R18
COURSE STRUCTURE
&
DETAILED SYLLABUS

COLLEGE CODE: C4

COMPUTER SCIENCE AND ENGINEERING
(Artificial Intelligence & Machine Learning)

For

B.TECH. FOUR YEAR DEGREE COURSE
(Applicable for the batches admitted from 2020-21)

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(An Autonomous Institution)

Narsampet, Warangal – 506 332
Telangana State, India

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES
(UGC-AUTONOMOUS)

B.TECH-CSE (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)
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I YEAR **I SEMESTER**

S.No	Subject Code	Subject Name	L	T	P	Credits
1	J1001	Mathematics-I (Linear Algebra & Calculus)	3	1	0	4
2	J1302	Engineering Graphics	1	0	4	3
3	J1202	Basic Electrical & Electronics Engineering	2	1	0	3
4	J1501	Programming For Problem Solving	3	1	0	4
5	J1203	Basic Electrical & Electronics Engineering Lab	0	0	3	1.5
6	J1502	Programming For Problem Solving Lab	0	0	3	1.5
7	J1507	IT and Engineering Workshop	1	0	2	2
		Total Credits	***10***	***3***	***12***	***19***

I YEAR **II SEMESTER**

S.No	Subject Code	Subject Name	L	T	P	Credits
1	J2002	Mathematics-II (ODE's and Multivariable Calculus)	3	1	0	4
2	J2007	Engineering Physics	3	1	0	4
3	J2008	Engineering Chemistry	3	1	0	4
4	J2011	English	2	0	0	2
5	J2508	Data Structures	3	0	0	3
6	J2509	Data Structures Lab	0	0	3	1.5
7	J2009	Engineering Physics & Engineering Chemistry Lab	0	0	3	1.5
8	J2012	English Language and Communication Skills Lab	0	0	2	1
		Total Credits	***14***	***3***	***8***	***21***

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II YEAR I SEM **III SEMESTER**

S.No	Subject Code	Subject Name	L	T	P	Credits
1	J3006	Applied Probability and Statistics	3	0	0	3
2	J3591	Introduction to Artificial Intelligence	3	0	0	3
3	J3419	Computer Organization	3	0	0	3
4	J3592	OOPs through Java	3	0	0	3
5	J3593	Python Programming	3	0	0	3
6	J3594	OOPs through Java Lab	0	0	2	1
7	J3595	Python Programming Lab	0	0	2	1
8	HSMC (H-102)	UHV-II ***(Mandatory Course)***	2	1	0	3
		Total Credits	***17***	***1***	***4***	***20***

II YR II SEM **IV SEMESTER**

S.No	Subject Code	Subject Name	L	T	P	Credits
1	J4004	Discrete Mathematics	3	0	0	3
2	J4596	Introduction to Machine Learning	3	0	0	3
3	J4518	Database Management Systems	3	0	0	3
4	J4513	Operating Systems	3	0	0	3
5	J4511	Design and Analysis of Algorithms	3	0	0	3
6	J4525	Database Management Systems Lab	0	0	4	2
7	J4516	Operating Systems Lab	0	0	3	1.5
8	J4597	ML Lab	0	0	3	1.5
		Total Credits	***15***	***0***	***10***	***20***
9	JMC02	Gender Sensitization ***(Mandatory Course)***	2	0	0	0

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III YR I SEM **V SEMESTER**

S.No	Subject Code	Subject Name	L	T	P	Credits
1	J5528	Computer Networks	3	0	0	3
3	J5598	Automata and Compiler Design	2	1	0	3
3	J5599	Introduction to Data Science	3	0	0	3
4	J5538	Data Mining	3	0	0	3
5		**Professional Elective –I**	3	0	0	3
6	J55100	Data Science Lab	0	0	4	2
7	J55101	Computer Networks And Compiler Design Lab	0	0	4	2
8	J5549	Data Mining Lab	0	0	4	2
		Total Credits	***14***	***1***	***12***	***21***
9	JMC03	Constitution of India***(Mandatory Course)***	**3**	**0**	**0**	0

III YR II SEM **VI SEMESTER**

S.No	Subject Code	Subject Name	L	T	P	Credits
1	J6520	Web Programming	2	1	0	3
2	J6535	Software Engineering	2	1	0	3
3		**Professional Elective –II**	2	1	0	3
4		**Professional Elective –III**	3	0	0	3
5		**Open Elective-I**	3	0	0	3
6	J6526	Web Programming Lab	0	0	4	2
7	J6537	OOAD Lab	0	0	2	1
8	J6580	Internship	0	0	2	1
		Total Credits	***12***	***3***	***8***	***19***

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IV YR I SEM **VII SEMESTER**

S.No	Subject Code	Subject Name	L	T	P	Credits
1	J75102	Information Security	3	0	0	3
2		**Open Elective-II**	3	0	0	3
3		**Professional Elective-IV**	2	1	0	3
4		**Professional Elective-V**	2	1	0	3
5	J75103	Information Security Lab	0	0	4	2
6	J75104	Data Analytics Lab	0	0	4	2
7	J7581	Mini Project	0	0	8	4
8	J7582	Technical Seminar	0	0	2	1
		Total Credits	***10***	***2***	***18***	***21***

IV YR II SEM **VIII SEMESTER**

S.No	Subject Code	Subject Name	L	T	P	Credits
1		**Open Elective-III**	3	0	0	3
2		**Open Elective-IV**	3	0	0	3
3		**Professional Elective-VI**	2	1	0	3
4	J8583	Comprehensive Viva-Voce	0	0	4	2
5	J8584	Major Project	0	0	16	8
		Total Credits	***8***	***1***	***20***	***19***
	J8585	**NSS***	**0**	**0**	**0**	**2**

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LIST OF PROFESSIONAL ELECTIVES

Professional Elective-I	**Professional Elective-II**
(J5533) Distributed Computing	(J6548) Software Testing Methodologies
(J5547) Cloud Computing	(J6559)Semantic Web and Social Networks
(J5553) Soft Computing	(J6570) Cyber security
(J5551) Internet of Things	(J6552)Human Computer Interaction
Professional Elective-III	**Professional Elective-IV**
(J6571) Genetic algorithm and its Applications	(J7456) Digital Image Processing
(J6572) Artificial Neural networks	(J7556) Natural Language Processing
(J6573) Fuzzy Logic and its Applications	(J7575) Statistical Machine Learning
(J6574)Computer Vision	(J7576) Nature Inspired Computing Techniques
Professional Elective-V	**Professional Elective-VI**
(J7577) Applied Machine Learning	(J8587) Advanced Algorithms
(J7578) Data Analytics	(J8588) Speech Systems
(J7579) Intelligent Machining	(J8589) Virtual Reality
(J7586) Deep Learning	(J8590) Block Chain Technology

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LIST OF OPEN ELECTIVES OFFERED AT COLLEGE LEVEL

Sl.No.	Subject code	Title
1.	**J_150**	Remote Sensing & GIS
2.	**J_151**	Traffic Engineering and Transportation Planning
3.	**J_152**	Disaster Preparedness & Planning
4.	**J_153**	Environmental Impact Assessment
5.	**J_219**	Control Systems
6.	**J_223**	Renewable Energy Sources
7.	**J_224**	Energy Storage Systems
8.	**J_238**	Industrial Electricals Systems
9.	**J_249**	Electrical Engineering Materials
10.	**J_250**	Neural Networks & Fuzzy Logic
11.	**J_351**	Basic Mechanical Engineering
12.	**J_352**	Applied Mechanics
13.	**J_353**	Material Science
14.	**J_354**	Basics of Thermodynamics
15.	**J_355**	Strength of Materials
16.	**J_356**	Modeling and Simulation of manufacturing systems
17.	**J_357**	Mechatronics
18.	**J_358**	Finite Element Analysis
19.	**J_359**	Nano Technology
20.	**J_402**	Signals and Systems
21.	**J_409**	Digital System Design
22.	**J_410**	Electromagnetic Waves and Transmission Lines
23.	**J_414**	IC Applications
24.	**J_415**	Digital Signal Processing
25.	**J_418**	Bio Medical Electronics
26.	**J_419**	Computer Organization
27.	**J_422**	Linear Control Systems
28.	**J_424**	Microprocessors and Microcontrollers
29.	**J_434**	Image and Video Processing
30.	**J_437**	Embedded Systems
31.	**J_447**	Wireless Sensor Networks
32.	**J_454**	Microprocessors and Interfacing
33.	**J_456**	Digital Image Processing
34.	**J_518**	Database Management Systems
35.	**J_528**	Computer Networks

36.	**J_529**	Machine Learning
37.	**J_538**	Data Mining
38.	**J_539**	Cryptography & Network Security
39.	**J_547**	Cloud Computing
40.	**J_551**	Internet of Things(IoT)
41.	**J_553**	Soft Computing
42.	**J_555**	Data Science & Big Data Analytics
43.	**J_556**	Natural Language Processing
44.	**J_559**	Semantic Web& Social Networks
45.	**J_560**	E-Commerce
46.	**J_563**	IT Infrastructure Management
47.	**J_564**	Mobile Application Development
48.	**J_565**	System Modeling and Simulation
49.	**J_566**	Free and Open Source Softwares
50.	**J_567**	Android Development
51.	**J_568**	Data Analysis using Open Source Tool
52.	**J_569**	IOS Development
53.	**J_E01**	Management Science
54.	**J_E02**	Managerial Economics and Financial Analysis
55.	**J_E03**	Total Quality Management
56.	**J_E04**	Global Marketing
57.	**J_E05**	Green Marketing
58.	**J_E06**	Intellectual Property Rights
59.	**J_E07**	Supply Chain Management
60.	**J_E08**	Statistical Quality Control
61.	**J_E09**	Financial Statement Analysis and Reporting
62.	**J_E10**	Micro Small Medium Enterprises Management
63.	**J_E11**	Entrepreneurship Development
64.	**J_E12**	Organizational Behavior
65.	**J_E13**	Industrial Management
66.	**J_E14**	Production and Operations Management
67.	**J_E15**	Economic Policies of India
68.		
Note: '_' represents the applicable semester code		
Note: The syllabus of open elective subjects is kept available in the Departments and website		

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(J1001) Mathematics-I

B.Tech. I Year I Sem: Common to All Branches

L	T	P	C
3	1	0	4

Objectives: To learn

- Types of matrices and their properties.
- Concept of a rank of the matrix and applying this concept to know theconsistency and solving the system of linear equations.
- Concept of eigenvalues and eigenvectors and to reduce the quadratic formto canonical form.
- Concept of Sequence.
- Concept of nature of the series.
- Geometrical approach to the mean value theorems and their applicationto the mathematical problems.
- Evaluation of surface areas and volumes of revolutions of curves.
- Evaluation of improper integrals using Beta and Gamma functions.
- Partial differentiation, concept of total derivative.
- Finding maxima and minima of function of two and three variables.

UNIT-I: Matrices

Matrices: Types of Matrices, Symmetric; Hermitian; Skew-symmetric; Skew- Hermitian; orthogonal matrices; Unitary Matrices; rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss- Jordanmethod; System of linear equations;solving system of Homogeneous and Non-Homogeneous equations. Gauss elimination method; Gauss Seidel Iteration Method.

UNIT-II: Eigen values and Eigen vectors

Linear Transformation and Orthogonal Transformation: Eigen values and Eigenvectors and their properties: Diagonalization of a matrix; Cayley-HamiltonTheorem (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: Sequences & Series

Sequence: Definition of a Sequence, limit; Convergent, Divergent and Oscillatory sequences.

Series: Convergent, Divergent and Oscillatory Series; Series of positive terms; Comparison test, p-test, D-Alembert‘s ratio test; Raabe‘s test; Cauchy‘s Integral Test; Cauchy‘s root test; logarithmic test. Alternating series: Leibnitz test; Alternating Convergent series: Absolute and Conditionally Convergence.

UNIT-IV: Calculus

Mean value theorems: Rolle‘s theorem, Lagrange‘s Mean value theorem with their Geometrical Interpretation and applications, Cauchy‘s Mean value Theorem. Taylor‘s Series. Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates), Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT-V: Multivariable calculus (Partial Differentiation and applications)

Definitions of Limit and continuity.
Partial Differentiation; Euler‘s Theorem; Total derivative; Jacobian; Functional dependence &independence, Maxima and minima of functions of two variablesand three variables using method of Lagrange multipliers.

Course outcomes :

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

- Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations.
- Find the Eigen values and Eigen vectors.
- Reduce the quadratic form to canonical form using orthogonaltransformations.
- Analyse the nature of sequence and series.
- Solve the applications on the mean value theorems.
- Evaluate the improper integrals using Beta and Gamma functions.
- Find the extreme values of functions of two variables with/ withoutconstraints.

Text Books :

- B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers,36 thEdition, 2010.
- Erwin kreyszig, Advanced Engineering Mathematics, 9thEdition, John Wiley&Sons,2006.
- G.B. Thomas and R.L. Finney, Calculus and Analytic geometry,9 thEdition,Pearson, Reprint, 2002.

References :

- N.P. Bali and Manish Goyal, A text book of Engineering Mathematics,LaxmiPublications, Reprint, 2008.
- Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill NewDelhi,11thReprint, 2010.

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(J1007) ENGINEERING PHYSICS

B.Tech I Year I Sem:

L	T	P	C
3	1	0	4

Objectives:

1. Enable the student to connect the historical development of quantum mechanics and learn the basic principles of quantum mechanics andemploys the Bloch's theorem to draw the band structure of solids on the basis of Kronig Penny model.
2. The students learn basic theory of semiconductors and principles and operations of optoelectronic devices.
3. The Students to understand the basic properties of light, Concepts of LASER and it's engineering applications.
4. Enable the students to learn the basic principles of dielectrics, magnetic superconductors and their engineering applications and also learn the preparation, dimensional characteristics of nano materials along with theirengineering applications.
5. Enable the students to learn about the types of oscillation, mechanics, which helps in analyzing and solving the engineering problems.

UNIT-I: Quantum Mechanics

Introduction to quantum mechanics**,** Wave nature of the particle, de-Broglie's hypothesis, Davisson and Germer's experiment, GP Thompson experiment, Heisen berg's uncertainty principle, Schrodinger time independent wave equation, Particle in one dimensional box.

Band theory of Solids: Electron in periodic potential – Bloch theorem**,** Kronig– Penny Model, Brillion zone concept, Effective mass of an electron, Origin of energy band formation-Classification of materials.

UNIT-II: Semiconductor Physics:

Introduction to intrinsic and extrinsic semiconductors, Carrier concentration in conduction band and valancy band of intrinsic and extrinsic semiconductor, Fermi level, Effect of carrier concentration and temperature on Fermi level, Hall Effect- Applications of semiconductors.

Semiconductor Optoelectronics: Radative and Non-radative recombination mechanisms in semiconductors, Formation of PN junction diode-V-I characteristics, Zener diode - characteristics, Solar cell and LED- Constructionand working mechanism.

UNIT-III: Optics

Huygens' principle, Superposition of waves and interference of light by wave front splitting and amplitude splitting; Young's double slit experiment, Newton's rings, Michelson interferometer, Farunhofer diffraction from a single slit, Diffraction grating and resolving power.

LASERS

Introduction-characteristics of lasers, absorption, spontaneous emission, stimulated emission, Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, Ruby laser, He-Ne laser, Semiconductor diode laser, applications of lasers in science, Engineering and Medicine.

UNIT-IV: Dielectric Materials

Introduction-Types of Polarizations, derivation for electronic and ionicpolarizabilities, internal fields in solids, Clausius Mossotti equation, Ferro electricity, structure of $BaTiO_3$, piezo-electricity.

Magnetic Materials

Introduction-origin of magnetic moment, Bohr Magneton, classification of Dia, Para and Ferro magnetic materials, Hysteresis curve, Soft and hard magnetic materials; Superconductivity- properties, BCS theory, Type –I &II Superconductors-Applications.

UNIT-V: Oscillations, waves

Simple harmonic motion, Damped and forced simple harmonic oscillator, damped harmonic oscillator – heavy, critical and light damping quality factor, forced mechanical oscillators, mechanical impedance, steady state motion of forced damped harmonic oscillator.

Mechanics

Motion of a rigid body in the plane; Rotation in the plane; Kinematics in a coordinatesystem rotating and translating in the plane; Angular momentum about a point of a rigid body in planar motion; Euler‘s laws of motion, their independence from Newton‘slaws, and their necessity in describing rigid body motion.

Outcomes :

1. The student learns about solving engineering solutions employing thequantum mechanical concepts.
2. The students learns about the physics of semiconductor materials andalong with their applications in science and engineering.
3. The student learns about the construction, working and applications ofLASER in engineering.
4. The students get exposure to dielectric and magnetic materials and theirengineering applications.
5. The students learn about theory of waves and oscillation and mechanicsof rigid bodies for engineering applications.

Text Books :

1. Introduction to Quantum Physics-Eisberg and Resnick.
2. J. Singh, Semiconductor Optoelectronics: Physics and Technology,McGraw-Hill Inc.
3. H.J. Pain, The Physics of vibrations and waves.
4. Quantum Mechanics- Decker.
5. Ian G. Main, Oscillations and waves in physics.

REFERENCE :

1. Engineering Physics, P.K Palanisamy, Scitech Publications.
2. Applied Physics- Dr. N Chandra Shaker and P. Appal Naidu.
3. Applied Physics for Engineers- P. Madhusudana rao, Academic PublishingCompany.
4. Engineering Physics, V. Rajandran, Tata mc. Graw Hill Book Publishers.
5. Introduction to Mechanics — MK Verma.

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(J1202) BASIC ELECTRICAL &ELECTRONICS ENGINEERING

B.Tech I Year I SEM:

L	T	P	C
2	1	0	3

Course Objective :

1. To understand the concepts of Basis Electrical Engineering parameters,quantities, and network theorems.
2. To analyze the steady state analysis of AC and DC circuits.
3. To Study the construction operation and analysis of transformers, DC andAC machines.
4. To Study the Operational Characteristics of Diodes and Rectifier Circuits.
5. To Study the Operational Characteristics of transistor, characteristics andits applications.

UNIT- I

Electrical Circuits: Circuits concept, R-L-C Parameters, Voltage and Current sources, Source Transformation, V–I relationship for Passive elements, Kirchoff's Laws, Network reduction techniques – series, parallel, series parallel,star/delta transformations, Nodal Analysis, Mesh analysis with DC excitations.

Network Theorems - Thevenin's, Norton's, Maximum Power Transfer, Superposition, Reciprocity Theorems with DC excitation.

UNIT- II

Single Phase AC Circuits - R.M.S. and Average values, Form Factor, steadystate analysis of series, Parallel and Series parallel Combinations of R, L and C with Sinusoidal excitation, concept of reactance, Impedance, Susceptance and Admittance – phase and phase difference, Concept of Power Factor, j- notation, complex and Polar forms of representation.

UNIT- III

D.C.Machines: Constructional features, Methods of Excitation, E.M.F. Equation and Applications, Torque development in D.C motor, Characteristics of DC motors, losses, Efficiency, Swinburne's test, Speed control of DC Shunt motors**Single Phase Transformers**: Construction and principle of operation, Development of No Load & On Load Phasor diagrams (Basic fundamentals only).

3-Phase Induction Motor: Constructional features, Principle of Operation (Basic fundamentals only).

UNIT- IV

P-N Junction Diode – Qualitative theory of P-N Junction, P-N Junction diode,V-I characteristic(Forward and Reverse), Temperature dependence, Ideal versuspractical, Static and dynamic resistances.

Rectifiers and Filters - The P-N junction as a rectifier - A Half Wave Rectifier, Ripple Factor, Full Wave Rectifier, Bridge Rectifier, Filters-Inductive and Capacitive with qualitative analysis.

UNIT- V

Bipolar Junction Transistor (BJT) - Construction, Principle of Operation, CB, CE and CC configurations.

Junction Field Effect Transistor - Construction, Principle of Operation, V-I Characteristic, Comparison of BJT and FET.

Zener Diode and SCR Devices- Zener diode characteristics, Use of Zener diode as simple regulator, Breakdown Mechanisms in Zener diode, Principleof Operation of SCR.(Basic fundamentals only).

TEXT BOOKS :

1. Electronic Devices and Circuits – R.L. Boylston and Louis Nashelsky, PEI/PHI, 9th Ed, 2006.
2. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, McGraw Hill Company, 6th edition.
3. Electrical Machines – by P.S.Bimbra.

REFERENCES :

1. Introduction to Electronic Devices and Circuits-Rober T. Paynter, Pearson Education.
2. Electronic Devices and Circuits -- K. Lal Kishore, B.S. Publications, 2nd Edition, 2005.
3. Electrical Machines – by J.B.Gupta.
4. Network Theory by N.C.Jagan & C.Lakshminarayana, B.S. Publications.
5. Network Theory by Sudhakar, Shyam Mohan Palli, TMH.

Course outcomes :

After going through this course the student gets a thorough knowledge on

1. Basic Electrical Circuits and Parameters.
2. The operational characteristics of A.C circuits and parameters.
3. Operation of the transformers in the energy conversion process, electromechanical. Energy conversion, construction operation characteristics of DC machines.
4. The constructional features and also fundamental and characteristics of diode and Rectifier Circuit.
5. The constructional features and also fundamental and characteristics of transistor. With which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

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(J1501) PROGRAMMING FOR PROBLEM SOLVING

B.Tech. I Year I SEM: CSE (AI&ML)

L	T	P	C
3	0	0	3

Course Objectives:
1. To introduces the basics of computers and information technology.
2. To educate problem solving techniques.
3. To impart programming skills in C language.
4. To practice structured programming to solve real life problems.
5. To study the concepts of Assembler, Macro Processor, Loader and Linker

Syllabus

UNIT-I
History and Classifications of Computers – Components of a Computer – Working Principle of Computer – Hardware – Software and its Types – Applications of Computers –Network and its Types – Internet and its services – Intranet– Extranet – Generations of Programming Languages Introduction to Number System.

UNIT-II
Problem solving techniques – Program development life-cycle – Algorithm – Complexities of Algorithm – Flowchart – Pseudo code. Introduction to C –C Program Structure – C tokens: Keyword, Identifiers, Constants, Variable, Data types (simple and user-defined) – Operators and its types – Operator Precedence – Expression Evaluation – Type Conversion – Input/output operations.

UNIT-III
Branching Statements – Looping Statements – Arrays – Multidimensional arrays. Functions: Function Prototype, Passing Arguments to Function – Call by Value and Call by Reference – Nested function call – Library Functions – User-defined Functions – Recursion. Strings – String I/O functions, String Library functions – Storage classes

UNIT-IV
Structures – Arrays and Structures – Nested structures – Structure as Argument to functions– Union Pointers – Declaration, Initialization and Accessing Pointer variable – Pointers and arrays – pointers as argument and return value – Pointers and strings - pointers and structures.

UNIT-V
Introduction to File Concepts in C – File types – I/O operations on files – File modes – Random access to files – Command line arguments. Dynamic Memory Allocation: MALLOC, CALLOC, FREE, REALLOC Introduction to preprocessor – Macro substitution directives – File inclusion directives –Compiler Control directives – Miscellaneous directives.

Text Books:

1. J. B. Dixit, –Computer Fundamentals and Programming in C‖, Firewall Media, 2009.
2. Balagurusamy. E, –Programming in ANSI C‖, Tata McGraw Hill, Sixth edition, 2012.
3.

Reference Books:

1. Ashok N Kamthane, –Computer Programming‖, Pearson education, Second Impression, 2008.
2. Venugopal.K and Kavichithra.C, –Computer Programming‖, New Age InternationalPublishers, First Edition, 2007.
3. Byron S Gottfried, –Programming with C‖, Schaum's Outlines, Second Edition, TataMcGraw-Hill, 2006.
4. Dromey R.G., –How to Solve it by Computer‖, Pearson Education, Fourth Reprint, 2007.
5. Kernighan,B.W and Ritchie,D.M, –The C Programming language‖, Second Edition, PearsonEducation, 2006.

Course Outcomes:

1. Know the fundamentals of computers
2. Uunderstand applying logical skills for problem solving3.Learn C programming language concepts
4. Apply C programming language concepts for problem solving
5. Gain knowledge in using memory management techniques in c programming

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(J1203) BASIC ELECTRICAL & ELECTRONICSENGINEERING LAB

B.Tech I Year I sem **L T P C**

0 0 3 1.5

List of Experiments :

1. Verification of Kirchhoff's Laws.
2. Verification of superposition and Reciprocity Theorems.
3. Verification of Maximum Power transfer theorem.
4. Experimental Determination of Thevenin's theorem.
5. Magnetization characteristics of DC Shunt Generator.
6. Swinburne's Test on DC shunt machine.
7. Brake test on DC shunt motor.
8. OC & SC tests on single phase transformer.
9. PN Junction Diode characteristics (Forward bias, Reverse bias).
10. Zener Diode Characteristics.
11. Transistor CE Characteristics (Input and Output).
12. Rectifier without filters (Full wave & Half wave).
13. Rectifier with filters (Full wave & Half wave).

Note: Student should perform 11 experiments out of 13 experiments.Experiments. 7 & 8 are optional.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J1502) PROGRAMMING FOR PROBLEM SOLVING LABORATORY

B.Tech. I Year I SEM: CSE (AI&ML)

L	T	P	C
0	0	4	2

Course Objectives:

1. To study and understand the use of OS commands
2. To expose the undergraduate students to the practical implementation of C Programmingconcepts
3. To improve students capability in applying C Programming for problem solving.
4. To make students use effective memory management techniques in programming
5. To expose students to modular programming concepts in problem solving

LIST OF EXPERIMENTS

Week 1: Study of OS commands

Week 2: Study of Compilation and execution of simple C programs

Week 3: Basic C

Programsa.Arithmetic

Operations

b. Area and Circumference of a circle

c. Swapping with and without Temporary Variables

Week 4: Programs using Branching statements

a. To check the number as Odd or Even

b. Greatest of Three Numbers

c. Counting Vowels

d. Grading based on Student‘s Mark

Week 5: Programs using Control Structures

a. Computing Factorial of a number

b. Fibonacci Series generation

c. Prime Number Checking

d. Computing Sum of Digit

Week 6: Programs using String Operations

a. Palindrome Checking

b. Searching and Sorting

Names **Week 7**: Programs

using Arrays **Week 8**:

Programs using Functions

a. Computing nCr

b. Factorial using Recursion

c. Call by Value and Call by Reference

Week 9: Programs using Structure

a. Student Information System

b. Employee Pay Slip Generation

c. Electricity Bill Generation

Week 10: Programs using Pointers

a. Pointer and Array

b. Pointer to function

c. Pointer to Structure

Week 11: Programs using File Operation

a. Counting No. of Lines, Characters and Black Spaces

b. Content copy from one file to another

c. Reading and Writing Data in File

Text Books:

1. J. B. Dixit, –Computer Fundamentals and Programming in C‖, Firewall Media, 2009.
2. Balagurusamy. E, –Programming in ANSI C‖, Tata McGraw Hill, Sixth edition, 2012.

Course Outcomes:

1. Learn practical implementation of C programming language concepts.
2. Debug and document programs in C.
3. Know usage of logical skills in developing C programs.
4. Apply effective memory management techniques for problem solving
5. Understand the file management techniques

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COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J1507) IT AND ENGINEERING WORKSHOP

B.Tech. I Year I SEM: CSE (AI&ML)

L	T	P	C
1	0	2	2

Course Objectives:

1. The IT Workshop is a training lab course to get training on PC Hardware, Internet & WorldWide Web and Productivity tools for documentation, Spreadsheet computations, and Presentation.
2. To introduce to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers, hardware and software level troubleshooting process.
3. To introduce connecting the PC on to the internet from home and workplace and effectively usage of the internet, Usage of web browsers, email, newsgroups and discussion forums.
4. To introduce the usage of Productivity tools in crafting professional word documents, excelSpread sheets and power point presentations using open office tools and LaTeX.
5. To provide hands on experience about use of different engineering materials, tools,equipmentsand processes those are common in the engineering field.

LIST OF EXPERIMENTS:

Machine Issues: (2 problems)

Problem 1: **Hardware Troubleshooting**: Students have to be given a PC which does not bootdue to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor followed by a viva.

Problem 2: a) Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified bythe instructor and followed by a viva.

b) OS Installation and Hard Drive PartitioningInternet & World Wide Web (4 Problems)

Problem 3: **Orientation & Connectivity Boot Camp:** Students should get connected to theirLocal Area Network,access the Internet and transfer files from one system to another system across the LAN. 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 theinstructors to simulate the WWW on the LAN.

Problem 4: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Problem 5: Search Engines & Netiquette: Students should know what search engines areand how to use the search engines. A few topics would be given to the studentsfor which they need to search on Google. This should be demonstrated to the instructors by the student.

Problem 6: 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 first install antivirus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers toblock pop ups, block active x downloads to avoid viruses and/or worms.

Productivity Tools: LaTeX and FOSS Text Processing Tools (4 Problems)

Problem 7: Document Preperation: The mentor needs to give an overview of LaTeX and FOSS tools: Importance of LaTeX and FOSS tools for text processing, Details ofthe four tasks and features that would be covered in each, Using LaTeX and text Processor – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

Problem 8: Using LaTeX and FOSS Text Processing Tools to create project certificate. Features to be covered: Formatting Fonts, Drop Cap, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, UsingDate and Time option in both LaTeX and FOSS Text Processing Tools.

Problem 9: Text Layouts :abstract Features to be covered:-Formatting Styles, Inserting table,Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Problem 10: Creating a Newsletter: Features to be covered:- Table of Content, Newspapercolumns, Images from files and clipart, Drawing toolbars and text highlights, Formatting Images, Textboxes and Paragraphs using FOSS.

Spreadsheet: (3 Problems)

Problem 11: Spreadsheet Orientation: The mentor needs to tell the importance of FOSS Spreadsheet tools, give the details of the four tasks and features that would becovered in each.

Problem 12: Using Spreadsheet –Accessing, overview of toolbars, saving files, Using help andresources, Creating a Scheduler **,** Gridlines, Format Cells, Summation, auto fill and Formatting Text.

Problem 13: Calculating GPA - Features to be covered:- Cell Referencing, Formulae in spreadsheet – average, standard deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Aggregates and lookups, Sorting, , Conditionalformatting

LaTeX and FOSS Slide shows (3 Problems)

Problem 14: Students will be working on basic slide show utilities and tools which help them create basic power point presentation. Topic covered during this problem includes: Slide Layouts, Inserting Text, Text high lighting Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and FOSS Tool. Students will be given model slide shows which need to be replicated. (Exactly how it‘s asked).

Problem 15: Second Problem helps students in making their presentations interactive. Topic covered during this problem includes: Hyperlinks, Inserting –Images, Image galleries, Audio, Video, Objects, Tables and Charts

Problem 16: Concentrating on the in and out of FOSS Slide shows and presentations in LaTeX. Helps them learn best practices in designing and preparing slide shows. Topic covered during this problem includes: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides.

Engineering Workshop

Workshop Practice: (Two exercises are required to perform from each trade)

1. Fitting
2. Carpentry
3. Tin – Smithy
4. House – wiring
5. Plumbing

Text Books:

1. Introduction to Information Technology, ITL Education Solutions limited, PearsonEducation.
2. LaTeX Companion – Leslie Lamport, PHI/Pearson.
3. Introduction to computers, Peter Norton, 6/e Mc Graw Hill.
4. Upgrading and Repairing, PC‘s 18th e, Scott Muller QUE, Pearson Education.
5. Complex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
6. IT Essentials PC Hardware and Software Companion Guide Third Edition
7. PC Hardware and A+ Handbook – Kate J. Chase PHI
8. Workshop Manual – P.Kannaiah / K.L.Narayana/Scitech Publishers.

Course Outcomes:

1. Apply knowledge for computer assembling and software installation.
2. Ability how to solve the trouble shooting problems.
3. Apply the tools for preparation of PPT, Documentation and budget sheet etc.
4. Usage of Web browsers to access Internet, Search Engines
5. Ability to apply the knowledge of FOSS and Practice on manufacturing of components usingworkshop trades including plumbing,fitting, carpentry, insmithy and house wiring.

Note: Students should be able to use FOSS like Open Office, Zoho Docs, Libre Office, Soft Maker Free Office, Google Doss, Think Free Online, Live Document etc.

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COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J2002) MATHEMATICS-II

ODE"s and Multivariable Calculus

B.Tech. I Year II Semester

L	T	P	C
3	1	0	4

Objectives :

To learn

- Methods of solving the differential equations of first and higher order.
- Evaluation of multiple integrals and their applications.
- The physical quantities involved in engineering field related to vector valued functions. The basic properties of vector valued functions and their applications to line, surface and volume integrals.

UNIT-I: First Order ODE

Exact, linear and Bernoulli's equations; Applications : Newton's law of cooling, Law of natural growth and decay; Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut'stype.

UNIT-II: Ordinary Differential Equations of Higher Order

Second order linear differential equations with constant coefficients: Non- Homogeneous terms of the type e^{ax}, sinax, cosax polynomials in x^m, $e^{ax}v(x)$ xv(x) and; method of variation of parameters; Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation.

UNIT-III: Multivariable Calculus (Integration)

Evaluation of Double Integrals (Cartesian and polar coordinates); change of order of integration (only Cartesian form); Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals.

Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals).

UNIT-IV: Vector Differentiation

Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Tangent plane and normal line. Vector Identities. Scalar potential functions. Solenoidal and Irrotational vectors.

UNIT-V: Vector Integration

Line, Surface and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

Course outcomes :

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

- Identify whether the given differential equation of first order is exact or not.
- Solve higher differential equation and apply the concept of differential equation to real world problems.
- Evaluate the multiple integrals and apply the concept to find areas and volumes, Evaluate the line,

surface and volume integrals and converting them from one to another.

Text Books :

- B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
- Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley&Sons,2006 G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition,Pearson, Reprint, 2002.

References :

- Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishes.
- S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

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COMPUTER SCIENCE AND ENGINEERING

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(J2007) ENGINEERING PHYSICS

B.Tech I Year II Sem: **L T P C**

3 1 0 4

Objectives :

1. Enable the student to connect the historical development of quantum mechanics and learn the basic principles of quantum mechanics andemploys the Bloch‘s theorem to draw the band structure of solids on the basis of Kronig Penny model.
2. The students learn basic theory of semiconductors and principles and operations of optoelectronic devices.
3. The Students to understand the basic properties of light, Concepts of LASER and it‘s engineering applications.
4. Enable the students to learn the basic principles of dielectrics, magnetic superconductors and their engineering applications and also learn the preparation, dimensional characteristics of nano materials along with theirengineering applications.
5. Enable the students to learn about the types of oscillation, mechanics, which helps in analyzing and solving the engineering problems.

UNIT-I: Quantum Mechanics

Introduction to quantum mechanics**,** Wave nature of the particle, de-Broglie‘s hypothesis, Davisson and Germer‘s experiment, GP Thompson experiment, Heisen berg‘s uncertainty principle, Schrodinger time independent wave equation, Particle in one dimensional box.

Band theory of Solids: Electron in periodic potential – Bloch theorem**,** Kronig– Penny Model, Brillion zone concept, Effective mass of an electron, Origin of energy band formation-Classification of materials.

UNIT-II: Semiconductor Physics:

Introduction to intrinsic and extrinsic semiconductors, Carrier concentration in conduction band and valancy band of intrinsic and extrinsic semiconductor, Fermi level, Effect of carrier concentration and temperature on Fermi level, Hall Effect- Applications of semiconductors.

Semiconductor Optoelectronics: Radative and Non-radative recombination mechanisms in semiconductors, Formation of PN junction diode-V-I characteristics, Zener diode - characteristics, Solar cell and LED- Constructionand working mechanism.

UNIT-III: Optics

Huygens‘ principle, Superposition of waves and interference of light by wave front splitting and amplitude splitting; Young‘s double slit experiment, Newton‘s rings, Michelson interferometer, Farunhofer diffraction from a single slit, Diffraction grating and resolving power.

LASERS

Introduction-characteristics of lasers, absorption, spontaneous emission, stimulated emission, Einstein‘s theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, Ruby laser, He-Ne laser, Semiconductor diode laser, applications of lasers in science, Engineering and Medicine.

UNIT-IV: Dielectric Materials

Introduction-Types of Polarizations, derivation for electronic and ionicpolarizabilities, internal fields in solids, Clausius Mossotti equation, Ferro electricity, structure of $BaTiO_3$, piezo-electricity.

Magnetic Materials

Introduction-origin of magnetic moment, Bohr Magneton, classification of Dia, Para and Ferro magnetic materials, Hysteresis curve, Soft and hard magnetic materials; Superconductivity- properties, BCS theory, Type –I &II Superconductors-Applications.

UNIT-V: Oscillations, waves

Simple harmonic motion, Damped and forced simple harmonic oscillator, damped harmonic oscillator – heavy, critical and light damping quality factor, forced mechanical oscillators, mechanical impedance, steady state motion of forced damped harmonic oscillator.

Mechanics

Motion of a rigid body in the plane; Rotation in the plane; Kinematics in a coordinatesystem rotating and translating in the plane; Angular momentum about a point of a rigid body in planar motion; Euler‘s laws of motion, their independence from Newton‘slaws, and their necessity in describing rigid body motion.

Outcomes :

1. The student learns about solving engineering solutions employing thequantum mechanical concepts.
2. The students learns about the physics of semiconductor materials andalong with their applications in science and engineering.
3. The student learns about the construction, working and applications ofLASER in engineering.
4. The students get exposure to dielectric and magnetic materials and theirengineering applications.
5. The students learn about theory of waves and oscillation and mechanicsof rigid bodies for engineering applications.

Text Books :

1. Introduction to Quantum Physics-Eisberg and Resnick.
2. J. Singh, Semiconductor Optoelectronics: Physics and Technology,McGraw-Hill Inc.
3. H.J. Pain, The Physics of vibrations and waves.
4. Quantum Mechanics- Decker.
5. Ian G. Main, Oscillations and waves in physics.

REFERENCE :

1. Engineering Physics, P.K Palanisamy, Scitech Publications.
2. Applied Physics- Dr. N Chandra Shaker and P. Appal Naidu.
3. Applied Physics for Engineers- P. Madhusudana rao, Academic PublishingCompany.
4. Engineering Physics, V. Rajandran, Tata mc. Graw Hill Book Publishers.
5. Introduction to Mechanics — MK Verma.

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COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J2008) ENGINEERING CHEMISTRY

B.Tech I year II sem.:

L	T	P	C
3	1	0	4

Course Objectives :

- To achieve the knowledge about various kinds of Orbitals & Splitting patterns.
- To know about the water quality and its parameters, learning the knowledgein the assessment of water quality and purification.
- To achieve the knowledge about various kinds of Electrochemical cellsand batteries and corrosion phenomenon.
- To understand the reactions, mechanism and stereochemistry of organicmolecules.
- Understand the principle, instrumentation and applications of Spectroscopictechniques.

Unit-1: Molecular structure and Theories of Bonding: (9)

Atomic and Molecular orbitals. Linear Combination of Atomic Orbitals (LCAO), molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N_2,O_2 and F_2 molecules. ð molecular orbitals of butadiene and benzene.

Crystal Field Theory (CFT): Salient Features of CFT – Crystal Field Splitting oftransition metalion d- orbitals in Tetrahedral, Octahedral and square planar geometries. Band structure of solids and effect of doping on conductance.

Unit-2: Water and its treatment: (9)

Introduction – hardness of water – Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness – Estimation ofhardness of water by complexometric method. Potable water and its specifications. Steps involved in treatment of water – Disinfection of water by chlorination and ozonization. Boiler feed water and its treatment – Calgon conditioning, Phosphate conditioning and Colloidal conditioning. External treatment of water – Ion exchange process. Desalination of water – Reverse osmosis. Numerical problems.

Unit-3: Electrochemistry and corrosion: (9)

Electro chemical cells – electrode potential, standard electrode potential, types of electrodes – calomel, Quinhydrone and glass electrode. Nernst equation Determination of pH of a solution by using quinhydrone and glass electrode. Electrochemical series and its applications. Numerical problems. Potentiometric

titrations. Batteries – Primary (Lithium cell) and secondary batteries (Lead – acid storage battery and Lithium ion battery).Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current cathodic methods. Surface coatings – metallic coatings – methods of application. Electroless plating of Nickel.

Unit-4: Stereochemistry, Reaction Mechanism and synthesis of drug molecules: (9)

Introduction to representation of 3-dimensional structures, Structural and stereoisomers, configurations, symmetry and chirality. Enantiomers, diastereomers, optical activity and Absolute configuration. Conformation alanalysis of n- butane. Substitution reactions: Nucleophilic substitution reactions: Mechanism

of S_N1, S_N2 reactions. Electrophilic and nucleophilic addition reactions: Addition of HBr to propene. Markownikoff and anti Markownikoff's additions. Grignard additions on carbonyl compounds. Elimination reactions: Dehydro halogenation of alkylhalides. Saytzeff rule. Oxidation reactions: Oxidation of alcohols using $KMnO_4$ and chromic acid.

Reduction reactions: reduction of carbonyl compounds using $LiAlH_4$& $NaBH_4$. Hydroboration of olefins. Structure, synthesis and pharmaceutical applicationsof Paracetamol and Aspirin.

Unit-5: Spectroscopic techniques and applications: (9)

Principles of spectroscopy, selection rules and applications of electronic spectroscopy. vibrational and rotational spectroscopy. Basic concepts of Nuclear magnetic resonance Spectroscopy, chemical shift. Introduction to Magnetic resonance imaging.

Course Outcomes :

- Students will gain the basic knowledge of atomic and molecular orbitals &Splitting patterns.
- They can understand the basic properties of water and its usage in domesticand industrial purposes.
- To gain the knowledge about the Electrochemical cells, batteries andcorrosion phenomenon.
- They learn about organic reactions and the stereochemistry of organicmolecules.
- They can predict potential applications of spectroscopy and practical utilityin order to become good engineers and entrepreneurs.

Text books :

- Text Book of Engineering Chemistry by A.Jayashree, Wiley publications,New Delhi.
- Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai PublishingCompany, New Delhi (2010).
- Text Book of Engineering Chemistry by Shashi Chawla.
- Engineering Chemistry by Rama Devi, Venkata Ramana Reddy andRath,Cengage learning, New Delhi. (2016).
- Text Book of Engineering Chemistry by C. Parameshwara Murthy. B.S.Publications.
- Text Book of Engineering Chemistry by Y. Bharathi kumari and JyotsnaCherikuri, VGS Publications.

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JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

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COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J2011) ENGLISH

B.Tech. I Year II Sem: **L T P C**

2 0 0 2

Introduction :

In view of the growing importance of English as a tool for global communicationand the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicativeand critical thinking competencies of Engineering students.

In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.

Learning Objectives: The course will help to

a. Improve the language proficiency of students in English with an emphasison Vocabulary, Grammar, Reading and Writing skills.

b. Equip students to study academic subjects more effectively and criticallyusing the theoretical and practical components of English syllabus.

c. Develop study skills and communication skills in formal and informalsituations.

Course Outcomes : Students should be able to

- Use English Language effectively in spoken and written forms.
- Comprehend the given texts and respond appropriately.
- Communicate confidently in various contexts and different cultures.
- Acquire basic proficiency in English including reading and listeningcomprehension, writing and speaking skills.

UNIT –I

„The Raman Effect‟ from the prescribed textbook „English for Engineers‟ published by Cambridge University Press.

Vocabulary Building: The Concept of Word Formation —The Use of Prefixesand Suffixes.

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

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

Basic Writing Skills: Sentence Structures - Use of Phrases and Clauses inSentences-Importance of Proper Punctuation- Techniques for writing precisely.

– **Paragraph writing** – Types, Structures and Features of a Paragraph - CreatingCoherence-Organizing Principles of Paragraphs in Documents.

UNIT –II

„Ancient Architecture in India‟ from the prescribed textbook „English forEngineers‟ published by Cambridge University Press.

Vocabulary: Synonyms and Antonyms.

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

Reading: Improving Comprehension Skills – Techniques for GoodComprehension.

Writing: Format of a Formal Letter-**Writing Formal Letters** E.g.., Letter ofComplaint, Letter of Requisition, Job Application with Resume.

UNIT –III

„Blue Jeans‟ from the prescribed textbook „English for Engineers‟ published by Cambridge University Press.

Vocabulary: Acquaintance with Prefixes and Suffixes from Foreign Languages in English to form Derivatives-Words from Foreign Languages and their Use inEnglish.

Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.

Reading: Sub-skills of Reading- Skimming and Scanning.

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

UNIT –IV

„What Should You Be Eating‟ from the prescribed textbook „English forEngineers‟ published by Cambridge University Press.

Vocabulary: Standard Abbreviations in English.

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Comprehension- Intensive Reading and Extensive Reading.

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

UNIT –V

„How a Chinese Billionaire Built Her Fortune‟ from the prescribed textbook „English for Engineers‟ published by Cambridge University Press. Vocabulary: Technical Vocabulary and their usage.

Grammar : Common Errors in English.

Reading : Reading Comprehension-Exercises for Practice.

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

Prescribed Textbook :

1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. CambridgeUniversity Press.

References :

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

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(J2508) DATA STRUCTURES

B.Tech. I Year II SEM: CSE (AI&ML)

L	T	P	C
3	1	0	4

Course Objectives:
1. Basic data structures and its usage in handling real world applications
2. Representing the data using linear data structures such as queues, circular queues, dequeue,priority queue, and using non-linear data structures such as trees
3. Representing and retrieving the data in the form of various types of trees and graph datastructures
4. Searching of data with the help of various search methods, to sort data using various sortingmethods
5. Store and retrieve data effectively using various hashing methods

Syllabus:

UNIT - I
Basic Concepts: Algorithm specification- Introduction, Performance analysis and measurement-Performance analysis, Performance measurement.
Arrays: The arrays as an abstract data type, the polynomial abstract data type, sparse matrices-Introduction, Sparse matrix representation, transposing a matrix.
Stacks and Queues: The stack abstract data Type, The queue abstract data type, Evaluation of expressions- Expressions, Postfix notations, Infix to postfix, Infix to prefix.

UNIT - II
Linked Lists: Singly linked lists and chains, Representing chains, Circular lists, Linked stacks and Queues, Polynomials, Doubly linked lists.
Trees: Introduction, Binary trees- The abstract data type, Properties of binary trees, Binary tree representations, Binary tree traversals and Tree iterator-Introduction, Inorder traversal, Preorder traversal, Postorder traversal, Iterative traversals. Threaded binary trees, Heaps, Binary search trees- Definition, Searching a binary search tree, Insertion into a binary search tree, Deletionfrom a binary search tree, Joining and Splitting binary search trees, Height of a binary searchtree.

UNIT - III
Graphs: The graph abstract data type- Introduction, Definition, Graph representation, Elementary graph operations- Depth first search, Breadth first search, Connected components, Spanning trees, Minimum cost spanning trees- Kruskal‘s algorithm, Prim‘s algorithms, Shortest paths- All pairs shortest paths.
Efficient Binary Search Trees: Optimal binary search trees, AVL trees.
Multiway Search Trees: M-way search trees, B-trees, B+ trees.

UNIT - IV

Sorting and Searching: Searching, Search techniques- Binary search, Fibonacci search, Sorting-Types of sorting, General sort concepts, Bubble sort, Insertion sort, Selection sort, Quicksort, Heap sort, Merge sort, Comparison of all sorting methods.

UNIT-V

Hashing: Introduction, Key terms and issues, Hash functions, Collision resolution strategies,Hash table overflow, Extendible hashing.

Text Book:

1. Ellis Horowitz, Sartaj Sahani, Dinesh Metha, –Fundamentals of Data Structures in C++‖, *Universities Press*, 2nd Edition, ISBN-978 81 7371 606 5, 2008.
2. Varsha H.Patil, –Data Structures Using C++‖, *Oxford University Press*, 1st Edition, ISBN-10:0-19-806623-6, ISBN-13: 978-0-19-806623-1, 2012 (Chapters: 9, 11)

Reference Books:

1. D. Samanta, –Classic Data Structures‖, *Prentice Hall India*, 2nd Edition, ISBN- 978-203-3731-2, 2009.
2. Mark Allen Weiss, –Data Structure & Algorithm Analysis in C++‖, *Pearson Education*, 3rdEdition, ISBN-10: 81-3171-474-8, ISBN-13:97-8813-1714-744, 2007.

Course Outcomes:

1. Implement the basics of data structures in handling real world applications
2. Represent data using linear data structures such as queues, circular queues, dequeue, priorityqueue, and using non-linear data structures such as trees and graphs
3. Represent and retrieve the data in the form of various non-linear data structures like trees andgraphs
4. Search for data with the help of various searching techniques 5.Store and retrieve data using various hashing techniques

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(J2509) DATA STRUCTURES LAB

B.Tech. I Year II SEM: CSE (AI&ML)

L	T	P	C
0	0	4	2

Course Objectives:
This course will develop students' knowledge in/on…
1. Concepts, operations and implementation details of various data structures
2. Implementing the different algorithms using C++ programming language
3. Improving the student capability in applying various data structures in different applications
4. Different types of sorting techniques
5. 5.Different types of searching techniques

LIST OF EXPERIMENTS:

Experiment-I
1. Program to implement array operations.
2. Program to display sparse representation for a given m*n matrix.
3. Program to read a sparse matrix and display its transpose.

Experiment-II
4. Program to perform addition of two sparse matrices.
5. Program to implement stack operations using arrays

Experiment-III
6. Program to implement multiple stacks in single array.
7. Program to convert infix expression into postfix.
8. Program to convert given infix expression into prefix notation.
9. Program to evaluate given postfix expression.

Experiment-IV
10. Program to implement queue operations using arrays.
11. Program to implement circular queue operations using arrays.

Experiment-V
12. Program to create single linked list and implement its operations.
i. Insert
ii. Delete
iii. Search
iv. Reverse
13. Program to create single linked list and implement its operations with separate header node.
i. Insert
ii. Delete
iii. Search
iv. Reverse

Experiment-VI
14. Program to implement double linked list and its operations.

15. Program to implement double linked list and its operations with separate header node.

Experiment-VII

16. Program to implement circular single linked list and its operations.
17. Program to implement circular double linked list and its operations.

Experiment-VIII

18. Program to implement stack operations using linked list.
19. Program to implement queue operations using linked list.

Experiment-IX

20. Implementation of binary tree and its traversal techniques using recursive and non recursivemethods.
21. Program to create a binary search tree and perform the tree operations.

a) Insertion of a node b) Deleting a node.

Experiment-X

22. Implement the following graph traversal techniques.

a) Depth first search b) Breadth first search.

Experiment-XI

23. Program to implement Fibonacci Search.
24. Program to implement insertion sort technique.
25. Program to implement selection sort technique.
26. Program to implement quick sort technique.

Experiment-XII

27. Program to implement merge sort technique.
28. Program to implement heap sort technique.

Text Book:

1. Ellis Horowitz, Sartaj Sahani, Dinesh Metha, –Fundamentals of Data Structures in C++‖,
Universities Press, 2nd Edition, ISBN-978 81 7371 606 5, 2008.
2. Varsha H.Patil, –Data Structures Using C++‖, *Oxford University Press*, 1st Edition, ISBN-10: 0-19-806623-6, ISBN-13: 978-0-19-806623-1, 2012 (Chapters: 9, 11)

Course Outcomes (COs):

Upon completion of this course, students will be able to…

1. Know practical knowledge about implementing various data structures using C++
2. Uunderstand the knowledge about how various data structures will be implemented likeArrays, stacks, queues, linked list, trees, and graphs
3. Implement various sorting techniques
4. Implement various searching techniques
5. Apply these data structures efficiently to develop different software applications

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(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J2009) ENGINEERING PHYSICS AND ENGINEERING CHEMISTRY LAB

B.Tech I Year II Sem:

L	T	P	C
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OBJECTIVES :

This course on Physical Sciences lab has been designed with 18 experiments in Physics and Chemistry. The objective of the course is that the student will have exposure to various experimental skills which is very essential for an engineering student. The experiments are selected from various areas ofphysics and chemistry like Physical Optics, Lasers, Fiber optics, waves and oscillations, semiconductors, Electricity, Conductometry, Potentiometry, etc... The student is also exposed to various tools like Screw Gauge, Vernier callipers, Physical balance, Spectrometer, Microscope, Viscometer, and stalagmometer, etc.

PHYSICS LAB (CYCLE-1)

(Any Six Experiments compulsory)

- Determination of Eenergy gap of semiconductor material of p-n junctiondiode.
- Determination of frequency of electrical vibrator by using Melde‘sexperiment.
- Determination of wavelength of LASER by using diffraction grating.
- Determination of rigidity modulus of a given wire using Torsional pendulum.
- R-C circuit analysis.
- Determination of Numerical aperture of a given optical fiber.
- Determination of the radious of curvature of plano-convex lens by formingNewton‘s rings.
- LED-characteristics.

CYCLE-2 CHEMISTRY LAB

- Determination of total hardness of water by complexometric method usingEDTA.
- Estimation of an HCl by Conductometric titrations.
- Estimation of Acetic acid by Conductometric titrations.
- Estimation of HCl by Potentiometric titrations.
- Determination of rate constant of acid catalysed hydrolysis of methyl acetate
- Synthesis of Aspirin and Paracetamol.
- Thin layer chromatography calculation of R_f values. egortho and para nitrophenols.
- Verification of freundlich adsorption isotherm-adsorption of acetic acid oncharcoal.
- Determination of viscosity of castor oil and ground nut oil by using Ostwald‘s viscometer.
- Determination of surface tension of a give liquid using stalagmometer.

Laboratory Manuals :

- Laboratory Manual Of Engineering Physics By Dr. Y.Aparna And Dr K.Venkateswara Rao (V.G.S Publishers).
- Practical Engineering Chemistry by K. Mukkanti, etal‘ B‘S‘ Publications,Hyderabad.

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(J1012) (J2012) ENGLISH LANUAGECOMMUNICATION SKILLS LAB

B.Tech. I Year--II Sem: **L T P C**

0 0 2 1

The Language Lab focuses on the production and practice of sounds of language.

It familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives :

1. To facilitate computer-assisted multi-media instruction enablingindividualized and independent language learning.
2. To sensitize the students to the nuances of English speech sounds, wordaccent, intonation and rhythm.
3. To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
4. To improve the fluency of students in spoken English and neutralize theirmother tongue influence.
5. To train students to use language appropriately for public speaking, groupdiscussions and interviews.

Learning Outcomes: Students will be able to attain

1. Better understanding of nuances of English language through audio- visualexperience and group activities.
2. Neutralization of accent for intelligibility.
3. Speaking skills with clarity and confidence which in turn enhances theiremployability skills.

Syllabus :

The language Lab shall have two parts :

Computer Assisted Language Learning (CALL) Lab.Interactive Communication Skills (ICS) Lab.

Listening Skills :

Objectives :

- To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation.
- To equip students with necessary training in listening, so that they can comprehend the speech of people of different backgrounds and regions.

- Students should be given practice in listening to the sounds of the languageto be able to recognize them, to distinguish between them to mark stress and recognize and use the right intonation in sentences.
- Listening for general content.
- Listening to fill up information.
- Intensive listening.
- Listening for specific information.

Speaking Skills :

Objectives :

- To make students aware of the role of speaking in English and itscontribution to their success.
- To enable students to express themselves fluently and appropriately insocial and professional contexts.
- Oral practice.
- Describing objects/situations/people.
- Role play.
- Just A Minute (JAM) Sessions.

Reading Skills :

Objectives :

To develop an awareness in the students about the significance of silent readingand comprehension.

- To develop the ability of students to guess the meanings of words fromcontext and grasp the overall message of the text, draw inferences etc.
- Skimming and Scanning the text.
- Understanding the gist of an argument.
- Identifying the topic sentence.
- Inferring lexical and contextual meaning.
- Understanding discourse features.

NOTE: The students will be trained in reading skills using the prescribed text for detailed study. They will be examined in reading and answering questions using ‗unseen' passages which may be taken from authentic texts, such as magazines/newspaper articles.

Writing Skills :

Objectives :

- To develop an awareness in the students about writing as an exact and formal skill.
- To equip them with the components of different forms of writing, beginningwith the lower order ones. Writing sentences.
- Use of appropriate vocabulary.
- Paragraph writing.
- Coherence and cohesiveness.
- Narration / description.
- Note Making.
- Formal and informal letter writing.

The following course content is prescribed for the Lab.Exercise – I

CALL Lab :

Understand : Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening.

Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.

ICS Lab :

Understand : Communication at Work Place- Spoken vs. Written language.

Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave –

Introducing Oneself and Others.

Exercise – IICALL Lab:
Understand: Structure of Syllables – Word Stress and Rhythm– Weak Formsand Strong Forms in Context.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and StrongForms in Context.

ICS Lab:
Understand: Features of Good Conversation – Non-verbal Communication.

Practice: Situational Dialogues – Role-Play- Expressions in Various Situations –
Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise - IIICALL Lab:
Understand: Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).

Practice: Common Indian Variants in Pronunciation – Differences in Britishand American Pronunciation.

ICS Lab:
Understand: How to make Formal Presentations.Practice: Formal Presentations.

Exercise – IVCALL Lab:
Understand: Listening for General Details.

Practice: Listening Comprehension Tests.

ICS Lab:
Understand: Public Speaking – Exposure to Structured Talks.Practice: Making a Short Speech – Extempore.

Exercise – VCALL Lab :
Understand: Listening for Specific Details.Practice: Listening Comprehension Tests.

ICS Lab:
Understand: Interview Skills.Practice: Mock Interviews.

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. **Computer Assisted Language Learning (CALL) Lab** has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.

System Requirement (Hardware component) :
Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications :

i) Computers with Suitable Configuration.

ii) High Fidelity Headphones.

2. **Interactive Communication Skills (ICS) Lab:** A Spacious room with movable chairs and audio-visual aids with a Public-Address System, a LCD and a projector etc.

Prescribed Lab Manuals:

- ELCS Lab Manual – A Workbook for CALL and ICS Lab Activities.Hyderabad, Orient Black Swan Pvt. Ltd. 2016. Print.
- Hart, Steve. Nair, Aravind R. and Bhambhani, Veena. EMBARK- Englishfor Undergraduates. Delhi. Cambridge University Press. 2016. Print.

Suggested Software :

- Cambridge Advanced Learner‘s dictionary with CD, Fourth edition.
- Oxford Advanced Learner‘s Compass, 8th Edition, with CD.
- Hancock, Mark. English Pronunciation in Use: Intermediate. UnitedKingdom. Cambridge University Press, 2007.
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS).

References :

- Mohanraj, Jayashree. Let Us Hear Them Speak. New Delhi: Sage Texts.2015. Print.
- Hancock, M. English Pronunciation in Use. Intermediate Cambridge. Cambridge University Press. 2009. Print.

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(J3006) APPLIED PROBABILITY AND STATISTICS

B.Tech. II Year I SEM: CSE (AI&ML)

L	T	P	C
3	0	0	3

Course Objectives:
1. To learn the theory of Probability, and probability distributions of single and multiplerandom variables
2. To learn the sampling theory and testing of hypothesis and making inferences
3. To learn stochastic process and Markov chains.

UNIT - I
Probability: Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules, Conditional Probability, Independence, and the Product Rule, Bayes' Rule. Random Variables and Probability Distributions: Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions, Statistical Independence.

UNIT - II
Mathematical Expectation: Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables, Chebyshev's Theorem. Discrete Probability Distributions: Introduction and Motivation, Binomial, Distribution, Geometric Distributions and Poisson distribution.

UNIT - III
Continuous Probability Distributions: Continuous Uniform Distribution, Normal Distribution, Areas under the Normal Curve, Applications of the Normal Distribution, Normal Approximation to the Binomial, Gamma and Exponential Distributions. Fundamental Sampling Distributions: Random Sampling, Some Important Statistics, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem, Sampling Distribution of S2, t –Distribution, F-Distribution.

UNIT - IV
Estimation & Tests of Hypotheses: Introduction, Statistical Inference, Classical Methods of Estimation.: Estimating the Mean, Standard Error of a Point Estimate, Prediction Intervals, Tolerance Limits, Estimating the Variance, Estimating a Proportion for single mean , Difference between Two Means, between Two Proportions for Two Samples and Maximum Likelihood Estimation. Statistical Hypotheses: General Concepts, Testing a Statistical Hypothesis, Tests Concerning a Single Mean, Tests on Two Means, Test on a Single Proportion, Two Samples: Tests on Two Proportions.

UNIT - V
Stochastic Processes and Markov Chains: Introduction to Stochastic processes-Markov process. Transition Probability, Transition Probability Matrix, First order and Higher order Markov process, nstep transition probabilities, Markov chain, Steady state condition, Markov analysis.

TEXT BOOKS:

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability &Statistics for Engineers & Scientists, 9th Ed. Pearson Publishers.
2. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khannapublications.
3. S. D. Sharma, Operations Research, Kedarnath and Ramnath Publishers, Meerut, Delhi

REFERENCE BOOKS:

1. T.T. Soong, Fundamentals of Probability And Statistics For Engineers, John Wiley &Sons Ltd, 2004.
2. Sheldon M Ross, Probability and statistics for Engineers and scientists, AcademicPress.

Course Outcomes: After learning the contents of this subject the student must be able to

1. Apply the concepts of probability and distributions to some case studies
2. Correlate the material of one unit to the material in other units
3. Resolve the potential misconceptions and hazards in each topic of study.

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(J3591) INTRODUCTION TO ARTIFICIAL INTELLIGENCE

B.Tech. II Year I SEM: CSE (AI&ML)

L	T	P	C
3	0	0	3

Course Objectives:

1. To learn the difference between optimal reasoning vs human like reasoning
2. To understand the notions of state space representation, exhaustive search, heuristic searchalong with the time and space complexities
3. To learn different knowledge representation techniques
4. To understand the applications of AI: namely Game Playing, Theorem Proving,ExpertSystems, Machine Learning and Natural Language Processing

UNIT - I

Introduction, History, Intelligent Systems, Foundations of AI, Sub areas of AI, Applications. Problem Solving - State-Space Search and Control Strategies: Introduction, General Problem Solving, Characteristics of Problem, Exhaustive Searches, Heuristic Search Techniques, Iterative-Deepening A*, Constraint Satisfaction. Game Playing, Bounded Look-ahead Strategy and use of Evaluation Functions, Alpha-Beta Pruning

UNIT - II

Logic Concepts and Logic Programming: Introduction, Propositional Calculus, Propositional Logic, Natural Deduction System, Axiomatic System, Semantic Tableau System in Propositional Logic, Resolution Refutation in Propositional Logic, Predicate Logic, Logic Programming. Knowledge Representation: Introduction, Approaches to Knowledge Representation, Knowledge Representation using Semantic Network, Extended Semantic Networks for KR, KnowledgeRepresentation using Frames.

UNIT - III

Expert System and Applications: Introduction, Phases in Building Expert Systems, Expert System Architecture, Expert Systems Vs Traditional Systems, Truth Maintenance Systems, Application of Expert Systems, List of Shells and Tools. Uncertainty Measure - Probability Theory: Introduction, Probability Theory, Bayesian Belief Networks, Certainty Factor Theory, Dempster-Shafer Theory.

UNIT-IV

Machine-Learning Paradigms: Introduction. Machine Learning Systems. Supervised and Unsupervised Learning. Inductive Learning. Learning Decision Trees (Text Book 2), Deductive Learning. Clustering, Support Vector Machines. Artificial Neural Networks: Introduction, Artificial Neural Networks, Single-Layer FeedForward Networks, Multi-Layer Feed-Forward Networks, Radial-Basis Function Networks, Design Issues of Artificial Neural Networks, Recurrent Networks.

UNIT-V

Advanced Knowledge Representation Techniques: Case Grammars, Semantic Web Natural Language Processing: Introduction, Sentence Analysis Phases, Grammars and Parsers, Types of Parsers, Semantic Analysis, Universal Networking Knowledge.

TEXT BOOKS:

1. Saroj Kaushik. Artificial Intelligence. Cengage Learning. 2011
2. Russell, Norvig: Artificial intelligence, A Modern Approach, Pearson Education, SecondEdition. 2004

REFERENCE BOOK:

1. Rich, Knight, Nair: Artificial intelligence, Tata McGraw Hill, Third Edition 2009.
2. Introduction to Artificial Intelligence by Eugene Charniak, Pearson.
3. Introduction to Artificial Intelligence and expert systems Dan W.Patterson. PHI.
4. Artificial Intelligence by George Fluger rearson fifth edition.

Course Outcomes:

1. Possess the ability to formulate an efficient problem space for a problem expressed in English.
2. Possess the ability to select a search algorithm for a problem and characterize its time and space complexities.
3. Possess the skill for representing knowledge using the appropriate technique
4. Possess the ability to apply AI techniques to solve problems of Game Playing, ExpertSystems, Machine Learning and Natural Language Processing

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(J3419) COMPUTER ORGANIZATION

B.Tech. II Year I-Sem: **L T P C**

3 0 0 3

Objectives :

1. To understand basic components of computers.
2. To explore the I/O organizations in depth.
3. To explore the memory organization.
4. Organization of I/O devices.
5. Pipelining concepts.

UNIT I:

BASIC STRUCTURE OF COMPUTERS: Computer Types, Functional units, Basic operational concepts, Bus Structures, Software, Performance, Multiprocessors and multi computers.Instruction Codes, Computer Registers, Computer instructions, Instruction cycle, Instruction formats, Addressing Modes, STACK organization.

UNIT II:

PROGRAM CONTROL: Status Bit Conditions, Conditional Branch Instructions, Program Interrupts: Types Of Interrupts. MICROPROGRAMMED CONTROL: Control memory, hard wired control, Micro programmed control, Address sequencing, micro program example, design of control unit.

UNIT III:

MEMORY ORGANIZATIONS: Memory hierarchy, Main Memory, RAM, ROM Chips, Memory Address Map, Memory Connection to CPU, Associate memory, Cache Memory, Virtual memory.

UNIT-IV:

INPUT-OUTPUT ORGANIZATION : Peripheral Devices, Input Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct memory Access, Input –Output Processor (IOP), Serial communication.

UNIT V:

PIPELINE AND VECTOR PROCESSING: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

TEXT BOOKS :

1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.
2. Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson/PHI.

REFERENCES :

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition, PHI/Pearson.
3. Fundamentals of Computer Organization and Design, - Sivaraama Dandamudi, Springer Int. Edition.
4. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth

Edition, Elsevier.
5. Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

Course outcomes:

1. Ability to model, understands, and develops complex software for system software as well as application software.
2. The broad education necessary to understand the impact of computer science and engineering solutions in the scientific, societal and human contexts.
3. Knowledge of contemporary issues be able to manipulate numeric information in different forms, e.g., different bases, signed integers, various codes such as ASCII, Gray, and BCD.
4. Be able to understand about the memory of computer in detail.
5. Be able to design and analyze combinational circuits and to use standard combinational functions/building block to build more complex circuits.

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(J3591) OOPS THROUGH JAVA

B.Tech. II Year I SEM: CSE (AI&ML)

L	T	P	C
3	0	0	3

Course Objectives:

1. To introduce the object oriented programming concepts.
2. To understand object oriented programming concepts, and apply them insolving problems.
3. To introduce the principles of inheritance and polymorphism; and demonstratehow they relate to the design of abstract classes
4. To introduce the implementation of packages and interfaces
5. To introduce the concepts of exception handling and multithreading.
6. To introduce the design of Graphical User Interface using applets and swing controls.

UNIT - I

Object-oriented thinking- A way of viewing world – Agents and Communities, messages and methods, Responsibilities, Classes and Instances, Class Hierarchies- Inheritance, Method binding, Overriding and Exceptions, Summary of Object-Oriented concepts. Java buzzwords, An Overview of Java, Data types, Variables and Arrays, operators, expressions, control statements, Introducing classes, Methods and Classes, String handling.

Inheritance– Inheritance concept, Inheritance basics, Member access, Constructors, Creating Multilevel hierarchy, super uses, using final with inheritance, Polymorphism-ad hoc polymorphism, pure polymorphism, method overriding, abstract classes, Object class, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance.

UNIT - II

Packages- Defining a Package, CLASSPATH, Access protection, importing packages.

Interfaces- defining an interface, implementing interfaces, Nested interfaces, applying interfaces, variables in interfaces and extending interfaces.

Stream based I/O(java.io) – The Stream classes-Byte streams and Character streams, Reading console Input and Writing Console Output, File class, Reading and writing Files, Random access file operations, The Console class, Serialization, Enumerations, auto boxing, generics.

UNIT - III

Exception handling - Fundamentals of exception handling, Exception types, Termination or resumptive models, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built- in exceptions, creating own exceptionsub classes.

Multithreading- Differences between thread-based multitasking and process-based multitasking, Java thread model, creating threads, thread priorities, synchronizing threads, inter thread communication.

UNIT - IV

The Collections Framework (java.util)- Collections overview, Collection Interfaces, The Collection classes- Array List, Linked List, Hash Set, Tree Set, Priority Queue, Array Deque.
Accessing a Collection via an Iterator, Using an Iterator, The For-Each alternative, Map Interfaces and Classes, Comparators, Collection algorithms, Arrays, The Legacy Classes and Interfaces- Dictionary, Hashtable ,Properties, Stack, Vector More Utility classes, String Tokenizer, Bit Set, Date, Calendar, Random, Formatter, Scanner

UNIT - V

GUI Programming with Swing – Introduction, limitations of AWT, MVC architecture, components, containers. Understanding Layout Managers, Flow Layout, Border Layout, Grid Layout, Card Layout, Grid Bag Layout.

Event Handling- The Delegation event model- Events, Event sources, Event Listeners, Event classes, Handling mouse and keyboard events, Adapter classes, Inner classes, Anonymous Inner classes.

A Simple Swing Application, **Applets –** Applets and HTML, Security Issues, Applets and Applications, passing parameters to applets. Creating a Swing Applet, Painting in Swing, A Paint example, Exploring Swing Controls- JLabel and Image Icon, JText Field, The Swing Buttons- JButton, JToggle Button, JCheck Box, JRadio Button, JTabbed Pane, JScroll Pane, JList, JCombo Box, Swing Menus, Dialogs.

TEXT BOOKS

1. Java The complete reference, 9th edition, Herbert Schildt, McGraw HillEducation (India) Pvt. Ltd.
2. Understanding Object-Oriented Programming with Java, updated edition, T.Budd, Pearson Education.

REFERENCE BOOKS

1. An Introduction to programming and OO design using Java, J. Nino and F.A.Hosch, John Wiley & sons.
2. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
3. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.
4. Programming in Java, S. Malhotra, S. Chudhary, 2nd edition, Oxford Univ. Press.
5. Java Programming and Object oriented Application Development, R. A.Johnson, Cengage Learning.

Course Outcomes:

1. Able to solve real world problems using OOP techniques.
2. Able to understand the use of abstract classes.
3. Able to solve problems using java collection framework and I/o classes.
4. Able to develop multithreaded applications with synchronization.
5. Able to develop applets for web applications.
6. Able to design GUI based applications

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(J3594) OOPS THROUGH JAVA LAB

B.Tech. II Year I SEM: CSE (AI&ML)

L	T	P	C
0	0	2	1

Course Objectives:
1. To write programs using abstract classes.
2. To write programs for solving real world problems using java collection frame work.
3. To write multithreaded programs.
4. To write GUI programs using swing controls in Java.
5. To introduce java compiler and eclipse platform.
6. To impart hands on experience with java programming.

Note:
1. Use LINUX and MySQL for the Lab Experiments. Though not mandatory, encourage the useof Eclipse platform.
2. The list suggests the minimum program set. Hence, the concerned staff is requested to addmore problems to the list as needed.

LIST OF EXPERIMENTS:
1. Use Eclipse or Net bean platform and acquaint with the various menus. Create a test project, add a test class, and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods, and classes. Try debug step by step witha small program of about 10 to 15 lines which contains at least one if else condition and a for loop.

2. Write a Java program that works as a simple calculator. Use a grid layout to arrange buttonsfor the digits and for the +, -,*, % operations. Add a text field to display the result. Handle anypossible exceptions like divided by zero.

3. **a)** Develop an applet in Java that displays a simple message.
b) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named ―Compute‖ is clicked.

4. Write a Java program that creates a user interface to perform integer divisions. The user enterstwo numbers in the text fields, Num1 and Num2. The division of Num1 and Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.

5. Write a Java program that implements a multi-thread application that has three threads. Firstthread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print

thevalue of cube of the number.

6. Write a Java program for the following:
Create a doubly linked list of elements.
Delete a given element from the above list.
Display the contents of the list after deletion.

7. Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with ―Stop‖ or ―Ready‖ or ―Go‖ should appear above the buttons in selected color. Initially, there is no message shown.

8. Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle, and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.

9. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header,and the remaining lines correspond to rows in the table. The elements are separated by commas.Write a java program to display the table using Labels in Grid Layout.

10. Write a Java program that handles all mouse events and shows the event name at the centerof the window when a mouse event is fired (Use Adapter classes).

11. Write a Java program that loads names and phone numbers from a text file where the data isorganized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).

12. Write a Java program that correctly implements the producer – consumer problem using theconcept of interthread communication.

13. Write a Java program to list all the files in a directory including the files present in all itsSub directories.

14. Write a Java program that implements Quick sort algorithm for sorting a list of names inascending order

15. Write a Java program that implements Bubble sort algorithm for sorting in descending orderand also shows the number of interchanges occurred for the given set of integers.

REFERENCE BOOKS

1. Java for Programmers, P. J. Deitel and H. M. Deitel, 10th Edition *Pearson* education.
2. Thinking in Java, Bruce Eckel, *Pearson* Education.
3. Java Programming, D. S. Malik and P. S. Nair, *Cengage* Learning.
4. Core Java, Volume 1, 9th edition, Cay S. Horstmann and G Cornell, *Pearson*.

Course Outcomes:

1. Able to write programs for solving real world problems using java collection frame work.
2. Able to write programs using abstract classes.
3. Able to write multithreaded programs.
4. Able to write GUI programs using swing controls in Java.

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(J3593) PYTHON PROGRAMMING

B.Tech. II Year I SEM: CSE (AI&ML)

L	T	P	C
3	0	0	3

Course Objectives:

1. To be able to introduce core programming basics and program design with functionsusing Python programming language.
2. To understand a range of Object-Oriented Programming, as well as in-depth data andinformation processing techniques.
3. To understand the high-performance programs designed to strengthen the practicalexpertise.

UNIT - I

Introduction to Python, Installing Python. How a Program Works, Using Python, Program Development Cycle, Input, Processing, and Output, Displaying Output with the Print Function, Comments, Variables, Reading Input from the Keyboard, Performing Calculations,Operators. Type conversions, Expressions, More about Data Output. Decision Structures and Boolean Logic: if, if-else, if-elif-else Statements, Nested Decision Structures, Comparing Strings, Logical Operators, Boolean Variables. Repetition Structures: Introduction, while loop, for loop, Calculating a Running Total, Input Validation Loops, Nested Loops.

Data types and Expressions: Strings, Assignment and Comments, Numeric Data Types andCharacter Sets, Expressions, Functions and Modules.

UNIT - II

Control Statements: Definite Iteration, Formatting Text for Output, Selection, Conditional Iteration.

File and Exceptions: Introduction to File Input and Output, Using Loops to Process Files, Processing Records, Exceptions.

Functions: Introduction, Defining and Calling a Void Function, Designing a Program to Use Functions, Local Variables, Passing Arguments to Functions, Global Variables and Global Constants, Value-Returning Functions-Generating Random Numbers, The math Module, Storing Functions in Modules.

UNIT - III

Strings and Text Files: Accessing Characters and Substrings in a String, Strings and Number System, String Methods, Basic String Operations, String Slicing, Testing, Searching, and Manipulating Strings. Text Files, Data Encryption, Lists, Introduction to Lists, List slicing, Finding Items in Lists with the in Operator, List Methods and Useful Built-in Functions, Copying Lists, Processing Lists, Two-Dimensional Lists, Tuples Sequences, Tuples. Dictionaries

and Sets: Dictionaries, Sets, Serializing Objects. Recursion: Introduction, Problem Solving with Recursion, Examples of Recursive Algorithms.

UNIT - IV

Design with Classes: Classes and Objects, Classes and Functions, Classes and Methods, Working with Instances, Inheritance and Polymorphism.

Object-Oriented Programming: Procedural and Object-Oriented Programming, Classes,techniques for Designing Classes.

UNIT - V

Graphical User Interfaces: Behavior of terminal based programs and GUI-based programs,Coding simple GUI-based programs, other useful GUI resources. GUI Programming:Graphical User Interfaces, Using the tkinter Module, Display text with Label Widgets,Organizing Widgets with Frames, Button Widgets and Info Dialog Boxes, Getting Input with Entry Widget, Using Labels as Output Fields, Radio Buttons, Check Buttons.

Simple Graphics and Image Processing: Overview of Turtle Graphics, Two dimensionalShapes, Colors and RBG System, Image Processing.

TEXT BOOKS:

1. Kenneth A. Lambert, The Fundamentals of Python: First Programs, 2011, CengageLearning.
2. Think Python First Edition, by Allen B. Downey, Orielly publishing

REFERENCE BOOKS:

1. Introduction to Computation and Programming Using Python. John V. Guttag, TheMIT Press.
2. James Payne, Beginning Python using Python 2.6 and Python 3, Wrox publishing
3. Paul Gries, Practical Programming: An Introduction to Computer Science usingPython 3,The Pragmatic Bookshelf, 2nd edition (4 Oct. 2013)
4. Charles Dierach, Introduction to Computer Science using Python

Course Outcomes:

1. Student should be able to understand the basic concepts scripting and thecontributions of scripting language
2. Ability to explore python especially the object oriented concepts, and the built in objects of Python.
3. Ability to create practical and contemporary applications such as TCP/IP networkprogramming, Web applications, discrete event simulations

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(J3595) PYTHON PROGRAMMING LAB

B.Tech. II Year I SEM: CSE (AI&ML)

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Course Objectives:

1. To be able to introduce core programming basics and program design withfunctions using Python programming language.
2. To understand a range of Object-Oriented Programming, as well as in-depth dataand information processing techniques.
3. To understand the high-performance programs designed to strengthen the practicalexpertise.

List of Programs:

1. Write a program to demonstrate different number data types in Python.
2. Write a program to perform different Arithmetic Operations on numbers in Python.
3. Write a program to create, concatenate and print a string and accessing sub-stringfrom a given string.
4. Write a python script to print the current date in the following format –Sun May 2902:26:23 IST 2017‖
5. Write a program to create, append, and remove lists in python.
6. Write a program to demonstrate working with tuples in python.
7. Write a program to demonstrate working with dictionaries in python.
8. Write a python program to find largest of three numbers.
9. Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula : c/5 = f-32/9]

10. Write a Python program to construct the following pattern, using a nested for loop

```
*
* *
* * *
* * * *
* * * * *
* * * *
* * *
* *
*
```

11. Write a Python script that prints prime numbers less than 20.
12. Write a python program to find factorial of a number using Recursion.

13. Write a program that accepts the lengths of three sides of a triangle as inputs. Theprogram output should indicate whether or not the triangle is a right triangle (Recall from the Pythagorean Theorem that in a right triangle, the square of one side equals the sum of the squares of the other two sides).
14. Write a python program to define a module to find Fibonacci Numbers and import themodule to another program.
15. Write a python program to define a module and import a specific function in thatmodule to another program.
16. Write a script named **copyfile.py**. This script should prompt the user for the names oftwo text files. The contents of the first file should be input and written to the second file.
17. Write a program that inputs a text file. The program should print all of the uniquewords in the file in alphabetical order.
18. Write a Python class to convert an integer to a roman numeral.
19. Write a Python class to implement pow(x, n)
20. Write a Python class to reverse a string word by word.

Course Outcomes:

- Student should be able to understand the basic concepts scripting and the contributions of scripting language
- Ability to explore python especially the object oriented concepts, and the built in objects of Python.
- Ability to create practical and contemporary applications such as TCP/IP network programming, Web applications, discrete event simulations

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HSMC (H-102) UNIVERSAL HUMAN VALUES 2: UNDERSTANDING HARMONY

B.Tech. II Year I SEM: CSE (AI&ML)

L	T	P	C
2	1	0	3

Pre-requisites: None. Universal Human Values 1 (desirable)

1. OBJECTIVE: The objective of the course is four fold:

1. Development of a holistic perspective based on self-exploration about themselves (humanbeing), family, society and nature/existence.
2. Understanding (or developing clarity) of the harmony in the human being, family, society andnature/existence
3. Strengthening of self-reflection.
4. Development of commitment and courage to act.

2. COURSE TOPICS: The course has 28 lectures and 14 practice sessions in 5 modules:

MODULE 1: COURSE INTRODUCTION - NEED, BASIC GUIDELINES, CONTENTAND PROCESS FOR VALUE EDUCATION

1. Purpose and motivation for the course, recapitulation from Universal Human Values-I
2. Self-Exploration–what is it? - Its content and process; _Natural Acceptance‘ and ExperientialValidation- as the process for self-exploration
3. Continuous Happiness and Prosperity- A look at basic Human Aspirations
4. Right understanding, Relationship and Physical Facility- the basic requirements for fulfilmentof aspirations of every human being with their correct priority
5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
6. Method to fulfil the above human aspirations: understanding and living in harmony at variouslevels.

Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking

MODULE 2: UNDERSTANDING HARMONY IN THE HUMAN BEING - HARMONY IN MYSELF!

1. Understanding human being as a co-existence of the sentient _I‘ and the material _Body‘
2. Understanding the needs of Self (_I‘) and _Body‘ - happiness and physical facility
3. Understanding the Body as an instrument of _I‘ (I being the doer, seer and enjoyer)
4. Understanding the characteristics and activities of _I‘ and harmony in _I‘
5. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail
6. Programs to ensure Sanyam and Health.

Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one‘s own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease

MODULE 3: UNDERSTANDING HARMONY IN THE FAMILY AND SOCIETY- HARMONY IN HUMANHUMAN RELATIONSHIP

1. Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust andRespect as the foundational values of relationship
2. Understanding the meaning of Trust; Difference between intention and competence
3. Understanding the meaning of Respect, Difference between respect and differentiation; theother salient values in relationship
4. Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals
5. Visualizing a universal harmonious order in society- Undivided Society, Universal Order-from family to world family.

Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students‘ lives

MODULE 4: UNDERSTANDING HARMONY IN THE NATURE AND EXISTENCE - WHOLE EXISTENCE AS COEXISTENCE

1. Understanding the harmony in the Nature
2. Interconnectedness and mutual fulfilment among the four orders of naturerecyclability andselfregulation in nature
3. Understanding Existence as Co-existence of mutually interacting units in allpervasive space
4. Holistic perception of harmony at all levels of existence.

Include practice sessions to discuss human being as cause of imbalance in nature (film ‘Home’ can be used), pollution, depletion of resources and role of technology etc.

MODULE 5: IMPLICATIONS OF THE ABOVE HOLISTIC UNDERSTANDING OF HARMONY ON PROFESSIONAL ETHICS

1. Natural acceptance of human values
2. Definitiveness of Ethical Human Conduct
3. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
4. Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems.
5. Case studies of typical holistic technologies, management models and production systems
6. Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers b. Atthe level of society: as mutually enriching institutions and organizations
7. Sum up Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg.To discuss the conduct as an engineer or scientist etc.

3. READINGS:

Text Book

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010

REFERENCE BOOKS

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. Small is Beautiful - E. F Schumacher.
6. Slow is Beautiful - Cecile Andrews
7. Economy of Permanence - J C Kumarappa
8. Bharat Mein Angreji Raj – PanditSunderlal
9. Rediscovering India - by Dharampal
10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland (English)
13. Gandhi - Romain Rolland (English)

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(J4004) DISCRETE MATHEMATICS

B.Tech. II Year II SEM: **L T P C**

3 0 0 3

Course Objectives :

1. To introduce Mathematical Logic, especially First Order Logic to students intending to graduate in Computer Science.
2. To introduce proof techniques such as Mathematical Induction and Contradiction.
3. To Develop an understanding of counting, functions and relations.
4. To make the students familiar with fundamental notions and applicability of algebraic systems.
5. To make the students familiar with fundamental notions of graph theory.

UNIT-I

Fundamental Principles of counting: The Rules of Sum and Product, permutations, Combinations: Binomial Theorem. Introduction to Propositional Calculus: Basic Connectives and Truth tables, Logical Equivalence: Laws of Logic, Logical Implication: Rules of Inference. Predicates: The Use of Quantifiers, Quantifiers, Definitions and the Proofs of Theorems.

UNIT-II

Sets: Sets and Subsets, Operations on sets and the Laws of Set Theory, Counting and Venn Diagrams. Relations and Functions: Cartesian Products and Relations, Functions:oneone and Onto Pigeonhole principle, partial ordering relations, POSET, hasse diagrams, Equivalence relations.

UNIT-III

Generating function: Generating Functions, Function of Sequences, Calculating Coefficient of generating function. Recurrence Relations: The First Order Linear Recurrence Relation, Second Order Linear. Homogenous Recurrence relations with constant coefficients, Non Homogenous Recurence relations.

UNIT-IV

Introduction to graphs: Graphs and their basic properties - degree, path, cycle, Sub graphs, Complements and Graph Isomorphism, Euler trails and circuits, planar graphs, Hamiltonian paths and cycles, Graph Coloring and Chromatic polynomial.

Trees: Definitions, Properties, Rooted Trees, Spanning Trees, Minimum Spanning trees : The Algorithms of Kruskal and Prim.

UNIT-V

Algebraic Structures: Algebraic Systems: Examples and General Properties, Semigroups and Monoids, Groups: Definitions and Examples, Subgroups and Homomorphisms. Lattices: Lattices as Partially Ordered Sets, Lattices as Algebraic Systems.

Text books :

1. Ralph P. Grimaldi, Discrete and Combinatorial Mathematics, An Applied Introduction, 4th edition, Pearson Education, 2003.
2. J.P. Tremblay, R.Manohar, Discrete Mathematical Structures with Applications to Computer Science, TATA McGraw-Hill Edition, 1995.

Reference Books :

1. Kenneth H. Rosen, Discrete Mathematics and its Applications, 7th edition, Tata McGraw-Hill, 2005.
2. Joe L.Mott, Abraham Kandel, Theodore P. Baker, Discrete Mathematics for Computer Scientists & mathematicians, 2nd Edition , PHI ,1986.
3. David D.Railey,Kenny A.Hunt, Computational Thinking for the modern problem solving, CRC Press,2014.
4. Uwe Naumann,Olaf Scherk, Combinatorial Scientific Computing,CRC Press,2012.

Course Outcomes :

1. Distinguish between Propositional Logic and Predicate Logic.
2. Apply induction and other proof techniques towards solving recurrences and other problems in elementary algebra.
3. Have an understanding of elementary combinatorics.and distinguish between functions and relations.
4. Deal with problems which may arise in Computer Science and Engineering in near future.
5. Better equipped for examinations involving placement opportunities.

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(J4596) INTRODUCTION TO MACHINE LEARNING

B.Tech. II Year II SEM: CSE (AI&ML)

L	T	P	C
3	0	0	3

Course Objectives:

1. This course explains machine learning techniques such as decision tree learning, Bayesianlearning etc.
2. To understand computational learning theory.
3. To study the pattern comparison techniques.

UNIT - I

Introduction - Well-posed learning problems, designing a learning system, Perspectives and issues in machine learning Concept learning and the general to specific ordering – introduction, a concept learning task, concept learning as search, find-S: finding a maximally specific hypothesis, version spaces and the candidate elimination algorithm, remarks on version spaces and candidate elimination, inductive bias. Decision Tree Learning – Introduction, decision tree representation, appropriate problems for decision tree learning, the basic decision tree learning algorithm, hypothesis space search in decision tree learning, inductive bias in decision tree learning, issues in decision tree learning.

UNIT - II

Artificial Neural Networks-1

Introduction, neural network representation, appropriate problems for neural network learning, perceptions, multilayer networks and the back-propagation algorithm.

Artificial Neural Networks-2

Remarks on the Back-Propagation algorithm, An illustrative example: face recognition, advanced topics in artificial neural networks. Evaluation Hypotheses – Motivation, estimation hypothesis accuracy, basics of sampling theory, a general approach for deriving confidence intervals, difference in error of two hypotheses, comparing learning algorithms.

UNIT - III

Bayesian learning – Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum Likelihood and least squared error hypotheses, maximum likelihood hypotheses for predicting probabilities, minimum description length principle, Bayes optimal classifier, Gibs algorithm, Naïve Bayes classifier, an example: learning to classify text, Bayesian belief networks, the EM algorithm. Computational learning theory – Introduction, probably learning an approximately correct hypothesis, sample complexity for finite hypothesis space, sample complexity for infinite hypothesis spaces, the mistake bound model of learning. Instance-Based Learning- Introduction, k-nearest neighbour algorithm, locally weighted regression, radial basis functions, case-based reasoning, remarks on lazy and eager learning.

UNIT- IV

Genetic Algorithms – Motivation, Genetic algorithms, an illustrative example, hypothesis space search, genetic programming, models of evolution and learning, parallelizing genetic algorithms. Learning Sets of Rules – Introduction, sequential covering algorithms, learning rule sets: summary, learning First-Order rules, learning sets of First-Order rules: FOIL, Induction as inverted deduction, inverting resolution. Reinforcement Learning – Introduction, the learning task, Q–learning, non-deterministic, rewards and actions, temporal difference learning, generalizing from examples, relationship to dynamic programming.

UNIT - V

Analytical Learning-1

Introduction, learning with perfect domain theories: PROLOG-EBG, remarks on explanation-based learning, explanation-based learning of search control knowledge.

Analytical Learning-2

Using prior knowledge to alter the search objective, using prior knowledge to augment search operators. Combining Inductive and Analytical Learning – Motivation, inductive-analytical approaches to learning, using prior knowledge to initialize the hypothesis.

TEXT BOOKS:

1. Machine Learning – Tom M. Mitchell, - MGH

REFERENCES:

1. Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis

Course Outcomes:

1. Understand the concepts of computational intelligence like machine learning
2. Ability to get the skill to apply machine learning techniques to address the real time problemsin different areas
3. Understand the Neural Networks and its usage in machine learning application

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(J4518) DATABASE MANAGEMENT SYSTEMS

B.Tech. II Year II-SEM CSE(AI&ML)

L	T	P	C
3	0	0	3

Course Objectives:
This Course provides an emphasis on
1. How to organize, maintain and retrieve information efficiently and effectively from aDatabase
2. It presents an introduction to database management systems (DBMS) and relational datamodel.
3. Understanding the different issues involved in the design of a database system
4. Identifying functional dependencies to normalize the relations of database
5. Also the course introduces the concepts of transactions and transaction processing and the issues and techniques relating to concurrency and recovery in multi-user database environments.

Syllabus:

UNIT-I
Database System Applications, database System VS file System, View of Data – Data Abstraction –Instances and Schemas – Data Models, Database Languages, Database Architecture, Database Users and Administrators.
Database design, ER diagrams, Beyond ER Design, Entities, Attributes and Entity sets, Relationships and Relationship sets, Additional features of ER Model, Conceptual Design with the ER Model.

UNIT-II
Introduction to the Relational Model – Integrity Constraints over Relations, Enforcing Integrity constraints, Querying relational data, Logical data base Design, Introduction to Views – Destroying/altering Tables and Views. Relational Algebra – Selection and Projection, Set Operations, Renaming, Joins, Division, Examples of Algebra Queries, Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

UNIT-III
Form of Basic SQL Query – Examples of Basic SQL Queries, Introduction to Nested Queries, Correlated Nested Queries, Set – Comparison Operators – Aggregate Operators, NULL values – Comparison using Null values – Logical connectives – AND, OR and NOT – Impact on SQL Constructs, Outer Joins, Disallowing NULL values, Complex Integrity Constraints in SQL Triggers and Active Data bases.Schema refinement – Problems Caused by redundancy,

Decomposition – Problem related to decomposition - Reasoning about FDS - FIRST, SECOND, THIRD Normal forms – BCNF –Schema Refinement in Data base Design – Multi valued Dependencies – FOURTH Normal Form.

UNIT–IV

Transaction Concept- Transaction State- Implementation of Atomicity and Durability – Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation.

Lock –Based Protocols – Timestamp Based Protocols- Validation- Based Protocols.

Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions –Buffer Management – Failure with loss of nonvolatile storage-Advance Recovery systems- Remote Backup systems.

UNIT–V

Data on External Storage, File Organization and Indexing – Clustered Indexes, Primary and Secondary Indexes, Index data Structures – Hash Based Indexing – Tree base Indexing, Comparison of File Organizations.

Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM) B+ Trees: A DynamicIndex Structure.

Text Books:

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

Reference Books:

1. Peter Rob and Carlos Coronel –Data base Systems design, Implementation, andManagement‖ 7th Edition.
2. Elmasri Navrate –Fundamentals of Database Systems‖ Pearson Education

Course outcomes:

1: Differentiate database systems from file system by understanding the features of databasesystem and design a ER model for a database system.

2: Develop solutions to a broad range of query and data update problems using relational algebra, relational calculus and SQL.

3: Apply the normalization theory in relational databases for removing anomalies.

4: Analyze the basic issues of transaction processing, concurrency control, deadlock and itsrecovery schemes

5: Compare database storage and access techniques for file organization, indexing methods and Query Processing.

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(J4525) DATABASE MANAGEMENT SYSTEMS LAB

B.Tech. II Year II-SEM CSE(AI&ML)

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Course Objectives:
This lab enables the students

1. To practice the concepts learnt in the subject DBMS by developing a database for anexample company named "Roadway Travels" whose description is as follows.
2. The student is expected to practice the designing, developing and querying a database inthe context of example database "Roadway travels". Students are expected to use "Mysql" database.
3. To create a database and query it using SQL, design forms and generate reports.
4. Understand the significance of integrity constraints, referential integrity constraints,triggers, assertions
5. Improve the database design by normalization.

LIST OF EXPERIMENTS:

Roadway Travels
"Roadway Travels" is in business since 1997 with several buses connecting different places in India. Its main office is located in Hyderabad. The company wants to computerize its operations in the following areas:
• Reservations and Ticketing
• Cancellations
Reservations & Cancellation: Reservations are directly handled by booking office. Reservations can be made 30 days in advance and tickets issued to passenger. One Passenger/person can book many tickets (to his/her family).Cancellations are also directly handed at the booking office. In the process of computerization of Roadway Travels you have todesign and develop a Database which consists the data of Buses, Passengers, Tickets, and Reservation and cancellation details. You should also develop query's using SQL to retrieve the data from the database.
The above process involves many steps like
1. Analyzing the problem and identifying the Entities and Relationships
2. E-R Model
3. Relational Model
4. Normalization
5. Creating the database
6. Querying.

Students are supposed to work on these steps week wise and finally create a complete "Database System" to Roadway Travels. Examples are given at every experiment for guidance to students. **WEEK 1: E-R Model**

Analyze the carefully and come up with the entities in it. Identify what data has to be persisted in the database. This contains the entities, candidate attributes etc.Identify the primary keys for all the entities. Identify the other keys like keys, partial keys, if any.

Example: Entities:

1. BUS
2. Ticket
3. passenger

Relationships:

1. Reservation
2. Cancellation

PRIMARY KEY ATTRIBUTES:

1. Ticket ID (Ticket Entity)
2. Passport ID (Passenger Entity)
3. Bus_NO (Bus Entity)

Apart from the above mentioned entities you can identify more. The above mentioned are few.Note: The student is required to submit a document by writing the Entities and Keys to the labteacher.

WEEK 2: Concept design with E-R Model

Relate the entities appropriately. Apply cardinalities for each relationship. Identify strong entitiesand weak entities (if any). Indicate the type of relationships (total / partial). Try to incorporate generalization, aggregation, specialization etc wherever required.

Note: The student is required to submit a document by drawing the E-R Diagram to the labteacher.

WEEK 3: Relational Model

Represent all entities (Strong, Weak) in tabular fashion. Represent relationships in a tabular fashion. There are different ways of representing relationships as tables based on the cardinality. Represent attributes as columns in tables or as tables based on the requirement. Different types ofAttributes (Composite, Multi-valued, and Derived) have different way of representation.

Example: The passenger tables look as below. This is an example. You can add more attributesbased on E-R model. This is not a normalized table.

Passenger

Name	Age	Sex	Address	Ticket_id	Passport ID

Note: The student is required to submit document relationships in a tabular fashion to the lab teacher.

WEEK 4: Normalization

Database normalization is a technique for designing relational database tables to minimize duplication of information and, in so doing, to safeguard the database against certain types of logical or structural problems, namely data anomalies. For example, when multiple instances of a

given piece of information occur in a table, the possibility exists that these instances will not be kept consistent when the data within the table is updated, leading to a loss of data integrity. A table that is sufficiently normalized is less vulnerable to problems of this kind, because its structure reflects the basic assumptions for when multiple instances of the same information should be represented by a single instance only.For the above table in the First normalization we can remove the multi valued attribute Ticket_id and place it in another table along with the primary key of passenger.
First Normal Form: The above table can be divided into two tables as shown below.
Passenger

Name	Age	Sex	Address	Passport_ID

Passport_ID	Ticket_id

You can do the second and third normal forms if re wired. Any ht)* given Normalized tables are at the end.

WEEK 5: installation of Mysql and practicing DDL commands

Installation of MySql. In this week you will learn Creating databases, How to create tables,altering the database, dropping tables and databases if not required. You will also try truncate, rename commands etc.Example for creation of a normalized "Passenger" table.

```
CREATE TABLE Passenger (
Passport_id INTEGER PRIMARY KEY,
Name VARCHAR (50) Not NULL,
Age Integer Not NULL,
Sex Char,
Address VARCHAR (50) Not NULL);
```

Similarly create all other tables.
Note: Detailed creation of tables is given at the end.

WEEK 6: Practicing DML commands

DML commands are used to for managing data within schema objects. Some examples:

- SELECT - retrieve data from the a database
- INSERT - insert data into a table
- UPDATE - updates existing data within a table
- DELETE - deletes all records from a table, the space for the records remain

Inserting values into "Bus" table:

```
Insert into Bus values (1234,'hyderabad', lirupathi');
Insert into Bus values (2345,1hyderabd,Banglore');
Insert into Bus values (23,'hyderabd','Kolkata');
Insert into Bus values (45,11rupathi,'Banglore');
```

Insert into Bus values (34,1h derab yc11,1Chennar);

Inserting values into "Passenger" table:

Insert into Passenger values (1, 45,'ramesh', 45,'M','abc123');
Insert into Passenger values (2, 78,'geetha', 36,'F','abc124');
Insert into Passenger values (45, 90,'ram', 30,'M',1abc12');
Insert into Passenger values (67, 89,'ravi', 50,'M','abc14');
Insert into Passenger values (56, 22,'seetha', 32,'F','abc55');

Few more Examples of DML commands:

Select * from Bus; (selects all the attributes and Display)
UPDATE BUS SET Bus No = 1 WHERE BUS NO=2;

WEEK 7: Querying

In this week you are going to practice queries (along with subquries) Using queries ANY,ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.

Practice the following Queries:

1. Display unique PNR_no of all passengers.
2. Display all the names of male passengers.
3. Display the ticket numbers and names of all the passengers.
4. Find the ticket numbers of the passenger whose name start with and ends with 'h'.
5. Find the names of passengers, whose age is between 30 and 45,
6. Display all the passengers‘ names beginning with 'A'
7. Display the sorted list of passenger‘s names

WEEK 8 and WEEK 9: Querying (continued...)

You are going to practice queries using Aggregate functions (COUNT, Sum, AVG, and MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.

1. Write a Query to display the Information present in the Passenger and cancellation tables.Hint: Use UNION Operator.
2. Display the number of days in a week on which the 9W01 bus is available.
3. Find number of tickets booked for each PNR_no using GROUP BY CLAUSE. Hint: UseGROUP BY on PNR No.
4. Find the distinct PNR numbers that are present.
5. Find the number of tickets booked by a passenger where the number of seats is greater than 1. Hint: Use GROUP BY, WHERE and HAVING CLAUSES.
6. Find the total number of cancelled seats.

WEEK 10: Triggers

In this week you are going to work on Triggers. Creation of insert trigger, delete trigger, update trigger. Practice triggers using the above database.

Eg: CREATE TRIGGER update check BEFORE UPDATE ON passenger FOR EACH ROW
BEGIN IF NEW.TickentNO > 60 THEN
SET New.Tickent no = Ticket no;
ELSE
SET New.Ticketno:at 0;
END IF;
END;

WEEK 11: Procedures

This session you are going to learn Creation of stored procedure, Execution of procedure and modification of procedure. Practice procedures using the above database.

Eg: CREATE PROCEDURE myProc ()
BEGIN
SELECT COUNT (Tickets) FROM Ticket WHERE age>=40;
End;

WEEK 12: Cursors

In this week you need to do the following: Declare a cursor that defines a result set.Open the cursor to establish the result set. Fetch the data into local variables as needed from the cursor, one row at a time. Close the cursor when done

CREATE PROCEDURE myProc (in_customer_id INT)
BEGIN
DECLARE v_id INT;
DECLARE v_name VARCHAR (30);
DECLARE c1 CURSOR FOR SELECT stdld,stdFirstname FROM students WHERE stdId=in_customer_id;
OPEN c1;
FETCH cl into v_id, v_name;
Close c1;
END;

Tables

BUS

Bus No: Varchar: PK (public key)
Source: Varchar
Destination: Varchar

Passenger

PPNO: Varchar(15)) :
PK Name: Varchar(15)
Age int (4)
SexIChar(10) : Male / Female
Address: VarChar(20)

Passenger_Tickets

PPNO: Varchar(15)) :
PK Ticket_No: Numeric (9)

Reservation

PNR_No: Numeric (9) :
FK Journey_date : datetime(8)
No_of_seats : int (8)
Address: Varchar (50)
Contact_No: Numeric (9) --> should not be less than 9 and should not accept any other Character other than Integer

Status: Char (2): Yes / No

Cancellation

PNR_No: Numeric (9): FK

Journey_date : datetime(8)
No_of_seats : int (8)
Address: Varchar (50)
Contact_No: Numeric (9) --> should not be less than 9 and should not accept any other Character other than Integer
Status: Char (2): Yes / No

Ticket

Ticket_No: Numeric (9): PK
Journey date: datetime(8)
Age: int (4)
Sex:Char(10) : Male / Female
Source: Varchar
Destination: Varchar
Dep_time: Varchar

Reference Books:

1. Introduction to SQL, Rick F.Vander Lans, Pearson education.
2. Oracle PL/SQL, B.Rosenzweig and E.Silvestrova, Pearson education
3. Oracle PL/SQL Programming, Steven Feuerstein, SPD.
4. SQL & PL/SQL for Oracle 10g, Black Book, Dr. P. S. Deshpande, Dream Tech.
5. Oracle Database 11g PL/SQL Programming, M. Mc Laughlin, TMH.
6. SQL Fundamentals, J.J. Patrick, Pearson Education.

Course Outcomes:

1. Ability to design and implement a database schema for given problem.
2. Be capable to Design and build a UI application.
3. Apply the normalization techniques for development of application software torealistic problems.
4. Ability to formulate queries using SQL DML/DDL/DCL commands.5.Ability to design cursors and procedures.

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(J4513) OPERATING SYSYTEMS

B.Tech II Year II-Sem: CSE(AI&ML)

L	T	P	C
3	0	0	3

Course Objectives:
1. To understand main components of OS and their working
2. To study the operations performed by OS as a resource manager
3. To understand the different scheduling policies of OS
4. To understand the different memory management techniques
5.To understand process concurrency, synchronization, input/output, storage and file management.

UNIT-I
Computer System and Operating System Overview: Overview of computer operating systems, operating systems functions, protection and security. Distributed systems, special purpose systems, operating systems structures, systems calls and operating systems generation.**Process Management:** Process concepts, threads, scheduling-criteria algorithms, their evaluation, thread scheduling, case studies UNIX, Linux, Windows.
UNIT-II
Concurrency: Process synchronization, the critical- section problem, Peterson‘s Solution, synchronization Hardware, semaphores, and classic problems of synchronization, monitors, Synchronization examples, and atomic transactions. Case studies UNIX, Linux, and Windows.**Memory Management:** Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual memory, demand paging, page-Replacement, algorithms, case studies UNIX, Linux, Windows.
UNIT–III
Principles of Deadlock: System model, deadlock characterization, deadlock prevention, detection and avoidance, recovery form deadlock.
File system Interface: The concept of a file, Access Methods, Directory structure,File system mounting, file sharing,protection.
File System implementation: File system structure, file system implementation, directory implementation, directory implementation, allocation methods, free-space management, efficiency and performance, case studies. UNIX, Linux, Windows. **UNIT–IV**
Mass-Storage Structure: Mass-storage structure overview of Mass-storage structure, Disk structure, disk attachment disk scheduling, swap-space management, RAID structure, stable-storage implementation, Tertiary storage structure.

UNIT–V

Protection: Protection, Goals of Protection, Principles of Protection, Domain of protection Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights,Capability- Based systems,Language–Based Protection.

Security- The Security problem, program threats, system and network threats cryptography as a security tool, user authentication, implementing security defenses, firewalling to protect systemsand networks, computer –security classifications, case studies UNIX, Linux, Windows.

Text Books:

1. Abraham Silberchatz, Peter B. Galvin –Operating System Concepts‖ Greg Gagne 7th Edition,John Wiley,ISBN:-10:04->1694665
2. Stallings, –Operating Systems – Internal and Design Principles‖, Fifth Edition– 2005,Pearson education/PHI,ISBN:0-13-147954-7

Reference Books:

1. D.M.Dhamdhere –Operating systems- A Concept based Approach‖ 2nd Edition,TMH,ISBN:13:9780070611948
2. Andrew S Tanenbaum –Modern Operating Systems‖ 2nd Edition, Pearson/PHI,ISBN:-10:0132392275

Course outcomes:

1. Understand the basics of operating systems like kernel, shell, types and views ofoperating systems
2. Describe the various CPU scheduling algorithms and remove deadlocks.
3. Explain various memory management techniques and concept of thrashing.
4. Use disk management and disk scheduling algorithms for better utilization of externalmemory.
5. Recognize file system interface, protection and security mechanisms.

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(J4511) DESIGN AND ANALYSIS OF ALGORITHMS

L	T	P	C
3	0	0	3

B.Tech II Year II-Sem: CSE(AI&ML)

Course Objectives:

This course will develop students‘ knowledge in/on

1. Techniques for effective problem solving in computing.
2. Analyzing the algorithms and calculating their complexity
3. Designing algorithms using greedy strategy, divide and conquer approach and dynamic programming
4. Backtracking and least cost search
5. Fundamental computability concepts and the complexity of classes P, NP and NP-complete

Syllabus:

UNIT-I

Introduction: Algorithm analysis, Performance analysis, Space complexity and time complexity, Big _O‘ notation, Omega notation, Theta notation, Different mathematical approach‘s for solving Time complexity of Algorithms.

Sets and disjoint set union: Introduction, Union, Find operations.

UNIT-II

Divide and conquer: General method, Binary search, Merge sort, Quick sort, Strassen‘s matrix multiplication.

Greedy method: General method, Knapsack problem, Job sequencing with deadlines, Minimum cost spanning trees, Optimal storage on tapes, Optimal merge patterns, Single source shortest paths.

UNIT-III

Dynamic programming: General method, Multistage graphs, All pairs shortest paths, Single source shortest paths**.** Optimal binary search trees, String editing, *0/1* Knapsack problem, Reliability design problem, Travelling sales person problem.

UNIT-IV

Back tracking: General method, *N-Queens* problem, Sum of subsets, Graph coloring problem, Hamiltonian cycles.

Branch and bound: General method, Least cost (*LC*) search, the 15-puzzle problem, Control abstractions for *LC search*, *0/1* Knapsack problem, Travelling salesperson problem.

UNIT-V

NP Hard and NP complete problems: Basic concepts - Nondeterministic algorithms, The classes *NP* hard and *NP* complete; *COOK’s* Theorem, NP hard graph problems - Clique decisionproblem, Node cover decision problem, Traveling salesperson decision problem.

Text Books:

1. E.Horowitz, S.Sahni, S.Rajasekaran, ‖Fundamentals of Computer Algorithms*", 2nd Edition, Universities Press,* ISBN: 978-8173716126, 2008

Reference Books:

1. Thomas H.Cormen, Charles E.Leiserson, Ronald L.Rivest, Cliford Stein, –Introduction toAlgorithms‖, *3rd Edition, Prentice-Hall of India,* ISBN: 978-81-203-4007-7, 2010
2. S.Sridhar, –Design and Analysis of Algorithms‖, *Oxford University Press, India,* ISBN - 13:978-0-19-809369-5, ISBN-10: 0-19-809369-1, 2015

Course Outcomes:

Upon completion of this course, students will be able to…

1. Argue the correctness of algorithms using inductive proofs and invariants
2. Analyze the time and space complexity of an algorithms
3. Design algorithms using greedy strategy and dynamic programming4.Identify algorithm design methodology to solve problems
5. Analyze the classes P, N and NP Complete and be able to prove that a certain problem is NP complete

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(J4516) OPERATING SYSYTEMS LAB

B.Tech II Year II-Sem: CSE(AI&ML)

L	T	P	C
0	0	3	1.5

Course Objectives:
1. To Know LINUX environment and basic OS commands
2. To use LINUX operating system for study of operating system concepts.
3. To write the code to implement and modify various concepts in operating systems usingLinux.
4. To implement different CPU scheduling algorithms, page replacement algorithms and deadlock avoidance algorithm
5. To learn different types of file organization techniques

LIST OF EXPERIMENTS:

1. Simulate the following CPU scheduling algorithms
    a. Round Robin
    b. SJF
    c. FCFS
    d. Priority
2. Simulate all file allocation strategies
    a. Sequential
    b. Indexed
    c. Linked
3. Simulate MVT and MFT
4. Simulate all File Organization Techniques
    a. Single level directory
    b. Two level
    c. Hierarchical
    d. DAG
5. Simulate Bankers Algorithm for Dead Lock Avoidance
6. Simulate Bankers Algorithm for Dead Lock Prevention
7. Simulate all page replacement algorithms
    a. FIF
    b. LRU
    c. LFU etc.
8. Simulate Paging technique of memory management.

Text Books:

1. Abraham Silberchatz, Peter B. Galvin –Operating System Concepts‖ Greg Gagne 7th Edition, John Wiley,ISBN:-10:04->1694665
2. Stallings, ―Operating Systems – Internal and Design Principles‖, Fifth Edition– 2005,Pearson education/PHI,ISBN:0-13-147954-7

Reference Books:

1. D.M.Dhamdhere –Operating systems- A Concept based Approach‖ 2nd Edition, TMH,ISBN: 13:9780070611948
2.Andrew S Tanenbaum –Modern Operating Systems‖ 2nd Edition, Pearson/PHI, ISBN:-10:0132392275

Course Outcomes:

1. Upon completing the course the student is capable of explaining the basic structure andfunctioning of operating system.
2. Student is able to point the problems related to process management and synchronization as well as is able to apply learned methods to solve basic problems.
3. Student is capable of explaining the cause and effect related to deadlocks and is able toanalyze them related to common circumstances in operating systems.
4. The student is able to explain the basics of memory management.
5. Student is able to know the structure of the most common file-systems.

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(J4597) MACHINE LEARNING LAB

B.Tech. II Year II SEM: CSE (AI&ML)

L	T	P	C
0	0	3	1.5

Course Objectives: The objective of this lab is to get an overview of the various machine learning techniques and can able to demonstrate them using python.

List of Experiments

1. The probability that it is Friday and that a student is absent is 3 %. Since there are 5 school days in a week, the probability that it is Friday is 20 %. What is the probability that a student isabsent given that today is Friday? Apply Baye‘s rule in python to get the result. (Ans: 15%)

2. Extract the data from database using python

3. Implement k-nearest neighbours classification using python

4. Given the following data, which specify classifications for nine combinations of VAR1 and VAR2 predict a classification for a case where VAR1=0.906 and VAR2=0.606, using the result of kmeans clustering with 3 means (i.e., 3 centroids)

VAR1	VAR2	CLASS
1.713	1.586	0
0.180	1.786	1
0.353	1.240	1
0.940	1.566	0
1.486	0.759	1
1.266	1.106	0
1.540	0.419	1
0.459	1.799	1
0.773	0.186	1

5. The following training examples map descriptions of individuals onto high, medium and low credit-worthiness.

medium skiing design single twenties no -> highRisk
high golf trading married forties yes -> lowRisk
low speedway transport married thirties yes -> medRisk
medium football banking single thirties yes -> lowRisk
high flying media married fifties yes -> highRisk
low football security single twenties no -> medRisk
medium golf media single thirties yes -> medRisk

medium golf transport married forties yes ->
lowRisk high skiing banking single thirties yes -
> highRisk low golf unemployed married forties
yes -> highRisk
Input attributes are (from left to right) income, recreation, job, status, age-group, home-owner. Find the unconditional probability of `golf' and the conditional probability of `single' given
`medRisk' in the dataset?

6. Implement linear regression using python.
7. Implement Naïve Bayes theorem to classify the English text
8. Implement an algorithm to demonstrate the significance of genetic algorithm
9. Implement the finite words classification system using Back-propagation algorithm

Course Outcomes:
After the completion of the course the student can able to:
1. understand complexity of Machine Learning algorithms and their limitations;
2. understand modern notions in data analysis-oriented computing;
3. be capable of confidently applying common Machine Learning algorithms inpractice and implementing their own;
4. Be capable of performing experiments in Machine Learning using real-world data

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GENDER SENSITIZATION (JMC02)

B.Tech. II Year II Sem **L T P C**
2 0 0 0

Course Objectives :

1. To develop students‘ sensibility with regard to issues of gender in contemporary India.
2. To provide a critical perspective on the socialization of men and women.
3. To introduce students to information about some key biological aspects of genders.
4. To expose the students to debates on the politics and economics of work.
5. To help students reflect critically on gender violence.
6. To expose students to more egalitarian interactions between men and women.

UNIT – I UNDERSTANDING GENDER :
Gender: Why Should We Study It? (Towards a World of Equals: Unit -1) Socialization: Making Women, Making Men (Towards a World of Equals: Unit - 2) Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.

UNIT – II GENDER AND BIOLOGY Missing Women:
Sex Selection and Its Consequences (Towards a World of Equals: Unit-4) Declining Sex Ratio. Demographic Consequences. Gender Spectrum: Beyond the Binary (Towards a World of Equals: Unit - 10) Two or Many? Struggles with Discrimination.

UNIT – III GENDER AND LABOUR
Housework: the Invisible Labour (Towards a World of Equals: Unit -3) –My Mother doesn‘t Work.‖ –Share the Load.‖ Women‘s Work: Its Politics and Economics (Towards a World of Equals: Unit -7) Fact and Fiction. Unrecognized and Unaccounted work. Additional Reading: Wages and Conditions of Work.

UNIT – IV ISSUES OF VIOLENCE
Sexual Harassment: Say No! (Towards a World of Equals: Unit -6) Sexual Harassment, not Eveteasing- Coping with Everyday Harassment- Further Reading: –Chupulu‖. Domestic Violence: Speaking Out (Towards a World of Equals: Unit -8) Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Additional Reading: New Forums for Justice. Thinking about Sexual Violence (Towards a World of Equals: Unit -11) Blaming the Victim-‖I Fought for my Life….‖ – Additional Reading: The Caste Face of Violence.

UNIT – V GENDER : CO – EXISTENCE
Just Relationships: Being Together as Equals (Towards a World of Equals: Unit -12) Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Additional Reading: Rosa Parks-The Brave Heart. Prescribed Textbook : All the five Units in the Textbook, ―Towards a World of Equals: A Bilingual Textbook on Gender‖ written by A.Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie

Tharu and published by Telugu Akademi, Hyderabad,Telangana State in the year 2015.
Note: Since it is an Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.

REFERENCE BOOKS :

1. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012.
2. Abdulali Sohaila. ―I Fought For My Life…and Won.‖ Available online at: http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohailaabdulal/.

Course Outcomes:

1. Students will have developed a better understanding of important issues related to gender in contemporary India.
2. tudents will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
3. Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
4. Students will acquire insight into the gendered division of labour and its relation to politics and economics.
5. Men and women students and professionals will be better equipped to work and live together as equals.
6. Students will develop a sense of appreciation of women in all walks of life.
7. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

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(J5528) COMPUTER NETWORKS

B.Tech. III Year I Sem

L	T	P	C
3	0	0	3

Course Objectives:

This course will develop students' knowledge in/on
1. Computer network architecture and reference model
2. Different types of data link and medium access control protocols
3. Developing routing algorithms and internetworking
4. Network protocols for real time applications
5. Protocols used in Transport and Application layers

Syllabus:

UNIT - I

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

Physical Layer: Guided transmission media, wireless transmission media.

Data Link Layer - design issues, CRC codes, Elementary Data Link Layer Protocols, sliding window protocol

UNIT - II

Multi Access Protocols - ALOHA, CSMA, Collision free protocols, Ethernet- Physical Layer, Ethernet Mac Sub layer, data link layer switching & use of bridges, learning bridges, spanningtree bridges, repeaters, hubs, bridges, switches, routers and gateways.

UNIT - III

Network Layer: Network Layer Design issues, store and forward packet switching connection less and connection oriented networks-routing algorithms-optimality principle, shortest path, flooding, Distance Vector Routing, Control to Infinity Problem, Hierarchical Routing, Congestion control algorithms, admission control.

UNIT - IV

Internetworking: Tunneling, Internetwork Routing, Packet fragmentation, IPv4, IPv6 Protocol, IP addresses, CIDR, IMCP, ARP, RARP, DHCP.

Transport Layer: Services provided to the upper layers elements of transport protocol-addressing connection establishment, connection release, Connection Release, Crash Recovery.

UNIT - V

The Internet Transport Protocols UDP-RPC, Real Time Transport Protocols,

The Internet Transport Protocols- Introduction to TCP, The TCP Service Model, The TCP Segment Header, The Connection Establishment, The TCP Connection Release, The TCP Connection Management Modeling, The TCP Sliding Window, The TCP Congestion Control, The future of TCP.

Application Layer- Introduction, providing services, Applications layer paradigms, Client server model, Standard client-server application-HTTP, FTP, electronic mail, TELNET, DNS, SSH

Text Books:

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

References Books:

1. An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W. A. Shay, Cengage Learning.
3. Introduction to Computer Networks and Cyber Security, Chwan-Hwa (John) Wu, J. David Irwin, CRC Press.
4. Computer Networks, L. L. Peterson and B. S. Davie, 4th edition, ELSEVIER.
5. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, Pearson Education.

Course Outcomes:

Upon completion of this course, students will be able to…

1.Demonstrate computer network architecture, OSI and TCP/IP reference models
2.Determine types of data link and medium access control protocols
3.Use Routing algorithms and internetworking
4.Design network protocols for real time application
5.Understand internals of main protocols such as HTTP, FTP, SMTP, TCP, UDP, IP

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(J5598) AUTOMATA AND COMPILER DESIGN

B.Tech. III Year I Sem

L	T	P	C
2	1	0	3

Course Objectives:

1. To demonstrate the interplay between different models and formallanguages.
2. Employ finite state machines to solve problems in computing.
3. Classify machines by their power to recognize the languages.
4. Explain deterministic and non-deterministic machines.
5. Emphasize the concepts learnt in lexical analysis, syntax analysis, semantic analysis,intermediate code generation and type checking process through several programming exercises.
6. To provide the understanding of language translation peculiarities by designingcomplete translator for mini language.

Unit I – Introduction to Automata

Languages, definitions, Regular Expressions, Regular Grammars, Acceptance of Strings and Languages, Finite Automaton Model, DFA, NFA, conversion of NFA to DFA, Conversion of Regular Expression to NF.

Unit II– Stages of Compilation and Lexical Analysis and Top Down Parsing

Chomsky hierarchy of Languages, Phases of compilation overview, Pass, Phase, Interpretation, Bootstrapping.

Context free grammars, Top Down Parsing: Parse Trees, Ambiguous Grammars, Backtracking, LL (1), Recursive Descent parsing, Predictive parsing, pre-processing steps for predictive processing.

Unit III – Bottom Up Parsing and Semantic Analysis and Symbol Table Organization

Bottom-up parsing and handle pruning, LR (k) grammar parsing, LALR (k) grammars, ErrorRecovery in parsing, parsing ambiguous grammars, YACC parser generator.

Intermediate source program forms - AST, polish notation and 3 address code, Attribute Grammars, Syntax Directed Translation, Conversion of popular programming constructs into intermediate code forms, Inherited Grammars, Type Checking, Equivalence of type expressions.

Unit IV – Data Structure Support and Code Optimization

Symbol table format, organization, Block structured languages, hashing, Block structure and non-block structure storage allocation: static, runtime and heap allocation for arrays, strings and records.

Consideration for optimization, Scope of optimization, DAG representation, Basic blocks, partitioning into basic blocks, Compile Time Evaluation, Common Subexpression elimination,

dead code elimination, Strength Reduction, Code Movement, Loop Invariant Method, Loop Fusion, Loop Unrolling, Induction Variables and Reduction in Strength.

Unit V – Code Generation
Absolute Code, Relocatable Machine Code, Assembler Code, Register and Address Descriptors, Implementing Global Register Allocation, Usage Counts, Using DAG for register allocation, Simple Code generation Algorithm, Generic Code generation Algorithm, Generating code from DAG.

Text Books:
1. Introduction to Automata Theory Languages and Computation, Hopcroft H.E. andUllman J.D., Pearson Education, 2009.
2. Principles of Compiler Design, A.V Aho and J D Ullman, Pearson Education.
3. Modern Compiler Construction in C, Andrew W. Appel, Cambridge University Press.

References:
1. Compiler Construction: Principles And Practice, Kenneth C. Louden, Thomson/ DelmarCengage Learning, 2006.
2. Lex & yacc, Doug Brown, John Levine and Tony Mason, 2nd Edition, O'reilly Media.
3. Engineering a compiler, Keith Cooper and Linda Torczon, 2nd Edition, Morgan Kaufmann,2011.

Course Outcomes: At the end of the course, the student should be able to
CO 1 : Employ finite state machines to solve problems in computing and classifymachines by their power to recognize languages.
CO 2 : Understand the basic concept of compiler design, and its different phases which will be helpful to construct new tools like LEX, YACC, etc.
CO 3 : Ability to implement semantic rules into a parser that performs attributionwhile parsing and apply error detection and correction methods.
CO 4 : Apply the code optimization techniques to improve the space and time complexity of programs while programming.
CO 5 : Ability to design a compiler for a concise programming

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(J5599) INTRODUCTION TO DATA SCIENCE

B.Tech. III Year I Sem

L	T	P	C
3	0	0	3

Course Objectives:

- This course introduces Data Science.
- Explain concepts of Data Preparation.
- Give an insight into the statistical methods of data analysis and prediction.
- Explain methods of Data Warehouse to analyse the data

UNIT -I: Fundamentals of Data Science

Introduction to data science, Why learn data science, Data analytics lifecycle: Data discovery, Data preparation, Model planning, Model building, Communicate results, Operationalization. Types of data analysis: Descriptive analysis, Diagnostic analysis, Predictive analysis, Prescriptive analysis. Types of jobs Data Analytics1. Data science tools: Python programming , R programming, SAS, Tableau Public, Microsoft Excel, RapidMiner, Knime, Apache Spark. Fundamental areas of study in data science:
Machine learning, Deep learning, Natural Language Processing (NLP), Statistical data analysis, Knowledge discovery and data mining, Text mining, Recommender systems, Data visualization, Computer vision,Spatial data management. Role of SQL in data science. Pros and cons of data science.

UNIT- II: Data Preprocessing

Introduction to data preprocessing. Data types and forms. Possible data error types. Various data preprocessing operations: Data cleaning, Filling missing values, Smoothing noisy data, Detecting and removing outliers, Data integration, Data transformation: Rescaling data, Normalizing data, Binarizing data, Standardizing data, Label encoding, One hot encoding. Data reduction: Dimensionality reduction, Data cube aggregation, Numerosity reduction. Data Discretization.

UNIT -III: Data Plotting and Visualization

Introduction to data visualization. Visual encoding. Data visualization libraries: matplotlib library, seaborn library, ggplot library, Bokeh library, plotly library, pygal library, geoplotlib library, Gleam library,missingno library, Leather library. Basic data visualization tools: Histograms, Bar charts/graphs, Scatter plots, Line charts, Area plots, Pie charts, Donut charts. Specialized data visualization tools: Boxplots, Venn diagram, Treemap chart. Data visualization types

.UNIT -IV: Statistical Data Analysis

Role of statistics in data science. Kinds of statistics: Descriptive statistics: Measures of frequency, Inferential statistics. Basic Statistical Descriptions of Data: Measuring the Central Tendency: Mean, Median, and Mode, Measuring the Dispersion of Data: Range, Quartiles, Variance, Standard Deviation, and Interquartile Range, Graphic Displays of Basic Statistical Descriptions of Data. Measuring Data Similarity and Dissimilarity: Data Matrix versus Dissimilarity Matrix, Proximity Measures for Nominal Attributes, Proximity Measures for Binary Attributes, Dissimilarity of Numeric Data: Minkowski Distance, Proximity Measures for Ordinal Attributes, Dissimilarity for Attributes of Mixed Types, Cosine Similarity.

UNIT- V: Data Warehousing and Online Analytical Processing

Data Warehouse: Basic Concepts: What Is a Data Warehouse? Differences between Operational Database Systems and Data Warehouses, Why Have a Separate Data Warehouse? Data Warehousing: A Multi tiered Architecture, Data Warehouse Models. Data Warehouse Modeling: Data Cube and OLAP. AMultidimensional. Data Model Stars, Snowflakes,and Fact Constellations: Schemas for Multidimensional Data Models. Typical OLAP Operations . A Starnet Query Model for Querying Multidimensional Databases.Data Warehouse Design and Usage. From Online Analytical Processing to Multidimensional Data Mining. Data Warehouse Implementation. Data Generalization by Attribute- Oriented Induction.

TEXT BOOKS:

1. Data Science Fundamentals and Practical Approaches. Dr. Gypsy Nandi ,Dr. Rupa Kumar Sharma
2. Data Mining Concepts and Techniques Third Edition Jiawei Han, Micheline Kamber.

References:

1. Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk from The Frontline. O'Reilly.
2. Jure Leskovek, Anand Rajaraman and Jeffrey Ullman. Mining of Massive Datasets. v2.1,Cambridge University Press.

Course Outcomes:

CO-1: Understands the terms and concepts in Data Science.
CO-2: Understands the different methods used for data cleaning and preparation.
CO-3: Plots and visualize the data using different tools.
CO-4: Develops the methods using statistics in Data Science.
CO-5: Demonstrates the concepts in Data Warehouse and Online Analytical Processing.

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COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J5538) DATA MINING

B.Tech. III Year I Sem

L	T	P	C
3	0	0	3

Course Objectives:

1. Understand data mining principles and techniques: Introduce DM as a cutting edge business intelligence method and acquaint the students with the DM techniques for building competitive advantage through proactive analysis, predictive modeling, and identifying new trends and behaviors.
2. Building basic terminology.
3. Learn how to gather and analyze large sets of data to gain useful business understanding.
4. Learn how to produce a quantitative analysis report/memo with the necessary information tomake decisions.
5. Describing and demonstrating basic data mining algorithms, methods, and tools

UNIT I

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of DataMining Systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data Warehouse System, Issues in Data Mining. Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT II

Data Warehouse and OLAP Technology for Data Mining: Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Usage of Data Warehousing Online Analytical Processing and Mining Data Cube Computation: Efficient Methods for simple Data Cube Computation (Full Cube, Iceberg Cube, Closed Cube and Shell Cube), Discovery Driven exploration of data cubes, Attribute-Oriented Induction for data characterization and its implementation.

UNIT III

Mining Frequent Patterns, Associations and Correlations: Basic Concepts, The Apriori algorithm for finding frequent itemsets using candidate generation, Generating association rules from frequent itemsets, Mining frequent itemsets without candidate generation, Mining various kinds of Association Rules, Correlation Analysis.

UNIT IV

Classification and Prediction: Description and comparison of classification and prediction, preparing data for Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back propagation Prediction, linear and non-linear regression, evaluating accuracy of a Classifier or a Predictor.

UNIT V

Cluster Analysis: Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, k-means and k-mediod methods, CLARANS, Agglomerative and divisive hierarchical clustering, chameleon dynamic modeling, Constraint-Based Cluster Analysis, Outlier Analysis.

Text Books:

1. Jiawei Han, Micheline Kamber and Jian Pei, "Data Mining – Concepts and Techniques" , 3rdedition, Morgan Kaufmann Publishers, ELSEVIER,2012.
2. Pang-Ning Tan, Michael Steinbach and Vipin Kumar "Introduction to Data Mining", Pearson Education, 2005.

Reference Books:

1. Sam Aanhory & Dennis Murray "Data Warehousing in the Real World" , Pearson Edn Asia.
2. K.P.Soman, S.Diwakar, V.Ajay ,‖Insight into Data Mining‖, PHI, 2008.
3. Ralph Kimball Wiley "The Data Warehouse Life cycle Tool kit",student edition
4. William H Inmon, John Wiley & Sons Inc "Building the Data Warehouse", 2005.
5. Margaret H Dunham "Data Mining Introductory and advanced topics", Pearson education.
6. Arun K Pujari "Data Mining Techniques", 2nd edition, Universities Press.

Course Outcomes:

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

1. Understand operational database, warehousing and multidimensional need of data base to meet industrial needs.
2. Apply the association rules for mining the data.
3. Design and deploy appropriate classification techniques.
4. Cluster the high dimensional data for better organization of the data.
5. Compare and contrast the dominant data mining algorithms.

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(J5533) DISTRIBUTED COMPUTING
Professional Elective –I

B.Tech. III Year I Sem

L	T	P	C
3	0	0	3

Course Objectives:

1. Present the principles underlying the function of distributed computing.
2. Create an awareness of distributed computing design and implementation.
3. Describe and distinguish synchronization and concurrency control in distributed computingsystem.
4. Understanding distributed transaction and control of distributed deadlocks.
5. Understanding distributed computing in cloud and grid computing.

UNIT I

Characterization of Distributed Systems: Introduction, Examples of distributed systems, Resource sharing and the web, Challenges.

System Models: Introduction, Architectural models, Fundamental models.

Operating System Support: Introduction, The operating system layer, Protection, Processes and threads, Communication and invocation, Operating system architecture.

UNIT II

Interprocess communication: Introduction, The API for the internet protocols, External data representation and marshalling, Client Server communication, Group Communication.

Case study: Interprocess communication: Introduction to UNIX.

Distributed objects and Remote Invocation: Introduction, Communication between distributed objects.

Remote procedure call, Events and notifications.

Case study: Java RMI.

Name Services: Introduction, Name services and the Domain Name System.

UNIT III

Time and Global States: Introduction, Clocks events and process states, Synchronizing physical clocks, Logical clocks, Global states, Distributed debugging.

Coordination and Agreement: distributed mutual exclusion, Election, Multicast communication, Consensus and related problems.

UNIT IV

Transactions and Concurrency Control: Introduction, Transactions, Nested transactions, Locks Optimistic concurrency control. Timestamp ordering, Comparison of methods for concurrencycontrol.

Distributed Transactions: Introduction, Flat and nested distributed transactions, Atomic commitprocess, Concurrency control in distributed transactions.

Distributed deadlocks, Transaction recovery. Replication: Introduction, System model and group communication, Fault-tolerant services.

UNIT V

Grid Computing: How Grid Computing Works, Grid Middleware, Grid Architecture, Types of Grids, Grid Computing Applications.

Service Oriented Architecture, Web Services , Service-Oriented Grid, SOA Design and Development, Advantages and the Future of SOA.

Cloud Computing: Features and Architecture, Cloud Computing Landscape.

Text Books:

1. Colouris, Dollimore, Kindberg, ― Distributed Systems concepts and Design‖, 5th Ed. Pearson Education, 2016.
2. Andrew S. Tanenbaum, Van Steen, ― Distributed Systems" , Pearson Education , 2002.

Reference Books:

1. Sunita Mahajan and Seema Shah ,"Distributed Computing", Oxford University Press, 2013.
2. S.Ghosh, Chapman and Hall/CRC ,‖Distributed Systems‖ , Taylor & Francis Group, 2010.
3. Pradeep K.Sinha ,‖Distributed Operating Systems Concepts and Design‖ , PHI.

Course Outcomes*:*

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

1. Understand the characteristics and models in distributed computing.
2. Understand key mechanisms of remote execution.
3. Get familiar with synchronization of processes in distributed environment.
4. Acquire the knowledge of distributed transaction, concurrency and deadlock.
5. Acquire the knowledge of working of grid and cloud computing.

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(J5547) CLOUD COMPUTING
Professional Elective –I

B.Tech. III Year I Sem

L	T	P	C
3	0	0	3

Course Objectives:

1. To impart the fundamentals and essentials of Cloud Computing.
2. To provide students a sound foundation of the Cloud Computing so that they can adopt CloudComputing services and tools in their real life scenarios.
3. To provide knowledge about secutrity and privacy issues related to cloud computingenvironments.
4. To enable students explore cloud computing driven commercial systems such as Google AppEngine, Microsoft Azure and Amazon Web Services and others.
5. To Provide Knowledge about Cloud Programming,Software Environments and basic standardsin cloud computing

UNIT I

Introduction to Cloud Computing: Cloud Computing in a Nutshell, System Models for Distributed and Cloud Computing, Roots of Cloud Computing, Grid and Cloud, Layers and Types of Clouds, Desired Features of a Cloud, Basic Principles of Cloud Computing, Challenges and Risks, Service Models.

UNIT II

Virtual Machines and Virtualization of Clusters and Data Centers: Levels of Virtualization, Virtualization Structures//Tools and Mechanisms, Virtualization of CPU, Memory and I/O Devices, Virtual Clusters and Resource Management, Virtualization Data-Center Automation.
Case studies: Xen Virtual machine monitors- Xen API. VMware - VMware products-Vmware Features. Microsoft Virtual Server - Features of Microsoft Virtual Server.

UNIT III

Cloud computing architectures over Virtualized Data Centers: Data-Center design and Interconnection networks, Architectural Design of Compute and Storage Clouds, Public Cloud Platforms, GAE, AWS, Azure, Inter-cloud Resource Management.

UNIT IV

Cloud Security and Trust Management, Data Security in the Cloud : An Introduction to the Idea of Data Security, The Current State of Data Security in the Cloud, CryptDb:Onion Encryption layers-DET,RND,OPE,JOIN,SEARCH, HOM, and Homomorphic Encryption, FPE.Trust, Reputation and Security Management.

UNIT V

Cloud Programming and Software Environments: Features of Cloud and Grid Platforms, parallel and distributed Programming Paradigms, Programming Support of Google App Engine, Programming on Amazon AWS and Microsoft Azure, Emerging Cloud Software Environments.
Common Standards in Cloud Computing: The Open Cloud Consortium, the Distributed Management Task Force, Standards for Application Developers, and Standards for Messaging.

Internet Messaging Access Protocol (IMAP), Standards for Security, Examples of End-User Access to Cloud Computing.

Text Books:

1. John W. Rittinghouse, "Cloud Computing: Implementation, Management, and Security". James F. Ransome, CRC Press 2009.

2. Kai Hwang. Geoffrey C.Fox, Jack J. Dongarra, –Distributed and Cloud Computing From Parallel Processing to the Internet of Things‖, Elsevier, 2012.

3. Rajkumar Buyya, James Broberg and Andrzej M. Goscinski,‖ Cloud Computing: Principles and Paradigms (Wiley Series on Parallel and Distributed Computing), Wiley *Publishing* ©2011.

Reference Books:

1. Raluca Ada Popa, Catherine M.S. Redfield, Nickolai Zeldovich, and Hari Balakrishnan, –CryptDB: Protecting Confidentiality with encrypted Query Processing‖23rd ACM Symposium on Operating Systems Principles (SOSP 2011), Cascais, Portugal October 2011.

2. A Fully Homomorhic Encryption Scheme, Craig Gentry, September 2009.

3. David Marshall, Wade A. Reynolds, "Advanced Server Virtualization: VMware and MicrosoftPlatform in the Virtual Data Center", Auerbach Publications, 2006.

4. Web resources:

a. http://aws.amazon.com

b. http://code.google.com/appsengine

c. http://www.buyya.com/

Course Outcomes:

Upon completion of this course, students will be able to…

1. Assess the knowledge and the important role of cloud computing in the development ofvarious applications
2. Describe the of various services offered in cloud computing
3. Summarize the knowledge of underlying technologies used in cloud computing
4. Identify the security related issues involved in cloud computing5.Identify the common standards in cloud computing

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COMPUTER SCIENCE AND ENGINEERING

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(J5553) SOFT COMPUTING

Professional Elective –I

B.Tech. III Year I Sem

L	T	P	C
3	0	0	3

Course Objectives:

This course will develop students' knowledge in/on…

1. Key aspects of soft computing and Genetic algorithm
2. Fuzzy logic components
3. Neural networks and its applications
4. Fundamentals of Genetic algorithms
5. Hybrid systems

UNIT-I

Introduction to Soft Computing: Introduction, Fuzzy Computing, Neural Computing, Genetic Algorithms, Associative Memory, Adaptive Resonance Theory, Applications.

Fundamentals of Neural Network: Introduction, Model of Artificial Neuron, Architectures, Learning Methods, Taxonomy of NN Systems, Single-Layer NN System, Applications.

UNIT-II

Back Propagation Network: Background, Back-Propagation Learning, Back-Propagation Algorithm.

Associative Memory: Description, Auto-associative Memory, Bi-directional Hetero-associative Memory.

UNIT-III

Adaptive Resonance Theory: Recap - supervised, unsupervised, backprop algorithms; Competitive Learning; Stability-Plasticity Dilemma (SPD), ART Networks, Iterative Clustering, Unsupervised ART Clustering.

UNIT-IV

Fuzzy Set Theory: Introduction, Fuzzy set : Membership, Operations, Properties; Fuzzy Relations.

Fuzzy Systems: Introduction, Fuzzy Logic, Fuzzification, Fuzzy Inference, Fuzzy Rule Based System, Defuzzification.

UNIT-V

Fundamentals of Genetic Algorithms: Introduction, Encoding, Operators of Genetic Algorithm, Basic Genetic Algorithm.

Hybrid Systems: Integration of Neural Networks, Fuzzy Logic and Genetic Algorithms, GA Based Back Propagation Networks, Fuzzy Back Propagation Networks, Fuzzy Associative Memories, Simplified Fuzzy ARTMAP.

Text Books:

1. Fuzzy sets and Fuzzy logic by George Klir , Bo Y uan, PHI
2. Neural Networks, Fuzzy logic and Genetic Algorithms, Synthesis and applications by S.Rajsekharan, Vijayalaxmi Pai
3. Intelligent Hybrid Systems, D. Ruan, Kluwer Academic Publisher, 1997

Reference Books:

1. Neural Fuzzy Systems, Chin-Teng Lin & C. S. George Lee, Prentice Hall PTR.
2. Neural Networks, S. Haykin, Pearson Education, 2ed, 2001.

Course Outcomes:

1, Learn about soft computing techniques and their applications
2. Analyze various neural network architectures
3. Understand perceptrons and counter propagation networks.
4. Define the fuzzy systems
5. Analyze the genetic algorithms and their applications.

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(J5551) INTERNET OF THINGS
Professional Elective –I

B.Tech. III Year I Sem

L	T	P	C
3	0	0	3

Course Objectives:
1. To introduce the terminology, technology and its applications
2. To introduce the concept of M2M (machine to machine) with necessary protocols3.To introduce the Python Scripting Language which is used in many IoT devices
4. To introduce the Raspberry PI platform, that is widely used in IoT applications
5.To introduce the implementation of web based services on IoT devices

Syllabus:

Unit I

Introduction to Internet of Things –Definition and Characteristics of IoT,hysical Design of IoT – IoT Protocols, IoT communication models, Iot Communication APIs
IoT enabaled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates
Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle

Unit II

IoT and M2M – Software defined networks, network function virtualization, difference between SDN and NFV for IoT Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER

Unit III

Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling
Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib

Unit IV

IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

Unit V

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs Webserver – Web server for IoT, Cloud for IoT, Python web application

framework designing a RESTful web API

Text Book:

Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547

Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

Course Outcomes:

1. Able to understand the application areas of IoT
2. Able to realize the revolution of Internet in Mobile Devices
3. Able to understand Cloud &Sensor Networks
4. Able to understand building blocks of Internet of Things
5. Able to understand characteristics of IoT

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COMPUTER SCIENCE AND ENGINEERING

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(J55100) DATA SCIENCE LAB

B.Tech. III Year I Sem

L	T	P	C
0	0	4	2

Course Objectives:

1. This course introduces Data Science.
2. Explain concepts of Data Preparation.
3. give an insight into the statistical methods of data analysis and prediction

Experiment-I

1. Program to experiment with basic statistics.
    a. Basic statistics using NumPy , Pandas, Matplotlib, Scikit
    b. Using discrete & continuous random variables
    c. Finding mean, mode and median
    d. Calculate variance and standard deviation
    e. Basic statistics using Sk-learn

Experiment-II

2. Program to perform data exploration and preprocessing in Python.

Experiment-III

3. Program to implement data manipulation concepts using Python
    a. Indexing a data frame
    b. Apply function in data frame
    c. Aggregating data
    d. Sorting data frames and merging data frames

Experiment-IV

4. Program to implement data visualization techniques using matplotlib library
    a. Line plot
    b. Area plot
    c. Histogram
    d. Box plot
    e. Scatter plot

Experiment-V

5. Install tableau software for data visualization and perform the following
    a. Create Tableau Workspace
    b. Connecting to a Data Source
    c. Creating a view
    d. Refining the view
    e. Adding Filters to the view
    f. Adding Colors to the view with key findings
    g. Building a map view
    h. Getting into details and identifying the key points
    i. Creating a dashboard and adding interactiveness

Experiment-VI

6. Implement a program to use regular expressions for data science using python
7. Implement Naive Bayes classifier for dataset stored as CSV file.

Experiment-VII

8. Implement a decision tree to classify the data set

Experiment-VIII

9. Implement a program to perform sampling analysis in inferential statistics

Experiment-IX

10. Implement sampling distribution and 1-tail test & 2-tail test

Experiment-X

11. Develop a simple linear regression model in python

Experiment-XI

12. Develop a multiple linear regression model in python

Experiment-XII

14. Implement a program for clustering analysis in data science

Course outcomes:

1. Experiment with basic statistics and data manipulation
2. utilize data visualization techniques to visualize the given data set
3. choose proper classification techniques to predict the class and apply inferential statistics to analyze the samples
4. apply regular expression, linear regression and hypothesis testing for optimal solutions

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(J55101) COMPUTER NETWORKS AND COMPILER DESIGN LAB

B.Tech. III Year I Sem

L	T	P	C
0	0	4	2

Course Objectives:

1. To provide an understanding of the language translation peculiarities by designing a complete translator for a mini language.
2. The **course** is intended to teach the students the basic techniques that underlie the practice of **Compiler** Construction.
3. The **course** will introduce the theory and tools that can be standarly employed in order to perform syntax-directed translation of a high-level programming language into an executable code.
4. Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
5. Allow the student to gain expertise in some specific areas of networking such as the designand maintenance of individual networks.

Recomended System / Software Requirements:

- Intel based desktop PC with minimum of 166 MHZ or faster processor with atleast 64MB RAM and 100 MB free disk space
- C++ compiler

COMPUTER NETWORKS LAB

1. Implement Bit-Stuffing in C language.
2. Implement Character-Stuffing in C language.
3. Write a C program for Cyclic Redundancy check (CRC) at sender side and receiver side.
4. Implement Dijkstra‘s algorithm to compute the shortest path to a graph
5. Implement the Routing table to graph using Distance Vector Routing algorithm.
6. Implement the DES algorithm.

7. Implement the RSA algorithm

LIST OF EXPERIMENTS:

Consider the following mini Language, a simple procedural high-level language, only operating on integer data, with a syntax looking vaguely like a simple C crossed with Pascal. The syntax of the language is defined by the following BNF grammar:

<program> ::= <block>
<block> ::= { <variabledefinition> <slist> } | { <slist> }
<variabledefinition> ::= int<vardeflist>;
<vardeflist> ::= <vardec> | <vardec>, <vardeflist>
<vardec> ::= <identifier> | <identifier> [<constant>]
<slist> ::= <statement> | <statement>; <slist>
<statement> ::= <assignment> | <ifstatement> | <whilestatement> | <block> | <printstatement> | <empty>
<assignment> ::= <identifier> = <expression> | <identifier> [<expression>] = <expression>
<ifstatement> ::= <bexpression> then <slist> else <slist> endif | if <bexpression> then <slist> endif
<whilestatement> ::= while <bexpression> do <slist> enddo
<printstatement> ::= print (<expression>)
<expression> ::= <expression> <additionop> <term> | <term> | addingop> <term>
<bexpression> ::= <expression> <relop> <expression>
<relop> ::= < | <= | == | >= | > | !=
<addingop> ::= + | -
<term> ::= <term> <mulitop> <factor> | <factor>
<multop> ::= * | /
<factor> ::= <constant> | <identifier> | <identifier> [<expression>] | (<expression>)
<constant> ::= <digit> | <digit> <constant>
<identifier> ::= <identifier> <letterordigit> | <letter>
<letterordigit> ::= <letter> | <digit>
<letter> ::= a|b|c|d|e|f|g|h|i|j|k|l|m|n|o|p|q|r|s|t|u|v|w|x|y|z
<digit> ::= 0|1|2|3|4|5|6|7|8|9
<empty> has the obvious meaning
Comments (zero or more characters enclosed between the standard C / Java style comment brackets /*...*/) can be inserted. The language has rudimentary support for 1-dimensional arrays. The declaration
int a[3] declares an array of three elements, referenced as a[0], a[1] and a[2] Note also that you should worry about the scoping of names.
A simple program written in this language is:

```
{
  int a[3], t1, t2;
  t1 = 2;
  a[0] = 1; a[1] = 2; a[t1] = 3;
  t2 = -(a[2] + t1 * 6)/ a[2] - t1);
  if t2 > 5
  then
  print(t2);
  else
  {
    int t3;
    t3 = 99;
    t2 = -25;
    print(-t1 + t2 * t3); /* this is a comment on 2 lines */
```

}
endif

1. Design a Lexical analyzer for given language. The lexical analyzer should ignore redundantspaces, tabs and newlines.
2. LEXtocountthenumberofcharacters, words, spaces and lines in a given input file Programusing
3. ProgramusingLEXto recognizeandcountthenumber of identifiers in a given input file.
4. Implement the lexical analyzer using JLex, flex or lex or other lexical analyzer generartingtools.
5. Design Predictive parser for the given language.
6. Design LALR bottom up parser for the above language.
7. Convert the BNF rules into Yacc from and write code to generate abstract syntax tree.
8. Write program to generate machine code from the abstract syntax tree generated by the parser.

Course outcomes:

1. Identify the different types of network topologies and protocols.
2. Identify the different types of network devices and their functions within a network
3. Implement DES and RSA algorithms
4. Implement a lexical analyzer from a specification of a language's lexical rules.
5. Compute the FIRST set for a BNF grammar and Compute follow set - Compute the FOLLOW setfor a BNF grammar.

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(J5549) DATA MINING LAB

B.Tech. III Year I Sem

L	T	P	C
0	0	4	2

Course Objectives:

1. Practical exposure on implementation of well known data mining tasks.
2. Exposure to real life data sets for analysis and prediction.
3. Learning performance evaluation of data mining algorithms in a supervised and an unsupervised setting.
4. Handling a small data mining project for a given practical domain.
5. At the end to compare and contrast different conceptions of data mining.

LIST OF EXPERIMENTS:

Week 1: Introduction to WEKA.
Week 2: Implementation of measures of proximity.
Week 3: Implementation of pre-processing using WEKA.
Week 4: Learning Of Remove Attributes From Pre-processing Using REMOVE Filter.
Week 5: Implementation of Apriori Algorithm for Association rule Mining.
Week 6: Learning and implementing k-means clustering
Week 7: Learning Naïve and Decision Tress classifier in WEKA
Week 8: Learning Bayesian modelling and Inference in Netica
Week 9: Learning About Attribute Discritization.

Reference Books:

1. Introduction to Data Mining Pang-Ning Tan, Michael Steinbach, Vipin KumarPearson Education (Addison Wesley), 0-321-32136-7, 2006
2. Data Mining with WEKA. http://www.cs.waikato.ac.nz/ml/weka/

Course Outcomes:

1. The data mining process and important issues around data cleaning, pre-processingand integration.
2. The principle algorithms and techniques used in data mining, such as clustering, association mining,classification and prediction.
3. To evaluate the different models of OLAP and data preprocessing.
4. To enlist various algorithms used in information analysis of Data Mining Techniques.
5. To demonstrate the knowledge retrieved through solving problems

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COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(JMC03)CONSTITUTION OF INDIA

B.Tech. III Year I Sem

L	P	C
3	-	3

Course Objectives :

1. The Constitution is the basic and fundamental law.
2. To introduce concepts and salient features of the constitution Indian.
3. Analyze the Preamble of the Constitution and identify the core values reflected in it;
4. Appreciate the core constitutional values that permeate the salient features of the.
5. Indian Constitution; and examine the nature of the Indian federal system and the parliamentary form of govern.

Course outcome :

1. It also tells us about the rights and also the duties of its citizens.
2. They know about the role, powers of members of local sabha and raj sabha.
3. It lays down the rules to govern the country.
4. Role and function of election commissioner.
5. Power and duties of elected represented s for panchayatraj , ZP, corporation and Importance of democracy.

Unit I

Introduction to Constitution‘ meaning of the term,, Indian Constitution: Sources and constitutional history, Features: Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

Unit II

Union Government and its Administration Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha.

Unit III

State Government and its Administration Governor: Role and Position, CM and Council of ministers, State Secretariat: Organisation, Structure and Functions.

Unit IV

Local Administration District‘s Administration head: Role and Importance, Municipalities:Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation, Pachayatiraj: Introduction, PRI: Zila parishadh, Elected officials and their roles, CEO Zila parishadh: Position and role, Block level: Organizational Hierarchy (Different departments) village level: Role of Elected and Appointed officials, Importance of grass root democracy.

Unit V

Election Commission Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning, Institute and Bodies for the welfare of SC/ ST/OBC and women.

REFERENCES :

1. Books. Recommended.
2. Indian Polity‘ by Laxmikanth.
3. Indian Administration‘ by Subhash Kashyap.
4. _Indian Constitution‘ by D.D. Basu.
5. _Indian Administration‘ by Avasti and Avasti.

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J6520) WEB PROGRAMMING

B.Tech. III Year II Sem

L	T	P	C
2	1	0	3

Course Objectives:

This course will develop students' knowledge in/on…

1. Designing the static web page using HTML Tags, CSS properities, javascript
2. Demonstrate JDBC connections, XML Schema with servlets
3. Designing a web page in JSP with different databases
4. Understanding the basics of PHP
5. Accessing the data from the database using MySQL and different types of databases

UNIT-I

Introduction to HTML: Basic Tags, List, Linking document, Creating table and its attributes, Images, Frames, Forms, *CSS* (cascading style sheet) rules and properties.

Introduction to JavaScript: JavaScript syntax, Datatype, Variable, Array, Operator and expression, Looping, Function, Dialog box, Events and events handling.

UNIT-II

JDBC: Introduction to *JDBC*, Types of *JDBC* drivers, Different statement objects statement, Prepared statement, Callable statement, Batch updates.

Introduction to XML: Structuring of data, *XML* namespaces, Document type definitions (*DTD's*), *W3C XML* schema documents, *XML* vocabularies, Extensible style sheet language and *XSL* transformations, Document object model (*DOM*).

Servlets: The *javax.servlet.http* package, Handling http request and responses, Cookies session tracking, Security issues.

UNIT-III

Introduction to JSP: *JSP* and *HTTP*, *JSP* engines, How *JSP* works, *JSP* and servlet, Anatomy of a *JSP* page, *JSP* syntax, *JSP* components, Session tracking, Database connectivity, *JDBC* drivers, *SQL* statement**.**

UNIT-IV

Introduction to PHP: Overview of *PHP*, General server characteristics, Starting to script on server side, Syntax, Variables, Strings, Operators, *if else*, Loop, *switch*, array, function, Session, Exception, Form handling, Servers to run PHP.

UNIT-V

Databases with PHP: Working with *MySQL* database, Operations of database using queries; Accessing *MySQL* database with *PHP* - How web database architectures work, Querying a database from the web, Checking and filtering input data, Setting up a connection, Choosing a database to use, Querying the database, Retrieving the query results, Disconnecting from the database, Putting new information in the database, Using prepared statements, Using other PHP database interfaces.

Text Books:

1. Kogent, ―Web Technologies HTML, CSS, JavaScript, ASP.NET, Servlets, JSP, PHP, ADO.NET, JDBC and XML‖, *1st Edition, Dreamtech Press (Black Book),* ISBN-13:9789351192510, 2013.

2.Phil Hanna, –JSP: The Complete Reference‖, *2nd Edition, McGraw-Hill,* ISBN: 007-212768-6, 2001, (Chapters 4,5,6,7,12,13,14,16)

Reference Books:

1. Ivan Bayross, –Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP‖, *4th Edition, BPB Publications,* ISBN-13: 978-8183330084, 2009,
2. Uttam K.Roy, ―Web Technologies‖, *7th Edition, Oxford Higher Education,* ISBN-10: 0-19-806622-8, ISBN-13: 978-0-19-806622-4, 2010
3. Luke Welling, Laura Thomson,‖PHP and MySQL Web Development‖, *3rd Edition, Sams Publications,* ISBN: 0-672-32672-8, 2005
4. Jayson Falkner, Kevin Jones, ‖Servlets and Java Server Pages‖, *1st Edition, Pearson,* ISBN: 0-321-13649-7, 2003

Course Outcomes:

Upon completion of this course, students will be able to…

1. Design a static web page using HTML Tags, CSS properities, javascripts
2. Design and develop a dynamic web page using JDBC, XML schema, servlets.
3. Design and develop a web page to access data from the databases using JSP concepts
4. Design and demonstrate on secured web page with PHP scripting
5. Design architecture for accessing MySQL database with PHP

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COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J6535) SOFTWARE ENGINEERING

B.Tech III Year II Sem

L	T	P	C
2	1	0	3

Course Objectives :

1. To understand the software life cycle system and the different softwarearchitectural views.
2. To understand the software requirement engineering and SRS document.
3. A general understanding of software process models.
4. To aware of Software Engineering methods and practices, and theirappropriate application.
5. To understand the V and V techniques, design of software product.

UNIT –I

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, Legacy Software, Software myths.

A Generic view of process: Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Processpatterns, process assessment, personal and team process models.

Process models: The waterfall model, Incremental process models, Evolutionary process models, The Unified process.

UNIT - II

Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

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

System models: Context Models, Behavioral models, Data models, Object models, structured methods.

UNIT – III

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

Creating an architectural design: Software architecture, Data design, Architectural styles and patterns, Architectural Design.

Object-Oriented Design: Objects and object classes, An Object-Oriented design process, Design evolution.

Performing User interface design: Golden rules, User interface analysis anddesign, interface analysis, interface design steps, Design evaluation.

UNIT - IV

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing,System testing, the art of Debugging.

Product metrics: Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

Metrics for Process and Products: Software Measurement, Metrics for software quality.

UNIT –V

Risk Management: Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

Quality Management : Quality concepts, Software quality assurance, SoftwareReviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

Text Books :

1. Software engineering A practitioner's Approach, Roger S Pressman, 6thedition. McGrawHill International Edition.
2. Software Engineering, Ian Sommerville, 7th edition, Pearson education.

Reference Books :

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India,2010.
2. Software Engineering: A Primer, Waman S Jawadekar, Tata McGraw-Hill,2008.
3. Fundamentals of Software Engineering, Rajib Mall, PHI, 2005.
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modelling, Diner Bjorner, Springer International edition, 2006.
6. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition 2006.
7. Software Engineering Foundations, Yingux Wang, Auerbach Publications,2008.
8. Software Engineering Principles and Practice, Hans Van Vliet, 3rd edition,John Wiley & Sons Ltd.

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COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J6548) SOFTWARE TESTING METHODOLOGIES

Professional Elective –II

B.Tech. III Year II Sem

L	T	P	C
2	1	0	3

Course Objectives:

1. To study fundamental concepts in software testing, including software testing objectives, process,criteria, strategies, and methods.
2. To learn how to planning a test project, design test cases and data, conduct testing operations, manage software problems and defects, generate a testing report.
3. To expose the advanced software testing topics, such as object-oriented software testing methods, andcomponent-based software testing issues, challenges, and solutions.
4. To gain software testing experience by applying software testing knowledge and methods to practice-oriented software testing projects.
5. To understand software test automation problems and solutions.

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.

Dataflow testing: - Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

UNIT-III

Domain Testing:-domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

UNIT-IV

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-V

State, State Graphs and Transition testing: - state graphs, good & bad state graphs, state testing, Testability tips. 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 or Win-runner).

Text Books:

1. Software Testing techniques – Baris Beizer, Dreamtech, second edition.
2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.

Reference Books:

1. the craft of software testing – Brian Marick, Pearson Education.
2. Software Testing Techniques – SPD(Oreille)
3. Software Testing in the Real World – Edward Kit, Pearson.
4. Effective methods of Software Testing, Perry, John Wiley.
5. Art of Software Testing – Meyers, John Wiley.

Course Outcomes:

By the end of the course, the student should:

1. Have an ability to apply software testing knowledge and engineering methods.
2. Have an ability to design and conduct a software test process for a software testing project.
3. Have an ability to identify the needs of software test automation, and define and develop a test tool to support test automation.
4. Have an ability to understand various software testing problems,.
5. Have an ability to identify and solve these problems by designing and selecting software test models, criteria, strategies, and methods.

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COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J6559) SEMANTIC WEB AND SOCIAL NETWORKS

Professional Elective –II

B.Tech. III Year II Sem

L	T	P	C
2	1	0	3

Course Objectives:

1. To learn Web Intelligence
2. To learn Knowledge Representation for the Semantic Web
3. To learn Ontology Engineering
4. To learn Semantic Web Applications, Services and Technology
5. To learn Social Network Analysis and semantic web

UNIT –I

Web Intelligence Thinking and Intelligent Web Applications, The Information Age ,The World Wide Web, Limitations of Today‘s Web, The Next Generation Web, Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, BernersLee www, Semantic Road Map, Logic on the semantic Web.

UNIT –II

Knowledge Representation for the Semantic WebOntologies and their role in the semantic web, Ontologies Languages for the Semantic Web Resource Description Framework(RDF) / RDF Schema, Ontology Web Language(OWL), UML, XML/XML Schema.

UNIT-III

Ontology EngineeringOntology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and OntologyMapping, Logic, Rule and Inference Engines.

UNIT- IV

Semantic Web Applications, Services and TechnologySemantic Web applications and services, Semantic Search, elearning, Semantic Bioinformatics, Knowledge Base ,XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods.

UNIT-V

Social Network Analysis and semantic web,What is social Networks analysis, development of the social networks analysis, Electronic Sources for Network Analysis Electronic Discussion networks, Blogs and Online Communities, Web Based Networks. Building Semantic Web Applications with social network features.

Text Books:

1. Thinking on the Web Berners Lee, Godel and Turing, Wiley inter science, 2008.
2. Social Networks and the Semantic Web, Peter Mika, Springer, 2007.

Reference Books:

1. Semantic Web Technologies, Trendsand Research in Ontology Based Systems, J.Davies, R.Studer,P.Warren, John Wiley &Sons.
2. Programming the Semantic Web, T.Segaran, C.Evans, J.Taylor, O'Reill y, SPD.

Course Outcomes:

1. Demonstrate knowledge and be able to explain the three different ―named‖ generations of the web.
2. Demonstrate the ability to anticipate materially in projects that develop programs relating to Web applications and the analysis of Web data.
3. Be able to understand and analyze key Web applications including search engines and social networking sites.
4. Be able to understand and explain the key aspects of Web architecture and why these are important to the continued functioning of the World Wide Web.
5. Be able to analyze and explain how technical changes affect the social aspects of Web- based computing.

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(J6570) CYBER SECURITY
Professional Elective –II

L	T	P	C
2	1	0	3

B.Tech. III Year II Sem

Course Objectives:

- To learn about cyber crimes and how they are planned. To learn the
- vulnerabilities of mobile and wireless devices.To learn about the
- crimes in mobile and wireless devices.

UNIT - I

Introduction to Cybercrime: Introduction, Cybercrime and Information security, who are cybercriminals, Classifications of Cybercrimes, Cybercrime: The legal Perspectives and IndianPerspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes.

Cyber offenses: How criminals Plan Them: Introduction, How Criminals plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, AttackVector, Cloud Computing.

UNIT- II

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

UNIT - III

Cybercrimes and Cyber security: the Legal Perspectives

Introduction, Cyber Crime and Legal Landscape around the world, Why Do We Need Cyber laws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario In India, Digital signatures and the Indian IT Act, Amendments to the Indian IT Act, Cybercrime and Punishment, Cyber law, Technology and Students: Indian Scenario.

UNIT - IV

Understanding Computer Forensics

Introduction, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital evidence, Forensics Analysis of Email, Digital Forensics Lifecycle, Chain of Custody concept, Network Forensics, Approaching a computer, ForensicsInvestigation, Challenges in Computer Forensics, Special Tools and Techniques, Forensics Auditing

UNIT - V

Cyber Security: Organizational Implications

Introduction, Cost of Cybercrimes and IPR issues, Web threats for Organizations, Security and Privacy Implications, Social media marketing: Security Risks and Perils for Organizations, Social Computing and the associated challenges for Organizations.

Text Books:

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole and Sunil Belapure, Wiley INDIA.
2. Introduction to Cyber Security**,** Chwan-Hwa(john) Wu, J. David Irwin. CRC Press T & F Group.

Reference Book:

1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC

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COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J6552) HUMAN COMPUTER INTERACTION

Professional Elective –II

B.Tech. III Year II-SEM

L	T	P	C
2	1	0	3

Course Objectives:

A successful student will be able to:

1. Demonstrate an understanding of guidelines, principles, and theories influencing human computer interaction.
2. Recognize how a computer system may be modified to include human diversity.
3. Design mock ups and carry out user and expert evaluation of interfaces.
4. Carry out the steps of experimental design, usability and experimental testing, and evaluation of human computer interaction systems.
5. Use the information sources available, and be aware of the methodologies and technologies supporting advances in HCI.

UNIT-I

Introduction : Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design.**The graphical user interface –** popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT-II

Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

UNIT-III

Screen Designing : Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT - IV

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls.**Components –** text and messages, Icons and increases – Multimedia, colors, uses problems,choosing colors.

UNIT - V

Software tools – Specification methods, interface – Building Tools.

Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

TextBooks: :

1. The essential guide to user interface design, Wilbert O Galitz, Wiley DreamaTech.
2. Designing the user interface. 3rd Edition Ben Shneidermann , Pearson Education Asia.

Reference Books:

Human – Computer Interaction. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, Pearson.

Course Outcomes:

After studying the course you will be able to:

1. Gain Knowledge and understanding of Human Computer Interaction
2. Explain why it is important to design interactive products that are usable
3. Define key terms used in interaction design
4. Explain key theories used in the design of interactive products
5. Explain the importance of iteration, evaluation and prototyping in interaction design

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COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J6571) GENETIC ALGORITHM AND ITS APPLICATIONS

Professional Elective –III

B.Tech. III Year II-SEM

L	T	P	C
3	0	0	3

Objectives:

Evolutionary methods can be thought of as experimental computing that simulates evolution. Its aims are the following:

- How to solve hard problems without using complex mathematical formulations
- Design algorithms that are robust yet easy to program

UNIT 1: Basics of Optimization, Optimization Problems, Point to Point Algorithms, Simulated Annealing.

UNIT 2:

Population Based Algorithms, Brief Overview of Evolutionary Computation, Genetic Algorithms(Theory and Advanced Operators), Genetic Representation, search operators, selection schemesand selection pressure.

UNIT 3: Operators on Real-valued Representations, Niche and fitness sharing, Particle Swarm Optimization, Mimetic Algorithms.

UNIT 4: Evolution Strategies, Genetic Programming, Evolutionary Programming,Differential Evolution .

UNIT 5: Constraint handling in optimization problems, Real Life application of optimization Algorithms, Introduction of Multi-objective Evolutionary Algorithms.

Text/Reference Books:

1. Genetic algorithms in search,optimization and machine learning by DE GoldbergMulti-objective optimization using evolutionary algorithms by K.Deb
2. Handbook on evolutionary computation by T.Baeck,D.B Fogel,and Z.Michalewicz(eds)

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COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J6572)ARTIFICIAL NEURAL NETWORKS
Professional Elective-III

B.Tech III Year II SEM

L	T	P	C
3	0	0	3

Course Objectives:

- To understand the biological neural network and to model equivalent neuron models.
- To understand the architecture, learning algorithms
- To know the issues of various feed forward and feedback neural networks.
- To explore the Neuro dynamic models for various problems.

UNIT-I:

Introduction: A Neural Network, Human Brain, Models of a Neuron, Neural Networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks
Learning Process: Error Correction Learning, Memory Based Learning, Hebbian Learning, Competitive, Boltzmann Learning, Credit Assignment Problem, Memory, Adaption, Statistical Nature of the Learning Process

UNIT-II:

Single Layer Perceptrons: Adaptive Filtering Problem, Unconstrained Organization Techniques, Linear Least Square Filters, Least Mean Square Algorithm, Learning Curves, Learning Rate Annealing Techniques, Perceptron –Convergence Theorem, Relation Between Perceptron and Bayes Classifier for a Gaussian Environment
Multilayer Perceptron: Back Propagation Algorithm XOR Problem, Heuristics, Output Representation and Decision Rule, Computer Experiment, Feature Detection

UNIT-III:

Back Propagation: Back Propagation and Differentiation, Hessian Matrix, Generalization, Cross Validation, Network Pruning Techniques, Virtues and Limitations of Back Propagation Learning, Accelerated Convergence, Supervised Learning

UNIT – IV:

Self-Organization Maps (SOM): Two Basic Feature Mapping Models, Self-Organization Map, SOM Algorithm, Properties of Feature Map, Computer Simulations, Learning Vector Quantization, Adaptive Patter Classification

UNIT-V:

Neuro Dynamics: Dynamical Systems, Stability of Equilibrium States, Attractors, Neuro Dynamical Models, Manipulation of Attractors as a Recurrent Network Paradigm Hopfield Models – Hopfield Models, restricted boltzmen machine.

Course Outcomes:

Upon completing this course, the student will be able to

- Understand the similarity of Biological networks and Neural networks.
- Perform the training of neural networks using various learning rules.
- Understanding the concepts of forward and backward propagations.
- Understand and Construct the Hopfield models.

Text Books:

1. Neural Networks a Comprehensive Foundations, Simon S Haykin, PHI Ed.,.
2. Introduction to Artificial Neural Systems Jacek M. Zurada, JAICO Publishing House Ed. 2006.

Reference Books:

1. Neural Networks in Computer Inteligance, Li Min Fu TMH 2003
2. Neural Networks -James A Freeman David M S Kapura Pearson Ed., 2004.
3. Artificial Neural Networks – B. Vegnanarayana Prentice Hall of India P Ltd 2005

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COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J6573) FUZZY LOGIC AND ITS APPLICATIONS

Professional Elective –III

B.Tech. III Year II-SEM

L	T	P	C
3	0	0	3

COURSE OBJECTIVES:

1. To develop the fundamental concepts such as fuzzy sets, operations and fuzzy relations.
2. To lean about the fuzzification of scalar variables and the defuzzification of membership functions.
3. To learn three different inference methods to design fuzzy rule based system.
4. To develop fuzzy decision making by introducing some concepts and also Bayesian decision methods
5. To learn different fuzzy classification methods.

UNIT I

Classical sets : Operations and properties of classical sets, Mapping of classical sets to the functions. Fuzzy sets - Membership functions, Fuzzy set operations, Properties of fuzzy sets. Classical and Fuzzy relations : Cartesian product, crisp relations-cardinality, operations and properties of crisp relations. Fuzzy relations-cardinality, operations, properties of fuzzy relations, fuzzy Cartesian product and composition, Fuzzy tolerance and equivalence relations, value assignments and other format of the composition operation.

UNIT II

λ Fuzzification and Defuzzification : Features of the membership functions, various forms, fuzzification, defuzzification to crisp sets, - cuts for fuzzy relations, Defuzzification to scalars. Fuzzy logic and approximate reasoning, Other forms of the implication operation.

UNIT III

Fuzzy Systems : Natural language, Linguistic hedges, Fuzzy (Rule based) System, Aggregation of fuzzy rules, Graphical techniques of inference,Membership value assignments: Intuition, Inference, rank ordering, Fuzzy Associative memories.

UNIT IV

Fuzzy decision making : Fuzzy synthetic evaluation, Fuzzy ordering, Preference and consensus, Multi objective decision making, Fuzzy Bayesian, Decision method, Decision making under Fuzzy states and fuzzy actions.

UNIT V

Fuzzy Classification : Classification by equivalence relations-crisp relations, Fuzzy relations, Cluster analysis, Cluster validity, C-Means clustering, Hard C-Means clustering, Fuzzy C-Means algorithm, Classification metric, Hardening the Fuzzy C-Partition.

COURSE OUTCOMES: After successful completion of the course, the students are able to

1. understand the basic ideas of fuzzy sets, operations and properties of fuzzy sets and also about fuzzy relations.
2. understand the basic features of membership functions, fuzzification process and defuzzification process.

3. design fuzzy rule based system.
4. know about combining fuzzy set theory with probability to handle random and non-random uncertainty, and the decision making process.
5. gain the knowledge about fuzzy C-Means clustering.

TEXT BOOK(s):

1. Timothy J.Ross - Fuzzy logic with engineering applications, 3rd edition, Wiley,2010.
2. George J.KlirBo Yuan - Fuzzy sets and Fuzzy logic theory and Applications, PHI, New Delhi,1995.

REFERENCE BOOK(s): S.Rajasekaran, G.A.Vijayalakshmi - Neural Networks and Fuzzy logic and Genetic Algorithms, Synthesis and Applications, PHI, New Delhi,2003. WEB RESOURCES: http://www.nptel.ac.in/syllabus/syllabus.php?subjectId=111106048

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COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J6574) COMPUTER VISION

Professional Elective –III

B.Tech. III Year II-SEM

L	T	P	C
3	0	0	3

Course Objectives: To review image processing techniques for computer vision.

- To understand shape and region analysis
- To understand Hough Transform and its applications to detect lines, circles,ellipses.
- To understand three-dimensional image analysis techniques.
- To understand motion analysis.
- To study some applications of computer vision algorithms.

UNIT – I

Image Processing Foundations: Review of image processing techniques – classical filtering operations – thresholding techniques – edge detection techniques – corner and interest point detection – mathematical morphology – texture.

UNIT - II

Shapes and Regions: Binary shape analysis – connectedness – object labeling and counting – size filtering – distance functions – skeletons and thinning – deformable shape analysis – boundary tracking procedures – active contours – shape models and shape recognition – centroidal profiles – handling occlusion – boundary length measures – boundary descriptors – chain codes – Fourier descriptors – region descriptors – moments

.

UNIT - III

Hough Transform: Line detection – Hough Transform (HT) for line detection – foot-ofnormal method – line localization – line fitting – RANSAC for straight line detection – HT based circular object detection– accurate center location – speed problem – ellipse detection – Case study: Human Iris location– hole detection – generalized Hough Transform (GHT) – spatial matched filtering – GHT for ellipse detection – object location – GHT for feature collation.

UNIT - IV

3D Vision and Motion: Methods for 3D vision – projection schemes – shape from shading – photometric stereo – shape from texture – shape from focus – active range finding – surface representations – point-based representation – volumetric representations – 3D object recognition – 3D reconstruction – introduction to motion – triangulation – bundle adjustment – translational alignment – parametric motion – spline-based motion – optical flow – layered motion.

UNIT - V Applications: Application: Photo album – Face detection – Face recognition – Eigen faces – Active appearance and 3D shape models of faces Application: Surveillance – foregroundbackground separation – particle filters – Chamfer matching, tracking, and occlusion – combining views from multiple cameras – human gait analysis Application: In-vehicle vision system: locating roadway – road markings – identifying road signs – locating pedestrians.

Course Outcomes: Upon completion of this course, the students should be able to

- Implementfundamental image processing techniques required for computer vision
- Perform shape analysis
- Implement boundary tracking techniques.
- Apply chain codes and other region descriptors.
- Apply Hough Transform for line, circle, and ellipse detections.
- Apply 3D vision techniques
- .Implement motion related techniques
- .Develop applications using computer vision techniques.

TEXT BOOKS:

1. Simon J. D. Prince, ―Computer Vision: Models, Learning, and Inference‖, Cambridge University Press, 2012.
2. Mark Nixon and Alberto S. Aquado, ―Feature Extraction & Image Processing for Computer Vision‖, Third Edition, Academic Press, 2012. 3. E. R. Davies, ―Computer & Machine Vision, Fourth Edition, Academic Press, 2012.

REFERENCES:

1. D. L. Baggio et al., ―Mastering OpenCV with Practical Computer Vision Projects‖, Packt Publishing, 2012.
2. 2. Jan Erik Solem, ―Programming Computer Vision with Python: Tools and algorithms for analyzing images, O'Reilly Media, 2012. 2. R. Szeliski, ―Computer Vision: Algorithms and Applications‖, Springer 2011.

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COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J6E02) MANAGERTAL ECONOMICS AND FINANCIAL ANALYSIS

(Open Elective-I)

B.Tech. III Year II-SEM

Course Objective:

L	T	P	C
3	0	0	3

1. To enable the student to understand and appreciate with financialinsights.
2. To give importance for certain basic issues governing business operations.
3. To understand the relation between demand and supply of products and services.
4. To understand the relation of cost and output (production) of certain productsservices.
5. To observe the markets and form of business organizations. describe the financial matters like capital budgeting, financial accounting & analysisof different kinds of business organizations.

Course outcome

The nature of economic activities like needs and wants of people in micro and macro environment.

1. The cost identification of product & services produced by organizations.
2. Market analysis of organizational products and services with different environments.
3. Determination of long term financial planning and the evaluation by using variousmethods.
4. Preparation of financial reports, analysis of business with different techniques of rationanalysis, funds flow analysis, etc.

Unit I

lntroduction & Demand Analysis.

Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting.

Unit II

Production & Cost Analysis: Production Function-

lsoquants and lsocosts, MRTS, Least Cost Combination of lnputs, Cobb-Douglas Production function, Laws of Returns, lnternal and External Economies of Scale. Cost Analysis: Cost concepts. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

Unit III

Markets & New Economic Environment:

Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. Pricing Objectives and Policies of Pricing. Methods of Pricing. Eusrness; Features and evaluation of different forms of Business Organisation: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, New Economic Environment Changing Business Environment in Post-liberalization scenario.

Unit IV

Capital Budgeting:

Capital and its significance, Types of Capitat, Estimation of Fixed and Working capital requirements,

Methods and sources of raising capital - Trading Forecast, Capital Budget, Cash Budget. Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

Unit V

Introduction to Financial Accounting & Financial Analysis:

Accounting concepts and conventions - lntroduction IFRS - Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance sheet withsimple adjustments).

Financial, Analysis: Analysis and lnterpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios. Du Pont Chart'

References:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand' 2009.
2. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age international Publishers, Hyderabad 2013'
3. M' Kasi Reddy & Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi,2012.

Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi. 2012.

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J6526) WEB PROGRAMMING LAB

B.Tech. III Year II-SEM

L	T	P	C
0	0	4	2

Course Objectives:

This course will develop students' knowledge in/on…

1. Designing a static web page using HTML tags, CSS, javascript
2. Demonstrating a dynamic web page using JDBC, XML schema, servlets
3. Accessing data from different databases using JSP concepts
4. Understanding the basics of PHP
5. Accessing the data from the database using MySQL and different types of databases

LIST OF EXPERIMENTS:

Week-I

Design the following static web pages with the following attributes:

Basic Tags.
Heading Tags.
List (Ordered and Un-Ordered).
Textbox, Buttons.

Week-II

Design the following static web pages required for an online store web site.

a. Home Page: The static home page must contain three **frames**.

Top frame: Logo and the stores name and links to Home page, Login page, Registration page, Catalogue page and Cart page.

Left frame: At least four links for navigation, which will display the catalogue of respective links.

Right frame: The pages to the links in the left frame must be loaded here. Initially this page contains description of the web site.

Login Page: Create a simple form with input fields and demonstrate required field validations to validate that all input fields are required and display error messages if the above validations do not hold, navigate to next page when the input fields are valid.

Week-III

Catalogue Page: The catalogue page should contain the details of all the books available in the web site in a table. The details should contain the following:

Snap shot of Cover Page.

Author Name and Publisher.

Price and Add to cart button.

Week-IV

Validation: Write JavaScript to validate the following fields of the above registration page.

Name (Name should contains alphabets and the length should not be less than 6 characters).

Password (Password should not be less than 6 characters length).

E-mail id (should not contain any invalid and must follow the standard pattern

(name@domain.com)

Phone number (Phone number should contain 10 digits only).

Note: You can also validate the login page with these parameters.

CSS (Cascading **S**tyle **S**heets**):** Design a web page using **CSS (C**ascading **S**tyle **S**heets**)** which includes the following:

Use different font, styles: In the style definition you define how each selector should work (font, color etc.).Then, in the body of your pages, you refer to these selectors to activate the styles.

Set a background image for both the page and single elements on the page. You can define the background image for the page like this:

Control the repetition of the image with the background-repeat property. As background-repeat: repeat

Define styles for links Work with layers

Add a customized cursor

Embedding JavaScript in HTML pages.

Design a form and validate its field by using JavaScript.

Week-V

Design a web page to demonstrate on each button events using JavaScript.

WAP to create popup boxes in JavaScript.

Program to create a class that contains an overloaded method called "add" to calculate the sum of two integers, two float numbers and, one integer and one float.

Week-VI

Display the contents of a database table in a neat format.

Insert **N**, no. of records into a database table using Prepared Statement.

Enhance the salaries into the database table by 10% who are earning salary greater than 5000 using Callable Statement.

Delete all records whose marks are below 50% and also display the count.

Week-VII

User Authentication

Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a servlet for doing the following. If he is a valid user (i.e., user-name and password match) you should welcome him by name (user-name) else you should display —You are not an authenticated user —. Use init-parameters to do this. Store the user-names and passwords in the web.xml and access them in the servlet by using the getInitParameters() method.

Write a program illustrating MySQL database program using Servlets

Week-VIII

Write a HTML file to create a simple form with input fields and demonstrate required field

validations to validate that all input fields are required and display error messages if the above validations do not hold.

Create a JSP Page with and run in JSP Engines.Demonstrate Session Tracking in JSP.

Week-IX

Create Database Connectivity with JSP page with different JDBC Drivers.

Create a JSP Page to Insert, Update, Select, and Delete the Data into the Database and from the Database**.**

Week-X

Create a form for your college library entering student details for each student in the college. Validate the form using PHP valuators and display error messages.

Write a PHP which does the following job:

Insert the details of the 3 or 4 users who register with the web site by using registration form. Authenticate the user when he submits the login form using the UserName and Password from the database (instead of cookies).

Week-XI

Create tables in the database which contain the details of items of each category. Modify your catalogue page in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using PHP.

Create and delete MYSQL database using PHP.

Week-XII

Create a PHP program to demonstrate opening and closing a file.

Create a PHP program to demonstrate reading a file and writing in a file.

Text Books:

Kogent, ―Web Technologies HTML, CSS, JavaScript, ASP.NET, Servlets, JSP, PHP, ADO.NET, JDBC and XML‖, 1st Edition, Dreamtech Press (Black Book), ISBN-13:9789351192510, 2013.

Ivan Bayross, ―Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP‖, BPB Publications, 4th Edition, ISBN-13: 978-8183330084), 2009

Phil Hanna ,―JSP: The Complete Reference‖, McGraw-Hill, 2nd Edition,(ISBN:0-07-212768-6) 2001 (Chapters 4,5,6,7,12,13,14,16)

Course Outcomes:

Upon completion of this course, students will be able to…

1. Develop a static web page using HTML Tags, CSS, javascripts
2. Implement with JDBC connections, XML schema, servlets
3. Implement a web page in JSP, accessing the data from different database
4. Implement a web page in PHP scripting
5. To retrieve the data using MySQL and other different types of databases

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

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COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J6537) OBJECT ORIENTED ANALYSIS AND DESIGN LAB

B.Tech. III Year II-SEM

L	T	P	C
0	0	2	1

Course Objectives:

The course will develop student's knowledge in/on…

1. Use case documents that capture requirements for a software system
2. Class diagrams that model both the domain model and design model of a software system
3. Transforming a designed model into code through a mapping to an implementation language
4. Functions of each object-oriented analysis and design model using the UML case tools.
5. Applying Unified modeling to real world applications.

LIST OF EXPERIMENTS:

Experiment-I:

Design Forward Engineer Class diagrams for the following.

a. File System
b. Spread Sheet
c. Window Manager
d. School Information System

Experiment-II:

Design Reverse Engineering for the following Class specifications

a. Class student with attributes name, roll_no and operation study ()
b. Relationship Aggregation
c. Relationship Generalization
d. Interface.

Experiment-III:

Construct Use case Diagrams for the following.

a. Diagram Editor
b. Library Information System
c. Banking System
d.Cab Dispatching System.

Experiment-IV:

Construct Sequence Diagrams for the following.

a. Mobile Phone
b. Use case student register for a course
c. Diagram Editor.

Experiment-V:

Construct Collaboration Diagrams for the following.

a. Use case Librarian issues books to student.
b. Mobile Phone

c. Diagram Editor.

Experiment-VI:

Construct Activity Diagrams for the following.

a. ATM Transaction
b.Ticket Machine
c.Sales Order Processing.

Experiment-VII:

Construct State Chart Diagrams for the following.
a. Account
b.CD Player
c.ATM machine.

Experiment-VIII:

Case Study 1: Passport Automation System

Experiment-IX:

Case Study 2: Credit card processing

Experiment-X:

Case Study 3: BPO management system

Experiment-XI:

Case Study 4: e-book management system.

Experiment-XII:

Case Study 5: Recruitment system.

Text Books:

1. Grady Booch, James Rumbaugh, Ivar Jacobson, –The Unified Modeling Language User Guide‖, *2nd Edition, Addison-Wesley Professional*, ISBN-13: 978-0321267979, 2005.

Course Outcomes:

Upon successful completion of this course, the students will be able to…
1. Eexplain basic object oriented concepts such as types, inheritance & interfaces
2. Implement Forward and Reverse Engineering Techniques.
3. Eexplain the facets of the Unified Process approach to designing and building software system
4. Develop object oriented designs of software suing Unified Modeling Language
5.Develop UML models for real world applications.

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J75102: INFORMATION SECURITY

B.Tech IV-Year I-Sem

L	T	P	C
3	0	0	3

Course Objectives:

- Explain the objectives of information security
- Explain the importance and application of each of confidentiality, integrity, authentication and availability
- Understand various cryptographic algorithms.
- Understand the basic categories of threats to computers and networks
- Describe public-key cryptosystem.
- Describe the enhancements made to IPv4 by IPSec
- Understand Intrusions and intrusion detection
- Discuss the fundamental ideas of public-key cryptography.
- Generate and distribute a PGP key pair and use the PGP package to send an encrypted e- mail message.
- Discuss Web security and Firewalls

CourseOutcomes:

- Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.
- Ability to identify information system requirements for both of them such as client and server.
- Ability to understand the current legal issues towards information security.

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 Concept and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

UNIT-II

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

Asymmetric key Ciphers: Principles of public key crypto systems, RSA algorithm, Elgamal Cryptography, Diffie-Hellman Key Exchange, Knapsack Algorithm.

UNIT-III

Cryptographic Hash Functions: Message Authentication, Secure Hash Algorithm (SHA-512), **Message authentication codes:** Authentication requirements, HMAC, CMAC, Digital signatures, Elgamal Digital Signature Scheme.

Key Management and Distribution: Symmetric Key Distribution Using Symmetric & Asymmetric Encryption, Distribution of Public Keys, Kerberos, X.509 Authentication Service, Public – Key Infrastructure

UNIT-IV

Transport-level Security: Web security considerations, Secure Socket Layer and Transport Layer Security, HTTPS, Secure Shell (SSH)

Wireless Network Security: Wireless Security, Mobile Device Security, IEEE 802.11 Wireless LAN, IEEE 802.11i Wireless LAN Security

UNIT-V

E-Mail Security: Pretty Good Privacy, S/MIME

IP Security: IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, combining security associations, Internet Key Exchange

Case Studies on Cryptography and security: Secure Multiparty Calculation, Virtual Elections, Single sign On, Secure Inter-branch Payment Transactions, Cross site Scripting Vulnerability.

TEXTBOOKS:

1. Cryptography and Network Security Principles and Practice: William Stallings, Pearson Education, 6th Edition
2. Cryptography and Network Security:Atul Kahate, McGrawHill, 3rdEdition

REFERENCEBOOKS:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, WileyIndia, 1st Edition.
2. Cryptography and Network Security: Forouzan Mukhopadhyay, McGrawHill, 3rdEdition
3. Information Security, Principles, and Practice: MarkStamp, WileyIndia.
4. Principles of Computer Security :WM.Arthu rConklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

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(J7223) RENEWABLE ENERGY SOURCES

(Open Elective-II)

B.Tech IV-Year I-Semester

L	T	P	C
3	0	0	3

Objectives:

1. Introduce to the technology of renewable sources of energy.

2. Learn about the solar radiation, it's applications and radiation measuring instruments.
3. Learn about the various types of geothermal resources and its applications.
4. Study the biomass energy resources, bio-mass systems.
5. Learn the methods of energy extraction from the wind and oceans and learn to the technology of direct energy conversion methods.

UNIT – I

Principles of solar radiation: Role and potential of new and renewable source, the solar energy option, environmental impact of solar power, physics of the sun, the solar constant, extra terrestrial and terrestrial solar radiation, solar radiation on tilted surface, instruments for measuring solar radiation and Sunshine, solar radiation data for India.

UNIT – II

Solar energy collection: flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors, tracking CPU and solar swing.

Solar energy storage and applications: Different methods, sensible, latent heat and stratified storage, solar ponds, solar applications solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion, applications of PV system-PV hybrid systems.

UNIT – III

Wind energy: sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria, analysis of aerodynamic forces acting on blade, applications.

Bio-Mass: principles of bio-conversion, anaerobic/aerobic digestion, types of biogas digesters, gas yield, combustion characteristics of biogas, utilization for cooking, I.C engine operation and economic aspects, biomass resource development in India.

UNIT – IV

Geothermal energy: structure of earth's interior- geothermal sites earthquakes & volcanoes-geothermal resources-hot springs-steam ejection principle of working- types of geothermal station with schematic representation site selection for geothermal power plants-problems associated with geothermal conversion-applications- geothermal energy prospects in India

Ocean energy: OTEC, principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: potential and conversion techniques, mini- hydel power plants and their economics.

UNIT – V

Direct energy conversion: Need for DEC, carnot cycle, limitations, principles of DEC. Thermo-electric generators, seebeck, peltier and joule Thomson effects and applications. MHD generators, principles and applications. Fuel cells, principles and applications.

Text Books:

1. Non -Conventional energy sources by G.D. Rai, Khanna publishers, fourth edition,2008

Course outcomes:

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

1. Technology to capture the energy from the renewable sources like sun,wind,ocean,biomass, geothermal.
2. Use different renewable energy sources to produce electrical power.
3. Minimise the use of conventional energy sources to produce electrical energy.
4. Identify the fact that the conventional energy sources are depleted.
5. Identify the direct energy conversion.

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COMPUTER SCIENCE AND ENGINEERING
(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J7456) DIGITAL IMAGE PROCESSING

Professional Elective-IV

B. Tech. IV Year I Semester

L	T	P	C
2	1	0	3

Prerequisite: Digital Signal Processing

Course Objectives:

- To provide a approach towards image processing and introduction about 2D transforms
- To expertise about enhancement methods in time and frequency domain
- To expertise about segmentation and compression techniques
- To understand the Morphological operations on an image

Course Outcomes: Upon completing this course, the student will be able to

- Explore the fundamental relations between pixels and utility of 2-D transforms in image processer.
- Understand the enhancement, segmentation and restoration processes on an image.
- Implement the various Morphological operations on an image
- Understand the need of compression and evaluation of basic compression algorithms.

UNIT-I:
Digital Image Fundamentals & Image Transforms: Digital Image Fundamentals, Sampling and Quantization, Relationship between Pixels.
Image Transforms: 2-D FFT, Properties, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar Transform, Slant Transform, Hotelling Transform.

UNIT-II:
Image Enhancement (Spatial Domain): Introduction, Image Enhancement in Spatial Domain, Enhancement through Point Processing, Types of Point Processing, Histogram Manipulation, Linear and Non – Linear Gray Level Transformation, Local or Neighborhood criterion, Median Filter, Spatial Domain High-Pass Filtering.
Image Enhancement (Frequency Domain): Filtering in Frequency Domain, Low Pass (Smoothing) and High Pass (Sharpening) Filters in Frequency Domain.

UNIT -III:
Image Restoration: Degradation Model, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT -IV:
Image Segmentation: Detection of Discontinuities, Edge Linking And Boundary Detection, thresholding, Region Oriented Segmentation.

Morphological Image Processing: Dilation and Erosion: Dilation, Structuring Element Decomposition, Erosion, Combining Dilation and Erosion, Opening and Closing, Hit or Miss Transformation.

UNIT -V:

Image Compression: Redundancies and their Removal Methods, Fidelity Criteria, Image Compression Models, Huffman and Arithmetic Coding, Error Free Compression, Lossy Compression, Lossy and Lossless Predictive Coding, Transform Based Compression, JPEG 2000 Standards.

TEXT BOOKS:

1. Digital Image Processing - Rafael C. Gonzalez, Richard E. Woods, 3rd Edition, Pearson, 2008
2. Digital Image Processing- S Jayaraman, S Esakkirajan, T Veerakumar- TMH, 2010.

REFERENCE BOOKS:

1. Digital Image Processing and Analysis-Human and Computer Vision Application with usingCVIP Tools - Scotte Umbaugh, 2nd Ed, CRC Press, 2011
2. Digital Image Processing using MATLAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Eddings, 2nd Edition, TMH, 2010.
3. Digital Image Processing and Computer Vision – Somka, Hlavac, Boyle- Cengage Learning(Indian edition) 2008.

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COMPUTER SCIENCE AND ENGINEERING
(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J7556) NATURAL LANGUAGE PROCESSING

Professional Elective-IV

B.Tech. IV Year I Sem:

L	T	P	C
2	1	0	3

Prerequisites: Data structures, finite automata and probability theory

Course Objectives:
- Introduce to some of the problems and solutions of NLP and their relation to linguistics and statistics.

Course Outcomes:
- Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
- Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems
- Able to manipulate probabilities, construct statistical models over strings and trees, and estimate parameters using supervised and unsupervised training methods.
- Able to design, implement, and analyze NLP algorithms
- Able to design different language modeling Techniques.

UNIT - I
Finding the Structure of Words: Words and Their Components, Issues and Challenges, Morphological Models
Finding the Structure of Documents: Introduction, Methods, Complexity of the Approaches, Performances of the Approaches

UNIT - II
Syntax Analysis: Parsing Natural Language, Treebanks: A Data-Driven Approach to Syntax, Representation of Syntactic Structure, Parsing Algorithms, Models for Ambiguity Resolution in Parsing, Multilingual Issues

UNIT - III
Semantic Parsing: Introduction, Semantic Interpretation, System Paradigms, Word Sense Systems, Software.

UNIT - IV
Predicate-Argument Structure, Meaning Representation Systems, Software.

UNIT - V
Discourse Processing: Cohension, Reference Resolution, Discourse Cohension and Structure **Language Modeling:** Introduction, N-Gram Models, Language Model Evaluation, Parameter Estimation, Language Model Adaptation, Types of Language Models, Language-Specific Modeling Problems, Multilingual and Crosslingual Language Modeling

TEXT BOOKS:

1. Multilingual natural Language Processing Applications: From Theory to Practice – Daniel M. Bikel and Imed Zitouni, Pearson Publication
2. Natural Language Processing and Information Retrieval: Tanvier Siddiqui, U.S. Tiwary

REFERENCE BOOK:

1. Speech and Natural Language Processing - Daniel Jurafsky & James H Martin, Pearson Publications

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COMPUTER SCIENCE AND ENGINEERING
(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J7575) STATISTICAL MACHINE LEARNING
Professional Elective-IV

B.Tech. IV Year I Sem. **L T P C**
2 1 0 3

Prerequisites:
Basics of linear algebra, statistics, calculus and algorithm design and analysis.

Course Objectives:

1. To understand the basic theory underlying machine learning..
2. To be able to formulate machine learning problems corresponding to different applications.
3. To understand a range of machine learning algorithms along with their strengths and weaknesses.
4. To be able to apply machine learning algorithms to solve problems of moderate complexity.
5. To apply the algorithms to a real-world problem, optimize the models learned and report on the expected accuracy that can be achieved by applying the models.

Course Outcomes: After completion of this course students will be able to:

1. Apply Common probability distributions in machine learning applications.
2. Use cross Validation to select Parameters.
3. Use Maximum likelihood estimate (MLE) For parameter estimation.
4. Implement fundamental learning algorithms such as logistic regression and k- means clustering.

UNIT - I

Introduction of Machine learning :

Define Machine Leaning, Common misconceptions, supervised Learning, Unsupervised Learning, Data Representation, Numerical Representation , Graph Representation, Applications of Machine Learning.

UNIT – I

Probability: Discrete Random Variables, probability Mass Function(PMF),Conditional Probability, Bayes Theorem, Probability Density Function (PDF), Maximum Likelihood Estimation: Likelihood Functions, Maximum Likelihood Estimation(MLE).

.**UNIT - III**

Supervised Learning :

Generative vs Discriminative Model of Supervised Learning , Naïve Bayes ,parameter of Naive Bayes , MLE of Naïve Bayes Parameters, Bag of Words Model for Text , Logistic Regression ,Logistic Function, Linear Classifier , Parameter Estimation , Maximizing Conditional Log Likelihood, Gradient Ascent, Optimization Algorithm, Empirical comparison of Navie Bayes And Logistic Regression.

UNIT – IV

Supervised Learning: Support Vector Machines

Introduction to Support Vector Machine, Separable Vs Non Superable.
Max-margin Separating Hyperplane, Optimization problem of SVM,Dual SVM Formulation ,Hinge Loss, input space to Feature Space, Kernel Trick.

UNIT - V

Cluster : Introduction of Cluster, K-Mean: K-mean Models, Properties of K-Means Algorithm , Comparing K-means Clustering‘s , K-Means Variants, kmeans++

UNIT – VI

Dimensionally Reduction
Introduction to Dimensionality Reduction, Using Principle Components Analysis (PCA)

TEXT BOOKS:

1. Richard .M Golden, Tilttoma Goswami , G.R Sinhan
2. Games. G , Witten. D , Hastin T, Tibshirani R(2017)

REFERENCE BOOKS:

1. Kristian Kersting , TU Darmstadt

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(J7576) NATURE INSPIRED COMPUTING TECHNIQUES
Professional Elective-IV

IV- Year B.Tech. CSE I-Sem

L	T	P	C
2	1	0	3

Course Objectives: Knowledge on significance of intelligence, genetic algorithms Ant Colony algorithms.

Course Outcomes:

- Familiar with Genetic algorithm and its applications.
- Compare different Ant Colony Optimization algorithmic models.
- Compare different Artificial Bee Colony Optimization algorithmic models.
- Illustrate Particle swam optimization algorithm with an example.

UNIT - I: Models of Life and Intelligence - Fundamentals of bio-inspired models and bio-inspired computing. Evolutionary models and techniques, Swarm models and its self-organization, swarm and evolutionary algorithms. Optimisation problems — single and multi-objective optimisation, heuristic, meta-heuristic and hyper heuristic functions.

UNIT - II: Genetic algorithms - Mathematical foundation, Genetic problem solving, crossover and mutation. genetic algorithms and Markov process, applications of genetic algorithms.

UNIT - III: Ant Colony Algorithms - Ant colony basics, hybrid ant system, ACO in combinatorial optimisation, variations of ACO, case studies.

UNIT - IV: Particle Swarm algorithms - particles moves, particle swarm optimisation, variable length PSO, applications of PSO, case studies. Artificial Bee Colony algorithms - ABC basics, ABC in optimisation, multi-dimensional bee colony algorithms, applications of bee algorithms, case studies.

UNIT - V: Selected nature inspired techniques - Hill climbing, simulated annealing, Gaussian adaptation, Cuckoo search, Firey algorithm, SDA algorithm, bat algorithm, case studies. Other nature inspired techniques - Social spider algorithm, Cultural algorithms, Harmony search algorithm, Intelligent water drops algorithm, Artificial immune system, Flower pollination algorithm, case studies.

TEXT BOOKS:

1. Albert Y.Zomaya - "Handbook of Nature-Inspired and Innovative Computing", Springer, 2006
2. Floreano, D. and C. Mattiussi -"Bio-Inspired Artificial Intelligence: Theories, methods andTechnologies" IT Press, 2008.

REFERENCE BOOKS:

1. Leandro Nunes de Castro - " Fundamentals of Natural Computing, Basic Concepts, Algorithmsand Applications", Chapman & Hall/ CRC, Taylor and Francis Group, 2007.
2. Marco Dorrigo, Thomas Stutzle -‖ Ant Colony Optimization‖, Prentice Hall of India, New Delhi,2005.
3. Vinod Chandra S S, Anand H S - –Machine Learning: A Practitioner's Approach‖, Prentice Hallof India, New Delhi, 2020.

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(UGC-AUTONOMOUS)
COMPUTER SCIENCE AND ENGINEERING
(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J7577) APPLIED MACHINE LEARNING
Professional Elective-V

B.Tech. IV Year I Sem. **L T P C**
2 1 0 3

Prerequisites:
A course on ―Machine learning‖ Knowledge of probability and statistics.

Course Objectives:

6. Understand and implement the most popular learning algorithms.
7. Perform feature selection and experimental set up on real tasks.
8. Evaluate multiple learning algorithms across several tasks.

Course Outcomes: After completion of this course students will be able to:

1. Understand the concepts of computational intelligence like machine learning.
2. Ability to get the skill to apply machine learning techniques to address the real time problems in different Area.
3. Understand the Neural Networks and it‘s usage in machine learning application.

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UNIT - I
Introduction –Motivation and Applications, Basics of Supervised and Unsupervised Learning

UNIT - II
Regression Techniques: Basic concepts and application of Regression, Simple Linear Regression-Gradient Descent and normal equation Method Multiple Linear Regression, Non -Linear Regression, Linear Regression with Regularization, Hyper-Parameters tuning, Loss Functions, Decision Tree Regression, Evaluation Measures for Regression Techniques.

UNIT - III
Classifications Techniques: Naive Bayes Classification: Fitting Multivariate Distribution, Gaussian Distribution and Multinomial Distribution, K-Nearest Neighbours, Classification Tress, Linear Discrimination Analysis, Support Vector Machines: Hard Margin and soft Margin , Kernels and Kernal Tricks, Evaluation Measures For Classification.

UNIT – IV

Artificial Neural Networks –Biological Neurons and Biological Neural networks, perceptron Learning, Activation Functions, Mulitilayer perceptron‘s Back-propagation Neural Networks Learning with Momentum, Winner take all Learning competitive Neural Network Adaptive ANN.

UNIT - V
Clustering:-Hierarchical Agglomerative Clustering K-means Algorithm ,Self-organizing maps

UNIT – VI

Advance in Machine Learning:

Basic of Semi-supervised and Reinforcement Learning, Introduction to Deep Learning, best practices for machine Learning case studies in interdisciplinary domain.

TEXT BOOKS:

3. C.Bishop,pattern Recgnition and Machine Learning Springer.
4. R.O.Duda , P.E Hart and D.G Stock, pattern classification and scene Analysis , Wiley

REFERENCE BOOKS:

2. Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)
COMPUTER SCIENCE AND ENGINEERING
(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J7578) DATA ANALYTICS
Professional Elective-V

B.Tech. IV Year I Sem. **L T P C**
2 1 0 3

Prerequisites:
A course on ―Database Management Systems‖ Knowledge of probability and statistics.

Course Objectives:
1. To explore the fundamental concepts of data analytics.
2. To learn the principles and methods of statistical analysis
3. Discover interesting patterns, analyze supervised and unsupervised models and estimate the
4. accuracy of the algorithms.
5. To understand the various search methods and visualization techniques.

Course Outcomes: After completion of this course students will be able to:
1. Understand the impact of data analytics for business decisions and strategy
2. Carry out data analysis/statistical analysis
3. To carry out standard data visualization and formal inference procedures
4. Design Data Architecture; Understand various Data Sources

UNIT - I
Data Management: Design Data Architecture and manage the data for analysis, understand various sources of Data like Sensors/Signals/GPS etc. Data Management, Data Quality (noise, outliers, missing values, duplicate data) and Data Processing.

UNIT - II
Data Analytics: Introduction to Analytics, Introduction to Tools and Environment, Application of Modeling in Business, Databases & Types of Data and Variables, Data Modeling Techniques, Missing Imputations etc. Need for Business Modeling.

UNIT - III
Regression – Concepts, Blue property assumptions, Least Square Estimation, Variable Rationalization, and Model Building etc.
Logistic Regression: Model Theory, Model fit Statistics, Model Construction, Analytics applications to various Business Domains etc.

UNIT - IV
Object Segmentation: Regression Vs Segmentation – Supervised and Unsupervised Learning, Tree Building – Regression, Classification, Overfitting, Pruning and Complexity, Multiple Decision Trees etc.
Time Series Methods: Arima, Measures of Forecast Accuracy, STL approach, Extract features from generated model as Height, Average Energy etc and Analyze for prediction

UNIT - V
Data Visualization: Pixel-Oriented Visualization Techniques, Geometric Projection Visualization Techniques, Icon-Based Visualization Techniques, Hierarchical Visualization Techniques, Visualizing Complex Data and Relations.

TEXT BOOKS:

1. Student‘s Handbook for Associate Analytics – II, III.
2. Data Mining Concepts and Techniques, Han, Kamber, 3rd Edition, Morgan Kaufmann Publishers.

REFERENCE BOOKS:

1. Introduction to Data Mining, Tan, Steinbach and Kumar, Addision Wisley, 2006.
2. Data Mining Analysis and Concepts, M. Zaki and W. Meira
3. Mining of Massive Datasets, Jure Leskovec Stanford Univ. Anand Rajaraman Milliway Labs Jeffrey D Ullman Stanford Univ

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)

COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J7579) INTELLIGENT MACHINING

Professional Elective-V

B.Tech. IV Year I Sem.

L	T	P	C
2	1	0	3

Prerequisites:

A good catch on statistics, linear algebra, matrix, calculus, probability, programming languages and data modeling.

Course Objectives:

1. To have a basic proficiency in a traditional AI language including an ability to write simple.
2. To intermediate programs and an ability to understand code written in that language. To introduce the basic concepts and techniques of Machine Learning.
3. To develop the skills in using recent machine learning software for solving
4. practical problems.

Course Outcomes: After completion of this course students will be able to

1. Analyze and design a real world problem for implementation and understand the dynamic behavior of a system.
2. Use different machine learning techniques to design AI machine and enveloping applications for real world problems.
3. Be able to apply knowledge of computing analyze a problem, and identify and define the computing requirements appropriate to its solution.

UNIT - I

INTRODUCTION: Introduction to Intelligent Machining, Machining Basics, The Evolution of Intelligent Machining, Why Intelligent Machining and Acknowledgements.

UNIT - II

SENSORS AND SENINGS TECHNIQUES :

Sensors, Signal Processing, Transforming Data into Information, Practical Uses of Machine Learning, Types of Sensors and Signal Processing , Machine Learning: Setting the Context.

UNIT - III

PROCESS CONTROL STRATEGIES:

Programmable Logic Controllers (PLC), Closed Loop Process Control Systems, Introduction to Adaptive Control, Commercially Available Software, Introduction to Machining Process Control.

UNIT - IV

FEATURES DIRECTION IN ADVANCED MACHINES:

Intelligent Machining and the Future, Tech Talk on Metrology, Future Directions in Advanced Machining, Intelligent Machining- Key Takeaways and Course References.

UNIT - V

Constitutes and Components an Intelligent Machine , Adaptive Control with Optimization, Machining Force Control, Manufacturing Process Control: Commonly Used Software.

TEXT BOOKS:

1. Ankur Saxena, Shivani Chandra · 2021
2. Donald Michie · 1982
3. Niladri Syam, Rajeeve Kaul · 2021

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(UGC-AUTONOMOUS)

COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J7586) Deep Learning
Professional Elective-V

B.Tech IV Year I Sem

L	T	P	C
2	1	0	3

Course Objectives:

1.To make students comfortable with tools and techniques required in handling large amounts of datasets
2.To uncover various deep learning methods in NLP, Neural Networks etc.
3.To Use Several libraries and datasets publicly available for the application of these algorithms.
4.To help the students in developing skills required to gain experience of doing independent study.

UNIT-I
INTRODUCTON TO DEEP LEARNING

Introducton to Deep Learning: 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
FEEDFORWARD NETWORKS

Feedforward Networks: Multilayer Perceptron, Gradient Descent, Backpropagation, Empirical Risk Minimization, regularization, autoencoders.

UNIT-III
CONVOLUTIONAL NETWORKS

Convolutional Networks: The Convolution Operation - Variants of the Basic Convolution Function - Structured Outputs - Data Types - Efficient Convolution Algorithms - Random or Unsupervised Features- LeNet, AlexNet

UNIT-IV
RECURRENT NEURAL NETWORKS

Recurrent Neural Networks: Bidirectional RNNs - Deep Recurrent Networks Recursive Neural Networks - The Long Short-Term Memory and Other Gated RNNs

UNIT -V
Deep Generative Models

Boltzmann Machines - Restricted Boltzmann Machines - Introduction to MCMC and Gibbs Sampling- gradient computations in RBMs - Deep Belief Networks- Deep Boltzmann Machines
Applications: Large-Scale Deep Learning - Computer - Speech Recognition - Natural Language Processing - Other Applications

COURSE OUTCOMES

CO1: Understanding the basics concepts of deep learning.
CO2: Emphasizing knowledge on various deep learning algorithms.
CO3: Understanding of CNN and RNN to model for real world applications.
CO4: Understanding the various challenges involved in designing deep learning algorithms for varied applications

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(UGC-AUTONOMOUS)
COMPUTER SCIENCE AND ENGINEERING
(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J75103) Information Security Lab

B.Tech. IV Year I Sem. **L T P C**
0 0 4 2

Course Objectives : The student should be made to

- To learn different cipher techniques
- To implement the algorithms DES, RSA,MD5,SHA-1
- To use network security tools and vulnerability assessment tools

Course Outcomes : At the end of the course, the student should be able to

- Develop code for classical Encryption Techniques to solve the problems.
- Build cryptosystems by applying symmetric and public key encryption algorithms.
- Construct code for authentication algorithms.
- Develop a signature scheme using Digital signature standard.
- Demonstrate the network security system using open source tools

LIST OF EXPERIMENTS:

1. Perform encryption, decryption using the following substitution techniques
    - Ceaser cipher
    - Playfair cipher
    - Hill Cipher
    - Vigenere cipher
2. Perform encryption and decryption using following transposition techniques Rail fence - Row & Column Transformation
3. Apply DES algorithm for practical applications.
4. Apply AES algorithm for practical applications
5. Implement RSA Algorithm using HTML and JavaScript
6. Implement the Diffie-Hellman Key Exchange algorithm for a given problem.
7. Calculate the message digest of a text using the SHA-1 algorithm
8. Implement the SIGNATURE SCHEME - Digital Signature Standard.
9. Demonstrate intrusion detection system (ids) using any tool eg. Snort or any other s/w.
10. Automated Attack and Penetration Tools Exploring N-Stalker, a Vulnerability Assessment Tool
11. Defeating Malware - Building Trojans, Rootkit Hunter

LAB EQUIPMENT:

C Compiler ,JAVA Compiler

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(J75104) DATA ANALYTICS LAB

B.Tech. IV Year I Sem. **L T P C**
0 0 4 2

Course Objectives:

- To explore the fundamental concepts of data analytics.
- To learn the principles and methods of statistical analysis
- Discover interesting patterns, analyze supervised and unsupervised models and estimate the accuracy of the algorithms.
- To understand the various search methods and visualization techniques.

Course Outcomes:

- Understand linear regression and logistic regression.
- Understand the functionality of different classifiers.
- Implement visualization techniques using different graphs.
- Apply descriptive and predictive analytics for different types of data.

List of Experiments:

1. Data Preprocessing
    a. Handling missing values
    b. Noise detection removal
    c. Identifying data redundancy and elimination
2. Implement any one imputation model
3. Implement Linear Regression
4. Implement Logistic Regression
5. Implement Decision Tree Induction for classification
6. Implement Random Forest Classifier
7. Implement ARIMA on Time Series data
8. Object segmentation using hierarchical based methods
9. Perform Visualization techniques (types of maps - Bar, Colum, Line, Scatter, 3D Cubes etc)
10. Perform Descriptive analytics on Healthcare data
11. Perform Predictive analytics on Product Sales data
12. Apply Predictive analytics for Weather forecasting.

TEXT BOOKS:

1. Student‘s Handbook for Associate Analytics – II, III.
2. Data Mining Concepts and Techniques, Han, Kamber, 3rd Edition, Morgan KaufmannPublishers.

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)
COMPUTER SCIENCE AND ENGINEERING
(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J8587) ADVANCED ALGORITHMS
Professional Elective-VI

B.Tech. IV Year II Sem

L	T	P	C
2	1	0	3

Course Objectives:

1. Introduce students to the advanced methods of designing and analyzing algorithms.
2. The student should be able to choose appropriate algorithms and use it for a specific problem.
3. To familiarize students with basic paradigms and data structures used to solve advanced algorithmic problems.
4. Students should be able to understand different classes of problems concerning their computation difficulties.
5. To introduce the students to recent developments in the area of algorithmic design.

Course Outcomes: After completion of course, students would be able to:

1. Analyze the complexity/performance of different algorithms.
2. Determine the appropriate data structure for solving a particular set of problems.
3. Categorize the different problems in various classes according to their complexity.

UNIT – I Sorting: Review of various sorting algorithms, topological sorting Graph: Definitions and Elementary Algorithms: Shortest path by BFS, shortest path in edge-weighted case (Dijkstra's), depth-first search and computation of strongly connected components, emphasis on correctness proof of the algorithm and time/space analysis, example of amortized analysis.

UNIT – II Matroids: Introduction to greedy paradigm, algorithm to compute a maximum weight maximal independent set. Application to MST. Graph Matching: Algorithm to compute maximum matching. Characterization of maximum matching by augmenting paths, Edmond's Blossom algorithm to compute augmenting path.

UNIT - III Flow-Networks: Maxflow-mincut theorem, Ford-Fulkerson Method to compute maximum flow, Edmond-Karp maximum-flow algorithm. Matrix Computations: Strassen's algorithm and introduction to divide and conquer paradigm, inverse of a triangular matrix, relation between the time complexities of basic matrix operations, LUPdecomposition.

UNIT - IV Shortest Path in Graphs: Floyd-Warshall algorithm and introduction to dynamic programming paradigm. More examples of dynamic programming. Modulo Representation of integers/polynomials: Chinese Remainder Theorem, Conversion between base-representation and modulo-representation. Extension to polynomials. Application: Interpolation problem. Discrete Fourier Transform (DFT): In complex field, DFT in modulo ring. Fast Fourier Transform algorithm. Schonhage-Strassen Integer Multiplication algorithm.

UNIT - V Linear Programming: Geometry of the feasibility region and Simplex algorithm.
NP-completeness: Examples, proof of NP-hardness and NP-completeness.

Text Books/Reference Books:

1. Cormen, Leiserson, Rivest, Stein, "Introduction to Algorithms".
2. Aho, Hopcroft, Ullman "The Design and Analysis of Computer Algorithms".
3. Kleinberg and Tardos."Algorithm Design".

Course Outcomes:

1. Analyze the complexity/performance of different algorithms.
2. Determine the appropriate data structure for solving a particular set of problems.
3. Categorize the different problems in various classes according to their complexity.

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(J8588) SPEECH PROCESSING
Professional Elective-VI

B.Tech. IV Year II Sem

L	T	P	C
2	1	0	3

Prerequisites: Signals and Systems, Digital Signal Processing

Course Objectives:

1. To understand the basic principles of sound and speech production and perception.
2. To understand basic principles of speech recognition, synthesis and dialogue systems;.
3. To obtain an introductory overview in the field.

UNIT-I

Fundamentals of Digital Speech Processing

Anatomy and Physiology of Speech Organs, The process of Speech Production, Acoustic Phonetics, Articulatory Phonetics, The Acoustic Theory of Speech Production- Uniform lossless tube model, effect of losses in vocal tract, effect of radiation at lips, Digital models for speech signals.

UNIT-II

Time Domain Models for Speech Processing

Introduction- Window considerations, Short time energy and average magnitude Short time average zero crossing rate, Speech Vs Silence discrimination using energy and zero crossing, Pitchperiod estimation using a parallel processing approach, The short time autocorrelation function, The short time average magnitude difference function, Pitch period estimation using the autocorrelation function.

UNIT-III

Linear Predictive Coding (LPC) Analysis

Basic principles of Linear Predictive Analysis: The Autocorrelation Method, The Covariance Method, Solution of LPC Equations: Cholesky Decomposition Solution for Covariance Method,

Durbin‘s Recursive Solution for the Autocorrelation Equations, Comparison between the Methods of Solution of the LPC Analysis Equations, Applications of LPC Parameters: Pitch Detection using LPC Parameters, Formant Analysis using LPC Parameters.

UNIT-IV

Homomorphic Speech Processing

Introduction, Homomorphic Systems for Convolution: Properties of the Complex Cepstrum, Computational Considerations, The Complex Cepstrum of Speech, Pitch Detection, Formant Estimation, The Homomorphic Vocoder.

UNIT-V

Speech Enhancement

Nature of interfering sounds, Speech enhancement techniques: Single Microphone Approach: spectral subtraction, Enhancement by re-synthesis, Comb filter, Wiener filter, Multi microphone Approach.

Applications of Speech Processing:

Speech recognition systems, Text-to-Speech system and Speaker recognition systems: speakerverification systems, speaker identification systems.

Text Books:

1. L.R. Rabiner and S. W. Schafer, *Digital Processing of Speech Signals*, Pearson Education,2008.
2. Human & Machine, Douglas O'Shaughnessy, *Speech Communications*, 2nd Edition., WileyIndia, 2000.

References:

1. Thomas F. Quateri, *Discrete Time Speech Signal Processing: Principles and Practice*, 1stEdition, PE, 2001.
2. Ben Gold & Nelson Morgan, S*peech & Audio Signal Processing*, 1st Edition, Wiley, 2011.

Course Outcomes: At the end of the course the student will be able to

1: Understand production of speech.

2: Analyze time domain models for speech signals.

3: Analyze linear predictive coding techniques.

4: Illustrate the homomorphic speech processing.

5: Analyze the speech enhancement techniques.

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(UGC-AUTONOMOUS)

COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J8589)Virtual Reality

(PROFESIONALELECTIVE-VI)

L	T	P	C
2	1	0	3

B.Tech. IVYearIISEM:CSE(AI&ML)

Course Objectives:

1. Learn the fundamental Computer Vision, Computer Graphics and Human-Computer interaction Techniques related to VR/AR
2. Review the Geometric Modeling Techniques
3. Review the Virtual Environment
4. Discuss and Examine VR/AR Technologies
5. Use of various types of Hardware and Software in Virtual Reality systems
6. Simulate and Apply Virtual/Augmented Reality to varieties of Applications

Syllabus

UNIT-I

Introduction to Virtual Reality (VR)

Virtual Reality and Virtual Environment, Computer graphics, Real time computer graphics, Flight Simulation, Virtual environment requirement, benefits of virtual reality, Historical development of VR, Scientific Landmark

UNIT-II

Computer Graphics and Geometric Modeling

The Virtual world space, positioning the virtual observer, the perspective projection, human vision, stereo perspective projection, Color theory, Conversion From 2D to 3D, 3D space curves, 3D boundary representation, Simple 3D modelling, 3D clipping, Illumination models, Reflection models, Shading algorithms, Geometrical Transformations: Introduction, Frames of reference, Modeling transformations, Instances, Picking, Flying Scaling the VE, Collision detection

UNIT-III

Virtual Environment

Input/Output Devices: Input (Tracker, Sensor, Digital Gloves, Movement Capture, Videobased Input, 3D Menus & Scanner, 3D etc.). Output (Visual/Auditory/Haptic Devices) Generic VR system: Introduction, Virtual environment, Computer environment, VR technology, Model of interaction, VR Systems, Animating the Virtual Environment: Introduction, The dynamics of numbers, Linear and Nonlinear interpolation, the animation of objects, linear and non-linear translation, shape & object in between, free from deformation, particle system Physical Simulation: Introduction, Objects falling in a gravitational field, Rotating wheels, Elastic collisions, projectiles, simple pendulum, springs, Flight dynamics of an aircraft

UNIT-IV

Augmented Reality (AR)

Taxonomy, Technology and Features of Augmented Reality, AR Vs VR, Challenges with AR, AR systems and functionality, Augmented Reality Methods, Visualization Techniques for Augmented Reality, Enhancing interactivity in AR Environments, Evaluating AR systems

UNIT-V

Development Tools and Frameworks

Human factors: Introduction, the eye, the ear, the somatic senses Hardware: Introduction, sensor hardware, Head-coupled displays, Acoustic hardware, Integrated VR systems Software: Introduction, Modelling virtual world, Physical simulation, VR toolkits, Introduction to VRML**. AR/VR Applications** Introduction, Engineering, Entertainment, Science, Training, Game Development

Text Books:

1. Coiffet, P., Burdea, G. C., (2003), -Virtual Reality Technology, I Wiley-IEEE Press, ISBN: 9780471360896
2. Sclamalstieg, D., Höllerer, T., (2016), -Augmented Reality: Principles & Practice, Pearson, ISBN: 9789332578494
3. Norman, K., Kirakowski, J., (2018), Wiley Handbook of Human Computer Interaction, Wiley-Blackwell, ISBN: 9781118976135
4. LaViola Jr., J. J., Kruijff, E., McMahan, R. P., Bowman, D. A., Poupyrev, I., (2017), -3D User Interfaces: Theory and Practice, Pearson, ISBN: 9780134034324 5. Fowler, A., (2019),-Beginning IOS AR Game Development: Developing Augmented Reality Apps with Unity and C#, Apress, ISBN: 9781484246672
6. Hassanien, A. E., Gupta, D., Khanna, A., Slowik, A., (2022), -Virtual and Augmented Reality for Automobile Industry: Innovation Vision and Applications, I Springer, ISBN: 9783030941017

Reference Books:

1. Craig, A. B., (2013), -Understanding Augmented Reality, Concepts and Applications, Morgan Kaufmann, ISBN: 9780240824086
2. Craig, A. B., Sherman, W. R., Will, J. D., (2009), Developing Virtual Reality Applications, Foundations of Effective Design, Morgan Kaufmann, ISBN: 9780123749437 3. John Vince, J., (2002), -Virtual Reality Systems, Pearson, ISBN: 9788131708446
4. Anand, R., Augmented and Virtual Reality, I Khanna Publishing House
5. Kim, G. J., (2005), -Designing Virtual Systems: The Structured Approachl, ISBN:9781852339586
6. Bimber, O., Raskar, R., (2005), -Spatial Augmented Reality: Merging Real and Virtual
CRC Press, ISBN: 9781568812304 Worlds, I
7. O'Connell, K., (2019),-Designing for Mixed Reality: Blending Data, AR, and the
Physical World, I O'Reilly, ISBN: 9789352138371
8. Sanni Siltanen, S., (2012), **"Theory and applications of marker-based augmented reality,"
Julkaisija-Utgivare Publisher, ISBN: 9789513874490**

Course Outcomes:

1. UNDERSTAND fundamental Computer Vision, Computer Graphics and HumanComputer Interaction. Techniques related to VR/AR .
2.UNDERSTAND Geometric Modeling Techniques
3. UNDERSTAND the Virtual Environment
4. ANALYZE and EVALUATE VR/AR Technologies
5. APPLY various types of Hardware and Software in Virtual Reality systems
6. DESIGN and FORMULATE Virtual/Augmented Reality Applications

JAYAMUKHI INSTITUTE OF TECHNOLOGICAL SCIENCES

(UGC-AUTONOMOUS)
COMPUTER SCIENCE AND ENGINEERING
(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

(J8590) Block Chain Technology
Professional Elective-VI

B.Tech. IV Year II Sem

L	T	P	C
2	1	0	3

Course Objectives

1. By the end of the course, students will be able to
2. Understand how block chain systems (mainly Bit coin and Ethereum) work and to securely interact with them.
3. Design, build, and deploy smart contracts and distributed applications,
4. Integrate ideas from block chain technology into their own projects

UNIT-I
Introduction
Introduction, Scenarios, Challenges Articulated, Blockchain, Blockchain Characteristics, Opportunities Using Blockchain, History of Blockchain.
Evolution of Blockchain : Evolution of Computer Applications, Centralized Applications, Decentralized Applications, Stages in Blockchain Evolution, Consortia, Forks, Public Blockchain Environments, Type of Players in Blockchain Ecosystem, Players in Market.

UNIT-II
Blockchain Concepts
Blockchain Concepts: Introduction, Changing of Blocks, Hashing, Merkle-Tree, Consensus, Mining and Finalizing Blocks, Currency aka tokens, security on blockchain, data storage on blockchain, wallets, coding on blockchain: smart contracts, peer-to-peer network, types of blockchain nodes, risk associated with blockchain solutions, life cycle of blockchain transaction.

UNIT-III
Architecting Blockchain solutions
Architecting Blockchain solutions: Introduction, Obstacles for Use of Blockchain, Blockchain Relevance Evaluation Framework, Blockchain Solutions Reference Architecture, Types of Blockchain Applications. Cryptographic Tokens, Typical Solution Architecture for Enterprise Use Cases, Types of Blockchain Solutions, Architecture Considerations, Architecture with Blockchain Platforms, Approach for Designing Blockchain Applications.

UNIT-IV
Ethereum Blockchain Implementation
Ethereum Blockchain Implementation: Introduction, Tuna Fish Tracking Use Case, Ethereum Ecosystem, Ethereum Development, Ethereum Tool Stack, Ethereum Virtual Machine, Smart Contract Programming, Integrated Development Environment, Truffle Framework, Ganache, Unit Testing, Ethereum Accounts,

MyEtherWallet, Ethereum Networks/Environments, Infura, Etherscan, Ethereum Clients, Decentralized Application, Metamask, Tuna Fish Use Case Implementation, OpenZeppelin Contracts

UNIT-V

Hyperledger Blockchain Implementation

Hyperledger Blockchain Implementation, Introduction, Use Case – Car Ownership Tracking, Hyperledger Fabric, Hyperledger Fabric Transaction Flow, FabCar Use Case Implementation, Invoking Chaincode Functions Using Client Application. Advanced Concepts in Blockchain: Introduction, InterPlanetary File System (IPFS),
Zero-Knowledge Proofs, Oracles, Self-Sovereign Identity, Blockchain with IoT and AI/ML Quantum Computing and Blockchain, Initial Coin Offering, Blockchain Cloud Offerings, Blockchain and its Future Potential.

Text Books

1) Ambadas, Arshad Sarfarz Ariff, Sham ―Blockchain for Enterprise Application Developers‖, Wiley
2) Andreas M. Antonpoulos, ‒Mastering Bitcoin: Programming the Open Blockchain‖ , O'Reilly

Reference Books

1) Blockchain: A Practical Guide to Developing Business, Law, and Technology Solutions, Joseph Bambara, Paul R. Allen, Mc Graw Hill.
2) Blockchain: Blueprint for a New Economy, Melanie Swan, O'Reilly

Course Outcomes

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

1. Demonstrate the foundation of the Block chain technology and understand the processes in payment and funding.
2. Identify the risks involved in building Block chain applications.
3. Review of legal implications using smart contracts.
4. Choose the present landscape of Blockchain implementations and Understand Crypto currency markets
5. Examine how to profit from trading crypto currencies.