COURSE STRUCTURE
AND
DETAILED SYLLABUS

COMPUTER SCIENCE AND ENGINEERING
(DATA SCIENCE)

For
B.TECH FOUR YEAR DEGREE PROGRAMME
(Applicable for the batches admitted from 2020-2021)

VAAGDEVI COLLEGE OF ENGINEERING
(Autonomous)
Bollikunta, Warangal-506 005
Telangana State, India.

I- SEMESTER

S. No.	Course Code	Title of the Course	L	T	P	Credits
1	B20MA01	Linear Algebra and Calculus	3	1	0	4
2	B20PH01	Modern Physics	3	0	0	3
3	B20EE01	Basic Electrical and Electronics Engineering	3	0	0	3
4	B20CS01	Programming for Problem Solving	4	0	0	4
5	B20ME01	Engineering Drawing	0	0	4	2
6	B20PH05	Physics Lab	0	0	3	1.5
7	B20CS02	Programming for Problem Solving Lab	0	0	3	1.5
8	B20MC01	Induction Program	-	-	-	0
		Total Credits	**13**	**1**	**10**	**19**

II SEMESTER

S. No	Course Code	Title of the Course	L	T	P	Credits
1	B20MA02	Differential Equations and Vector Calculus	3	1	0	4
2	B20CH04	Modern Chemistry	3	0	0	3
3	B20CS04	Data Structures and Algorithms	4	0	0	4
4	B20CS03	Python Programming	4	0	0	4
5	B20CS08	Data Structures and Algorithms Lab	0	0	3	1.5
6	B20CS07	Python Programming Lab	0	0	3	1.5
7	B20EN02	English Language and Interactive Communication Skills Lab	0	0	3	1.5
8	B20ME03	Engineering & IT Workshop Lab	0	0	3	1.5
9	B20MC02	Sports	2	0	0	0
		Total Credits	**16**	**1**	**12**	**21**

III SEMESTER

S. No	Course Code	Title of the Course	L	T	P	Credits
1	B20CS16	Operating Systems	3	0	0	3
2	B20CS19	Database Management Systems	3	0	0	3
3	B20EN01	English For Effective Communications	2	0	0	2
4	B20DS01	Data Preparation and Analysis	3	0	0	3
5	B20MA07	Probability and Statistics	3	0	0	3
6	B20EC11	Computer Organization & Micro Processors	3	0	0	3
7	B20CS21	Database Management Systems Lab	0	0	3	1.5
8	B20DS02	Operating Systems and Data Preparation Lab	0	0	3	1.5
9	B20DS03	Project Based Learning – 1	0	0	2	1
		Total Credits	**17**	**0**	**8**	**21**

IV SEMESTER

S. No	Course Code	Title of the Course	L	T	P	Credits
1	B20CS12	Java Programming	3	0	0	3
2	B20AI01	Mathematical Modeling and Optimization	3	0	0	3
3	B20DS04	Data Mining	3	0	0	3
4	B20CS10	Design and Analysis of Algorithms	3	0	0	3
5	B20MB01	Managerial Economics and Financial Analysis	3	0	0	3
6	B20CS13	Design and Analysis of Algorithms Lab	0	0	3	1.5
7	B20CS14	Java Programming Lab	0	0	3	1.5
8	B20DS05	Data Mining Lab	0	0	3	1.5
9	B20DS06	Project Based Learning -2	0	0	2	1
		Total Credits	**15**	**0**	**11**	**20.5**

VAAGDEVI COLLEGE OF ENGINEERING
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COMPUTER SCIENCE AND ENGINEERING
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COURSE STRUCTURE
(R20 Regulations applicable for the batches admitted from Academic Year 2020-2021)

V SEMESTER

S.No	Course Code	Title of the Course	L	T	P	C
1.	B20DS07	Big Data Analytics	3	0	0	3
2.	B20CS30	Data Communications and Computer Networks	3	0	0	3
3.	B20AI03	Artificial Intelligence	3	0	0	3
4.	B20CS29 B20DS08 B20AI11	**Professional Elective – I** Software Engineering Information Retrieval Systems Advanced Databases	3	0	0	3
5.		**Open Elective – I**	3	0	0	3
6.	B20DS09	Big Data Analytics Lab	0	0	3	1.5
7.	B20CS34	Data Communications and Computer Networks Lab	0	0	3	1.5
8.	B20AI04	Artificial Intelligence Lab	0	0	3	1.5
9.	B20MC03	Indian Constitution	2	0	0	0
10.	B20DS10	Project Based Learning -3	0	0	2	1
		Total Credits	**17**	**0**	**11**	**20.5**

VI– SEMESTER

S.No	Course Code	Title of the Course	L	T	P	C
1.	B20CS36	Cloud Computing	3	0	0	3
2.	B20AI06	Machine Learning	3	0	0	3
3.	B20DS11	Data Visualization Techniques	3	0	0	3
4.	B20CS38 B20AI11 B20AI19	**Professional Elective – II** Software Project Management Theory of Computation Natural Language Processing	3	0	0	3
5.		**Open Elective – II**	3	0	0	3
6.	B20CS41	Cloud Computing Lab	0	0	3	1.5
7.	B20AI08	Machine Learning Lab	0	0	3	1.5
8.	B20DS12	Data Visualization Techniques Lab	0	0	3	1.5
9.	B20MC05	Logical Reasoning and Quantitative Aptitude	2	0	0	0
10.	B20DS13	Project Based Learning -4	0	0	2	1
		Total Credits	**17**	**0**	**11**	**20.5**

VII Semester

S.No	Course Code	Title of the Course	L	T	P	C
1.	B20CS37	Internet of Things	3	0	0	3
2.	B20CS39	Network Security and Cryptography	3	0	0	3
3.	B20DS14 B20AI10 B20DS15	**Professional Elective – III** Semantic Web Technology Deep Learning Exploratory Data Analysis	3	0	0	3
4.	B20CS44 B20DS16 B20CS40	**Professional Elective – IV** Software Testing Time Series Data Analytics Web Services	3	0	0	3
5.		**Open Elective – III**	3	0	0	3
6.	B20DS17	Mini project & Internship	0	0	0	2
7.	B20CS42	Internet of Things Lab	0	0	3	1.5
8.	B20DS18	Major Project Phase – 1	0	0	8	4
9.	B20MC05	Human Values & Professional Ethics	2	0	0	0
		Total Credits	**17**	**0**	**11**	**22.5**

VIII Semester

S.No	Course Code	Course Title	L	T	P	C
1	B20CS48 B20DS19 B20AI20	**Professional Elective – V** Cyber Security and Ethical Hacking Mining Massive Datasets Social Network Analysis	3	0	0	3
2	B20CS52 B20DS20 B20DS21	**Professional Elective – VI** Block Chain Technologies Web and Graph Mining Data Privacy and Security	3	0	0	3
3	B20DS22	Technical Seminar	0	0	2	1
4	B20DS23	Major Project Phase –II	0	0	16	8
		Total Credits	**6**	**0**	**18**	**15**

VAAGDEVI COLLEGE OF ENGINEERING
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COMPUTER SCIENCE AND ENGINEERING
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COURSE STRUCTURE

(R20 Regulations applicable for the batches admitted from Academic Year 2020-2021)

R20 B.Tech list of open electives. (Applicable form 2020-2021 admitted batch)

S.No.	Subject code	Subject	L	T	P	Credits	Offered Dept
1	B20CE55	Disaster Preparedness & Planning Management	3	0	0	3	CIVIL
2	B20CE56	Environmental Management	3	0	0	3	CIVIL
3	B20CE57	Urban Planning	3	0	0	3	CIVIL
4	B20EE54	Electrical Power Utilisation and Safety	3	0	0	3	EEE
5	B20EE55	Concepts of Control systems	3	0	0	3	EEE
6	B20EE56	Renewable Energy Sources	3	0	0	3	EEE
7	B20ME59	Non-Conventional Energy Sources	3	0	0	3	MECH
8	B20ME45	Robotics	3	0	0	3	MECH
9	B20ME33	Mechatronics	3	0	0	3	MECH
10	B20EC37	Digital Image Processing	3	0	0	3	ECE
11	B20EC46	Wireless and Mobile Communication	3	0	0	3	ECE
12	B20EC49	Sensor Networks	3	0	0	3	ECE
13	B20EC61	Biomedical Instrumentation	3	0	0	3	ECE
14	B20CS19	Data base Management Systems	3	0	0	3	CSE
15	B20CS12	Java Programming	3	0	0	3	CSE
16	B20CS55	Introduction to Network Security	3	0	0	3	CSE
17	B20CS56	Introduction to Cloud Computing	3	0	0	3	CSE
18	B20CS37	Internet of Things	3	0	0	3	CSE
19	B20CS04	Data Structures and Algorithms	3	0	0	3	CSE
20	B20AI03	Artificial Intelligence	3	0	0	3	CSE(AI&ML)
21	B20AI29	Introduction to Machine Learning	3	0	0	3	CSE(AI&ML)
22	B20AI30	Neural Networks	3	0	0	3	CSE(AI&ML)
23	B20AI31	Introduction to Cyber Security	3	0	0	3	CSE(AI&ML)
24	B20DS24	Introduction to Data science	3	0	0	3	CSE(DS)
25	B20DS25	Data Handling and Visualization	3	0	0	3	CSE(DS)
26	B20DS26	Introduction to Big Data	3	0	0	3	CSE(DS)
27	B20DS27	Introduction to Computer Forensics	3	0	0	3	CSE(DS)
28	B20MB02	Management Science	3	0	0	3	MBA
29	B20MB03	Entrepreneurship Development	3	0	0	3	MBA
30	B20MB06	Intellectual Property Rights	3	0	0	3	MBA

Note: Students should take open electives from the list of open electives offered by the other departments/branches only.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

LINEAR ALGEBRA AND CALCULUS

B. TECH- I Semester **L/T/P/C**
3/1 /0 /4

Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives:

To learn

- Concept of rank of matrix and apply to know the consistency of system of linear equations.
- To determine Eigen values, Eigen vectors of matrices.
- Analyse the nature of sequence and series.
- Geometrical approach to the mean value theorems and their applications.
- To find extreme value of function of two and three variables.

UNIT-I

Matrices

Types of Matrices: Symmetric, Skew-symmetric, Hermitian, Skew-Hermitian, orthogonal, Unitary matrices, Rank of a matrix by Echelon form and Normal form, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations.

UNIT-II

Eigen Values and Eigen vectors

Linear Transformation and Orthogonal Transformation: Eigen values and Eigen vectors and their properties: Diagonalization of a matrix; Cayley-Hamilton Theorem (without proof); finding inverse and power of a matrix by Cayley-Hamilton Theorem;

UNIT-III

Sequences and Series

Definitions, limit, Convergent, Divergent and Oscillatory sequences and Series. Comparison test, p-test, D-Alembert's ratio test; Cauchy's Integral test; Cauchy's n^{th} root test. Alternating series: Leibnitz test,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. 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; Total derivative; Jacobian; Functional dependence and independence, Maxima and Minima of functions of two and three variables using method of Lagrange's method of undetermined multipliers.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO-1: Understand the principles of matrix to calculate the characteristics of system of linear equations using multiple methods.

CO-2: Determine Eigen values, Eigenvectors of matrices.

CO-3: Analyse the nature of sequence and series to identify the convergence.

CO-4: Evaluate limits of single-variable functions graphically and computationally. Analyse improper

integrals using Beta and Gamma functions.

CO-5: Calculate Partial derivatives, extreme of functions of multiple variables.

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 42nd Edition, 2012.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John wiley& Sons, 2006.
3. T.K.V. Iyengar, Engineering Mathematics-I, S. Chand, 2018.

REFERENCE BOOKS:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

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VAAGDEVI COLLEGE OF ENGINEERING
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MODERN PHYSICS

B. TECH- I Semester **L/T/P/C**
3/0 /0 /3

Pre-requisites: None

Course Objectives:

The course will develop students' knowledge in/on

- Concepts of Quantum mechanics their applications
- Concepts and working principles of lasers and optical fibres
- Concepts of Wave optics and Semiconductors in detail
- The course aims at making students to understand the basic concepts of Principles of Physics in a broader sense with a view to lay foundation for the various engineering courses.
- Various chapters establish a strong foundation on the different kinds of materials and pave a way for them to use in at various technical and engineering applications.

UNIT I: Quantum Mechanics

Introduction to Quantum mechanics, Wave nature of Particles, de-Broglie's hypothesis, Time- Independent Schrodinger equation, Significance of Wave function, Uncertainty principle, Particle in one dimension box.

UNIT II: Wave Optics

Huygens's principle, superposition of waves and interference of light by wave front splitting and amplitude splitting; Thin film interference, Newton's rings.
Farunhofer diffraction from a single slit and circular aperture, Diffraction gratings and their resolving power.

UNIT III: Lasers

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, CO2 laser and semiconductor diode laser, applications of lasers in science, Engineering and Medicine.

UNIT IV: Physics of Semiconductors and devices

Classification of materials: conductors, semi- conductors and insulators, calculation of carrier concentration in intrinsic and extrinsic (N-type) semiconductors, Direct and indirect band gap semiconductors. Energy diagram of P-N diode, LED, Types of semiconductor photodetectors, working principles and characteristics of PIN diode, Solar Cell.

UNIT V: Optical Fibres

Optical Fibres introduction, Total internal reflection, Acceptance angle and Cone, Numerical aperture, Types of Optical Fibres, step and graded index fibres, losses in optical fibres, applications of optical fibres.

COURSE OUTCOMES:

On successful completion of this course, students are able to:

- **CO-1:** Understands the basic concepts and hypothesis of quantum mechanics
- **CO-2:** Describes the characteristics and working of lasers and their use in various fields.
- **CO-3:** Analyze and apply the concepts of wave optics for accurate determination of the interference in thin films, Newton's rings and the diffraction in single slit etc.
- **CO-4:** Classify the materials on the basis of energy band gap, and evaluates the carrier concentration of given semiconductors for device applications
- **CO-5:** Apply the concepts of the light propagation in optical fibres in optical communication systems

TEXT BOOKS:

1. A Text Book of Engineering Physics, Dr. M.N. Avadhanulu, Dr. P.G. Kshrisagar-S.Chand.
2. Modern Engineering Physics (Vol-I & II), Dr. K. Vijaya Kumar, Dr. S. Chandralingam – S.Chand.
3. Engineering Physics, P.K. PalaniSwamy, Scitech Publications.
4. Electric Devices & Circuits – Millman & Halkies.

REFERENCES BOOKS:

1. Haliday and Resnick, Physics-Wiley
2. J. Singh Semiconductor Optoelectronics: Physics and Technology, Mc. Graw-Hill inc(1995).

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

B. TECH- I Semester **L/T/P/C**
3/0 /0 /3

Pre-requisites: None

Course objectives:

In this course it is aimed to introduce

- The basic concepts of electrical circuits which is the foundation for network theory
- To understand about single phase AC circuits.
- To understand functioning of different types of DC machines and transformers.
- To understand the various operations of transistors and special purpose diodes
- To learn basic concepts of diodes, Rectifiers and filters.

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 & 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 Calculation of Power (VI)

UNIT-II

Single Phase AC Circuits - R.M.S. and Average values, Form Factor, steady state analysis of series, Parallel and Series parallel Combinations of R, L and C with Sinusoidal excitation concept of reactance, Impedance, Susceptance and Admittance –Concept of Power Factor.

UNIT-III

Transformers and DC Machines:: 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, Speed control of DC Shunt motors Role of Transformers in the fields of engineering, Transformer principle, Ideal and Practical Transformers Equivalent circuit, Regulation and Efficiency.

UNIT-IV

P-N Junction Diode - Diode equation, V-I characteristic, Temperature dependence, Bipolar Junction Transistor (BJT) - Construction, Principle of Operation, CB,CE and CC configurations, Zener Diode, Zener diode characteristics, Use of Zener diode as simple regulator.

UNIT-V

Operational amplifier basics, op amp inverting and Non-Inverting amplifier, Rectifiers and Filters - The P-N junction as a rectifier - A Half Wave Rectifier, Bridge Rectifier, Filters –Inductor Filters, Capacitor Filters.

Course Outcomes:

After Completion of the course, the students will be able to

CO-1: Analyze circuit theorems, mesh and nodal analysis, series and parallel networks, Electrical power.

CO-2: Gain knowledge on AC circuits, reactance, Impedance, Susceptance and Admittance and Power Factor

CO-3: Learn the working principle of DC motors, Transformers

CO-4: Study the characteristics of PN Junction diode and zener diode

CO-5: Learn the basic of Amplifiers and Rectifiers.

TEXT BOOKS:

1. Circuit Theory Analysis and Synthesis by A Chakrabarti, Dhanpat rai & co.
2. Basic Electrical Engineering, P Ramana, M. Suryakalavathi, G. T. Chandra Sekhar,1st Edition, S. Chand Technical Publications, 2018
3. Electronic Devices and Circuits, S. Salivahanan and N Suresh Kumar, 3rd Edition TMH, Revised 2019

REFERENCE BOOKS:

1. Network Analysis by M.E Van Valkenburg, Pearson Publications 3rd Edition
2. Principles of electrical machines by V K Mehta, S Chand Publications
3. Electronics devices and circuits by I J NagrathPHI Publications

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

PROGRAMMING FOR PROBLEM SOLVING

B. TECH- I Semester **L/T/P/C**
4/0 /0 /4

Pre-requisites: None

Course Objectives:

- To provide the necessary knowledge on general engineering problem solving methodologies.
- To provide necessary foundations for step by step computer program development and to present the basic concepts in C programming language.
- To prepare the students to write modular and readable C Programs.
- The Course introduces the essential concepts like abstract data types, user defined data types.
- To analyze the performance of algorithms and how to use such knowledge for later processing with the help of files.
- Aims to train the students to write working programs to solve problems.

UNIT -I

Introduction: Steps in Problem Solving, Algorithms, Flowcharts, Pseudo code, Types of Programming Languages, Introduction to C, History of C, Structure of a C Program.

Introduction to C Programming: The C Character Set, Identifiers and - Keywords, Data Types, Constants and Variables, Declarations, Expressions & Statements, Input / Output Statements (Formatted and Unformatted), Creating and Running a C program.

Operators and Expressions : Unary Operators, Arithmetic Operators, Relational and Logical Operators, Assignment Operators, Conditional operator, Bitwise Operators, special operators, Precedence & Associativity, Type Casting and Type Conversion.

UNIT – II

Control Statements: Branching Statements – if, if-else, else- if, nested-if. Switch statement. Un - conditional Branching Statement- goto. Looping Statements- while, do-while, for, nested loops. Break & Continue.

Functions : Introduction, Defining a Function, Types of Functions, Accessing a Function, Function Prototypes, Passing Arguments to a Function – call by value, Recursion.

Storage Classes: Automatic Variables, External (Global) Variables, Static Variables, Register.

UNIT – III

Arrays: Definition - Single Dimensional Arrays, Multi Dimensional Arrays, Declaration, Initialization, Reading & Writing elements in to an Array, Passing Arrays to Functions. Linear Search, Binary search, Bubble sort.

Strings: Declaration and Initialization of Strings, Reading and Writing a String, String Manipulation Functions, String as Array of Characters, Array of strings, Sorting of Strings.

Structures and Unions: User-Defined Data Types , Defining a Structure, Processing a Structure, Array of Structures, Nested Structures, Passing Structures To Functions. Unions. Typedef, Enumerated types - enum.

UNIT – IV

Pointers: Introduction, Pointer Declarations, Pointer to Pointer, Operations on Pointers -Pointer Arithmetic, Dynamic Memory Allocation – Malloc(), Calloc(), Realloc(), Free(). Pointers and Functions - call by Reference, Pointers and Arrays (one dimensional, two dimensional), Array of Pointers. Structures and Pointers, Self-Referential Structures.

UNIT- V

File Handling: Introduction, Text Files and Binary Files, File Handling Functions-Opening and Closing a File, File Opening Modes, Reading and Writing a File. Random Access File Functions – fseek() , rewind(), ftell(). Command Line Arguments, C Preprocessor Directives.

Course Outcomes:

CO-1: Understanding how problems are posed and how they can be analyzed for obtaining solutions.

CO-2: Learning of sequencing, branching, looping and decision making statements to solve scientific and engineering problems.

CO-3: Implementing different operations on arrays and creating and using of functions to solve problems.

CO-4: Understanding and exploring the various methods of memory allocations.

CO-5: Ability to design and implement different types of file structures using standard methodology.

TEXT BOOK:

1. Byron Gottfried, ***"Programming with C"*** . Third Edition (Schaum's Outlines) McGraw Hill.

REFERENCE BOOKS:

1. B.A. Forouzan and R.F. Gilberg ,*"C Programming and Data Structures"* , Cengage Learning (3rd Edition)
2. Pradip Dey & Manas Ghosh, *"Programming in C"*, 2nd Edition , Oxford University Press,2013.
3. E. Balaguruswamy , *"Programming in ANSI C "* ,McGraw-Hill Education, 2008.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ENGINEERING DRAWING

B. TECH- I Semester **L/T/P/C**
0/0 /4 /2

Pre-requisites: None

Course Objectives:

- Use of various command, object properties in AUTOCAD.
- Learn the basic convention of drawings, dimensioning, scales and conic sections like ellipse, parabola and hyperbola.
- Learn projection of points, lines viewed in different positions.
- Learn projections of plane surfaces and solids viewed in different positions.
- Gain knowledge of sections of solids and their usage in real time applications and conversion of orthographic projection to isometric projection vice-versa.

UNIT – I

Chapter-I Introduction to Computer Graphics : Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software -The Menu System, Toolbars Standard, Object Properties, Draw, Modify and Dimension.

Chapter-II Introduction to Engineering Drawing:

Principles of Engineering Graphics and their significance, ISO and ANSI standards for coordinate dimensioning- usage of Drawing instruments, lettering

a. Conic sections including the Rectangular Hyperbola (General method only);
b. Roulettes-Cycloid, Epicycloid, Hypocycloid
c. Involute
d. Scales – Plain, Diagonal and Vernier Scales.

UNIT –II

Principles of Orthographic Projections in First Angle Projection- Conventions

Projections of Points

Projection of lines: Parallel, Perpendicular, inclined to one plane and inclined to both the planes.

UNIT-III

Projection of planes: Plane parallel, perpendicular and inclined to one reference plane. Planes inclined to both the reference planes.

Projection of Regular Solids-Projection of regular solids, Cube, prisms, pyramids, tetrahedron, Cylinder and cone, axis inclined to one plane and both planes, Projections of Regular Solids.

UNIT-IV

Projections of Sections and sectional views of right angular solid-Prism, Cylinder, Pyramid, Cone.

Development of surfaces of Right Regular Solids – Prism, Pyramid, Cylinder and Cone.

UNIT-V Isometric Projections:

Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric views to Orthographic views and Vice-versa, Conventions.

Course Outcomes:

The students will be able to

CO-1: Understand various commands, modify the applications and object properties in AUTOCAD

CO-2: Analyse the Projections of Points and solids

CO-3: Estimate the use of drawings, dimensioning, scales and conic sections

CO-4: Compare the Conversion of Isometric views to Orthographic views

TEXT BOOKS:

1. Agrawal B & Agrawal C.M. (2012), Engineering Graphics, TMH Publications.
2. Bhatt N.D., Panchal V.M. & Ingke P.R., (2014), Engineering Drawing, Charotar Publishing House.

REFERENCE BOOKS:

1. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers.
2. (Corresponding set of) CAD Software Theory and User Manuals.
3. Engineering Graphics. P I Varghese Tata McGraw Hill Education Pvt. Ltd.
4. Engineering Drawing – P.J.Shan S.Chand Publishers.
5. Engineering Drawing – Johle/Tata McGraw Hill Book Publishers.

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VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

PHYSICS LAB

B. TECH- I Semester **L/T/P/C**
0/0 /3 /1.5

Pre-requisites: None

Course Objectives:

The laboratory course will develop student's knowledge in/on...

- Determination of frequency of AC supply by Sonometer
- Determination of the wavelengths, slit widths with high degree of accuracy from diffraction phenomena using conventional light and laser light
- Determination of time constant of RC circuit and optical fibre characteristics.
- Determination of Solar cell, LED and LASER diode etc. characteristics
- Determination of the wavelength and radius of curvature of Plano convex lens using Newton's rings

Name of the Experiment

1	Torsional Pendulum- Determination of rigidity modulus of materials of a wire
2	Determination of energy gap of material of a p-n junction
3	Study of LED diode V-I & P-I characteristics
4	Determination of dispersive power of a material of a prism-spectrometer.
5	Bending losses of optical fibres and evaluation of numerical aperture of a given optical fibre
6	Study of decay charge & determination of time constant of RC circuit
7	Study of characteristics of Solar cell
8	Determination of wavelength of laser source- Diffraction grating
9	Determination of frequency of AC supply - Sonometer
10	Study of LASER diode V-I & L-I characteristics
11	Determination of wavelength and radius of curvature of Plano convex lens using Newton Rings Experiment.
12	Study of P-N diode Characteristics.

Course Outcomes:

CO1: Estimate the frequency of tuning for and AC supply with the help of stretched strings
CO2: Analyze as well as compare the intensity distribution of interference and diffraction patterns
CO3: Draw the characteristics of electrical and electronic circuits and evaluate the dependent parameters
CO4: Explore and understand the applications of semiconducting devices
CO5: Evaluates the wavelength and radius of curvature of Plano convex lens by Newton's rings

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

PROGRAMMING FOR PROBLEM SOLVING LAB

B. TECH- I Semester **L/T/P/C**
0/0 /3 /1.5

Pre-requisites: None

Course Objectives:

- To provide the necessary knowledge on general engineering problem solving methodologies.
- To provide necessary foundations for step by step computer program development and to present the basic concepts in C programming language.
- To prepare the students to write modular and readable C Programs.
- The Course introduces the essential concepts like abstract data types, user defined data types.
- To analyze the performance of algorithms and how to use such knowledge for later processing with the help of files.
- Aims to train the students to write working programs to solve problems.

WEEK-1

Write a C program to find the areas of shapes like circle, square, rectangle and triangle
Write a C program to demonstrate Type Casting and Type Conversion.

WEEK-2

Write a C program to find the roots of a quadratic equation.
Write a C program to find greatest of any 3 numbers.
Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

WEEK-3

Fibonacci sequence is defined as follows: the first and second terms in sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

A positive integer d is said to be a factor of another positive integer N if when N is divided by d, the remainder obtained is zero. For example, for number 12, there are 6 factors 1, 2, 3, 4, 6, 12. Every positive integer k has at least two factors, 1 and the number k itself.Given two positive integers N and k, write a program to print the kth largest factor of N.

Input Format: The input is a comma-separated list of positive integer pairs (N, k).

Output Format: The k^{th} highest factor of N. If N does not have k factors, the output should be 1.

Constraints:

- 1<N<10000000000
- 1<k<600.

You can assume that N will have no prime factors which are larger than 13.

Example

- **Input**: 12,3
- **Output**: 4

Write a C program to find the second largest number in a set of n numbers.

WEEK-4

Write a C program to generate Pascal's triangle.
Write a C program to find the LCM(Least Common Multiple) and GCD (greatest common divisor) of two given integers.
Write a C program to generate all the prime numbers between 1 and n, where n is a valuesupplied by the user.

WEEK-5

Write a C program to find sum of series 1+x^1+x^2+x^3+..... +x^n using functions.

Write a C program to find factorial of a given number using Recursion.

Write a C program to demonstrate the use of Storage Classes

WEEK-6

Write a C program to find both the largest and smallest number in a list of integers.

N monkeys are invited to a party where they start dancing. They dance in a circular formation, very similar to a Gujarati Garba or a Drum Circle. The dance requires the monkeys to constantly change positions after every 1 second.

The change of position is not random & you, in the audience, observe a pattern. Monkeys are very disciplined & follow a specific pattern while dancing.

Consider N = 6, and an array monkeys = {3,6,5,4,1,2}.

This array (1-indexed) is the dancing pattern. The value at monkeys[i], indicates the new of position of the monkey who is standing at the ith position.

Given N & the array monkeys[ ], find the time after which all monkeys are in the initial positions for the 1st time.

Constraints

1<=t<=10 (test cases)

1<=N<=10000 (Number of monkeys)

Input Format

First line contains single integer t, denoting the number of test cases.

Each test case is as follows -

Integer N denoting the number of monkeys.

Next line contains N integer denoting the dancing pattern array, monkeys[].

Output

t lines,

Each line must contain a single integer T, where T is the minimum number of seconds after which all the monkeys are in their initial position

Write a C program to insert an element at a given position in an Array using functions.

WEEK-7

7. Write a C program to perform all of the following:

a) Matrix Addition and subtraction

b) Matrix Multiplication

c) Find Transpose and test if a matrix is symmetric or not

d) A traditional chess board consists of 8 rows and 8 columns. Write a program to count the number of safest places that a King can be positioned when 3 queens (ministers) are placed at different positions on the chess board.

WEEK-8

Write a C program to perform linear search

Write a C program to perform binary search

Write a C program to sort the elements using bubble sort

WEEK-9

Write a C program to insert a sub-string in to a given main string at a given position.

Write a C program to count number of characters, words and sentences in a given text.

Write a C program to determine if the given string is a palindrome or not.

Write a C program to sort the given names in alphabetical order.

WEEK-10

Write a C program to implement array of structures.(use student structure) and write functions to

i. to search student data using hall ticket number.
ii. to sort the student records based on the total marks.

Write a menu driven C program that uses functions to perform the following operations on complex numbers stored in a structure:

i. Reading a complex number
ii. Writing a complex number
iii. Addition of two complex numbers
iv. Multiplication of two complex numbers

Write a C program to demonstrate Unions and enum.

WEEK-11

Write a C program for Pointer Arithmetic.

Write a C program to swap two numbers using Call by value and Call by reference.

Write a C program to demonstrate calling of a function (like add, subtract, multiply) using a function pointer.

WEEK-12

Write a C program using pointer to create a two dimensional matrix, to input values in to the matrixand to display the matrix and its transpose. Free the memory properly.

Write a C program to demonstrate on structures and pointers.

Write a C program for dynamic creation of structures using pointers

WEEK-13

Write a C program to count no of alphabets, no of digits, no of special symbols, no of white spaces and no of tabs in a given text file.

Write a C program which copies one text file to another text file and verify the correctness.

Write a C program which copies one binary file to another binary file and verify the correctness.

WEEK-14

Write a C program to produce reverse of the content of a text fie into another text file and verify the result.

Write a C program to merge two text files into a third text file (i.e., the contents of the first file followed by those of the second are put in the third file) and verify the correctness.

WEEK-15

Write a command-line C program to reverse the first n characters in a file.
(Note: The file name and n are specified on the command line.)

Write a C Program that removes all comment lines from a C source file.

Course Outcomes:

CO-1: Understand basic structure of the C Programming, data types, declaration and usage of variables, control structures and all related concepts.

CO-2: Ability to understand any algorithm and Write the C programming code in executable form.

CO-3: Implement Programs using functions, pointers and arrays, and use the pre-processors to solve real time problems.

CO-4: Ability to use file structures and implement programs on files.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

B. Tech: II- Semester **L/T/P/C**
3/1/0/4

Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives:

To learn

- Methods of solving the applications of differential equations.
- To solve initial value problems using differential equations.
- Evaluation of multiple integrations and their applications
- The physical quantity involved in Engineering field related to vector field.
- To apply fundamental theorems of vectors integrations in their applications.

UNIT-I: Ordinary Differential Equations of First Order: Exact, Non-Exact differential equations, linear and Bernoulli's differential equations, Applications: Newton's law of cooling, Law of Natural growth and decay.

UNIT-II: Ordinary Differential Equations of Higher Order: Second order linear differential equations with constant coefficients, Non-Homogeneous terms of the type e^{ax}, sin ax, cos ax, polynomials in x, e^{ax} V(x), Method of variation of parameters.

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.

UNIT-IV: Vector Differentiation: Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Tangent plane and normal line. Scalar potential functions. Solenoidal and Irrotational vectors.

UNIT-V: Vector Integration: Line Integrals, Surface Integrals and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO-1: Apply the fundamental concepts of ordinary differential equations to real time problems.
CO-2: Find the complete solution of a non homogeneous differential equations and applying its concepts in Engineering problems.
CO-3: Evaluate the multiple integrals in various coordinate systems.
CO-4: Apply the concepts of gradient, divergence and curl to formulate Engineering problems.
CO-5: Analyse line, surface and volume integrals using fundamental theorems.

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 42nd Editions, 2012.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. T.K.V. Iyengar, Engineering Mathematics-II, S. Chand, 2018.

REFERENCE BOOKS:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishers
3. S.L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
MODERN CHEMISTRY

B. Tech: II- Semester **L/T/P/C**
3/0/0/3

Pre-requisites: None

COURSE OBJECTIVES:

- To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.
- To acquire the knowledge of electrochemical cells, different batteries.
- To acquire the knowledge of corrosion and it's control methods.
- To acquire the knowledge of water treatment which are essential for the Engineers in industry.
- To acquire the knowledge of Amino acids, Proteins and nucleic acids
- To acquire the knowledge and skills of forensic science and importance of spectroscopic techniques in processing crime scene evidence.

UNIT-I: Batteries

Batteries: Introduction to Electrochemical and Electrolytic cells, e.m.f. and it's calculation, primary cells-lithium cells. Secondary cells – Pb-acid storage cell, lithium-ion cells, Fuel cells-hydrogen-oxygen fuel cell. Methanol-oxygen fuel cell-advantages and applications.

UNIT-II: Corrosion & It's control methods

Corrosion & It's control methods: Introduction, causes of corrosion, types of corrosion-dry and wet corrosion-mechanism of electrochemical corrosion. Factors affecting on corrosion and corrosion control methods- cathodic protection(sacrificial anodic protection and impressive current cathodic protection) and surface coatings (anodic and cathodic), Methods of application of metal coatings-Hot dipping(galvanization and tinning) and electroplating of copper.

UNIT-III: Water Technology

Introduction, types of hardness, units. Estimation of hardness of water-EDTA method. Boiler troubles- scales and sludges, Caustic embrittlement and boiler corrosion. Treatment of Boiler feed water-Ion- exchange process. De-salination of brackish water-Reverse Osmosis. Domestic water treatment- specifications and steps involved in the treatment of potable water.

UNIT-IV: Amino acids-Proteins and Nucleic acids

Amino acids -Proteins: Introduction to Amino acids, classification based on nutritional values & structure, peptide bond formation. Introduction to proteins, functional classification of proteins, and structures. **Nucleic acids:** Structure and properties of RNA & DNA.

UNIT-V: Forensic Drug Analysis

Introduction to forensic drug chemistry and classifications of drugs and drug abuse and forensic drug analysis by Ultra violet and visible spectra: Basic principle Lambert and Beers Law. It's applications in forensic chemistry .Infrared spectra: Basic principle, qualitative analysis and interpretation of IR spectra, forensic applications.NMR: Basic principle, Chemical shifts, Spin-spin coupling, interpretation of spectra and forensic application

Course Outcomes: The basic concepts included in this course will help the student to gain:

CO-1: The knowledge of electrochemical cells, different batteries

CO-2: The knowledge of principles and concepts in corrosion & it's control methods.

CO-3: The knowledge of Water treatment.

CO-4: The knowledge of Amino acids, Proteins and Nucleic acids.

CO-5: The knowledge of principles and concepts in Forensic drug chemistry and it's analysis.

SUGGESTED READING:

(i) Text book of Engineering Chemistry by Jain & Jain.
(ii) Text book of Engineering Chemistry by M. Thirumala Chary, E. Laxminarayana.
(iii) K. Shashikala – Pearson publications
(iv) University chemistry, by B. H. Mahan
(v) Engineering Chemistry by Shashi Ch
(vi) Fundamentals of Forensic science by Max M Houck
(vii) Lee & Gaensslen : Advances in Forensic Science, (Vol. 2) Instrumental Analysis.
(viii) Settle, F.A. (1997) Handbook of Instrumental Techniques for Analytical Chemistry, Prentice Hall
(ix) Biochemistry by U.SATYANARAYANA
(x) Saferstein, R (1982) Forensic Science Hand Book, Vol I, II and III, Pretince

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

DATA STRUCTURES AND ALGORITHMS

B. Tech: II- Semester **L/T/P/C**
4/ 0/0/ 4

Prerequisites: A course on "Programming for Problem Solving".

Course Objectives:

- Exploring basic data structures such as stacks and queues.
- Introduces a variety of data structures such as hash tables, search trees, heaps, graphs.

UNIT - I

Basic Concepts: Algorithm specification- Introduction, Performance analysis and Performance measurement. Arrays: The Abstract data type, Sparse matrices- Introduction, Sparse matrix representation, Transposing a matrix.

Stacks and Queues: Stack Abstract Data Type, Stack operations, Queue Abstract Data Type, Queue operations. Evaluation of expressions- Expressions, Postfix notations, Infix to postfix.

UNIT - II

Linked Lists: Singly linked lists and chains, Representing chains, Linked stacks and Queues, Doubly linked lists, Circular lists.

Trees: Introduction, Binary trees- The abstract data type, Properties of binary trees, Binary tree representations, Binary tree traversals- Inorder traversal, Preorder traversal, Postorder traversal.

Binary search trees: Definition, Searching a binary search tree, Insertion into a binary search tree, Deletion from a binary search tree, Joining and Splitting binary search trees, Height of a binary search tree.

UNIT - III

Heaps: Priority Queues, Definition of MAX heap, insertion into a MAX Heaps, Deletion from a MAX Heaps.

Efficient Binary Search Trees: Optimal binary search trees, AVL trees, rotations of AVL trees. Multiway Search Trees: M-way search trees, B-trees.

UNIT -IV

Hashing: Introduction, Hash functions, Collision resolution Techniques - Hash table overflow, Extendible hashing.

Graphs: The Graph Abstract Data Type- Introduction, Definition, Graph representations, Elementary graph operations- Depth first search, Breadth first search.

UNIT - V

Sorting-Types of sorting, Insertion sort, Selection sort, Quick sort, Merge sort, Heap sort, External sorting- K-way merge sort, Comparison of all sorting methods.

Course Outcomes:

CO-1: Define the basic techniques of algorithm analysis
CO-2: Examine the linear and non linear data structures.
CO-3: Develop Priority Queues and Balanced Trees.
CO-4: Understand Hashing Techniques and Graph applications.
CO-5: Apply suitable algorithms for sorting Technique

TEXT BOOK:

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan

Anderson Freed, *Universities Press.*

REFERENCE BOOKS:

1. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B.A. Forouzan, Cengage Learning.

2. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M.J. Augenstein, *PHI/Pearson Education*.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

PYTHON PROGRAMMING

B. Tech: II- Semester **L/T/P/C**
4 /0/0/4

Prerequisites: A course on "Programming for Problem Solving".

Course Objectives:

The purpose of the course is to make students

- To develop Python programs with conditionals and loops.
- To develop Python functions and call them.
- To develop and use Python data structures – lists, tuples, dictionaries.
- To do input/output with files in Python.
- To get exposure to various problems solving approaches of computer science

UNIT – I

Introduction to Python: What is Python?, What is Python Good For?, Python History, How does Python Execute a Program, Review of a Simple Program, Some of the Basic Commands, Variables, Statements, Input/Output Operations, Keywords, Variables, Assigning values, Standard Data Types, Strings, Operands and operators.

UNIT – II

Understanding the Decision Control Structures: The if Statement, A Word on Indentation, The if … else Statement, The if … elif … else Statement,

Loop Control Statements: The while Loop, The for Loop, Infinite Loops, Nested Loops.

The break Statement, The continue Statement, The pass Statement, The assert Statement, The return Statement.

UNIT – III

Functions- Function Definition and Execution, Scoping, Arguments: Arguments are Objects, Argument Calling by Keywords, Default Arguments, Function Rules, Return Values.

Advanced Function Calling: The apply Statement, The map Statement, Indirect Function Calls, Anonymous Functions.

UNIT - IV

Lists: List, Creating List, Updating the Elements of a List, Sorting the List Elements. Storing Different Types of Data in a List, Nested Lists, Nested Lists as Matrices, List Comprehensions.

Tuples: Creating Tuple, Accessing the Tuple Elements, Basic Operations on Tuples, Functions to Process Tuples, Nested Tuples, Inserting Elements in a Tuple, Modifying Elements of a Tuple, Deleting Elements from a Tuple.

Sets: Creating Set, Basic Operations on Sets, Methods of Set.

Dictionaries: Operations on Dictionaries, Dictionary Methods, Using for Loop with Dictionaries, Sorting the Elements of a Dictionary using Lambdas, Converting Lists into Dictionary.

UNIT – V

Modules: Importing a Module, Tricks for Importing Modules, Packages.

Exceptions and Error Trapping: What is an Exception?, Exception Handling: try..except..else.., try..finally.., Exceptions Nest, Raising Exceptions, Built-In Exceptions.

Files: Working with Files and Directories, File Processing, Controlling File I/O.

Course Outcomes:

CO-1: Defining the fundamentals of writing Python scripts.

CO-2: Expressing the Core Python scripting elements such as variables and flow control structures.
CO-3: Apply Python functions to facilitate code reuse.
CO-4: Extending how to work with lists and sequence data.
CO-5: Implement file operations such as read and write and Adapting the code robust by handling errors and exceptions properly.

TEXT BOOKS:

1. The Complete Reference-Python by Martin C. Brown, Mc Graw Hill
2. Python Bible- Complete Python Language Reference by Dave Brueck and Stephen Tanner

REFERENCE BOOKS:

1. Python Programming for Beginners by Adam Stewart
2. Python Essential Reference (3rd Edition) by David M. Beazleyf

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

DATA STRUCTURES AND ALGORITHMS LAB

B. Tech: II- Semester **L/T/ P/C**
0/0/3/1.5

Prerequisites: A Course on "Programming for problem solving".

Course Objectives:

- It covers various concepts of C programming language
- It introduces searching and sorting algorithms
- It provides an understanding of data structures such as stacks and queues.

LIST OF EXPERIMENTS:

1. Write a program that uses functions to perform the following operations on singly linked list.:
   i) Creation ii) Insertion iii) Deletion iv) Traversal
2. Write a program that uses functions to perform the following operations on doubly linked list.:
   i) Creation ii) Insertion iii) Deletion iv) Traversal
3. Write a program that uses functions to perform the following operations on circular linked list.:
   i) Creation ii) Insertion iii) Deletion iv) Traversal
4. a)Write a program to perform the following operations on stack using Arrays
   i) Creation ii)push iii)pop iv)display
   b) Write a program to evaluate an expression.
5. Write a program to perform the following operations on stack using linked list
   i) Creation ii)push iii)pop iv)display
6. Write a program to perform the following operations on queue using arrays
   i) Creation ii)insert iii) delete iv)display
7. Write a program to perform the following operations on queue using linked list
   i) Creation ii)insert iii) delete iv)display
8. Write a program to perform insert and delete operations on binary search tree.
9. Write a program to implement the tree traversal methods.
10. Write a program to perform following operations on a AVL Tree
    i) Creation ii) insertion iii) deletion iv) display

1 . Write a program to perform following operations on a B-Tree
   i) Creation ii) insertion iii) deletion iv) display

12. Write a program to implement linear probing technique.
13. Write a program to implement BFS and DFS techniques on a graph.
14. Write a program that implements the following sorting methods to sort a given list of integers in ascending order
    i) Insertion sort ii) Selection sort iii) Quick sort
15. Write a program to implement Heap sort.

Course Outcomes:

CO-1: Explaining the linear data structures such as List, Stack, Queue and its applications
CO-2: Implement non-linear data structure such as Trees, Graphs and its applications
CO-3: Apply suitable algorithms for sorting Techniques
CO-4: Choose appropriate algorithm for Searching and Hashing

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

PYTHON PROGRAMMING LAB

B. Tech: II- Semester **L/T/P/C**
0/0/3/1.5

Prerequisites: A course on "Programming for Problem Solving".

Course Objectives:

The purpose of the course is to make students

- To develop Python programs with conditionals and loops.
- To develop Python functions and call them.
- To develop and use Python data structures – lists, tuples, dictionaries.
- To do input/output with files in Python.
- To get exposure to various problems solving approaches of computer science

Week 1:

a. Write a program to perform the arithmetic operators. Find out the student total marks and average
b. Write a program to apply type conversion techniques in python. Convert from string to int, int to float, float to string

Week 2:

a. Write a program to display whether a student passed in a single subject or not using if statement
b. Write a program to display the grade of a student based on the average of 3 subject marks using if-elif statement

Week 3:

a. Write a program to display the reverse of a given number using while loop and for loop
b. Write a program to display the factorial of a given number using while loop and for loop

Week 4:

a. Write a program to display the prime numbers between 2 and n using while loop and for loop
b. Write a program to print the average marks of 10 students using loops(input 3 subjects for each student)

Week 5:

a. Write a program to define a function to display the grade of a student by using positional arguments(rno, sub1,sub2,sub3)
b. Write a program to define a function to display total bill for a shopping by taking customer name and number of items as keyword arguments.

Week 6:

a. Write a program to define a function to calculate the area of a circle using default arguments
b. Write a program to display the reverse of a given number using recursive function.

Week 7:

a. Write a program to convert a decimal number to binary number using recursive function.
b. Write a program to perform the arithmetic operations using the functions to each opearation.(add(),sub(),mul(),div())

Week 8:

a. Write a program to perform bubble sort on a list without using the sort().
b. Write a program to display the elements of a list in reverse order without using the reverse()

Week 9:

a. Write a program to find a student name from the list of students
b. Write a program to perform addition of 2 matrices using nested lists

Week 10:

a. Write a program to perform multiplication of 2 matrices using nested lists
b. Write a program to demonstrate the tuple operations

Week 11:

a. Write a program to create a list and eliminate the duplicate values from the list
b. Write a program to create 2 sets and perform union, intersection, set difference and symmetric difference operations on sets.

Week 12:

a. Write a program to create a student dictionary with the rno as key and a list as the values of a key (name,sub1,sub2,sub3) and display a memo with total, avg, result and grade
b. Write a program to create a package Shapes and perform the area calculation for different shapes(use one function for each shape)

Week 13:

a. Write a program to create a package Calculator and perform various arithmetic operations (use one function for each operation like add(),mul(),sub(),div())
b. Write a program to create module with packages like Shapes and Calculator and import the module into program, access the functions defined the in the module.

Week 14:

a. Write a program to create a file and save the details of a students (rno,name,sub1,sub2,sub3)
b. Write a program to open a file of students and display the students details in tabular format like rno,name,sub1,sub2,sub3,total,avg,result,grade

Week 15:

a. Write a program to perform demonstrate filename not exist exception
b. Write a program to demonstrate the variable not available exception

Week 16:

a. Write a program to demonstrate arithmetic exception
b. Write a program to create a lambda function to display whether a person is eligible for voting or not

Course Outcomes:

CO-1: Expressing the Core Python scripting elements such as variables and flow control structures.
CO-2: Apply Python functions to facilitate code reuse
CO-3: Extending how to work with lists and sequence data.
CO-4: Implement file operations such as read and write and Adapting the code robust by handling errors and exceptions properly.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
ENGLISH LANGUAGE AND INTERACTIVE COMMUNICATION SKILLS LAB

B.Tech: II- Semester **L/T/P/C**
0/0/3/1.5

Prerequisites: Basic vocabulary grammar in English

The ELICS Lab focuses on the production and practice of sounds of language to familiarize the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives:

- To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning.
- To sensitize students to the nuances of English speech sounds, stress and intonation.
- To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking.
- To improve the fluency of students in spoken English and neutralize the influence of the sounds of their mother tongue.
- To train students to use language appropriately for public speaking and interviews.

SYLLABUS

English Language and Interactive Communication Skills Lab (ELICS) shall have two parts:

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

Module - I

CALL Lab: *Understand the essentials of English pronunciation through dialogues and conversations:* Listening skill- its importance – purpose- process- types- barriers. *Practice*: introduction to phonetics – speech sounds – vowels and consonantal phonemes.

ICS Lab: *Understand the practicalities in using English in formal contexts:* Communication at workplace– spoken vs. written language. *Practice:* Ice-breaking activity and JAM session– situational dialogues – greetings – taking leave – introducing oneself and others.

Module - II

CALL Lab: *Understand the fundamentals of English pronunciation though expressions used in day to day situations:* Structure of syllables – word stress and rhythm– weak forms and strong forms in context. *Practice:* Basic rules of word accent – stress shift – weak forms and strong forms in context.

ICS Lab: *Understand and practice non-verbal cues in various situations:* Features of good conversation – non-verbal communication. *Practice:* Situational dialogues – role play– expressions in various situations – making requests and seeking permissions – telephone etiquette.

Module - III

CALL Lab: *Understand the importance of e-correspondence:* The basics– general format –drafting – features of good e-mails– do's and don'ts of e-mail etiquette. *Practice:* Assignments through e-mails observing e-mail etiquette.

ICS Lab: *Apply the strategies of browsing to make effective oral presentations:* Understanding text features, print features – collecting data needed for the presentation – how to make formal presentations. *Practice:* Formal presentations.

Module – IV

CALL Lab: *Identify and differentiate audio text from the given source while listening to authentic material:* Listening for general details about an event / object/ person or a piece of art. *Practice:* Listening descriptions / discussions / interpretations / comments/ analysis/ evaluations / summaries.

ICS Lab: *Understand:* Public speaking – exposure to structured talks. *Practice:* To make an academic talk – extempore.

Module – V

CALL Lab: *Understand:* Listening for specific details of a survey to fill up the survey sheet.
Practice: Listening to comprehension texts to understand the gist.

ICS Lab: *Understand:* Debate/group discussion based on contemporary topic/survey report, interview skills.
*Practice: Mock group discussion/*mock interviews.

Minimum Requirement of infrastructural facilities for ELICS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer Assisted Language Learning 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:

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public-Address System, an LCD and a projector etc.

Course Outcomes:

After the completion of this course, students will be able to –

CO-1: Understand the nuances of English language through audio-visual experience and group activities.
CO-2: Speak with clarity and confidence which in turn enhances their employability skills.
CO-3: Develop their listening skills so that they may appreciate its role in developing LSRW skills language and improve their pronunciation.
CO-4: Involve the students in speaking activities in various contexts.

References:

1. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.
2. Spoken English: A self-learning guide to conversation practice by V Sasikumar and P V Dhamija, Tata McGraw-Hill, 2008.
3. Fundamentals of English Grammar, Third Edition by Betty Schrampfer Azar, Barbara F. Matthies and Shelley Hartle, Longman.
4. Handbook for Technical Writing by David A Mc Murrey & Joanne Buckely CENGAGE Learning 2008.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
ENGINEERING & IT WORKSHOP LAB

B. Tech: II- Semester(common for ECE, EEE, CSE, CSE(DS) & CSE(AI&ML)

L/T/P/C
0/0/3/1.5

Pre-requisites: None

Course Objectives:

- Know the usage of various tools and their application in house wiring and Soldering.
- Identify a particular component from the given group of passive electronic components.
- Know the usage of various Voltage sources and equipment.
- Know the concepts of hardware and assemble and dissemble of computer.
- Know the installation of XP and Linux software.
- Overview of Microsoft word and table formats, Mail-merge concepts, Hyperlink concepts.
- Overview of Microsoft Excel, Functions and formulas.
- Overview of Microsoft PowerPoint , Slides creation, Layouts and insert images
- Overview of Microsoft Access , Creation of Tables , data base
- Information of data analysis functions and concatenate functions.

UNIT-I : TRADES FOR EXERCISES:

1. House – wiring
2. Soldering

UNIT-II : ELECTONIC COMPONENTS AND EQUIPMENTS

1. Passive components: Different types of: resistors, inductors, capacitors, potentiometers, Thermistor, Transformers.
2. Active components: Diode, Zener diode, Varactor diode, LED, Photo diode, BJT, Photo transistor, FET, LDR, Solar cell, Photocell, Optocoupler.
3. Voltage Sources: DC battery,. AC power supply, DC power supply.
4. Measuring Instruments: Different types of Voltmeters, Ammeters, Multimeter, CRO, DSO and Function Generator.

UNIT-III : INTRODUCTION TO COMPUTERS

Block diagram of computer – Memory functions of the CPU along with the configuration of each peripheral. Identify the peripherals of a computer, components in a CPU and its functions. Disassemble and assemble the PC back to working condition. Every student should individually install MS windows and Linux on the personal computer. Students should get connected to their Local Area Network and access the Internet.

UNIT-IV : INTRODUCTION TO MS OFFICE

Overview of Microsoft Word, Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Mail-merge concepts. Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Overview of Microsoft Excel, Description about Spread Sheet, Gridlines, Format Cells, Summation, auto fill, Formatting Text, Cell Referencing, Filters, Formulae in excel – average, std deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function.

Overview of Microsoft PowerPoint, PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting – Images, Clip Art.

Overview of Microsoft Access, Creation of Tables, creation of data base, import or export the data base, hyperlinks to another tools.

UNIT-V: DATA ANALYSIS

Insert tables, Draw the column chart, Pie chart, Line chart, bar Diagrams and also insert Auto functions. Data analysis functions: Concatenate, Len, Count of sell, sum if function, average if condition, find/search techniques, if error function, count ifs function.

Course Outcomes:

CO-1: Know the fundamental knowledge of House wiring and soldering and their usage in realtime Applications.
CO-2: Gain knowledge on electronic components and measuring instruments.
CO-3: Use basic concepts of computer hardware for assembly and disassembly.
CO-4: Use Microsoft tools for exercise.

TEXT BOOKS:

1. Workshop Manual – P.Kannaiah / K.L.Narayana/Scitech Publishers.
2. Workshop Manual – Venkat Reddy/BS Publication / 6th Edition.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

OPERATING SYSTEMS

B. TECH- III Semester **L/T/P/C**
3/0 /0 /3

Pre-Requisites: None

Course Objectives:

- To understand the OS role in the overall computer system
- To study the operations performed by OS as a resource manager
- To understand the scheduling policies of OS and process concurrency and synchronization
- To understand the different memory management techniques
- To understand the goals and principles of protection

UNIT - I

Overview-Introduction-Operating system objectives, User view, System view, Operating system definition, Computer System Organization, Computer System Architecture, OS Structure, OS Operations, Process Management, Memory Management, Storage Management, Protection and Security, Special Purpose Systems, Computing Environments.

System Structures- Operating System services, User and OS Interface, System Calls, Types of System Calls, System Programs, Operating System Design and Implementation, OS Structure.

UNIT - II

Process Concept- Process Concept, Process Scheduling, Inter process Communication, Multithreading Models. **Process Scheduling**- Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Algorithm Evaluation. **Synchronization**- Background, The Critical-Section Problem, Peterson's Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic Problems of Synchronization, Monitors.

UNIT – III

Memory-Management Strategies - Background, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of the Page Table.

Virtual-Memory Management- Demand Paging, Copy-on-Write, Page Replacement, Thrashing.

UNIT – IV

Deadlocks-System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock.

File System -File Concept, Access Methods, Directory and Disk Structure, Protection.

Implementing File-Systems - File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free-Space Management.

UNIT – V

Mass Storage Structure – Overview of Mass Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Disk Management, RAID structure, Swap space Management.

Protection – System 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.

Course Outcomes:

After the completion of this course, the students should be able to

CO-1: Compare various Operating Systems architectures, IO structures, Network Structure

CO-2: Analyze the virtual memory, paging and memory allocation techniques for various applications.

CO-3: Apply Deadlock prevention and Deadlock Detection algorithms and perceive the working of an operating system as a File manager, I/O manager, Process manager.
CO-4: Understand the overview of Disk Storage Structure.
CO-5: Analyze assess access controls to protect files.

TEXT BOOKS:

1. Operating System Concepts , Abraham Silberschatz, Peter B. Galvin, Greg Gagne, 9th Edition, Wiley, 2016 India Edition
2. Operating Systems – Internals and Design Principles, W. Stallings, 7th Edition, Pearson.

REFERENCE BOOKS:

1. Modern Operating Systems, Andrew S Tanenbaum, 3rd Edition, PHI
2. Operating Systems: A concept-based Approach, 2nd Edition, D.M. Dhamdhere, TMH.
3. Principles of Operating Systems, B. L. Stuart, Cengage learning, India Edition.
4. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
5. Principles of Operating systems, Naresh Chauhan, Oxford University Press.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

DATABASE MANAGEMENT SYSTEMS

B. TECH- III Semester **L/T/P/C**
3/0 /0 /3

Pre-requisites: Data Structures, Mathematics-I

Course Objectives:

- This Course provides an emphasis on how to organize, maintain and retrieve information efficiently and effectively from a Database and it presents an introduction to data base management systems (DBMS) and relational data model. 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. .

UNIT- I: Introduction

Database system Applications - Database System versus File Systems - View of Data– Instances and schema - Data Models - Database Languages -DDL-DML - Database Users and Administrator –Transaction Management - Database System Structure-Application Architectures – History of Database Systems.

UNIT- II: Database Design and ER model

Basic concepts - Entity sets and Relationship Sets – Constraints - Keys - Design Issues - Entity-Relationship Diagram- Weak Entity Sets - Extended E-R Features - Designing of an E-R Database Schema-Reduction of an E-R Schema to Tables.

UNIT- III: Relational Model

Introduction to the Relational Model – Structure of Relational Databases - Relational Algebra –Relational Calculus – Domain relational Calculus, Tuple Relational Calculus - Integrity and Security –Domain Constraints, Referential Integrity Constraints-Triggers-security and Authorization – SQL- Basic Structure, Set operations, Aggregate Operations –Null values- Nested Sub queries – Views –Modification of Database-Joined relations, Case Statement, NVL Function, Conversion Functions.

UNIT- IV: Informal Design guidelines for Relation Schema

Functional Dependencies– Normal Forms based on Primary Keys-Decomposition–Desirable properties of Decomposition – First Normal Form, Second Normal Form–Third Normal Form- Boyce- Codd Normal Form - Multivalued Dependency- Fourth Normal Form- Fifth Normal Form-Transactions-Transaction Concept- Transaction state- Implementation of atomicity and Durability- Concurrent Executions – Serializability, Recoverability-Implementation of Isolation.

UNIT-V: Concurrency Control

Lock Based Protocols, Dead Lock Handling, Multiple Granularity, Time-stamp Based Protocols, Validation Based Protocols.

Recovery System: Failure Classification, Storage Structure, Recovery and Atomicity, Log Based recovery, Shadow Paging, Recovery with concurrent transactions.

Storage and File Structure - File Organization – Organization of records in file - Data Dictionary Storage – Indexing and Hashing – Basic Concepts , Ordered Indices, B+ Tree Index files, B- tree index files – Static Hashing – Dynamic Hashing – Comparison of Indexing and Hashing.

Course Outcomes:

After the completion of this course, the students should be able to

CO-1: Perceive the fundamental concepts of database management.

CO-2: Analyze database models & Entity Relationship models and to draw the E-R diagram for the given case study.

CO-3: Apply relational Database Theory, and be able to write relational algebra expressions for queries.

CO-4: Apply Normalization Process to construct the database and explain Basic Issues of Transaction processing.

CO-5: Compare the basic Database storage structures and access techniques: File Organization indexing methods including B- Tree and Hashing.

TEXT BOOKS:

1. Database System Concepts, Silberschatz, Korth , sixth Edition, McGraw hill.
2. Database Systems,Ramez Elmasri Shamkant B.Navathe Pearson Education,6th edition

REFERENCE BOOKS:

1. Database Management Systems, Raghu ramakrishnan, Johannes Gehrke, TATA Mc Graw Hill
2. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
3. Database Systems ,The Complete Book, Hector Garcia-Molina, Jeffrey D.Ullman, Jennifer Widom.
4. An Introduction to Database Systems, C.J. Date ,Eighth edition

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ENGLISH FOR EFFECTIVE COMMUNICATIONS

B. TECH- III Semester **L/T/P/C**
2/0 /0 /2

INTRODUCTION

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and 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. The course follows an integrated approach to language teaching. Instructors and students are encouraged to use online, print media and electronic media resources in compliance with the course topics of the prescribed book and make the best use of worksheets, quizzes, presentations, discussions, role plays and assignments.

Course Objectives

The course will enable the students to -

- Understand types of reading for different purposes and practice a variety of texts inprint and electronic format.
- Improve the language proficiency of students in English with an emphasis on vocabulary, grammar, reading and writing skills.
- Motivate students to study academic subjects more effectively and critically using the theoretical and practical components of English.
- Develop study skills and communication skills in formal and informal situations.

SYLLABUS

UNIT- I: Note Making Skills

- Listen to the audio texts on current issues by English speakers and make notes based on the audio text.
- Read the texts in printed format and make notes based on the text.
- Make notes for texts on scientific concepts.
- Read the excerpt, ‘Inventors’ and do the activities on skimming, scanning and information transfer.
- Vocabulary: Word formation – prefixes and suffixes.
- Grammar: Contracted forms of verbs, tense and aspects.

UNIT-II: Summarizing Skills

- Watch the given videos on current issues and summarize the information.
- Read the given texts in electronic format to summarize the information.
- Summarize the given texts / videos on scientific concepts by English speakers.
- Read the excerpt, ‘War’ and do the activities on summarizing, and vocabulary building.
- Vocabulary: Homonyms, homophones and homographs.
- Grammar: Subject-verb agreement.

UNIT-III: Mind Mapping Skills

- Use mind map techniques to read the text and infer the information using digital tools /through graphical representation.
- Read the excerpt, ‘Aliens’ and complete the activities on the reading passage.
- Vocabulary: One-word substitutes.
- Grammar: Articles.

UNIT -IV: Making Oral Presentations

- ❖ Train the students to prepare the drafts for the technical events and present to the class.
- ❖ Produce visuals using various digital tools for making effective oral presentation.
- ❖ Prepare the visuals, audio and text materials based on the four major components.
- ❖ Read the excerpt, 'Genetics' and make an oral presentation.
- ❖ Vocabulary: Abbreviations and acronyms.
- ❖ Grammar: Common errors in tenses.

UNIT-V: Drafting Skills

- ❖ Letter writing – types– parts - styles – format – appropriate language – model letters.
- ❖ Prepare the script for comparing for various college events.
- ❖ Read the excerpt, 'Sports' and write an essay on the most favorite sport.
- ❖ Vocabulary: Technical vocabulary.
- ❖ Grammar: Common errors in English.

Course Outcomes

After completing this course, students will be able to -

CO-1: Skim and scan the digital text to summarize it for future reference.
CO-2: Read the text to make notes according to their needs.
CO-3: Use English language effectively in spoken and written forms.
CO-4: Communicate confidently in various contexts and different cultures.
CO-5: Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

PRESCRIBED TEXTBOOK:

English for Technical Communication by **Sudarshana, N.P. and C. Savitha,** Published by Cambridge University Press.

REFERENCE BOOKS:

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

Digital tools for mind mapping activities

1. https://www.mindomo.com/
2. https://www.mindmeister.com/
3. https://www.ayoa.com/
4. https://coggle.it/
5. https://www.popplet.com/

Digital tools for the activities on oral presentation

1. https://prezi.com/
2. https://www.clearslide.com/product/presentations/
3. https://wideo.co/
4. https://slidebean.com/
5. https://www.canva.com/
6. https://docs.google.com/presentation/u/0/
7. https://www.powtoon.com/

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

DATA PREPARATION AND ANALYSIS

B. TECH- III Semester **L/T/P/C**
3/0 /0 /3

Prerequisites: None

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 . A Multidimensional 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.

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.

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.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

PROBABILITY AND STATISTICS

B. TECH- III Semester **L/T/P/C**
3/0 /0 /3

Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives:

To learn

- The ideas of probability and random variables and various discrete and continuous probability distributions and their properties
- Find the application of discrete probability distributions.
- Find the application of continuous probability distributions.
- The basic ideas of statistics including measures of central tendency, correlation and regression.
- To apply the tests in deriving the conclusions of the data.

UNIT-I: Basic Probability: Probability spaces, conditional probability, independent events and Bayes' theorem. Random variables: Discrete and continuous random variables, Expectation of Random Variables, Variance of random variables.

UNIT-II: Discrete Probability distributions: Binomial, Poisson, evaluation of statistical parameters for these distributions, Poisson approximation to the binomial distribution.

UNIT-III: Continuous Random variable and Distributions: Continuous random variables and their properties, distribution functions and densities, Uniform, exponential and Normal distributions, evaluation of statistical parameters for these distributions.

UNIT-IV: Applied Statistics: Curve fitting by the method of least squares: Fitting of straight lines, second degree parabolas and more general curves, Correlation and regression, Rank correlation.

UNIT-V: Testing of Hypothesis: Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, Test for single mean, difference of means for small samples, test for ratio of variances for small samples.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO-1: Use probability theory and deals with modeling uncertainty in order to evaluate The probability of real world events.

CO-2: Develop discrete probability distributions and its applications, and use the techniques to generate data from Binomial and Poisson Distributions.

CO-3: Use the techniques of continuous probability distributions to generate data from Normal Distributions.

CO-4: Perform correlation and regression analysis, in order to estimate the nature and the strength of the linear relationship between two variables.

CO-5: Construct confidence interval to estimates population parameters to test the hypothesis.

TEXT BOOKS:

1. Probability and statistics for engineers and scientists, 9th Edition, Pearson Publications, Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, keying Ye.
2. Fundamentals of Mathematical Statistics, Sultan Chand & Sons Publications, S C Guptha and V.K. Kapoor.

3. T.K.V. Iyengar, Probability and Statistics, S. Chand, 2018.

REFERENCE BOOKS:

1. Probability and Statistics for Engineers, 8th Edition, Miller and Freund's, Pearson Educations.
2. A First Course in Probability, 6th Ed., Pearson Education India, 2002, S. Ross.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

COMPUTER ORGANIZATION & MICRO PROCESSORS

B. TECH- III Semester **L/T/P/C**
3/0 /0 /3

Pre-Requisites: None

Course Objectives:

- To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
- To understand the basic components of computers.
- To understand the basic chip design and organization of 8086 with assembly language programming.

UNIT - I:

Introduction to Digital Logic circuits: Number System, complements, binary codes, error detection codes, Logic gates, Boolean algebra, maps simplification.

UNIT - II:

Basic Structure of Computers: Computer Types, Functional unit, Basic operational concepts, Bus structures, Data Representation: Fixed Point Representation, Floating - Point Representation
Register Transfer Language: Register Transfer language, Register Transfer Bus and memory transfers.

UNIT - III:

Pipeline and Vector Processing: Parallel processing, pipelining, Arithmetic Pipeline, Instruction Pipeline.
Multiprocessors: Characteristics of multiprocessors, Interconnection Structures-Time shared common bus, Multi port memory, Crossbar switch, Multistage switching network, Hypercube interconnection.

UNIT - IV:

Architecture of Microprocessors: Introduction to Microprocessors & Overview of 8086 microprocessor, Signals and pins of 8086 microprocessor, Physical memory organization.
Assembly language of 8086: Machine language Instruction format, Addressing modes, Instruction set of 8086, Assembler Directives and Operators, Assembly software programs with algorithms.

UNIT - V:

Interfacing with 8086: Interfacing with RAMs, ROMs, interfacing with peripheral ICs like 8255. ADCs, DACs, serial data transfer schemes USART 8251 serial data communication, interrupt vector table, interrupt structure with 8259 etc.

Course Outcome:

Upon completion of this course, the students will be able to:

CO-1: Utilize and explain the functionality of logic gates.
CO-2: Describe the fundamental organization of a computer system.
CO-3: Understand the concepts of parallel processing, pipelining.
CO-4: Develop assembly language programs for various applications.
CO-5: Design Memory Interfacing circuits.

TEXT BOOKS:

1. Digital Design – Morris Mano, PHI, 3rd Edition, 2006.
2. Switching and Finite Automata Theory- Zvi Kohavi & Niraj K. Jha, 3rdEdition, Cambridge
3. Computer System Architecture- Morris Mano, 3rd Edition.
4. D. V. Hall, Microprocessors and interfacing, TMGH, 2nd Edition 2006

REFERENCE BOOKS:

1. Computer organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.
2. Switching Theory and Logic Design – A Anand Kumar, PHI,2013.
3. A.K. Ray & K.M.Bhurchandi, "Advanced Microprocessors and peripherals- Architectures, Programming and Interfacing", TMH, 2002 reprint

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

DATABASE MANAGEMENT SYSTEMS LAB

B. TECH- III Semester **L/T/P/C**
0/0 /3/1.5

Pre-Requisites: None

Course Objectives:

This lab enables the students to practice the concepts learnt in the subject DBMS by developing a database for an example company named "Roadway Travels" whose description is as follows. The student is expected to practice the designing, developing and querying a database in the context of example database "Roadway travels". Students are expected to use "Mysql" database.

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 to design 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 lab teacher.

WEEK 2: Concept design with E-R Model

Relate the entities appropriately. Apply cardinalities for each relationship. Identify strong entities and 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 lab teacher.

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 of Attributes (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 attributes based 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 a 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, Case Statement, NVL Function, Conversion Functions.

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 passengers 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 passengers 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: Use GROUP 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 updcheck BEFORE UPDATE ONpassenger FOR EACH ROW BEGIN IF NEW.TickentNO > 60 THENSET 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

Course Outcomes:

After the completion of this course, the students should be able to

- **CO-1:** Design database schema for given Application.
- **CO-2:** Transform ER Model to Relational Model.
- **CO-3:** Apply the normalization techniques for development of application software to realistic problems.
- **CO-4:** Construct SQL queries to retrieve information from databases.

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VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

OPERATING SYSTEMS AND DATA PREPARATION LAB

B. TECH- III Semester **L/T/P/C**
0/0 /3 /1.5

Pre-Requisites: Programming for Problem Solving and Python Programming

Course Objective:

- To provide an understanding of the language translation peculiarities by designing a complete translator for a mini language and understanding the design aspects of operating system.
- It introduces the basic principles in Operating System and covers all the management modules present in the OS like process management, Memory management, File management, Disk management, Network management, I/O management.
- To Develop different methods for Data preparation to fill missing values.
- To Visualize the transformed data and outlier data.
- Understands different method for Data Visualization.

Syllabus Content

Week 1 : Simulate the following CPU scheduling algorithms
a) FCFS b) SJF c) Preemptive SJF

Week 2: Simulate the following CPU scheduling algorithms
a) Priority b) Round Robin

Week 3: Simulate all file allocation strategies
a) Sequential b) Indexed c) Linked

Week 4: Simulate MVT and MFT

Week 5: Simulate all File Organization Techniques
a) Single level directory b) Two level

Week 6: Simulate all File Organization Techniques
c) Hierarchical d) DAG

Week 7: Simulate Bankers Algorithm for Dead Lock Avoidance

Week 8: Simulate following page replacement algorithms
a) FIFO b) LRU

Week 9: Simulate Optimal page replacement algorithms

Week 10: Simulate all file accessing methods
a) Sequential access method b)Random access method

Week 11: a) Write a program using python for filling missing values
b) Write a program using python for equal width binning

Week 12:
a) Write a program using python for outlier detection
b) Write a program using python for outlier detection and removal

Week 13:
a) Write a program using python for data transformation
b) Write a program using python for data transformation using encoding

Week 14:
a) Write a program using python for data visualization
Histogram, Bar graphs, Scatter Plots, Line Chart, Pie Chart, Box Plot

Course Outcomes:

After the completion of this course, the students should be able to

CO-1: Apply CPU scheduling algorithms, Page replacement algorithms.

CO-2: Explain Bankers Algorithm for Dead Lock Avoidance, Dead Lock Prevention and describe the concepts of paging and segmentation.

CO-3: Analysis the data using binning and missed values, data for outlier detection and removal.

CO-4: Develops different methods for Data visualization.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

PROJECT BASED LEARNING – 1

B. TECH- III Semester **L/T/P/C**
0/0 /2 /1

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

JAVA PROGRAMMING

B. TECH- IV Semester **L/T/P/C**
3/0 /0 /3

Pre-Requisites: Programming for Problem Solving

Course Objectives:

- This course introduces computer programming using the JAVA programming language with object-oriented programming principles.
- The use of Java in a variety of technologies and on different platforms.
- To understand fundamentals of object-oriented programming in Java which includes defining classes, invoking methods, using class libraries.
- Using API to solve real world problems.

UNIT-I

OOP Concepts: OOP Features, OOP Concepts-Data Abstraction, Encapsulation, Inheritance, Polymorphism, Classes and Objects, Procedural and Object Oriented Programming paradigms.

Java Programming: History of Java, Data Types, Variables, Constants, Scope and Life Time of Variable, Operators, Type Conversion and Casting, Conditional Statements, Iterative statements, Break and Continue statements, Access Controls, Arrays, Methods and Constructors, Static variables and Static methods, This reference, Overloading methods, Garbage collection, Nested Classes, and Inner Classes.

UNIT-II

Inheritance: Inheritance - types of Inheritance, Member access rules, Method Overriding, Super keyword, Preventing Inheritance: Final classes and methods.

Interfaces: Abstract class, defining an Interface, Abstract Vs Interface, implementing and extending Interface.

UNIT-III

Packages- Defining, creating and accessing a Package, and importing Packages.

Exception Handling- Exception Handling**,** Types of Exceptions. Usage of try, catch, throw, throws and finally, re-throwing exceptions, and User defined Exceptions.

UNIT-IV

Multi Threading- Creating Thread, Life cycle of Thread, Thread priorities, Synchronization of Threads, Inter-Thread Communication, and Producer Consumer Problem.

Collection Framework in Java- Overview of Java Collection Frame work, Generics, Commonly used Collection Classes and Interfaces-Array List, Vector, Hash Table, Stack, Enumeration, Iterator, String Tokenizer, Random, Scanner, Calendar, and Properties.

UNIT-V

GUI Programming with Java- AWT class Hierarchy, Introduction to Swing, Swing vs. AWT, Containers- JFrame, JApplet, and JPanel, Swing components- JButton, JLabel, JTextField, and JTextArea. Layout manager and its types.

Event Handling- Events, Event classes, Event Listeners, Delegation event model, Examples: handling a button click, and handling mouse and keyboard events.

Applet: Create an Applet, Life Cycle of an Applet, and passing parameters to Applet.

Course Outcomes:

CO-1: Understand the use of OOP concepts and solve real world problems using OOP techniques.

CO-2: Solve the inter-disciplinary applications using the concept of inheritance.

CO-3: Develop robust and faster applications by applying different exception handling mechanisms.

CO-4: Understand the multithreading concepts and develop efficient applications.
CO-5: Design GUI based applications and develops applets for web applications.

TEXT BOOKS:

1. Java The Complete Reference, 8th Edition. herbert schildt. Indian edition.

REFERENCE BOOKS:

1. Java for Programmers, P.J. Dietel and H.M Dietel,Pearson Education (OR) JAVA: How to Program P.J. Dietel and H.M. Dietel, PHI.
2. Object Oriented Programming through Java, P. Radha Krishna, University Press.
3. Thinking in Java, Bruce Ecel, Pearson Education
4. Programming in Java, S. Malhotra and S. Choudary, Oxford Univ. Press.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

MATHEMATICAL MODELING AND OPTIMIZATION

B. TECH- IV Semester **L/T/P/C**
3/0/0/ 3

Prerequisite : Linear Algebra and Calculus

Course Objectives:

- Understand the concepts of population models
- Study different population models with examples
- Analyze linear program problems using big M method
- Concepts of different transportation problems
- Understanding of assignment problem Hungarian algorithm and travelling salesman problem.

UNIT – I:

Matrices, operations on matrices, rank of a matrix, solution of linear equations, optimization. Mathematical modeling: Introduction- Microbial population models-Single species, Population models with examples.

UNIT – II:

Two species population models, multispecies population models with examples, Optimal exploitation models.

UNIT – III:

Linear Programming Problems (LPP): Mathematical models and basic concepts of linear programming problem; Solution of linear programming problems - Graphical method, Analytical method, Simplex method, Artificial variable technique (Big-M and Two-phase methods), Duality principle.

UNIT-IV:

Special type of LPPs: Mathematical model of transportation problem, Methods of finding initial basic feasible solution to find the optimal solution of transportation problem, Exceptional cases in transportation problem, Degenerate solution of transportation problem.

UNIT – V:

Assignment problem as a special case of transportation problem, Hungarian algorithm to solve an assignment problem, Special cases in assignment problem.
The travelling salesman problem, Formulation of travelling salesman problem as an assignment problem.

Course Outcomes:

CO-1: Learn the concepts of population models
CO-2: Apply population model to different examples
CO-3: Gain Knowledge of solutions for linear program problems
CO-4: Ability to find optimal solution for transportation problem.
CO-5: Learn and compare assignment problem Hungarian algorithm and travelling salesman problem.

TEXT BOOKS:

1. N.Kapur, *Mathematical Models in Biology and Medicine,* Affiliated East-WestPvt.Ltd.,2010.
2. Kantiswarp, P. K. Gupta,ManMohan, "Operations Research", *S.Chand & Sons*, New Delhi. 16th Edition, 2013. (*UnitI,II,IV*)

REFERRENCE BOOKS:

1. W.J. Meyer, *Concepts of Mathematical Modelling*, McGraw Hill, Tokyo,1985.
2. Hamdy.A.Taha,Operations Research, *Prentice Hall of IndiaLtd,* NewDelhi, 7th Edition, 2002.
3. J.C.Pant,"IntroductiontoOptimization",*JainBrothers*,NewDelhi,7thEdition,2012.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

DATA MINING

B. TECH- IV Semester **L/T/P/C**
3/0 /0 /3

Pre-requisites: Data Preparation and Analysis

Course Objectives:
- To enable students to make more effective use of data stored in databases.
- To create a clean and consistent repository of data within a data warehouse.
- To utilize various levels and types of summarization of data to support management decision making.
- To discover patterns and knowledge that is embedded in the huge quantities of data records using different data mining techniques.

UNIT -I
Data Mining: Types of Data, Data Mining Functionalities, Interestingness Patterns-Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data Warehouse System, Major issues in Data Mining.

UNIT -II
Association Rule Mining and Classification: Mining Frequent Patterns, Associations and Correlations, Mining Methods, Mining various kinds of Association Rules, Correlation Analysis, Constraint based Association Mining

UNIT -III
Classification and Prediction: Basic Concepts, Decision Tree Induction, Bayesian Classification, Rule-Based Classification, Classification by Back propagation, Support Vector Machines, Associative Classification, Lazy Learners, Other Classification Methods, Prediction.

UNIT -IV
Clustering And Applications: Types of Data in Cluster Analysis, Categorization of Major Clustering Methods, Partitioning Methods: K-Means, K-Mediods , Hierarchical Methods, Density-Based Methods: DBSCAN, Grid-Based Methods: CLIQUE.

UNIT –V
Model-Based Clustering Methods, Clustering High-Dimensional Data, Constraint-Based Cluster Analysis, Outlier Detection, Data Mining Trends and Research Frontiers

Course Outcomes:
After completion of this course the student should be able to:

CO-1: Introduce data mining concepts and develops understanding of data mining application.
CO-2: Develop an understanding of data warehouse, designing and using data in data warehouse using various operations.
CO-3: Develop an outlook of Association rule mining, association rule mining methods and their application on some sample data sets, evaluate these methods based on need.
CO-4: Develop an understanding of classification and prediction, classification methods and their application on some sample data sets, evaluate these methods based on need.
CO-5: Develop conceptual understanding of clustering, various clustering methods and their application on some sample data sets, evaluate these methods based on need.

TEXT BOOK:

1. Data Mining – Concepts and Techniques - Jiawei Han & Micheline Kamber, Morgan Kaufmann Publishers, Elsevier , 3rd Edition, 2006.

REFERENCE BOOKS:

1. Data Mining Techniques – Arun K Pujari,2nd edition, Universities Press.
2. Data Warehousing in the Real World – Sam Aanhory & Dennis Murray Pearson Edn Asia.
3. Insight into Data Mining,K.P.Soman,S.Diwakar,V.Ajay,PHI,2008.
4. Data Warehousing Fundamentals – Paulraj Ponnaiah Wiley student Edition
5. Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson education.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
DESIGN AND ANALYSIS OF ALGORITHMS

B. TECH- IV Semester **L/T/P/C**
3/0 /0 /3

Prerequisites: Data Structures and Algorithms

Course Objectives:

- This course trains the students to study a few known methods of solution processes, build new solution algorithms, analyze the asymptotic performance of algorithms and to write rigorous correctness proofs for algorithms.
- Focus would be to make the students to choose the appropriate data structures and algorithm design methods for specified classes of applications.
- To understand how the choice of data structures and algorithm design methods would impact the performance of programs and how to compare them.
- Design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound; and methods to deal with logarithmic type, polynomial type and non-polynomial type of classes of problems.
- Synthesis of efficient algorithms in common engineering design situations would be discussed.

UNIT I:

Introduction: Algorithm, algorithm specifications, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Randomized analysis, Amortized analysis.

Disjoint Sets: Disjoint set operations, union and find algorithms**.**

UNIT II:

Divide and Conquer: General method, **Applications**-Binary search, Quick sort, Merge sort, Stassen's matrix multiplication, Selection Problem.

Greedy method: General method, Applications-Job sequencing with deadlines, knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

UNIT III:

Dynamic Programming: General method, **Applications**-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design. Differences between Greedy method and Dynamic programming approaches**.**

UNIT IV:

Backtracking: General method, Applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles, connected components and biconnected components.

Branch and Bound: General method, Applications - Travelling sales person problem, 0/1 knapsack problem, LC Branch and Bound solution, FIFO Branch and Bound solution.

UNIT V:

NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP - Hard and NP-Complete classes, proofs-CLIQUE is NP Complete, NP completeness of Vertex covering problem.

Course Outcomes:

After the completion of this course, the students should be able to

CO-1: Expose student's to few known methods of solution processes, build new solution algorithms, analyze the asymptotic performance of algorithms and to write rigorous correctness proofs for algorithms.

CO-2: Identify appropriate data structures and algorithm design methods for specified classes of applications;

CO-3: Perceive how the choice of data structures and algorithm design methods would impact the performance of programs and how to compare them.

CO-4: Design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound

CO-5: Perceive methods to deal with logarithmic type, polynomial type and non-polynomial type of classes of problems and Synthesis of efficient algorithms in common engineering design situations would be discussed.

TEXT BOOKS:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam, Galgotia publications pvt. Ltd.
2. Design and Analysis of Algorithms, S.Sridhar Oxford Higher Education.

REFERENCE BOOKS:

1. Introduction to Algorithms, second edition, T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein, PHI Pvt. Ltd. / Pearson Education
2. Design and Analysis Algorithms - Parag Himanshu Dave, Himanshu Bhalchandra Dave Publisher: Pearson
3. Algorithm Design: Foundations, Analysis and Internet examples, M. T. Goodrich and R. Tomassia, John wiley and sons.
4. Introduction to Design and Analysis of Algorithms A strategic approach, R. C. T. Lee, S. S. Tseng, R. C. Chang and T. Tsai, Mc Graw Hill.
5. Data structures and Algorithm Analysis in C++, Allen Weiss, Second edition, Pearson education.
6. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
7. Algorithms – Richard Johnson baugh and Marcus Schaefer, Pearson Education
8. Data Structures and Algorithms C V Sastry, CH Rajaramesh & Rakesh Nayak I K International Publishing House**ISBN-13:** 978-9385909849

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

B. TECH- IV Semester **L/T/P/C**
3/0 /0 /3

Pre-Requisites: None

Course Objective:

- To enable the student to understand and appreciate, with a practical insight,
- the importance of certain basic issues governing the business operations namely: demand and supply,
- production function, cost analysis, markets, forms of business organizations, capital budgeting and financial accounting and financial analysis.

UNIT-I

Introduction & 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 inputs, Cobb-Douglas Production function, Laws of Returns, internal 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. Business; Features and evaluation of different forms of Business Organization: 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 Capital, 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 - introduction IFRS - Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance sheet with simple adjustments).

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

Course Outcomes:

After the completion of this course, the students should be able to

CO-1: Understand the nature, scope and importance of Managerial Economics.

CO-2: Know what demand is, analyze demand and how elasticity of demand is used for pricing decisions and to evaluate methods for forecasting demand.

CO-3: Know how production function is carried out to achieve least cost combination of Inputs and how to analyze cost.

CO-4: Understand the characteristics of different kinds of markets and outline different form of business organization and analyze how capital budgeting techniques are used for investment decisions.

CO-5: Know how to prepare final accounts and how to interpret them, analyze and interpret financial statements using ratio analysis.

TEXT BOOK:

1. A.R. Aryasri, MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS, Himalaya Publishing House.

REFERENCE BOOKS:

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

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

DESIGN AND ANALYSIS OF ALGORITHMS LAB

B. TECH- IV Semester **L/T/P/C**
0/0 /3 /1.5

Prerequisites: Data Structures and Algorithms

Course Objectives:

- To learn the importance of designing an algorithm in an effective way by considering space and time complexity
- To learn the dynamic programming design techniques.
- To develop recursive backtracking algorithms.
- Strengthen the ability to identify and apply the suitable algorithm for the given real world problem.

List of programs:

1. Implement Quick sort algorithm for sorting a list of integers in ascending order and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the 1st to be sorted and plot a graph of the time taken versus n.
2. Implement Merge sort algorithm for sorting a list of integers in ascending order and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the 1st to be sorted and plot a graph of the time taken versus n.
3. Implement Union and Find Algorithms.
4. Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm.
5. Find Minimum Cost Spanning Tree of a given undirected graph using Prim's algorithm.
6. From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm.
7. Implement greedy algorithm for job sequencing with deadlines.
8. Implement All Pair Shortest paths problem using Floyd's Algorithm.
9. Implement 0/1 Knapsack problem using dynamic programming.
10. Implement Dynamic Programming algorithm for the Optimal Binary Search Tree Problem.
11. Find all Hamiltonian Cycles in a connected undirected Graph G of n vertices using backtrackingprinciple.
12. Implement N Queen's problem using Back Tracking.

Course Outcomes:

Upon completion of the course, the students will be able to

CO-1: Ability to choose appropriate algorithm design techniques for solving problems.
CO-2: Design an algorithm in an effective manner
CO-3: Design and apply iterative and recursive algorithms.
CO-4: Ability to analyze the performance of algorithms.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

JAVA PROGRAMMING LAB

B. Tech: IV- Semester **L/T/P/C**

0/0/3/1.5

Pre-Requisites: Programming for Problem Solving

Course Objectives:

- This course introduces computer programming using the JAVA programming language with object-oriented programming principles.
- The use of Java in a variety of technologies and on different platforms.
- To understand fundamentals of object-oriented programming in Java which includes defining classes, invoking methods, using class libraries.
- Using API to solve real world problems.

Week 1:

a) Write a program to demonstrate class.
b) Write a program on this keyword.
c) Write a java program to implement matrix multiplication.

Week 2:

a) Write a java program to find factorial of a number using recursion.
b) Write a java program on finalize method.
c) Write a java program on nested class.

Week 3:

a) Write a program on parameterized constructor.
b) Write a java program to implement constructor overloading.
c) Write a program on static binding.

Week 4:

a) Write a java program on multilevel inheritance.
b) Write a Java program that illustrates how run time polymorphism is achieved.
c) Write a program using keyword super.

Week 5:

a) 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.
b) Write a program on multiple inheritance using interfaces.

Week 6:

Write a java program that illustrates the following:
a) Creation of simple package.
b) Accessing a package.
c) Implementing interfaces.

Week 7: Write a java program to implement following exception types.
a) try - catch .

b) throw .
c) Multiple exceptions.
d) user defined exceptions.

Week 8: Write a Java program that implements a multi-thread application that has three threads. First thread 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 the value of cube of the number.

Week 9:
a) Write a Java program for handling mouse and keyboard events.
b) Write a Java program for handling menu events.

Week 10: 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.

Week 11: Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, *, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.

Week 12:
a) Write an applet 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 "Computer" is clicked.

Course Outcomes: After the completion of this course the students should be able to :
CO-1: Use the Java SDK environment to create, debug and run simple Java programs.
CO-2: Write Java programs to implement error handling techniques using exception handling
CO-3: Develop multithreaded applications with synchronization.
CO-4: Design simple Graphical User Interface applications and event driven programming.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
DATA MINING LAB

B. Tech: IV- Semester **L/T/P/C**
0/0/3/1.5

Pre-Requisites: A course on "Java Programming"

COURSE OBJECTIVES:

- Learn to perform data mining tasks using a data mining toolkit (such as open source WEKA).
- Understand the data sets and data pre-processing.
- Demonstrate the working of algorithms for data mining tasks such association rule mining, classification, clustering and regression.
- Exercise the data mining techniques with varied input values for different parameters.
- To obtain Practical Experience Working with all real data sets
- Emphasize hands-on experience working with all real data sets.

Course content

Week1:

1. (i) Downloading and/or installation of WEKA data mining toolkit.
   (ii) Understand the features of WEKA tool kit such as Explorer, Knowledge flow interface, Experimenter, command-line interface.
   (iii) Navigate the options available in the WEKA (ex. select attributes panel, pre-process panel, classify panel, cluster panel, associate panel and visualize)

Week 2:

2. Create an Employee Table with the help of Data Mining Tool WEKA
3. Create a Weather Table with the help of Data Mining Tool WEKA.

WEEK 3:

4. Apply Pre-Processing techniques to the training data set of Weather Table
5. Apply Pre-Processing techniques to the training data set of Employee Table

WEEK 4:

6. Write a procedure for Visualization for Weather Table
7. Write a procedure for Visualization for Employee Table

WEEK 5:

8. Normalize Weather Table data using Knowledge Flow
9. Normalize Employee Table data using Knowledge Flow.

WEEK 6:

10. Finding Association Rules for Buying data.
11. Finding Association Rules for Banking data.
12. Finding Association Rules for Employee data.

WEEK 7:

13. Construct Decision Tree for Weather data and classify it.
14. Construct Decision Tree for Customer data and classify it.
15. Construct Decision Tree for Location data and classify it.

WEEK 8:

16. Write a procedure for cross-validation using J48 Algorithm for weather table.
17. Write a procedure for Clustering Customer data using Simple KMeans Algorithm

WEEK 9:

18. Write a procedure for Clustering Buying data using Cobweb Algorithm
19. Write a procedure for Clustering Weather data using EM Algorithm.

WEEK 10:

20. Write a procedure for Banking data using Farthest First Algorithm.

21. Write a procedure for Employee data using Density Based (DBSCAN)Cluster Algorithm.

COURSE OUTCOMES:

CO-1: Explore the features of data mining tool weka and perform various operations
CO-2: Perform various data mining tasks using data mining tool
CO-3: Understand application of data mining on real world data
CO-4: Emphasize hands-on experience working with all real data sets

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Data Mining Techniques – Arun K Pujari,2nd edition, Universities Press.
2. Data Warehousing in the Real World – Sam Aanhory & Dennis Murray Pearson Edn Asia.
3. Insight into Data Mining,K.P.Soman,S.Diwakar,V.Ajay,PHI,2008.
4. Data Warehousing Fundamentals – Paulraj Ponnaiah Wiley student Edition

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
PROJECT BASED LEARNING – 2

B. TECH- IV Semester **L/T/P/C**
0/0 /2 /1

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

BIG DATA ANALYTICS

B.TECH-V Semester **L/T/P/C**
3/0 /0 /3

Pre-requisites: Programming Knowledge(C, Java), DBMS, Data Mining

Course Objectives:

- To understand the basic concepts of Big Data Analytics
- Explore the different tools for working with Big Data
- Understand the fundamentals of Hadoop and Map Reduce.
- Working on different command of HIVE & PIG.

UNIT-I: Introduction to Big Data

Types of Digital Data: Classification of Digital Data: Structured data, Semi-structured data and Unstructured. Introduction to Big Data: Characteristics of Data, Evolution of Big Data, Definition of Big Data, Challenges with Big Data, What is Big Data?, Why Big Data?, Traditional Business Intelligence (BI) versus Big Data, A Typical Data Warehouse Environment, A Typical Hadoop Environment, What is New Today?, What is Changing in the Realms of Big Data?

UNIT-II: Big Data Analytics

What is Big Data Analytics?, Sudden Hype Around Big Data Analytics?, Classification of Analytics, Challenges that Prevent Businesses from Capitalizing on Big Data, Top Challenges Facing Big Data, Why is Big Data Analytics Important?, Data Science, Data Scientist, Terminologies Used in Big Data Environments, Top Analytics Tools. The Big Data Technology Landscape: NoSQL: Types of NoSQL databases, advantages and comparison.

UNIT-III: Introduction to Hadoop

Features and advantages and versions of Hadoop. Hadoop Ecosystems and distributions. Hadoop versus SQL. Introducing Hadoop, RDBMS versus Hadoop, Distributed Computing Challenges, History of Hadoop, Hadoop Overview, HDFS (Hadoop Distributed File System), Processing Data with Hadoop, Managing Resources and Applications with Hadoop YARN (Yet Another Resource Negotiator), Interacting with Hadoop Ecosystem: PIG, HIVE & HBase.

UNIT-IV: Understanding Map Reduce

Introduction to Map Reduce,The Map Reduce framework, Techniques to optimize Map Reduce jobs, uses of Map Reduce. Mapper, Reducer, Combiner, Partitioner, Searching, Sorting, Compression.

UNIT-V: HIVE and PIG

Introduction to HIVE, Hive Architecture, Hive Data Types, Hive File Format, Hive Query Language (HQL), Hive Operations. Introduction to PIG, Pig Latin Overview: statements, keywords, identifiers, operators. Data Types in Pig: simple, complex. Running Pig, Execution Modes of Pig: local, Map Reduce.

Course Outcomes: After completing this course the students will be able to

CO-1: Understand the importance of Big Data.
CO-2: Learn Big Data Analytics and NoSQL databases.
CO-3: Understand the Hadoop Ecosystems and Hadoop Distributed File System
CO-4: Apply Map Reduce analytics using Hadoop
CO-5: Learn the commands and operations of HIVE & PIG.

TEXT BOOK

1. Big Data and Analytics, Seema Acharya, Subhasinin Chellappan, Wiley publications.

REFERENCE BOOKS

1. Big Data, Black BookTM , DreamTech Press, 2015 Edition.
2. "Hadoop: The definitive Guide", Tom White, O'Reilly Media, 2010.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

DATA COMMUNICATIONS AND COMPUTER NETWORKS

B.TECH-V Semester **L/T/P/C**
3/0/0 /3

Pre-requisites: None

Course Objectives:

- To expose the students to the basic principles of the technology of data communications and networking.
- To understand the concept of data communication and its components.
- To comprehend the use of different types of transmission media and network devices, error detection and correction in transmission of data.
- To understand the concept of flow control, error control, LAN protocols and functions performed by Network Management System.

UNIT-I: Introduction

Introduction: Data Communications, Networks, The Internet, Protocols and Standards, Network Models, Layered Tasks, The OSI Model, TCP/IP Protocol Suite, Addressing.
Physical Layer and Media: Data and Signals, Analog and Digital, Multiplexing. **Transmission Media:**Guided Media, Unguided Media, Switching.

UNIT-II: Data Link Layer

Data link layer: Error Detection and Correction, Framing, Flow and Error Control, Protocols, Noiseless Channels, Noisy Channels, HDLC, Point to Point Protocol, Multiple Access, Random Access, Controlled Access, Channelization.

UNIT-III: Network Layer

Network Layer: Logical Addressing, IPv4 Addresses, CIDR, Subnets, Classfull and special addressing, IPv6 Addresses, Transition from IPv4 to IPv6, Network Layer: Address Mapping, ICMP, IGMP, ICMPv6.
Network Layer: Delivery, Forwarding, Shortest Path Algorithm, Routing Protocols- Intradomain & Interdomain Routing, Distance Vector Routing, Link-State Routing, Path Vector Routing Protocols.

UNIT-IV: Transport Layer

Transport Layer: Process to Process Delivery: UDP, TCP and SCTP, Data Traffic, Congestion, Congestion Control, Two Examples, Quality of Service, Techniques to improve QoS.

UNIT-V: Application Layer

APPLICATION LAYER:DNS, Remote Logging,ELECTRONIC MAIL, File Transfer, The World Wide Web, HTTP—The Hypertext Transfer Protocol.

Course Outcomes:

CO-1. Illustrate basic computer network technology, functions of each layer in the OSI and TCP/IP reference model.
CO-2. Gain the knowledge onerror control and flow control mechanisms.
CO-3. Obtain the skills of subnetting and routing mechanisms.
CO-4. Analyze the features and Operations of TCP/UDP, congestion control and QoS Techniques.

CO-5. Familiarity with the essential protocols of application layer, and how they can be used in network design and implementation.

TEXT BOOKS:

1. Data Communications and Networking, Fourth Edition by BehrouzaA.Forouzan, TMH.
2. Computer Networks,A.S.Tanenbaum,5th edition, Pearson education

REFERENCE BOOKS:

1. Introduction to Data communications and Networking, W.Tomasi,Pearson education.
2. Data and Computer Communications, G.S.Hura and M.Singhal,CRC Press, Taylor and Francis Group.
3. An Engineering Approach to Computer Networks S. Keshav,2nd Edition, Pearson Education.
4. Understanding communications and Networks, 3rd Edition, W.A.Shay, Cengage Learning.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ARTIFICIAL INTELLIGENCE

B. TECH- V Semester **L/T/P/C**
3/0 /0 /3

Pre-Requisites: None

Course Objectives:

- To learn the difference between optimal reasoning vs human like reasoning
- Tounderstandthenotionsofstatespacerepresentation,exhaustivesearch,heuristicsearchalong withthetime and space complexities
- To learn different knowledge representation techniques
- To understand the applications of AI: namely Game Playing.
- To understand Theorem Proving, Expert Systems.

UNIT -I

Introduction: AI problems, Agents and Environments, Structure of Agents, Problem Solving Agents Basic Search Strategies: Problem Spaces, Uninformed Search (Breadth-First, Depth-First Search, Depth-first withIterativeDeepening),HeuristicSearch(HillClimbing,GenericBest- First, A*), Constraint Satisfaction(Backtracking, Local Search)

UNIT -II

Advanced Search: Constructing Search Trees, Stochastic Search, A* Search Implementation, Minimax Search, Alpha-Beta Pruning Basic Knowledge Representation and Reasoning: Propositional Logic, First-Order Logic, Forward Chaining and Backward Chaining, Introduction to Probabilistic Reasoning, BayesTheorem

UNIT -III

Advanced Knowledge Representation and Reasoning: Knowledge Representation Issues, Non monotonic Reasoning, Other Knowledge Representation Schemes Reasoning Under Uncertainty: Basic probability, Acting Under Uncertainty, Bayes'Rule, Representing Knowledge in an Uncertain Domain, Bayesian Networks

UNIT -IV

Learning: What Is Learning? Rote Learning, Learning by Taking Advice, Learning in Problem Solving, Learning from Examples, Winston's Learning Program, Decision Trees.

UNIT -V

Expert Systems: Representing and Using Domain Knowledge, Shell, Explanation, Knowledge Acquisition.

Course Outcomes:

CO-1: Possess the ability to formulate an efficient problem space for a problem expressed in English.
CO-2: Possess the ability to select a search algorithm for a problem.
CO-3: Possess the skill for representing knowledge using the appropriate technique
CO-4: Possess the ability to apply AI techniques to solve problems of Game Playing.
CO-5: Possess the Expert Systems, Machine Learning and Natural Language Processing

TEXTBOOK:

1.Russell, S. and Norvig, P, Artificial Intelligence: A Modern Approach, Third Edition,PrenticeHall,2010.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

SOFTWARE ENGINEERING
(Professional Elective – I)

B.TECH-V Semester L/T/P/C
3/0 /0 /3

Perquisites: Programming for Problem Solving.

Course Objectives:

1. To understand of software process models such as waterfall and evolutionary models.
2. To understand of software requirements and be able to prepare SRS document.
3. To understand of different software architectural system models.
4. To understand design engineering process at varied level.
5. To understand testing procedure and software metrics
6. To understand quality control and how to ensure good quality software

UNIT- I

Introduction to Software Engineering: The evolving role of software, changing nature of software, software myths. A Generic view of process: Software engineering- a layered technology, a process framework, the capability maturity model integration (CMMI), process patterns, 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, conceptual model of UML, basic structural modeling, class diagrams, sequence diagrams, collaboration diagrams, use case diagrams, component diagrams.

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.

UNIT- V

Metrics for Process and Products: Software measurement, metrics for software quality. 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, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality standards.

Course Outcomes:

CO-1. Define Software Engineering and list core principles of software engineering and understand various process models

CO-2. Develop an understanding of software requirements and be able to prepare SRS document.

CO-3. Understand software design engineering process using structural and object oriented approaches and be able to model.

CO-4. Differentiate the techniques of verification and validation in the process of software development, Apply the testing strategies on different level of implementation (unit, integration,…)

CO-5. Understand and able to compute quality measures and develop a software quality assurance plan for a software development.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

INFORMATION RETRIEVAL SYSTEMS
(Professional Elective – I)

B.TECH-V Semester L/T/P/C
3/0 /0 /3

Prerequisites: DBMS

Course Objectives:

- Students of this course will be exposed to text informational retrieval and it's past, present and future research directions.
- They would understand the processes, techniques and the evaluation methods presently used in the IR modeling.
- The languages used in IR and use these to write queries in IR.
- They would be adequately exposed to human computer interaction for IR and for application of IR in searching the web.

UNIT I

Retrieval Strategies:
Vector Space Model: Example of similarity coefficient Similarity measures Probabilistic Retrieval Strategies: Simple Term Weights, Non-Binary Independence Model, Language models

UNIT II

Retrieval Utilities: Relevance Feedback Clustering N grams Regression Analysis .Thesauri

UNIT III

Retrieval Utilities: Semantic networks Parsing Cross language Information Retrieval: Introduction Crossing the language barrier

UNIT IV

Efficiency: I Inverted index Query processing Signature files Duplicate document detection

UNIT V

Integrating Structured Data and Text: A Historical progression Information retrieval as a relational application Semi-structured search using a relational schema Distributed Information Retrieval: A Theoretical model of distributed retrieval Web search

Course Outcomes:

After the completion of this course,

CO1: the students should be able to Define Vector space model, understand various similarity coefficient and measures.
CO2: Develop an Understanding on Relevance feedback, Clustering, Regression Analysis, Thesauri.
CO3: Apply various Retrieval Utilities for Information Retrieval.
CO4: Develop an Understanding about Signature files, Duplicate document detection.
CO5: Apply IR principles to locate relevant information large collection of data.

TEXT BOOK:

1. Information Retrieval: Algorithms and Heuristics By David A Grossman and Ophir Frieder, 2 nd Edition, Springer.

REFERENCE BOOKS:

1. Modern Information Retrieval Algorithms and Heuristics By David A. Grossman, Ophir Frieder, 2007. 2. Information Storage and Retrieval Systems: Theory and Implementation By Kowalski, Gerald, Mark T Maybury , Springer.
3. Natural Language Processing and Information Retrieval, T.Siddiqui and U.S.Tiwary, Oxford Univ. Press.*****

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ADVANCED DATABASES
(Professional Elective – I)

B.TECH-V Semester **L/T/P/C**
3/0 /0 /3

Pre-requisites: Database Management Systems

Objectives:

- The objective aims at features and benefits of Database Management System in Information Technology.
- It introduces recovery in database system. Various sections explain the basic design and execution of relational databases.
- It also provides knowledge and understanding of the underlying principles of Relational Database Management Solution.
- The information about implementing and maintaining an effective, efficient database system with the help of the rising trends are also focused.

UNIT-I

The Enhanced Entity-Relationship (EER) Model

Subclasses, Superclasses, and Inheritance- Specialization and Generalization- Constraints and Characteristics of Specialization and Generalization Hierarchies- Modelling of UNION Types Using Categories- A Sample UNIVERSITY EER Schema, Design Choices, and Formal Definitions- Example of Other Notation: Representing Specialization and Generalization in UML Class Diagrams- Data Abstraction, Knowledge Representation, and Ontology Concepts.

UNIT-II

Database Recovery Technique Recovery Concepts- NO-UNDO/REDO Recovery Based on Deferred Update- Recovery Techniques Based on Immediate Update- Shadow Paging- The ARIES Recovery Algorithm-Recovery in Multi database Systems- Database Backup and Recovery from Catastrophic Failures.

UNIT-III

Parallel and Distributed Databases and Client Server Architecture : Introduction, Architecture for parallel databases Parallel Query evaluation, Parallelizing individual operations, Sorting, Joins, Distributed database concepts, Data fragmentation, Replication, Allocation techniques for distributed database design, Query Processing in distributed databases, Concurrency control in distributed databases, Recovery in distributed databases, An Overview of Client Server Architecture.

UNIT- IV

Database Security

Introduction to Database Security Issues- Discretionary Access Control Based on Granting and Revoking Privileges- Mandatory Access Control and Role-Based Access Control for Multilevel Security- SQL Injection- Introduction to Statistical Database Security- Introduction to Flow Control- Encryption and Public Key Infrastructures- Privacy Issues and Preservation- Challenges of Database Security- Oracle Label-Based Security.

UNIT-V

Enhanced Data Models for Advanced Applications: Databases on the Web and Semi Structured Data: Introduction,Web interfaces to the Web,

Overview of XML: Structure of XML Data, XML Applications, The Semi Structured Data Model, Implementation Issues. Enhanced Data Models for Advanced Application: Introduction, Active database concepts, Temporal database concepts, Spatial databases, Deductive databases.

Course Outcomes:

CO-1. Define Database Languages, Models along with Client Server Architecture.
CO-2. Explain principles of Database Recovery protocols.
CO-3. Construct EER model for real world problems.
CO-4. Determine various database security issues.
CO-5. Adapt with advanced Data models and its applications.

TEXT BOOKS :

1. Ramez Elmasri , Shamkant B. Navathe, Fundamentals of Database Systems – six edition-TMH

REFERENCE BOOKS :

1. Raghu Ramakrishnan, Johannes Gehrke- Database Management Systems- Third edition- McGraw-Hill.
2. Silberschatz, Korth, Sudarshan- Database System Concepts- Forth edition- McGraw-Hill.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

Open elective - I

B.TECH – V SEMESTER **L/T/P/C**
3 0/ 0/ 3

Note: Students should take open electives from the list of open electives offered by the other departments/branches only

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

BIG DATA ANALYTICS LAB

B.TECH-V Semester **L/T/P/C**
0/0 /3 /1.5

Pre-requisites: Programming Knowledge(C, Java), DBMS

Course Objectives:

- To provide knowledge to setup Hadoop cluster and learn basic commands and file handling in HDFS.
- Develop programs using Map Reduce.
- To introduce PIG and PIG Latin and practice commands and scripts of PIG.
- To understand HIVE installation and operations.

List of Experiments

Week 1: Installation of VMWare to setup the Hadoop environment and its ecosystems.
Week 2: Understanding and using basic HDFS commands.
Week 3: Program to write files to Hadoop File System.
Week 4: Program to read files from Hadoop File System.
Week 5: Program to implement Word Count Application using Map Reduce.
Week 6: Program to analyze the Weather Data Set using Map Reduce.
Week 7: Implement matrix multiplication with Hadoop Map Reduce
Week 8: Understand the installation of PIG .
Week 9: Commands and Scripts of PIG.
Week 10: Pig Latin Modes and Programs.
Week 11: Understand the installation of HIVE .
Week 12: HIVE Operations.

Course Outcomes: After completing this course the students will be able to

CO-1. Understand the working environment and distributed file system of Hadoop.
CO-2. Solve applications using Map Reduce.
CO-3. Install PIG and execute commands, scripts and programs on PIG.
CO-4. Install HIVE and work on operations of HIVE.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

DATA COMMUNICATIONS AND COMPUTER NETWORKS LAB

B.TECH-V Semester **L/T/P/C**
0/0 /3 /1.5

Pre-Requisites: IT-work shop

Course Objectives

- To understand the working principle of various communication protocols.
- To understand the network simulator environment and visualize a network topology and observe its performance.
- To analyze the traffic flow and the contents of protocol frames.

List of Experiments

Week 1:
Study of different types of Network cables and practically implement the cross-wired cable and straight through cable using clamping tool.

Week 2:
Study of Network Devices in Detail.

Week 3:
Study of network IP address and Subnetting.

Week 4:
Connect the computers in Local Area Network.

Week 5:
Study of basic network command and Network configuration commands.

Week 6:
Performing an Initial Switch Configuration

Week 7:
Performing an Initial Router Configuration

Week 8:
Implementing an IPv4 Addressing Schema.

Week 9:
Implementing an IPv6 Addressing Schema.

Week 10:
Configure LAN with different topology using packet tracer software.

Week 11:
Configuring and Troubleshooting a Switched Network.

Week 12:
Interpreting Ping and Traceroute Output.

Course Outcomes

CO-1. Implement data link layer farming methods.
CO-2. Analyze error detection and error correction codes.
CO-3. Implement and analyze routing and congestion issues in network design.
CO-4. Implement Encoding and Decoding techniques used in presentation layer.

Text Books:

1. ComputerNetworks— AndrewSTanenbaum,4thEdition.PearsonEducation/PHI.
2. Principlesofcompilerdesign-A.V.Aho. J.D.Ullman;PearsonEducation.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ARTIFICIAL INTELLIGENCE LAB

B.TECH-V Semester **L/T/P/C**
0/0 /3 /1.5

Pre-Requisites: None

Course Objectives:

- To learn the difference between optimal reasoning vs human like reasoning
- Tounderstandthenotionsofstatespacerepresentation,exhaustivesearch,heuristicsearchalong withthetime and space complexities
- To learn different knowledge representation techniques
- To understand the applications of AI: namely Game Playing.
- To understand Theorem Proving, Expert Systems.

List of Programs:

WEEK 1: Write predicates One converts centigrade temperatures to Fahrenheit, the other checks if Atemperature is below freezing
WEEK 2: Write a program to solve the Monkey Banana problem.
WEEK 3: Write a Program on Conjunction and Disjunction
WEEK4: Write a program to solve min max problem
WEEK 5: Write a program in turbo prolog for medical diagnosis and show t he advantage anddisadvantage of green and red cuts.
WEEK6: Write a program to implement factorial, Fibonacci of a given number.
WEEK7: Write a program to solve4-Queenproblem.
WEEK 8: Write a program to solve traveling salesman problem.
WEEK 9: Write a program to solve water jug problemusing LISP
WEEK10: Write a program to solve Towers of Hanoi

Course Outcomes:

CO-1: Demonstrate Knowledge of the building blocks of AI as presented in terms of intelligent agents.
CO-2: Analyze and formalize the problem as a state space, graph and design heuristics
CO-3: Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for game playing.
CO-4: Attain the capability to represent various real life problem domains using logicbased techniques and use this to perform inference or planning.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

INDIAN CONSTITUTION

B.TECH-V Semester **L/T/P/C**
2/0 /0 /0

Pre-requisites: None

Course objectives:

- To introduce the concepts and features Indian constitution.
- To identify the core values reflected in Preamble of the Constitution.
- To examine the nature of the Indian federal system and the parliamentary form of government.

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: Zilla 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: 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.

Course Outcomes:

CO-1: Demonstrate the fundamental rights and duties of a citizen
CO-2: Classify the administrative structure of the Indian union
CO-3: Identify the power of state government and make use of positions
CO-4: Categorize the various department and local administrations responsibilities
CO-5: Functions of election commission and its roles

TEXTBOOKS:

1. Durga Das Basu, Introduction to the constitution of India, Lexis, 2013
2. Granville Aurtin: The Indian Constitution, Oxford University Press, 1999
3. R. Sudarshan, Zoya HasanEt al, India'sLiving constitution, Ideas, Practices, Controversies, Anthem2005.

REFERENC EBOOKS:

1. Indian Polity by Laxmikanth
2. Indian Administration by Subhash Kashyap
3. Indian Administration by Avastiand Avasti

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VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

PROJECT BASED LEARNING - 3

B.Tech : V SEMESTER **L/ T/ P/ C**

0/ 0/ 2/ 1

Course objectives:

Course Outcomes:

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
CLOUD COMPUTING

B.TECH-VI Semester **L/T/P/C**
3/0 /0 /3

Pre-requisites:

1. A course on "Computer Networks"
2. A course on "Operating Systems"
3. A course on "Distributed Systems"

Course Objectives:

- This course provides an insight into cloud computing
- Topics covered include- distributed system models, different cloud service models, service-oriented architectures, cloud programming and software environments, resource management.

UNIT-I

Computing Paradigms: High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Bio computing, Mobile Computing, Quantum Computing, Optical Computing, Nano computing.

UNIT-II

Cloud Computing Fundamentals: Motivation for Cloud Computing, The Need for Cloud Computing, Defining Cloud Computing, Definition of Cloud computing, Cloud Computing Is a Service, Cloud Computing Is a Platform, Principles of Cloud computing, Five Essential Characteristics, Four Cloud Deployment Models

UNIT-III

Cloud Computing Architecture and Management: Cloud architecture, Layer, Anatomy of the Cloud, Network Connectivity in Cloud Computing, Applications, on the Cloud, Managing the Cloud, Managing the Cloud Infrastructure Managing the Cloud application, Migrating Application to Cloud, Phases of Cloud Migration Approaches for Cloud Migration.

UNIT-IV

Cloud Service Models: Infrastructure as a Service, Characteristics of IaaS. Suitability of IaaS, Pros and Cons of IaaS, Summary of IaaS Providers, Platform as a Service, Characteristics of PaaS, Suitability of PaaS, Pros and Cons of PaaS, Summary of PaaS Providers, Software as a Service, Characteristics of SaaS, Suitability of SaaS, Pros and Cons of SaaS, Summary of SaaS Providers, Other Cloud Service Models.

UNIT-V

Cloud Service Providers: EMC, EMC IT, Captiva Cloud Toolkit, Google, Cloud Platform, Cloud Storage, Google Cloud Connect, Google Cloud Print, Google App Engine, Amazon Web Services, Amazon Elastic Compute Cloud, Amazon Simple Storage Service, Amazon Simple Queue ,service, Microsoft, Windows Azure, Microsoft Assessment and Planning Toolkit, SharePoint, IBM, Cloud Models, IBM Smart Cloud, SAP Labs, SAP HANA Cloud Platform, Virtualization Services Provided by SAP, Sales force, Sales Cloud, Service Cloud: Knowledge as a Service, Rack space, VMware, Manjrasoft, Aneka Platform

Course Outcomes:

CO-1. Ability to understand various service delivery models of a cloud computing architecture.
CO-2. Ability to understand the ways in which the cloud can be programmed and deployed.
CO-3. Understanding Cloud Computing Architecture and Management
CO-4. Understanding cloud service Models.
CO-5. Understanding cloud service providers.

TEXT BOOK:

1. Essentials of cloud Computing: K. Chandrasekhran, CRC press, 2014

REFERENCE BOOKS:

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.
3. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp 2011.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

MACHINE LEARNING

B.TECH-VI Semester **L/T/P/C**

3/0 /0 /3

Pre-requisites: Knowledge of DAA, Programming for Problem solving, Data Warehouse and Data mining.

Course Objectives:

- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses
- To understand the basic theory underlying machine learning.
- To be able to apply machine learning algorithms to solve problems of moderate complexity.
- To be able to read current research papers and understands the issues raised by current research.

UNIT-I: The ingredients of machine learning, Tasks: the problems that can be solved with machine learning, Models: the output of machine learning, Features, the workhorses of machine learning. Binary classification and related tasks:Classification, Scoring and ranking.

UNIT- II:
Beyond binary classification: Handling more than two classes, Regression, Unsupervised and descriptive learning.Concept learning: The hypothesis space, Paths through the hypothesis space.

UNIT-III:
Models: Decision trees, Ranking and probability estimation trees, Tree learning as variance reduction. Rule models: Learning ordered rule lists, Learning unordered rule sets, Descriptive rule learning, First order rule learning.

UNIT-IV:
Linear models: The least-squares method, The Perceptron: a heuristic learning algorithm for linear classifiers, Support vector machines, Probabilistic models: The normal distribution and its geometric interpretations, Probabilistic models for categorical data.

UNIT- V:
Getting Started with R: Installing R, Running R, The Comprehensive R Archive Network, Getting Help in R, Packages in R. Essentials of the R Language: Calculations, Logical Operations, Vectors and Subscripts, Matrices and arrays, Random numbers , Sampling and shuffling, loops and repeats, List, Data Input, Data Frames, Graphics.

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

CO-1: Understand the theory underlying machine learning
CO-2: Learn beyond binary classification.
CO-3: Recognize and implement various genetic algorithms.
CO-4: Construct algorithms to learn tree, to learn linear, non-linear models and Probabilistic models.
CO-5: Able to analyze the data using R Programming.

TEXT BOOKS:

1. Machine Learning: The art and science of algorithms that make sense of data, Peter Flach, Cambridge.
2. The R Book. Second Edition. Michael J. Crawley. 3. Machine Learning, Tom M. Mitchell, MGH.

REFERENCE BOOKS:

1. Understanding Machine Learning: From Theory to Algorithms, Shai Shalev-Shwartz, Shai BenDavid, Cambridge.
2. Machine Learning in Action, Peter Harington, 2012, Cengage.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

DATA VISUALIZATION TECHNIQUES

B.TECH-VI Semester **L/T/P/C**
3/0 /0 /3

Pre-requisites: Data Analysis and Programming Knowledge on Python

Course Objectives:

- To understand the basic concepts of Data Visualization
- Explore the different visualization tools of Python
- Understand the methods to visualize amounts, distribution and proportions.
- Gain knowledge on time-oriented, trees, graphs and network-based data visualization techniques.

UNIT-I:
Introduction to Data Visualization, Key elements of Data Visualization, importance of Data Visualization, benefits and examples of Data Visualization, Types of charts and graphs used in Data Visualization, methods for selection of right Data Visualization elements, Data Visualization software and tools.

UNIT-II:
Visualizing Data: Aesthetics and Types of Data, Scales Map Data Values onto Aesthetics, Coordinate Systems and Axes: Cartesian Coordinates, Nonlinear Axes, Directory of Visualizations, Visualizing Amounts: Bar Plots / charts, Grouped and Stacked Bars, Dot Plots and Heat maps. Using Matplotlib with Python: Introduction, plotting functions, modules and toolkits of Matplotlib.

UNIT-III:
Visualizing Distributions: Histograms and Density Plots: Visualizing a Single Distribution, Histograms, Visualizing Multiple Distributions at the Same Time, Empirical Cumulative Distribution Functions, Quantile-Quantile Plots, Visualizing Distributions Along the Vertical Axis: Boxplot, violin plot, strip charts. Visualizing Distributions Along the Horizontal Axis: ridgeline plot. Using Pandas for plotting: introduction, plotting functions, modules and extensions of pandas.

UNIT-IV:
Visualizing Proportions: pie charts, Side-by-Side Bars, stacked bars, Visualizing Proportions Separately as Parts of the Total. Visualizing Nested Proportions: Mosaic Plots and Treemaps, Nested Pies. Visualizing Associations Among Two or More Quantitative Variables: Scatter plots, Correlograms, Dimension Reduction, Paired Data. Using Seaborn for visualization: introduction, features and benefits, visualization functions.

UNIT-V:
Visualization Techniques for Time-Oriented Data: Introduction, Definitions, characterizing time-oriented data, Relating data and time, Visualizing time-oriented data, Categorization. Visualization Techniques for Trees, Graphs, and Networks: Displaying hierarchical structures, Displaying arbitrary graphs, networks, Node-link graphs, Matrix representations for graphs.

Course Outcomes: After completing this course the students will be able to
CO1: Understand Data Visualization elements, methods and tools.
CO2: Learn about different methods for Visualizing Amounts and Matplotlib.
CO3: Understand Visualization of Distributions.
CO4: Learn to Visualize Proportions and Seaborn tool for Visualization.
CO5: Gain knowledge on time-oriented, trees, graphs and network-based data visualization techniques.

TEXT BOOK

1. Claus Wilke, Fundamentals of Data Visualization: A Primer on Making Informative and Compelling Figures, 1st ed., Sebastopol: O'Reilly Media Inc, 2019.
2. Kalilur Rahman, Python Data Visualization Essentials Guide, 2021.
3. Matthew O. Ward, Georges Grinstein, Daniel Keim , *Interactive Data Visualization: Foundations, Techniques,and Applications,* 2nd ed., Boca Raton: A K Peters/CRC Press, 2015.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

SOFTWARE PROJECT MANAGEMENT
(Professional Elective – II)

B.TECH-VI Semester L/T/P/C
3/0 /0 /3

Pre-requisites: software Engineering
Course Objectives:

- The Objective is to provide graduates with knowledge of engineering to creatively, innovatively solve difficult computer systems problems, regularly engage in exploring, learning and applying state-of-the-art of hardware & software technologies.
- The solution of computer systems problems iseffective software development team member that contributes innovative software design solutions to the resolution of business, scientific or government computer systems problems.
- It able to communicate effectively, successfully, both individually and within multi-disciplinary teams.

UNIT – I
Conventional Software Management: The waterfall model, conventional software Management performance.
Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

UNIT - II
Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.**The old way and the new:** The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

UNIT - III
Life cycle phases: Engineering and production stages, inception, Elaboration, construction,transition phases.
Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts,programmatic artifacts.
Model based software architectures: A Management perspective and technical perspective.

UNIT- IV
Work Flows of the process: Software process workflows, Iteration workflows.
Checkpoints of the process: Major mile stones, Minor Milestones, Periodic status assessments. Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.
Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations.
Process Automation: Automation Building blocks, The Project Environment

UNIT- V
Project Control and Process instrumentation: The seven core Metrics, Management indicators,quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation.
Tailoring the Process: Process discriminate.
Future Software Project Management: Modern Project Profiles, Next generation Softwareeconomics, modern process transitions.

Case Study: The command Center Processing and Display system- Replacement (CCPDS-R)

Course Outcomes:

After the completion of this course, the students should be able to

CO-1. Gain knowledge of software economics, phases in the life cycle of software development, project organization, and project control and process instrumentation.

CO-2. Summarize software economics, software development life cycle, artifacts of the process, workflows, checkpoints, project organization and responsibilities, project control and process instrumentation.

CO-3. Choose the right software development approach. Compare various project organizations and responsibilities.

CO-4. Analyze the major and minor milestones, artifacts and metrics for management and technical perspective.

CO-5. Design software product using conventional and modern principles of software project management.

TEXT BOOK:

1. Software Project Management, Walker Royce: Pearson Education, 2005.

REFERENCE BOOKS:

1. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.
2. Software Project Management, Joel Henry, Pearson Education.
3. Software Project Management in practice, Pankaj Jalote, Pearson Education.2005.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

THEORY OF COMPUTATION
(Professional Elective – II)

B.TECH-VI Semester **L/T/P/C**
3/0 /0 /3

Course Objectives:

- Introduce students to the mathematical foundations of computation including automata theory;
- understand the theory of formal languages and grammars; the notions of algorithm, decidability, complexity, and computability.
- Develop students' ability to understand and conduct mathematical proofs for computation and algorithms.

UNIT – I

FINITE AUTOMATA (FA): Introduction, Deterministic Finite Automata (DFA) -Formal definition, simpler notations (state transition diagram, transition table), Nondeterministic Finite Automata (NFA)-Definition of NFA, Equivalence of Deterministic and Nondeterministic Finite Automata, Applications of Finite Automata, Finite Automata with Epsilon Transitions, Eliminating Epsilon transitions, Minimization of Deterministic Finite Automata, Finite automata with output (Moore and Mealy machines) and Inter conversion.

UNIT – II

REGULAR EXPRESSIONS (RE): Introduction, Identities of Regular Expressions, Finite Automata and Regular Expressions- Converting from DFA's to Regular Expressions, Converting Regular Expressions to Automata, applications of Regular Expressions. REGULAR GRAMMARS: Definition, regular grammars and FA, FA for regular grammar, Regular grammar for FA. Proving languages to be non-regular -Pumping lemma, applications, Closure properties of regular languages.

UNIT – III

CONTEXT FREE GRAMMER (CFG): Derivation Trees, Sentential Forms, Rightmost and Leftmost derivations of Strings. Ambiguity in CFG's, Minimization of CFG's, CNF, GNF, Pumping Lemma for CFL's, Enumeration of Properties of CFL (Proof's omitted).

UNIT – IV

PUSHDOWN AUTOMATA: Definition, Model, Acceptance of CFL, Acceptance by Final State and Acceptance by Empty stack and its Equivalence, Equivalence of CFG and PDA. TURING MACHINES (TM): Formal definition and behaviour, Languages of a TM, TM as accepters, and TM as a computer of integer functions, Types of TMs.

UNIT V

RECURSIVE AND RECURSIVELY ENUMERABLE LANGUAGES (REL): Properties of recursive and recursively enumerable languages, Universal Turing machine, The Halting problem, Undecidable problems about TMs. Context sensitive language and linear bounded automata (LBA), Chomsky hierarchy, Decidability, Post's correspondence problem (PCP), undecidability of PCP.

Course Outcomes

CO-1. Understand the notions of computation, such as algorithm, computability, decidability, reducibility, and complexity, through problem solving.
CO-2. Describe the models of computation, including formal languages, grammars and automata, and their connections.
CO-3. Explain the Church-Turing thesis and its significance.
CO-4. Design finite automata, pushdown automata, Turing machines, formal languages, and grammars.
CO-5. Analyze computational problems regarding their computability and complexity and prove the basic results of the theory of computation.

TEXT BOOKS:

1. John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman (2007), Introduction to Automata Theory Languages andComputation, 3rdedition, Pearson Education, India.

REFERENCE BOOKS:

1. K. L. P Mishra, N. Chandrashekaran (2003), Theory of Computer Science-Automata Languages and Computation, 2nd edition, Prentice Hall of India, India.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
NATURAL LANGUAGE PROCESSING
(Professional Elective – II)

B.TECH-VI Semester L/T/P/C
3/0 /0 /3

Pre requisites: Data structures.

Course Objectives:

- Introduce to some of the problems and solutions of NLP and their relation to linguistics and statistics.

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 Approache

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

Course Outcomes:

After the completion of this course the students should be able to:

CO-1. Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
CO-2. Understand and carry out proper experimental methodology for training and evaluating
CO-3. empirical NLP systems
CO-4. Able to manipulate probabilities, construct statistical models over strings and trees, and
CO-5. estimate parameters using supervised and unsupervised training methods.

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 Books:

1. Speech and Natural Language Processing - Daniel Jurafsky & James H Martin, Pearson Publications

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

Open elective - II

B.TECH – VI SEMESTER **L/T/P/C**
3 0/ 0/ 3

Note: Students should take open electives from the list of open electives offered by the other departments/branches only

VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

CLOUD COMPUTING LAB

B.TECH-VI Semester **L/T/P/C**
0/0 /3 /1.5

Pre-requisites
- Programming Skills.
- Familiarity with Databases.
- Basics of Security and Privacy.
- Knowledge of Agile Development.
- Familiarity with Operating Systems.
- Understanding of Virtualization.
- Basics of Networking.

Course Objectives:
- Identify the technical foundations of cloud systems architectures.
- Analyze the problems and solutions to cloud application problems.
- Apply principles of best practice in cloud application design and management.
- Identify and define technical challenges for cloud applications and assess their importance.

Syllabus Content:

Week 1: Introduction to basic cloud computing concepts.
Week 2: Draw a neat diagram of cloud computing Architecture.
Week 3: Find procedure to run the virtual machine of different configuration. Check how many virtual machines can be utilized at particular time.
Week 4: Find procedure to attach virtual block to the virtual machine and check whether it holds the data even after the release of the virtual machine.
Week 5: Install a C compiler in the virtual machine and execute a sample program.
Week 6: Show the virtual machine migration based on the certain condition from one node to the other.
Week 7: Find procedure to install storage controller and interact with it.
Week 08: Installation & Configuration of Oracle Virtual box.
Week 09: Installing open Solaris as a guest OS to Sun xVM Virtual Box using the 7-Zip archive tool
Week 10: Evaluation of performance of services over cloud:Amazon web services.
Week 11: Create a Amazon EC2 and perform the following tasks
- Launch a web server with termination protection enabled
- Monitor Your EC2 instance
- Modify the security group that your web server is using to allow HTTP access
- Resize your Amazon EC2 instance to scale
- Explore EC2 limits
- Test termination protection
- Terminate your EC2 instance

Week 12: Create an Amazon EBS volume and perform the following tasks
- Attach it to an instance
- Apply a file system to the volume, and then Take a snapshot backup

Week 13: Build a VPC and Launch a Web Server and perform the following tasks
- Create a VPC.

- Create subnets.
- Configure a security group.
- Launch an EC2 instance into a VPC.

Week 14: Build Your DB Server and Interact With Your DB Using an App and perform the following tasks

- Launch an Amazon RDS DB instance with high availability.
- Configure the DB instance to permit connections from your web server.
- Open a web application and interact with your database.

Week 15: Introduction to AWS IAM and perform the following tasks

- Exploring pre-created IAM Users and Groups
- Inspecting IAM policies as applied to the pre-created groups
- Following a real-world scenario, adding users to groups with specific
- capabilities enabled
- Locating and using the IAM sign-in URL
- Experimenting with the effects of policies on service access

Week 16: Scale and Load Balance Your Architecture and perform the following tasks

- Create an Amazon Machine Image (AMI) from a running instance.
- Create a load balancer.
- Create a launch configuration and an Auto Scaling group.
- Automatically scale new instances within a private subnet
- Create Amazon CloudWatch alarms and monitor performance of your infrastructure.

Course outcomes:

CO-1: Analyze Cloud Computing fundamentals, technologies, applications and implementation of virtualization with Oracle VM Virtual box.

CO-2: Development knowledge of cloud computing using Amazon Web Services like Compute, Storage and Networking.

CO-3: Providing Security to the Cloud System using Identity Access Management**(IAM).**

CO-4: Attain the Capability of design, development of agile and highly available systems using Amazon Web Services.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
MACHINE LEARNING LAB

B.TECH-VI Semester **L/T/P/C**
0/0 /3 /1.5

Pre-requisites: Knowledge of DAA and Programming for Problem solving

Course Objectives:

- Understand the complexity of Machine Learning algorithms and their limitations.
- Understand modern notations in data analysis oriented computing.
- Capable of confidently applying common Machine Learning algorithms in practice and implementing their own**.**
- Capable of performing distributed computations.
- Capable of performing experiments in Machine Learning using real world data.

Week-1: Write a program to create and combine data frames to get whole data

Week-2: Write a program to demonstrate data visualization based on user requirement

Week-3: Write a program to predict data on Insurance Fraud Detection based on given past historical data.

Week-4: Write a program for finding the most specific hypothesis based on a given set of training data samples. Read thedata from .csv file

Week-5: Write a program to represent each document as a vector uses term frequency to identify commonly used termsthat help classify the documents from various documents

Week-6: Write a program to derive knowledge from a given dataset using Decision Support System.

Week-7: Write a program to predict the future data based on past data (take past data as a data set)

Week-8: Write a program to implement Bayes theorem for support vector machine

Week-9: Experiment on " to demonstrate least-square method".

Week-10:

a) Write a R program to Create Pie-Chart.
b) Write a R Program to Demonstrate Scatter plots .

Week-11:

a) Write a R Program to Create Line Chart.
b) Write a R Program to Create Multiple Line Chart.

Week-12: Write a R Program to Create Histograms
Week-13: Write a R Program to Create Boxplots
Week-14: Write a R Program to Create Bar Charts

Course Outcomes:

After the completion of this course the students should be able to :

CO-1: Discuss different application on Machine Learning problems.
CO-2: Describe various algorithms on Machine Learning mentioning its strengths and weaknesses.
CO-3: Improve the performance of Machine Learning algorithms with different parameters.
CO-4: Understand the latest issues raised by current researchers.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

DATA VISUALIZATION TECHNIQUES LAB

B.TECH-VI Semester **L/T/P/C**
0/0 /3 /1.5

Pre-requisites: Programming Knowledge in Python

Course Objectives:
- To provide knowledge on Matplotlib, Pandas and Seaborn tools of Python for visualization of data.
- Application of different libraries and functions of Python to represent data in various forms.

List of Experiments

Week 1: Visualizing data using Line Plots: with markers, without markers and multiple line plots
Week 2: Representing data using single bar plot and multiple bar plots both horizontal and vertical.
Week 3: Creating a grouped bar plot and stacked bar plot in Matplotlib.
Week 4: Visualizing data using Dot Plots and Heat Maps.
Week 5: Visualizing Distributions using Histograms and Density Plots
Week 6: Comparing probability distributions using Quantile Quantile plot
Week 7: Visualizing Distributions Along the Vertical Axis: Boxplot, violin plot.
Week 8: Visualizing Distributions using strip charts and ridgeline plot.
Week 9: Visualizing Proportions using pie charts, Side-by-Side Bars
Week 10 : Representing data using Area Charts, Donut Charts and Matshow.
Week 11: Visualizing Nested Proportions using Mosaic Plots, Treemaps and Nested Pies.
Week 12: Visualizing Associations Among Quantitative Variables using Scatter plots and Correlograms.

Course Outcomes: After completing this course the students will be able to

CO1: Understand the working environment of python for data visualization.
CO2: Visualize the data distributions and proportions using different visualization tools of python.
CO3: Representation of data using different plotting methods of python.
CO4: Visualize the Nested Proportions and Associations among data using python.

Suggested reading:

1. Kalilur Rahman, Python Data Visualization Essentials Guide, 2021.
2. Swapnil Saurav, Learn and Practice Data Visualization using Python,2020.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

LOGICAL REASONING AND QUANTITATIVE APTITUDE

B.TECH-VI Semester **L/T/P/C**
2/0 /0 /0

Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives:

The purpose of this course ensure the students

- To improve logical thinking with general applications using mathematical concepts like sequences, series, number theory and probability.
- It also features students to analyze data interpretation and able of improve their mathematical skills in various general aspects like coding and decoding, Time and Work puzzles solving blood relations etc.

Unit – I: Logical Reasoning

1. Coding and Decoding
2. Distance and Directions
3. Classifications
4. Odd man out and series
5. Clocks and Calendars etc.

Unit – II: Logical ability

1. Blood relations
2. Seating Arrangements
3. Figure Analysis
4. Puzzles etc.

Unit – III: Number systems

1. LCM and HCF
2. Ratio and proportion
3. Simple interest and compound interest
4. Profit and Loss etc.

Unit – IV: Arithmetic ability

1. Time and work
2. Partnerships
3. Time speed and distance
4. Problems on Trains etc.

Unit – V: Mathematical ability

1. Sequence and series
2. Permutations and combination
3. General probability etc.

COURSE OUTCOMES:

On successful completion of this course, students will be able to:

CO-1: Apply quantitative reasoning and mathematical analysis methodologies to understand and solve problems.

CO-2: Apply quantitative correctly arrive at meaningful conclusions regarding their answers and manipulate equations and formulas in order to solve for the desired variable

CO-3: Interpret given information correctly, determine which mathematical model best describes the data, and apply the model correctly.

CO-4: Correctly apply mathematical language and notation to explain the reasoning underlying their conclusions when solving problems using mathematical or statistical techniques.

CO-5: Improve their mathematical skills in various general aspects to solve real time problems.

Reference Books:

1. A modern approach to verbal and non-verbal reasoning by Dr. R.S. Agarwal.
2. Quantitative Aptitude by Abhijit Guha Tata Mc Graw-Hill Company Limited.
3. Quantitative Aptitude by P.A. Anand (Wiley)
4. Quantitative Aptitude by Dr. R.S. Agarwal.
5. Objective Arithmetic by S.L. Gulati.

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VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

PROJECT BASED LEARNING - 4

B.Tech : VI SEMESTER **L/ T/ P/ C**

0/ 0/ 2/ 1

Course objectives:

Course Outcomes:

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(AUTONOMOUS)

B.Tech-CSD **INTERNET OF THINGS (IoT)** *R20Regulations*

3 0 0 3

Pre-requisites: Basic Programming Knowledge, Communications Protocols

Course Objectives:

- To introduce the terminology, technology and its applications
- To introduce the concept of M2M (machine to machine) with necessary protocols
- To introduce the Python Scripting Language which is used in many IoT devices
- To introduce the Raspberry PI platform, that is widely used in IoT applications
- To introduce the implementation of web based services on IoT devices

UNIT I

Introduction to Internet of Things –Definition and Characteristics of IoT , Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs, IoT enabled 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 (Text Book-1. page no: 20-73)

UNIT II

IoT and M2M – Software Defined Networks, Network Function Virtualization, differences between SDN and NFV for IoT, Basics of IoT System Management with SNMP, NETCONF, NETOPEER (Text Book-1. page no: 76-110)

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 . (Text Book-1. page no: 140- 175)

UNIT IV

IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming – Python programs with Raspberry PI with focus of interfacing external gadgets,controlling output, reading input from gpio pins. (Text Book-1 page no: 177-196)

UNIT V

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs Web servers – Web server for IoT, Cloud for IoT, Python web application framework, Designing a RESTful web API (Text Book-1. page no: 197-250)

Course Outcomes:

After the completion of this course, the students should be able to

- Interpret the vision of IoT from global context.
- Perceive building blocks of Internet of Things and its characteristics.

- Learn the basic concepts of Python. Implement the python programming using Raspberry.

- Perceive the application areas of IoT. Realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks
- Determine the Market perspective of IoT. Develop Python web applications and cloud servers for IoT.

TEXT BOOKS:

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

REFERENCE BOOK:

1. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, “From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence”, 1 st Edition, Academic Press, 2014.

VAAGDEVICOLLEGEOFENGINEERING
(AUTONOMOUS)
NETWORK SECURITY & CRYPTOGRAPHY

B.Tech:VII- Semester **L/T/P/C**
3/0/0/3

Pre requisites: Data Communications and Computer Networks.

Course Objectives:

- To explain the objectives of information security and importance and application of each of confidentiality, integrity, authentication and availability. Understand various cryptography concepts and techniques.
- To illustrate various symmetric key and asymmetric key cryptographic algorithms.
- To define the basic requirements of message authentication, hashing algorithms and Kerberos.
- To describe E-Mail Security with PGP, S/MIME and enhancements made to IPv4 by IPSec.
- To discuss the requirements of SSL, TLS, SET and understand intrusion detection, Firewalls.

UNIT – I

Security Concepts: Introduction, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security, **Cryptography Concepts and Techniques:** Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, Steganography.

UNIT – II

Symmetric key Ciphers: Block Cipher principles, Feistel Cipher Structure, DES algorithm, AES algorithm, Multiple Encryption and Triple DES, Block cipher operation, Stream ciphers, RC4. **Asymmetric key Ciphers:** Principles of public key cryptosystems, RSA algorithm, Diffie- Hellman Key Exchange.

UNIT – III

Cryptographic Hash Functions: Message Authentication, Secure Hash Algorithm(SHA-512). **Message authentication codes:** Authentication requirements, HMAC, Digital signatures.
Key Management and Distribution: Symmetric Key Distribution Using Symmetric & Asymmetric Encryption, Distribution of Public Keys, Kerberos, X.509 Authentication Service.

UNIT – IV

E-Mail Security: Pretty Good Privacy, S/MIME IP Security: IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, combining security associations.

UNIT – V

Web Security: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET), Intruders, Firewall Design principles, Trusted Systems, Intrusion Detection Systems (Online Chapters and Appendices: Chapter 22, Chapter 23), Wireless Network Security.

Course Outcomes:

After the completion of this course, the students should be able to

CO1: Identifies various types of vulnerabilities, attacks, mechanisms and security services.
CO2: Compare and contrast symmetric and asymmetric encryption algorithms.
CO3: Implementation of message authentication, hashing algorithms and able to understand kerberos.
CO4: Explore the attacks and controls associated with IP, transport level, web and E-mail security.
CO4: Develop intrusion detection system, solutions for wireless networks and designing of various types of firewalls.

TEXT BOOK:

1. Cryptography and Network Security - Principles and Practice: William Stallings, Pearson Education, 6th Edition

REFERENCE BOOKS:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1st Edition.
2. Cryptography and Network Security : Forouzan Mukhopadhyay, Mc Graw Hill, 3 rd Edition
3. Information Security, Principles, and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM. Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

VAAGDEVICOLLEGEOFENGINEERING
(AUTONOMOUS)

SEMANTIC WEB TECHNOLOGY

B.Tech:VII-Semester **L/T/P/C**
3/0/0/3

Pre-requisites: Programming Knowledge: Java, HTML, XML, Scripting Languages

Course Objectives:

- To understand the basic concepts of World Wide Web and its generations.
- Explore the ways of Knowledge Representation for the Semantic Web.
- Understand the concepts of Ontology Engineering.
- Learn the different Semantic Web Applications, Services and Technology.

UNIT-I:
Thinking and Intelligent Web Applications, The Information Age ,The World Wide Web, Limitations of Today's Web, The Next Generation Web. Artificial Intelligence, Machine Intelligence, Ontology, Inference Engines, Software Agents, the Semantic Web Roadmap, Logic on the Semantic Web.

UNIT-II:
Web Ontology and Logic: Resource Description Framework, Overview, HTML Language, XML Language, RDF Language, Basic Elements, RDF Schema, XQuery: XML Query Language. Web Ontology Language: Overview, Ontology Language, Ontology Language Requirements, the OWL Language, Basic Elements, OWL Example, Applying OWL, OWL Capabilities and Limitations.

UNIT-III:
Ontology Engineering: Overview, Constructing Ontology , Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries, Ontology Matching, Ontology Mapping, Ontology Mapping Tools. Logic, Rules, and Inference: Overview, Logic and Inference, Descriptive Logic, Inference Engines, RDF Inference Engine.

UNIT-IV:
Semantic Web Rule Language: Overview, Rule Systems, Rule Languages, Semantic Web Rule Language. Semantic Web Applications: Overview, Semantic Web Applications, Semantic Web Services, Semantic Search, e-Learning, Semantic Bioinformatics, Enterprise Application Integration, Knowledge Base.

UNIT-V:
Web Ontology Language for Services: Overview, XML-based Web Services, Next Generation Web Services, Creating an OWL-S Ontology for Web Services. Semantic Search Technology: Overview, Search Engines, Semantic Search, Semantic Search Technology, Web Search Agents, Semantic Methods, Latent Semantic Index Search, Swoogle.

Course Outcomes: After completing this course the students will be able to
CO1: Understand the generations of Web.
CO2: Learn the different frame works and languages for semantic web.
CO3: Understand the concepts of ontology engineering.
CO4: Understand the concepts of semantic web applications and services.
CO5: Learn the application of OWL for different services.

TEXT BOOK

Thinking on the Web - Berners Lee, Godel and Turing, Wiley interscience.

REFERENCE BOOKS

1. Semantic Web Technologies, Trends and Research in Ontology Based Systems, J. Davies, Rudi Studer, Paul Warren, John Wiley & Sons.
2. Information sharing on the semantic Web - Heiner Stucken schmidt; Frank Van Harmelen, Springer Publications.

(AUTONOMOUS)
DEEP LEARNING

B.Tech:VII- Semester **L/T/P/C**
3/0/0/3

Course Objective

1. Learn introduction, foundations and types of Artificial Neural Networks.
2. Understand the knowledge on Neural Networks and Deep Learning Concepts.
3. Gain knowledge to apply optimization strategies on Neural Networks.
4. Ability to select and use the Learning Networks, Deep Models to model real world system.
5. Ability to apply optimization strategies for large scale applications.

UNIT-I:

Artificial Neural Networks Introduction, Basic models of ANN, important terminologies, Supervised LearningNetworks, Perceptron Networks, Adaptive Linear Neuron, Back-propagation Network. Associative Memory Networks. Training Algorithms for pattern association, BAM and Hopfield Networks.

UNIT-II:

Unsupervised Learning Network- Introduction, Fixed Weight Competitive Nets, Maxnet, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter Propagation Networks, AdaptiveResonance Theory Networks. Special Networks-Introduction to various networks.

UNIT – III:

Introduction to Deep Learning, Historical Trends in Deep learning, Deep Feed - forward networks, Gradient-Basedlearning, Hidden Units, Architecture Design, Back-Propagation and Other Differentiation Algorithms

UNIT - IV :

Regularization for Deep Learning: Parameter norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under-Constrained Problems, Dataset Augmentation, Noise Robustness, Semi-Supervised learning, Multi-task learning, Early Stopping, Parameter Typing and Parameter Sharing, Sparse Representations, Bagging and other Ensemble Methods, Dropout, Adversarial Training, Tangent Distance, tangent Prop and Manifold,Tangent Classifier

UNIT – V:

Optimization for Train Deep Models: Challenges in Neural Network Optimization, Basic Algorithms, Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates, Approximate SecondOrder Methods,Optimization Strategies and Meta-Algorithms Applications: Convolutional Networks,Large-Scale Deep Learning, Computer Vision, Speech Recognition, Natural Language Processing

Course Outcomes:

CO-1: Understand the basics of Artificial Neural Networks.

CO-2: Describe the various Learning Networks and Special Networks.

CO-3: Understand the Deep Neural Network.

C0-4: Develop different parameters for Regularization for Deep Learning.

CO-5: Design Optimized for training Deep Models.

TEXT BOOKS: 1. Deep Learning: An MIT Press Book By Ian Goodfellow and Yoshua Bengio and Aaron Courville
2. Neural Networks and Learning Machines, Simon Haykin, 3rd Edition, Pearson Prentice Hall

VAAGDEVICOLLEGEOFENGINEERING
(AUTONOMOUS)
EXPLORATORY DATA ANALYTICS

B.Tech:VII- Semester **L/T/P/C**
3/0/0/3

Unit I

Managing Data Frames with the dplyr package: Data Frames, the dplyr Package, dplyr Grammar, Installing the dplyr package, select(), ilter(), arrange(), rename(), mutate(), group_by(), Exploratory Data Analysis : Formulate your question, Read in your data, Check the packaging, Run str().

Unit II

Principles of Analytic Graphics: Show comparisons, Show causality, mechanism, explanation, systematic structure, Show multivariate data, Integrate evidence, Describe and document the evidence, Exploratory Graphs: Characteristics of exploratory graphs, Air Pollution in the United States, Getting the Data, Simple Summaries: One Dimension, Five Number Summary, Box plot, Histogram, Overlaying Features, Bar plot, Simple Summaries: Two Dimensions and Beyond, Multiple Box plots, Multiple Histograms, Scatter plots, Scatter plot - Using Color, Multiple Scatter plots

Unit III

Plotting Systems: The Base Plotting System, The Lattice System, The ggplot2 System Graphics Devices: The Process of Making a Plot, How Does a Plot Get Created?, Graphics File Devices, Multiple Open Graphics Devices, Copying Plots The Base Plotting System: Base Graphics, Simple Base Graphics, Some Important Base Graphics Parameters, Base Plotting Functions, Base Plot with Regression Line, Multiple Base Plots Plotting and Color in R: Colors 1, 2, and 3, Connecting colors with data, Color Utilities in R, colorRamp(), colorRampPalette(), RColorBrewer Package, Using the RColorBrewer palettes, The smoothScatter() function, Adding transparency

Unit IV

Hierarchical Clustering: Hierarchical clustering, How do we define close?, Example: Euclidean 13 distance, Example: Manhattan distance, Example: Hierarchical clustering, Prettier dendrograms, Merging points: Complete, Merging points: Average, Using the heatmap() function, K-Means Clustering: Illustrating the K-means algorithm, Stopping the algorithm, Using the kmeans() function, Building heatmaps from K-means solutions, Notes and further resources Dimension Reduction: Matrix data, Patterns in rows and columns, Related problem, SVD and PCA, Unpacking the SVD: u and v, SVD for data compression, Components of the SVD - Variance explained, Relationship to principal components, What if we add a second pattern?, Dealing with missing values.

Unit V

The ggplot2 Plotting System: Part 1 The Basics: qplot(), Before You Start: Label Your Data, ggplot2 “Hello, world!”, Modifying aesthetics, Adding a geom, Histograms, Facets, Case Study: MAACS Cohort, Summary of qplot().

Text Book(s)

1.Roger D.Peng, Exploratory Data Analysis with R.

References

1.John W. Tukey, Exploratory Data Analysis, Addison-Wesley

VAAGDEVICOLLEGEOFENGINEERING
(AUTONOMOUS)
SOFTWARE TESTING

B.Tech:VII- Semester **L/T/P/C**
3/0/0/3

Pre-Requisites: Software Engineering.

Course Objectives:

The purpose of the course is to make students

- To determine software testing objectives and criteria
- To develop and validate a test plan
- To select and prepare test cases
- To identify the need for testing
- To prepare testing policies and standards
- To use testing aids and tools

UNIT - I

Introduction: Testing as an Engineering Activity, Testing as a Process, Testing axioms, Basic Definitions Software Testing Principles, The Tester'sRolein a Software Development Organization, Verification & Validation, Quality Assurance, Quality Control Origins of Defects, Cost of Defects, Defect Classes, The Defect Repository and Test Design, Developer/Tester Support for Developing a Defect Repository, Defect Prevention Strategies.

UNIT - II

Test case Design, Test Case Design Strategies, Using Black Box Approach to Test Case Design, Random Testing, Requirements based Testing, Boundary Value Analysis, Decision tables, Equivalence Class Partitioning, State-based Testing, Cause-effect graphing, Error guessing, Compatibility testing, User documentation testing, Domain testing.

White Box Approach to Test Design, Test Adequacy Criteria, Static testing vs. Structural testing, code functional testing, Coverage and Control Flow Graphs, Covering Code Logic, Paths Their Role in White–box Based Test Design, Code complexity testing, Evaluating Test Adequacy Criteria.

UNIT - III

Levels of Testing, The Need for Levels of Testing, Unit Test, Unit Test Planning, Designing the Unit Tests, The Test Harness, Running the Unit tests and Recording results, Integration tests, Designing Integration Tests, Integration Test Planning, Scenario testing, Defect bash eliminationSystem Testing, Acceptance testing, Performance testing, Regression Testing, Internationalization testing, Ad-hoc testing, Alpha , Beta Tests, testing OO systems, Usability and Accessibility testing Configuration testing, Compatibility testing, Testing the documentation, Website testing.

UNIT - IV

Test Management, People and organizational issues in testing, organization structures for testing teams, testing services, Test Planning, Test Plan Components, Test Plan Attachments, Locating Test Items, Test management, Test process, Reporting Test Results, The Role of three groups in Test Planning and Policy Development, Introducing the test specialist, Skills needed by a test specialist Building a Testing Group.

UNIT - V

Test Automation, Software test automation, Skills needed for automation, Scope of automation, Design and architecture for automation, Requirements for a Test Tool, Challenges in automation, Test metrics and measurements, Project progress and Productivity metrics.

Course Outcomes:
After completion of this course the student should be able to:

CO1: Design test cases suitable for a software development for different domains.

CO2: Prepare test planning based on the document.

CO3: Identify suitable tests to be carried out.

CO4: Validate test plan and test cases designed.

CO5: Use of automatic testing tools.

TEXT BOOKS:

1. Ilene Burnstein, “Practical Software Testing”, Springer International Edition, 2003.

2. Srinivasan Desikan and Gopalaswamy Ramesh, “SoftwareTesting– Principles and Practices”,Pearson education, 2006.

REFERENCE BOOKS:

1. Ron Patton, “ Software Testing”, Second Edition, Sams Publishing, Pearson education, 2007
2. Renu Rajani, Pradeep Oak, “Software Testing – Effective Methods, Tools and Techniques”, Tata McGraw Hill, 2004.
3. Edward Kit, “SoftwareTesting in the Real World – Improving the Process”,
4. Pearson Education, 1995.
5. Boris Beizer, “Software Testing Techniques” – 2nd Edition, Van Nostrand Reinhold, New York, 1990.
6. Aditya P. Mathur, “Foundationsof Software Testing – Fundamental algorithms and techniques”,Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
(B20DS16) TIME SERIES DATA ANALYTICS

B.Tech : VII- Semester **L T P C**
3 0 0 3

Pre-requisites: knowledge about mathematics and programming

Course Objectives:

- To understand the basic concepts of time series data.
- Explore the different uses of time series analysis.

UNIT-I:
Introduction to Time Series and Forecasting -Different types of data-Internal structures of time series-Models for time series analysis-Autocorrelation and Partial autocorrelation.
UNIT-II:
Visualizing Data: Aesthetics and Types of Data, Scales Map Data Values onto Aesthetics, Coordinate Systems and Axes: Cartesian Coordinates, Nonlinear Axes, Directory of Visualizations, Visualizing Amounts: Bar Plots / charts, Grouped and Stacked Bars, Dot Plots and Heat maps. Using Matplotlib with Python: Introduction, plotting functions, modules and toolkits of Matplotlib.
UNIT-III:
Visualizing Distributions: Histograms and Density Plots: Visualizing a Single Distribution, Histograms, Visualizing Multiple Distributions at the Same Time, Empirical Cumulative Distribution Functions, Quantile-Quantile Plots, Visualizing Distributions Along the Vertical Axis: Boxplot, violin plot, strip charts. Visualizing Distributions Along the Horizontal Axis: ridgeline plot. Using Pandas for plotting: introduction, plotting functions, modules and extensions of pandas.
UNIT-IV:
Visualizing Proportions: pie charts, Side-by-Side Bars, stacked bars, Visualizing Proportions Separately as Parts of the Total. Visualizing Nested Proportions: Mosaic Plots and Treemaps, Nested Pies. Visualizing Associations Among Two or More Quantitative Variables: Scatter plots, Correlograms, Dimension Reduction, Paired Data. Using Seaborn for visualization: introduction, features and benefits, visualization functions.
UNIT-V:
Visualization Techniques for Time-Oriented Data: Introduction, Definitions, characterizing time-oriented data, Relating data and time, Visualizing time-oriented data, Categorization. Visualization Techniques for Trees, Graphs, and Networks: Displaying hierarchical structures, Displaying arbitrary graphs, networks, Node-link graphs, Matrix representations for graphs.
Course Outcomes: After completing this course the students will be able to
CO1: Understand Data Visualization elements, methods and tools.
CO2: Learn about different methods for Visualizing Amounts and Matplotlib.
CO3: Understand Visualization of Distributions.
CO4: Learn to Visualize Proportions and Seaborn tool for Visualization.
CO5: Gain knowledge on time-oriented, trees, graphs and network-based data visualization techniques.

TEXT BOOK

1. Master Time Series Data Processing, Visualization, And Modeling Using Python Dr. Avishek Pal Dr. Pks Prakash (2017)

VAAGDEVICOLLEGEOFENGINEERING
(AUTONOMOUS)
WEB SERVICES

B.Tech:VII- Semester **L/T/P/C**
3/0/0/3

Prerequisites: Web Technologies

Course Objectives:

- To understand the details of web services technologies like WSDL, UDDI, and SOAP.
- To learn how to implement and deploy web service client and server.
- To explore interoperability between different frameworks.

UNIT-I

Evolution and Emergence of Web Services – Evolution of distributed computing, Core distributed computing technologies — client/server, CORBA, JAVA RMI, Microsoft DCOM, MOM, Challenges in Distributed Computing, The role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA.Introduction to Web Services -The definition of web services, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services.

UNIT-II

Web Services Architecture — Web services Architecture and its characteristics, core building blocks of web services, standards and technologies available for implementing web services, web services communication models, basic steps of implementing web services. Fundamentals of SOAP — SOAP Message Structure, SOAP encoding, Encoding of different data types, SOAP message exchange models, SOAP communication and messaging, limitations of SOAP.

UNIT- III

Describing Web Services — WSDL — WSDL in the world of Web Services, Web Services life cycle, anatomy of WSDL definition document, WSDL bindings, WSDL Tools, limitations of WSD

UNIT- IV

Discovering Web Services — Service discovery, role of service discovery in a SOA, service discovery mechanisms, UDDI — UDDI registries, uses of UDDI Registry, Programming with UDDI,

UDDI data structures, Publishing API, Publishing, searching and deleting information in a UDDI Registry, limitations of UDD1.

UNIT- V

Web Services Interoperability — Means of ensuring Interoperability, Overview of .NET, Challenges in creating Web Services Interoperability

Interoperability: Web Services Security — XML security frames work, four Goals of Cryptography, XML signature, Digital Certificate, XML Encryption.

Course Outcomes:

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

CO1: Implement Web service client and server with interoperable systems like core distributed computing, J2EE, SOA, WSDL, UDDI and EBXML
CO2: Perceive and analyze the principles of SOAP.
CO3: Perceive the implement Web Services life cycle, Anatomy of WSDL definition document.
CO4: How to utilize the semantics of web services. Working with UDDI, programming with UDDI, UDDI data structures.
CO5: Explore interoperability between different frameworks. Design web based applications that use web services

TEXT BOOK:

1. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India.

REFERENCE BOOKS:

1. Java Web Service Architecture, James McGovern, Sumer Tyagi etal., Elsevier
2. Building Web Services with Java, 2 Edition, S. Graham and others, Pearson Edn.
3. Java Web Services, D.A. Chappell & T. Jewell, O'Reilly,SPD.
4. Web Services, G. Alonso, F. Casati and others, Springer. Outcomes
5. Basic details of WSDL, UDDI, SOAP
6. Implement WS client and server with interoperable systems

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(AUTONOMOUS)

MINI PROJECT &INTERNSHIP

B.Tech:VII- Semester **L/T/P/C**

0/0/0/2

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(AUTONOMOUS)

INTERNET OF THINGS LAB

B.Tech:VII- Semester **L/T/P/C**
0/0/3/1.5

Pre-requisites: Computer Networks

Course Objectives:

- To introduce the terminology, technology and its applications
- To introduce the concept of M2M (machine to machine) with necessary protocols
- To introduce the Python Scripting Language which is used in many IoT devices
- To introduce the Raspberry PI platform, that is widely used in IoT applications
- To introduce the implementation of web based services on IoT devices

IoT Lab Experiments Using Raspberry Pi3 :

Week-1

Experiment 1: Read your name and print Hello message with name using Python Programming
Experiment 2: Read two numbers and print their sum, difference, product and division using PythonProgramming
Experiment 3: Word and Characters and Space count of a given string using Python Programming **Experiment 4:** Area of a given shape (rectangle, triangle and circle) reading shape and appropriate valuesfrom a standard input using Python Programming

Week-2

Experiment 5: Print name n times where name and n are read from standard input using WHILE loopsusing Python Programming
Experiment 6: Print name n times where name and n are read from standard input using FOR loop usingPython Programming
Experiment 7: Handle Divided by Zero Exception using Python Programming
Experiment 8: Print current time for 10 times with an interval of 10 seconds using Python Programming

Week-3

Experiment 9: Read a file line by line and print the word count of each line using Python Programming
Experiment 10: LED Blinking ON/OFF using Raspberry Pi3
Experiment 11: Multiple LED Blinking ON/OFF using Raspberry Pi3**Experiment 12:** Buzzer Beep with Raspberry Pi3

Week-4

Experiment 13: IR Sensor to Detect Object using Raspberry Pi3
Experiment 14: IR Sensor to Detect Object with LED using Raspberry Pi3

Week-5

Experiment 15: PIR Sensor motion Detection using Raspberry Pi3
Experiment 16: PIR Sensor Motion Detection (Cloud Based) using Raspberry Pi3

Week-6

Experiment 17: DHT11 Temperature & Humidity Sensor using Raspberry Pi3

Experiment 18: DHT11 Temperature & Humidity Sensor (Cloud Based) using Raspberry Pi3

Week-7

Experiment 19: Temperature & Humidity of CPU Data (Cloud Based) using Raspberry Pi3

Experiment 20: Smoke Sensor using Raspberry Pi3
Experiment 21: Sound Sensor using Raspberry Pi3

Week-8

Experiment 22: Ph Sensor for detect moisture levels in soil using Raspberry Pi3

Week-9

Experiment 23: Implement an Intruder system that sends an alert to the given E-mail using Raspberry Pi

Week-10

Experiment 24: Get an alarm from a remote area (through LAN) if smoke is detected.

Week-11

Experiment 25: Control a Light source using web page.

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Week-12

Experiment 26: Switch on a relay at a given time using cron, where the relay's contact terminals areconnected to a load.

Week-13

Experiment 27: Create communication Using Raspberry pi and Telegram app

Internet of Things(IoT) Lab Experiments using TinkerCAD Simulation Software

Week1:

Experiment 1-ONE LED Blinking using Arduino and TinkerCad Simulation Software
Experiment 2-THREE LED Bulbs using Arduino and Tinkercad Simulation Software
Experiment 3 - PIR Sensor to Detect Motion of A Person using Arduino and TinkerCad SimulationSoftware

Week2:

Experiment 4- UltraSonic Sensor Find Distance from Ojbect using Arduino and TinkerCad SimulationSoftware
Experiment 5- Temperature Sensor using Arduino and TinkerCad Simulation Software
Experiment 6- Controlling servo motor with speed measured by the ultrasonic sensor with Arduino -TinkerCad

Week3:

Experiment 7 - GAS sensor using Arduino and TinkerCad Simulation Software
Experiment 8 -Ambient Light Sensor Control the Intensity of LED light using Arduino and TinkerCadSimulation Software
Experiment 9 - Servo Meter Speed Measure using Arduino and TinkerCad Simulation Software

Week4:

Experiment 10 - How to use Flex sensor using Arduino and TinkeCad Simulation Software
Experiment 11 - IR sensor To control LED bulb using Arduino and TinkerCad Simulation

Software **Experiment-12** - Home Automation using Automatic Bulb ON/OFF by PIR Sensor using Arduiono andTinerCAD Simulation Software

Week5:

Experiment-13

i) Serial Communication using Arduiono and TinerCAD Simulation Software

ii) Serial Communication using LED Bulb ON/OFF by input 1/0 using Arduiono and TinerCAD SimulationSoftware

Experiment-14

Master and Slave Communication using Two Arduino and TinkerCAD Simulation Software.

Course Outcomes:

CO-1: Improve the quality of life of humans through IoT technology for that student closer interactionbetween the experiment and the society.

CO-2: Identify the Components that forms part of IoT specific Application.

CO-3: Determine the most appropriate IoT Devices and Sensors based on IoT application.

CO-4: Improve the Python programming skills for writing IoT Application

VAAGDEVICOLLEGEOFENGINEERING

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MAJOR PROJECT PHASE-1

B.Tech:VII- Semester **L/T/P/C**

0/0/8/4

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
HUMAN VALUES AND PROFESSIONAL ETHICS

B. TECH- VII Semester **L/T/P/C**
2/0 /0 /0

Pre-requisites: None

Course Objectives:

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

UNIT I

Human Values: Morals, values, ethics – integrity – work ethics – service learning – civic virtue – respect for others – living peacefully – Caring – sharing – honesty – courage – valuing time – cooperation – commitment – empathy – self-confidence – spirituality – character.

UNIT II

Professional Ethics: Profession and professionalism – Two models of professionalism – Professional etiquette – Three types of Ethics or morality Responsibility in Engineering standards – Engineering Ethics – Positive and Negative faces.

UNIT III

Professional Responsibilities: Ethical standards Vs Professional Conduct – Zero Tolerance for Culpable Mistakes – Hazards and Risks- Risk benefit analysis-congeniality, collegiality and loyalty. Respect for authority – conflicts of interest – occupational crime.

UNIT IV

Professional Rights: Professional rights and employee rights communicating risk and public policy – Whistle blowing – Collective bargaining. Professionals /engineers as managers, advisors, experts, witnesses and consultants – moral leadership-

UNIT V

Ethics in global context: Global issues in MNCs-Problems of bribery, extortion, and grease payments – Problem of nepotism, excessive gifts.

Course Outcomes:

After the completion of this course, the students should be able to

CO-1: Perceive the importance of ethics and values in life and society.
CO-2: Develop moral responsibility and mould them as best professionals.
CO-3: Create ethical vision and achieve harmony in life.
CO-4: Provide a critical perspective on the socialization of men and women.
CO-5: Perceive the important issues related to gender in contemporary India.

TEXT BOOK:

1. Aryasri, *Human Values and Professional Ethics*, Maruthi Publications.

REFERENCE BOOKS:

1. S B George, *Human Values and Professional Ethics,* Vikas Publishing.
2. KR Govindam & Saenthil Kumar *Professional Ethics and Human Values*, AnuradhaPublications.
3. S K Chakraborthy & D Chakraborthy: *Human Values and Ethics*, Himalaya.
4. M. Govindarajan, S. Natarajan, & V.S. Senthilkumar: *Engineering Ethics (Includes HumanValues)*, HI Learning Pvt. Ltd., New Delhi -110001.

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(AUTONOMOUS)

CYBER SECURITY& ETHICAL HACKING

B.Tech:VIII- Semester **L/T/P/C**

3/0/0/3

Prerequisites: Operating System, Data Communications and Computer Networks, Network Security and Cryptography.

Course Objectives:

- To introduce the methodologies and framework of ethical hacking for enhancing the security.
- To learn about cybercrimes and how they areplanned.
- To learn the vulnerabilities of mobile and wireless devices.
- To learn about the cyber-Law and legalperspectives.

UNIT – I

Introduction to Cybercrime: Introduction, Cybercrime and Information Security, Who are Cybercriminals, Classifications of Cybercrimes, Cyber-crime: The legal Perspectives and Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes.

UNIT – II

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, Attack Vector, Cloud Computing.

UNIT – III

Cyber-crime: Mobile and Wireless devices-Trend mobility-authentication service security-Attacks on mobile phones-mobile phone security Implications for organizations-Organizational measurement for Handling mobile-Security policies and measures in mobile computing era.

UNIT – IV

Tools and Methods Used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horse and Backdoors, Steganography, DoS and DDoS attacks, SQL Injection, Buffer Overflow.

UNIT – V

Cyber Security: Organizational Implications, Introduction, Cost of Cybercrimes and IPRissues, 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.

Course Outcomes:

After the completion of this course, the students should be able to

CO1: Outline key terms and concepts in cyber law, intellectual property andcybercrimes.

CO2: Explore the vulnerabilities, threats and cybercrimes posed bycriminals.

CO3: Identify various security challenges phased by mobiledevices.

CO4: Identify various types of tools and methods used in cybercrime, develops the secure counter methods to maintain securityprotection.

CO5: Analyze the cyber security risk management policies in order to adequately protect an organization's critical information andassets.

TEXT BOOK:

1. **Cyber Security:** Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole and Sunil Belapure, Wiley INDIA.

REFERENCE BOOKS:

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

VAAGDEVICOLLEGEOFENGINEERING
(AUTONOMOUS)

Mining Massive Datasets

B.Tech:VIII- Semester **L/T/P/C**

3/0/0/3

Pre-Requisites: Data base Management Systems. Data mining

Course Objectives:

- To understand Data mining concepts and similarity search methods.
- To enable students in Data-stream processing and specialized algorithms for dealing with data that arrives so fast it must be processed immediately or lost.
- To utilize various technology of search engines, including Google's PageRank and link-spam detection.
- To get knowledge on Frequent-itemset mining, including association rule algorithms and Algorithms for clustering very large and high-dimensional datasets.
- To understand two key problems for Web applications: managing advertising and recommendation systems.

UNIT -I

Data Mining - What is Data Mining, Statistical Modeling, Machine Learning , Approaches to Modeling, Summarization, Feature Extraction, Statistical Limits on Data Mining , Total Information Awareness, Bonferroni's Principle , Things Useful to Know , Importance of Words in Documents , Hash Functions ,Indexes, Secondary Storage , The Base of Natural Logarithms **,** Distributed File Systems ,Physical Organization of Compute Nodes ,Large-Scale File-System Organization .

Finding Similar Items-Applications of Near-Neighbor Search, Jaccard Similarity of Sets, Similarity of Documents, Collaborative Filtering as a Similar-Sets Problem, similarity-Preserving Summaries of Sets, Matrix Representation of Sets , Minhashing, Minhashing and Jaccard Similarity, Minhash Signatures Distance Measures , Definition of a Distance Measure Euclidean Distances, Jaccard Distance , Cosine Distance , Edit Distance, Hamming Distance .

UNIT -II

Mining Data Streams- The Stream Data Model , A Data-Stream-Management System, Examples of Stream Sources, Stream Queries, Issues in Stream Processing , Sampling Data in a Stream, A Motivating Example, Obtaining a Representative Sample , The General Sampling Problem , Varying the Sample Size, Filtering Streams , A Motivating Example, The Bloom Filter, Analysis of Bloom Filtering, Counting Distinct Elements in a Stream , The Count-Distinct Problem , The Flajolet-Martin Algorithm , Combining Estimates, Space Requirements

UNIT – III

Link Analysis-PageRank, Early Search Engines and Term Spam , Definition of PageRank, Structure of the Web , Avoiding Dead Ends, Spider Traps and Taxation,Using PageRank in a Search Engine, Efficient Computation of PageRank , Representing Transition Matrices, PageRank Iteration Using MapReduce, Use of Combiners to Consolidate the Result Vector, Representing Blocks of the Transition Matrix , Other Efficient Approaches to PageRank Iteration Topic-Sensitive PageRank , Motivation for Topic-Sensitive Page Rank , Biased Random Walks, Using Topic-Sensitive PageRank, Inferring Topics from, Link Spam, Architecture of a Spam Farm , Analysis of a Spam Farm , Combating Link Spam , TrustRank,Spam Mass

UNIT – IV

Frequent Itemsets-The Market-Basket Model , Definition of Frequent Itemsets , Applications of Frequent Itemsets, Association Rules, Finding Association Rules with High Confidence, Handling Larger Datasets in Main Memory, The Algorithm of Park, Chen, and Yu, The Multistage Algorithm , The Multihash Algorithm , Limited-Pass Algorithms, The Simple, Randomized Algorithm , Avoiding Errors in Sampling Algorithms , The Algorithm of Savasere, Omiecinski, and Navathe , Counting Frequent Items in a Stream , Sampling Methods for Streams, Frequent Itemsets in Decaying Windows Hybrid Methods

Clustering-Hierarchical Clustering, Hierarchical Clustering in a Euclidean Space, Efficiency of Hierarchical Clustering, Alternative Rules for Controlling Hierarchical Clustering, Hierarchical Clustering in Non-Euclidean Spaces. The CURE Algorithm, Initialization in CURE, Completion of the CURE Algorithm, Clustering for Streams and Parallelism, The Stream-Computing Model, A Stream-Clustering Algorithm, Initializing Buckets, Merging Buckets, Answering Queries, Clustering in a Parallel Environment

UNIT – V

Advertising on the Web- Issues in On-Line Advertising , Advertising Opportunities, Direct Placement of Ads , Issues for Display Ads , On-Line Algorithms , On-Line and Off-Line Algorithms , Greedy Algorithms , The Competitive Ratio , The Matching Problem , Matches and Perfect Matches, The Greedy Algorithm for Maximal Matching , Competitive Ratio for Greedy Matching , The Adwords Problem, History of Search Advertising , Definition of the Adwords Problem ,The Greedy Approach to the Adwords Problem , The Balance Algorithm , A Lower Bound on Competitive Ratio for Balance The Balance Algorithm with Many Bidders , The Generalized Balance Algorithm , Final Observations About the Adwords Problem

Recommendation Systems- A Model for Recommendation Systems , The Utility Matrix , The Long Tail , Applications of Recommendation Systems , Populating the Utility Matrix ,Content-Based Recommendations , Item Profiles, Discovering Features of Documents , Obtaining Item Features From Tags , Representing Item Profiles, User Profiles, Recommending Items to Users Based on Content ,classification Algorithms

Course Outcomes:

After the completion of this course, the students should be able to

CO-1: Introduce data mining concepts and develops understanding of data mining application.

CO-2: Develop an understanding of data warehouse, designing and using data in data warehouse using various operations.

CO-3: Develop an outlook of Association rule mining, association rule mining methods and their application on some sample data sets, evaluate these methods based on need.

CO-4: Develop an understanding of classification and prediction, classification methods and their application on some sample data sets, evaluate these methods based on need.

CO-5: Develop conceptual understanding of clustering, various clustering methods and their application on some sample data sets, evaluate these methods based on need.

TEXT BOOK: Mining of Massive Datasets by Jure Leskovec Stanford Univ. Anand Rajaraman Milliway Labs Jeffrey D. Ullman Stanford Univ.cambridge University press

REFERENCEBOOKS:

1. Data Mining – Concepts and Techniques - Jiawei Han & Micheline Kamber, Morgan Kaufmann Publishers, Elsevier ,2nd Edition, 2006.
2. Data Mining Techniques – Arun K Pujari,2nd edition, Universities Press.
3. Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson education.

VAAGDEVICOLLEGEOFENGINEERING
(AUTONOMOUS)
SOCIAL NETWORK ANALYSIS

B.Tech:VIII- Semester **L/T/P/C**

3/0/0/3

Pre-Requisites: Database Management System, Data Warehousing and Data Mining.

Course Objectives:

- Learn the Semantic Web and Social Networks in detail.
- Able to learn technology used in XML.
- Learn the models and case studies used in social Network data.

UNIT-1

The Semantic Web and Social Networks: The Semantic Web, The semantic solution, Key concepts of the Semantic Web, Development of the Semantic Web, The emergence of the social web, Social Network Analysis, What is network analysis, Development of Social Network Analysis, Key concepts in network analysis, The global structure of networks, The macro-structure of social networks, Personal networks .

UNIT-II

Semantic Technology for Social Network Analysis**:** Electronic sources for network analysis, Electronic discussion networks, Blogs and online communities, Web-based networks. Ontology-based Knowledge Representation: The Resource Description Framework (RDF) and RDF Schema, RDF and the notion of semantics . The Web Ontology Language (OWL), Comparison to the Unified Modelling Language (UML), Comparison to the Entity/Relationship (E/R) model and the relational model, Comparison to the Extensible Markup Language (XML) and XML Schema 8

UNIT-III

Modelling and aggregating social network data, State-of-the-art in network data representation, Ontological representation of social individuals, Ontological representation of social relationships, Conceptual model, Aggregating and reasoning with social network data, Representing identity On the notion of equality . Determining equality, Reasoning with instance equality, Evaluating smushing.

UNIT-IV

Implementation of the method, Developing Semantic Web applications with social network features, Sesame, Elmo, GraphUtil , Flink. The features of Flink, System design, openacademia. The features of openacademia . System design .

UNIT-V

Case Studies: Evaluating electronic data extraction for network analysis, Semantic-based Social Network Analysis in the sciences, Methodology, Data acquisition, Representation, storage and reasoning, Visualization and Analysis. Electronic data for network analysis, Results, Descriptive analysis . Structural and cognitive effects on scientific performance

Course Outcomes:

After the completion of this course, the students should be able to:

CO-1: Understand the definition of Semantic Web and Social Networks.
CO-2: Apply the technology for Social Network Analysis.
CO-3: Analyze the models, aggregate and evaluate the social network data.
CO-4: Implement and develop methods in semantic web applications.
CO-5: Create case study on data extraction for network analysis.

TEXT BOOK:

1.social networks and the semantic web, peter mika, springer.

REFERENCE BOOKS:

1.Semantic Web Technologies, Trends and Research in Ontology Based Systems, J. Davies, Rudi Studer, Paul Warren, John Wiley & Sons.
2. Semantic Web and Semantic Web Services -Liyang Lu Chapman and Hall/CRC Publishers,(Taylor & Francis Group)

VAAGDEVICOLLEGEOFENGINEERING
(AUTONOMOUS)
BLOCK CHAIN TECHNOLOGIES

B.Tech:VIII- Semester **L/T/P/C**
3/0/0/3

Course Objectives:
The objective of this course is to introduce blockchain technology, its history, development and usage with required fundamentals and in the light of blockchain applications.

UNIT I:
Blockchain 101:Distributed systems, the history of blockchain, introduction to blockchain, Features of blockchain, Applications of blockchain technology, tiers of blockchain technology, types of blockchain, CAP theorem and blockchain, benefits and limitations of blockchain (pages 1-34**),** Decentralization using blockchain, methods of decentralization (pages 34-39)

UNIT II:
Cryptographic primitives, asymmetric cryptography, public and private keys, cryptographic primitives hash functions, elliptic curve digital signature algorithm (ECDSA)(56-105)

UNIT III:
BIT COIN: Bitcoin, transactions, blockchain, the bitcoin network wallets (111-148)
Alternatives to Proof of work, difficulty adjustment and retargeting algorithms, bitcoin limitations.(163-176), Smart contracts(198-210),

UNIT IV Introducing solidity (297-308), introducing Web3, (309-353)

UNIT V: Hyperledger: projects, Hyperledger as a protocol, Fabric Hyperledger fabric (355-369) Scalability and other challenges: scalability, privacy, security (443-459).

Course Outcomes:
After the completion of this course the students should be able to
CO1: Introduce the fundamentals of blockchain, history, technology and decentralization.
CO2: Revise cryptographic concepts and its use in blockchain.
CO3: Define bitcoin and understand structure of blockchain, alternatives to proof of work.
CO4: Introduce smart contracts, solidity and Web3 to implement blockchain
CO5: Understand applications of blockchain and its challenges

Text book:
1.Mastering Blockchain, March 2017,byimranbasher,packt publishing.

References:

1 Joseph Bonneau et al, SoK: Research perspectives and challenges for Bitcoin and cryptocurrency, IEEE Symposium on security and Privacy, 2015 (article available for free download) { curtain raiser kind of generic article, written by seasoned experts and pioneers}.
2. J.A.Garay et al, The bitcoin backbone protocol - analysis and applications EUROCRYPT 2015 LNCS VOl 9057, (VOLII), pp 281-310. (Also available at eprint.iacr.org/2016/1048). (serious beginning of discussions related to formal models for bitcoin protocols).
3. R.Pass et al, Analysis of Blockchain protocol in Asynchronous networks , EUROCRYPT 2017, (eprint.iacr.org/2016/454) . A significant progress and consolidation of several principles).

4. R.Pass et al, Fruitchain, a fair blockchain, PODC 2017 (eprint.iacr.org/2016/916).
5. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller, and Steven Goldfeder. Bitcoin and cryptocurrency technologies: a comprehensive introduction. Princeton University Press, 2016. (Free download available)

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
WEB AND GRAPH MINING

B.Tech : VIII- Semester : **L T P C**
3 0 0 3

Pre-requisites: Data Mining
Course Objectives:

- To describe web mining and understand the need for web mining
- To differentiate between Web mining and data mining
- To understand the different application areas for web mining
- To learn the different fundamentals of graph data
- To understand the different operations on graph data

UNIT – I :
Introduction – What is World Wide Web (WWW), A Brief History of the Web and the Internet, Web Data Mining-Data Mining, Web Mining (Chapter 1). Web Mining: Information Retrieval and Web Search: Basic Concepts of Information Retrieval, Information Retrieval Methods – Boolean Model, Vector Space Model and Statistical Language Model, Relevance Feedback, Evaluation Measures, Text and Web Page Preprocessing – Stopword Removal, Stemming, Web Page Preprocessing, Duplicate Detection, Inverted Index and Its Compression – Inverted Index, Search using Inverted Index, Index Construction, Index Compression, Latent Semantic Indexing – Singular Value Decomposition, Query and Retrieval. (Chapter 6)

UNIT –II :
Web Search: Meta-Search: Combining Multiple Rankings, Combination Using Similarity Scores, Combination Using Rank Positions. Web Spamming: Content Spamming, Link Spamming. Hiding Techniques: Combating Spam.(Chapter 6) PageRank: PageRank Algorithm, Strengths and Weaknesses of PageRank. Timed PageRank and Recency Search. HITS: HITS Algorithm, Finding Other Eigenvectors, Relationships with Co-Citation and Bibliographic, Coupling, Strengths and Weaknesses of HITS.(Chapter 7).

UNIT –III :
Web Crawling: A Basic Crawler Algorithm, Breadth-First Crawlers, Preferential Crawlers Implementation Issues:Fetching,Parsing, Link Extraction and Canonicalization,Spider Traps Page Repository, Concurrency, Universal Crawlers, Scalability, Coverage vs Freshness vs Importance, Focused Crawlers, Topical Crawlers, Topical Locality and Cues . Best-First Variations . Adaptation. Evaluation. Crawler Ethics and Conflicts. (Chapter 8)

UNIT –IV :
Graph Data Management and Mining: Introduction, Graph Data Management Algorithms, Indexing and Query Processing Techniques, Reachability Queries, Graph Matching. Graph Mining Algorithms: Pattern Mining in Graphs, Clustering Algorithms for Graph Data, Classification Algorithms for Graph Data. Graph Applications: Web Applications.

UNIT –V :
Query Language and Access Methods for Graph Databases: Introduction: Graphs-at-a-time Queries. Graph Specific Optimizations, GraphQL, Operations on Graph Structures, Concatenation, Disjunction, Repetition. Graph Query Language, Data Model, Graph Patterns Graph Algebra, FLWR Expressions, Expressive Power ,Implementation of the Selection Operator, Graph Pattern Matching, Local Pruning and Retrieval of Feasible Mates,Joint Reduction of Search

Space, Optimization of Search Order.

Course Outcomes: After completing this course the students will be able to
CO1: Understand the fundamentals of web data mining.
CO2: Learn the concepts related to web search..
CO3: Understand the concepts of web crawling
CO4: Learn the concepts of graph data management and mining.
CO5: Understand the Query Language implementation on graph database

TEXT BOOK

1. Web Data Mining: Exploring Hyperlinks, Contents, and Usage Data by Bing Liu (Springer Publications)
2. Managing and Mining Graph Data .Charu C. Aggarwal, Haixun Wang. Springer

REFERENCE BOOKS

3. Web Mining:: Applications and Techniques by Anthony Scime
4. Mining the Web: Discovering Knowledge from Hypertext Data by Soumen Chakrabarti
5. Mining Graph Data. Diane J. Cook, Lawrence B. Holder. Wiley

VAAGDEVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

DATA PRIVACY & SECURITY

(PROFESSIONAL ELECTIVE – VI)

B. TECH- VIII Semester **L/T/P/C**

3/0 /0 /3

Pre requisites: Data Communications and Computer Networks.

Course Objectives:

- To explain the various types of Substitution ciphers.
- To illustrate various techniques to break the ciphers and understands transposition techniques.
- To define the contrast block cipher and stream cipher algorithms.
- To describe asymmetric key cryptographic algorithms and understand key management in public key cryptography.
- To discuss the steganography techniques to hide the data in text and images.

UNIT-I

Introduction: Basic Concepts, The Caesar Cipher, The Affine Cipher, The One-Time Pad, Kerckhoffs' Principle. **Data Encryption**: **Monoalphabetic Substitution Ciphers** -Letter Distributions, Breaking a Monoalphabetic Cipher, The Pigpen Cipher, Polybius's Monoalphabetic Cipher, Extended Monoalphabetic Ciphers, The Playfair Cipher, Homophonic Substitution Ciphers.

UNIT -II

Transposition Ciphers-Simple Examples, Cyclic Notation and Keys, Transposition by Turning Template, Columnar Transposition Cipher, Double Transposition, A 2-Step ADFGVX Cipher, An Approach to Decryption. **Polyalphabetic Substitution Ciphers**-Self-Reciprocal Ciphers, The Porta Polyalphabetic Cipher, The Beaufort Cipher, The Trithemius Cipher, The Vigenere Cipher, Breaking the Vigenere Cipher, Long Keys, A Variation on Vigenere, The Gronsfeld Cipher, Generating Permutations, The Eyraud Cipher The Hill Cipher, The Jefferson Multiplex Cipher, Strip Ciphers, Polyphonic Ciphers and Ambiguity Polybius's Polyalphabetic Cipher.

UNIT -III

Stream Ciphers-Symmetric Key and Public Key, Stream Ciphers, Linear Shift Registers, Cellular Automata, Nonlinear Shift Registers, Other Stream Ciphers, Dynamic Substitution, The Latin Square Combiner, SEAL Stream Cipher, RC4 Stream Cipher, **Block Ciphers**-Block Ciphers, Lucifer, The Data Encryption Standard, Blowfish, IDEA,RC5, Rijndael.

UNIT -IV

Public-Key Cryptography -Diffie-HeIlman-Merkle Keys, Public-Key Cryptography, RSA Cryptography Rabin Public-Key Method, El Gamal Public-Key Method, Pretty Good Privacy, Sharing Secrets: Threshold Schemes, The Four Components, Authentication, Elliptic Curve Cryptography.

UNIT -V

Data Hiding in Text-Basic Features, Applications of Data Hiding, Watermarking, Intuitive Methods Simple Digital Methods, Data Hiding in Text, Innocuous, Mimic Functions. **Data Hiding in Images**-LSB Encoding, BPCS Steganography, Lossless Data Hiding, Spread Spectrum Steganography, Data Hiding by Quantization, Patchwork, Signature Casting in Images, Transform Domain Methods, Robust Data Hiding in JPEG Images, Robust Frequency Domain Watermarking, Detecting Malicious Tampering, Wavelet Methods, Kundur-Hatzinakos Watermarking-I, Kundur-Hatzinakos Watermarking-II, Data Hiding in Binary Images, The Zhao-Koch Method, The Wu-Lee Method, The CPT Method, The TP Method, Data Hiding in Fax Images.

Course Outcomes:

After the completion of this course, the students should be able to

CO-1: Understands various types of Substitution ciphers.

CO-2: Explore various techniques to break the ciphers and understands transposition techniques.

CO-3: Compare and contrast block cipher and stream cipher algorithms.

CO-4:Implementation of asymmetric key cryptographic algorithms and understand key management in public key cryptography.

CO5: Explore different types of steganography techniques to hide the data in text and images.

TEXT BOOK:

1. Data Privacy and Security**,** David Salomon (Springer Professional Computing) 2003rd Edition, Kindle Edition.

REFERENCE BOOK:

1. Cryptography and Network Security - Principles and Practice: William Stallings, Pearson Education, 6th Edition

VAAGDEVICOLLEGEOFENGINEERING

(AUTONOMOUS)

TECHNICAL SEMINAR

B.Tech:VIII- Semester **L/T/P/C**

3/0/0/3

VAAGDEVICOLLEGEOFENGINEERING

(AUTONOMOUS)

MAJOR PROJECT PHASE –II

B.Tech:VIII- Semester **L/T/P/C**

3/0/0/3

DISASTER PREPAREDNESS & PLANNING MANAGEMENT
(OPEN ELECTIVE – CIVIL ENGINEERING)

B.Tech –EEE, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre-Requisites–No prerequisites are needed for enrolling into the course

Course Objectives:

- To Know about the state of art of disaster management in world
- To Study the various natural disasters and its mitigation measures
- To understand human induced Hazards and its case studies
- To impart knowledge on remote sensing and GIS
- To expose students to various technologies used for disaster mitigation and management.

UNIT – I : Introduction

Hazard, vulnerability and risk, Types of disasters, Disaster management cycle, role of civil engineers in disaster management, Progress of disaster management in world, vulnerability profile of India, Disaster management act, Disaster management in India

UNIT – II : Natural Disasters

Hydro - meteorological based disasters –Tropical cyclones, floods, drought and desertification zones, Geographical based disasters – Earthquake, Tsunamis, Landslides and avalanches – Causes, Types, effects and Mitigation measures, coastal zone management

UNIT – III : Human induced hazards

Human induced hazards: chemical industrial hazards, major power breakdowns, traffic accidents, etc. Case studies

UNIT - IV: Remote sensing and GIS for Disaster Management

Introduction to remote sensing and GIS, its applications in disaster mitigation and management, case studies

UNIT - V: Disaster Management

Risk assessment and hazard mapping –mitigation and management options – warning and forecasting

Course Outcomes

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

CO 1: Attain knowledge on various types, stages, phases in disaster management
CO 2: Recognize various types of natural disaster, Mitigation and Management Systems
CO 3: Know the different types of manmade disasters and its effects
CO 4: Explain Remote sensing technology and GIS in disaster mitigation and management.
CO 5: Know the concepts of risk, warning and forecasting methods in disaster management

TEXT BOOKS:

1. Pradeep Sahni, "Disaster Risk Reduction in South Asia", Prentice Hall, First Edition, 2003
2. Singh B.K., "Handbook of Disaster Management: Techniques & Guidelines", Rajat Publication, 2008
3. Ghosh G.K., "Disaster Management", APH Publishing Corporation, First Edition, 2011

REFERENCE BOOKS:

1. Rajib, S and Krishna Murthy, R.R. "Disaster Management Global Challenges andLocal Solutions", Universities Press, First Edition, 2012
2. Navele, P & Raja, C.K., "Earth and Atmospheric Disasters Management, Natural and Manmade", B.S. Publications, First Edition, 2019
3. Tushar Battacharya., "Disaster Science and Management", Tata McGraw Hill Company, 2012

Online Resources:

1. https://nptel.ac.in/courses/105/104/105104183/
2. https://nptel.ac.in/courses/124/107/124107010/

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ENVIRONMENTAL MANAGEMENT
(OPEN ELECTIVE – CIVIL ENGINEERING)

B.Tech –EEE, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre Requisites –No prerequisites are needed for enrolling into the course

Course Objectives:
- To introduce the environmental management policies and legal aspects in India
- To study the various steps involved in Environment management system standard
- To understand the importance of Environmental Impact Assessment
- To know about the environment management plan
- To know about the Environmental management techniques and control measure

UNIT – I : Introduction to Environmental Management
Scope and nature of Environment Management - its need and brief discussion on the ethical, legal and financial reasons for Environment Management, the framework and approach to develop Environment management system, Policies and legal aspect in India

UNIT – II : Environment management system (EMS) standard
Guideline to implement effective Environment management system, core element of EMS, EMS standard: ISO 14000, its evolution, principle and specification, benefit of EMS. Planning and its implementation, Comparison of other standards with ISO 14000

UNIT – III : Environmental Impact Assessment
EIA definition, its need and principle, scoping, screening and the baseline condition, different methodologies, Impact identification and decision making, EIA case studies in India

UNIT - IV : Environment management plan
Planning and identification of baseline condition and impact, monitoring and evaluation of risk, mitigation plan, legislation and environmental audit, disaster management plan, Life cycle assessment and risk analysis

UNIT – V : Environmental management techniques and control measure
Environmental monitoring, modelling and risk assessment, Implementation of sustainable design, control measure for different environment pollution such as air pollution, water pollution, soil and noise pollution

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

CO1 : Comprehend the need for Environmental Management
CO2 : Identify the attributes of Environment Management system and standards
CO3 : Apply different methodologies for impact assessment
CO4 : To understand the various Environment management plan
CO5 : Identify the techniques and control measures for Environment management

TEXT BOOKS:

1. John Pallister ., Environmental Management, Oxford University Press,2nd Edition,2017
2. Ajith Sankar., Environmental Management, Oxford University Press, First Edition, 2015
3. Krishnamoorthy Bala., Environmental Management, PHI Learning,3rd Edition,2017

REFERENCE BOOKS:

1. V Murali Krishna, Valli Manickam., Environmental Management, ELSEVIER, 1stEdition, 2017
2. Jacob Thomas ., Environmental Management, Pearson Education India.1st Edition,2014
3. M.C. Dash., Concepts of Environmental Management for Sustainable Development, Dreamtech Press &Wiley, First Edition, 2019

Online Resources:

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

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

URBAN PLANNING
(OPEN ELECTIVE – CIVIL ENGINEERING)

B.Tech –EEE, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre Requisites –No prerequisites are needed for enrolling into the course

Course Objectives:
- To introduce the history of town planning and its importance
- To study the various steps involved in urban planning and its methods
- To know the importance of housing development
- To understand the importance of public transport and non-motorized transport.
- To introduce the concept of smart cities in India

UNIT – I : Introduction
History of Town Planning - Definitions and Objectives of Planning - Examples of planned and unplanned cities - Retrofitting medieval towns and existing cities - Healthy city planning

UNIT – II : Basic Planning Methods
Base map preparation - survey techniques - Analytical methods - region classification -
Demographic methods - population forecasting - Introduction of Remote sensing, GIS and GPS in urban planning context - Regional planning

UNIT – III : Housing Development
Policies and schemes - Housing typologies - Housing for the poor and elderly - Housing finance options – under privileged population management - Planning and management of local streets, water supply and storm water drainage - municipal solid waste management systems - new possibilities for recycling.

UNIT – IV : Transport and Mobility
Costs of congestion - Public and Para-transit modes (taxis and autos) - Feeder systems for the use of public transport - non-motorized transport facilities - cycling and walking infrastructure – Integrated public transport

UNIT – V: Smart Cities
Smart city developments across the world - Specific priorities for Smart Cities in India – Leveraging recent technologies in enhancing urban living: internet of things (IoT) - Recreation - Renewable energy - green corridors, green space and green buildings - Safety and security of urban population.

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

CO1 : Describe the importance of proper urban planning for a healthy city
CO2 : Apply basic methods for urban planning
CO3 : Describe housing development schemes
CO4 : Design public transport and non-motorized transport facilities for a city
CO5 : Describe smart city developments in India and abroad and its various elements

TEXT BOOK:

1. Peter Hall, Mark Tewdwr-Jones, Urban and Regional Planning. Taylor & Francis, 6th Edition, 2019
2. Joy Sen., Sustainable Urban Planning. The Energy and Resources Institute, New Delhi, 2013 Edition, 2013
3. Rao M. P., Urban Planning Theory And Practice, CBS Publishers,Revised Edition, 2019

REFERENCE BOOKS:

1. Peter Hall, Cities of Tomorrow: An Intellectual History of Urban Planning and Design Since 1880, Wiley-Blackwell, 4th Edition, 2014
2. Randall Crane and Rachel Weber, The Oxford Handbook of Urban Planning. Oxford University Press, 2012
3. Amiya Kumar Das., Urban Planning in India, Rawat Pubns,First Edition 2007

Online Resources:

1. https://nptel.ac.in/courses/124/107/124107158/

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ELECTRICAL POWER UTILISATION AND SAFETY
(OPEN ELECTIVE – ELECTRICAL AND ELECTRONICS ENGINEERING)

B.Tech –CIVIL, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Prerequisites: None

Course Objectives:

- To provide information of importance various parameters in electrical system.
- To analyze and design illumination scheme, electrification, earthing system and protection system for anapplication.

Unit-I:

Electric Heating and Welding Advantages of electric heating, resistance heating, types of furnaces, induction heating, types of induction furnaces, dielectric heating, types of welding- arc and resistance

Unit-II:

IlluminationScheme Basic terms used in illumination scheme, Electric lamps, Recommended levels of illumination, types of lighting schemes, design of lighting schemes, factory lighting, street lighting, flood lighting

Unit-III:

Electrical Installation, Estimating andCosting Types of loads, Load assessment, Electrical supply systems, wiring systems, Permissible voltage drops and conductor size calculations, Estimating and costing for residential and commercial service connections (single phase and three phase)

Unit-IV:

Power Factor Effects of power factor, causes of low power factor, disadvantages of low power factor, methods of improving power factor, most economical power factor.

Unit-V:

Electrical Safety, Earthing System and Protective Devices Electrical shock mechanisms, factors influencing the electric shock, body current thresholds (tolerable body current limit), thevenin's concepts and accidental equivalent circuits (step and touch potentials), protection against electric shock, purpose of earthing, IS rules for earthing of electrical installations, factors governing the resistance of earth electrode, methods of earthing, measurement of earth resistance, methods of reducing earth resistance, fuse, miniature circuit breakers (MCB) and earth leakage circuit breakers (ELCB).

Text Books:

1. E. Openshaw Taylor, Utilisation of Electrical Energy, Universities Press.
2. H. Partab, Art and Science of Utilisation of Electrical Energy, Dhanpat Rai & Co.
3. J. B. Gupta, Utilization of Electric Power and Electric Traction, S. K. Kataria & Sons, New Delhi.
4. G. C. Garg, Utilization of Electric Power and Electric Traction, Khanna Publishers, Delhi.
5. R. K. Rajput, Utilisation of Electrical Power, Laxmi Publications (P) Ltd., New Delhi.

References:

1. N. V. Suyranarayana, Utilisation of Electric Power Including Electric Drives and Electric Traction,NewAge Publishers, New Delhi.
2. J. B. Gupta, A Course in Electrical Installation Estimating and Costing, S. K. Kataria & Sons, NewDelhi.
3. Dr. J. G. Jamnani, Elements of Electrical Design, Mahajan Publishing House

Course outcomes:

On successful completion of this course, students are able to:

CO1: Know about the electric heating and welding

CO2: Gain the knowledge on illumination system.

CO3: Understand the electrical installation, estimation and costing.

CO4: Understand the importance of power factor.

CO5: Gain the knowledge on safety and protection.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

CONCEPTS OF CONTROL SYSTEMS
(OPEN ELECTIVE – ELECTRICAL AND ELECTRONICS ENGINEERING)

B.Tech –CIVIL, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Prerequisites: None

Course Objectives:

- To understand the different ways of system representations such as Transfer functionrepresentation and state space representations and to assess the system dynamic response.
- To assess the system performance using time domain analysis and methods for improving it.

Unit-I:

Basic concepts of control system: Terminology - plant, process, system, disturbances, controlled variable, manipulated variable etc., Block diagram of basic control system, application areas with examples. Classifications of control systems, Concept of superposition for linear systems with examples.

Unit-II:

Mathematical modelling of systems: Translational and rotational mechanical systems, electrical systems, Force voltage and force current analogy, Position servo mechanism. Block diagram and signal flow graph representation of physical systems along with rules, properties, comparison and limitation, Mason's gain formula.

Unit-III:

Time response analysis: Standard test signals along with examples of their usage, steady state errors for step, ramp and parabolic inputs, analysis of first and second order systems, Transient response specifications with numerical examples, Basic control actions and two position, proportional, PI, PID and rate feedback controllers, Limitations of time domain analysis.

Unit-IV:

Frequency response analysis: Need of frequency response analysis, Sinusoidal response of linear system, methods used in frequency response, Frequency domain specifications.

Unit-V:

Stability: Concept of stability, types of stability, Routh's stability criterion, special cases with numerical examples, stability of closed loop system, concept of root locus, open loop and closed loop transfer poles, step by step procedure for root loci, numerical examples.

Text Books:

1. Katsuhiko Ogata, Modern control theory, Pearson Education International, Fifth edition.
2. Norman S Nise, Control system engineering, John Wiley & Sons, Inc., Sixth edition
3. Richard C. Dorf, Robert H Bishop, Modern control systems, Pearson Education International,Twelfth edition.

References:
1. Farid Golnaraghi, Benjamin C Kuo, Automatic control systems, John Wiley & Sons, Inc.,Nineth edition
2. J.Nagrath and M.Gopal,Control System Engineering, New Age International Publishers,5th Edition, 2007

Course Outcomes:
On successful completion of this course, students are able to:
CO1: Understand the basic concept control systems.
CO2: Know the mathematical model of the systems.
CO3: Estimate the time domain specifications and steady state error.
CO4: Know the frequency response analysis.
CO5: Understand concept of stability.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

RENEWABLE ENERGY SOURCES
(OPEN ELECTIVE – ELECTRICAL AND ELECTRONICS ENGINEERING)

B.Tech –CIVIL, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Prerequisites: None

Course Objectives:

- To introduce to the technology of renewable sources of energy.
- To learn about the solar radiation, its applications and radiation measuring instruments.
- To study the Geothermal biomass energy resources, biomass systems.
- To learn the methods of energy extraction from the wind and oceans.

Unit-I:

Global and National Energy Scenario: Over view of conventional & renewable energy sources, need, potential &development of renewable energy sources, types of renewable energy systems, Future of Energy Use, Global and Indian Energy scenario, Energy for sustainable development, renewable electricity and key elements, Global climate change, CO2 reduction potential of renewable energy- concept of Hybrid systems

Unit–II:

Solar Energy: Solar energy system, Solar Radiation, Availability, Measurement and Estimation, Solar Thermal Conversion Devices and Storage, Solar-Electrical Power Generation, general Solar Photo Voltaic (SVP) system, Different configurations, SPV system components and their characteristics, Stand-Alone and Grid Connected SPV systems, other Miscellaneous Applications of Solar Energy.

Unit–III:

Wind Energy: Wind Energy Conversion, Potential, Nature of the wind, Wind Data and Energy Estimation, Site selection, Types of wind turbines, Wind farms, Wind Generation and Control., classification of wind, characteristics, offshore wind energy – Hybrid systems, wind energy potential and installation in India

Unit -IV:

Hydel and Tidal Power Systems: Basic working principle, Classification of hydel systems: Large, small, micro – measurement of head and flow – Energy equation – Types of turbines – Numerical problems. Tidal power – Basics – Kinetic energy equation – Numerical problems – Wave power – Basics – Kinetic energy equation.

Unit- V:

Bio-Mass, Geothermal& Ocean Energy: Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I. C. Engine operation and economic aspects. Geothermal Energy: Resources, types of wells, methods of harnessing the energy, potential in India. Ocean Energy: OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles.

Text Books:

1. Godfrey Boyle, Renewable Energy,Oxford university, press, 3rd edition, 2013.

2. Ahmed and Zobaa, Ramesh C Bansal, Handbook of renewable technology World scientific, Singapore.
3. Ramesh & Kumar, Renewable Energy Technologies, Narosa.
4. Chetong Singh Solanki, Renewable energy technologies – A practical guide for beginners –, PHI.

References:

1. B.H. Khan, Non-conventional energy source TMH-2nd edition.
2. Karlsson, Kenneth Bernard; Skytte, Klaus Morthorst, Integrated energy systems modeling, DTU International Energy Report 2015.

Course outcomes:

On successful completion of this course, students are able to:
CO1: Know about the global and national energy scenario.
CO2: Understand the concept of solar energy.
CO3: Know the basics of wind energy.
CO4: Differentiate the hydel and tidal power plants.
CO5: Explore the bio-mass, geothermal and ocean energy.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

NON-CONVENTIONAL ENERGY SOURCES
(OPEN ELECTIVE – MECHANICAL ENGINEERING)

B.Tech –CIVIL, EEE, ECE, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Prerequisite – Nil

COURSE OBJECTIVES:

- Introduce to the technology of renewable sources of energy
- Learn about the solar radiation, its applications and radiation measuring instruments
- Learn about the various types of geothermal resources and its applications
- Study the biomass energy resources, bio-mass systems.
- Learn the methods of energy extraction from the wind and oceans 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, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT – II

SOLAR ENERGY COLLECTION:

Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

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.

UNIT – III

WIND ENERGY: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria.

BIO-MASS: Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Biogas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C. Engine operation and economic aspects.

UNIT – IV

GEOTHERMAL ENERGY: Resources, types of wells, methods of harnessing the energy, Potential 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 and principles of DEC. Thermoelectric generators, see beck, pettier and joule Thomson effects, Figure of merit, materials, applications, MHD generators, principles, dissociation and ionization, hall effect, magnetic flux, MHD accelerator, MHD Engine, power generation systems, electron gas dynamic conversion, economic aspects. Fuel cells, principles, faraday's law's, thermodynamic aspects, selection of fuels and operating conditions.

COURSE OUTCOMES:

The students will be able to

CO1 Apply the technology to capture the energy from the renewable sources like sun, Wind,ocean, biomass, geothermal.

CO2 Use different renewable energy sources to produce electrical power minimize the use ofconventional energy sources to produce electrical energy

CO3 Identify the fact that the conventional energy resources are depleted

CO4 Understand direct energy conversion

CO5 Learn different methods in solar energy system.

TEXTBOOKS:

1. Non-Conventional Energy Sources /G.D. Rai
2. Renewable Energy Technologies /Ramesh & Kumar /Narosa

REFERENCE BOOKS:

1. Renewable energy resources/ Tiwari and Ghosal/ Narosa.
2. Non-Conventional Energy / Ashok V Desai /Wiley Eastern.
3. Non-Conventional Energy Systems / K Mittal /Wheeler
4. Solar Energy /Sukhame

ONLINE RESOURCES:

1. NPTEL Course: Non-Conventional Energy Resources by Dr. Prathap Haridoss, IIT Madras.

Link: https://nptel.ac.in/courses/121/106/121106014/

2. NPTEL Course: Non-Conventional Energy Systems by Prof. L. Umanand, IISc Bangalore.

Link: https://nptel.ac.in/courses/108/108/108108078/

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ROBOTICS
(OPEN ELECTIVE – MECHANICAL ENGINEERING)

B.Tech –CIVIL, EEE, ECE, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Prerequisite – Nil

COURSE OBJECTIVES:

- Students will be able to understand the concepts of robotics – classification by coordinate system and control system.
- Students will be able to determine the degrees of freedom, end effectors, electric hydraulic and pneumatic devices.
- Students will possess the concepts of homogeneous transformations.
- Student will understand the Jacobean problems, Newton – Euler transmations.
- Students will know about the actuators and feedback components, resolvers, encoders - velocity sensors.
- Students will be able to know the applications of robots in manufacturing.

UNIT – I

INTRODUCTION

Automation and Robotics – An over view of Robotics – classification by coordinate system and control systems – Components of Industrial Robotics: Degrees of freedom – End effectors: Types of grippers: Mechanical, Magnetic, Vacuum cup – General considerations on gripper selection and design.

UNIT – II

MOTION ANALYSIS

Basic rotation matrices – Composite rotation matrices – Euler Angles – Equivalent Angle and Axis – Homogeneous transformation – Problems.

Manipulator Kinematics: D.H.Notation– Joint coordinates and world coordinates – Forward and inverse kinematics – problems.

Differential Kinematics: Differential kinematics of planar and spherical manipulators – Jacobians – Problems.

UNIT – III

ROBOT DYNAMICS

Lagrange – Euler formulations – Newton – Euler formulations – Problems on planar two link manipulators.

UNIT – IV

TRAJECTORY PLANNING

Joint space scheme – cubic polynomial fit – Avoidance of obstacles – Types of motion – Slew motion – Joint interpolated motion – straight line motion – problems.

UNIT – V

ROBOT ACTUATORS AND FED BACK COMPONENTS

Actuators: Pneumatic and Hydraulic actuators. Electric Actuators: DC servo motors – stepper motors. Feedback components: position sensors – potentiometers, resolvers and encoders – Velocity sensors – Tactile sensors.

Robot Application in Manufacturing: Material handling – Assembly and Inspection.

COURSE OUTCOMES:

The students will be able to

CO1 Apply the knowledge of robotics in real time human life applications.
CO2 Analyse the concept of CAD/CAM and automation to the robotics.
CO3 Compare knowledge of robot applications in manufacturing like, material handling, loading and unloading etc.
CO4 Experiment the robotics to the spot and continuous arc welding and spray painting.
CO5 Relate the Robot Application in Manufacturing.

TEXTBOOKS:

1. Groover M P, "Industrial Robotics", Pearson Edu., 2012 1st Edition, ISBN Number: 0070265097, 9780070265097, 978-0070265097.
2. JJ Craig, "Introduction to Robotic Mechanics and Control", Pearson, 2008 3rd edition. ISBN-13: 978-0201543612

REFERENCE BOOKS:

1. Fu K S, "Robotics", McGraw Hill, 1st Ed., 2008, ISBN 13: 9780070226258.
2. Richard D.Klafter, "Robotic Engineering", Prentice Hall, 1st Ed., 1989, ISBN-13: 9780137820535.

ONLINE RESOURCES:

1. NPTEL Course: Introduction to Robotics by Dr. Balaraman Ravindran, IIT Madras. Link: https://nptel.ac.in/courses/107/106/107106090/
2. NPTEL Course: Introduction to Robotics by Prof. Ashish Dutta, IIT Kanpur. Link: https://nptel.ac.in/courses/112/104/112104298/
3. http://www.robogrok.com/index.html

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

MECHATRONICS
(OPEN ELECTIVE – MECHANICAL ENGINEERING)

B.Tech –CIVIL, EEE, ECE, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Prerequisite – Nil

COURSE OBJECTIVES:

- Know the basic concepts of mechatronics.
- Know the various actuating systems like Hydraulic, pneumatic, mechanical and electrical actuating system.
- Know about the micro processor and micro controllers.
- Know about the system and interfacing and data acquisition.

UNIT – I

Mechatronics systems, elements, levels of mechatronics system, Mechatronics design system, measurement systems, control systems, microprocessor-based controllers, advantages and displacement, position, proximity, velocity, motion, force, acceleration, torque, fluid pressure, liquid flow, liquid level, temperature and light sensors.

UNIT – II

Solid state electronic devices, PN Junction diode, BJT, FET, DIA and TRIAC. Analog signal conditioning, amplifiers, filtering. Introduction to MEMS & typical applications.

UNIT – III

Hydraulic and pneumatic actuating systems, Fluid systems, Hydraulic and pneumatic systems, components, control valves, electro-pneumatic, hydro-pneumatic, electro-hydraulic servo systems: Mechanical actuating systems and electrical actuating systems.

UNIT – IV

Digital electronics and systems, digital logic control, micro processors and micro controllers, programming, process controllers, programmable logic controllers, PLCs versus computers, application of PLCs for control.

UNIT – V

System and interfacing and data acquisition , DAQS, SCADA, A to D and D to A conversions; Dynamic models and analogies, System response . Design of mechatronics systems & future trends.

COURSE OUTCOMES:

The students will be able to

CO1 Use the control system, mechatronics design systems and measurement systems.
CO2 Work on various actuating systems.
CO3 Convert the signals from one form to another form.
CO4 Estimate the micro controllers and micro processors.
CO5 Develop the simple programming code for PLC's.

TEXTBOOKS:

1. Mechatronics Integrated Mechanical Electronics Systems/KP Ramachandran &GKVijaya Raghavan/WILEY india Edition/2008
2. Mechatronics Electronics control systems in Mechanical andElectrical Engineering/W Bolton/Pearson Education press/3rd edition,2005.

REFERENCE BOOKS:

1. Mechatronics Source books by Newton C Braga, Thomson Publications, Chennai.
2. Mechatronics – N.Shanmugam/ Anuradha Agencies Publishers.
3. Mechatronics System Design/Devdas shetty/Richard/Thomson.

ONLINE RESOURCES:

1. NPTEL Course: Mechatronics by Prof. Pushparaj Mani Pathak, IIT Roorkee.Link: https://nptel.ac.in/courses/112/107/112107298/
2. NPTEL Course: Mechatronics and Manufacturing Automation by Dr. Shrikrishna N.Joshi, IIT Guwahati.

Link: https://nptel.ac.in/courses/112/103/112103174/

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

DIGITAL IMAGE PROCESSING
(OPEN ELECTIVE – ELECTRONICS & COMMUNICATION ENGINEERING)

B.Tech –CIVIL, EEE, MECH, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre Requisites: None

Course Objectives

- To familiarize the students with digital image fundamentals.
- To get exposed to simple image enhancement techniques in Spatial and Frequency domain.
- To learn concepts of degradation function and restoration techniques.
- To study the image segmentation and representation techniques.
- To Understand the concepts of image compression techniques.

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 Operation, Types of Point Operation, Histogram Manipulation, Linear and Non — Linear Gray Level Transformation, Spatial domain filtering.

Image Enhancement (Frequency Domain): Low Pass (Smoothing) filters, High Pass (Sharpening) filters and Homomorphism filtering.

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 based Segmentation.

Morphological Image Processing: Dilation and Erosion operations, Opening and Closing operations, 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 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. Fundamentals of Digital Image Processing — A.K.Jain, PHI, 1989

Reference Books

1. Digital Image Processing using MATLAB — Rafael C. Gonzalez, Richard E Woods and Steven L.Eddings, 2nd Edition, TMH, 2010.

2. Digital Image Processing- S Jayaraman, S Esakkirajan, T Veerakumar- TMH, 2010.

3. Digital Image Processing with MATLAB & Labview — Vipula Singh, Elsevier.

Course Outcomes

After completion of this course students will be able to

CO1 Gain the knowledge of digital image fundamentals and image transforms.
CO2 Understand image enhancement in spatial and frequency domain.
CO3 Understand the different methods to restore an image.
CO4 Analyze image segmentation techniques and morphological image processing.
CO5 Analyze the different image compression techniques.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

WIRELESS AND MOBILE COMMUNICATION
(OPEN ELECTIVE – ELECTRONICS & COMMUNICATION ENGINEERING)

B.Tech –CIVIL, EEE, MECH, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre Requisites: None

Course Objectives

- To provide the student with an understanding of the Cellular concept, Frequency reuse, Hand-off strategies.
- To enable the student to analyze and understand wireless and mobile cellular communication systems over a stochastic fading channel
- ToprovidethestudentwithanunderstandingofCo-channelandNon-Co-channelinterference
- To give the student an understanding of cell coverage for signal and traffic, diversity techniques and mobile antennas.
- To give the student an understanding of frequency management, Channel assignment and types of hand off.

UNIT - I

Introduction to Cellular Mobile Radio Systems: Limitations of Conventional Mobile Telephone Systems, Basic Cellular Mobile System, First, Second, Third and Fourth Generation Cellular Wireless Systems, Uniqueness of Mobile Radio Environment- Fading, Coherence Bandwidth, Delay Spread, Doppler Spread and Coherence Time. Fundamentals of Cellular Radio System Design: Concept of Frequency Reuse, Co-Channel Interference, Co-Channel Interference Reduction Factor, Desired C/I From a Normal Case in a Omni Directional Antenna System, Trunking and Grade of Service, ImprovingCoverageandCapacityinCellularSystems-CellSplitting,Sectoring,MicrocellZoneConcept.

UNIT - II

Co-Channel Interference: Measurement Of Real Time Co-Channel Interference, Design of Antenna System, Diversity Techniques-Space Diversity, Polarization Diversity, Frequency Diversity, Time Diversity, Directional Diversity. Non-Co-Channel Interference: Adjacent Channel Interference, Near End Far End Interference, Cross Talk, Effects on Coverage and Interference by Power Decrease, Antenna Height Decrease, Effects of Cell Site Components.

UNIT - III

Cell Coverage for Signal and Traffic: Signal Reflections in Flat and Hilly Terrain, Effect of Human Made Structures, Phase Difference Between Direct and Reflected Paths, Constant Standard Deviation, Straight Line Path Loss Slope, General Formula for Mobile Propagation Over water and Flat Open Area, Near and Long Distance Propagation, Path Loss From a Point to Point Prediction Model in Different Conditions, Merits of Lee Model. Cell Site and Mobile Antennas: Space Diversity Antennas, Umbrella Pattern Antennas.

UNIT - IV

Frequency Management and Channel Assignment: Numbering and Grouping, Access and Paging Channels, Channel Assignments to Cell Sites and Mobile Units, Channel Sharing and Borrowing, Sectorization, Overlaid Cells, Non Fixed Channel Assignment.

UNIT - V

Handoffs and Dropped Calls: Handoff Initiation, Types of Handoff, Delaying Handoff, Advantages of Handoff, Power Difference Handoff, Forced Handoff, Mobile Assisted and Soft Handoff, inter system

Handoff, Introduction to Dropped Call Rates and their Evaluation.

Text Books

1. MobileCellularTelecommunications—W.C.Y.Lee,McGrawHill,2ndEdn.,1989.
2. Wireless Communications – Theodore. S. Rapport, Pearson Education, 2nd Edn.,2002.
3. Mobile Cellular Communication – Gottapu sashibhushana Rao, Pearson,2012.

Reference Books

1. PrinciplesofMobileCommunications—GordonL.Stuber,SpringerInternational,2ndEdn.,2001.
2. Modern Wireless Communications-Simon Haykin, Michael Moher,Pearson Education,2005.
3. Wireless Communications Theory and Techniques, Asrar U. H .Sheikh,Springer, 2004.
4. Wireless Communications and Networking, Vijay Garg, Elsevier Publications,2007.
5. Wireless Communications —Andrea Goldsmith, Cambridge University Press,2005.

Course Outcomes

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

CO1 Estimate the impairments due to multi path fading channel.
CO2 Explain an Importance of the fundamental techniques to overcome the different fading effects.
CO3 Distinguish the co-channel and Non co-channel interference.
CO4 Inspect cell coverage for signal and traffic, diversity techniques and mobile antennas.
CO5 Relate and explain the functioning of frequency management, Channel assignment and types of handoff.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

SENSOR NETWORKS
(OPEN ELECTIVE – ELECTRONICS & COMMUNICATION ENGINEERING)

B.Tech –CIVIL, EEE, MECH, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre-requisites: None

Course Objectives:

- To introduce the various types of sensor & networks in wireless
- To explore the analysis of various sensors & networks

UNIT-I

OVERVIEWOFWIRELESSSENSORNETWORKS: ChallengesforWirelessSensorNetworks,EnablingTechnologiesForWireless Sensor Networks.

UNIT-II

ARCHITECTURES: Single-NodeArchitecture-HardwareComponents,EnergyConsumption of Sensor Nodes , Operating Systems and Execution Environments, Network Architecture - Sensor Network Scenarios, Gateway Concepts.

UNIT-III

NETWORKING SENSORS: Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts -S-MAC , The Mediation Device Protocol, Wakeup Radio Concepts, Address and Name Management, Assignment of MAC Addresses.

UNIT-IV

INFRASTRUCTURE ESTABLISHMENT: Topology Control , Clustering, Time Synchronization, Localization and Positioning**.**

UNIT-V

SENSOR NETWORK PLATFORMS AND TOOLS: Sensor Node Hardware – Berkeley Motes, Programming Challenges, Node-levels of twareplatforms, Node-level Simulators**.**

TEXTBOOKS

1. HolgerKarl&AndreasWillig,"ProtocolsAndArchitecturesforWirelessSensorNetworks", John Wiley,2005.
2. Feng Zhao &Leonidas J. Guibas, -Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007.

REFERENCES

1. Kazem Sohraby, Daniel Minoli, &Taieb Znati, -Wireless Sensor Networks- Technology, Protocols, And Applications‖,JohnWiley, 2007.
2. AnnaHac, -Wireless Sensor Network Designs‖, John Wiley, 2003.

Course Outcomes

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

CO1 Understand the overview of sensor &networks.

CO2 Explore the various architectures of sensors & network

CO3 Uunderstand the various protocols in sensor networks.

CO4 Identify the infrastructure and establishment of sensor networks.

CO5 Explore various sensor network platforms and tools.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

BIOMEDICAL INSTRUMENTATION
(OPEN ELECTIVE – ELECTRONICS & COMMUNICATION ENGINEERING)

B.Tech –CIVIL, EEE, MECH, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre Requisites: None

Course Objectives

The following are the course objectives

- To study bioamplifier, biosignals and measurement of physiological parameters.
- To know about different bioelectrodes and activities of heart.
- To understand therapeutic and cardic instrumentation.
- To study EEG and EMG machines, recordings and interpretations.

UNIT-I

Components of Medical Instrumentation System: Bloamplifier, Static and Dynamic Characteristics of Medical Instruments, Biosignals and Characteristics, Problems encountered with Measurements from Human beings. Organization of Cell, Derivation of Nernst equation for Membrane Resting Potential Generation and Propagation of Action Potential, Conduction through Nerve to Neuromuscular Junction.

UNIT -II

Bio Electrodes: Biopotential Electrodes-External Electrodes, Internal Electrodes, Biochemical Electrodes. Mechanical Function, Electrical Conduction System of the Heart, Cardiac Cycle, Relation between Electrical and Mechanical Activities of the Heart.

UNIT -III

Cardiac Instrumentation: Blood Pressure and Blood Flow Measurement, Specification of ECG Machine, Einthoven Triangle, Standard 12-Lead Configurations, Interpretation of ECG waveform with respect to Electro Mechanical Activity of the Heart.

UNIT -IV

Therapeutic Equipment: Pacemaker, Defibrillator, Shortwave Diathermy, Hemodialysis Machine. Respiratory Instrumentation: Mechanism of Respiration, Spirometry, Pnemuotachograph Ventilators.

UNIT -V

Neuro-Muscular Instrumentation: Specification of EEG and EMG Machines, Electrode Placement for EEG and EMG Recording, Interpretation of EEG and EMG.

Text Books

1. Biomedical Instrumentation and Measurements — by Leslie Cromwell, F.J. Weibell, E.A. Pfeiffer, PHI.
2. Medical Instrumentation, Application and Design — by John G.Webster, John Wiley.

Reference Books

1. Principles of Applied Biomedical Instrumentation — by L.A. Geoddes and L.E. Baker, John Wiley and Sons.
2. Hand-book of Biomedical Instrumentation — by R.S. Khandpur, McGraw-Hill, 2003.
3. Biomedical Telemetry — by Mackay, Stuart R., John Wiley.

Course Outcomes

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

CO1 Understand the functions of bio amplifiers, characteristics of medical instruments and bio signals.

CO2 Discuss the various internal, external Bio electrodes and relations between electrical and mechanical activities of heart.

CO3 Compare various concepts of Cardiac Instrumentation and gain the knowledge about

CO4 Analyze the Therapeutic Equipment and their operation.

CO5 Acquires knowledge about neuro-muscular Instrumentation like ECG EMG and EEG.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

DATABASE MANAGEMENT SYSTEMS
(OPEN ELECTIVE – COMPUTER SCIENCE & ENGINEERING)

B.Tech –CIVIL, EEE, MECH, ECE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre-requisites: Data Structures, Mathematics-I

Course Objectives:

This Course provides an emphasis on how to organize, maintain and retrieve information efficiently and effectively from a Database and it presents an introduction to data base management systems (DBMS) and relational data model. 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. .

UNIT- I: Introduction

Database system Applications - Database System versus File Systems - View of Data– Instances and schema - Data Models - Database Languages -DDL-DML - Database Users and Administrator –Transaction Management - Database System Structure-Application Architectures – History of Database Systems.

UNIT- II: Database Design and ER model

Basic concepts - Entity sets and Relationship Sets – Constraints - Keys - Design Issues - Entity-Relationship Diagram- Weak Entity Sets - Extended E-R Features - Designing of an E-R Database Schema-Reduction of an E-R Schema to Tables.

UNIT- III: Relational Model

Introduction to the Relational Model – Structure of Relational Databases - Relational Algebra –Relational Calculus – Domain relational Calculus, Tuple Relational Calculus - Integrity and Security –Domain Constraints, Referential Integrity Constraints-Triggers-security and Authorization – SQL- Basic Structure, Set operations, Aggregate Operations –Null values- Nested Sub queries – Views –Modification of Database-Joined relations, Case Statement, NVL Function, Conversion Functions.

UNIT- IV: Informal Design guidelines for Relation Schema

Functional Dependencies– Normal Forms based on Primary Keys-Decomposition–Desirable properties of Decomposition – First Normal Form, Second Normal Form–Third Normal Form- Boyce- Codd Normal Form - Multivalued Dependency- Fourth Normal Form- Fifth Normal Form-Transactions-Transaction Concept- Transaction state- Implementation of atomicity and Durability- Concurrent Executions – Serializability, Recoverability-Implementation of Isolation.

UNIT-V: Concurrency Control

Lock Based Protocols, Dead Lock Handling, Multiple Granularity, Time-stamp Based Protocols, Validation Based Protocols.

Recovery System: Failure Classification, Storage Structure, Recovery and Atomicity, Log Based recovery, Shadow Paging, Recovery with concurrent transactions.

Storage and File Structure - File Organization – Organization of records in file - Data Dictionary Storage – Indexing and Hashing – Basic Concepts , Ordered Indices, B+ Tree Index files, B- tree index files – Static Hashing – Dynamic Hashing – Comparison of Indexing and Hashing.

Course Outcomes:

After the completion of this course, the students should be able to

CO-1: Perceive the fundamental concepts of database management.

CO-2: Analyze database models & Entity Relationship models and to draw the E-R diagram for the given case study.

CO-3: Apply relational Database Theory, and be able to write relational algebra expressions for queries.

CO-4: Apply Normalization Process to construct the database and explain Basic Issues of Transaction processing.

CO-5: Compare the basic Database storage structures and access techniques: File Organization indexing methods including B- Tree and Hashing.

TEXT BOOKS:

2. Database System Concepts, Silberschatz, Korth , sixth Edition, McGraw hill.
2. Database Systems,Ramez Elmasri Shamkant B.Navathe Pearson Education,6th edition

REFERENCE BOOKS:

5. Database Management Systems, Raghu ramakrishnan, Johannes Gehrke, TATA Mc Graw Hill
6. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
7. Database Systems ,The Complete Book, Hector Garcia-Molina, Jeffrey D.Ullman, Jennifer Widom.
8. An Introduction to Database Systems, C.J. Date ,Eighth edition

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

JAVA PROGRAMMING
(OPEN ELECTIVE – COMPUTER SCIENCE & ENGINEERING)

B.Tech –CIVIL, EEE, MECH, ECE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre-Requisites: Programming for Problem Solving

Course Objectives:

- This course introduces computer programming using the JAVA programming language with object-oriented programming principles.
- The use of Java in a variety of technologies and on different platforms.
- To understand fundamentals of object-oriented programming in Java which includes defining classes, invoking methods, using class libraries.
- Using API to solve real world problems.

UNIT-I

OOP Concepts: OOP Features, OOP Concepts-Data Abstraction, Encapsulation, Inheritance, Polymorphism, Classes and Objects, Procedural and Object Oriented Programming paradigms.

Java Programming: History of Java, Data Types, Variables, Constants, Scope and Life Time of Variable, Operators, Type Conversion and Casting, Conditional Statements, Iterative statements, Break and Continue statements, Access Controls, Arrays, Methods and Constructors, Static variables and Static methods, This reference, Overloading methods, Garbage collection, Nested Classes, and Inner Classes.

UNIT-II

Inheritance: Inheritance - types of Inheritance, Member access rules, Method Overriding, Super keyword, Preventing Inheritance: Final classes and methods.

Interfaces: Abstract class, defining an Interface, Abstract Vs Interface, implementing and extending Interface.

UNIT-III

Packages- Defining, creating and accessing a Package, and importing Packages.

Exception Handling- Exception Handling**,** Types of Exceptions. Usage of try, catch, throw, throws and finally, re-throwing exceptions, and User defined Exceptions.

UNIT-IV

Multi Threading- Creating Thread, Life cycle of Thread, Thread priorities, Synchronization of Threads, Inter-Thread Communication, and Producer Consumer Problem.

Collection Framework in Java- Overview of Java Collection Frame work, Generics, Commonly used Collection Classes and Interfaces-Array List, Vector, Hash Table, Stack, Enumeration, Iterator, String Tokenizer, Random, Scanner, Calendar, and Properties.

UNIT-V

GUI Programming with Java- AWT class Hierarchy, Introduction to Swing, Swing vs. AWT, Containers-JFrame, JApplet, and JPanel, Swing components- JButton, JLabel, JTextField, and JTextArea. Layout manager and its types.

Event Handling- Events, Event classes, Event Listeners, Delegation event model, Examples: handling a button click, and handling mouse and keyboard events.

Applet: Create an Applet, Life Cycle of an Applet, and passing parameters to Applet.

Course Outcomes:

CO-1: Understand the use of OOP concepts and solve real world problems using OOP techniques.
CO-2: Solve the inter-disciplinary applications using the concept of inheritance.
CO-3: Develop robust and faster applications by applying different exception handling mechanisms.
CO-4: Understand the multithreading concepts and develop efficient applications.
CO-5: Design GUI based applications and develops applets for web applications.

TEXT BOOK:

2. Java The Complete Reference, 8th Edition. herbert schildt. Indian edition.

REFERENCE BOOKS:

5. Java for Programmers, P.J. Dietel and H.M Dietel,Pearson Education (OR) JAVA: How to Program P.J. Dietel and H.M. Dietel, PHI.
6. Object Oriented Programming through Java, P. Radha Krishna, University Press.
7. Thinking in Java, Bruce Ecel, Pearson Education
8. Programming in Java, S. Malhotra and S. Choudary, Oxford Univ. Press.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

INTRODUCTION TO NETWORK SECURITY
(OPEN ELECTIVE – COMPUTER SCIENCE & ENGINEERING)

B.Tech –CIVIL, EEE, MECH, ECE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre requisites: Data Communications and Computer Networks.

Course Objectives:

- To explain the objectives of information security and importance and application of each of confidentiality, integrity, authentication and availability. Understand various cryptography concepts and techniques.
- To illustrate various symmetric key and asymmetric key cryptographic algorithms.
- To define the basic requirements of message authentication, hashing algorithms.
- To describe E-Mail Security with PGP, S/MIME.
- To discuss the requirements of SET, understand intrusion detection and Firewalls.

UNIT – I

Security Concepts: Introduction, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security, **Cryptography Concepts and Techniques:** Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, Steganography.

UNIT – II

Symmetric key Ciphers: Block Cipher principles, Feistel Cipher Structure, DES algorithm, AES algorithm, Multiple Encryption and Triple DES, Block cipher operation, Stream ciphers, RC4. **Asymmetric key Ciphers:** Principles of public key cryptosystems, RSA algorithm, Diffie- Hellman Key Exchange.

UNIT – III

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

UNIT – IV

E-Mail Security: Pretty Good Privacy-Notations, PGP Operation-Authentication and Confidentiality, Cryptographic Keys and Key Rings, Message Transmission and Reception. **S/MIME**-S/MIME Functionality, Messages, Certificate Processing, Certification Authorities

UNIT – V

Web Security: Requirements, Secure Electronic Transaction (SET), Intruders, Firewall Design principles, Trusted Systems, Intrusion Detection Systems(Online Chapters and Appendices: Chapter 22,Chapter 23).

Course Outcomes:

After the completion of this course, the students should be able to

CO-1: Identifies various types of vulnerabilities, attacks, mechanisms and security services.
CO-2: Compare and contrast symmetric and asymmetric encryption algorithms.
CO-3: Implementation of message authentication, hashing algorithms.
CO-4: Explore E-Mail security, S/MIME Functionality.
CO-5: Develop intrusion detection system and designing of various types of firewalls.

TEXT BOOK:

1. Cryptography and Network Security - Principles and Practice: William Stallings,Pearson Education, 6th Edition

REFERENCE BOOKS:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1st Edition.
2. Cryptography and Network Security :Forouzan Mukhopadhyay, Mc Graw Hill, 3rd Edition
3. Information Security, Principles, and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM. Arthur Conklin, 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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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

INTRODUCTION TO CLOUD COMPUTING
(OPEN ELECTIVE – COMPUTER SCIENCE & ENGINEERING)

B.Tech –CIVIL, EEE, MECH, ECE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Prerequisites:

4. A course on "Computer Networks"
5. A course on "Operating Systems"
6. A course on "Distributed Systems"

Course Objectives:

- This course provides an insight into cloud computing
- Topics covered include- distributed system models, different cloud service models, service-oriented architectures, cloud programming and software environments, resource management.

UNIT-I

Computing Paradigms: High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Bio computing, Mobile Computing, Quantum Computing, Optical Computing, Nano computing.

UNIT-II

Cloud Computing Fundamentals: Motivation for Cloud Computing, The Need for Cloud Computing,Defining Cloud Computing, Definition of Cloud computing, Cloud Computing Is a Service, Cloud Computing Is a Platform, Principles of Cloud computing, Five Essential Characteristics, Four Cloud Deployment Models

UNIT-III

Cloud Computing Architecture and Management: Cloud architecture, Layer, Anatomy of the Cloud,Network Connectivity in Cloud Computing, Applications, on the Cloud, Managing the Cloud, Managingthe Cloud Infrastructure Managing the Cloud application, Migrating Application to Cloud, Phases of Cloud Migration Approaches for Cloud Migration.

UNIT-IV

Cloud Service Models: Infrastructure as a Service, Characteristics of IaaS. Suitability of IaaS, Pros and Cons of IaaS, Summary of IaaS Providers, Platform as a Service, Characteristics of PaaS, Suitability of PaaS, Pros and Cons of PaaS, Summary of PaaS Providers, Software as a Service, Characteristics of SaaS, Suitability of SaaS, Pros and Cons of SaaS, Summary of SaaS Providers, Other Cloud Service Models.

UNIT-V

Cloud Service Providers: EMC, EMC IT, Captiva Cloud Toolkit, Google, Cloud Platform, Cloud Storage, Google Cloud Connect, Google Cloud Print, Google App Engine, Amazon Web Services, Amazon Elastic Compute Cloud, Amazon Simple Storage Service, Amazon Simple Queue ,service, Microsoft, Windows Azure, Microsoft Assessment and Planning Toolkit, SharePoint, IBM, Cloud Models, IBM Smart Cloud, SAP Labs, SAP HANA Cloud Platform, Virtualization Services Provided by SAP, Sales force, Sales Cloud, Service Cloud: Knowledge as a Service, Rack space, VMware, Manjrasoft, Aneka Platform

Course Outcomes:

CO-1: Ability to understand various service delivery models of a cloud computing architecture.
CO-2: Ability to understand the ways in which the cloud can be programmed and deployed.
CO-3: Understanding Cloud Computing Architecture and Management
CO-4: Understanding cloud service Models.
CO-5: Understanding cloud service providers.

TEXT BOOK:

2. Essentials of cloud Computing: K. Chandrasekhran, CRC press, 2014

REFERENCE BOOKS:

4. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
5. Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.
6. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp 2011.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

INTERNET OF THINGS (IoT)
(OPEN ELECTIVE – COMPUTER SCIENCE & ENGINEERING)

B.Tech –CIVIL, EEE, MECH, ECE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre-requisites: Basic Programming Knowledge, Communications Protocols

Course Objectives:

- To introduce the terminology, technology and its applications
- To introduce the concept of M2M (machine to machine) with necessary protocols
- To introduce the Python Scripting Language which is used in many IoT devices
- To introduce the Raspberry PI platform, that is widely used in IoT applications
- To introduce the implementation of web based services on IoT devices

UNIT I

Introduction to Internet of Things –Definition and Characteristics of IoT , Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs, IoT enabled 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 – Introduction to M2M, Difference between M2M and IoT, Software Defined Networks, Network Function Virtualization, differences between SDN and NFV for IoT, Basics of IoT System Management with SNMP, NETCONF, NETOPEER.

UNIT IV

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

UNIT V

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs Web servers – Web server for IoT, Cloud for IoT, Python web application framework, Designing a RESTful web API.

Course Outcomes:

After the completion of this course, the students should be able to

CO-1: Interpret the vision of IoT from global context.

CO-2: Perceive building blocks of Internet of Things and its characteristics.

CO-3: Learn the basic concepts of Python. Implement the python programming using Raspberry.

CO-4: Perceive the application areas of IoT. Realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks

CO-5: Determine the Market perspective of IoT. Develop Python web applications and cloud servers for IoT.

TEXT BOOKS:

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

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

REFERENCE BOOK:

1. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1 st Edition, Academic Press, 2014.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

DATA STRUCTURES AND ALGORITHMS
(OPEN ELECTIVE – COMPUTER SCIENCE & ENGINEERING)

B.Tech –CIVIL, EEE, MECH, ECE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Prerequisites: A course on "Programming for Problem Solving".

Course Objectives:

- Exploring basic data structures such as stack sand queues.
- Introduce a variety of data structures such as hash tables, search trees, heaps, graphs.

UNIT -I

Basic Concepts: Algorithm specification- Introduction , Performance analysis and Performance measurement. Arrays: The Abstract data type, Sparsematrices- Introduction, Sparse matrix representation, Transposing a matrix.

Stacks and Queues : StackAbstractDataType,Stackoperations,QueueAbstractDataType,Queue operations.Evaluationofexpressions-Expressions,Postfixnotations,Infixtopostfix.

UNIT -II

Linked Lists: Singly linked lists and chains, Representing chains, Linked stacks and Queues,Doubly linked lists, Circular lists.

Trees: Introduction, Binary trees- The abstract data type, Properties of binary trees, Binary tree representations, Binary tree traversals- Inorder traversal, Preorder traversal, Post order traversal.

Binary search trees: Definition, Searching a binary search tree, Insertion into a binary search tree, Deletion from a binary search tree, Joining and Splitting binary search trees, Height ofa binary search tree.

UNIT-III

Heaps: Priority Queues, Definition of MAX heap, insertion into a MAX Heaps, Deletion froma MAX Heaps.

Efficient Binary Search Trees: Optimal binary search trees, AVL trees, rotations of AVLtrees. Multiway Search Trees: M-way search trees, B-trees.

UNIT -IV

Hashing: Introduction, Hash functions, Collision resolution Techniques - Hash tableoverflow, Extendible hashing.

Graphs: The Graph Abstract Data Type- Introduction, Definition, Graph representations, Elementary graph operations-Depth first search, Breadth first search.

UNIT -V

Sorting-Types of sorting, Insertion sort, Selection sort, Quick sort, Merge sort, Heapsort, External sorting-K-way merge sort, Comparison of all sorting methods.

Course Outcomes:

CO-1: Define the basic techniques of algorithm analysis
CO-2: Examine the linear and non linear data structures.
CO-3: Develop Priority Queues and Balanced Trees.
CO-4: Understand Hashing Techniques and Graph applications.
CO-5: Apply suitable algorithms for sorting Technique.

TEXT BOOK:

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni andSusanAndersonFreed, Universities Press.

REFERENCE BOOKS:

1. Data Structures: A PseudocodeApproachwithC,2ndEdition, R.F. Gilberg and B.A.Forouz and Cengage Learning.
2. Data Structures using C–A.S.T anenbaum, Y.Langsam, and M.J. Augenstein, PHI/ Pearson Education.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ARTIFICIAL INTELLIGENCE
(OPEN ELECTIVE – CSE (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING))

B.Tech –CIVIL, EEE, MECH, ECE, CSE & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre-Requisites: None

Course Objectives:

- To learn the difference between optimal reasoning vs human like reasoning
- To understand the notions of state space representation, exhaustive search, heuristic search along with the time and space complexities
- To learn different knowledge representation techniques
- To understand the applications of AI: namely Game Playing.
- To understand Theorem Proving, Expert Systems.

UNIT - I

Introduction: AI problems, Agents and Environments, Structure of Agents, Problem Solving Agents Basic Search Strategies: Problem Spaces, Uninformed Search (Breadth-First, Depth-First Search, Depth-first with Iterative Deepening), Heuristic Search (Hill Climbing, Generic Best-First, A*), Constraint Satisfaction (Backtracking, Local Search)

UNIT - II

Advanced Search: Constructing Search Trees, Stochastic Search, A* Search Implementation, Minimax Search, Alpha-Beta Pruning Basic Knowledge Representation and Reasoning: Propositional Logic, First-Order Logic, Forward Chaining and Backward Chaining, Introduction to Probabilistic Reasoning, Bayes Theorem

UNIT - III

Advanced Knowledge Representation and Reasoning: Knowledge Representation Issues, Nonmonotonic Reasoning, Other Knowledge Representation Schemes Reasoning Under Uncertainty: Basic probability, Acting Under Uncertainty, Bayes' Rule, Representing Knowledge in an Uncertain Domain, Bayesian Networks

UNIT - IV

Learning: What Is Learning? Rote Learning, Learning by Taking Advice, Learning in Problem Solving, Learning from Examples, Winston's Learning Program, Decision Trees.

UNIT - V

Expert Systems: Representing and Using Domain Knowledge, Shell, Explanation, Knowledge Acquisition.

Course Outcomes:

CO-1: Possess the ability to formulate an efficient problem space for a problem expressed in English.
CO-2: Possess the ability to select a search algorithm for a problem.
CO-3: Possess the skill for representing knowledge using the appropriate technique
CO-4: Possess the ability to apply AI techniques to solve problems of Game Playing,
CO-5: Possess the Expert Systems, Machine Learning and Natural Language Processing

TEXT BOOK:

1. Russell, S. and Norvig, P, Artificial Intelligence: A Modern Approach, Third Edition, PrenticeHall, 2010.

REFERENCE BOOKS:

1. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivasankar B. Nair, The McGraw Hill publications, Third Edition, 2009.
2. George F. Luger, Artificial Intelligence: Structures and Strategies for Complex Problem Solving, Pearson Education, 6th ed., 2009.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

INTRODUCTION TO MACHINE LEARNING
(OPEN ELECTIVE – CSE (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING))

B.Tech –CIVIL, EEE, MECH, ECE, CSE & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre-requisites: Programming for Problem solving,

Course Objectives:

- To be able to formulate machine learning problems corresponding to different applications.
- To understand a range of machine learning algorithms along with their strengths and weaknesses
- To understand the basic theory underlying machine learning.
- To be able to apply machine learning algorithms to solve problems of moderate complexity.
- To be able to read current research papers and understands the issues raised by current research.

UNIT-I

The ingredients of machine learning, Tasks: the problems that can be solved with machine learning, Models: the output of machine learning, Features, the workhorses of machine learning.. (Text Book 1- page no: 1-80)

UNIT- II

Binary classification and related tasks: Classification, Scoring and ranking Beyond binary classification: Handling more than two classes, Regression, Unsupervised and descriptive learning. (Text Book 1- page no: 81-127)

UNIT-III

Intoduction of Concept Learning, Models: Decision trees, Ranking and probability estimation trees, Tree learning as variance reduction. (Text Book 1- page no: 129-156)

UNIT-IV

Rule models: Learning ordered rule lists, Learning unordered rule sets, The Perceptron: a heuristic learning algorithm for linear classifiers. (Text Book 1- page no: 194-218, 262-297).

UNIT- V

Support vector machines, Probabilistic models: The normal distribution and its geometric interpretations, Probabilistic models for categorical

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

CO-1: Explain the theory underlying machine learning.
CO-2: Learn beyond binary classification.
CO-3: Recognize and implement various genetic algorithms.
CO-4: Construct algorithms to learn tree, to learn linear, non-linear models and Probabilistic models.
CO-5: Able to analyze the data.

TEXT BOOKS:

1. Machine Learning: The art and science of algorithms that make sense of data, Peter Flach, Cambridge.
2. The R Book. Second Edition. Michael J. Crawley. 3. Machine Learning, Tom M. Mitchell, MGH.

REFERENCE BOOKS:

1. Understanding Machine Learning: From Theory to Algorithms, Shai Shalev-Shwartz, Shai BenDavid, Cambridge.
2. Machine Learning in Action, Peter Harington, 2012, Cengage.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

NEURAL NETWORKS
(OPEN ELECTIVE – CSE (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING))

B.Tech –CIVIL, EEE, MECH, ECE, CSE & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre requisites: None

Course Objectives:

- To understand the biological neural network and to model equivalent neuron models.
- To understand the architecture, learning algorithm and issues of various feed forward and feedback neural networks.

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,

UNIT – II

Memory Based Learning, Hebbian Learning, Competitive, Boltzmann Learning, Credit Assignment Problem, Memory, Adaption, Statistical Nature of the Learning Process

Single Layer Perceptron : Adaptive Filtering Problem, Unconstrained Organization Techniques, Linear Least Square Filters, Least Mean Square Algorithm, Learning Curves, Learning Rate Annealing Techniques,

UNIT-III

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-IV

Back Propagation Algorithm XOR Problem, Heuristics, Output Representation and Decision Rule, Computer Experiment, Feature Detection.

UNIT-V

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

Course Outcomes:

By completing this course the student will be able to:

CO-1: Describe different neural networks of various architectures
CO-2: Understand the feed forward and feed backward.
CO-3: Design the training of neural networks.
CO-4: Learn various learning rules.
CO-5: Develop the testing of neural networks and do the perform analysis of these networks for various pattern recognition application.

TEXT BOOKS:

1. Neural Networks a Comprehensive Foundations, Simon Haykin, PHI edition.

REFERENCE BOOKS:

1. Artificial Neural Networks – B. Yegnanarayana Prentice Hall of India P Ltd 2005
2. Neural Networks in Computer Intelligance , Li Min Fu TMH 2003
3. Neural Networks -James A Freeman David M S Kapura Pearson Education 2004.
4. Introduction to Artificial Neural Systems Jacek M. Zurada, JAICO Publishing House Ed. 2006.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

INTRODUCTION TO CYBER SECURITY
(OPEN ELECTIVE – CSE (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING))

B.Tech –CIVIL, EEE, MECH, ECE, CSE & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Prerequisites: Basic Computer knowledge.

Course Objectives:

- To introduce the methodologies and framework of ethical hacking for enhancing the security.
- To learn about cybercrimes and how they areplanned.
- To learn the vulnerabilities of mobile and wireless devices.
- To learn about the cyber-Law and legalperspectives.

UNIT – I

Introduction to Cybercrime: Introduction, Cybercrime and Information Security, Who are Cybercriminals, Classifications of Cybercrimes, Cyber-crime: The legal Perspectives and Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes.
(Text Book-1 : Page no : 1 – 39)

UNIT – II

Cryptography: Introduction Cryptography, Steganography, Objectives of Cryptography: Confidentiality, Integrity, Authenticity, Non-repudiation, Accountability, Types of Attacks:
Passive Attacks, Active Attacks, Introduction to Symmetric key cryptography, Asymmetric Key Cryptography, Hashing. (Text Book-2)

UNIT – III

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, Attack Vector.(Text Book-1 : Page no : 45 –78)

UNIT – IV

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. (Text Book-1 : Page no : 81-119)

UNIT – V

Tools and Methods Used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horse and Backdoors, Steganography, DoS and DDoS attacks, SQL Injection, Buffer Overflow.(Text Book-1 : Page no :125-170)

Course Outcomes:

CO-1: After the completion of this course, the students should be able to
CO-2: Outline key terms and concepts in cyber law, intellectual property and cybercrimes.
CO-3: Understand basic cryptography and stenography.
CO-4: Explore the vulnerabilities, threats and cybercrimes posed by criminals.
CO-5: Identify various security challenges phased by mobile devices and identify various types of tools and methods used in cybercrime, develops the secure counter methods to maintain security protection.

TEXT BOOKS:

1 .Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole and Sunil Belapure, Wiley INDIA.

2. Cryptography and Network Security - Principles and Practice: William Stallings, Pearson Education, 6th Edition

REFERENCE BOOKS:

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

2. Introduction to Cyber Security, Chwan-Hwa (john) Wu, J. David Irwin. CRC Press T&F Group.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

INTRODUCTION TO DATA SCIENCE
(OPEN ELECTIVE – CSE (DATA SCIENCE))

B.Tech –CIVIL, EEE, MECH, ECE, CSE & CSE(AI&ML) **L/T/P/C**
3/ 0/ 0/ 3

Pre-requisites: Basics of Computer science and Mathematics

Course Objectives:

- To understand the basic concepts of Data Science
- To learn data pre processing and techniques for data analytics
- Understand the statistical concepts for data science.

UNIT-I:

Introduction: What Is Data Science? How Does Data Science Relate to Other Fields? Data Science and Statistics, Computer Science, Engineering, and Business Analytics. Data Science, Social Science, and Computational Social Science, The Relationship between Data Science and Information Science, Information vs. Data, Skills for Data Science, Tools for Data Science, Issues of Ethics, Bias, and Privacy in Data Science.(TB1)

UNIT-II:

Data: Introduction, Data Types, Structured Data, Unstructured Data, Challenges with Unstructured Data, Data Collections, Open Data, Social Media Data, Multimodal Data, Data Storage and Presentation, Data Pre-processing, Data Cleaning, Data Integration, Data Transformation , Data Reduction, Data Discretization.(TB1)

UNIT-III:

Techniques: Introduction, Data Analysis and Data Analytics, Descriptive Analysis, Variables, Frequency Distribution, Measures of Centrality, Dispersion of a Distribution, Diagnostic Analytics, Correlations, Predictive Analytics, Prescriptive Analytics, Exploratory Analysis, Mechanistic Analysis, Regression.(TB1)

UNIT-IV:

Statistical Data Analysis: Role of statistics in data science, Kinds of statistics, Descriptive statistics, Inferential statistics, Probability theory , Random variables, Independence, Four perspectives on probability, Bayesian probability, Probability distribution .(TB2)

UNIT-V:

Machine Learning for Data Science: Overview of machine learning, Supervised machine learning , Regression methods, Classification methods, KNN classification, Decision tree classification, Naive Bayes classification, Unsupervised machine learning, Clustering methods, K-means, Principle Component Analysis (PCA), Association Analysis, Apriori algorithm, FP-Growth Analysis. (TB2)

Course Outcomes: After completing this course the students will be able to

CO1: Understand the basic concepts of Data Science.
CO2: Learn about types of data and data pre processing.
CO3: Understand the techniques for data analytics.
CO4: Learn the statistical fundamentals related to Data Science.
CO5: Understand the concepts of Machine Learning for Data Science.

TEXT BOOK

1. Chirag Shah, A Hands-On Introduction To Data Science, Cambridge University Press.
2. Data Science Fundamentals and Practical Approaches. Dr. Gypsy Nandi, Dr. Rupa Kumar Sharma.

REFERENCE BOOKS

3. Doing Data Science, Straight Talk from The Frontline. Cathy O'Neil and Rachel Schutt, O'Reilly, 2014.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

DATA HANDLING AND VISUALIZATION
(OPEN ELECTIVE – CSE (DATA SCIENCE))

B.Tech –CIVIL, EEE, MECH, ECE, CSE & CSE(AI&ML) **L/T/P/C**
3/ 0/ 0/ 3

Pre-requisites: Fundamentals of Data Science

Course Objectives:

- Understand basics of Data Visualization
- Learn about visualization of distributions.

UNIT-I:

Introduction to Visualization: Visualizing Data-Mapping Data onto Aesthetics, Aesthetics and Types of Data, Scales Map Data Values onto Aesthetics, Coordinate Systems and Axes- Cartesian Coordinates, Nonlinear Axes, Coordinate Systems with Curved Axes, Colour Scales-Colour as a Tool to Distinguish, Colour to Represent Data Values ,Colour as a Tool to Highlight.

UNIT-II:

Directory of Visualizations- Amounts, Distributions, Proportions, x–y relationships, Geospatial Data. Visualizing Distributions: Visualizing Amounts-Bar Plots, Grouped and Stacked Bars, Dot Plots and Heatmaps, Visualizing Distributions: Histograms and Density Plots- Visualizing a Single Distribution, Visualizing Multiple Distributions at the Same Time.

UNIT-III:

Visualizing Proportions-A Case for Pie Charts, A Case for Side-by-Side Bars, A Case for Stacked Bars and Stacked Densities, Visualizing Proportions Separately as Parts of the Total ,Visualizing Nested Proportions-Nested Proportions Gone Wrong, Mosaic Plots and Treemaps, Nested Pies ,Parallel Sets.

UNIT-IV:

Visualizing Associations Among Two or More Quantitative Variables-Scatterplots, Correlograms, Dimension Reduction, Paired Data. Visualizing Time Series and Other Functions of an Independent Variable-Individual Time Series , Multiple Time Series and Dose–Response Curves, Time Series of Two or More Response Variables

UNIT-V:

Visualizing Trends-Smoothing, Showing Trends with a Defined Functional Form, Detrending and Time-Series Decomposition, Visualizing Geospatial Data-Projections, Layers, Choropleth Mapping, Cartograms, Visualizing Uncertainty-Framing Probabilities as Frequencies, Visualizing the Uncertainty of Point Estimates, Visualizing the Uncertainty of Curve Fits, Hypothetical Outcome Plots.

Course Outcomes: After completing this course the students will be able to

CO1: Understand the fundamentals of Data Visualization.
CO2: Learn the concepts of Visualizing Distributions
CO3: Understand how to Visualizing Proportions and Nested Proportions
CO4: Learn the concepts of Visualizing Associations and Time series data.
CO5: Understand the different Visualizing Trends

TEXT BOOK

1. Claus Wilke, “Fundamentals of Data Visualization: A Primer on Making Informative and Compelling Figures”, 1st edition, O’Reilly Media Inc, 2019.

REFERENCE BOOKS

1. Tony Fischetti, Brett Lantz, R: Data Analysis and Visualization,O’Reilly ,2016
2. Ossama Embarak, Data Analysis and Visualization Using Python: Analyze Data to Create Visualizations for BI Systems,Apress, 2018

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

INTRODUCTION TO BIG DATA
(OPEN ELECTIVE – CSE (DATA SCIENCE))

B.Tech –CIVIL, EEE, MECH, ECE, CSE & CSE(AI&ML) **L/T/P/C**
3/ 0/ 0/ 3

Pre-requisites: DBMS

Course Objectives:

- To understand the basic concepts of Big Data
- To learn distributed computing and big data analytics
- Understand the fundamentals of Hadoop and Map Reduce.

UNIT-I:

Grasping the Fundamentals of Big Data: The Evolution of Data management, Understanding the Waves of Managing Data. Defining big data, Building a Successful Big Data Management Architecture, The Big Data Journey. Examining Big Data Types, Defining Structured Data, Defining Unstructured Data, Putting Big Data Together.(TB1)

UNIT-II:

Types of Digital Data: Classification of Digital Data: Structured data, Semi-structured data and Unstructured. Introduction to Big Data: Characteristics of Data, Evolution of Big Data, Definition of Big Data, Challenges with Big Data, What is Big Data?, Why Big Data?, Traditional Business Intelligence (BI) versus Big Data, A Typical Data Warehouse Environment, A Typical Hadoop Environment, What is New Today?, What is Changing in the Realms of Big Data? (TB2)

UNIT-III:

A Brief History of Distributed Computing, Giving thanks to DARPA, Understanding the Basics of Distributed Computing. Big Data Technology Components: Exploring the Big Data Stack, Big Data Analytics, Big Data Applications. Cloud and Big Data: Defining the Cloud in the Context of Big Data, Understanding Cloud Deployment and Delivery Models, Making Use of the Cloud for Big Data, Providers in the Big Data Cloud Market.(TB1)

UNIT-IV:

Introduction to Hadoop: Features and advantages and versions of Hadoop. Hadoop Ecosystems and distributions. Hadoop versus SQL. Introducing Hadoop, RDBMS versus Hadoop, Distributed Computing Challenges, History of Hadoop, Hadoop Overview, HDFS (Hadoop Distributed File System), Processing Data with Hadoop, Managing Resources and Applications with Hadoop YARN (Yet Another Resource Negotiator), Interacting with Hadoop Ecosystem: PIG, HIVE & HBase. (TB2)

UNIT-V:

MapReduce Fundamentals: Tracing the Origins of MapReduce, Understanding the map Function, Adding the reduce Function, Putting map and reduce Together, Optimizing MapReduce Tasks. Integrating Big Data with the Traditional Data Warehouse, Big Data Analysis and the Data Warehouse, Changing the Role of the Data Warehouse.(TB1)

Course Outcomes: After completing this course the students will be able to

CO1: Understand the importance of Big Data.
CO2: Learn about the types of data and Big Data Analytics.
CO3: Understand the Big Data technology components and applications.
CO4: Learn the basics of Hadoop Eco system.
CO5: Understand the map reduce fundamentals.

TEXT BOOK

1. Big Data for Dummies, Judith Hurwitz, Alan Nugent, Dr. Fern Halper, and Marcia Kaufman, Wiley
2. Big Data and Analytics, Seema Acharya, Subhasinin Chellappan, Wiley publications.

REFERENCE BOOKS

1. Big Data, Black BookTM , DreamTech Press, 2015 Edition.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

INTRODUCTION TO COMPUTER FORENSICS
(OPEN ELECTIVE – CSE (DATA SCIENCE))

B.Tech –CIVIL, EEE, MECH, ECE, CSE & CSE(AI&ML) **L/T/P/C**
3/ 0/ 0/ 3

Pre-requisites: Fundamentals of Computers

Course Objectives:

- Understand the fundamentals of computer forensics.
- Learn about the different computer forensics systems and data collection methods.
- Understand Computer Forensics Analysis.

UNIT-I:

Computer Forensics Fundamentals: Introduction to Computer Forensics, Use of Computer Forensics in Law Enforcement, Computer Forensics Assistance to Human Resources/ Employment Proceedings, Computer Forensics Services, Benefits of Professional Forensics Methodology, Steps Taken by Computer Forensics Specialists. Types of Computer Forensics Technology: Types of Military Computer Forensic Technology and Business Computer Forensic Technology. Specialized Forensics Techniques, Encryption Methods and vulnerabilities, Protecting Data from Being Compromised.

UNIT-II:

Types of Computer Forensics Systems: Internet Security Systems, Intrusion Detection Systems, Firewall Security Systems, Storage Area Network Security Systems , Network Disaster Recovery Systems, Public Key Infrastructure Systems, Wireless Network Security Systems, Instant Messaging (IM) Security Systems, Net Privacy Systems, Identity management Security Systems, Identity Theft, Biometric Security Systems, Homeland Security Systems.

UNIT-III:

Computer Forensics Evidence and Capture: Data Recovery Defined, Data Back-up and Recovery, The Role of Back-up in Data Recovery, The Data-Recovery Solution. Evidence Collection and Data Seizure: Why Collect Evidence? Collection Options, Obstacles, Types of Evidence, The Rules of Evidence ,Volatile Evidence, General Procedure, Collection and Archiving, Methods of Collection, Artifacts, Collection Steps.

UNIT-IV:

Duplication and Preservation of Digital Evidence: Preserving the Digital Crime Scene, Computer Evidence Processing Steps, Legal Aspects of Collecting and Preserving, Computer Forensic Evidence. Computer Image Verification and Authentication: Special Needs of Evidential Authentication, Practical Consideration, Practical Implementation.

UNIT-V:

Computer Forensics Analysis: Discovery of Electronic Evidence, Electronic Document Discovery: A Powerful New Litigation Tool, Identification of Data: Timekeeping, Forensic Identification and Analysis of Technical Surveillance Devices. Reconstructing Past Events: How to Become a Digital Detective, Useable File Formats, Unusable File Formats, Converting Files.

Course Outcomes: After completing this course the students will be able to

CO1: Understand the definition of computer forensics fundamentals.

CO2. Describe the types of computer forensics technology. Analyze various computer forensics systems.

CO3. Illustrate the methods for data recovery, evidence collection and data seizure.

CO4. Summarize duplication and preservation of digital evidence. Evaluate the effectiveness of available digital forensics tools.

CO5. Employ fundamental computer theory in the context of computer forensics practices

Text Books:

1. Computer Forensics, Computer Crime Investigation by John R. Vacca, Firewall Media, New Delhi.

Reference Books:

1. Real Digital Forensics by Keith J. Jones, Richard Bejtiich, Curtis W. Rose, Addison- Wesley Pearson Education
2. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE Learning.
3. Forensic Compiling, A Tractitioneris Guide by Tony Sammes and Brian Jenkinson, Springer International edition.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

MANAGEMENT SCIENCE
(OPEN ELECTIVE – MBA)

B.Tech – CIVIL, EEE, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre-requisites: None

Course Objectives:

- This course is intended to familiarize the students with the framework for the managers and leaders available for understanding and making decisions relating to issues related organizational structure, production operations, marketing, human resource management, product management and strategy.

UNIT - I:

Introduction to Management and Organization: Concepts of Management and organization-nature, importance and Functions of Management, Systems Approach to Management - Taylor's Scientific Management Theory- Fayal's Principles of Management- Maslow's theory of Hierarchy of Human Needs- Douglas McGregor's Theory X and Theory Y - Hertzberg Two Factor Theory of Motivation - Leadership Styles, Social responsibilities of Management, Designing Organizational Structures: Basic concepts related to Organization - Departmentation and Decentralization, Types and Evaluation of mechanistic and organic structures of organization and suitability.

UNIT - II:

Operations and Marketing Management: Principles and Types of Plant Layout-Methods of Production(Job, batch and Mass Production), Work Study - Basic procedure involved in Method Study and Work Measurement - Business Process Reengineering(BPR) - Statistical Quality Control: control charts for Variables and Attributes (simple Problems) and Acceptance Sampling, TQM, Six Sigma, Deming's contribution to quality, Objectives of Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Store Records - JIT System, Supply Chain Management, Functions of Marketing, Marketing Mix, and Marketing Strategies based on Product Life Cycle, Channels of distribution.

UNIT - III:

Human Resources Management (HRM): Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating - Capability Maturity Model (CMM) Levels - Performance Management System.

UNIT - IV:

Project Management (PERT/ CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).

UNIT - V:

Strategic Management and Contemporary Strategic Issues: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Bench Marking and Balanced Score Card as Contemporary Business Strategies.

TEXT BOOKS:

1. Stoner, Freeman, Gilbert, Management, 6th Ed, Pearson Education, New Delhi, 2004.
2. P. Vijay Kumar, N. Appa Rao and Ashnab, Chnalill, Cengage Learning India, 2012.

REFERENCE BOOKS:

1. Kotler Philip and Keller Kevin Lane: Marketing Management, Pearson, 2012.
2. Koontz and Weihrich: Essentials of Management, McGraw Hill, 2012.
3. Thomas N. Duening and John M. Ivancevich Management - Principles and Guidelines, Biztantra, 2012.
4. Kanishka Bedi, Production and Operations Management, Oxford Uiversity Press, 2012.
5. Samuel C. Certo: Modern Management, 2012.
6. Schermerhorn, Capling, Poole and Wiesner: Management, Wiley, 2012.
7. Parnell: Strategic Management, Cengage, 2012.
8. Lawrence R Jauch, R. Gupta and William F. Clueck: Business Policy and Stragtegic Management Science, McGraw Hill, 2012.

Course Outcomes:

CO1 Outline the fundamentals of management and contributions to management.

CO2 Define the social Responsibilities of an organization towards stakeholders and build the suitable organization structure and to identify factors influencing plant location and layout decisions.

CO3 Know importance of materials management, evaluate quality of products using SQC techniques and Identify the basic concepts of marketing mix and Human Resource concepts.

CO4 Know how PERT and CPM different and to construct network by proper planning organizing an managing the efforts to accomplish a successful project.

CO5 Appraise all contemporary management practices and analyze how these contemporary management practices one applicable in modern business and service organizations.

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VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

ENTREPRENEURSHIP DEVELOPMENT
(OPEN ELECTIVE – MBA)

B.Tech – CIVIL, EEE, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre-requisites: None

Course Objective: The objective of the course is to make students understand the nature of entrepreneurship, and to motivate the student to start his/her own enterprise. The objective of the course is to enlighten with the fragrance of Corporate Good Governance and Business Ethics, so that they would become the best entrepreneurs / managers of the corporate world.

Unit – I

Nature of Entrepreneurship; Characteristics – Qualities and skills of an Entrepreneur – Functions of entrepreneur – Entrepreneur scenario in India and Abroad. Forms of Entrepreneurship: Small Business – Importance in Indian Economy – Types of ownership – Sole trading – Partnership – Joint stock company and other forms. First – Mover disadvantages, Risk Reduction strategies, Market scope strategy, Imitation strategies and Managing Newness

Unit – II

Aspects of Promotion: Generation of new entry opportunity, SWOT Analysis,Technological Competitiveness, legal regulatory systems, patents and trademarks, Intellectual Property Rights-Project Planning and Feasibility Studies- Major steps in product development. Financial Aspects: Sources of raising Capital, Debt-Equity, Financing by Commercial Banks, Government Grants and Subsidies, Entrepreneurship Promotion Schemes of Department of Industries (DIC), KVIC, SIDBI, NABARD, NSIC, APSFC, IFCI and IDBI. New Financial Instruments.

Unit - III

Introduction to Business Ethics: Necessity for Business Ethics-Need for Ethical guideline –Salient Issues in Ethics and Commerce- Ethics as a Luxury – Earlier attempts at Ethics in Industry – Justification for Ethics – Effect of Migration of National Character – Shadow Economy – Basic Principles in Ethics – Corporate Climate and corporate climate audits – Political Issues – Nature and theory of Ethics – The Naturalistic fallacy - G.E.Moore's Philosophy.

Unit – IV

Understanding Corporate Governance: Corporate Governance- Capitalism at crossroads – Historical perspective of Corporate Governance – Issues of Corporate Governance – Theoretical basis of Corporate Governance – Corporate Governance mechanisms – Indian Model of Governance – Good Corporate Governance – Corporate Governance committees – OECD Principles – Indian Committee and guidelines – The confederation of Indian Industry's initiative. Corporate Governance Models, Corporate Social Responsibility.

Unit – V

Corporate Social Responsibility: System Concept of Business Society – SocialResponsibility – Social Responsibility tools – approaches to Ethics – Corporate Social Accountability - Business in a Social World – Ethics and Social Responsibility – professional ethics – Ethics of practicing company secretaries- Ethical investing.

Text Books:

1. Robert D Hisrich, Michael P Peters, Dean A Shepherd: Entrepreneurship, TMH, 2009
2. Vasanth Desai: Entrepreneurship, HPH, 2009

3. C.S.V.Murthy: Business Ethics & Corporate Governance, Himalaya, 2009.

References:

1. Bholanath Dutta: Entrepreneurship Text and Cases, Excel, 2009
2. David Martin: Corporate Governance, Viva, 2009
3. H. Nandan: Fundamentals of Entrepreneurship, PHI, 2009.
4. Barringer: Entrepreneurship, Pearson,2009.
5. Ronald D Francis & Mukti Mishra: Business Ethics, TMH, 2009
6. RK Mishra,Gitarani: Corporate Governance, Excel,2009
7. A.C.Frenando: Corporate Governance, Pearson, 2006
8. V.Balachandran &V.Chandrasekaran: Corporate Governance & Social Responsibility, PHI, 2009
9. A.C.Fernando: Business Ethics, Pearson, 2009
10. Laura P Hartman & Abha Chatterjee: Business Ethics, TMH, 2009
11. Tripat Kaur: Values and Ethics in Management, 2/e, Paragon International,2009.

Course Outcomes:

CO1 Explain characteristics, Qualities, Skills and Functions of Entrepreneur.
CO2 Demonstrates Entrepreneur Scenario in India and abroad.
CO3 Summarizes necessity for business ethics and ethical guidelines in business.
CO4 Interprets about Government Grants and subsides and Entrepreneurship promotion schemes.
CO5 Prioritizes corporate social responsibility and professional ethics by company secretaries.

VAAGDEVI COLLEGE OF ENGINEERING
(AUTONOMOUS)

INTELLECTUAL PROPERTY RIGHTS
(OPEN ELECTIVE – MBA)

B.Tech – CIVIL, EEE, MECH, ECE, CSE, CSE(AI&ML) & CSE(Data Science) **L/T/P/C**
3/ 0/ 0/ 3

Pre-requisites: None

Course Objectives:

- In the interest of the national economic growth the innovations and improvements are to be owed and used for the production and distribution process. The Students of technology willnbe benefited by knowing the process of obtaining recognition of their innovations. This course will enable them to know the legal process of registering the innovation.

UNIT – I

INTRODUCTION TO INTELLECTUAL PROPERTY: Introduction, types of intellectual property,International organizations, agencies and treaties, importance of intellectual property rights.

UNIT – II

TRADE MARKS: Purpose and function of trademarks, acquisition of trade mark rights, protectable matter,selecting and evaluating trade mark, trade marks registration processes.

UNIT – III

LAW OF COPY RIGHTS: Fundamental of copy right law, originally of material, rights of reproduction,rights of perform the work publicity, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

LAW OF PATENTS: Foundation of patent law, patent searching process ownership rights and transfer.

UNIT- IV

TRADE SECRETS: Trade secrete law, determination of trade secrete status, liability for misappropriations oftrade secrets, protection for submission trade secrete litigation.

UNIT-V

NEW DEVELOPMENT OF INTELLECTUAL PROPERTY: New developments in trade mark law: Copyright law, patent law, intellectual property audits.

TEXT BOOOKS & REFERENCES:

1. Intellectual property rights, Deborah, E. Bouchux, cengage learing
2. Intellectual property right – Unleashing the knowledge economy, prabuddhaganguli, Tate Mc Graw Hill Publishing company ltd.

Course Outcomes:

CO1 Outline the increasing importance of Intellectual Property Rights
CO2 Utilize post registration procedures and trade mark registration process
CO3 Explain the copyright principles and rights
CO4 Prioritize the law of patents and patent ownership
CO5 Develop the trade secret and maintenance