: The water fall model, conventional software Management performance.
Evolution of Software Economics: Software Economics, pragmatic software cost estimation.
Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.
The old way and the new: The principles of conventional software Engineering, principles of modern software management ,transitioning to an iterative process.

UNIT-II
Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases. **Artifacts of the process:** The artifactsets, Management artifacts, Engineering artifacts, program maticartifacts.

UNIT-III

Model based software architectures: A Management perspective and technical perspective.
Work Flows of the process: Software process work flows, Iteration workflows.
Check points of the process: Majorm ilestones, Minor Milestones, Periodic status assessments.
Iterative Process Planning: Work break down structures, planning guidelines, cost and schedule estimating, It eration planning process,P ragmatic planning.

UNIT-IV

Project Organizations and Responsibilities: Line-of-Business Organizations,Project Organizations, evolution of Organizations.
Process Automation: Automation Building blocks, The Project Environment.
Project Control and Process in strumentation: The seven core Metrics, Management in dicators, quality in dicators, life cycle expectations ,pragmatic Software Metrics, Metricsautomation.

UNIT-V

Agile Methodology, A DAPTing to Scrum, Patterns for Adopting Scrum, Iterating towards Agility.
Fundamentals of DevOps: Architecture, Deployments, Orchestration, Need, Instance of applications, DevOps delivery pipeline, DevOpseco system. DevOps adoption in projects: Technology aspects,Agilingcapabilities,Toolstackimplementation,Peopleaspect,processes

TEXTBOOKS:

1. Software Project Management,WalkerRoyce,PEA,2005.
2. Succeeding with Agile:Software Development Using Scrum,Mike Cohn,AddisonWesley.
3. The DevOps Handbook:How to Create World-Class Agility, Reliability,and Securityin Technology Organizations, Gene Kim, John Willis, Patrick Debois, Jez Humb,1st Edition,O'Reillypublications,2016.

REFERENCEBOOKS:

1. Software Project Management,BobHughes,3/e,MikeCotterell,TMH
2. Software Project Management, JoelHenry,PEA
3. Software Project Management inpractice, PankajJalote,PEA, 2005,
4. Effective Software Project Management,RobertK.Wysocki,Wiley,2006.
5. Project Management in IT,Kathy Schwalbe,Cengage.

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III B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	0	0	30	70	100	3
SUBCODE: **B23AI65B**	**MOBILE ADHOC AND SENSOR NETWORKS**						

COURSE OUTCOMES

At the end of the course students will be able to

CO1: Apply fundamental concepts of Ad Hoc and Wireless Sensor Networks (WSNs) to analyze their architecture, applications, and associated challenges

CO2: Design routing and transport layer protocols for Ad Hoc networks considering design constraints and performance requirements

CO3: Analyze security challenges and apply security protocols in Ad Hoc and Wireless Sensor Networks to protect against attacks

CO4: Model and evaluate data communication and energy consumption in sensor network deployments under various application scenarios

CO5: Implement and simulate WSN systems using sensor operating systems (TinyOS, TOSSIM) and node-level tools to assess network behavior

SYLLABUS

UNIT-I

Introduction- Adhoc networks. Mobile Ad-Hoc networking with a View of 4G Wireless, Off-the-Shelf Enables of Ad Hoc, IEEE 802.11 in Ad Hoc Networks:

UNIT-II

Protocols, Performance and Open Issues, Scatternet Formation in Bluetooth Networks, Antenna Beamforming and Power Control for Ad Hoc Networks, Topology Control in Wireless Ad Hoc Networks, Broadcasting and Activity Scheduling in Ad Hoc Networks.

UNIT-III

Location Discovery, Routing Approaches in Mobile AdHoc Networks, Energy-Efficient Communication in AdHoc Wireless, AdHoc Networks Security, Self-Organized and Cooperative Ad Hoc Networking.

UNIT-IV

Simulation and Modeling of Wireless, Mobile, and AdHoc Networks, Modeling Cross-Layering Interaction Using Inverse Optimization Algorithmic Challenges in Ad Hoc Networks.

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DEPARTMENT OF CSE-AIML

UNIT-V

Sensor Networks: Introduction to sensor network, Unique constraints and challenges, Localization and Tracking, Networking Sensors, Infrastructure establishment, Sensor Tasking and Control, Sensor network databases, Sensor Network Platforms and tools, Industrial Applications and Research directions.

TEXT BOOKS:

1. Mobile Adhoc Networks–Aggelou, George(McGraw-Hill).
2. Mobile Adhoc Networking –Stefano Basagni (Editor), Marco Conti(Editor), Silvia Giordano(Editor),Ivan Stojmenovi&Cacute (Editor) (Wiley-IEEE Press).

REFERENCES:

1. Wireless Sensor Networks: An Information Processing Approach–Feng Zhao,Leonidas Guibas(Elsevier).
2. Hand book of Sensor Networks: Algorithms and Architectures–Ivan Stojmenovi&Cacute(Wiley).

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DEPARTMENT OF CSE-AIML

III B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	0	0	30	70	100	3
SUBCODE: **B23AI65C**	**COMPUTER VISION**						

COURSE OBJECTIVES:

- To understand the Fundamental Concepts related to sources, shadows and shading
- To understand the Geometry of Multiple Views

COURSE OUTCOMES

At the end of the course students will be able to

CO1: Apply local shading models to analyze lighting effects and interpret image structures
CO2: Represent and analyze texture using oriented pyramids and local models
CO3: Apply principles of multi-camera systems to enhance scene understanding.
CO4: Analyze the robustness of model fitting methods in noisy or uncertain environments.
CO5: Evaluate real-world applications like mobile robot localization and medical image registration..

SYLLABUS

UNIT–I

CAMERAS: Pinhole Cameras Radiometry –Measuring Light: Light in Space, Light Surfaces, Important Special Cases Sources, Shadows, And Shading: Qualitative Radiometry, Sources and Their Effects, Local Shading Models, Application: Photometric Stereo, **inter reflections**: Global Shading Models Color: The Physics of Color, Human Color Perception, Representing Color, A Model for Image Color, Surface Color from Image Color.

UNIT-II:

Linear Filters: Linear Filters and Convolution, Shift Invariant Linear Systems, Spatial Frequency and Fourier Transforms, Sampling and Aliasing, Filters as Templates, **Edge Detection:** Noise, Estimating Derivatives, Detecting Edges Texture0: Representing Texture, Analysis (and Synthesis) Using Oriented Pyramids, Application: Synthesis by Sampling Local Models, Shape from Texture.

UNIT-III

The Geometry of Multiple Views: Two Views Stereopsis: Reconstruction, Human Stereopsis, Binocular Fusion, Using More Cameras Segmentation by Clustering: What is Segmentation? Human Vision: Grouping and Getstalt ,**Applications:** Shot Boundary Detection and Background Subtraction, Image Segmentation by Clustering Pixels, Segmentation by Graph-Theoretic Clustering,

UNIT-IV

Segmentation by Fitting a Model: The Hough Transform, Fitting Lines, Fitting Curves, fitting as a Probabilistic Inference Problem, Robustness Segmentation and Fitting Using Probabilistic Methods: Missing Data Problems, Fitting, and Segmentation, The EM Algorithm in Practice, tracking with Linear Dynamic Models: Tracking asan Abstract Inference Problem, Linear Dynamic Models, Kalman Filtering, Data Association, Applications and Examples

UNIT-V

Geometric Camera Models: Elements of Analytical Euclidean Geometry, Camera Parameters and the Perspective Projection, Affine Cameras and Affine Projection Equations Geometric Camera Calibration: Least-Squares Parameter Estimation, A Linear Approach to Camera Calibration, Taking Radial Distortion into Account, Analytical Photo grammetry,

Case study: Mobile Robot Localization Model- Based Vision: Initial Assumptions, Obtaining Hypotheses by Pose Consistency, Obtaining Hypotheses by pose Clustering, Obtaining Hypotheses Using Invariants, Verification, Case study: Registration In Medical Imaging Systems, Curved Surfaces and Alignment.

TEXT BOOKS:

1. David A. Forsyth and Jean Ponce: Computer Vision – A Modern Approach, PHI Learning (Indian Edition), 2009.

REFERENCE BOOKS:

1. E. R. Davies: Computer and Machine Vision – Theory, Algorithms and Practicalities, Elsevier (Academic Press), 4th edition, 2013.
2. R. C. Gonzalez and R. E. Woods "Digital Image Processing" Addison Wesley 2008. 3. Richard Szeliski "Computer Vision: Algorithms and Applications" Springer-Verlag London Limited 2011.

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DEPARTMENT OF CSE-AIML

III B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	0	0	30	70	100	3
SUBCODE: **B23AI65D**	**No SQL Databases**						

COURSE OUTCOMES:

At the end of the Course the student will be able to

CO1: Explain and compare different types of NoSQL Databases
CO2: Compare and contrast RDBMS with different NoSQL databases.
CO3: Demonstrate the detailed architecture and performance tune of Document-oriented NoSQL databases.
CO4: Explain performance tune of Key-Value Pair NoSQL databases.
CO5: Apply NoSQL development tools on different types of NoSQL Databases.

SYLLABUS

UNIT-I
Overview and History of NoSQL Databases. Definition of the Four Types of NoSQL Database, The Value of Relational Databases, Getting at Persistent Data, Concurrency, Integration, Impedance Mismatch, Application and Integration Databases, Attack of the Clusters, The Emergence of NoSQL, Key Points.

UNIT-II
Comparison of relational databases to new NoSQL stores, Mongo DB, Cassandra, HBASE, Neo4j use and deployment, Application, RDBMS approach, Challenges NoSQL approach, Key-Value and Document Data Models, Column-Family Stores, Aggregate-Oriented Databases. Replication and sharding, Map Reduce on databases. Distribution Models, Single Server, Sharding, Master-Slave Replication, Peer-to-Peer Replication, Combining Sharding and Replication.

UNIT-III
NoSQL Key/Value databases using MongoDB, Document Databases, Document oriented Database Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases, Event Logging, Content Management Systems, Blogging Platforms, Web Analytics or Real-Time Analytics, E-Commerce Applications, Complex Transactions Spanning Different Operations, Queries against Varying Aggregate Structure.

UNIT-IV
Column-oriented NoSQL databases using Apache HBASE, Column-oriented NoSQL databases using Apache Cassandra, Architecture of HBASE, Column-Family Data Store Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases, Event Logging, Content Management Systems, Blogging Platforms, Counters, Expiring Usage.

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UNIT-V

No SQL Key/Value databases using Riak, Key-Value Databases, Key-Value Store, Key-Value Store Features, Consistency, Transactions, Query Features, Structure of Data, Scaling, Suitable Use Cases, Storing Session Information, User Profiles, Preferences, Shopping Cart Data, Relationships among Data, Multi operation Transactions, Query by Data, Operations by Sets. Graph NoSQL databases using Neo4, NoSQL database development tools and programming languages, Graph Databases, Graph Database. Features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable Use Cases.

TEXT BOOKS:

1. Sadalage,P.&Fowler,NoSQLDistilled:ABriefGuidetotheEmergingWorldof PolyglotPersistence, Wiley Publications,1st Edition,2019.

WEB REFERENCES:

1. https://www.ibm.com/cloud/learn/nosql-databases
2. https://www.coursera.org/lecture/nosql-databases/introduction-to-nosql-VdRNp
3. https://www.geeksforgeeks.org/introduction-to-nosql/
4. https://www.javatpoint.com/nosql-databa

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DEPARTMENT OF CSE-AIML

III B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	0	0	3	30	70	100	1.5
SUBCODE: **B23AI66**	**DEEP LEARNING LAB**						

COURSE OUTCOMES:

On completion of this course, the student will be able to

- Implement deep neural networks to solve real world problems
- Choose appropriate pre-trained model to solve real time problem
- Interpret the results of two different deep learning models

Software Packages required:

- Keras
- Tensorflow
- PyTorch

COURSE OUTCOMES

At the end of the course students will be able to

CO1: Apply modular arithmetic in modern cryptography

CO2: Make use of Substitution and transposition transformation Symmetric Encryption Algorithms

CO3: Make use of number theory knowledge in Asymmetric Encryption algorithms.

CO4: Analyze various Hash functions and digital signatures for online authentication

CO5: Analyze network security protocols for providing better security

SYLLABUS

LIST OF EXPERIMENTS:

1. Implement multi-layer perceptron algorithm for MNIST Handwritten Digit Classification.
2. Design a neural network for classifying movie reviews (Binary Classification) using IMDB dataset.
3. Design a neural Network for classifying news wires (Multi class classification) using Reuters dataset.
4. Design a neural network for predicting house prices using Boston Housing Price dataset.

5. Build a Convolution Neural Network for MNIST Handwritten Digit Classification.
6. Build a Convolution Neural Network for simple image(dogs and Cats) Classification
7. Use a pre-trained convolution neural network (VGG16) for image classification.
8. Implement one hoten coding of words or characters.
9. Implement word embedding's for IMDB dataset.
10. Implement a Recurrent Neural Network for IMDB movie review classification problem.

TEXT BOOKS:

1. Reza ZadehandBharath Ram sundar, "Tensorflow for Deep Learning", O'Reilly publishers, 2018

REFERENCES:

1. https://github.com/fchollet/deep-learning-with-python-notebooks

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III B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	0	0	3	30	70	100	1.5
SUBCODE: **B23AI67**	**DATA VISUALIZATION LAB**						

COURSE OBJECTIVES:

- To visualize the different datasets using histograms, line charts.
- To understand the use of bar charts and box plots.
- To understand Scatter plots, mosaic plots
- To understand different Map visualizations
- To learn advanced graphs such as correlogram, heatmap and 3D graphs.

COURSE OUTCOMES:

At the end of the course student will be able to

- Visualize the different datasets using histograms, line charts.
- Make use of bar charts and box plots on different datasets
- Apply Scatter plots, mosaic plots in R for different datasets
- Apply different Map visualizations in R
- Create advanced graphs such as correlogram, heatmap and 3D graphs.

SYLLABUS

List of Experiments:

1. a) Load VADeaths (Death Rates in Virginia)dataset in R and visualize the data using different histograms.

   b) Load air quality dataset in R and visualize La Guardia Airport's dialy maximum temperature using histogram.
2. Load Air Passengers dataset in R and visualize the data using line chart that shows increase in air passengers over given time period.
3. a) Load iris dataset in R, visualize the data using different Bar Charts and also demonstrate the use of stacked plots.

   b) Load air quality dataset in R and visualize ozone concentration in air.

4. a) Load iris dataset in R, visualize the data using different Box plots including group by option and also use color palette to represent species.

   b) Load air quality dataset in R and visualize air quality parameters using box plots.

5. Visualize iris dataset using simple scatter, multivariate scatter plot and also visualize scatter plot matrix to visualize multiple variables across each other.
6. Load diamonds dataset in R and visualize the structure in datasets with large data points using hexagon binning and also add color palette then use the
7. Load Hair Eye Color dataset in R and plot categorical data using mosaic plot.
8. Load mtcars dataset in R and visualize data using heat map.
9. Install leaflet library in R and perform different map visualizations.
10. Visualize iris dataset using 3d graphs such as scatter3d, cloud, xyplot.
11. Make use of correlogram to visualize data in correlation matrices for iris dataset.
12. Install maps library in R and draw different map visualizations.

WEB REFERENCES:

1. https://www.analyticsvidhya.com/blog/2015/07/guide-data-visualization-r/
2. https://www.geeksforgeeks.org/data-visualization-in-r/

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III B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	0	1	2	30	70	100	2
SUBCODE: **B23SH61**	**SOFT SKILLS**						

COURSE OBJECTIVES:

- To equip the students with the skills to effectively communicate in English
- To train the students in interview skills, group discussions and presentation skills
- To motivate the students to develop confidence
- To enhance the students' interpersonal skills
- To improve the students' writing skills

COURSE OUTCOMES

At the end of the course students will be able to

CO1: Understand the corporate etiquette.
CO2: Make presentations effectively with appropriate body language
CO3: Students able to understand enhance their writing abilities
CO4: Be composed with positive attitude
CO5: Understand the core competencies to succeed in professional and personal

SYLLABUS

UNIT -I
Analytical Thinking & Listening Skills: Self-Introduction, Shaping Young Minds - A Talk by Azim Premji (Listening Activity), Self – Analysis, Developing Positive Attitude, Perception.
Communication Skills: Verbal Communication; Non Verbal Communication (Body Language)

UNIT-II
Self-Management Skills: Anger Management, Stress Management, Time Management, Six Thinking Hats, Team Building, Leadership Qualities
Etiquette: Social Etiquette, Business Etiquette, Telephone Etiquette, Dining Etiquette

UNIT-III
Standard Operation Methods: Basic Grammars, Tenses, Prepositions, Pronunciation, Letter Writing; Note Making, Note Taking, Minutes Preparation, Email & Letter Writing

UNIT-IV
Job-Oriented Skills: Group Discussion, Mock Group Discussions, Resume Preparation, Interview Skills, Mock Interviews

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF CSE-AIML

UNIT-V

Interpersonal relationships: Introduction, Importance, Types, Uses, Factors affecting interpersonal relationships, Accommodating different styles, Consequences of interpersonal relationships

TEXT BOOKS:

1. Barun K. Mitra, Personality Development and Soft Skills, Oxford University Press, 2011.
2. S.P. Dhanavel, English and Soft Skills, Orient Blackswan, 2010.

REFERENCE BOOKS:

1. R.S.Aggarwal, A Modern Approach to Verbal & Non-Verbal Reasoning, S.Chand& Company Ltd., 2018.
2. Raman, Meenakshi& Sharma, Sangeeta, Technical Communication Principles and Practice, Oxford University Press, 2011.

E-RESOURCES:

1. https://swayam-plus.swayam2.ac.in/courses/course-details?id=P_CAMBR_01

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF CSE-AIML

III B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	2	0	0	30	70	100	-
SUBCODE: **B23CC6A**	**TECHNICAL PAPER WRITING & IPR**						

COURSE OBJECTIVE:

- The course will explain the basic related to writing the technical reports and understanding the concepts related to formatting and structuring the report. This will help students to comprehend the concept of proofreading, proposals and practice

COURSE OUTCOMES

At the end of the course students will be able to

CO1: Understand the structure of the technical paper and its components

CO2: Review the literature and acquire the skills to write a technical paper for first submission

CO3: Understand the process and development of IPR.

CO4: Create awareness about the scope of patent rights.

CO5: Analyze the new developments in IPR include latest software

SYLLABUS

UNIT-I

Introduction: An introduction to writing technical reports, technical sentences formation, using transitions to join sentences, Using tenses for technical writing.

Planning and Structuring: Planning the report, identifying reader(s), Voice, Formatting and structuring the report, Sections of a technical report, Minutes of meeting writing.

UNIT-II

Drafting report and design issues: The use of drafts, Illustrations and graphics.

Final edits: Grammar, spelling, readability and writing in plain English: Writing in plain English, Jargon and final layout issues, Spelling, punctuation and Grammar, Padding, Paragraphs, Ambiguity.

UNIT-III

Proofreading and summaries: Proofreading, summaries, Activities on summaries. **Presenting final reports:** Printed presentation, Verbal presentation skills, Introduction to proposals and practice.

UNIT-IV

Using word processor: Adding a Table of Contents, Updating the Table of Contents, Deleting the Table of Contents, Adding an Index, Creating an Outline, Adding Comments, Tracking Changes, Viewing Changes, Additions, and Comments, Accepting and Rejecting Changes , Working with Footnotes and Endnotes, Inserting citations and Bibliography, Comparing Documents, Combining

Documents, Mark documents final and make them read only., Password protect Microsoft Word documents., Using Macros,

UNIT-V

Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of **Patenting and Development:** technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property

TEXT BOOKS:

1. Kompal Bansal &Parshit Bansal, "Fundamentals of IPR for Beginner's", 1st Ed., BS Publications, 2016.
2. William S. Pfeiffer and Kaye A. Adkins, "Technical Communication: A Practical Approach", Pearson.
3. Ramappa,T., "Intellectual Property Rights Under WTO", 2nd Ed., S Chand, 2015.

REFERENCE BOOKS:

1. Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011.
2. Day R, How to Write and Publish a Scientific Paper, Cambridge University Press (2006)

E-RESOURCES:

1. https://www.udemy.com/course/reportwriting/
2. https://www.udemy.com/course/professional-business-english-and-technical-report-writing/
3. https://www.udemy.com/course/betterbusinesswriting/

Open Electives, offered to other department students:

Open Elective I: Operating Systems / Computer Organization and Architecture
Open Elective II: Database Management Systems
Open Elective III: Object Oriented Programming Through Java
Open Elective IV: Computer Networks / Software Engineering / IOT Based Smart Systems

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF CSE-AIML

III B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE: B23CSO1A	**OPERATING SYSTEMS** Open Elective I						

COURSE OBJECTIVES

The main objectives of the course is to make student

- Understand the basic concepts and principles of operating systems, including process management, memory management, file systems, and Protection
- Make use of process scheduling algorithms and synchronization techniques to achieve better performance of a computer system.
- Illustrate different conditions for deadlock and their possible solutions.

COURSE OUTCOMES:

At the end of the course students will be able to

CO1: Make use of Different operating System Services and Implement System calls for the Services
CO2: Examine Different types of Algorithms for Process Scheduling and Compare the Scheduling Criteria
CO3: Organize Different Synchronization Tools for Concurrency and use different Mechanisms for Deadlock free
CO4: Organize Different Memory Management Strategies and Operate Different Algorithms Storage structure,
CO5: Organize File System management and Different File System protection Mechanisms

SYLLABUS

UNIT-I

Operating Systems Overview: Introduction, Operating system functions, Operating systems operations, Computing environments, Free and Open-Source Operating Systems System Structures: Operating System Services, User and Operating-System Interface, system calls, Types of System Calls.

UNIT-II

Processes: Process Concept, Process scheduling, Operations on processes, Inter-process communication. Threads and Concurrency: Multithreading models, Thread libraries, Threading issues. CPU Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms.

UNIT–III

Synchronization Tools: The Critical Section Problem, Peterson's Solution, Mutex Locks, Semaphores, Monitors, Classic problems of Synchronization.
Deadlocks: system Model, Deadlock characterization, Methods for handling Deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, Recovery from Deadlock.

UNIT-IV

Memory-Management Strategies: Introduction, Contiguous memory allocation, Paging, Structure of the Page Table, Swapping.
Virtual Memory Management: Introduction, Demand paging, Copy-on-write, Page replacement, Allocation of frames, Thrashing

UNIT-V

File System: File System Interface: File concept, Access methods, Directory Structure; File system Implementation: File-system structure, File-system Operations, Directory implementation, Allocation method, Frees pace Management, Disk Structure, Disk Scheduling.

TEXTBOOKS

1. Operating System Concepts, Silbers chatzA, GalvinPB, GagneG, 10thEdition, Wiley, 2018.
2. ModernOperatingSystems,TanenbaumAS,4thEdition, Pearson, 2016

REFERENCEBOOKS

1. OperatingSystems-InternalsandDesignPrinciples,StallingsW,9th edition, Pearson, 2018
2. OperatingSystems:AConceptBasedApproach,D.MDhamdhere,3rd Edition, McGraw- Hill, 2013

Online Learning Resources

https://nptel.ac.in/courses/106/106/106106144/
http://peterindia.net/OperatingSystems.html

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF CSE-AIML

III B.TECH I SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE: B23CSO1B	**COMPUTER ORGANIZATION AND ARCHITECTURE** Open Elective I						

COURSEOBJECTIVES:

The main objectives of the course is to

- Provide students with a comprehensive understanding of digital logic design principles and computer organization fundamentals
- Describe memory hierarchy concepts
- Explain input/output(I/O)systems and their interaction with the CPU, memory, and peripheral devices

COURSE OUTCOMES:

Student should be able to:

CO1: Analyze Digital Circuits using Binary Number systems, Boolean Algebra, K-maps.

CO2: Analyze the design procedures of Sequential circuits and identify functional units of a computer and register transfer operations

CO3: Identify appropriate addressing modes for specifying the location of an operand and the design of Hardwired and Micro programmed control unit

CO4: Analyze the concepts of memory organization its impact on computer cost/performance.

CO5: Organize the different ways of communicating with I/O devices and standard I/O Interfaces.

SYLLABUS:

UNIT–I

Data Representation: Binary Numbers, Fixed Point Representation. Floating Point Representation. Number base conversions, Octal and Hexadecimal Numbers, components, Signed binary numbers, Binary codes

Digital Logic Circuits-I: Basic Logic Functions, Logic gates, universal logic gates, Minimization of Logic expressions. K-Map Simplification.

UNIT–II

Digital Logic Circuits-II: Sequential Circuits, Flip-Flops, Binary counters, Registers, Shift Registers.

Basic Structure of Computers: Computer Types, Functional units, Basic operational concepts, Bus structures, Software, Performance, multiprocessors and multi computers.

UNIT–III

Computer Arithmetic: Addition and Subtraction of Signed Numbers, Design of Fast Adders, Multiplication of Positive Numbers, Signed-operand Multiplication, Floating-Point Numbers and Operations

Processor Organization: Fundamental Concepts, Execution of a Complete Instruction, Multiple-Bus Organization.

UNIT–IV

The Memory Organization: Basic Concepts, Semiconductor RAM Memories, Read-Only Memories, Speed, Size and Cost, Cache Memories, Performance Considerations, Virtual Memories, Memory Management Requirements, Secondary Storage

UNIT–V

Input / Output Organization: Accessing I/O Devices, Interrupts, Processor Examples, Direct Memory Access, Buses, Interface Circuits, Standard I/O Interfaces

TEXTBOOKS

1. Computer Organization, Carl Hamacher, Zvonko Vranesic, Safwat Zaky, 6thedition, McGraw Hill
2. DigitalDesign,6thEdition, M.Morris Mano, Pearson Education.
3. Computer Organization and Architecture, William Stallings, 11thEdition, Pearson.

REFERENCEBOOKS

1. Computer Systems Architecture, M.Moris Mano, 3rdEdition, Pearson
2. Computer Organization and Design, DavidA.Paterson, JohnL. Hennessy, Elsevier
3. FundamentalsofLogicDesign,Roth,5thEdition, Thomson

ONLINELEARNINGRESOURCES:

1. https://nptel.ac.in/courses/106/103/106103068/

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF CSE-AIML

III B.TECH II SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
				30	70	100	3
SUBCODE: B23CSO2A	**DATABASE MANAGEMENT SYSTEMS** **Open Elective II**						

COURSE OBJECTIVES:

The main objectives of the course is to

- Introduce database management systems and to give a good formal foundation on the relational model of data and usage of Relational Algebra
- Introduce the concepts of basic SQL as a universal Database language
- Demonstrate the principles behind systematic database design approaches by covering conceptual design, logical design through normalization
- Provide an overview of physical design of a database system, by discussing Database indexing techniques and storage techniques

COURSE OUTCOMES:

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

CO1: Utilize various fundamentals of DBMS.
CO2: Apply different relational database using SQL.
CO3: Develop Queries in RDBMS.
CO4: Analyze different levels of normal forms and normalization.
CO5: Analyze various transaction properties and indexing techniques

SYLLABUS

UNIT-I

Introduction: Database system, Characteristics (Database Vs File System), Database Users, Brief introduction of different Data Models; Concepts of Schema, Instance and data independence; Three tier schema architecture for data independence; Database system structure, environment, Centralized and Client Server architecture for the database. Entity Relationship Model: Introduction, Representation of entities, attributes, entity set, relationship, relationship set, constraints, sub classes, super class, inheritance, specialization, generalization using ER Diagrams.

UNIT-II

Relational Model: Introduction to relational model, concepts of domain, attribute ,tuple, relation, important ceofnull values, constraints(Domain, Keyconstraints,integrityconstraints)andtheirimportance,Relational Algebra, Relational Calculus. BASICSQL: Simple Database schema, data types, table definitions (create,alter), different DML operations(insert, delete, update).

UNIT-III

SQL:BasicSQLquerying(selectandproject)usingwhereclause,arithmetic & logical operations. Creating tables with relationship, implementation of key and integrity constraints, nested queries, sub queries, grouping, aggregation, ordering, implementation of different types of joins, view(updatable and non-updatable), relational set operations.

UNIT-IV

Schema Refinement (Normalization):Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency Lossless join and dependency preserving decomposition, (1NF,2NFand3NF), concept of surrogate key, Boyce- Codd Normal form (BCNF),MVD, Fourth normal form (4NF), Fifth Normal Form (5NF).

UNIT-V

Transaction Concept: Transaction State, ACID properties, Concurrent Executions, Serializability, Recoverability, lock based, time stamp based, optimistic, concurrency protocols, Deadlocks, Failure Classification, Storage, Recovery and Atomicity, Recovery algorithm.

TEXT BOOKS:

1) DatabaseManagementSystems,3rdedition, Raghurama Krishnan, Johannes Gehrke, TMH (For Chapters 2, 3, 4)
2) Database System Concepts,5thedition, Silberschatz, Korth, Sudarsan,TMH (For Chapter 1 and Chapter 5)

REFERENCE BOOKS:

1) IntroductiontoDatabaseSystems,8thedition, CJDate, Pearson.
2) DatabaseManagementSystem,6thedition, RamezElmasri, Shamkant B.Navathe, Pearson
3) Database Principles Fundamentals of Design Implementation and Management, Corlos Coronel, Steven Morris, Peter Robb, Cengage Learning.

Web-Resources

1) https://nptel.ac.in/courses/106/105/106105175/
2) https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_012758066672820224 56_shared/overview

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B.TECH SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE: B23CSO3A	**OBJECT ORIENTED PROGRAMMING THROUGH JAVA** **Open Elective III**						

COURSE OBJECTIVES:

The learning objectives of this course are to:

- Identify Java language components and how they work together in applications
- Learn the fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries.
- Learn how to extend Java classes with in heritance and dynamic binding and how to use exception handling in Java applications
- Understand how to design applications with threads in Java
- Understand how to use Java APIs for program development

COURSE OUTCOMES

At the end of the Course/Subject, the students will be able to:

CO1: Realize Java Concepts
CO2: Make use of the OOP's concepts in solving real world problems.
CO3: Apply the concept of Arrays and Implement a solution using Inheritance for a given problem.
CO4: Realize packages and Exception handling concepts
CO5: Design GUI Applications with JAVAFX Scene Builder

SYLLABUS

UNIT-I

Object Oriented Programming: Basic concepts, Principles,
Program Structure in Java: Introduction, Writing Simple Java Programs, Elements or Tokens in Java Programs, Java Statements, Command Line Arguments.
Data Types, Variables, and Operators :Introduction, Data Types in Java, Declaration of Variables, Data Types, Type Casting, Scope of Variable Identifier, Formatted Output with print f () Method. **Introduction to Operators**, Precedence and Associativity of Operators, Assignment Operator (=), Basic Arithmetic Operators, Increment (++) and Decrement (- -) Operators, Boolean Logical Operators, Bitwise Logical Operators.
Control Statements: Introduction, if Expression, Nested if Expressions, if–

else Expressions, Ternary Operator?:, Switch Statement, Iteration Statements, while Expression, do–while Loop, for Loop, Nested for Loop, For– Each for Loop, Break Statement, Continue Statement.

UNIT-II

Classes and Objects: Introduction, Class Declaration and Modifiers, Class Members, Declaration of Class Objects, Assigning One Object to Another, Access Control for Class Members, Accessing Private Members of Class, Constructor Methods for Class, Overloaded Constructor Methods.

Methods: Introduction, Defining Methods, Overloaded Methods, Overloaded Constructor Methods, Class Objects as Parameters in Methods.

UNIT-III

Arrays: Introduction, Declaration and Initialization of Arrays, Storage of Array in Computer Memory, Accessing Elements of Arrays, Operations on Array Elements, Assigning Array to Another Array, Dynamic Change of Array Size, Sorting of Array.

Inheritance: Introduction, Process of Inheritance, Types of Inheritances, Universal Super Class-Object Class, Access Control and Inheritance, Multilevel Inheritance, Method Overriding.

Interfaces: Introduction, Declaration of Interface, Implementation of Interface, Multiple Interfaces, Nested Interfaces, Inheritance of Interfaces, Default Methods in Interfaces.

UNIT-IV

Packages and Java Library: Introduction, Defining Package, Importing Packages and Classes into Programs, Path and Class Path, Access Control, Packages in Java SE, Java. lang Package and its Classes, Class Object, Enumeration, class Math, Formatter Class, Random Class, Time Package.

Exception Handling: Introduction, Hierarchy of Standard Exception Classes, Keywords throws and throw, try, catch, and finally Blocks, Multiple Catch Clauses, Unchecked Exceptions, Checked Exceptions.

Java I/O and File: JavaI/OAPI, standard I/O streams, types, Byte streams, Character streams, Scanner class, Files in Java(Text Book 2)

UNIT-V

String Handling in Java: Introduction, Interface Char Sequence, Class String, Methods for Extracting Characters from Strings, Comparison, Modifying, Searching; Class String Buffer.

Multithreaded Programming: Introduction, Need for Multiple Threads Multithreaded Programming for Multi-core Processor, Thread Class, Deadlock and Race Situations, Inter-thread Communication - Suspending, Resuming, and Stopping of Threads.

Java Database Connectivity: Introduction, JDBC Architecture, Installing My SQL and My SQL Connector/J, JDBC Environment Setup, Establishing JDBC Database Connections, Result Set Interface
(Text Book 3)

TEXTBOOKS:

1) JAVA one stepahead, Anitha Seth,B.L.Juneja, Oxford.
2) Joy with JAVA, Fundamentals of Object Oriented Programming, Debas is Samanta, Monalisa Sarma, Cambridge, 2023.
3) JAVA9forProgrammers,PaulDeitel, HarveyDeitel,4thEdition, Pearson.

REFERENCESBOOKS:

1) The complete Reference Java,11thedition, Herbert Schildt, TMH
2) Introduction to Java programming,7thEdition, YDaniel Liang, Pearson

ONLINERESOURCES:

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
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B.TECH SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE: B23CS04A	**SOFTWARE ENGINEERING** **Open Elective -IV**						

COURSE OBJECTIVES:

The objectives of this course are to introduce

- Software life cycle models, Soft ware requirements and SRS document.
- Project Planning, quality control and ensuring good quality software.
- Software Testing strategies, use of CASE tools, Implementation issues, validation & verification procedures.

COURSE OUTCOMES

At the end of the Course/Subject, the students will be able to:

CO1: Identify the suitable Software Life cycle models in Software Engineering
CO2: Analyze the software management and requirements specifications of the SRS Documents
CO3: Analyze various design and Development solutions for Software Project
CO4: Compare and assess Various Testing and Quality management techniques
CO5: Analyze the concepts of CASE and software maintenance concepts

SYLLABUS

UNIT-I

Introduction: Evolution, Software development projects, Exploratory style of software developments, Emergence of software engineering,

Software Life Cycle Models: Basic concepts, Waterfall model and its extensions, Rapid application development, Agile development model, Spiral model.

UNIT-II

Software Project Management: Software project management complexities, Responsibilities of a software project manager, Metrics for project size estimation, Project estimation techniques.

Requirements Analysis And Specification: Requirements gathering and analysis, Software Requirements Specification (SRS), Formal system specification, Axiomatic specification, Algebraic specification, Executable specification.

UNIT-III

Software Design: Overview of the design process, How to characterize a good software design? Layered arrangement of modules, Cohesion and Coupling. Approaches to software design.

Agility: Agility and the Cost of Change, Agile Process, Extreme Programming (XP), Other Agile Process Models, Tool Set for the Agile Process (Text Book 2)

Function Oriented Software Design: Overview of SA/SD methodology, Structured analysis, Developing the DFD model of a system,

User Interface Design: Characteristics of a good user interface, Basic concepts, Types of user interfaces, Fundamentals of component-based GUI development, and user interface design methodology.

UNIT-IV

Coding And Testing: Coding, Code review, Software documentation, Testing, Black-box testing, White-Box testing, Debugging.

Software Reliability And Quality Management: Software reliability. Statistical testing, Software quality, Software quality management system,

UNIT-V

Computer-Aided Software Engineering (Case): CASE and its scope, CASE environment, CASE support in the software lifecycle, other characteristics of CASE tools,

Software Maintenance: Characteristics of software maintenance, Software reverse engineering, Software maintenance process models.

Software Reuse: reuse- definition, introduction, reason behind no reuse so far, Basic issues in any reuse program, A reuse approach, and Reuse at organization level.

TEXTBOOKS:

1. Fundamentals of Software Engineering, RajibMall, 5thEdition,PHI.
2. Software Engineering A practitioner's Approach, RogerS. Pressman, 9th Edition, Mc-Graw Hill International Edition.

REFERENCEBOOKS:

1. Software Engineering, Ian So mmerville, 10thEdition, Pearson.
2. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.

e-Resources:

1) https://nptel.ac.in/courses/106/105/106105182/
2) https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01260589506387148827_shared/overview
3) https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01338269041100390473 5_shared/overview

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DEPARTMENT OF CSE-AIML

B.TECH SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE: B23CS52	**COMPUTER NETWORKS** **Open Elective -IV**						

COURSE OBJECTIVES

- To provide insight about networks, topologies, and the key concepts.
- To gain comprehensive knowledge about the layered communication architectures (OSI and TCP/IP) and its functionalities.
- To understand the principles, key protocols, design issues, and significance of each layers in ISO and TCP/IP.
- To know the basic concepts of network services and various network applications.

COURSE OUTCOMES:

At the end of the course students will be able to

CO1: Apply different network models & communication techniques, methods and protocol standards
CO2: Examine different transmission media for transferring error free data
CO3: Compare and Classify medium access control protocols Ethernet protocols
CO4: Examine the Network Layer Design Issues and internet protocols (IPV4 & IPV6).
CO5: Reflect application layer services and client server protocols working with the client server paradigms

SYLLABUS

UNIT-I

Introduction: Network Types, LAN, MAN, WAN, Network Topologies Reference models- The OSI Reference Model- the TCP/IP Reference Model - A Comparison of the OSI and TCP/IP Reference Models,
Physical Layer –Introduction to Guided Media- Twisted-pair cable, Coaxial cable and Fiber optic cable and introduction about unguided media.

UNIT-II

Data link layer: Design issues, **Framing**: fixed size framing, variable size framing, flow control, error control, error detection and correction codes, CRC, Checksum: idea, one's complement internet checksum, services provided to Network Layer, **Elementary Data Link Layer protocols**: simplex protocol, Simplex stop and wait, Simplex protocol for Noisy Channel.

UNIT-III

Media Access Control: Random Access: ALOHA, Carrier sense multiple access (CSMA), CSMA with Collision Detection, CSMA with Collision Avoidance, **Controlled Access:** Reservation, Polling, Token Passing,

Wired LANs: Ethernet, Ethernet Protocol, Standard Ethernet, Fast Ethernet(100 Mbps), Gigabit Ethernet, 10 Gigabit Ethernet.

UNIT-IV

The Network Layer Design Issues – Store and Forward Packet Switching-Services Provided to the Transport layer- Implementation of Connectionless Service-Implementation of Connection Oriented Service- Comparison of Virtual Circuit and Datagram Networks, Routing Algorithms-The Optimality principle-Shortest path, Flooding, Distance vector, Link state, Traffic Control Algorithm-Leaky bucket & Token bucket.

Internet Working: How networks differ- How networks can be connected- Tunnelling, internetwork routing-, Fragmentation, network layer in the internet – IP protocols-IP Version 4 protocol-IPV4 Header Format, IP addresses, The main IPV6 header, Comparison of IPV4 & IPV6.

UNIT-V

The Transport Layer: Transport layer protocols: Introduction-services- port number-User data gram protocol-User datagram-UDP services-UDP applications-Transmission control protocol: TCP services- TCP features- Segment

Application Layer – World Wide Web: HTTP, Electronic mail-Architecture- web based mail- email security- TELENET-local versus remote Logging-Domain Name System.

TEXT BOOKS:

1. Computer Networksm, Andrew S Tanenbaum, Fifth Edition. Pearson Education/PHI
2. Data Communications and Networks, Behrouz A. Forouzan, Fifth Edition TMH.

REFERENCES BOOKS:

1. Data Communications and Networks- Achut S Godbole, AtulKahate
2. Computer Networks, Mayank Dave, CENGAGE

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B.TECH SEMESTER	L	T	P	INTERNAL MARKS	EXTERNAL MARKS	TOTAL MARKS	CREDITS
	3	-	-	30	70	100	3
SUBCODE:	**IOT BASED SMART SYSTEMS** **Open Elective-V**						

COURSE OBJECTIVES:

- Vision and Introduction to Internet of Things(IoT).
- Understand IoT Market perspective.
- Data and Knowledge Management and use of Devices in IoT Technology.
- Understand State of the Art – IoT Architecture.
- Understand Real World IoT Design Constraints, Industrial Automation and Commercial.
-

COURSE OUTCOMES:

At the end of the course students will be able to

CO1: Describe the usage of the term 'the internet of things' in different contexts
CO2: Discover the various network protocols used in IoTand familiar with the key wireless technologies used in IoT systems, such as Wi-Fi, 6LoWPAN, Bluetooth and ZigBee
CO3: Define the role of big data, cloud computing and data analytics in a typical IoT system Design a simple IoT system made up of sensors, wireless network connection, data analytics and display/actuators, and write the necessary control software
CO4: Build and test a complete working IoT system

SYLLABUS

UNIT-I

The Internet of Things: An Overview of Internet of things, Internet of Things Technology, behind IoTs Sources of the IoTs, M2M Communication, Examples of IoTs, Design Principles for Connected Devices Internet Connectivity Principles, Internet connectivity, Application Layer Protocols: HTTP, HTTPS, FTP, Telnet.

UNIT-II

Business Models for Business Processes in the Internet of Things,IoT/M2M systems LAYERS AND designs standardizations,Modified OSI Stack for the IoT/M2M Systems,ETSI M2M domains and High- level capabilities ,Communication Technologies, Data Enrichment and Consolidation and Device Management Gateway Ease of designing and affordability

UNIT-III

Design Principles for the Web Connectivity for Connected-Devices, Web Communication protocols for Connected Devices, Message Communication protocols for Connected Devices, Web Connectivity for Connected-Devices.

UNIT-IV

Data Acquiring, Organizing and Analytics in IoT/M2M, Applications /Services /Business Processes, IOT/M2M Data Acquiring and Storage, Business Models for Business Processes in the Internet Of Things, Organizing Data, Transactions, Business Processes, Integration and Enterprise Systems.

UNIT-V

Data Collection, Storage and Computing Using a Cloud Platform for IoT/M2M Applications/Services, Data Collection, Storage and Computing Using cloud platform Everything as a service and Cloud Service Models, IOT cloud-based services using the Xively (Pachube/COSM), Nimbits and other platforms Sensor, Participatory Sensing, Actuator, Radio Frequency Identification, and Wireless, Sensor Network Technology, Sensors Technology, Sensing the World.

TEXT BOOKS:

1. Internet of Things: Architecture, Design Principles And Applications, Rajkamal, McGraw Hill Higher Education
2. Internet of Things, A.Bahgya and V.Madisetti, Univesity Press, 2015

REFERENCE BOOKS:

1. **Designing the Internet of Things, Adrian McEwen and Hakim Cassimally,Wiley**
2. Getting Started with the Internet of Things, CunoPfister ,Oreilly

Dr. M.H.M Krishna Prasad
JNTUK Nominee