

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

(Approved by AICTE | Accredited by NAAC with 'A' Grade

Accredited by NBA | Permanently Affiliated to JNTUA)

Karakambadi Road, Tirupati-517507



B.Tech CSE (Data Science)

Course Structure & Syllabus under

R20Regulations

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

Karakambadi Road, TIRUPATI-517507

Semester 0 Induction Program

(Common for all branches)

S.No	Course Name	Category	L-T-P-C
1	Physical Activities-Sports, Yoga and Meditation, Plantation	MC	0-0-6-0
2	Career Counseling	MC	2-0-2-0
3	Orientation to all branches -career options, tools, etc.	MC	3-0-0-0
4	Orientation on admitted Branch - corresponding labs, tools and platforms	EC	2-0-3-0
5	Proficiency Modules &Productivity Tools	ES	2-1-2-0
6	Assessment on basic aptitude and mathematical skills	MC	2-0-3-0
7	Remedial Training in Foundation Courses	MC	2-1-2-0
8	Human Values & Professional Ethics	MC	3-0-0-0
9	Communication Skills-focus on Listening, Speaking, Reading, Writing skills	BS	2-1-2-0
10	Concepts of Programming	ES	2-0-2-0

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

Computer Science & Engineering (Data Science)

B.Tech I Semester (Theory-4, Lab-5, MC-1)

S.No	Course No	Course Name	Category	L-T-P	Credits
1.	MA20ABS101	Linear Algebra and Calculus	BS	3-0-0	3
2.	PH20ABS103	Applied Physics	BS	3-0-0	3
3.	CS20AES101	Problem Solving using C	ES	3-0-0	3
4.	EG20AHS101	Communicative English	HS	3-0-0	3
5.	ME20AES101	Engineering Workshop	ES	0-0-3	1.5
6.	CS20AES103	IT Workshop	ES	0-0-3	1.5
7.	EG20AHS102	Communicative English Lab	HS	0-0-3	1.5
8.	PH20ABS104	Applied Physics Lab	BS	0-0-3	1.5
9.	CS20AES102	Problem Solving using C Lab	ES	0-0-3	1.5
10.	MA20AMC101	Logical Skills for Professionals-I	MC	2-0-0	0.0
				Total	19.5

B.Tech II Semester (Theory-5, Lab-5, MC-1)

S.No	Course No	Course Name	Category	L-T-P/D	Credits
1.	MA20ABS201	Differential Equations and Vector Calculus	BS	3-0-0	3
2.	CH20ABS103	Chemistry	BS	3-0-0	3
3.	EE20AES101	Basic Electrical & Electronics Engineering	ES	3-0-0	3
4.	CS20AES201	Data Structures	ES	3-0-0	3
5.	ME20AES102	Engineering Drawing	ES	1-0-0/2	2
6.	ME20AES103	Engineering Graphics Lab	ES	0-0-2	1
7.	CH20ABS104	Chemistry Lab	BS	0-0-3	1.5
8.	EE20AES102	Basic Electrical & Electronics Engineering Lab	ES	0-0-2	1.5
9.	CS20AES202	Data Structures Lab	ES	0-0-3	1.5
10.	BA20AHS201	Universal Human Values	HS	3-0-0	3
11.	EG20AMC101	Speech & Oral Communication	MC	2-0-0	0.0
				Total	22.5

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

Computer Science and Engineering (Data Science)

B.Tech II Year I Semester (Theory-6, Lab-3,SOC-1,MC-2)

S.No	Course No	Course Name	Category	L-T-P	Credits
1.	MA20ABS303	Discrete Mathematics & Graph Theory	BS	3-0-0	3
2.	AM20APC301	Design and Analysis of Algorithms	PC	3-0-0	3
3.	EC20AES301	Digital Electronics & Micro processors	ES	3-0-0	3
4.	CS20APC303	Database Management Systems	PC	3-0-0	3
5.	IT20APC301	Python Programming	PC	3-0-0	3
6.	CY20APC302	Design and Analysis of Algorithms Lab	PC	0-0-3	1.5
7.	CS20APC304	Database Management Systems Lab	PC	0-0-3	1.5
8.	IT20APC302	Python Programming Lab	PC	0-0-3	1.5
9.	IT20ASC301	Skill Oriented Course-II Exploratory Data Analysis With R	SC	1-0-2	2
10.	CH20AMC201	Mandatory non-credit course-II Environmental Science	MC	2-0-0	0
11	EG20AMC301	Enhancing English Language Skills (Lateral Entry Students only)	MC	2-0-0	0
12	BA20AHS201	Universal Human Values (Lateral Entry Students only)	HS	3-0-0	3
				Total	21.5

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Computer Science and Engineering (Data Science)

B. Tech II Year II Semester (Theory-5,Lab-3,SOC-1,MC-3)

S. No	Course No	Course Name	Category	T-P	Credits
1	MA20ABS401	Numerical Methods, Probability and Statistics	BS	3-0-0	3
2	CS20APC401	Object Oriented Programming Through Java	PC	3-0-0	3
3	IT20APC401	Operating Systems	PC	3-0-0	3
4	DS20APC401	Computer System Architecture	PC	3-0-0	3
5	BA20AHS301	Humanities Elective-I Managerial Economics and Financial Analysis	HS	3-0-0	3
	BA20AHS302	Business Environment			
	BA20AHS303	Organizational Behavior			
6	CS20APC402	Object Oriented Programming Through Java Lab	PC	0-0-3	1.5
7	IT20APC402	Operating Systems Lab	PC	0-0-3	1.5
8	DS20APC402	Computer Organization and Electronics Lab	PC	0-0-3	1.5
9	DS20ASC401	Internet of Things	SC	1-0-2	2
10	CS20AMC401	Mandatory non -credit course-III Design Thinking for Innovation	MC	2-1-0	0
11	SH20AAC401	NSS/YOGA/Cultural Activities/Sports	AC	0-0-2	0
12.	MA20AMC401	Engineering Mathematics (Lateral Entry Students only)	MC	2-0-0	0.0
13	MA20AMC301	Logical Skills for Professionals-II	MC	2-0-0	0
Total					21.5
Community Service project -After the end of IV Semester -4Weeks-1.5Credits					
Honors/Minor courses(Thehoursdistributioncanbe3-0-2or3-1-0also)				0-0-2	0

SRIVENKATESWARACOLLEGE OF ENGINEERING

(Autonomous)

Computer Science and Engineering (Data Science)

B.Tech III Year I Semester (Theory-5, Lab-2, SC-1, MC-2)

NO	Course No	Course Name	Category	L-T-P	Credits
1	DS20APC501	Artificial Intelligence & Machine Learning	PC	3-0-0	3
2	DS20APC503	Automata theory and Compiler Design	PC	3-0-0	3
3	DS20APC505	Data Analytics	PC	3-0-0	3
4	CE20AOE501E C20AOE501EE 20AOE501ME2 0AOE502	Open Elective-I Basics of civil engineering Basic VLSI Design Introduction to control Systems Solar and wind energy systems	OE	3-0-0	3
5	DS20APE501D S20APE502DS 20APE503	Professional Elective-I Data Visualization Techniques Information Storage Management Data Warehousing Data mining	PE	3-0-0	3
6	DS20APC502	Artificial Intelligence & Machine Learning Lab	PC	0-0-3	1.5
7	DS20APC504	Data Analytics Lab	PC	0-0-3	1.5
8	EG20ASC301	Skill Oriented Course-IV Soft Skills	SC	1-0-2	2
9	BA20AMC501	Mandatory non-credit course-IV Constitution of India	MC	2-0-0	0
10	CH20AMC301	Mandatory non-credit course-V Biology for Engineers	MC	2-0-0	0
11	DS20ATS501	Technical Seminar Presentation-I	TS		0.5
12	DS20ACS501	Community Service Project	CS		1.5
13	IT20AMC501	Problem solving & Programming (Lateral Entry Students only)	MC	2-0-0	0
Total					22
14	Honors/Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)			4-0-04	4
15	Honors/Minor courses (NPTEL/MOOCs)			2-0-0	2

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Computer Science & Engineering (Data Science)

B. Tech III Year II Semester (Theory-5, Lab-3,SC-1,MC-1)

S.N O	Course No	Course Name	Category	L-T-P	Credits
1	DS20APC601	Big Data Analytics	PC	3-0-0	3
2	DS20APC603	Cloud Computing	PC	3-0-0	3
3	DS20APC605	Natural Language Processing	PC	3-0-0	3
4	DS20APE601D S20APE602DS 20APE603	Professional Elective-II Data science for Business Informational Retrieval Systems Computer networks	PE	3-0-0	3
5	ME20AOE501E E20AOE503EC 20AOE602CE2 0AOE603	Open Elective-II Industrial Automation Renewable Energy Resources Signal Processing Water Resources Planning &Management	OE	3-0-0	3
6	DS20APC602	Big Data Analytics Lab	PC	0-0-3	1.5
7	DS20APC604	Cloud Computing Lab	PC	0-0-3	1.5
8	DS20APC606	Natural Language Processing Lab	PC	0-0-3	1.5
9	AM20ASC601	Skill Oriented Course-V Web Application Development'	SC	1-0-2	2
10	BA20AMC502	Mandatory non-credit course-V Intellectual Property Rights &Patents	MC	2-0-0	0
11	DS20ATS601	Technical Seminar Presentation II	TS		0.5
12	AM20AMC601	AI Tools Techniques &Applications(for LE Students only)	MC		0
13	Internship (Mandatory)1Month during summer vacation				
	Total				22
14	Honors / Minor courses (The hours distribution can be 3-0-0or3-1-0also)		4-0-0		4
15	Honors/Minor courses(NPTEL/MOOCs)		2-0-0		2

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B.Tech IV Year I Semester (Theory-6, SC-1)

S. No	Course No	Course Name	Category	L-T-P	Credits
1	DS20APE701D S20APE702DS 20APE703	Professional Elective-III Block Chain Technology Predictive Analytics Software Engineering and software project management	PE	3-0-0	3
2	DS20APE704D S20APE705DS 20APE706	Professional Elective-IV Deep Learning Process Mining Advanced Databases	PE	3-0-0	3
3	DS20APE707D S20APE708DS 20APE709	Professional Elective-V Video Analytics Business Intelligence Cryptography & Network Security	PE	3-0-0	3
4	CE20AOE701E E20AOE603ME 20AOE602EC2 0AOE702	Open Elective-III Air Pollution and Quality Control Optimization Techniques Through MATLAB Power Generation Techniques Principles of Communication Engineering	OE	3-0-0	3
5	EE20AOE701E C20AOE705CE 20AOE705ME2 0AOE702	Open Elective-IV Emedded Systems Introduction to Image Processing Low Cost Housing Techniques Roboticsin Industrial Usage	OE	3-0-0	3
6	BA20AHS701 BA20AHS705B A20AHS706	Humanities Elective-II Business Ethics and Corporate Governance Management Science Strategic Management	HS	3-0-0	3
7	DS20ASC701	Skill Oriented Course-V Digital & Social Media Marketing	SC	1-0-2	2
8	DS20AIP701	Internship	IP		3
9	DS20APW701	Project Work Stage-I	PW		2
10	DS20ATS701	Technical Seminar Presentation-III	TS		0.5
					25.5

11	Honors / Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)	4-0-0
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B.Tech IV Year II Semester

S. No	Course No	Course Name	Category	L-T-P	Credits
1	DS20APW801	Project work Stage -II or Full internship in industry	PW	0-0-0	8.5
Total					8.5

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B.Tech-I Sem

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(MA20ABS101) LINEARALGEBRA & CALCULUS

(Common to All Branches)

Course Objectives:

- This course will illuminate the students in the concepts of calculus and linearalgebra.
- To equip the students with standard concepts and tools at an intermediate toadvanced level mathematics to develop the confidence and ability among the students to handle various real-world problems and their applications.

Unit-1:

Matrices

Rank of a matrix by echelon form, normal form. Solving system of homogeneous and non-homo geneous linear equations.Eigen values and Eigen vectors and theirproperties, Cayley- Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilt on theorem, Diagonalisation of a matrix.

LearningOutcomes:

Attheend of this unit, the student willbe ableto

- Solve systems of linear equations, using technology to facilitate row reduction determine the rank, eigen values and eigen vectors. (L3)
- Identify special properties of a matrix, such as positive definite, etc., and use this information to facilitate the calculation of matrix characteristics.(L3)

Unit-2:

MeanValue Theorems

Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof) related problems.

Learning Outcomes:

At the end ofthis unit, the student will be able to

- Translate the given function as series of Taylor's and Maclaurin's with remainders. (L3)
- Analyze the behavior of functions by using mean value theorems. (L3)

Unit-3:

Multivariable Calculus

Partial derivatives, total derivatives, chain rule, change of variables, Jacobian, maxima and minima of functions of two variables, method of Lagrange multipliers.

Learning Outcomes:

At the end of this unit, the student will be able to

- Find partial derivative numerically and symbolically and use them to analyze and interpret the way a function varies. (L3)
- Acquire the Knowledge maxima and minima of Functions of several variables. (L1)

Utilize Jacobian of a coordinate transformation to deal with the problems in change of variables. (L3)

Unit-4:

Multiple Integrals

Double integrals, change of order of integration, change of variables. Evaluation of triple integrals, change of variables between Cartesian, Cylindrical and Spherical polar coordinates.

Learning Outcomes:

At the end of this unit, the student will be able to

- Evaluate double integrals of functions of several variables in two dimensions using Cartesian and polar coordinates. (L5)
- Apply double integration techniques in evaluating areas bounded by region. (L4)
- Evaluate multiple integrals in Cartesian, cylindrical and spherical geometries. (L5)

Unit-5:

Beta and Gamma functions

Beta and Gamma functions and their properties, relation between beta and gamma functions,

Evaluation of definite integrals using beta and gamma functions. Evaluation of double and triple integrals using Beta and Gamma functions.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand Beta and Gamma functions and its relations. (L2)
- Conclude the use of Special function in evaluating definite integrals. (L4)

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.

Reference Books:

1. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
3. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson Publishers, 2011.
4. B.V. Ramana, Higher Engineering Mathematics, McGraw Hill Education.
5. H.K. Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand.
6. N. Bali, M. Goyal, C. Watkins, Advanced Engineering Mathematics, Infinity Science Press.

Course Outcomes:

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

- Develop the use of matrix algebra techniques that is needed by engineers for practical applications. (L6)
- Utilize mean value theorems to real life problems. (L3)
- Familiarize with functions of several variables which are used in optimization. (L3)
- Apply multiple integrals to find the area and volumes for different functions. (L3)
- Analyze the concepts of Beta and Gamma special function for different functions. (L4)

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B.Tech I Sem

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(PH20ABS103) APPLIED PHYSICS

(ECE, EEE, CSE, CSE (AI&ML), IT, CSE (CyberSecurity), CSE (DataScience))

Course Objectives:

- To identify the importance of the optical phenomenon i.e., interference, diffraction and polarization related to its engineering applications.
- To understand the mechanisms of emission of light, the use of lasers as light sources for low and high energy applications, study of propagation of light wave through optical fibers along with engineering applications.
- To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.
- To enlighten the concepts of Quantum Mechanics and to provide fundament also of de Broglie waves, quantum mechanical wave equation and its applications, the importance of free electron theory and band theory of solids.
- Evolution of band theory to distinguish materials, basic concepts and transport phenomenon of charge carriers in semi conductors. To give an impetus on the subtle mechanism of superconductors using the concept of BCS theory and their fascinating applications.

Unit-1:

Wave Optics

Interference- Principle of superposition – Interference of light – Interference by division of wave front and amplitude-Interference in thin films (Reflection Geometry)–Colors in thin films–Newton’s Rings–Determination of wave length

And refractive index–Applications.

Diffraction-Introduction–Fresnel and Fraunhofer diffraction–Fraunhofer diffraction due to single slit, double slit and N-slits(qualitative)–Gratings spectrum–Applications.

Polarization- Introduction – Types of polarization – Polarization by reflection, refraction and double refraction - Nicol’s Prism - Half wave and Quarter wave plates–Applications.

Learning Outcomes:

At the end of this unit, the student will be able to

- Explain the need of coherent sources and the conditions for sustained interference. (L2)
- Identify engineering applications of interference. (L3)
- Analyze the differences between interference and diffraction with applications. (L4)
- Illustrate the concept of polarization of light and its applications. (L2)
- Classify ordinary polarized light and extraordinary polarized light. (L2)

Unit-2:

Lasers and Fiber Optics

Lasers-Introduction-Characteristics of laser-Spontaneous and Stimulated emission of radiation-Einstein's coefficients-Population inversion-Lasing action

- Pumping mechanisms - Nd-YAG laser-He-Ne laser- GaAs Laser - Applications of lasers.

Fiber Optics-Introduction-Principle of optical fiber-Acceptance Angle-Numerical Aperture - Classification of optical fibers based on refractive index profile and modes-Propagation of electromagnetic wave through optical fibers-Attenuation-Optical fiber communication system-Applications.

Learning Outcomes:

At the end of this unit, the student will be able to

- Demonstrate the basic concepts of LASER light Sources. (L2)
- Apply the concepts to learn the types of lasers. (L3)
- Identifies the Engineering application of lasers. (L3)
- Explain the working principle of optical fibers. (L2)
- Classify optical fibers based on refractive index profile and mode of propagation. (L2)
- Identify the applications of optical fibers in various fields. (L3)

Unit-3:

Dielectric and Magnetic Materials

Dielectric Materials-Introduction- Dielectric polarization-Dielectric polarizability, Susceptibility and Dielectric constant -Types of polarizations: Electronic, Ionic and Orientational polarizations (Qualitative)-Lorentz internal field

- Clausius-Mossotti equation- Ferroelectricity -Dielectric Loss-Applications.

Magnetic Materials-Introduction-Magnetic dipole moment-Magnetization-Magnetic susceptibility and Permeability-Origin of permanent magnetic moment-Classification of magnetic materials: (Dia, Para, FerroFerri, & Antiferro)-Domain theory of Ferromagnetism (Qualitative), -Hysteresis-Soft and Hard magnetic materials-Applications.

Learning Outcomes:

At the end of this unit, the student will be able to

- Explain the concept of dielectric constant and polarization in dielectric materials. (L2)
- Summarize various types of polarization of dielectrics. (L2)
- Interpret Lorentz field and Clausius-Mossotti relation in dielectrics. (L2)
- Classify the magnetic materials based on susceptibility and their temperature dependence. (L2)
- Explain the applications of dielectric and magnetic materials. (L2)
- Apply the concept of magnetism to magnetic devices. (L3)

Unit-4:

Quantum Mechanics, Free Electron Theory and Band theory of Solids

Quantum Mechanics-Dual nature of matter-de-Broglie hypothesis-Heisenberg uncertainty principle (Qualitative)-Significance of wave function-Schrodinger's time independent and dependent wave equation-Particle in a one-dimensional finite potential well.

Free Electron Theory- Classical free electron theory (Merits and demerits)-Quantum free electron theory-Equation for electrical conductivity based on quantum free electron theory-Density of States-Fermi-Dirac distribution.

Band theory of Solids- Origin of energy bands- Classification of solids - Bloch's Theorem (Qualitative)-Kronig- Penney model (Qualitative) -Evs k diagram.

Learning Outcomes:

At the end of this unit, the student will be able to

- Explain the concept of dual nature of matter. (L2)
- Explain the significance of wave function. (L2)
- Interpret the concepts of classical and quantum free electron theories. (L2)
- Explain the importance of K-P model. (L2)

- Classify the materials based on band theory. (L2)

Unit-5:

Semi conductor sand Super conductors

Semi conductors-Introduction-In trinsicsemi conductors-Density of charge carriers – Electrical conductivity – Fermi level – Extrinsic semiconductors – Density of charge carriers – Dependence of Fermi energy on carrier concentration and temperature-Drift and diffusion currents-Einstein'sequation-Direct and indirect bandgap semi conductors-Halleffect-Hallco efficient-Applications ofHalleffect.

Super conductors-Introduction-Concept& Properties of super conductors-Meissner effect – Type Iand Type II superconductors – BCS theory – Joseph son effects (ACand DC)-HighT_c super conductors –Applications of super conductors.

Learning Outcomes:

At the end of this unit, the student will be able to

- Interpret the direct and indirect bandgap semi conductors. (L2)
- Identifythetypeofsemiconductor usingHall effect. (L2)
- Identify applications of semiconductors in electronic devices. (L2)
- Explain how electrical resistivityofsolids changes with temperature. (L2)
- Classify super conductors based on Meissner's effect. (L2)

Textbooks:

1. A text book of Engineering Physics – Dr. M.N. Avadhanulu& Dr. P.G. Kshirsagar, S. ChandandCompany,11Edition,2019
- 2.Engineering Physics–B.K. Pandeyand S. Chaturvedi, Cengage Learning,2013

ReferenceBooks:

1. Engineering Physics–Shatendra Sharma, Jyotsna Sharma, Pearson Education,2018
2. Engineering Physics–K. Thyagarajan, McGraw Hill Publishers,2019
3. Engineering Physics - Sanjay D. Jain, D. Sahasrambudheand Girish, UniversityPress,2010
4. Semiconductor physics and devices- Basic principle - DonaldA, Neamen, McGrawHill,2011
5. Solid State Physics, A.J.Dekker, Macmillan EducationUK,1969

6. Kittel's Introduction to Solid State Physics, Charles Kittel, Wiley India Edition Paperback, 2019

Course Outcomes:

- Apply the different realms of physics and their applications in both scientific and technological systems through physical optics. (L3)
- Understand the mechanisms of emission of light, the use of lasers as light sources for low and high energy applications. (L2)
- Understand and the response of electric and magnetic materials to the applied electric and magnetic fields. (L2)
- Apply the quantum mechanical picture of subatomic world along with the discrepancies between the classical estimates and laboratory observations of electron transportation phenomena by free electron theory and band theory. (L3)
- Elaborate the physical properties exhibited by materials through the understanding of properties of semi conductors and super conductors. (L5)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech-ISEm

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3	0	0	3

(CS20AES101) PROBLEM SOLVING USING C (Common to All Branches)

Course Objectives:

- To learn how to solve a given problem.
- To illustrate the basic concepts of C programming language.
- To discuss the concepts of Functions, Arrays, Pointers and Structures.
- To familiar with Dynamic memory allocation concepts.
- To apply concepts of structures and files to solve realword problems.

UNIT-1:

Introduction to Problem Solving: Problem Solving Aspect, Problem Identification, Problem Understanding, Algorithm Development, Solution Planning, Flowcharts, flowgorithm.

Overview of C: History of C, C Language Elements, Basic Structure of C Program, CTokens-Variables and Data Types, Operators, Expressions and Type Conversions.

LearningOutcomes:

The students will be able to

- Develop solution through problem understanding and decomposition(L6).
- Develop basic flowcharts for performing input and output and computations(L3).
- Solve Numerical Problemsusing Flow algorithm (L3).
- UseCbasic concepts towrite simple C programs (L3).

UNIT-2:

Control Statements: Selection Statements-if and switch statements.

Iterative Statements: for, while and do-while statements.

JumpStatements: break and continue statements.

LearningOutcomes:

The students will be able to

- Implement C program using Conditional statements (L2).
- Implement C program using Iteratives statements (L2).

UNIT-3:

Arrays: Declaration, accessing array elements, Storing values, Operations on arrays, Multi-dimensional arrays.

Functions: Introduction, Using Functions, Function declaration, Function definition and Function call, Parameter passing, passing arrays to functions, Recursion, Storage classes.

Learning Out comes: The student's will be able to

- Writing Structured programs using Functions(L5).
- Apply arrays concepts on realtime applications(L6).

UNIT-4:

Pointers: Declaration and Initialization of pointer variables, Pointer arithmetic, Pointers and arrays, Pointer to pointer, Array of pointers, Pointers and functions, Dynamic Memory Allocation.

Strings: Introduction to Strings, String handling functions, Preprocessor Directives.

LearningOutcomes: The students will be able to

- Use pointers to write c Programs (L3).
- Understand the concepts of preprocessors (L2).
- Apply Dynamic Memory Allocation concepts on realtime applications (L6).

UNIT-5:

Structures: Introduction, Nested Structures, Array of Structures, Structures and Functions, Unions.

Files in C: Using Files in C, Read data from Files, Writing data to Files, Random access to files, Command-line Arguments

LearningOutcomes:

The students will be able to

- Use the concepts of Structures and Unions to write C programs (L3).
- Apply various operations on Files (L6).

TextBooks:

1. Reema Thareja, Programming in C, Oxford University Press, AICTE Edition, 2018.
2. R.G. Dromey, "How to Solve it by Computer". 2014, Pearson.

ReferenceBooks:

2. Jeri R. Hanly, Elliot B. Koffman, Problem Solving and Program Design in C, 5/e, Pearson
3. B. A. Forouzan and R. F. Gilberg, Computer Science: A Structured Programming Approach Using C, 3/e, Cengage Learning, 2007.
4. Brian W. Kernighan and Dennis M. Ritchie, the C Programming Language, Second Edition, Prentice Hall Publication.
5. Paul Deitel, Harvey Deitel - C
6. How to Program with an introduction to C++, Eighth Edition

CourseOutcomes:

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

- Solve computational problems (L3).
- Select the features of C language appropriate for solving a problem (L4)
- Design computer programs for real-world problems (L6)
- Organize the data which is more appropriate for solving a problem (L6).

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech I Sem

L	T	P	C
3	0	0	3

(EG20AHS101) COMMUNICATIVE ENGLISH

(Common to all Branches)

Course Objectives:

- To give inputs to students regarding effective listening skills for better comprehension of academic lectures and English spoken by native's speakers.
- To make students aware of reading strategies for comprehension of various academic texts and authentic materials.
- To improve speaking skills through participation in activities such as roleplays, discussions and structured talks/oral presentations.
- To impart effective strategies for good writing and demonstrate the same in summarizing, writing well-organized essays, record and report use ful information.
- To offer relevant inputs regarding grammatical structures and vocabulary and encourage their appropriate use in speech and writing.

Unit-1:

Lesson: On the Conduct of Life: William Hazlitt

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.

Speaking: Asking and answer in general questions on familiar topics such as home, family, work, studies and interests; introducing one self and others.

Reading: Skimming to get the main idea of a text; scanning to look for specific pieces of information.

Reading for Writing: Beginnings and endings of paragraphs Introducing the topic, summarizing the main idea and/or providing a transition to the next paragraph.

Grammar and Vocabulary: Parts of Speech, Prepositions, Word formation-I: Introduction to Word formation, Clauses and Sentences.

Learning Outcomes:

At the end of the module, the learners will be able to Understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information

- Ask and answer general questions on familiar topics and introduce one

self/others

- Employ suitable strategies for skimming and scanning to get the general idea of and extend locate specific information
- Recognize paragraph structure and be able to match beginnings/ endings/ headings with paragraphs
- Form sentences using proper grammatical structures and correct word forms

Unit-2:

Lesson: The Brook: Alfred Tennyson

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts.

Speaking: Discussion in pairs/small groups on specific topics followed by short structured talks.

Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

Writing: Paragraph writing (specific topics) using suitable cohesive devices; mechanics of writing- punctuation, capital letters.

Grammar and Vocabulary: Articles, Word formation-II: Root words from other languages, Punctuation.

Learning Outcomes:

At the end of the module, the learners will be able to

- Comprehend short talks on general topics.
- Participate in informal discussions and speak clearly on a specific topic using suitable discourse markers.
- Understand the use of cohesive devices for better reading comprehension.
- Write well-structured paragraphs on specific topics.
- Identify basic errors of grammar/usage and make necessary corrections in short texts.

Unit-3:

Lesson: The Death Trap: Saki

Listening: Listening for global comprehension and summarizing what is listened to.

Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed.

Reading: Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use textclues for comprehension.

Writing: Summarizing, ParagraphWriting.

Grammar and Vocabulary: Noun-pronoun agreement, Subject-verb agreement, Word formation-III: Prefixes & suffixes from other languages. Principles of Good writing.

Learning Outcomes:

At the end of the module, the learners will be able to

- Comprehend short talks and summarize the content with clarity and precision.
- Participate in informal discussions and report what is discussed.
- Infer meaning so fun familiar words using contextual clues.
- Write summaries based on global comprehension of reading/ listening texts
- Use correct tense forms, appropriate structures and arrange of reporting verbs in speech and writing.

Unit-4:

Lesson: Muhammad Yunus

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.

Speaking: Role plays for practice of conversational English in academic contexts (formal and informal)-asking for and giving information/directions.

Reading: Studying use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communication processes or display complicated data.

Writing: Letterwriting, Essaywriting.

Grammar and Vocabulary: Misplaced Modifiers, Synonyms and Antonyms, Essaywriting.

Learning Outcomes:

At the end of the module, the learners will be able to

- Infer and predict content of spoken discourse.
- Understand verbal and non-verbal features of communication and hold

formal/ informal conversations.

- Interpret graphic elements use in academic texts.
- Produce a coherent paragraph interpreting a figure/graph/chart/table.
Use appropriate language for description and interpretation of graphical elements.

Unit-5:

Lesson: Politics and the English Language: George Orwell

Listening: Identifying key terms, understanding concepts and answering a series of relevant questions.

Speaking: Formal oral presentations on topics from academic contexts-without the use of PPT slides.

Reading: Reading for comprehension.

Writing: Summary writing, Note making.

Grammar and Vocabulary: Clichés, Redundancies, Common Abbreviations, Writing a summary.

Learning Outcomes:

At the end of the module, the learners will be able to

- Take notes while listening to a talk/ lecture and make use of them to answer questions.
- Make formal oral presentations using effective strategies.
- Comprehend, discuss and respond to academic texts orally and in writing.
- Produce a well-organized essay with adequate support and detail.
- Edit short texts by correcting Common Errors.

Web links

1. www.englishclub.com
2. www.easyworldofenglish.com
3. www.languageguide.org/english
4. www.bbc.co.uk/learningenglish
5. www.eslpod.com/index.html
6. www.myenglishpages.com

TextBooks:

1. Language and Life: A Skills Approach-I Edition 2019, Orient Black-Swan.

ReferenceBooks:

1. Bailey, Stephen. Academic writing: A Handbook for International Students, Routledge, 2014.
2. Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking, Heinley ELT; 2nd Edition, 2018.
3. Raymond Murphy's English Grammar in Use, Fourth Edition (2012) E-book.
4. Hewings, Martin. Cambridge Academic English (B2). CUP, 2012.
5. Oxford Learners Dictionary, 12th Edition, 2011.
6. Norman Lewis Word Power Made Easy-The Complete Handbook for Building a Superior Vocabulary Goyal Reprint edition 2011.
7. Speed Reading with the Right Brain: Learn to Read Ideas Instead of Just Words by David Butler; 2nd edition 2014.

CourseOutcomes:

- Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English. (L2)
- Apply grammatical structures to formulate sentences and correct word forms. (L3)
- Analyze discourse markers to speak clearly on a specific topic in informal discussions. (L4)
- Evaluate reading /listening text and to write summaries based on global comprehension of the set texts. (L5)
- Create a coherent paragraph interpreting a figure/graph/chart/table. (L6)

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B. Tech I Sem

(ME20AES101) ENGINEERING WORKSHOP

(Common to all Branches)

Course Description:

This course will provide students with a hands-on experience on various basic engineering practices. This course will also provide an opportunity to the students to experience the various steps involved in the industrial product fabrication.

Course Objectives:

- To familiarize students with basic engineering applications in day-to-day life.

Wood Working :(Any2)

To familiarize with different types of wood and tools used in wood working and make following joints;

1. Planning and Sawing of Wood
2. Half-Lap Joint
3. Mortise and Tenon Joint
4. Dovetail Joint or Bridle Joint

Sheet Metal Working: (Any2)

To familiarize with different types of tools used in sheet metal working, developments of following sheet metal job from GI sheets;

- 1) Rectangular tray
- 2) Conical funnel
- 3) Open scoop

Fitting :(Any1)

To familiarize with different types of tools used in fitting and do the following fitting exercises;

- 1) V-fit
- 2) Square fit
- 3) Dovetail fit

Electrical Wiring:(Any2)

To familiarize with different types of basic electrical circuits and make the following connections;

1. Parallel and series
2. Two-wayswitch
3. Go down lighting
4. Soldering of wires.

Foundry Practice: (Any1)

To familiarize with different types of tools used in Foundry and do the following exercises;

5. Preparation of a greens and mould using single piece pattern
6. Preparation of a greens and mould using split piece pattern with core and demonstration of casting.

Welding Practice :(Any1)

To familiarize with different types of tools used in Welding and other following exercises;

1. Lap joint, but joint and T joint using arc welding
2. Lap joint using resistance spot welding
3. Lap and butt joints using gas welding

Assembling/Disassembling Practice :(Any1)

To familiarize with different types of tools used in Assembling/ Disassembling and do the following exercises;

1. Bicycle
2. Clutch and carburetor
3. Two-wheeler engine parts

Manufacture of a Plastic Component (Any1)

To familiarize with different types of tools used in Manufacture of a Plastic Component and do the following exercises;

1. Use of injection moulding machine
2. FRP composite preparation using hand lay up method
3. Joining of plastic components

Reference Books/Laboratory Manuals:

1. P. Kannaiah and K.L. Narayana, Workshop Manual, SciTech Publishers, 2009.
2. K. Venkata Reddy, Workshop Practice Manual, BS Publications, 2008.
3. V. Ramesh Babu, Engineering Workshop Practice, VRB Publishers Private Limited, 2009.

Additional Learning Resources:

1. R.K. Jain, Production Technology, Khanna Publishers, 17th edition, 2012.
2. Kalpakjian, Serape, Manufacturing Engineering and Technology, Pearson Education, 7th edition, 2014.

Course Outcomes:

After completion of this lab the student will be able to

1. Identify tools, work material, measuring instruments useful for domestic applications (L3).
2. Apply wood working skills in real world applications. (L3)
3. Build different parts with metal sheets in real world applications. (L3)
4. Apply fitting operations in various applications for good strength. (L3)
5. Analyze different types of basic electric circuit connections. (L4)
6. Demonstrate soldering and brazing in joining circuits. (L2)
7. Make moulds for sand casting using standard equipment. (L3)
8. Develop different weld joints for various metals. (L3)
9. Inspect various parts of machine components. (L4)
10. Make plastic components using proper raw material. (L3)

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B. Tech I Sem

(CS20AES103) ITWorkshop
(Common to All Branches)

Course Objectives:

- To make the students to know about the internal parts of computer, Generation of Computers
- To make the students to know how to assemble and disassemble a computer from its parts
- To make the students to install Operating system for a computer.
- To provide technical training to the students on productivity tool like WordProcessor, Spread Sheets, Presentations and LaTeX
- To learn about networking of computers and use Internet facility for browsing and searching

Task1:

Learn about Computer Hardware -1: Identifying the internal parts of computer with its peripherals, Block diagram of Computer, Generations of Computers. Write specifications for each part of a computer including peripherals and specifications of a system. Submit it in the form of report.

Task2:

Learn about Computer Hardware-2: Assemble and disassemble the Personal Computer, Internal and external connections of the computer, Trouble shoot the computer by identifying working and non-working parts. Submit a report about the working and non-working parts in a computer.

Task3:

Installation of Operating System: Linux, Windows 7/8/10 Installation, install both the operating system in a computer and make the system as Dual boot. Student should record the entire installation process.

Task4:

Installation of Device drivers: install supported device drivers for the system- printer drivers, audio and video drivers, Graphic card drivers, USB drivers, install new applications of twareand record the process of installations.

Task5:

Networking: Connecting computers directly using a cable or wireless connectivity and share information, connecting computers using switch/ hubor Local Area Network connection and share information, Wide Area Network Connection, crimpling activity, logical configuration. The entire process has to be documented.

Task6:

Introduction to Web Design: Introduction to Web Design, Introduction to HTML tags, Cascading Stylesheetsand Applications using HTMLandCSS.

Task7:

Introduction to Virus and Antivirus: Types of Virus, virus engine, Antivirus- download freely available Anti-virus software, install it and use it to check for thethreats to the computer being used. Student should submit information about the features of the installation process and antivirusused.

Task8:

Introduction to Microsoft Office-1: Microsoft word, Operations on text data inword- inserting, deleting, Aligning, header, footer, font style, font type, bulleting and numbering, hyperlinking, inserting images, pagesetup, insertingimages, writing equations, formatting Paragraphs, spell checking etc. Student should submit a user manual of the word processor

Task9:

Introduction to Microsoft Office-2: Microsoft Excel, Operation on data in Excel- creating, opening, saving the document as per the requirement, inserting, deletingthe cell data, format the cell, creation of pivot table, applying the formulas andfunctions, preparing charts, converting .xls to csv, etc., Student should submit auser manual of the Spreadsheet.

Task 10:

Introduction to Microsoft Office-3: Microsoft PowerPoint Presentation, creating, opening, savingthe presentations, inserting and deleting the slides, styles forslides, formatting the slides with different fonts, colours, creating charts and tables,

Inserting and deleting text, graphics and animations, bulleting and numbering, hyper linking, running the slideshow, Setting the timing for slide show. Student should submit a user manual of the Power Point presentation.

Task 11:

Introduction to LaTeX: LaTeX and its installation and different IDEs, Creating the document using Latex, content into sections using article and bookclass of Latex.

Styling Pages: Reviewing and customizing different paper sizes and formats. Formatting text, creating basic table, adding simple and dashed border, margin grows and columns, referencing and indexing. Student should submit a user manual of the LaTeX.

References:

1. Introduction to Computers, Peter Norton, McGraw Hill
2. PC Hardware, Maintenance & Trouble shooting In-Depth, Reddy N.S.
3. MOS study guide for Word, Excel, PowerPoint & Outlook Exams, Joan Lambert, Joyce Cox, PHI
4. Introduction to Information Technology, IT Education Solutions limited, Pearson Education.
5. Networking your computers and devices, Rusen, PHI
6. Lamport L. LaTeX: a document preparation system: user's guide and reference manual. Addison-Wesley: 1994

Course Outcomes:

- Identify the internal parts of computers and Generation of Computers. (L1)
- Assemble and disassemble a computer from its parts and prepare the computer ready to use. (L3)
- Installation process of different types Operating system for a computer by their own. (L3)
- Interconnect two or more computers for information sharing. (L4)
- Access the Internet and browse it for required information. (L1)
- Prepare the documents using Word Processor, prepare spreadsheets for calculations using Excel, and documents for LaTeX. (L3)
- Prepare slide presentation using the presentation tool. (L4)

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B. Tech I Sem

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(EG20AHS102) COMMUNICATIVE ENGLISH LAB

(Common to all Branches)

Course Objectives:

- To expose students to a variety of self-instructional, learner-friendly modes of language learning.
- To give inputs on better pronunciation through stress, intonation and rhythm.
- To make students aware of the impact of mother tongue on their use of English.
- To make students aware of the skills of using effective language in Interviews, Group Discussions and Public speaking.
- To equip students with knowledge of the use of computers in resume preparation, report writing, and format making etc.

Unit-1:

1. Phonetics (sound symbols, transcription and Received Pronunciation (R.P), stress and intonation).
2. Describing objects/places/persons.

Unit-2:

1. Role Play/Conversational Practice.
2. JAM.

Unit-3:

1. **Group Discussion:** Types, process, language and body language.
2. **Debate:** Arguing in favor of and against a topic-logical questioning.

Unit-4:

1. **Oral/ Poster Presentations:** Structure, preparation, visual aids and delivery.

2. **Resume Writing:** Definition formats and practice.

Unit-5:

1. **Interview Skills:** Basics of interviews -kinds of interviews- preparation – and performance.
2. **Film/bookreview:** Structure, language and practice.

Suggested Software

Orel, Walden InfoTech, Young India Films.

Reference Books

1. Bailey, Stephen. Academic writing: A Handbook for International Students, Routledge, 2014.
2. Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018.
3. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational. 2016.
4. Hewings, Martin. Cambridge Academic English (B2). Cambridge University Press, 2012.
5. T. Balasubramanian, A Textbook of English Phonetics for Indian Students, 3rd edition; Laxmi publications 2017.

WebLinks

1. www.esllab.com
2. www.englishmedialab.com
3. www.englishinteractive.net

Course Outcomes:

After completing the course, the students will be:

1. Develop to handle and excel in a variety of self-instructional, learner-friendly modes of language learning. (L6)

2. Develop to employ better stress and intonation patterns and utter English sound correctly. (L6)
3. Develop to avoid the impact of mother tongue in English and neutralize their accent. (L6)
4. Develop to participate with skill and confidence in Group Discussions, Interviews and Public Speaking. (L6)
5. Utilize the technical skills to prepare resume, report-writing, and format-making etc. (L3)

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B. Tech I Sem

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(PH20ABS104) APPLIED PHYSICS LAB

(ECE, EEE, CSE, CSE (AI&ML), IT, CSE (CyberSecurity), CSE(DataScience))

Course Objectives:

- Understands the concepts of interference, diffraction and their applications.
- Understand the role of optical fiber parameters in communication.
- Recognize the importance of energy gap in the study of conductivity and Hall Effect in a semi conductor.
- Illustrates the magnetic and dielectric materials applications.
- Apply the principles of semiconductors in various electronic devices.

Note: In the following list, out of 12 experiments, any 10 experiments must be performed in a semester.

List of Applied Physics Experiments:

1. Determine the thickness of the wire using wedge shape method.
2. Determination of the radius of curvature of the lens by Newton's ring method.
3. Determination of wave length by plane diffraction grating method.
4. Determination of dispersive power of prism.
5. Determination of wave length of LASER light using diffraction grating.
6. Determination of particle size using LASER.

7. To determine the numerical aperture of a given optical fiber its acceptance angle.
8. Determination of dielectric constant by charging and discharging method.
9. Magnetic field along the axis of a circular coil carrying current–Stewart Gee’s method.
10. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
11. To determine the energy gap of a semiconductor by temperature by Four-Probe Method.
12. Determination of thermistor negative temperature coefficient of resistance.

References:

1. S. Balasubramanian, M.N. Srinivasan “A Textbook of Practical Physics”- ChandPublishers, 2017.
2. <http://vlab.amrita.edu/index.php-VirtualLabs>, Amrita University.

Course Outcomes:

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

- Utilize optical instruments like microscope and spectrometer. (L3)
- Determine thickness of a hair/paper with the concept of interference. (L5)
- Estimate the wavelength of different colors using diffraction grating and resolving power. (L5)
- Organize the intensity of the magnetic field of circular coil carrying current with distance. (L3)
- Evaluate the acceptance angle of an optical fiber and numerical aperture. (L5)
- Determine the resistivity of the given semiconductor using four probe method. (L5)
- Identify the type of semiconductor i.e., n-type or p-type using hall effect. (L3)
- Determine the bandgap of a given semiconductor. (L5)

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B.Tech I Sem

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(CS20AES102) PROBLEMSOLVINGUSINGCLAB
(Common to All Branches of Engineering)

Course Objectives:

- To learn how to solve a given problem.
- To illustrate the basic concepts of C programming language.
- To discuss the concepts of Functions, Arrays, Pointers and Dynamic Memory Allocation.
- To understand and implement Structures and Unions.
- To familiarize with Files and File Operations.

Week-1: Draw flowcharts for fundamental algorithms.

Week-2: C Programs to demonstrate C-tokens.

Week-3: C Program on usage of operators.

Week-4: C Programs to demonstrate Decision making and branching (Selection).

Week-5: C Programs to demonstrate different loops.

Week-6: C Programs to demonstrate 1-D arrays.

Week-7: C Programs to demonstrate multi-dimensional arrays.

Week-8: C Programs to demonstrate functions.

Week-9: C Programs on pointers.

Week-10: C Programs to perform operation on Strings with String handling functions and without String handling functions.

Week-11: C Programs on Structures and Unions.

Week-12: C Programs to demonstrate Files.

TextBooks:

1. R.G. Dromey, How to Solve it by Computer, 1/e, Pearson Education, 2006.
2. Reema Thareja, Programming in C, Oxford University Press, AICTE Edition, 2018.

ReferenceBooks:

1. B. A. Forouzan and R. F. Gilberg, Computer Science: A Structured Programming Approach Using C, 3/e, Cengage Learning, 2007.
2. Pradip Dey, Manas Ghosh, Programming in C, Oxford University Press, AICTE Edition,
3. B. Gottfried, Programming with C, 3/e, Schaum's outlines, McGraw Hill (India), 2017.
4. Jeri R. Hanly, Elliot B. Koffman, Problem Solving and Program Design in C, 5/e, Pearson.

Course Outcomes:

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

- Build algorithm and flowchart for simple problems.
- Use suitable control structures to solve problems.
- Use suitable iterative statements, arrays and modular programming to solve the problems.
- Implement Programs using pointers and String handling Functions.
- Develop code for complex applications using structures, unions and file handling features

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B.Tech I Sem

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(MA20AMC101) LOGICAL SKILLS FOR PROFESSIONALS-I

(Mandatory Course)

Course Objectives:

- To learn the basic methods to find averages, percentages, Time and Distance and Time and Work concepts extended to problems on trains, Boats and Streams and different shortcut techniques to find the solution in a stipulated time.
- To understand the logic behind the series, coding-decoding, Directions, Problems on ages, Analogy concepts.

Unit-1:

Averages:

- Find the average on some quantities.
- Find the averages on speed and distance.

Ratio and Proportions:

- Ratio between quantities of the same kind.
- Comparison of two ratios and convert into equal fractions.
- Find the 4th, 3rd terms of proportions and mean proportions.

Profit and Loss:

- Find the Profit or Loss on Selling price, cost price and market price.

Unit-2:

Partnership:

- Ratio of division of gains.
- Working and sleeping partners.

Simple Interest and Compound Interest:

- Find the Principal, Rate of interest and time.
- Find the amount of compound interest when the compound interest is Annually or half-year or quarterly or daily.

- Find the difference between the simple and compound interests

Time and Distance:

- Find the time, speed and distance by using direct formula.
- Find the time, speed and distance by using ratios and averages.

Unit-3:

Time and Work:

- The relation between days taken by individuals to complete a given work independently and to complete while working simultaneously or alternately.
- Teams of men, women, children and time taken by the team to complete work independently or while working simultaneously.

Problems on Trains:

- Time Taken by Train to Cross any stationary Body or Platform.
- Time Taken by 2 trains to cross each other.
- Distance covered when two trains are moving in the same/opposite directions.

Boats and streams:

- Find the speed of boat in upstream and downstream.
- Find the speed of boat in still water and **average speed of boat.**

Unit-4:

Series:

- Alphabet series
- Number series
- Alpha-Numeric series

Coding and Decoding:

- Letter coding
- Number/symbol coding
- Substitution coding

Blood relation:

- Based on dialogue or conversation
- Based on puzzles

Unit-5:

Directions:

- The right and left direction movement
- The directional reference point
- The directions of sunrays and shadow

Problems on ages:

- Find the age at present
- Find the age in future
- Find the age in past

Analogy:

- Alphabet analogy
- Number analogy

Text Books:

1. Quantitative Aptitude, 2012, Dr. R.S. Agarwal, S. Chand and Company Ltd, New Delhi.
2. A Modern Approach to Verbal and Non-Verbal Reasoning, 2012, Dr. R.S. Aggarwal, S. Chand and Company Ltd, New Delhi.

Reference Books:

1. Quantitative Aptitude for Competitive Examinations, 14/e, 2010, Abhijit Guha, Tata McGraw Hill Publishers, New Delhi.
2. Course in Mental Ability & Quantitative Aptitude, 3/e, 2012, Edgar Thorpe, Tata McGraw Hill Publishers, New Delhi.
3. Fast Track Objective Arithmetic, 2012, Rajesh Verma, Arihant Publications, Meerut.
4. Reasoning and Aptitude, 2013, Nem Singh, Made Easy Publications, New Delhi

CourseOutcomes:

- Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of Averages - Percentages- Ratio. (L2)
- Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of Partnership - Simple Interest and Compound Interest and time and distance. (L2)
- Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of time and work, problems on trains and Boats and streams. (L2)
- Analyze the techniques in series, coding and decoding and blood relations. (L3)
- Analyze the techniques in directions, problems on ages and analogy. (L3)

(MA20ABS201) DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS (Common to All Branches)

Course Objectives:

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

Unit-1:

Differential equations

Exact, Non-Exact Linear and Bernoulli equations. Applications to Newton's law of cooling and law of natural growth and decay.

Learning Outcomes:

At the end of this unit, the student will be able to

- Identify the essential characteristics of linear differential equations with constant coefficients. (L3)
- Solve the linear differential equations with constant coefficients by appropriate method. (L3)
- Classify and interpret the solutions of linear differential equations. (L3)

Unit-2:

Linear differential equations of higher order

Definitions, homogeneous and non-homogeneous, complementary function, general solution, particular integral, method of variation of parameters, Cauchy's and Legendre's linear equations. Applications to L-C-R circuit.

Learning Outcomes:

At the end of this unit, the student will be able to

- Solve the linear differential equations with variable coefficients by appropriate method. (L3)
- Classify and interpret the solutions of linear differential equations of higher order. (L3)
- Formulate and solve the higher order differential equation by analyzing

physical situations. (L3)

Unit3:

Partial differential equations

Formation of a PDE, Linear partial differential equations of first order, non-linear PDEs of first order(standardforms). Solutions to homogenous linear partial differential equations with constant coefficients, rules for finding the complementary function and the particular integral.

Learning Outcomes:

At the end of this unit, the student will be able to

- Apply appropriate techniques to find solutions of standard PDEs. (L3)
- Outline the basic properties of standard PDEs. (L2)

Unit-4:

Vector differentiation

Scalar and vector point functions, vector operator del, del applies to scalar point functions-Gradient, del applied to vector point functions-Divergence, Curl and their related properties.

Learning Outcomes:

At the end of this unit, the student will be able to

- Apply del to Scalar and vector point functions. (L3)
- Illustrate the physical interpretation of Gradient, Divergence and Curl. (L3)

Unit-5:

Vector integration

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

Learning Outcomes:

At the end of this unit, the student will be able to

- Find the work done in moving a particle along the path over a force field. (L4)
- Evaluate the rates of fluid flow along and across curves. (L4)
- Apply Green's, Stokes and Divergence theorem in evaluation of double and triple integrals. (L3)

Text Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.
2. B.S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.

Reference Books:

1. Dennis G. Zill and Warren S. Wright, Advanced Engineering Mathematics, Jones and Bartlett, 2011.
2. Michael Greenberg, Advanced Engineering Mathematics, 2/e, Pearson, 2018
3. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
4. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
5. B.V. Ramana, Higher Engineering Mathematics, McGraw Hill Education.
6. H. K. Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand.
7. N. Bali, M. Goyal, C. Watkins, Advanced Engineering Mathematics, Infinity Science Press.

Course Outcomes:

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

- Solve the differential equations related to various engineering fields. (L6)
- Solve the linear differential equations of higher order related to various engineering fields. (L6)
- Identify solution methods for partial differential equations that model physical processes. (L3)
- Interpret the physical meaning of different operators such as gradient, curl and divergence. (L5)
- Estimate the work done against a field, circulation and flux using vector calculus. (L5)

SRI VENKATESWARA COLLEGE OF ENGINEERING

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(CH20ABS103) CHEMISTRY

(ECE, EEE, CSE, CSE (AI&ML), IT, CSE (CyberSecurity), CSE (DataScience))

Course Objectives:

- To impart the concept of soft and hardwaters, soft ening methods of hard water.
- To familiarize engineering chemistry and its applications.
- To train the students on the principles and applications of electro chemistry.
- To determine the polymermolecular weights and various applications of polymers.
- To introduce instrumental methods.

Unit1: Water Technology

Introduction –Soft Water and hardness of water, Estimation of hardness of water by EDTAMethod, Estimation of Dissolved Oxygen by Winkler’s method-Boiler troubles– Priming, foaming, scaleandsludge, Causticembrittlement, Domestictreatment of water, specifications for drinking water, Bureau of Indian Standards (BIS) and World Health Organization (WHO) standards, Industrial water treatment, ion-exchange processes- desalination of brackish water, reverseosmosis.

Learning Outcomes:

At theend of this unit, the students will be able to

- List the differences between temporary and permanent hardnes softwater. (L1)
- Explain the principles of reverseosmosis and electro dialysis. (L2)

- Compare quality of drinking water with BIS and WHO standards. (L2)
- Illustrate problems associated with hardwater- scale and sludge. (L2)
- Explain the working principles of different Industrial water treatment processes. (L2)

Unit 2: Modern Engineering materials

Understanding of materials: Crystal field theory – salient features – splitting in octahedral and tetrahedral geometry. Properties of coordination compounds- Oxidation state, coordination, magnetic and colour.

Semiconductor materials, superconductors- basic concept, band diagrams for conductors, semiconductors and insulators, Effect of doping on band structures. Supercapacitors: Introduction, Basic Concept- Classification- Applications.

Nanochemistry: Introduction, classification of nanomaterials, properties and applications of Fullerenes, carbon nanotubes and Graphene's nanoparticles.

Learning Outcomes:

At the end of this unit, the students will be able to

- Explain splitting in octahedral and tetrahedral geometry of complexes. (L2)
- Discuss the magnetic behavior and colour of coordination compounds. (L3)
- Explain the band theory of solids for conductors, semiconductors and insulators. (L2)
- Demonstrate the application of Fullerenes, carbon nanotubes and Graphene nanoparticles. (L2)

Unit 3: Electro chemistry and Applications

Introduction to Electrochemistry: Electrodes-concepts, reference electrodes (Calomel electrode, Ag/AgCl electrode and glass electrode); Electrochemical cell, Nernst equation, cell potential calculations and numerical problems, P^H metry, Potentiometry-potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations).

Electrochemical sensors-potentiometric sensors with examples, perometric sensors with examples.

Primary cells – Zinc-air battery, Secondary cells – Nickel-Cadmium (NiCad), and lithium ion batteries- working of the batteries including cell reactions; Principles and

applications of Fuelcells: hydrogen-oxygen, methanol fuel cells

Learning Outcomes:

At the end of this unit, the students will be able to

- Apply Nernst equation for calculating electrode and cell potentials. (L3)
- Differentiate between pH metry, potentiometric and conductometric titrations. (L2)
- Explain the theory of construction of battery and fuel cells. (L2)
- Solve problems based on cell potential. (L3)

Unit 4: Polymer Chemistry

Introduction to polymers, functionality of monomers, types of polymerization, chain growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation. Calculation of weight average molecular mass of polymers, polydispersity index (PDI).

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

Elastomers-Buna-S, Buna-N-preparation, properties and applications.

Conducting polymers-polyacetylene, polyaniline, polypyrroles-mechanism of conduction and applications.

Learning Outcomes:

At the end of this unit, the students will be able to

- Explain the different types of polymers and their applications. (L2)
- Explain the preparation, properties and applications of Bakelite, Nylon-6,6, and carbon fibres. (L2)
- Describe the mechanism of conduction in conducting polymers. (L2)
- Discuss Buna-S and Buna-N elastomers and their applications. (L2)

Unit 5: Instrumental Methods and Applications

Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law. Principle, instrumentation and applications of UV-Visible, IR Spectroscopies.

Learning outcomes:

After completion of Unit IV, students will be able to:

- Explain the different types of spectral series in electromagnetic spectrum. (L2)
- Understand the principles of different analytical instruments. (L2)
- Explain the different applications of analytical instruments. (L2)

TextBooks:

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

ReferenceBooks:

1. G.V. Subba Reddy, K.N. Jayaveera and C. Ramachandraiah, Engineering Chemistry, McGraw Hill, 2020.
2. D. Lee, Concise Inorganic Chemistry, 5/e, Oxford University Press, 2008.
3. Skoog and West, Principles of Instrumental Analysis, 6/e, Thomson, 2007.

CourseOutcomes:

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

- Estimate the amount of hardness and DO present in water. (L2)
- Compare the materials of construction for battery and electro chemical sensors. (L2)
- Explain the preparation, properties, and applications of thermoplastics & thermosetting, elastomers & conducting polymers. (L2)
- Explain the principles of spectrometry. (L2)
- Apply the principle of Band diagrams in application of conductors and semiconductors. (L3)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech-II Sem

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3	0	0	3

(EE20AES101) BASICELECTRICAL& ELECTRONICS ENGINEERING

Part A: BASIC ELECTRICAL ENGINEERING

(Civil, Mechanical, CSE, CSE(AI&ML) and IT, CSE(CyberSecurity), CSE(DataScience))

CourseObjectives:

- To introduce basics of electriccircuits.
- To teach DC and AC electricalcircuit analysis.
- To explain working principles of transformers and electrical machines.
- To impart knowledge on low voltage electrical installations

Unit-1: DC&AC Circuits

Electrical circuit elements (R - L and C) – Kirchhoff laws - Series and parallel connection of resistances with DC excitation. Nodal and Mesh analysis. Superposition Theorem - Representation of sinusoidal waveforms – average and rms values - phasor representation - real power - reactive power - apparent power - power factor - Analysis of single-phase ac circuits consisting of RL - RC - RLC series circuits.

Learning Outcomes:

The student will be able to

- Recall Kirchoff laws (L2)
- Analyze simple electric circuits with DC excitation (L4)
- Apply network theorems to simple circuits (L3)
- Analyze single phase AC circuits consisting of series RL-RC-RLC combinations (L4)

Unit-2: DC&AC Machines

Construction and working Principle of DC Generator-EMF equations-OCC characteristics of DC generator-principle and operation of DC Motor-Performance Characteristics of DC Motor-Speed control of DC Motor-Construction and working Principle of Single Phase Transformer - OC and SC test on transformer-principle and operation of Induction Motor and Synchronous Generator.

Learning Outcomes:

The student will be able to

- Explain principle and operation of DC Generator & Motor.
- Perform speed control of DC Motor(L2)
- Explain operation of transformer and induction motor. (L2)
- Explain construction&working of induction motor-DC motor

Unit-3: Basics of Power Systems

Layout & operation of Hydro, Thermal, Nuclear Stations - Solar & wind generating stations -Typical AC Power Supply scheme - Elements of Transmission line - Types of Distribution Systems: Primary&Secondary distribution systems.

Learning Outcomes:

The student will be able to

- Understand working operation of various generating stations(L1)
- Explain the types of Distribution systems(L2)

TextBooks:

1. D.P. Kothari&I.J. Nagrath-"BasicElectricalEngineering"-TataMcGrawHill-2010.
2. V.K. Mehta&RohitMehta, "PrinciplesofPowerSystem" -S. Chand-2018.

References:

1. L.S.Bobrow-"Fundamentals of Electrical Engineering"-Oxford University Press-2011.
2. E.Hughes-"Electrical and Electronics Technology"-Pearson- 2010.
3. C.L.Wadhwa-"Generation Distribution and Utilization of Electrical Energy",3rdEdition, New Age International Publications.

Course Outcomes:

- Apply concepts of KVL/KCL in solving DC circuits(L3)
- Choose correct rating of a transformer for a specific application(L5)
- Illustrate working principles of induction motor-DC Motor (L3)
- Identify type of electrical machine based on their operation. (L1)
- Describe working principles of protection devices used in electrical circuits.(L2)

Part 'B' - ELECTRONICS ENGINEERING

Course Objectives:

- Understand principles and terminology of electronics.
- Familiar with the construction, and operation and applications of electronic devices.
- Learn about biasing of BJTs and FETs.
- Understand the concept of logic gates.

Unit-1:

Diodes and Applications: Construction, Operation and VI characteristics of PN Junction diode, Diode as a Switch & Rectifier, Construction and Operation of Half Wave and Full Wave Rectifiers with and without Filters; Operation and VI characteristics of zener diode, zener as voltage regulator; Wave shaping circuits – clippers and clampers, peak detector, voltage doubler, LED, Photo Diode, Varactor diode.

Learning Outcomes:

At the end of this unit, the student will be able to

- Remember and understand the basic characteristics of semiconductor diode. (L1)
- Understand principle of operation of Zener diode and other special semiconductor diodes. (L1)
- Analyze the operation of diode circuits in different applications such as rectifier, wave shaping circuits, etc.

Unit-2:

Transistor Characteristics: Bipolar Junction Transistor (BJT) – Construction, different modes of Operation, Input and Output characteristics of BJT in Common Base, Common Emitter and Common Collector Configurations, Field Effect Transistor (FET) – Classification, Construction, Symbols, Characteristics of JFET, MOSFET,

Applications: Transistor as an amplifier, switch.

Digital Electronics: Number Systems, Logic Gates, Adders - Half Adder, Full Adder;

Flip Flops.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand and principle of operation of BJT in different configurations. (L2)
- Understand and principle of operation of JFET, MOSFET. (L2)
- Understand and the different applications of transistors. (L2)
- Explain the functionality of logic gates. (L2)

Unit-3:

Operational Amplifiers and Applications: Introduction to Op-Amp, Differential Amplifier Configurations, Characteristics of Ideal Op-Amp, Concept of Virtual Ground; Op-Amp Applications - Inverting, Non-Inverting, Summing and Difference Amplifiers, Voltage Follower, Comparator, Differentiator, Integrator.

Communication Systems: Introduction, Elements of communications systems, EM spectrum, Examples of communication systems: Satellite, Fibre Optic, Mobile communication (block diagram approach).

Learning Outcomes:

At the end of this unit, the student will be able to

- Describe operation of Op-Amp based linear application circuits, converters, amplifiers and non-linear circuits. (L2)
- Analyze Op-Amp based comparator, differentiator and integrator circuits. (L3)
- Understand and the basic principles of different communication systems. (L2)

Text Books:

1. D.P.Kothari, I.J.Nagrath, Basic Electrical and Electronics Engineering, McGraw Hill Education (India) Private Limited, 2014.
2. S.K.Bhattacharya, Basic Electrical and Electronics Engineering, 2nd Edition, Pearson India Private Limited.
3. R.L. Boylestad & Louis Nashlesky, Electronic Devices & Circuit Theory, Pearson Education, 2007.

Reference Books:

1. Ramakanth A. Gayakwad, Op-Amps & Linear ICs, 4th Edition, Pearson, 2017.
2. R.P.Jain, Modern Digital Electronics, 3rd Edition, Tata McGraw Hill, 2003.

Course Outcomes:

1. Explain the theory, construction, and operation of electronic devices. (L2)
2. Apply the concept of science and mathematics to explain the working of diodes and its applications, working of transistor and to solve the simple problems based on the applications. (L2)
3. Analyze small signal amplifier circuits to find the amplifier parameters (L5)
4. Design small signal amplifiers using proper biasing circuits to fix up proper Qpoint. (L5)
5. Distinguish features of different active devices including Microprocessors. (L3)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech II Sem

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(CS20AES201) DATASTRUCTURES

(CSE, CSE (AI&ML), IT CSE(Cyber Security) &CSE(Data Science))

CourseObjectives:

- To familiarize with basic techniques of algorithm analysis.
- To familiarize Stacks,Queues using Arrays and LinkedList.
- To Understand Searching and Sorting techniques.
- To learn the concepts of different types of trees and its operations.
- To familiarize with graph algorithms.

Unit-1:

Data Structures: Introduction to Data Structures, Abstract Data Types, analysis and efficiency of algorithms, TimeandSpaceComplexity.

Stack, Stack operations, Implementation using arrays, Applications of stack, Queue, Queue operations, Implementation using arrays, various Queue Structures, Applicationsofqueue.

Learning Outcomes:

Student should be able to

- Analyze the given algorithm to find the time and space complexities.(L4)
- Develop the applications of stack and queue using arrays. (L3)

Unit-2:

Linked lists: Single linked list, Double linked list, Circular linked list, operations onlinked lists, Applications of Linked List.Implementation of Stack using Pointers, Implementation of Queueusing Pointers.

Learningoutcomes:

Studentshouldbeableto

- Implement Stack and Queues using Pointers. (L3)
- Construct the linkedlists for various applications.(L4)

Unit-3:

Searching Techniques: Linear Search, Binary Search and Fibonacci

Search.**Sorting Techniques:** SelectionSort, Insertionsort, MergeSort, QuickSort, And Heapsort.

HashTables: HashFunctions, Collision Handling Schemes, Applications.

Learningoutcomes:

Studentshouldbeableto

- Select sorting technique for a given sorting.(L3)
- Construct Heap and its simple implementation.(L4)

Unit-4:

Trees: Vocabulary and Definitions, BinaryTree, Implementation, Binary Tree Traversal, Binary Search Tree, Implementation, Balanced Search Trees: AVL Trees, Implementation, SplayTrees, Red-BlackTrees.

Learningoutcomes:

Student should be able to

- Explain the concept of a tree. (L2)
- Compare different tree structures. (L4)
- Apply Trees for indexing.(L3)

Unit-5:

Graph Theory: Graphs Terminology, Graph ADT, Data Structures for Graphs-Adjacency Matrix Structure, Graph Traversals, Shortest Paths, Minimum SpanningTrees-Prims'Algorithm, Kruskal'sAlgorithm.

Learning outcomes:

Student should be able to

- Recognize the importance of Graphs in solving realworld problems.(L2)
- Apply various graph traversal methods to applications. (L3)
- Design a minimum cost solution for a problem using spanning trees.(L4)

TextBooks:

1. Data Structures and Algorithm Analysis in C, Mark Allen Weiss, Second Edition, 2002, Pearson.
2. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Third Edition, 2010, PHI.

3. Data Structures and Algorithms Made Easy by Narasimha Karumanchi,2020, CareerMonkPublications.

ReferenceBooks:

1. Fundamental of Data Structures in C, Horowitz, Sahani, Anderson-Freed, SecondEdition, 2008, UniversitiesPress.
2. Classic Data Structures, Debasis Samantha, SecondEdition,2009, PHI

CourseOutcomes:

- Analyze the problems using asymptoticnotations.(L4)
- Apply Stack, Queues and linkedlist to solve different applications.(L3)
- Demonstrate suitable sorting techniquesfor therealworld problem. (L4)
 - Implement tree structures in different patterns of representation of data.(L3)
- Analyze the given problem using graph traversal techniques.(L4)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech IISem

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1	0	2	2

(ME20AES102) ENGINEERING DRAWING (Common to all Branches of Engineering)

Engineering drawing being the principal method of communication for engineers

Course Objectives:

To introduce and make the students

- To use drawing instruments and to draw polygons, engineering curves.
- To draw orthographic projections of points, lines & planes.
- To draw the projections of the various types of solids in different positions inclined to one and both the planes.
- To draw the projections of sectional views of various types of right regular solids.
- To draw the development of regular solids.

Unit-1:

Introduction to Engineering Drawing:

Principles of Engineering Drawing and its Significance- Conventions in drawing- lettering – BIS conventions.

- a) Conic sections (General Method only) including Rectangular Hyperbola.
- b) Cycloid, Epicycloid and Hypocycloid.
- c) Involute.

Learning Outcomes:

At the end of this unit the student will be able to

- Understand the significance of engineering drawing. (L2)
- Identify and draw curves obtained in different conic sections. (L3)
- Draw different curves such as cycloids and involutes. (L3)

Unit-2:

Projection of Points, Lines and Planes: Projection of Points in any quadrant, lines inclined to one or both planes, finding true lengths, angle made by line. Projections of regular plane surface sinclined to one or both the planes.

Learning Outcomes:

At the end of this unit the student will be able to

- Understand the meaning of projection and draw the projections of points & lines. (L2)
- Differentiate between projected length and true length and find the true length of the lines. (L2)
- Draw the projection of regular plane surfaces. (L3)

Unit-3:

Projections of solids: Projections of regular solids inclined to one or both planes by rotation or auxiliary view method.

Learning Outcomes: At the end of this unit the student will be able to

- Understand the procedure to draw projection of solids. (L2)
- Draw the projection of solids inclined to one plane. (L3)
- Draw the projection of solids inclined to both the planes. (L3)

Unit-4:

Sections of solids: Section planes and sectional view of right regular solids-prism, cylinder, pyramid and cone. True shapes of the sections.

Learning Outcomes: At the end of this unit the student will be able to

- Understand different sectional views of regular solids. (L2)
- Obtain the true shapes of the sections of prism, cylinder, pyramid and cone. (L4)
- Draw the sectional views of prism, cylinder, and pyramid and cone. (L3)

Unit-5:

Development of surfaces: Development of surfaces of right regular solids-prism, cylinder, pyramid, cone and their sectional parts.

Learning Outcomes:

At the end of this unit the student will be able to

- Understand the meaning of development of surfaces. (L2)
- Draw the development of regular solids such as prism, cylinder, pyramid and cone. (L3)

- Obtain the development of sectional parts of regular shapes. (L4)

Text Books:

1. K.L.Narayana & P.Kannaiah, Engineering Drawing, 3/e, SciTech Publishers, Chennai, 2012.
2. N.D.Bhatt, Engineering Drawing, 53/e, Charotar Publishers, 2016.

Reference Books:

1. Dr K.Prahlada Rao, Dr.S.Krishnaiah, Prof.A.V.S.Prasad, Engineering Graphics, Amaravati publications.
2. Dhanajay A Jolhe, Engineering Drawing, Tata McGraw-Hill, Copyright, 2009.
3. Venugopal, Engineering Drawing and Graphics, 3/e, New Age Publishers, 2000.
4. Shah and Rana, Engineering Drawing, 2/e, Pearson Education, 2009.
5. K.C.John, Engineering Graphics, 2/e, PHI, 2013.
6. Basant Agarwal & C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, Copyright, 2008.

Course Outcomes:

After completing the course, the student will be able to

- **Draw** basic geometrical constructions, curves used in engineering practices. (L1)
- **Understand** the concept of projection and acquire visualization skills, projection of points, Lines and Planes. (L2)
- **Illustrate** the projections of solids graphically. (L3)
- **Draw** and explore the sectional views of right regular solids. (L3)
- **Draw** the development of surfaces of solids. (L3)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech II Sem

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0	0	2	1

(ME20AES103) ENGINEERING GRAPHICS LAB

(Common to all Branches of Engineering)

Course Objectives:

- Instruct the utility of drafting & modelling packages in orthographic and isometric drawings.
- Train the usage of 2D and 3D modelling.
- Develop the graphical skills for communication of concepts, ideas and design of engineering products through technical drawings

Introduction to Auto CAD: Basic drawing and editing commands: line, circle, rectangle, erase, view, undo, redo, snap, object editing, moving, copying, rotating, scaling, mirroring, layers, templates, polylines, trimming, extending, fillets, arrays, dimensions.

Exercises:

1. Practice exercise using basic drawing commands(4No's).
2. Practice exercise using editing commands(4No's).

Orthographic and Isometric Projections

Orthographic Projections: Systems of projections, conventions and application to orthographic projections.

Isometric Projections: Principles of isometric projection- Isometric scale; Isometric views: lines, planes, simple solids.

Exercises:

1. Practice exercises on Orthographic Projections(4No's).
2. Practice exercises on Isometric Projections(4No's).

TextBooks:

1. K. Venugopal, V. PrabhuRaja, Engineering Drawing+AutoCad, New Age International Publishers.
2. Engineering Drawing, NDBhatt, Charotar Publishing House.

3. EngineeringDrawing, K.L Narayana, SciTechPublishers.

4.D.M. Kulkarni, A.P. Rastogi, A.K. Sarkar, EngineeringGraphics with Auto CAD, PHI Learning PrivateLimited, NewDelhi, Revisededition,2010.

Course Outcomes:

After completing the course using CAD package, the student will be able to

- **Draw** the basic views related to projections of Lines, Planes. (L1)
- **Draw** the basic views related to projections of Planes. (L1)
- **Illustrate** orthographic views of simple objects. (L3)
- **Illustrate** is ometric projections of simple solids. (L3)
- **Interpret** and comprehend with drafting packages for engineering practice.
(L2)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech II Sem

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(CH20ABS104) CHEMISTRYLAB

(ECE, EEE, CSE, CSE (AI&ML), IT, CSE (CyberSecurity), CSE (DataScience))

Course Objectives:

- Verify the fundamental concepts with experiments

Note: In the following list, out of 12 experiments, any 10 experiments must be performed in a semester

List of Chemistry Experiments:

1. Determination of Hardness of a groundwater sample.
2. Estimation of Dissolved Oxygen by Winkler's method.
3. Conductometric titration of (i) strong acid vs. strong base, (ii) weak acid vs. strong base.
4. Determination of cell constant and conductance of solutions.
5. Potentiometry-determination of redox potentials and emfs.
6. Determination of Strength of an acid in Pb-Acid battery.
7. Preparation of Bakelite
8. Verify Lambert-Beer's law.
9. Thin layer chromatography.
10. Identification of simple organic compounds by IR.
11. Preparation of nanomaterials by precipitation.

12. Estimation of Ferrous Iron by Dichrometry.
13. pH metric titration of (i) strong acid vs. strong base, (ii) weak acid vs. strong base

Reference Books:

1. Vogel's Text book of Quantitative Chemical Analysis, Sixth Edition – Mendham et al., Pearson Education, 2012.
2. Chemistry Practical–Lab Manual, First edition, Chandra Sekhar KB, Subba Reddy GV and Jayaveera KN, SM Enterprises, Hyderabad, 2014.
3. Chemistry Laboratory Manual, Sri Krishna Hitech Publishing Company Pvt. Ltd, 2nd Edition, A Ravi Krishanan, B Tirumalarao, 2020-2021.

Course Outcomes:

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

- Determine the cell constant and conductance of solutions. (L3)
- Prepare advanced polymer-Bakelite. (L2)
- Measure the strength of an acid present in secondary batteries. (L3)
- Analyse the IR of some organic compounds. (L3)
- Estimate the amount of dissolved oxygen in water. (L3)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech II Sem

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0	0	3	1.5

(EE20AES102) BASIC ELECTRICAL & ELECTRONICS ENGINEERING LAB

(Civil, Mechanical, CSE, CSE (AI&ML) and IT, CSE (CyberSecurity), CSE (DataScience))

PartA: Electrical Engineering Lab

Course Objectives:

- To Verify Kirchoff's laws.
- To verify Super position theorem.
- To learn performance characteristics of DC Machines.
- To perform open circuit & Short Circuit test on 1-Phase Transformer.
- To Study the I-V Characteristics of Solar PV Cell.

List of experiments: -

1. Verification of Kirchhoff's laws.
2. Verification of Super position Theorem.
3. Open circuit characteristics of a DC Shunt Generator.
4. Speed control of DC Shunt Motor.
5. OC & SC test of 1-Phase Transformer.
6. Braketest on 1-Phase Induction Motor.
7. I-V Characteristics of Solar PV cell
8. Braketest on DC Shunt Motor.

Course Outcomes:

Student will be able to.

- Verify Kirchoff's Laws & Super position theorem. (L3)
- Perform testing on AC and DC Machines. (L5)
- Study I-V Characteristics of PV Cell. (L2)

PartB: ElectronicsEngineeringLab

Course Objectives:

- To verify the theoretical concepts practically from all the experiments.
- To analyze the characteristics of Diodes, BJT.
- To analyze the frequency response of amplifier circuits.
- Exposed to linear and digital integrated circuits.

List of Experiments:

1. PN Junction diode characteristics A) Forward biasB)Reversebias.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Full Wave Rectifier with&without filter.
4. Wave Shaping Circuits. (Clippers&Clampers)
5. Input&Output characteristics of TransistorinCB / CEconfiguration.
6. Frequency response of C Eamplifier.
7. Inverting and Non-inverting amplifiersusing Op-AMPs.
8. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gatesusing ICs.
9. Verification of Truth Tables of S-R, J-K&D flipflopsusingrespective ICs.

Tools/Equipment Required:

DC Powersupplies, Multimeters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, allthe required activedevices.

Course outcomes:

- Learn the characteristics of basic electronic devices like PN junction diode, Zener diode & BJT.
- Construct the given circuit in the lab.
- Analyze the application of diode asrectifiers, clippersand clampersand other circuits.
- Design simple electronic circuits and verify its functioning.

Note: Minimum Six Experiments to be perform edineach section.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech II Sem

L	T	P	C
0	0	3	1.5

(CS20AES202) DATASTRUCTURESLAB

(CSE, CSE(AI&ML) and IT, CSE(Cyber Security), CSE(Data Science))

Course Objectives:

- To strength entheability to identify and apply the suitable data structure for the given real-world problem.

Tasks:

1. Demonstrate recursive algorithms with examples.
2. Develop a program to perform operations of a Stack and Queue using arrays.
3. Implement and perform different operation son Single, Double and Circular Linked Lists.
4. Develop a program to perform operations of Stack and Queue using Linked Lists.
5. Develop a program to implement Stack applications.
6. Implement Circular Queues.
7. Implement various Searching techniques.
8. Develop programs for different Sorting techniques.
9. Developa program to represent a Tree Data Structure.
10. Develop a program to demonstrate operations on Binary Search Tree.
11. Demonstrate Graph Traversal Techniques.
12. Develop a program to find Minimum Cost Spanning tree.

TextBooks:

1. Data Structures and Algorithm Analysis in C, Mark Allen Weiss, Second Edition, 2002, Pearson.
2. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Third Edition, 2010, PHI.
3. Data Structures and Algorithms Made Easy by Narasimha Karumanchi, 2020, Career Monk Publications.

Course Outcomes:

- Demonstrate the concept of Recursion for solving a problem. (L4)
- Choose and implement linear data structure to solve problems. (L3)
- Develop programs for searching and sorting algorithms. (L3)
- Select and implement suitable nonlinear data structure for solving a problem. (L3)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech II Sem

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(BA20AHS201) UNIVERSAL HUMAN VALUES (Mandatory Course)
(ME, CSE, IT, AI&ML, CSE (CyberSecurity), CSE (Data Science))

Course Objectives:

The objective of the course is four fold:

- Development of a holistic perspective based on self-exploration about them selves(humanbeing), family, society and nature/existence.
- Understanding(ordevelopingclarity) of the harmony in the human being, family, societyand nature/existence.
- Streng the ning of self-reflection.
- Development of commitment and couragetoact.

Unit-1:

Course Introduction-Need, Basic Guidelines, Content and Process for Value Education

- Purpose and motivation for the course, recapitulation from Universal Human Values-I.
- Self-Exploration-what is it? Its content and process; 'Natural Acceptance' and Experiential Validation-as the process for self-exploration.
- Continuous Happiness and Prosperity-A look at basic Human Aspirations.
- Right understanding, Relationship and Physical Facility-the basic requirements for fulfilment of aspirations of every human being with their correctpriority.
- Understanding Happiness and Prosperity correctly-A critical appraisal of the current scenario.
- Methods to fulfil the above human aspirations: understanding and living in harmony at various levels.

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

Unit-2:

Understanding Harmony in the Human Being-Harmony in Myself!

- Understanding human being as co-existence of the sentient 'I' and the material 'Body'.
- Understanding the needs of Self('I') and 'Body' -happiness and physical facility.
- Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer).
- Understanding the characteristics and activities of 'I' and harmony in 'I'.
- Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail.
- Program to ensure Sanyam and Health.

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

Unit-3:

Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

- Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundation and values of relationship.
- Understanding the meaning of Trust; Difference between intention and competence.
- Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship.
- Understanding the harmony in the society (society being an extension of family):
- Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive

HumanGoals.

- Visualizing a universal harmonious order in society-UndividedSociety, Universal Order-from family to world family.

Include practice sessions to reflect on relationships in family, hostel and institute asexextended family, real life examples, teacher-student relationship, goal of educationetc. Gratitude as a universal value in relationships. Discuss with scenarios, elicit examples from students' lives.

Unit-4:

Understanding Harmony in the Nature and Existence-Whole existence as Co-existence

- Understanding the harmonyin the Nature.
- Interconnectedness and mutual fulfilment among the four orders of nature recyclability and self-regulationinnature.
- Understanding Existence as Co-existence of mutually interacting units in all pervasive Space.
- Holisticperception of harmonyatall levels of existence. Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" canbeused), pollution, depletion of resources and role of technology etc.

Unit-5:

Implications of the above Holistic Understanding of Harmony on Professional Ethics

- Na
turalacceptanceofhumanvalues.
- Definitiveness of Ethical Human Conduct.
- Basis for Humanistic Education, Humanistic Constitution and Humanisticuniversal order
- Competence in professional ethics: *a.* Ability to utilize the professional competence for augmenting universal human order *b.* Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, *c.* Ability to identify and develop appropriate technologies and management patterns for above production systems.
- Case studies of typical holistic technologies, management models and production systems
- Strategy for transition from the present state to Universal Human Order:

- a. At the level of individual: associably and ecologically responsible engineers, technologists and managers.
 - b. At the level of society: as mutually enriching institutions and organizations
- Sumup: Include practice Exercises and Case Studies will be taken up in Practice(tutorial) Sessions.
E.g., To discuss the conduct a an engineer or Scientist etc.

TextBooks:

1. RR Gaur, RAsthana, GP Bagaria, "A Foundation
2. Course in Human Values and Professional Ethics", 2nd Revised Edition, ExcelBooks, New Delhi, 2019. ISBN 978-93-87034-47-1.
3. RR Gaur, RAsthana, GP Bagaria, "Teachers' Manual for A Foundation Course in Human Values and Professional Ethics", 2nd Revised Edition, ExcelBooks, New Delhi, 2019. ISBN 978-93-87034-53-2.

ReferenceBooks:

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

CourseOutcomes:

By the end of the course,

- Understanding the value of education to become more aware of themselves, and their surroundings (family, society, nature). (L2)
- Utilize the concept of human being-harmony in my self become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. (L3)
- Understanding the concepts of society-harmony in human for better critical ability. (L2)
- Understanding the human values, human relationship and human society to become sensitive to their commitment. (L2)
- Apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction. (L3)

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(EG20AMC101) SPEECH AND ORAL COMMUNICATION (Mandatory Course)
(Common to All Branches)

Course Objectives:

- To improve the language proficiency of the students in English by practicing with is/herpeers.
- To impart creative skills for professional development.
- To develop the communication skillsoft he students in both formal and informal situations.
- To develop extensive speaking skills and comprehension for career growth.

Detailed Syllabus:

Unit-1:

Story Telling (Narrate a story)

1. Biography description (Describe a freedom fighter/politician/athlete/celebrityetc.)
2. Speechnsounds
3. Formal Conversation (Enact official Telephone conversation/Telephone interviewetc.) Verbforms, Subject-Verbageement, Vocabulary).

Unit-2:

1. Stress in Speech
2. English Puzzle solving (Finding cross words from table)
3. Fun with English (Speechnthroughgrammar-changingtense, voiceofthesentences)
4. Open Talk with CM (Funny interview with classmates) Voice, Speech.

Unit-3:

1. Intonation
2. If I'ma.... What would I do? (Student enact... and describe their choice swhatt hey would do?)
3. Language Translation (Dialogues/jokes/proverbs/quotations-Regional language to English)
4. Mock Assembly (Student enact speaker, MLA, CM and opposition leaders in Assembly) Wh- Questions, Question tags.

Unit-4:

1. Tonguetwisters/ pronounce it....
2. Humorous Play (Playing jokes/Telling funny dialogues in English)
3. Celebrity Interview (Enact Play), Spotting Errors, Etiquettes

Unit-5:

News Reader (Prepare funny news and read on Dias)

1. Film Review (A critique on regional language films by students)
2. Movie Script Narration (Subject-Verb agreement, Tenses)

Reference books:

1. K. R. Lakshmi Narayanan, A Coursebook on English, SCITECH publications Pvt. Ltd, Hyd, 2009.
2. Sanjay Kumar & Pushp Lata, Communication skills, Oxford university press, New Delhi, 2019.
3. M. Ashraf Rizvi, Effective Technical Communication, Tata McGraw-Hill, New Delhi, 2017.

Additional Learning Resources:

1. <https://www.bbc.co.uk/skillswise/english>
2. <https://www.nonstopenglish.com>
3. <https://www.grammarly.com/blog/>

Course Outcomes:

- Improve the neutral accent and be free from mother tongue influence. (L6)
- Hypothesizing small talk on general topics and learn critiquing skills by participating in Conversations. (L6)
- Applying Vocabulary and using it in their day-to-day life. (L4)
- Understanding and mastering in verbal and non-verbal communication. (L2)

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(MA20ABS303) DISCRETE MATHEMATICS AND GRAPH THEORY (CSE, AI&ML, IT, CSD)

Course Objectives:

- To describe logical sentence structure in terms of predicates, quantifiers, and logical connectives in theory of inference for the statement calculus. (L2)
- To demonstrate the application of basic methods of discrete mathematics in Computer Science problem solving. (L3)
- To explain about the Graph theory and Recurrence relations. (L5)
- To reveal the concepts of graph theory which is applied in addressing the problems related to computer science. (L3)
- To introduce the mathematical concepts which will be useful to study advanced courses such as Design and Analysis of Algorithms, Theory of Computation, Cryptography and Software Engineering etc. (L4)

UNIT-1: Mathematical logic:

Statements and Notation, Connectives-Negation, Conjunction, Disjunction, Conditional and Bi-conditional, Statement formulas and Truth Tables. Well-formed formulas, Tautologies, Equivalence of Formulas, Duality Law, Tautological Implications.

Normal Forms: Disjunctive Normal Forms, Conjunctive Normal Forms, Principal Disjunctive Normal Forms (PDNF), Principal Conjunctive Normal Forms (PCNF).

The Theory of Inference for the Statement Calculus: Rules of Inference, Consistency of Premises and Indirect Method of Proof.

The predicate Calculus, and Inference theory of the Predicate Calculus: Predicates, the statement function, variables and quantifiers, predicate formulas, free and bound variables, the universe of discourse, valid formulas and equivalences, some valid formulas over finite universe, special valid formulas involving quantifiers, theory of inference for the predicate calculus.

Learning Outcomes:

At the end of this unit, the student will be able to

- Describe logical sentences in terms of predicates, quantifiers, and logical connectives. (L2)
- Evaluate basic logic statements using truth tables and the properties of logic. (L5)
- Apply rules of inference to test the consistency of premises and validity of arguments and verify the equivalence of two formulas and their dual. (L3)
- Find the Principal Conjunctive and Principal Disjunctive Normal Forms of a statement formula. (L1)

UNIT–II: Set Theory:

Basic concepts of Set theory: Notation, inclusion and equality of sets, the powerset, some operation on sets, Venn diagrams, some basic set identities, Cartesian products.

Relations and Ordering: Relations, properties of binary relations in a set, relation matrix and the graph of a relation, partition and covering of a set, equivalence relations, compatibility relations, composition of binary relations, and partial ordering, Hasse Diagram.

Functions: Definition and introduction, composition of functions, inverse functions, binary and n-ary operations, characteristic function of a set.

Learning Outcomes:

At the end of this unit, the student will be able to

- Describe the basic concepts of set theory. (L2)
- Describe equivalence, partial order and compatible relations. (L2)
- Describe functions and composition of functions. (L2)
- Describe binary and n-ary operations. (L2)

UNIT–III:

Algebraic Structures

Algebraic Systems: Examples and General Properties.

Semi Groups and Monoids: Definitions and examples, homomorphism of semi groups and Monoids, Sub semi groups and Sub Monoids.

Groups: Definition and examples, subgroups and homomorphisms, cosets and Lagrange's theorem, normal subgroups, algebraic systems with two binary operations.

Learning Outcomes:

At the end of this unit, the student will be able to

- Describes the properties of Semigroups. (L2)
- Describes the properties of Monoids. (L2)
- Describes the properties of Groups. (L2)

UNIT– IV: Recurrence Relations:

Recurrence Relations: Generating Functions of Sequences, Calculating Coefficients of Generating Functions, Recurrence Relations, Solving Recurrence Relations by Substitution and Generating Functions, The method of Characteristic Roots, Solution of In-homogeneous Recurrence Relations.

Learning Outcomes:

At the end of this unit, the student will be able to

- Find the generating functions for a sequence. (L1)
- Solve recurrence relations by using the method of Characteristic root and Generating functions. (L3)

UNIT–V: Graph Theory:

Graphs: Basic Concepts, Isomorphism and Subgraphs, Planar Graphs, Euler's Formula, Multigraphs and Euler Circuits, Hamiltonian Graphs.

Graph coloring: Chromatic Number, The Four-Color Problem.

Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees.

Algorithms to find a spanning tree in connected graph: Minimum spanning tree, Depth first search (DFS) algorithm, Breadth first search (BFS) algorithm and Kruskal's algorithm.

Learning Outcomes:

At the end of this unit, the student will be able to

- Investigate if a given graph is simple or a multigraph, directed or undirected, cyclic or acyclic. (L6)
- Apply the concepts of functions to identify the Isomorphic Graphs and Identify Euler Graphs, Hamilton Graph. (L3)
- Describes Graph coloring and chromatic number of a graph. (L2)
- Apply depth-first and breadth-first search algorithm to find a minimum spanning tree. (L3)
- Apply Kruskal's algorithms to find a minimum spanning tree. (L3)

TextBooks:

- J P Tremblay and R Manohar, "Discrete Mathematical Structures with Applications to Computer Science", 1st Edition, Mc GrawHill, 2017 (For Unit I & II).

- Joe L. Mott. Abraham Kandel and Theodore P. Baker, "Discrete Mathematics for Computer Scientists & Mathematicians", 2nd Edition, Pearson, 2008. (for Units III to V).

Reference Books:

- Kenneth Rosen, "Discrete Mathematics and Its Applications (SIE)", 7th Edition, McGraw-Hill.
- Ralph P. Grimaldi and B.V. Ramana, "Discrete and Combinatorial Mathematics, an Applied Introduction", 5th Edition, Pearson, 2016.
- Narsingh Deo, "Graph Theory with Applications to Engineering", Prentice Hall, 1979.
- S. Malik and M.K. Sen, "Discrete Mathematics theory and Applications", 1st Edition, Cengage Learning, 2012.
- L. Liu and D. Mohapatra, "Elements of Discrete Mathematics, A computer Oriented approach", 4th edition, McGraw-Hill, 2018.
- Dr. D.S. Chandra Sekharaiah, "Mathematical foundations of computer science", 3rd edition Prism Books Pvt. Ltd.

Course Outcomes:

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

- Apply mathematical concepts and logical reasoning to solve problems in different fields of Computer science and information technology (L3).
- Apply the properties of Set theory to find Equivalence and Partial Ordering relations and Hasse Diagrams for different functions (L3).
- Analyse the properties of Algebraic Structures to find the given sets are Semigroup, Monoids and Groups (L4).
- Analyse the concepts of Generating and Recurrence relations for solving Homogeneous and In-Homogeneous equations (L4).
- Investigate the graphs are Isomorphic Graphs, Euler and Hamilton Graphs (L6).

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(AM20APC301) DESIGN AND ANALYSIS OF ALGORITHMS (CSE, CSM, IT, CSD)

Course Objectives:

- Demonstrate the importance of the complexity of a given algorithm.
- Illustrate various algorithm design techniques.
- Make use of datastructures and/oralgorithmic design techniques in solving new problems.
- Explain the advanced algorithm design and analysis techniques.
- Identify and understand basic computability concepts and the complexity classesP, NP, and NP-Complete.

UNIT I

Introduction: What is an Algorithm, Algorithm specification, Performance analysis.

Divide and Conquer: General method, BinarySearch, Finding the maximum and minimum, Mergesort, QuickSort, Selectionsort, Strassen’s matrix multiplication.

Learning Outcomes:

At the end of this unit, the student will be able to

- Analyze the complexity of Algorithms.(L4)
- Identify with mathematical formulation, complexity analysis and methodologies to solve recurrence relations for algorithms. (L3)
- Analyze different scenarios for running time of algorithms using asymptotic notations and Designusing Recursion. (L4)
- Apply divide and conquer strategy for design of various algorithms. (L3)
- Compare complexities of Mergesort, Quick sort and Selection sort techniques. (L2)

UNIT II

Greedy Method: General method, Knapsack problem, Job Scheduling with Deadlines, Minimum cost Spanning Trees, Optimal storage on tapes, Single-sourceshortest paths.

Dynamic programming: General Method, Multistage graphs, All-pairs shortest paths, Optimal binary search trees, 0/1 knapsack, The traveling sales person problem.

Learning Outcomes:

At the end of this unit, the student will be able to

- Decide and apply algorithmic strategies to solve given problem. (L5)
- Develop algorithms for wellknown problems using greedy methods. (L3)
- Define Principle of optimality with examples. (L1)
- Contrast Greedy and Dynamic programming paradigms. (L2)
- Apply dynamic-programming approach for designing graph and matrix based algorithms. (L3)

UNIT III

Basic Traversal and Search Techniques: Techniques for binary trees, Techniques for Graphs, Connected components and Spanning trees, Bi-connected components and DFS

Back tracking: General Method, 8-queens' problem, Sum of subsets problem, Graph coloring and Hamiltonian cycles, Knapsack Problem.

Learning Outcomes:

At the end of this unit, the student will be able to

- Define solution space tree. (L1)
- Illustrate graph search strategies: BFS, DFS and D- Search. (L2)
- Demonstrate the recursive and iterative back tracking algorithms. (L2)
- Apply back tracking strategy to solve N-queens' problem, Sum of subsets problem and Knapsack problem. (L3)

UNIT IV

Branch and Bound: The method, Travelling sales person, 0/1 Knapsack problem, Efficiency Considerations.

String Matching: The Naive String-Matching algorithm, The Rabin-Karp algorithm, String matching with Finite Automata, The Knuth-Morris-Pratt algorithm.

Learning Outcomes:

At the end of this unit, the student will be able to

- Find optimal solution by applying various methods. (L1)
- Analyze the advantage of bounding functions in Branch and Bound technique to solve the Travelling Sales person

problem. (L4)

- Apply the knowledge to find patterns in the given text. (L3)

UNIT V

NP-Hard and NP-Complete Problems: NP-Hardness, NP-Completeness, Consequences of being in P, Cook's Theorem, Reduction Source

Problems, Reductions: Reductions for some known problems

Learning Outcomes:

At the end of this unit, the student will be able to

- Define P, NP, NP-hard and NP-complete classes of problems. (L1)
- Prove that a certain problem is NP-Complete. (L5)
- Apply algorithm design principles to derive solutions for real life problems and comment on the complexity of solution. (L3)

Text Books:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, S. Satraj Sahani and Rajasekharan, 2nd edition, University Press. 2014,
2. Introduction to Algorithms, Third Edition, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein.

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. Introduction to Design and Analysis of Algorithms A strategic approach, R.C.T. Lee, S.S. Tseng, R.C. Chang and T. Tsai, McGraw Hill.
3. Data structures and Algorithm Analysis in C++, Allen Weiss, Second edition.

Course Outcomes:

- Analyze the complexity of the algorithms
- Make use of various design techniques like divide and conquer, greedy, dynamic programming, backtracking, branch and bound to solve the problems.
- Identify and analyze criteria and specifications appropriate to new problems, and choose the appropriate algorithmic design technique for the solution.
- Able to prove that a certain problem is NP-Complete.

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(EC20AES301) DIGITAL ELECTRONICS & MICROPROCESSORS (CSE, CSM, IT, CSD)

Course Objectives:

- To understand all the concepts of Logic Gates and Boolean Functions.
- To understand about Combinational Logic and Sequential Logic Circuits
- To Create Combinational logic circuits using Programmable Logic Devices.
- To understand the concepts of 8085, 8086 Microprocessor and 8051 Microcontroller.
- To Analyze Assembly Language Programming of 8086&8051.

Unit I

Number systems and Boolean Algebra: Digital Systems, Introduction to number systems and conversion, Binary codes, Complements, signed and unsigned Binary numbers, Boolean Algebra and its properties, Simplification of Boolean functions, SOP and POS methods–Simplification of Boolean functions using K-maps and realization using Universal Gates.

Learning Outcomes:

- Explain number systems and convert number systems.(L2)
- Explains the simplification of logical statements with using Boolean rules and de-morgan theorems(L2)
- Understand the simplification of logical statements with Karnaugh maps (L2)

Unit II

Combinational Logic Circuits : Adders & Subtractors, 4-bit binary adder and Subtractor, Decoders, Encoders, Multiplexers, Demultiplexers, Programmable Logic devices-PROM, PAL, PLA, Design of combinational circuits using PLD's.

Learning Outcomes:

- Analyze combinational logic circuits (L4)

- Understand and Analyze the working principle of encoders, decoders(L2)
- Design combinational circuits using PLD's. (L6)

Unit III

Sequential Logic Circuits: Sequential Circuits, Latches

, Flipflops:RS, D, JK, Master SlaveJK, TFlip-Flops, Shift Registers, Types of Shift Registers, Universal Shift registers, Counters, Synchronous Counters, Asynchronous Counters, Up-Down Counter

Learning Outcomes:

- Analyze sequential circuits(L4)
- Understand and Analyze the counters(L2)

Unit IV

Introduction to 8085 & 8086 Microprocessor:

8085 microprocessor Review (briefdetailonly),8086 Architecture –Block Diagram, register organization 8086, Flag register of 8086 and its functions, Pindiagram of 8086, Minimum mode & Maximum mode operation of 8086, Interrupts in 8086, Addressing modes of 8086.

Learning Outcomes:

- To understand the concepts of 8085,8086 Microprocessor (L2).
- To understand the addressing modes of 8086 Microprocessor (L2).

Unit V

Instruction Set of 8086 Microprocessor: Instruction set of 8086,

Assembler directives, Procedures and Macros, Simple programs involving arithmetic, logical, branch instructions, Ascending, Descending and Block move programs, String Manipulation Instructions.

Introduction to 8051 Microcontrollers: Overview of 8051 microcontroller, Architecture, Register set of 8051, Memory organization, Addressing modes & instruction set of 8051, Simple programs.

LearningOutcomes:

- Distinguish and analyze between Microprocessor and Microcontrollers. (L4)
- Underst and the concepts of 8051 microcontroller. (L2)
- Apply knowledge and demonstrate programming proficiency using various addressing modes and instruction sets of 8086&8051(L3)

TextBooks:

1. M.MorrisMano,MichaelD.Ciletti,DigitalDesign,PearsonEducation,5thEdition,2013
2. Advancedmicroprocessorsandperipherals-A.KRayandK.M.Bhurchandani,TMH,2ndedition,2006

References:

1. SwitchingTheoryandLogicDesign–A.AnandKumar, PHIlearningPvt.Ltd.2013.
2. N.SenthilKumar, M.Saravanan, S.Jeevanathan, MicroprocessorandMicrocontrollers, OxfordPublishers, 2010.

CourseOutcomes:

After the completion of the course, students will able to

CO1: To understand the concept of Logic circuits and analyze various Boolean algebra functions.

CO2:To understand the concept of Combinational Logic and Sequential Logic Circuits.

CO3: To create combinational circuits using PLD's.

CO4:To understand and Analyze the counters,

CO5:To understand the concepts of 8085, 8086 Microprocessor and 8051 Microcontroller.

CO6:Apply knowledge and demonstrate programming proficiency using various addressing modes and instruction sets of 8086 & 8051

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(CS20APC303) DATABASE MANAGEMENT SYSTEMS (CSE, CSM, IT, CSD)

Course objectives:

This course is designed to

- Train in the fundamental concepts of database management systems, database modeling and design, SQL, PL/SQL and system implementation techniques.
- Enable students to model ER diagram for any customized application.
- Inducting appropriate strategies for optimization of queries.
- Provide knowledge on concurrency techniques.
- Demonstrate the organization of Databases.

UNIT-I:

Introduction to DBMS: Database systems applications, Purpose of Database Systems, view of Data, Database Languages, Relational Databases, Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Database users and Administrators.

Database Design and the E-R Model: Overview of the Design Process, The Entity-Relationship Model, Constraints, Entity-Relationship Diagrams, and Convert E-R to Relational Schemas.

Learning outcomes:

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

- Distinguish between Database and File System(L4).
- Categorize different kinds of data models (L4).
- Define functional components of DBMS(L1).
- Develop E-R model for the given problem(L6).
- Derive tables from E-R diagrams(L5).

UNIT-II: Introduction to Relational Model: Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations.

Relational Database Design: Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Functional-Dependency Theory, Algorithms for Decomposition, Decomposition Using Multivalued Dependencies, More Normal Forms.

Learning outcomes:

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

- Outline the elements of the relational model such as domain, attribute, tuple, relation and entity(L2).
- Distinguish between various kinds of constraint sliked omain, key and integrity(L4).
- Differentiate between various normal forms based on functional dependency(L4).
- Apply normalization techniques to eliminate redundancy(L3).

UNIT-III: Introduction to SQL: Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Sub-queries, Modification of the Database, Joins and Views.

Advanced SQL: Accessing SQL from a Programming Language, Functions and Procedures, Triggers.

Learning outcomes:

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

- Define relational schema(L1)
- Develop queries using Relational Algebra and SQL(L6)
- Perform DML operations on databases(L3)

UNIT-IV: Query Processing :Overview ,Measures of Query cost, Selection operation,Sorting,Join Operation, other operations, Evaluation of Expressions.Transaction Management:Transactions:Concept,A Simple Transactional Model, Storage Structures, Transaction Atomicity and Durability,Transaction Isolation, Serializability, Isolation and Atomicity, Transaction

Isolation Levels, Implementation of Isolation Levels, Transactions as SQL Statements.

Learning outcomes:

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

- Identify variety of methods for effective processing of given queries(L2)
- Underst and various properties of transaction (L1)
- Design atomic transactions for an application(L6)

UNIT V: Concurrency Control: Lock based Protocols, Deadlock Handling, Multiple granularities, Timestamp based Protocols, and Validation based Protocols.

Recovery System: Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management, Failure with Loss of Non volatile Storage, Early Lock Release and Logical Undo Operations.

Learning outcomes:

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

- Underst and various locking protocols(L1)
- Gain the knowledge about log mechanism and check pointing techniques for system recovery(L2)

TEXTBOOKS:

1. A.Silberschatz,H.F.Korth,S.Sudarshan, "**Database System Concepts**", 6/e, TMH 2019

REFERENCE BOOKS:

1. Shamkant B. Navathe, "**Database Management System**" 6/e Ramez Elmasri PEA
2. "**Database Principles Fundamentals of Design Implementation and Management**", Carlos Coronel, Steven Morris, Peter Robb, Cengage Learning.
3. Raghurama Krishnan, Johannes Gehrke, "**Database Management Systems**", 3/e, TMH

Course Outcomes:

Students will be able to

- Design a database for areal world information system (L6)
- Define transactions which preserve the integrity of the database (L1)
- Generate tables for a database (L4)
- Organize the data to prevent redundancy(L4)

- Posequeries to retrieve the information from databas

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(IT20APC301) PYTHON PROGRAMMING

(CSE, CSM, IT&CSD)

Course Objectives:

1. To learn the fundamentals of Python
2. To elucidate problem-solving using a Python programming language
3. To introduce a function-oriented programming paradigm through python
4. To get training in the development of solutions using modular concepts
5. To introduce the programming constructs of python

Unit-I

Introduction to Python Programming: Overview of Programming Languages, History of Python, Installing Python, Executing Python Programs, Commenting in Python, Internal Working of Python.

Basics of Python Programming: Python Character Set, Token, Python Core DataType, I/O functions, Assigning Value to a Variable, Multiple Assignments, Writing Simple Programs in Python, Formatting Number and Strings, Python In-built Functions.

Operators and Expressions: Operators and Expressions, Arithmetic Operators, Operator Precedence and Associativity, Changing Precedence and Associativity of Arithmetic Operators, Translating Mathematical Formulae into Equivalent Python Expressions, Bitwise Operator, The Compound Assignment Operator.

Learning Outcomes:

At the end of this unit, the student will be able to

- List the basic constructs of Python(L1).
- Understand operators and expressions. (L2).

Unit-II

Decision Statements: Boolean Type, Boolean Operators, Using Numbers with Boolean Operators, Using String with Boolean Operators, Boolean Expressions and Relational Operators, Decision Making Statements, Conditional Expressions.

Loop Control Statements: The while Loop, The range () Function, The for Loop, Nested Loops, The break Statement, The continue Statement.

Functions: Syntax and Basics of a Function, Use of a Function, Parameters and Arguments in a Function, The Local and Global Scope of a Variable, The return Statement, Recursive Functions, The Lambda Function.

Learning Outcomes:

At the end of this unit, the student will be able to

- Apply the conditional execution of the program(L3).
- Apply the principle of recursion to solve the problems(L3).

Unit-III

Strings: The str class, Basic Inbuilt Python Functions for String, The index []Operator, Traversing String with for and while Loop, Immutable Strings, The StringOperators,String Operations.

Lists: Creating Lists, Accessing the Elements of a List, Negative List Indices, ListSlicing [Start: end], List Slicing with Step Size, Python Inbuilt Functions for Lists,The List Operator, List Comprehensions, List Methods, List and Strings, Splitting a String in List,Passing List to a Function, Returning List from a Function.

Tuples, Sets and Dictionaries: Introduction to Tuples, Sets, Dictionaries.

Learning Outcomes:

At the end of this unit, the student will be able to

- Design programs for manipulating strings(L6).
- Apply lists, Tuples, Sets and Dictionaries (L3).

Unit-IV

Exceptions: When Something Goes Wrong, Classes of Exceptions, A Final Note onPythonicExceptionHandling.

File Handling: Need of File Handling, Text Input and Output, The seek() Function, BinaryFiles, Accessing and Manipulating Files and Directories on a Disk.

Modules: Reusing Code with Modules and Packages, Understanding Python Modules, Everyday Module Usage, Advanced Module Behavior, Combining Modules into Packages

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand Exceptions and Modules (L2).
- Organize data in the form of files(L4).

Unit-V

Numpy, tensorflow, Object Oriented Programming:Class ,Objects and Inheritance: Defining Classes, The Self parameter and Adding Methods to a Class, Display Class Attributes and Methods,Special Class Attributes, Accessibility,The In it Method (Constructor),Passing an Object as Parameter to a Method, del() (Destructor Method),Class Membership Tests,Method Overloading,Operator Overloading, Inheritance, The Object Class.

The turtle module,Simple Repetition,Encapsulation,Generalization,Inter face design, Refactoring, docstring.

Learning Outcomes:

At the end of this unit, the student will be able to

- Plan programs using object orientation approach (L4).
 - Design graphics using turtle module (L4).

Textbooks:

1. Programming and problem solving with Python by Ashok Namdev Kamthane, Amit Ashok Kamthane (2018): McGraw Hill Education (India) PrivateLimited.
2. Allen B.Downey,“ThinkPython”,2ndedition,SPD/O’Reilly,2016.
3. Python 3 for AbsoluteBeginners, TimHallandJ-PStacey, Apress.

Reference Books:

- R.NageswaraRao,“CorePythonProgramming”,2ndedition,DreamtechPress ,2019.
- Python Pocket Reference 5ed:Pythonin Your Pocket,Mark Lutz,2014.

E -Resources:

- https://www.tutorialspoint.com/python3/python_tutorial.pdf

Course Outcomes:

- Apply the features of Python language in various real applications(L3).
- Select appropriate core data structure of Python for solving a problem(L5).
- Design object-oriented programs using Python for solving real-world problems(L4).
- Apply modularity to programs (L3).
- Design graphics using turtle module (L4).

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B.Tech III SEM

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(AM20APC302) ALGORITHMS LAB (CSE, CSM, IT, CSD)

Course objectives

- Analyze a problem and design the solution for the problem.
- Illustrate the method of finding the complexity of algorithms
- Infer the advanced algorithm design and analysis techniques.
- Identify and apply the suitable algorithm for the given real world problem.

Week-I QUICK SORT

Sort a given set of elements using the quick sort method 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 . The elements can be read from a file or can be generate dusing the random number generator.

Week-2 MERGE SORT

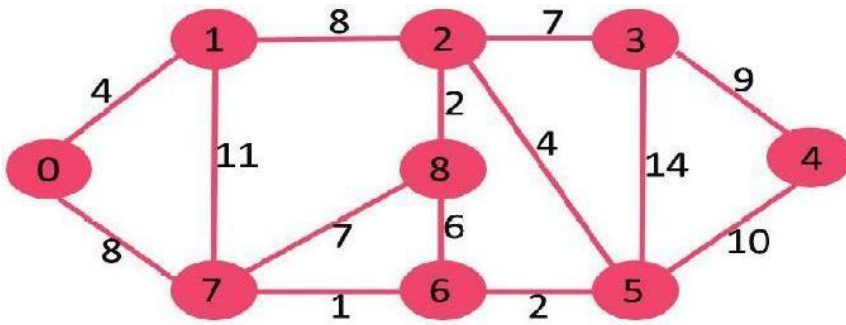
Implement merge sort algorithm to sort a given set of elements and determine the time required to sort the elements. Repeat the experiment for different values of n , the number of elements in the list to be sorted and plot a graph of the time taken versus n . The elements can be read from a file or can be generated using the random number generator.

Week-3 KNAP SACK PROBLEM

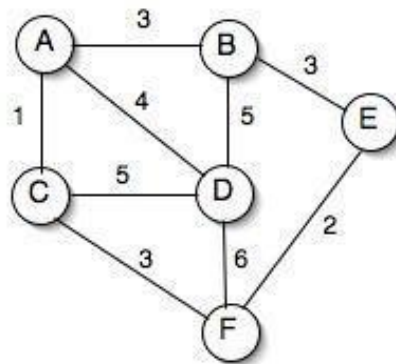
Implement 0/1 Knapsack problem using Dynamic Programming.

Week-4 SHORTEST PATHS ALGORITHM

From a given vertex in a weighted connected graph, find shortest paths from 0 to other vertices using Dijkstra's algorithm.



Week-5 MINIMUM COST SPANNING TREE

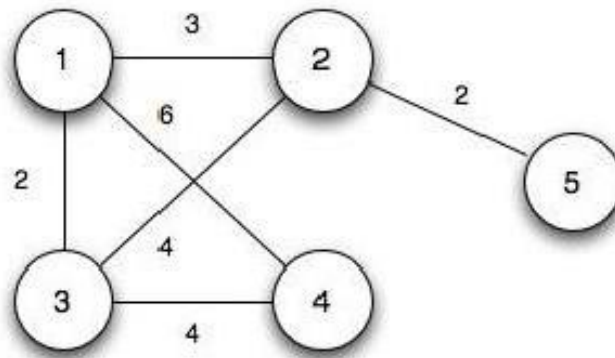


Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm.

Week-6 MINIMUM COST SPANNING TREE

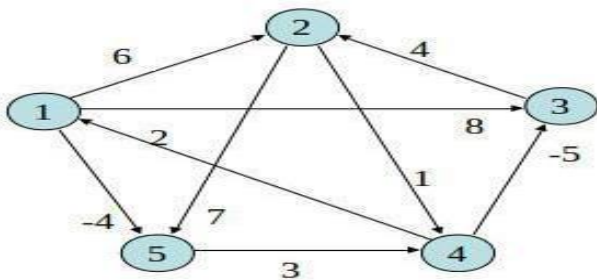
Find Minimum Cost Spanning Tree of a given undirected graph using Prim's

algorithm.



Week-7 ALL PAIRS SHORTEST PATHS

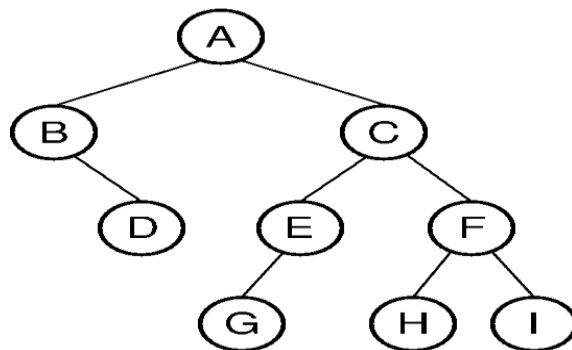
Implement All-Pairs Shortest Paths Problem using Floyd's algorithm.



	1	2	3	4	5
1	0	6	8	∞	-4
2	∞	0	∞	1	7
3	∞	4	0	∞	∞
4	2	∞	-5	0	∞
5	∞	∞	∞	3	0

Week-8 TREE TRAVERSALS

Perform various tree traversal for a given tree

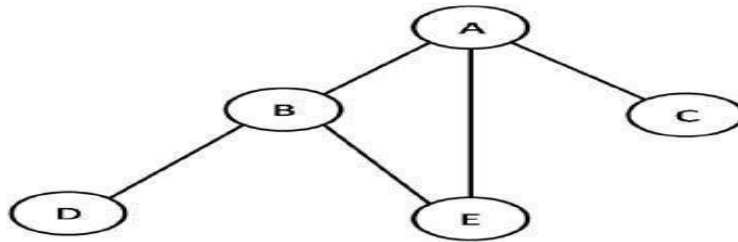


Week-9 GRAPH TRAVERSALS

a. Print all the nodes reachable from a given starting node in a digraph using

BFS method.

b. Check whether a given graph is connected or not using DFS method.



Week-10 SUM OF SUBSETS PROBLEM

Find a subset of a given set $S = \{s_1, s_2, \dots, s_n\}$ of n positive integers whose sum is equal to a given positive integer d . For example, if $S = \{1, 2, 5, 6, 8\}$ and $d = 9$ there are two solutions $\{1, 2, 6\}$ and $\{1, 8\}$. A suitable message is to be displayed if the given problem instance doesn't have a solution.

Week-11 TRAVELLING SALES PERSON PROBLEM

Implement any scheme to find the optimal solution for the Traveling Sales Person problem and then solve the same problem instance using any approximation algorithm and determine the error in the approximation.

Week-12 N QUEENS PROBLEM

Implement N Queen's problem using BackTracking.

Week-12 STRINGMATCHING

- Implement naïve string matching algorithm.
- Implement Rabin-karp string matching algorithm.
- Implement knuth-Morris-Pratt algorithm.
- Implement finite automata string matching algorithm.

Course outcomes

- Apply the Divide and Conquer strategy to solve searching, sorting problems. (L3)
- Analyze the efficiency of Greedy and Dynamic Programming design techniques to solve the optimization problems. (L2)

- Relate Backtracking technique for solving constraint satisfaction problems. (L3)

Reference Books:

- Levitin A—Introduction to the Design and Analysis of Algorithms, Pearson Education,2008.
- Goodrich, M.T. R Tomassia—Algorithm Design foundations Analysis and Internet Examples, John WileyandSons, 2006.

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(CS20APC304) DATABASE MANAGEMENT SYSTEMS LAB (CSE, CSM, IT&CSD)

Course Objectives:

This course is designed to

- Use SQL commands to create, update, modify and retrieve data from the databases.
- ER model for a practical real-life system.
- Understand the importance of good database design and indexing.
- Understand the properties of transactions in a database system.

List of Experiments

Week-1: Practice DDL and DML Queries

Week-2: Perform various SQL queries on LIKE, AND, OR, NOT AND BETWEEN operations.

Week-3: Perform various SQL queries on select clause, where clause, pattern matching, Order by and Group by.

Week-4: SQL Queries on Set operations, Aggregate

functions Week-5: To Perform various Join Operations.

Week-6: Perform DCL, TCL Queries, and Constraints with Primary and Foreign Keys.

1. Design and Create University Library Database using ER diagram and Schema Diagram.
2. Design and create a university database consisting of the following tables Department, Course, Instructor and Student using ER Modeling and Schema Diagram.
3. Create various tables like Branch, banking system with constraints using a Schema diagram.

Week-7: PL/SQL program using controls

Structures. Week-8: Program to implement

Procedures

Week-9: Program to implement Functions.

Week-10: Program to implement

Triggers. Week-11: Program to

implement Cursors.

WebReferences:

1. <https://www.w3schools.com/sql>
2. <https://www.tutorialspoint.com/plsql/index.htm>

Course Outcomes:

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

- Work with the concepts of DDL, DML, DCL Commands(L3).
- Design of databases for reallife systems using Oracle(L5).
- Learning of SQL queries on the real-life systems(L4).
- Execution ofPL/SQL programs for different problems(L6).
- Implementation of procedure, function, trigger and cursor conceptsinPL/SQL(L4).

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(IT20APC302) PYTHON PROGRAMMING LAB

(CSE, CSM, IT, CSD)

Course Objectives:

- To train the students insolving computational problems
- To elucidate solving mathematical problems using Python programming language
- To understand the fundamentals of Python programming concepts and its applications.
- To understand the object-oriented concepts using Python in problemsolving.

Laboratory Experiments

Week-1. a).Install Python Interpreter and use it to perform different Mathematical Computations.Try to do all the operations present in a Scientific Calculator

b). Write a function that draws a grid like the following:

```
+ - - - + - - +
```

```
| | |
```

```
| | |
```

```
| | |
```

```
| | |
```

```
+ - - - + - - +
```

```
| | |
```

```
| | |
```

```
| | |
```

```
| | |
```

```
+ - - - + - - - +
```

c). Write a function that draws a Pyramid with # symbols#

```
# # #
```

```
# # # # #
```

```
# # # # # # #
```

.Upto 15 has he sat the bottom

Week-2.a).Using turtles concept draw a wheel of your choice

b). Write a program that draws Archimedean Spiral

c). The letters of the alphabet can be constructed from a moderate number of basic elements, like vertical and horizontal lines and a few curves. Design an alphabet that can be drawn with a minimal number of basic elements and then write functions that draw the letters. The alphabet can belong to any Natural language excluding English. You should consider atleast Ten letters of the alphabet.

Week-3. a). The time module provides a function, also named time that returns the current Greenwich Mean Time in "the epoch", which is an arbitrary time used as a reference point. On UNIX systems, the epoch is 1 January 1970.

```
>>>import time
```

```
>>>time.time ()
```

```
1437746094.5735958
```

Write a script that reads the current time and converts it to a time of day in hours, minutes, and seconds, plus the number of days since the epoch.

b). Given $n+r+1 \leq 2^r$. n is the input and r is to be determined. Write a program which computes minimum value of r that satisfies the above.

c). Write a program that evaluates Ackermann function

Week-4. a). The mathematician Srinivasa Ramanujan found an infinite series that can be used to generate a numerical approximation of $1/\pi$:

Write a function called estimate_pi that uses this formula to compute and return an estimate of π .

$$\frac{1}{\pi} = \frac{2\sqrt{2}}{9801} \sum_{k=0}^{\infty} \frac{(4k)!(1103 + 26390k)}{(k!)^4 396^{4k}}$$

It should use a while loop to compute terms of the summation until the last term is smaller than $1e-15$ (which is Python notation for 10^{-15}). You can check the result by comparing it to `math.pi`.

b). Choose any five built-in string functions of C language. Implement them on your own in Python. You should not use string related Python built-in functions.

Week-5. a). Given a text of characters, Write a program which counts number of vowels, consonants and special characters.

b). Given a word which is a string of characters. Given an integer say 'n', Rotate each character by 'n' positions and print it. Note that 'n' can be positive or negative.

Week-6a). Given rows of text, write it in the form of columns.

b). Given a page of text. Count the number of occurrences of each letter (Assumecase in sensitivity and don't consider special characters). Draw a histogram to represent the same

Week-7. Write program which performs the following operations on list's. Don't use built-in functions

- a) Updating elements of a list
- b) Concatenation of list's
- c) Check for member in the list
- d) Insert in to the list
- e) Sum the elements of the list
- f) Push and pop element of list
- g) Sorting of list
- h) Finding biggest and smallest elements in the list
- i) Finding common elements in the list

Week-8. a). Write a program that reads a file, breaks each line into words, strips white space and punctuation from the words, and converts them to lowercase.

b). Go to Project Gutenberg (<http://gutenberg.org>) and download your favorite out-of-copy right book in plain text format. Read the book you downloaded, skip over the header information at the beginning of the file, and process the rest of the words as before. Then modify the program to count the total number of words in the book, and the number of times each word is used. Print the number of different words used in the book.

Compare different books by different authors, written in different eras.

Week-9. a). Go to Project Gutenberg (<http://gutenberg.org>) and download your favorite out-of-copyright book in plain text format. Write a program that allows you to replace words, insert words and delete words from the file.

b). Consider all the files on your PC. Write a program which checks for duplicate files in your PC and displays their location. Hint: If two files have the same check sum, they probably have the same contents.

Week-10. a). Consider turtle object. Write functions to draw triangle, rectangle, polygon, circle and sphere. Use object oriented approach.

Week-11. a). Write a program illustrating the object-oriented features supported by Python.

b). Design a Python script using the Turtle graphics library to construct a turtle bar

chart representing the grades obtained by N students read from a file categorizing the min to distinction, firstclass, secondclass, third class and failed.

Week-12. a).Design a Python script to determine the difference in date for given two dates in YYYY:MM:DD format ($0 \leq \text{YYYY} \leq 9999, 1 \leq \text{MM} \leq 12, 1 \leq \text{DD} \leq 31$) following the leap year rules.

b).Design a Python Script to determine the time difference between two given times in HH:MM:SS format. ($0 \leq \text{HH} \leq 23, 0 \leq \text{MM} \leq 59, 0 \leq \text{SS} \leq 59$)

Reference Books:

1. Peter Wentworth, Jeffrey Elkner, Allen B. Downey and Chris Meyers, "How to Think Like a Computer Scientist: Learning with Python3", 3rd edition, Available at <http://www.ict.ru.ac.za/Resources/cspw/thinkcspy3/thinkcspy3.pdf>
2. Paul Barry, "HeadFirst Python a Brain Friendly Guide" 2nd Edition, O'Reilly, 2016
3. Dainel Y. Chen "Pandas for Everyone Python Data Analysis" Pearson Education, 2019

Course outcomes:

Student should be able to

- Design solutions to mathematical problems (L6).
- Organize the data for solving the problem (L4).
- Develop Python programs for numerical and text-based problems (L6).
- Select appropriate programming construct for solving the problem (L5).
- Illustrate object-oriented concepts (L3).

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(IT20ASC301) EXPLORATORY DATA ANALYSIS WITH R (CSE, CSM, IT, CSD)(Skill Oriented Course)

Course Objectives:

- Understand the R Programming Language.
- Exposure on solving of data science problems.
- Understand The Regression Model

List of Experiments:

1: INTRODUCTION TO COMPUTING

- a. Installation of R
- b. The basics of R syntax, workspace
- c. Matrices and lists
- d. Sub setting
- e. System-defined functions; the help system
- f. Errors and warnings; coherence of the workspace

2: GETTING USED TO OR: DESCRIBING DATA

- a. View in and manipulating Data
- b. Plotting data
- c. Reading the data from console, file(.csv) local disk and web
- d. Working with larger datasets

3: SHAPE OF DATA AND DESCRIBING RELATIONSHIPS

- a. Tables, charts and plots.
- b. Univariate data, measures of central tendency, frequency distributions, variation, and Shape.
- c. Multivariate data, relationships between a categorical and a continuous variable,
- d. Relationship between two continuous variables – covariance, correlation coefficients, comparing multiple correlations.

- e. Visualization methods – categorical and continuous variables, two categorical variables, two continuous variables.

4: PROBABILITY DISTRIBUTIONS

- a. Sampling from distributions–Binomial distribution, normal distribution
- b. tTest, zTest, ChiSquaretest
- c. Density functions
- d. Data Visualization using ggplot–Boxplot, histograms, scatterplotter, linechart, barchart, heatmaps.

5: EXPLORATORY DATA ANALYSIS

- a. Demonstrate the range, summary, mean, variance, median, standard deviation, histogram, boxplot, scatter plot using population data set.

6: TESTING HYPOTHESES

- a. Null hypothesis significance testing
- b. Testing theme an o fone sample
- c. Testing two means

7: PREDICTING CONTINUOUS VARIABLES

- a. Linear models
- b. Simple linear regression
- c. Multiple regression
- d. Bias-variancetrade-off–cross-validation

8: CORRELATION

- a. How to calculate the correlation between two variables.
- b. How to makes catter plots.
- c. Use the scatter plottoin vestigate the relationship between two variables

9:TEST SOFHYPOTHESES

- a. Performtests of hypotheses about the mean when the varianceis known.
- b. Computethep-value.
- c. Explore the connection between the critical region, the test statistic, and thep-value

10: ESTIMATINGA LINEARRELATIONSHIP

Demonstration on a Statistical Model for a Linear Relationship

- a. Least Squares Estimates
- b. The R Functionlm
- c. Scrutinizing the Residuals

ReferenceBooks:

1. SandipRakshit, "StatisticswithRProgramming", cGrawHillEducation, 2018. GarethJames, DanielaWitten, TrevorHastie, RobertTibshirani, "AN IntroductiontoStatistical Learning:with ApplicationsinR", SpringerTextsin Statistics, 2017.
2. JosephSchmuller, "StatisticalAnalysiswithRforDummies", Wiley, 2017.
3. KGSrinivasa, GMSiddesh, ChetanShetty, SowmyaBJ, "StatisticalProgramminginR", Oxford HigherEducation, 2017

Web References:

- <http://www.r-bloggers.com/how-to-perform-a-logistic-regression-in-r/>
- <http://www.ats.ucla.edu/stat/r/dae/rreg.htm>
- <http://www.coastal.edu/kingw/statistics/R-tutorials/logistic.html>
- <http://www.ats.ucla.edu/stat/r/data/binary.csv>

SOFTWARE REQUIREMENTS:

SOFTWARE: RSoftware, RStudio Software

Course Outcomes:

- Installanduse Rfor simpleprogrammingtasks(L3).
 - Extract data from files and other sources and perform various data manipulation tasks on them(L3).
- Explore statistical functionsinR(L4).
- Use R Graphics and Tables to visualize results of various statistical operations ondata (L3).
- Apply theknowledge of R gained to data Analytics for real-life applications(L3).

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(CH20AMC201) ENVIRONMENTAL SCIENCE

(Common to All Branches)

Course Objectives:

- To make the students to get a wareness on environment.
- To understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day-to-day activities of humanlife.
- To save earth from the inventions by the engineers.

UNIT –I

Multidisciplinary Nature of Environmental Studies: – Definition, Scope and Importance–Need for Public Awareness.

Natural Resources:

Renewable and non-renewable resources–Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water –Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. Energy Resources.

Learning outcomes:

At the end of this unit, the students will be able to

- Understanding the importance of public awareness.(L2)
- Understanding about the various resources.(L2)

UNIT–II

Ecosystems:

Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem –

Ecological succession.

Food chains, food web and ecological pyramids—Introduction, types, characteristic features, structure and function of the following ecosystem:

- a. Forest ecosystem.
- b. Grassland ecosystem.
- c. Desert ecosystem.
- d. Aquatic ecosystems. (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and Its Conservation:

Introduction: Definition, genetic, species and ecosystem diversity—Biogeographical classification of India—Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels.

India as a mega-diversity nation—Hot-spots of biodiversity—Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Learning outcomes:

At the end of this unit, the students will be able to

- Understanding about various ecosystems and their characteristics. (L2)
- Understanding the biodiversity and its conservation. (L2)

UNIT—III

Environmental Pollution: Definition, Causes, effects and control measures of

- a. Air Pollution
- b. Water pollution
- c. Soil pollution
- d. Marine pollution
- e. Noise pollution
- f. Thermal pollution

g. Nuclear hazards

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes –Role of an individual in prevention of pollution – Pollution case studies–Disaster management: floods, earthquake, cyclone and landslides.

Learning outcomes:

At the end of this unit, the students will be able to

- Understanding about various sources of pollution.(L2)
- Understanding about the various sources of solid waste and preventive measures.(L2)
- Understanding about the different types of disasters and the managerial measures.(L2)

UNIT-IV

Social Issues and the Environment:

From Unsustainable to Sustainable development–Urban problems related to energy. Water conservation, rain water harvesting, watershed management –Resettlement and rehabilitation of people; its problems and concerns.Case studies– Environmental ethics: Issues and possible solutions–Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products Environment Protection Act. – Air (Prevention and Control of Pollution) Act. –Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act –Issues involved in enforcement of environmental legislation–Public awareness.

Learning outcomes:

At the end of this unit, the students will be able to

- Understanding about the social issues related to environment and their protection acts. (L2)
- Understanding about the various sources of conservation of natural resources.(L2)
- Understanding about the wildlife protection and forest conservation acts.(L2)

UNIT –V

Human Population and The Environment:

Population growth, variation among nations. Population explosion–Family Welfare Programmes.–Environment and human health–Human Rights–Value Education –HIV/AIDS–Women and Child Welfare–Role of information Technology in Environment and human health –Case studies.

Field Work: Visit to a local area to document environmental assets River/forest/grass/hill/mountain–Visit to a local polluted site– Urban/Rural/Industrial/Agricultural Study of common plants, insects, and birds– river, hillslopes.

Learning outcomes:

At the end of this unit, the students will be able to

- Understanding about the population explosion and family welfare programmes.(L2)
- To identify the natural assets and related case studies.(L3)

Text Books:

- Textbook of Environmental Studies for Undergraduate Courses Erach Bharucha for University Grants Commission, Universities Press.
- Palaniswamy, "Environmental Studies", Pearson Education.
- S. Azeem Unnisa, "Environmental Studies" Academic Publishing Company.
- K. Raghavan Nambiar, "Text book of Environmental Studies for Undergraduate Courses as per UGC model syllabus", Scitech Publications (India), Pvt. Ltd.

References:

- Deeksha Dave and E. Sai Baba Reddy, "Textbook of Environmental Science", Cengage Publications.
- M. Anji Reddy, "Textbook of Environmental Sciences and Technology", BS Publication.
- J. P. Sharma, Comprehensive Environmental studies, Laxmi Publications.
- J. Glynn Henry and Gary W. Heinke, "Environmental Sciences and Engineering", Prentice Hall of India Private Limited.

- G.R.Chatwal, "A Text Book of Environmental Studies" Himalaya Publishing House.
- Gilbert M. Masters and Wendell P. Ela, "Introduction to Environmental Engineering and Science, Prentice Hall of India Private limited.

Course Outcomes:

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

- Understanding multidisciplinary nature of environmental studies and various renewable and nonrenewable resources. (L2)
- Understand flow and bio-geo-chemical cycles and ecological pyramids. (L2)
- Understand various causes of pollution and solid waste management and related preventive measures. (L2)
- Apply the rainwater harvesting, watershed management, ozone layer depletion and wasteland reclamation. (L3)
- Apply the concepts of population explosion, value education and welfare program in society. (L3)

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(EG20AMC302) ENHANCING ENGLISH LANGUAGE SKILLS

(Common to All Branches of LE Students)

COURSE OBJECTIVES

- To enhance communication skills through listening, speaking, reading, and writing.
- To improve language proficiency of the students for career development.
- To train students to use language appropriately for interview skills, group discussion and public speaking.
- To develop confidence in the students to use English in everyday situations.
- To provide training and opportunities to participate in formal and informal communication.

UNIT- I

1. Greetings-Introducing oneself and others
2. Just A Minute (JAM) & Roleplay
3. Prepositions, Word formation

Learning Outcomes

At the end of the module, the learners will be able to

- Respond to general questions on familiar topics by introducing oneself and others
- Comprehend short talks on general topics.
- Use grammatical structures effectively and meaningfully.

UNIT-II

1. Oral Presentations-Technical presentations
2. Letter Writing-Formal and Informal, Email Writing
3. Articles, Punctuation.

Learning Outcomes

At the end of the module, the learners will be able to

- Make formal oral presentations using effective strategies

- Write formal letters and e-mail writing appropriately in formal contexts without any mistakes
- Use articles and use punctuation contextually.

UNIT-III

1. Communication-Verbal and Non-verbal communication
2. Telephone Etiquettes
3. Tenses, Subject-verb agreement, Prefixes & suffixes

Learning Outcomes

At the end of the module, the learner will be able to

- Understand non-verbal features of communication and hold formal & informal conversations
- Use correct tense forms and structures in speech and writing
- Use grammatical structures aptly.

UNIT-IV

1. Resume Writing and Technical Report writing
2. Book/Film review
3. Synonyms and Antonyms, Vocabulary building

Learning Outcomes

At the end of the module, the learners will be able to

- Write Resume appropriately and ready for an interview.
- Review a book/film
- Edit short texts by correcting errors

UNIT -V

1. Group Discussions
2. Debate
3. Interview Skills

Learning Outcomes

At the end of the module, the learners will be able to

- Participate in formal & informal discussions and speak clearly on a specific topic
- Understand how to face interviews effectively.
- Comprehend, discuss and respond to academic texts orally and in writing

REFERENCE BOOKS:

1. KrishnaMohan&NPSingh, SpeakingEnglishEffectively, 2ndEdition, 2011.
2. MAshrafRizvi, EffectiveTechnicalCommunication, ataMcGraw-Hill, NewDelhi, 2017.
3. FrancisSoundararaj, BasicsofCommunicationinEnglish: SoftSkillsforListening, Speaking, ReadingandWriting, NewDelhi: Macmillan-2012.
4. ChaseR. Tarver&Kristin L. Johannsen, Pathways: Listening, Speaking andCriticalThinking.HeinleyELT; 2ndEdition, 2018.
5. Meenakshi Raman,TechnicalCommunication,OxfordUniversityPress,2008
6. Raymond Murphy, English Grammar in Use, Cambridge University Press, 4thEdition, 2012.

COURSE OUTCOMES

- Use English language, both written and spoken, competently and correctly.
- Improve comprehension and fluency of speech.
- Hone the communication skills to meet the challenges of their careers successfully.
- Gainconfidencein using English in verbal situations.
- Strengthen communication skills in different contexts like formaland informal.

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(MA20ABS401) NUMERICAL METHODS, PROBABILITY AND STATISTICS

(Common to CIVIL, ME, EEE, CSE, AI&ML, IT, CSD)

Course Objectives:

To familiarize the students with numerical methods of solving the non-linear equations, interpolation, differentiation, integration, and ordinary differential equations. (L2)

- To impart knowledge in basic concepts and few techniques in probability and statistics in various applications in engineering. (L3)

UNIT-1: Solution to algebraic and transcendental equations & Interpolation:

Solution of algebraic and transcendental equations: Bisection method, Newton-Raphson method and Regula-Falsi method.

Interpolation: Newton's forward and backward difference formulae. Interpolation with un-equal intervals: Lagrange's formulae.

Learning Outcomes:

At the end of this unit, the student will be able to

- Find approximate roots of an equation by using different numerical methods (L3)
- Explain various discrete operators and find the relation among operators (L2)
- Apply Newton forward and backward formulas for equal intervals (L3)

UNIT - II: Numerical differentiation, integration & Solution of Initial Value Problems to Ordinary Differential Equations of first order:

Numerical differentiation using Newton's forward & backward interpolation formulae; Numerical Integration by trapezoidal rule, Simpson's $1/3^{\text{rd}}$ and $3/8^{\text{th}}$ rules.

Numerical Solutions of Ordinary differential equation: Solution by Taylor's series, Picard's method of successive approximations, Euler's method, modified Euler's method and Runge-Kutta method of fourth order.

Learning Outcomes:

At the end of this unit, the student will be able to

- Find integration of a function by using different numerical methods.(L3)
- Solve ordinary differential equations using different numerical schemes.(L3)

UNIT–III: Probability&Random Variables:

Probability axioms, addition law, conditional probability, Baye's theorem. Random variables (discrete and continuous), probability distribution: Binomial -Poisson and Normal distribution- their properties. (All concepts without proofs)

Learning Outcomes:

At the end of this unit, the student will be able to

- Explain the basic concepts of probability theory and elementary theorems on probability.(L2)
- Apply the knowledge of discrete random variable and continuous random variable and the respective probability distributions.(L3)

UNIT–IV: Testing of hypothesis:

Formulation of hypothesis, critical region, level of significance. Large sample tests: test for single proportion, difference of two proportions, test for single mean and difference of two means.

Learning Outcomes:

At the end of this unit, the student will be able to

- Explain the concept of testing of hypothesis(L2)
- Apply the concept of hypothesis testing for large samples(L3)

UNIT–V: Small Sample Tests:

Student t-distribution (single mean, two means and paired t-test), Testing of equality of variances (F-test), χ^2 - test for independence of attributes and goodness of fit.

Learning Outcomes:

At the end of this unit, the student will be able to

- Apply the concept of testing hypothesis for small samples(L3)
- Apply the concept of hypothesis testing for small samples and estimate the goodness of fit(L3)

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017, 44th edition.

2. Miller and Freund, Probability and Statistics for Engineers, 7/e, Pearson, 2008
3. S.S.Sastry, "Introductory methods of Numerical Analysis", 5th edition, PHI, 2012.
4. Advanced Engineering Mathematics, RK Jain and SRK Iyengar, Narosa Publishing House, New Delhi.

Reference Books:

1. S.C.Gupta and V.K.Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan Chand & Sons publications, 2012
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9/e, John Wiley & Sons, 2006.
3. Kandasamy, K.Thilagavathy, S.Gunavathy, Numerical Methods, S.Chand & Company, 2nd Edition, Reprint 2012.
4. S.Ranganatham, Dr.M.V.S.S.N.Prasad, Dr.V.Ramesh Babu, Numerical Analysis, S.Chand Publications, 2015
5. Dr.A.Singaravelu, Probability and Statistics, Meenakshi Agency, 2017

Course Outcomes:

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

- Apply different methods to find roots of algebraic and transcendental equations.(L3)
- Apply different methods to find approximate solution of ordinary differential equations
- And Numerical Integration.(L3)
- Analyse the concepts of probability and their applications.(L4)
- Apply discrete and continuous probability distributions in practical problems.(L3)
- Analyse the statistical inferential methods based on small and large sampling tests.(L4)

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(CS20APC4 OBJECTORIENTED PROGRAMMING THROUGH JAVA

| (CSE, CSM, IT, CSD)

Course Objectives:

- To understand object-oriented concepts and problem-solving techniques
- To obtain knowledge about the principles of inheritance and polymorphism
- To implement the concept of packages, interfaces, exception handling and concurrency mechanism.
- To design the GUIs using applets and swingcontrols.

UNIT -I

Introduction to OOP: OOP principles, Java Buzz words, Implementing Javaprogram, JVM, Data Types, Variables, Type conversions and Casting, Operators, Control statements, Arrays. Classes, Objects, Methods, Constructors, this keyword, statickeyword, Overloading Methods and Constructors, Argumentpassing, Exploring String class.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand the syntax, semantics and features of Java Programming Language (L1).
- Learn object-oriented features and understanding type conversion and casting (L2).
- Understand different types of string handling functionsand its usage(L1).

UNIT-II

Inheritance: Basics, UsingSuper, Creating Multi level hierarchy, Method overriding, Dynamic Method Dispatch, Using Abstract classes, Using final with inheritance

Interfaces: Definition, Implementing Interfaces, ExtendingInterfaces, NestedInterfaces, Applying Interfaces, Variables in Interfaces.

Packages: Basics, finding packages and CLASSPATH, Access Protection, Importing packages.

Learning Outcomes:

At the end of this unit, the student will be able to

- Implement types of Inheritance and developing new classes based on existing classes(L3)
- Demonstrate features of interfaces to implement multiple inheritances(L2).
- Distinguish between system packages and user defined packages(L2).

UNIT-III

Exception handling - Fundamentals, Exception types, uncaught exceptions, using try and catch, Multiple catch clauses, nested try statements, throw, throws and finally, built-in exceptions, creating own exception subclasses.

I/O and Other Topics: – I/O basics, Reading Console input, Writing consoleOutput, The PrintWriter class, Reading and writing files, Automatically closing a file, enumerations, typewrappers.

Learning Outcomes:

At the end of this unit, the student will be able to

- Learn what exceptions are and how they are handled (L1).
- Learn when to use exception handling and how to create user defined exceptions(L3)
- Learn the difference between various files and streams(L1)

UNIT-IV

Multithreading: The Java thread model, Creating threads, Thread priorities, Synchronizing threads, Interthread communication.

The Collections Framework(java.util): Collections overview, Collection Interfaces, The Collection classes- Array List, Linked List, Hash Set, Hash table, Properties, Stack, Vector, StringTokenizer, Date, Calendar, Random, Scanner.

Applets-Definition, LifeCycle and Execution.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand concurrency, parallelism and multithreading (L1).
- Learn the importance of collections and use prebuilt generic data structures from Framework (L1).
- Develop applets for web applications(L5)

UNIT –V

Event Handling-Delegation Event Model, Event Sources, Event Classes, Event Listener Interfaces, Handling Mouse and Keyboard Events, Adapter classes.

AWT AND Swings: AWT: AWT Hierarchy, AWT controls, Layout Managers: FlowLayout, BorderLayout, GridLayout, CardLayout, and Limitations of AWT. SWINGS: JFrame, JPanel, JComponent-JLabel and ImageIcon, JTextField, JTabbedPane, SwingButtons, JScrollPane, JComboBox, JTable.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand the GUI programming (L1).

TextBooks:

1. Java The complete reference, 9th edition, Herbert Schildt, McGrawHill Education (India) Pvt. Ltd.
2. Java How to Program, 10th Edition, Paul Dietel, Harvey Dietel, Pearson Education.

ReferenceBooks:

1. T. Budd "Understanding Object-Oriented Programming with Java", updated edition, Pearson Education.
2. Cay S. Horstmann "Core Java Volume – 1 Fundamentals", Pearson Education.
3. Sagayaraj, Dennis, Karthik and Gajalakshmi "Java Programming for core and advanced learners, University Press.
4. Y. Daniel Liang, "Introduction to Java programming", Pearson Education.
5. P. Radha Krishna "Object Oriented Programming through Java", University Press.
6. S. Malhotra, S. Chudhary, "Programming in Java", 2nd edition, Oxford Univ. Press.
7. R.A. Johnson, "Java Programming and Object-oriented Application Development", Cengage Learning.

Course Outcomes:

After completion of the course the student will be able

- To solve realworld problems using OOP techniques(L3).
- To apply code reusability through inheritance, packages and interfaces(L3)
- To solve problems using java collection framework and I/O classes(L3).
- To develop applications by using parallel streams for better performance(L4).
- To build GUIs and handleevents generated by user interactions(L4).

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(IT20APC401) OPERATING SYSTEMS

(CSE, CSM, IT, CSD)

Course Objectives:

- Understand basic concepts and functions of operating systems.
- Understand the processes, threads and scheduling algorithms.
- Provide good insight to various memory management techniques.
- Expose the students with different techniques of handling deadlocks.
- Explore the concept of file-system and its simple management issues.
- Implement various schemes for achieving system protection and security.
- Familiarize with the basics of Windows and Linux operating systems.

UNIT I

Operating Systems Overview: Operating system functions, Operating system structure, operating systems Operations, protection and security, Kernel dataStructures, Computing Environments, Open-Source Operating Systems.

Operating System Structure: Operating System Services, User and Operating-System Interface, system calls, Types of System Calls, system programs, operating system structure, operating system debugging, SystemBoot.

Processes: Process concept, process Scheduling, Operations on processes, Inter process Communication, Examples of IPC systems.

Learning Outcomes:

At the end of this unit, the student will be able to

- Identify major components of operating systems and understand the types of computing environments.(L1)
- Explore several open source operating systems.(L2)
- Recognize operating system services to users, processes and other systems. (L2)

- Understand the importance, features of a process and methods of communication between processes.(L2)

UNIT II

Multithreaded Programming: Overview, Multi-core Programming, Multithreading Models, Thread Libraries, Implicitthreading, ThreadingIssues, Examples.

CPU Scheduling: Basic concepts, Scheduling-Criteria, Scheduling Algorithms, ThreadScheduling, Multiple-Processor Scheduling, Real-Time CPU Scheduling, Algorithm Evaluation.

Inter-process Communication: Raceconditions, CriticalRegions, Mutualexclusion with busy waiting, Sleep and wakeup, Semaphores, Mutexes, Monitors, Message passing, Barriers, Classical IPC Problems - Dining philosopher's problem,Readersand writers problem.

Learning Outcomes:

At the end of this unit, the student will be able to

- Improving CPU utilization through multiprogramming and multithreaded programming.(L3)
- Examine several classical synchronization problems.(L2)
- Understand various process scheduling algorithms.(L2)
- Understand the importance, features of a process and methods of communication between processes.(L2)

UNIT III

Memory Management: Swapping, contiguous memoryallocation, segmentation, paging, structure of the page table.

Virtual memory: demand paging, page-replacement, Allocation of frames, Thrashing, Memory-MappedFiles, Allocating Kernel Memory, Examples

Learning Outcomes:

At the end of this unit, the student will be able to

- Examine the various techniques of allocating memory to processes.(L2)
- Summarize how segmentation and paging works in contemporary computer systems. (L2)
- Understanding the benefits of virtual memory systems.(L2)

UNIT IV

Deadlocks: System Model, deadlockcharacterization, Ostrich algorithm, Methods of handling Deadlocks, Deadlock prevention, Detection and Avoidance, Recovery

from deadlock.

File Systems: Files, Directories, File system implementation, management and optimization, Directory Implementation, AllocationMethods, Free-Spacemanagement.

Secondary- Storage Structure: Overview of disk structure, and attachment, Disk scheduling, RAID structure, Stable storage implementation.

Learning Outcomes:

At the end of this unit, the student will be able to

- Investigate methods for preventing/ avoiding deadlocks.(L3)
- Examine filesystems and its interface in various operating systems.(L2)
- Analyze different disk scheduling algorithms.(L4)
- Understand the Stable-storage implementation and Free-Space management.(L2)

UNIT V

Protection: Goals of Protection, Principles of Protection, Domain of protection, AccessMatrix, Implementation of Access Matrix, Accesscontrol, Revocation of Access Rights, Capability-Based systems, Language –BasedProtection

Security: The Security problem, Program threats, System and Network threats, Cryptography as a security tool, User authentication, Implementing security defenses, Firewalling to protect systems and networks, Computer–security classifications.

Learning Outcomes:

At the end of this unit, the student will be able to

- Identify various schemes available for achieving system protection.(L2)
- Acquiring knowledge about various counter measures to security attacks.(L2)
- Outline protection and security in Linux and Microsoft Windows.(L2)

TextBooks:

1. Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Ninth Edition, 2012, Wiley.
2. Modern Operating Systems, Andrew S. Tanenbaum, Third Edition, Pearson Education, 2008

ReferenceBooks:

1. Operating systems by A. K. Sharma, Universities Press.

2. Operating Systems: Internals and Design Principles, Stallings, Sixth Edition, 2009, Pearson Education.
3. Operating Systems, S. Haldar, A. A. Aravind, Pearson Education.
4. Operating Systems, A. S. Godbole, Second Edition, TMH.

Online Learning Resources:

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

Course Outcomes:

- Understand the OS design structures, its services and basics of a Process. (L2)
- Analyze various scheduling algorithms and examine concurrency mechanisms in Operating Systems. (L4)
- Apply memory management techniques in the design of operating systems. (L3)
- Compare and contrast various structures and organization of the file system and secondary storage structure. (L4)
- Apply different concepts of Protection and Security services in OS. (L3)

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(DS20APC401) COMPUTER SYSTEM ARCHITECTURE (CSE,CSM,IT,CSD)

Course Objectives:

- To learn the fundamentals of computer organization and its relevance to classical and modern problems of computer design
- To understand the structure and behavior of various functional modules of a computer.
- To learn the techniques that computers use to communicate with I/O devices
- To acquire the concept of pipelining and exploitation of processing speed.
- To learn the basic characteristics of multiprocessors

UNIT I

Digital Computers: Introduction, Block diagram of Digital Computer, Definition of Computer Organization

Basic Structure of Computer: Computer Types, Functional Units, Basic Operational Concepts, Bus Structure, Software, Performance, Multiprocessors and Multicomputer.

Machine Instructions and Programs: Numbers, Arithmetic Operations and Programs, Instructions and Instruction Sequencing, Addressing Modes, Basic Input/output Operations, Stacks and Queues, Subroutines, Additional Instructions.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand the various blocks & the definition of Computer Organization(L1)
- Identify the basic functional units and different ways of inter connecting to form a computer system (L1)
- Illustrate various addressing modes for accessing register and memory operands(L2)
- Describe the instruction sequencing and various types of instructions(L3)

UNIT II

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

Basic Processing Unit: Fundamental Concepts, Execution of a Complete Instruction, Multiple-Bus Organization, Hardwired Control and Multi-programmed Control.

Learning Outcomes:

At the end of this unit, the student will be able to

- Outline the arithmetic operations on signed numbers(L1)
- Describe the operations performed on floating point numbers(L1)
- Distinguish between hardwired and microprogrammed control units.(L2)

UNIT III

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

Learning Outcomes:

At the end of this unit, the student will be able to

- Recognize the various types of memories(L2)
- Analyze the performance of cache memory(L4)
- Apply effective memory management strategies(L3)

UNIT IV

Input/output Organization: Accessing I/O Devices, Interrupts, Processor Examples, Direct Memory Access, Modes of Transfer, Buses, Interface Circuits, Standard I/O Interfaces.

Learning Outcomes:

At the end of this unit, the student will be able to

- Examine the basics of I/O data transfer synchronization(L5)
- Analyze the interrupt handling mechanisms of various processors(L4)
- Describe various techniques for I/O data transfer methods(L1)

UNIT -V

Pipelining: Basic Concepts, Data Hazards, Instruction Hazards, Influence on Instruction Sets.

Large Computer Systems: Forms of Parallel Processing, ArrayProcessors, the Structure of General-Purpose multiprocessors, Interconnection Networks.

Learning Outcomes:

At the end of this unit, the student will be able to

- Investigate the use of pipelining and multiple functional units in the design of high-Performance processors(L4)
- Design and analyze a high-performance processor (L4)
- Describe the interconnection networks for multiprocessors(L1)

TEXTBOOKS:

1. M.Morris Mano, "ComputerSystemArchitecture", 3rdEdition, PearsonEducation
2. Carl Hamacher, ZvonkoVranesic, SafwatZaky, "Computer Organization", 5thEdition, McGrawHill Education, 2013.

REFERENCEBOOKS:

1. ThemesandVariations, AlanClements, "ComputerOrganizationandArchitecture", CENGAGE Learning.
2. SmrutiRanjanSarangi, "ComputerOrganizationandArchitecture", McGrawHill Education.
3. John P.Hayes, "Computer Architecture and Organization", McGrawHillEducation.

Course Outcomes:

At end of the course the student will be able to

- Understand the computer organization concepts related to design of modern processors, memories and I/Os(L2)
- Identify the hardware requirements for cachememory and virtualmemory(L2)
- Understand the importance and trade offsof different types of memories(L2)
- Design algorithms to exploit pipelining and multiprocessors(L4)
- Identify pipe line hazards and possible solutions to those hazards(L2)

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(BA20AHS301) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Objectives:

The objective of this course is to equip the student with the basic inputs of Managerial Economics and Economic Environment of business and to impart analytical skills in helping them take sound financial decisions for achieving higher organizational productivity.

UNIT I

INTRODUCTION TO MANAGERIAL ECONOMICS

Managerial Economics – Definition- Nature- Scope - Contemporary importance of Managerial Economics-Relationship of Managerial Economics with Financial Accounting and Management. Demand Analysis: Concept of Demand-Demand Function-Law of Demand-Elasticity of Demand-Significance-Types of Elasticity - Measurement of elasticity of demand - Demand Forecasting- factors governing demand forecasting-methods of demand forecasting.

UNIT II

THEORY OF PRODUCTION AND COST ANALYSIS

Production Function- Least cost combination- Short-run and Long- run production function- Isoquants and Isocosts, MRTS - Cobb-Douglas production function - Law of returns - Internal and External economies of scale - Cost Analysis: Cost concepts and cost behavior- Break-Even Analysis (BEA) - Determination of Break Even Point (Simple Problems)-Managerial significance and limitations of Break-Even Point.

UNIT III

INTRODUCTION TO MARKETS AND NEW ECONOMIC ENVIRONMENT

Market structures: Types of Markets - Perfect and Imperfect Competition – Features of Perfect Competition-Monopoly-Monopolistic Competition-Oligopoly-Price-Output Determination - Pricing Methods and Strategies-Forms of Business Organizations-

Sole Proprietorship- Partnership–JointStockCompanies – Public Sector Enterprises
–NewEconomicEnvironment-EconomicLiberalization–Privatization-
Globalization.GSTand Demonetization.

UNIT IV

INTRODUCTION TO FINANCIAL ACCOUNTING AND ANALYSIS

Financial Accounting – Concept - Emerging need and Importance - Double-Entry Book Keeping- Journal- Ledger – Trial Balance - Financial Statements - TradingAccount–Profit&LossAccount–BalanceSheet(withsimpleadjustments).

Financial Analysis – Ratios – Liquidity, Leverage, Profitability, and Activity Ratios(simpleproblems).

UNIT V

CAPITAL AND CAPITAL BUDGETING

Concept of Capital - Over and Undercapitalization – Remedial Measures - Sources of Short term and Longterm Capital - Estimating Working Capital Requirements – CapitalBudgeting–Features of Capital Budgeting Proposals–Methods and Evaluation of Capital Budgeting Projects – Pay Back Method – Accounting Rate ofReturn (ARR) – Net Present Value (NPV) – Internal Rate Return (IRR) Method(simpleproblems)

TEXTBOOKS:

1. ManagerialEconomics3/e,AhujaH.L,S.Chand,2013.
2. FinancialManagement, I.M.Pandey, VikasPublications,2013.

REFERENCES

1. Managerial Economics and Financial Analysis,1/e,Aryasri,TMH,2013.
2. Managerial Economics and Financial Analysis, S.A.Siddiqui and A.S.Siddiqui,New AgeInternational, 2013.
3. Accounting and Financial Mangement, T.S.Reddy& Y. Hariprasad Reddy,Margham

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(BA20AHS302) BUSINESS ENVIRONMENT

Objective: To provide the student with a background of various environment factors that have major repercussions on business and sharpen their mind to watch and update the changes that occur constantly in this sphere.

UNIT-I

An Overview of Business Environment:-

Type of Environment-internal, external, micro and macro environment-Competitive structure of industries, environmental analysis and strategic management-Managing diversity- Scope of business, characteristics of business- Objectives and the uses of study-Process and limitations of environmental analysis.

UNIT-II

Economic Environment:

Nature of Economic Environment-Economic factors-growth strategy, basic economic system, economic planning, Economic policies-new industrial policy, FEMA, monetary and fiscal policies-Consumer Protection Act and Competition Law.Liberalization, Privatization and Globalization of Indian Economy,-Trends and Issues.

UNIT-III

Socio-Cultural Environment:-

Nature and impact of culture on business, culture and globalization, social responsibilities of business, social audit, business ethics and corporate governance, Demographic environment population size, migration and ethnic aspects, birth rate, death rate and age structure

UNIT-IV

Political Environment:-

Functions of state-economic roles of government-government and legal environment-
The constitution and environment, rationale and extent of state intervention.

UNIT-V

Natural and Technological Environment:

Innovation, technological leadership and followership, source of technological dynamics, impact of technology on globalization, transfer of technology, time lags in technology introduction, Status of technology in India; Management of technology; Features and Impact of technology.

Textbooks:

- K. Aswathappa (2017), Essentials of Business Environment, 13th Edition, Himalaya publishers.
- N.D. Kapoor (2019), Elements of Mercantile Law, 38th Edition, Sultan Chand & Sons.

References:

- Indian Economy, Dutt and Sundaram, S. Chand, New Delhi.
- Business Environment – Text and Cases, Justin Paul, TMH.
- Indian Economy - Misra and Puri, Himalaya.
- Business Environment, Suresh Bedi, Excel.
- Rangarajan, C.A.; Perspective in Economics, S. Chand & Sons, New Delhi
- Cherunilam, Francis; Business Environment - Text and Cases, Himalaya Publishing House.
- Aswathappa, K.; Essentials of Business Environment, Himalaya Publishing House, New Delhi.

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(BA20AHS303) ORGANIZATIONAL BEHAVIOUR

Objective: To provide the student with background of various environment factors that have major repercussions on business and sharpen their mind to watch and update the changes that occur constantly in this sphere.

UNIT-I

Introduction to Organization Behaviour:-

Introduction to organization, organization and managers, manager's roles and skills, behaviour at work, introduction to organization behaviour, major behavioral science disciplines contributing to OB, challenges and opportunities managers have in applying OB concepts, OB model (including motivation models) and levels of OB model

UNIT-II

Individual behaviour:

Introduction to individual behaviour, values, attitudes, job satisfaction, personality, perception and individual decision making, learning, motivation at work, managing emotions and stress (Meaning-Definition Stress and job performance relationship) Approaches to stress management (Coping with stress)

UNIT-III

Interpersonal behavior :-

Interpersonal Behaviour, Johari Window, Transactional Analysis- ego states, types of transactions, life positions, applications of T.A., managerial interpersonal styles..

UNIT-IV

Group behaviour:-

Introduction to group behaviour, foundations of group behaviour, concept of group and group dynamics, types of groups, formal and informal groups, theories of group

formation, group norms, group cohesiveness, group decision making, inter groupbehaviour, concept of team vs. group, types of teams, building and managingeffective teams, leadership theories and styles, power and politics, conflict and negotiation.

UNIT-V

Organisational behaviour:

Foundations of organization structure, organization design, organization culture, organization change, managing across cultures, human resource management policies and practices, diversity at work.

Textbooks:

- Pardeshi, P. C., Organizational Behaviour& Principles & Practice OfManagement,Niralipublication

References:

- Robbins,S.P/Judge,T.A/Sanghi,S.,OrganizationalBehavior,PearsonPublication
- Aswathappa, K., OrganisationalBehaviour– Text and Problem, HimalayaPublication

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(CS20APC402) OBJECTORIENTED PROGRAMMING THROUGH JAVA LAB

(CSE, CSM, IT,CSD)

Course Objectives

- To introduce the concepts of Java.
- To Practice object-oriented programs and build java applications.
- To implement java programs for establishing interfaces.
- To implement sample programs for developing reusable software components.
- To establish database connectivity in java and implement GUI applications.

List of Experiments

Week1:

- Read the marks of a student in 4 subjects and find grade.
- Program to check a number is Amstrong ornot.
- Program to display prime numbers frommton.

Week 2:

- Define a class Rectangle with data member's length and width. Write methods to find perimeter and area of a rectangle.(class andobject)
- Create a class Account with data members name, accno and balance. Use appropriate methods to perform various operations likedeposit, withdraw, balanceCheck.
- Createa class Student with appropriate data and method susing constructor.

Week 3:

- Create overloaded methods to find volume of Sphere, Cylinder&Cone.
- To sort given list of elements in a scendingorder.
- Read two matrices of sizem*n,p*q,perform the multiplication of matrices.

Week 4:

- Check a string is palindrome or not.

- Given a string and an integer n, return a string made of n repetitions of the last n characters of the string.
- You may assume that n is between 0 and the length of the string, inclusive.

Write a Java program.

```
repeatEnd("Hello",3)→"llo"repeatEnd("Hello",2)→"llo"repeatEnd("Hello",1)→"o"
```

- Read array of City names and Sort in dictionary order.(Ascending order).

Week 5:

- Write Java program on use of inheritance, preventing inheritance using final, abstract classes.
- Write Java program on dynamic binding, differentiating method overloading and overriding

Week 6:

- Write a Java program to implement user defined exception handling.
- Write a Java program that inputs 5 numbers, each between 10 and 100 inclusive. As each number is read display it only if it's not a duplicate of any number already read. Display the complete set of unique values input after the user enters each new value.
- Write a Java program that creates a user interface to perform integer division. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 and Num2 were not integers, the program would throw a Number Format Exception. If Num2 were zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.

Week 7:

- Implement the concept of producer consumer problem using thread synchronization.
- Write a Java program that creates three threads. First thread displays —Good Morning|| every one second, the second thread displays —Hello|| every two seconds and the third thread displays —Welcome|| every three seconds.

Week 8:

- Use an Array List to manage Employee objects for insertion, display and remove.
- Use Hash Set methods to perform operations on collection of data.

Week 9:

- Implement Mouse Listener and Mouse Motion Listener to handle various mouse events.
- Implement Key Listener to handle key events.
- Create a Simple login window to validate a user with name and password.

Week10:

- Create a JT able to display various fields of Student data like RollNo, Name, Branch, Year, Percentage etc.
- Write a java program to Create and Read data using JDBC//Week-12

TextBooks:

1. Java The complete reference, 9th edition, Herbert Schildt, McGrawHill Education (India) Pvt. Ltd.
2. Java How to Program, 10th Edition, Paul Dietel, Harvey Dietel, Pearson Education.

ReferenceBooks:

1. T. Budd "Understanding Object-Oriented Programming with Java", updated edition, Pearson Education.
2. Cay S. Horstmann "Core Java Volume – 1 Fundamentals", Pearson Education.
3. Sagayaraj, Dennis, Karthik and Gajalakshmi "Java Programming for core and advanced learners, University Press.
3. Y. Daniel Liang, "Introduction to Java programming", Pearson Education.
4. P. Radha Krishna "Object Oriented Programming through Java", University Press.
6. S. Malhotra, S. Chudhary, "Programming in Java", 2nd edition, Oxford Univ. Press.
7. R. A. Johnson, "Java Programming and Object-oriented Application Development", Cengage Learning.

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

- Recognize the Java programming environment (L3).
- Select appropriate programming constructs to solve a problem (L2).
- Develop efficient programs using multithreading (L5).
- Design reliable programs using Java exception handling features (L3).
- Extend the programming functionality supported by Java (L4).

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B.Tech IV Sem

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(IT20APC402) OPERATING SYSTEMS LAB

(CSE, CSM, IT, CSD)

Course Objectives:

- To familiarize students with the architecture of OS.
- To provide necessary skills for developing and debugging CPU Scheduling algorithms.
- To explore the process management and scheduling and memory management.
- To explain the working of an OS as a resource manager, file system manager, process manager, memory manager, and page replacement tool.
- To provide insights into system calls, file systems and deadlock handling.

List of Experiments

1. Simulate the following CPU scheduling algorithms
a) Round Robin b) SJF c) FCFS d) Priority
2. Implement dynamic priority scheduling algorithm.
3. Assume that there are five jobs with different weights ranging from 1 to 5
Implement roundrobin algorithm with time slice equivalent to weight.
4. Implement priority scheduling algorithm. While executing, noprocess should wait for more than 10 seconds. If waiting time is more than 10seconds, that process has to be executed for at least 1 second before waiting again.
5. Control the number of ports opened by the operating system with
a) Semaphore b) Monitors.
6. Simulate how parent and child processes use share dmemory and address space.
7. Simulate sleeping barber problem.

8. Simulate dining philosopher's problem.
9. Simulate producer and consumer problem using threads.
10. Implement the following memory allocation methods for fixed partition
 - a) Firstfit b) Worstfit c) Bestfit
11. Simulate the following page replacement algorithms
 - a) FIFO b) LRU c) LFUetc.,
12. Simulate Paging Technique of memory management
13. Simulate Bankers Algorithm for DeadLock avoidance and prevention.
14. Simulate following file allocation strategies
 - a) Sequential b) Indexed c) Linked
15. Simulate all File Organization Techniques
 - a) Single level directory b) Twolevel c) Hierarchical d) DAG

ReferenceBooks:

1. PeterB.Galvin, GregGagne "OperatingSystemConcepts", Abraham Silberchatz, Eighth Edition, JohnWiley.
2. Stallings "OperatingSystems: Internals and Design Principles", Sixth Edition - 2009, Pearson Education
3. Andrew S Tanenbaum, "Modern Operating Systems", Second Edition, PHI.
4. S.Haldar, A.A.Aravind, "Operating Systems", Pearson Education.
4. B.L.Stuart, "Principles of Operating Systems", Cengage learning, India Edition. 2013-2014.
5. A.S.Godbole, "Operating Systems", Second Edition, TMH.

Online Learning Resources/Virtual Labs:

- <https://www.cse.iitb.ac.in/~mythili/os/>
- <http://peterindia.net/OperatingSystems.htm>

Course Outcomes:

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

- Trace different CPU Scheduling algorithm. (L2)
- Implement Bankers Algorithms to Avoid and prevent the Dead Lock. (L3)
- Evaluate Page replacement algorithms. (L5)
- Illustrate the file organization techniques. (L4)
- Illustrate share dmemory process. (L4)
- Design new scheduling algorithms. (L6)

SRI VENKATESWARA COLLEGE OF ENGINEERING

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(DS20APC402) Computer Organization and Electronics Lab

(CSD)

Course Objectives:

- To understand the various components of a Computer.
- To implement binary operations.
- To understand the working of Booth's multiplication.
- To understand the basics of logicgates.
- Analyze Combinational Logic and Sequential LogicCircuits
- Apply knowledge and demonstrate programming proficiency using various addressing modes and instruction sets of 8086&8051.

List of Experiments:

Week1. Study of peripherals, components of a Computer System.

Week2. Write a C Program for Binary Addition.

Week3. Write a C Program for Binary Multiplication.

Week4. Write a C Program for Booth's Multiplication algorithm.

Week5. Write a C Program for Restoring Division.

Week6. Write a C Program for Non Restoring Division Algorithm.

Week7. Design 8-bit ALU.

Week8. Implementing HALF ADDER, FULL ADDER using basic logicgates.

Week9. Programs using arithmetic and logical operations.

Week10. Programs for code conversions.

Week11. ASCII Arithmetic Addition and Subtraction.

Week12. Searching for an element in an Array.

Week13. Arithmetic and logical operations using 8051.

Week14. Sorting in Ascending and Descending Orders using 8051.

Course outcomes:

- Understand various components of computer system.
- Design adder circuit using basic gates.
- Analyze arithmetic operation on binary.
- Analyze the behavior of logic gates
- Analyze Combinational Logic and Sequential Logic Circuits.
- Apply knowledge and demonstrate programming proficiency using various addressing modes and instruction sets of 8086 & 8051

Equipment Required:

1. Hardware kits.
2. TASM
3. 8051 kits.
4. Personal computer with necessary peripherals

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(DS20ASC401) InternetofThings

(CSD)(Skill Oriented Course)

Course Objectives:

1. Introduce the fundamental concepts of IoT and physical computing
2. Expose the student to a variety of embedded boards and IoT Platforms
3. Create a basic understanding of the communication protocols in IoT communications.
4. Familiarize the student with application program interfaces for IoT.
5. Enable students to create simple IoT applications.

UNIT I

Overview of IoT:

The Internet of Things: An Overview, The Flavor of the Internet of Things, The "Internet" of "Things", The Technology of the Internet of Things, Enchanted Objects, Who is Making the Internet of Things?

Design Principles for Connected Devices: Calm and Ambient Technology, Privacy, Web Thinking for Connected Devices, Affordances.

Prototyping: Sketching, Familiarity, Costs Vs Ease of Prototyping, Prototypes and Production, Open source Vs Close source, Tapping into the community.

- Explain IoT architecture.[L2]
- Interpret the design principles that govern connected devices[L2]

UNIT II

Embedded Devices:

Electronics, Embedded Computing Basics, Arduino, Raspberry Pi, Mobile phones and tablets, Plug Computing: Always-on Internet of Things

- Explain the basics of microcontrollers[L2]
- Outline the architecture of Arduino[L2]

UNIT III

Communication in the IoT: Internet Communications: An Overview, IPAddresses, MAC Addresses, TCP and UDPPorts, Application Layer Protocols

Prototyping Online Components: Getting Started with an API, Writing a New API, Real-Time Reactions, Other Protocols Protocol

- Interpret different protocols and compare them[L2]
- Select which protocol can be used for a specific application[L3]

Practice Exercises:

Any 10 experiments are to be done (Software 6 +4 Hardware)

Hardware Experiments: Any Six Experiments are to be done

1. Data acquisition using My DAQ. Select any one development board (Eg., ArduinoorRaspberryPi) and control LED using the board.
2. Using the same board asin(1),read data from a sensor.Experiment with both ana log and digital sensors.
3. Control any two actuators connected to the development board using Bluetooth.
4. Read data from sensor and send it to a requesting client.(using socket communication)Note: The client and server should be connected to same local area network.
5. Create any cloud platform account, explore IoT services and registerathing on the platform. Push sensor data to cloud.
6. Control anactuator through cloud.
7. Accesses the data pushed from sensor to cloud and apply any data analyticsor visualization services.

Software Experiments: Any Four Experiments are to be done

1. Createamobileappto controlanactuator.
2. Design an IoT based air pollution control system which monitors the air pollution by measuring carbonmonoxide, ammonia, etc and gives alarmor sends message when the pollution levelis more than permitted range.
3. Designan IoT based systemwhich measures the physical and chemical properties of the water and displays the measured values.
4. Identify a problem in your local area or college which can be solved by integrating the things you learned and create aprototype to solve

it(MiniProject).

5. Design a business model canvas for a digital display

TextBooks:

1. AdrianMcEwen,HakimCassimally-DesigningtheInternetofThings, WileyPublications,2012.
2. AlexanderOsterwalder,andYves Pigneur–BusinessModelGeneration–Wiley,2011.

ReferenceBooks:

1. ArshdeepBahga, Vijay Madiseti- Internet of Things: A Hands-On Approach, UniversitiesPress,2014.
2. TheInternetofThings,Enablingtechnologiesandusecases– PethuruRaj,AnupamaC.Raman, CRC Press.

Referencesites:

1. <https://www.arduino.cc/>
2. <https://www.raspberrypi.org/>

Courseoutcomes:

CO1: Choose the sensors and actuators for an IoT application (L1)

CO2: Select protocols for a specific IoT application (L2)

CO3: Utilize the cloud platform and APIs for IoT applications (L3)

CO4: Experiment with embedded boards for creating IoT prototypes (L3)

CO5: Design a solution for a given IoT application(L6)

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B.Tech IV Sem

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(CS20AMC401) DESIGN THINKING FOR INNOVATION(Mandatory Course)
(CSE, CSM, IT, CSD)

Course Objectives:

- To familiarize product design process
- To introduce the basics of design thinking
- To bring awareness on idea generation
- To familiarize the role of design thinking inservices design

Unit-I

Introduction to design, product development process, product planning, Innovation in product development, characteristics of successful product development.

Design Thinking: Introduction, Defining design thinking, Principles, the process.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand design and development process.(L2)
- Understand Design thinking concept and its uses.(L2)
- Learn Principlesof design thinking.(L3)

Unit-II

Stages in design thinking, Benefits of Design thinking, design thinking and innovation, casestudies.

Immersion: Preliminary immersion, In Depthimmersion.

Learning Outcomes:

At the end of this unit, the student will be able to

- Familiarize with design thinking stages. (L2)
- Differentiate design thinking and innovation. (L3)
- Identify the problemsintheimmersionstage(L4)

Unit-III

Analysis and Synthesis is: Insight, Affinity diagram, Conceptual Map, Guiding criteria, Empathy map.

Idea generation: Introduction, techniques, Conventional methods, Brainstorming, Gallery method, Delphi method, Synectics, etc, Select ideas from ideation methods, case studies.

Learning Outcomes:

At the end of this unit, the student will be able to

- Analyze possibilities of the problem through analysis and synthesis process.(L4)
- Understand different analysis and synthesis techniques.(L2)
- Apply different ideation techniques for designing solutions.(L3)

Unit-IV

Prototyping: Paper prototyping, Volumetric model, Staging, Storyboard, Service prototyping. Design Thinking in Information Technology, Design thinking in Business process model, Design thinking for agile software development, TILES toolkit, Cloud implementation.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand different prototyping techniques.(L2)
- Know the role of design thinking in information technology field.(L2)
- To distinguish traditional software development model and agile model.(L3)

Unit V

Design thinking for service design: How to design a service, Principles of service design, Benefits of service design, Service blueprint, Design strategy, organization, principles for information design, principles of technology for service design.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand different prototyping techniques.(L2)
- Know the role of design thinking in information technology field.(L2)
- To distinguish traditional software development model and agile model.(L3)

Reference Books:

- Christoph Meinel and Larry Leifer, "Design Thinking", Springer, 2011

- Aders Riise Maehlum, "Extending the TILE Toolkit" from Ideation to Prototyping
- Maurício Vianna, Ysmar Vianna, Brenda Lucena and Beatriz Russo, "Design Thinking: Business Innovation", MJV Technologies and Innovation Press, 2011.
- Tim Brown, "Change by Design: Design Thinking Transforms Organizations and Inspires Innovations", HarperCollins publication, 2009
- <http://www.algorytm.com/it-executives-guide-to-design-thinking:e-book>.
- Marc Stickdorn and Jacob Schneider, "This is Service Design Thinking", Wiley, 2011
- Pahl and Vietz, "Engineering Design", Springer, 2007

Course Outcomes:

Student will be able to

- Generate and develop different design ideas. (L4)
- Appreciate the innovation and benefits of design thinking. (L3)
- Experience the design thinking process in IT and agile software development. (L2)
- Understand design techniques related to variety of software services. (L2)

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B.Tech IV Sem

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(MA20AMC401) ENGINEERING MATHEMATICS
(Common to All Branches of LE Students)

Course Objectives:

- This course will illuminate the students in the concepts of calculus and linear algebra.
- To equip the students with standard concepts and tool set intermediate to advanced level mathematics to develop the confidence and ability among the students to handle various real world problems and their applications.

UNIT -1

Matrices

Solving system of homogeneous and nonhomogeneous linear equations. Eigen values and Eigen vectors and their properties, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem,

Learning Outcomes:

At the end of this unit, the student will be able to

- Solving systems of linear equations, using technology to facilitate row reduction determine the rank, eigen values and eigen vectors (L3).
- Identify special properties of a matrix, such as positive definite, etc., and use this information to facilitate the calculation of matrix characteristics (L3).

UNIT -2

Mean Value Theorems

Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem, Taylor's and Maclaurin theorems with remainders (without proof) related problems.

Learning Outcomes:

At the end of this unit, the student will be able to

- Translate the given function as series of Taylor's and Maclaurin's with remainders (L3)

Analyze the behavior of functions by using mean value theorems (L3)

UNIT 3

Linear differential equations of higher order

Definitions, complete solution, operator D , rules for finding complimentary function, inverse operator, rules for finding particular integral, method of variation of parameters, Applications to L-C-R Circuit problems.

Learning Outcomes:

At the end of this unit, the student will be able to

- Identify the essential characteristics of linear differential equations with constant coefficients(L3)
- Solve the linear differential equations with constant coefficients by appropriate method(L3)

UNIT 4

Multi variable Calculus

Partial derivatives, total derivatives, chain rule, change of variables, Jacobian, maxima and minima of functions of two variables, method of Lagrange multipliers.

Learning Outcomes:

At the end of this unit, the student will be able to

- Find partial derivatives numerically and symbolically and use them to analyze and interpret the way a function varies. (L3)
- Acquire the Knowledge maxima and minima of functions of several variable(L1)
- Utilize Jacobian of a coordinate transformation to deal with the problems in change of variables(L3)

UNIT -5

Vector Calculus

Vector differentiation

Scalar and vector point functions, vector operator ∇ , ∇ applies to scalar point functions-Gradient, ∇ applied to vector point functions-Divergence, Curl and their related properties.

Vector integration

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

Learning Outcomes:

At the end of this unit, the student will be able to \square

- Find the work done in moving a particle along the path over a force field (L4)
- Evaluate the rates of fluid flow along and across curves(L4) \square
- Apply Green's, Stokes and Divergence theorem in evaluation of double and

TextBooks:

1. B.S.Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.

ReferenceBooks:

1. R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
3. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers, 2011.
4. B.V.Ramana, Higher Engineering Mathematics, McGraw Hill Education
5. H.kDas, Er.Rajnish Verma, Higher Engineering Mathematics, S.Chand.
6. N.Bali, M.Goyal, C.Watkins, Advanced Engineering Mathematics, Infinity Science Press.

Course Outcomes:

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

- Develop the use of matrix algebra techniques that is needed by engineers for practical applications(L6)
- Utilize mean value theorem to solve problems(L3)
- Solve the differential equations related to various engineering fields(L6) □
- Apply multiple integrals to find the area and volumes for different functions.(L3)
- Estimate the work done against a field, circulation and flux using vector calculus(L6)

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B.Tech IV Sem

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(MA20AMC301) Logical Skills for Professionals-II

(Mandatory Course)

Course Objectives:

- To learn the basic methods to find HCF, LCM Factors, Simplification, Pipes, Alligation or Mixture, Table, Bar Graphs and Pie Chart concepts.
- To understand the logic behind the Syllogism, Calendar, Clocks and Number Series Analogy concepts.

UNIT –I

HCF, LCM Factors:

- Find the HCF and LCM of the given numbers by using Factorization method.
- Find the HCF and LCM of the given numbers by using Division method.

Simplification:

- Using BODAMS rule to find out the value of a given expression.
- Using Vernacular rule to find out the value of a given expression.

UNIT–II

Pipes

- Find the how much time taken to fill the tank by opening one pipe, two pipe and one after another.

Alligation or Mixture

- Using Ratio and proportion to solve the mixture problems.
- To find quickly calculate the price of a mixture, given that it is a mix of two elements having different prices.

UNIT–III

Table, Bar Graphs

- Find the Average sales of all branches for the respective years.
- Find the ratio of the total sales of respective branches.

Pie Charts

- Study the Pie chart and the table answer the questions based on them.

- Find the central angle of the components.

UNIT-IV

Syllogism

- Type-I: Different types of Venn diagrams with their implications.
- Type-II: Analyse the figure carefully and then answer certain questions regarding the given data.

UNIT -V

Calendars

- Find the day of the week on a given date
- Find the ordinary year and Leap year

Clocks

- Find the angle between the hour and minute hand of a clock.
- When the hands are at right angles.

Number Series Analogy

- Choosing a similarly related pair as the given number pair on the basis of the relation between the numbers in each pair.
- Choosing a number similar to a group of numbers on the basis of certain common properties that they possess..

Textbooks:

1. Quantitative Aptitude, 2012, Dr.R.S.Aggarwal, S.Chand and Company Ltd, New Delhi.
2. A Modern Approach to Verbal and Non-Verbal Reasoning, 2012, Dr.R.S.Aggarwal, S.Chand and Company Ltd, New Delhi.

Reference Books:

1. Quantitative Aptitude for Competitive Examinations, 14/e, 2010, Abhijit Guha, Tata McGraw Hill Publishers, New Delhi.
2. Course in Mental Ability & Quantitative Aptitude, 3/e, 2012, Edgar Thorpe, Tata McGraw Hill Publishers, New Delhi.
3. Fast Track Objective Arithmetic, 2012, Rajesh Verma, Arihant Publications, Meerut.
4. Reasoning and Aptitude, 2013, Nem Singh, Made Easy Publications, New Delhi.

Course Outcomes (CO):

- Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of HCF, LCM Factors and Simplification.
- Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of Pipes, Alligation or Mixture.
- Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of Table, Bar Graphs and PieChart.
- Analyze the techniques in Syllogism.
- Analyze the techniques in Calendar, Clocks and Number Series Analogy concepts.

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B.Tech V Sem

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(DS20APC501) ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

Course Objectives:

This course is designed to:

- Define Artificial Intelligence and establish the cultural background for study
- Understand various learning algorithms
- Explore the searching and optimization techniques for problem solving
- Provide basic knowledge on Natural Language Processing and Robotics

Course outcomes:

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

- Recognize the importance of Artificial Intelligence
- Explain how an agent can formulate an appropriate view of the problem it faces.
- Explain the role of Robot in various applications
- Knowledge about the Classification and Clustering algorithms

Unit-I:

Introduction: What is AI, Foundations of AI, History of AI, The State of Art. Intelligent Agents: Agents and Environments, Good Behavior: The Concept of Rationality, The Nature of Environments, The Structure of Agents.

Learning Outcomes:

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

- Recognize the importance of Artificial Intelligence(L1)
- Identify how intelligent agents are related to its environment(L2)
- Build an Intelligent agent(L3)

Unit-II:

Solving Problems by searching: Problem Solving Agents, Example problems, searching for Solutions, Uninformed Search Strategies, Informed search strategies,

Heuristic Functions, Beyond Classical Search: Local Search Algorithms and Optimization Problems, Local Search in Continuous Spaces, Searching with Nondeterministic Actions, Searching with partial observations, online search agents and unknown environments.

Learning Outcomes:

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

- Explain how an agent can formulate an appropriate view of the problem it faces. (L2)
- Solve the problems by systematically generating new states (L2)
- Derive new representations about the world using process of inference (L5)

Unit-III:

Robotics: Introduction, Robot Hardware, Robotic Perception, planning to move, planning uncertain movements, Moving, Robotic software architectures, And application domains Philosophical foundations: Weak AI, Strong AI, Ethics and Risks of AI, Agent Components, Agent Architectures, Are we going in the right direction, What if AI does succeed.

Learning Outcomes:

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

- Explain the role of Robotics in various applications. (L2)
- List the main philosophical issues in AI. (L1)

Unit-IV:

Introduction to Machine Learning & Preparing to Model

Introduction, Machine Learning Activities, Basic Types of Data in Machine Learning, Exploring Structure of Data, Data Quality and Remediation, Data Pre-Processing **Supervised Learning:** Classification, training a binary classifier, performance measures, multiclass classification, error analysis, multi label classification, multioutput classification. Linear Regression, Gradient Descent, Polynomial Regression, learning curves, regularized linear models, logistic regression.

Unit-V:

Unsupervised Learning

Unsupervised Learning: Clustering, K-Means, Using clustering for image segmentation, Semisupervised learning, DBSCAN, other clustering algorithms. Gaussian Mixtures, anomaly detection, selecting number of clusters, Bayesian Gaussian Mixture Models, anomaly and novelty detection algorithms.

Textbooks:

1. Stuart J. Russell, Peter Norvig, "Artificial Intelligence A Modern Approach", 3rd Edition, Pearson Education, 2019.
2. Machine Learning, Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das, Pearson, 2019.

References:

1. Nilsson, Nils J., and Nils Johan Nilsson. Artificial intelligence: a new synthesis. Morgan Kaufmann, 1998. **157|SVCE** www.svcolleges.edu.in
2. Johnson, Benny G., Fred Phillips, and Linda G. Chase. "An intelligent tutoring system for the accounting cycle: Enhancing text book home work with artificial intelligence." *Journal of Accounting Education* 27.1 (2009): 30-39.
3. Ethem Alpaydin, "Introduction to Machine Learning", MIT Press, 2004

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech V Sem

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(DS20APC503) AUTOMATA THEORY AND COMPILER DESIGN

Course Objectives:

- Introduce the student to the concepts of Theory of computation in computer science.
- The students should acquire insights into the relationship among formal languages.
- Understand the basic theory underlying the different components and phases of a compiler
- Understand the languages and their grammars.

Course Outcomes:

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

CO1: Explain finite state machines for modeling and their power to recognize the languages.(L2)

CO2: Understand the parser and get the knowledge about Context free grammars.(L2)

CO3: Model SDD's using Intermediate Representations (L3)

CO4: Acquire knowledge about run time data structure like symbol table organization and different techniques used (L3)

CO5: Understand the target machine's runtime environment, its instruction set for code generation and techniques used for code optimization(L3)

UNIT-I

Fundamentals of Automation: Languages, regular expressions, Regular Languages, Chomsky hierarchy of languages. Finite Automata- Introduction to Finite State machine, Acceptance of strings and languages Deterministic finite automaton (DFA) and Non-deterministic finite automaton (NFA), Conversion of regular expression to NFA, NFA to DFA conversion, minimization of finite automata, Applications of Automata.

Learning Outcomes:

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

- Describe about Finite Automata Model (L2)
- Translate NFA to DFA and viceversa(L2)
- Explain about Regular Sets and Regular Expressions(L2)

UNIT-II

Compiler Design: phases, lexical analysis, lex tool, parsing- The role of the Parser, First and Follow, YACC tool. Context Free grammars-left recursion and left factoring in context free grammars.Derivation-Derivation trees, left most derivationand right most derivation, parse trees, ambiguity, handle pruning, LL(K) and LL (1) grammars, LR grammars.

Learning Outcomes:

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

- Explainthe phases of a compiler.(L2)
- Explain Ambiguity of Context Free Grammar (L2)
- Build various LR Parsing tables for a given grammar.(L3)
- Construct a Predictive Parsing table for the given grammar.(L3)

UNIT-III

Semantics: Syntax directed translation-Attributed SDD, L-Attributed SDD, translation of simple statements and control flow statements. Intermediate code- Graphical Representations, thread dress code, abstract syntax tree. Type checking, type conversions, equivalence of type expressions.

Learning Outcomes:

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

- Compare S-Attributed SDD and L-Attributed SDD. (L2)
- Explain graphical representations in intermediate code generation.(L2)
- Develop various representations for three address codes.(L3)

UNIT-IV

Symbol table, DS for symbol table, Activation record, Storage organization, storage allocation strategies, scope access to new local names, parameters, language facilities for dynamics storage allocation. Code optimization- Principal sources of optimization, optimization of basic blocks, peephole optimization, flowgraphs,

Optimization techniques.

Learning Outcomes:

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

- Understand the concepts of Storage allocation and optimization techniques(L1)
- Classify various storage allocation strategies(L3)

UNIT-V

Code generation- Machine dependent code generation, object code Forms, Design issues, generic code generation algorithm. Register allocation and assignment. DAG representation of blocks.

Learning Outcomes:

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

- Summarize various optimization techniques used for dataflow analysis and generate machine code from the source code of anovel language(L3).

TEXTBOOKS:

1. John E Hopcroft, Rajeev Motwani, Jeffrey D.Ullman, "Introduction to AutomataTheoryLanguagesandComputation",3rdEdition,PearsonEducation,2011.
2. AlfredAho,MonicaS Lam, RaviSethi,JeffreyD.Ullman,"Compilers-PrinciplesTechniquesand Tool",2ndEdition, PearsonEducationIndia,2013.

REFERENCEBOOKS:

1. Peter Linz, " An introduction to Formal Languages and Automata", 6th Edition,Jones&Bartlett,20162.V.Raghavan,"PrinciplesofCompilerDesign",1stEdition,McGrawHillEducation,2017.
3. MishraandChandrashekar,"TheoryofComputerScience–AutomataLanguagesand Computation",3rd Edition, PHI,2009
4. K.V.N.Sunitha,N.Kalyani,"FormalLanguagesandAutomataTheory",1stEdition,TMH , 2010
5. Michel Sipser, "Introduction to Theory of Computation", 2nd Edition, Thomson,2012WEB

REFERENCES:

1. WebReference:https://swayam.gov.in/nd1_noc19_cs79/preview

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B.Tech V Sem

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(DS20APC505) Data Analytics

Course Objectives:

- Understand the fundamental principles of dataanalytics, including datatypes, data.
- Learn various statistical methods for data analysis, such as hypothesis testing, regressionanalysis, and descriptive statistics.
- Develop skills in creating informative data visualizations using tools like charts, graphs, and dash boards to effectively communicate findings and trends to stake holders.
- Apply data analyticstoreal-worlds cenarios, exploring techniques for extracting insights from diverse data sets.

Course Outcomes:

- At tain the ability to proficiently collect, clean, and preprocess data from various sources for analysis.
- Develop expertise in applying statistical and computational methods to extractinsights, make predictions, and identify trends within data sets.
- Acquire skills to create impactful data visualizations that effectively convey findings to diverse audiences.
- Gain the confidence to use data-driven in sights for informed decision-making, contributing value across industries and domains.

Unit I

INTRODUCTION TO DATA SCIENCE Need for data science – benefits and uses – facets of data – data science process – setting the research goal – retrieving data – cleansing, integrating, and transforming data – exploratory data analysis – build the models – presenting and building applications.

Learning outcomes:

- Grasp the significance of data science, its benefits, and diverse applications across industries, appreciating its role in extracting insights from complex data sets.
- Develop the ability to identify various facets of data, including its types and sources, and acquire skills in retrieving, cleansing, integrating, and transforming data to ensure its suitability for analysis.
- Learn the process of constructing models using collected data, and understand how to present findings effectively.

Unit II: Data collection/generation and descriptive statistics

Data collection – types of data – Sampling methods – data generation methods – Bootstrapping – Jackknife sampling – bias and variance – simulation – confidence levels – sample size determination – descriptive statistics.

Learning outcomes:

- Gain knowledge about data proficiency.
- Acquire proficiency in sampling techniques.
- Apply descriptive statistics to summarize and interpret data patterns effectively.

Unit III INFERENCE STATISTICS Populations – samples – random sampling – Sampling distribution – standard error of the mean – Hypothesis testing – z-test – z-test procedure – decision rule – calculations – decisions – interpretations – one-tailed and two-tailed tests – Estimation – point estimate – confidence interval – level of confidence – effect of sample size.

Learning outcomes:

- Develop a deep comprehension of population, sample, and random sampling.
- Attain proficiency in hypothesis testing, including formulating hypotheses.

- Acquire skills in estimating population parameters using point estimates and constructing confidence intervals with a specified level of confidence.

Unit IV: Fitting of data and Inferential statistics

Hypothesis testing-Fitting of distribution to data–Binomial–Poisson–uniform–exponential
–Normal distributions, one-way, two-way-analysis of variance--Multiple range test for one way ANOVA.

Learning outcomes:

- Develop a strong command over hypothesis testing techniques.
- Attain proficiency in recognizing and working with different probability distributions.
- Acquire skills in conducting one-way and two-way analysis of variance (ANOVA)
- Apply the learned concepts to practical data analysis scenarios, effectively conducting distribution fitting.

Unit V: Dimensionality Reduction Methods and supervised learning methods

Multivariate statistics – multivariate normal distribution – multivariate regression analysis – Principal component analysis Linear discriminant analysis-Fisher's discriminate analysis–Statistical decision making-Bayesian classification.

Learning outcomes:

- Develop a solid understanding of multi variate statistics.
- Acquire proficiency in multivariate regression analysis techniques.
- Learn Fisher's Discriminate Analysis and its applications.
- Apply multivariate statistics and techniques like PCA, LDA, and Bayesian classification to real-world scenarios.

Textbook:

1. David Cielen, Arno D.B. Meysman, and Mohamed Ali, *Introducing Data Science*, Manning Publications, 2016. (first two chapters for Unit I).
2. Robert S. Witte and John S. Witte, *Statistics*, Eleventh Edition, Wiley Publications, 2017.

3. Ravichandran.J."Probability and Statistics for Engineers",First edition,Wiley,2012.
4. Hastie,T.,Tibshirani.R.,andFriedman,J.The elements of statistical learning.Vol.2.No.1.New York:Springer,2009.

ReferenceBooks:

1. AllenB.Downey, ThinkStats: Exploratory Data Analysisin Python, Green TeaPress, 2014.
2. SanjeevJ.Wagh, ManishaS.Bhende, AnuradhaD.Thakare, Fundamentals of DataScience, CRC Press, 2022.
3. RichardO.Duda,Peter E.Hart and DavidG.Stork,"Pattern Classification",Second Edition,2003,John wily&sons.
4. EarlGose, Richard John son baugh and SteveJost,"Pattern Recognition and Image Analysis",2002,PrenticeHallofIndia.

OnlineLearningRes ources:

1. <https://www.mastersindatascience.org/learning/what-is-data-analytics/>
2. <https://www.techtarget.com/searchdatamanagement/definition/data-analytics>
3. <https://www.lotame.com/what-is-data-analytics/>
4. <https://www.oracle.com/business-analytics/data-analytics/>

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(DS20APE501) Data Visualization Techniques

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Course Objectives:

- Discuss the importance of Data Visualization
- Demonstrate story telling
- Explain the environment of Tableau

Course Outcomes:

After completion of the course, students will be able to

- Effectively present the data
- Draw insights from the data
- Use Tableau

UNIT I

Introduction, the importance of Context, Choosing and effective visual.

Learning outcomes:

- Develop an understanding of the significance of context in data visualization.
- Acquire skills in selecting appropriate visualizations based on data characteristics and goals.

UNIT II

Clutter is your enemy, Focus your audience's attention, Lessons in Story telling.

Learning outcomes

- Gain the ability to identify and minimize clutter in visual presentations.
- Develop skills to direct and maintain your audience's attention on critical data points.
- Learn principles of story telling within data visualization

UNIT III

Communicating data: A step in the process, a model of communication, Three types of communication problems, six principles of communicating data.

Introduction to Tableau: Using Tableau, Tableau products, Connecting to data. How much and How many: Communicating how much, communicating how many Ratios and Rates: Ratios, Rates.

Learning outcomes:

- Develop the ability to understand data communication as a pivotal step in the data analysis process.
- Acquire skills in using Tableau, including understanding its products and effectively connecting to data sources.
- Develop proficiency in conveying quantitative information accurately.

UNIT IV

Proportions and Percentages: Part to whole, current to historical, actual to target.
Mean and Median Variation and Uncertainty: Respecting variation, Variation over time-Control charts, Understanding uncertainty.

Learning outcomes:

- Develop the ability to effectively communicate relationships using proportions and percentages.
- Acquire proficiency in understanding and communicating the concepts of mean and median in datasets.
- Develop an understanding of uncertainty in data and how to communicate it.

UNIT V

Multiple Quantities: Scatterplots, Stacked Bars, Regression and Trend Lines,
The Quadrant Chart Changes over time: The origin of time charts, the line chart, the dual axis line chart, the connected scatter plot, the date field type and seasonality, the timeline, the slopegraph
Maps and Location: One special map, circle maps, filled maps, dual encoded maps.

Learning outcomes:

- Develop proficiency in using scatter plots, stacked bar charts, regression.
- Acquire skills in representing change over time through various visualization methods.
- Gain expertise in conveying data geographically using different maps, including circle maps, filled maps, and dual-encoded maps. Learn to communicate location-based information effectively.

Textbooks:

1. Cole Nussbaumer Knaflic, *Storytelling with data*, Wiley
2. Ben Jones, *Communicating Data with Tableau*, O'Reilly

Reference Books:

1. A Julie Steele and Noah Iliinsky, *Designing Data Visualizations: Representing Informational Relationships*, O'Reilly.

2. AndyKirk, Data Visualization:A Successful Design Process, PAKT.
3. ScottMurray, Interactive DataVisualization for Web,O'Reilly.

Online Learning Resources:

1. Data Analysis and Visualization Foundations|Coursera
2. Data Visualization|Coursera

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B.Tech V Sem

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(DS20APC505) **INFORMATION STORAGE MANAGEMENT**

Course Objectives:

1. To understand the basic components of Storage System Environment.
2. To understand the Storage Area Network Characteristics and Components.
3. To examine emerging technologies including IP-SAN.
4. To describe the different back up and recovery topologies and their role in providing disaster recovery and business continuity capabilities.
5. To understand the local and remote replication technologies.

Course Outcomes:

1. Understand the logical and physical components of a Storage infrastructure.
2. Evaluate storage architectures, including storage subsystems, DAS, SAN, NAS, and CAS.
3. Understand the various forms and types of Storage Virtualization.
4. Describe the different roles in providing disaster recovery and business continuity capabilities.
5. Distinguish different remote replication technologies.

UNIT - I

Introduction to Storage Technology: Data proliferation and the varying value of data with time & usage, Sources of data and states of data creation, Data center requirements and evolution to accommodate storage needs, Overview of basic storage management skills and activities, The five pillars of technology, Overview of storage infrastructure components, Evolution of storage, Information Lifecycle Management concept, Data categorization within an enterprise, Storage and Regulations.

Learning outcomes:

- Develop an understanding of the significance of storage technology in managing data proliferation.

- Acquire an overview off undamental storage management skills and activities, including an understanding of the five pillars of technology and the components of storage infrastructure.
- Gaininsights into the importance of compliance and regulations indatastorage, including their impacton data categorization and storage practices.

UNIT – II

Storage Systems Architecture: Intelligent disk subsystems overview, Contrast of integrate dvs. Modular arrays, Component architecture of intelligent disksub systems,Disk physical structure components,properties,performance,andspecifications,Logicalpartitioning of disks, RAID & parity algorithms, hots paring, Physical vs. logical disk organization, protection, and backend management, Array caching properties and algorithms, Front end connectivity and queuing properties, Front end to host storage provisioning, mapping, and operation, Interaction of filesystems with storage, Storage system connectivity protocols.

UNIT – III

Introduction to Networked Storage: JBOD, DAS, SAN, NAS, & CAS evolution, Direct Attached Storage (DAS) environments: elements, connectivity, & management, StorageArea Networks (SAN): elements & connectivity, Fibre Channel principles, standards, & network management principles, SAN management principles, Network Attached Storage(NAS): elements, connectivity options,connectivity protocols(NFS,CIFS,ftp),&management principles, IP SAN elements, standards (iSCSI, FCIP, iFCP), connectivity principles, security,and management principles, Content Addressable Storage (CAS): elements, connectivity options, standards, and management principles, Hybrid Storage-solutions over view including technologies like virtualization & appliances.

UNIT-IV

Introductions to Information Availability: Business Continuity and Disaster Recovery Basics, Local business continuity techniques, Remote business continuity techniques, Disaster Recovery principles & techniques. Managing & Monitoring: Management philosophies (holistic vs. system &component), Industry management standards (SNMP,SMI-S,CIM),Standard framework applications, Key management

metrics (thresholds, availability, capacity, security, performance), Metric analysis methodologies & trend analysis, Reactive and proactive management best practices, Provisioning & Configuration change planning, Problem reporting, prioritization, and handling techniques, Management tools overview. **UNIT - V**
Securing Storage and Storage Virtualization: Define storage security. List the critical security attributes for information systems, describe the elements of a shared storage model and security extensions, Define storage security domains, List and analyze the common threats in each domain, Identify different virtualization technologies, describe block-level and file level virtualization technologies and processes.

TEXTBOOKS:

1. Marc Farley Osborne, "Building Storage Networks", Tata McGraw Hill, 2001.
2. Robert Spalding and Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill, 2003.
3. Meeta Gupta, "Storage Area Network Fundamentals", Pearson Education Ltd., 2002.

REFERENCE BOOKS:

1. Gerald J Kowalski and Mark T Maybury, "Information Storage Retrieval Systems theory & Implementation", BSP Publications, 2000.
2. Thejendra BS, "Disaster Recovery & Business continuity", Shroff Publishers & Distributors, 2006

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(DS20APE503) DATA WARE HOUSING AN DDATA MINING

Course Objectives:

The course is designed

- To familiarize with mathematical foundations of data mining tools.
- To introduce classical models and algorithms in data warehouses and data mining.
- To investigate the kinds of patterns that can be discovered by association rule mining, classification and clustering.
- To explore data mining techniques in various applications like social, scientific and environmental context.

Course Outcomes:

After completion of the course, students will be able to

- Designa Datawarehouse system and perform business analysis with OLAP tools
- Apply suitable pre-processing and visualization techniques for data analysis
- Apply frequent pattern and association rule mining techniques for data analysis
- Design appropriate classification and clustering techniques for data analysis
- Infer knowledge from raw data

UNIT I

Ware housing and Online Analytical Processing

Basic Concepts–Data Warehousing Components–Building a Data Warehouse–Database Architectures for Parallel Processing–Parallel DBMS Vendors–Multidimensional Data Model

-Data Warehouse Schemas for Decision Support, Concept Hierarchies-Characteristics of OLAP Systems –Typical OLAP Operations, OLAP and OLTP.

UNIT II

Data Mining and Data Preprocessing

Introduction to Data Mining Systems–Knowledge Discovery Process–Data MiningTechniques – Issues – applications- Data Objects and attribute types, Statistical description ofdata, Data Preprocessing – Cleaning, Integration, Reduction, Transformation and discretization, Data Visualization, Data similarity and

dissimilarity measures.

UNIT III

Associations

Mining Frequent Patterns, Associations and Correlations – Mining Methods- Pattern Evaluation Method – Pattern Mining in Multilevel, Multi-Dimensional Space – Constraint Based Frequent Pattern Mining, Classification using Frequent Patterns.

UNIT IV

Classification Analysis

Decision Tree Induction–Bayesian Classification–RuleBasedClassification– Classification by Back Propagation – Support Vector Machines -- Lazy Learners – Model Evaluation and Selection-Techniques to improve Classification Accuracy.

UNIT V

Cluster Analysis

Cluster Analysis-Partitioning Methods – Hierarchical Methods – Density Based Methods – GridBased Methods – Evaluation of clustering – Clustering high dimensional data- Clustering with constraints, Outlier analysis- outlier detection methods.

Introduction to WEKA, The Explorer–Getting started, exploring the explorer, Learning algorithms.

Textbooks:

1. Jiawei Han, Micheline Kamber and Jian Pei, Data Mining: Concepts and Techniques, Elsevier, Third Edition, 2013.
2. Introduction to Data Mining– Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson Education.

Reference Books:

1. Alex Berson and Stephen J. Smith, –Data Warehousing, Data Mining & OLAP, Tata McGraw–Hill Edition, 35th Reprint 2016.
2. K.P.Soman, Shyam Diwakar and V.Ajay, –Insight into Data Mining Theory and Practice, Eastern Economy Edition, Prentice Hall of India, 2006.
3. Ian H. Witten and Eibe Frank, –Data Mining: Practical Machine Learning Tools and Techniques, Elsevier, Second Edition.

Online Learning Resources:

1. <https://www.coursera.org/courses?query=data%20warehouse>
2. <https://www.edx.org/learn/data-warehouse>

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(DS20APC502) **ARTIFICIAL INTELLIGENCE MACHINE LEARNING LAB**

Course Objectives:

This course is designed to:

1. Explore the methods of implementing algorithms using artificial intelligence techniques
2. Illustrate search algorithms
3. Demonstrate building of intelligent agents

Course Outcomes:

1. Upon completion of the course, the students should be able to:
2. Implement search algorithms (L3)
3. Solve Artificial intelligence problems (L3)
4. Design chatbot and virtual assistant (L6)

List of Experiments:

1. Write a program to implement DFS and BFS
2. Write a Program to find the solution for travelling salesman Problem
3. Write a program to implement Simulated Annealing Algorithm
4. Write a program to find the solution for wampus world problem
5. Write a program to implement 8 puzzle problem
6. Write a program to implement Towers of Hanoi problem
7. Write a program to implement A* Algorithm
8. Write a program to implement Hill Climbing Algorithm
9. Build a Chatbot using AWS Lex, Pandorabots.
10. Build a bot which provides all the information related to your college.
11. Build a virtual assistant for Wiki pedia using Wolfram Alpha and Python
12. The following is a function that counts the number of times a string occurs in another string:
Count the number of times string s1 is found in string s2
def count_substring(s1,s2):
count=0
for I in range(0,len(s2)-len(s1)+1):
if s1==s2 [i:i+len(s1)]:
count+=1
return count
For instance, count

sub string('ab','cabalaba')returns2.

13. Write a recursive version of the above function. To get the rest of a string (i.e. everything but the first character).
14. Write a program to implement k-Nearest Neighbour algorithm to classify their is dataset. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.
15. Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.
16. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.

References:

1 Tensor flow: <https://www.tensorflow.org/>

2 Pytorch: <https://pytorch.org/> <https://github.com>

3 Keras: <https://keras.io/> <https://github.com/keras-team>

4 Theano: <http://deeplearning.net/software/theano/> [https://github.com/Theano70Page](https://github.com/Theano/Theano70Page)

5 Caffe2: <https://caffe2.ai/> <https://github.com/caffe26>

Deeplearning4j: <https://deeplearning4j.org/>

7 Scikit-learn: <https://scikit-learn.org/stable/> <https://github.com/scikit-learn/scikit-learn>

8 DeepLearning.Ai: <https://www.deeplearning.ai/>

9 OpenCv: <https://opencv.org/> <https://github.com/qqwweee/keras-yolo3>

10 YOLO: <https://www.pyimagesearch.com/2018/11/12/yolo-object-detection-with-opencv/nVIDIA:CUDA> <https://developer.nvidia.com/cuda-math-library>

11 David Poole, Alan Mackworth, Randy Goebel, "Computational Intelligence: a logic approach", Oxford University Press, 2004.

12 G.Luger, "Artificial Intelligence: Structures and Strategies for complex problems solving", Fourth Edition, Pearson Education, 2002.

13 J.Nilsson, "Artificial Intelligence: A new Synthesis", Elsevier Publishers, 19

98. 14 Artificial Neural Networks, B.Yagna Narayana, PHI

15 Artificial Intelligence, 2nd Edition, E.Richard K.Knight, TMH. 16 Artificial Intelligence

and Expert Systems, Patterson, PHI.

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B.Tech V Sem

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(DS20APC504) DataAnalytics lab

Course Objectives:

- To develop data analytic code in python
- To be able to use python libraries for handling data
- To develop analytical applications using python
- To perform data visualization using plots

Course Outcomes:

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

- Write python programs to handle data using Numpy and Pandas
- Perform descriptiveanalytics
- Perform data exploration using Mat plot lib
- Perform inferential data analytics
- Build models of predictive analytics

List of Experiments:

Tools: Python, Numpy, Scipy, Matplotlib, Pandas, statmodels, seaborn, plotly, bokeh Working with Numpy arrays

1. Working with Pandas data frames
2. Basic plots using Matplotlib
3. Frequency distributions, Averages, Variability
4. Normal curves, Correlation and scatterplots, Correlation coefficient
5. Regression
6. Z-test

7. T-test
8. ANOVA
9. Building and validating linear models
10. Building and validating logistic models
11. Time series analysis

Reference Books:

Jake VanderPlas, Python Data Science Hand book, OReilly, 2016.

1. Allen B. Downey, ThinkStats: Exploratory Data Analysis in Python, Green Tea Press, 2014.
3. Data Analysis and Visualization Using Python, Analyze Data to Create Visualizations for BI Systems Dr. Ossama Embarak

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B.Tech-VI Sem

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(DS20APC601) BigData Analytics

Course Objectives:

1. To understand the need of BigData, challenges and different analytical architectures
2. Installation and understanding of Hadoop Architecture and its ecosystems
3. To understand the concepts of distributed file system and Map Reduce programming
4. To understand BigData with Advanced architectures like spark.

Course Outcomes:

- Identify the characteristics of datasets.
- Illustrate various input and output formats of MapReduce
- Compare Hadoop with various Databases

Unit-I

Introduction BigData and Hadoop Framework

Data Storage and Analysis-Characteristics of BigData–BigData Analytics-Typical Analytical Architecture– Requirement for new analytical architecture– Challenges in BigData Analytics–Need of bigdata frameworks, Installation of Hadoop in Virtual Environment, Introduction to Hadoop ecosystems, Business Intelligence vs. Data Analytics.Hadoop Framework:Hadoop–Requirement of Hadoop Framework, Design principle of Hadoop–Comparison with other system, Hadoop Components, Hadoop Daemon’s, Overview of Hadoop-comparing SQL databases and Hadoop, Distributed File System: HDFS, Design of HDFS writing files to HDFS Reading files from HDFS.

Learning Outcomes:

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

- Identify the characteristics of data sets. (L3)
- Compare trivial data and bigdata for various applications. (L4)
- Choose and implement various ways of selecting suitable model parameters.
- Understand and apply scaling up Hadoop techniques and associated technologies. (L2)
- Estimate suitable test data.(L5)
- Analyze the procedure of storing, retrieving and writing data in HDFS environment.(L3)

Unit-II

Map Reduce Programming

Developing Map Reduce Program Anatomy of Map Reduce Code-Simple Map Reduce Program-counting thing, Map Reduce types and formats, MapReduce features, Combiner optimization, Map side join, Reduce Side Join, Secondary sorting, Pipelining Map Reduce jobs.

Learning Outcomes:

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

- Explore the Anatomy of Map Reduce. (L5)
- Illustrate various input and output formats of MapReduce. (L2)
- List various Map Reduce types.(L1)

Unit-III

Hadoop Environment: Setting up a Hadoop Cluster, Cluster specification, Cluster Setup and Installation, Hadoop Configuration, Security

Hadoop Ecosystems: Introduction to Hadoop ecosystem technologies: Serialization: AVRO, Co-ordination: Zookeeper, Databases: HBase, Hive, Scripting language: Pig, Streaming: Flink, Storm.

Learning Outcomes:

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

- Show the cluster set up and installation. (L2)
- Demonstrate the Configure the Hadoop.(L2)
- Compare Hadoop with various Databases. (L5)

Unit-IV

No SQL Databases. Definition of the Four Types of No SQL Database, The Value of Relational Databases, Getting at Persistent Data, Concurrency, Integration, Impedance Mismatch, Application and Integration Databases, Attack of the Clusters, The Emergence of No SQL, KeyPoints.

Learning Outcomes:

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

- Explain different types of NoSQL Databases. (L2)
- Illustrate the Emergence of No SQL.(L2)
- Outline the application and Integration of No SQL Databases. (L2)

Unit-V

Spark Framework

Overview of Spark–Hadoopvs Spark–Cluster Design–Cluster Management–performance, Application Programming interface (API): Spark Context, Resilient Distributed Datasets, Creating RDD, RDD Operations, Saving RDD - Lazy Operation – Spark Jobs-spark ML library. **Case Study: DataAnalysis with Spark Shell**
Writing Spark Application-Spark Programming in Scala, Python, R, Java-Application Execution.

Learning Outcomes:

- At the end of the unit, students will be able to:
- Explain the frameworks of Spark. (L2)
- Compare Hadoopand Spark(L4)
- Learn how to build anSpark application. (L1)

TextBooks:

1. TomWhite,“Hadoop:TheDefinitiveGuide”,O’Reilly,4th Edition,2015.
2. DonaldMiner, AdamShook,“Map Reduce Design Pattern”, O’Reilly, 2012
3. MikeFrampton,“Mastering Apache Spark”,Packt Publishing,2015.
4. Reference:
5. NickPentreath, Machine Learning with Spark,Packt Publishing,2015.
6. Mohammed Guller, BigData Analytics with Spark, Apress,2015.

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(DS20APE603) CLOUD COMPUTING

Course Objectives:

- To explain the evolving computer model called cloud computing.
- To introduce the various levels of services that can be achieved by cloud.
- To describe the security aspects in cloud.

Course Outcomes (CO):

After completion of the course, students will be able to

- Ability to create cloud computing environment
- Ability to design applications for Cloud environment
- Design & develop back up strategies for cloud data based on features.
- Use and Examine different cloud computing services.
- Apply different cloud programming model as per need.

UNIT-I

Basics of Cloud computing

Introduction to cloud computing: Introduction, Characteristics of cloud computing, Cloud Models, Cloud Services Examples, Cloud Based services and applications
Cloud concepts and Technologies: Virtualization, Load balancing, Scalability and Elasticity, Deployment, Replication, Monitoring, Software defined, Network function virtualization, Map Reduce, Identity and Access Management, services level Agreements, Billing.

Cloud Services and Platforms: Compute Services, Storage Services, Data base Services, Application services, Content delivery services, Analytics Services, Deployment and Management Services, Identity and Access Management services, Open Source Private Cloud software.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand the basic concepts of cloud computing
- Explore Cloud computing concepts and Technologies.
- Recognize various services provided by using cloud .

UNIT-II Hadoop and Python

Hadoop MapReduce: Apache Hadoop, Hadoop Map Reduce Job Execution, Hadoop Schedulers, Hadoop Cluster setup.

Cloud Application Design: Reference Architecture for Cloud Applications, Cloud Application Design Methodologies, DataStorage Approaches.

Python Basics: Introduction, Installing Python, Python dataTypes & Data Structures ,Control flow, Function, Modules, Packages,Filehandling, Date/TimeOperations, Classes.

Learning Outcomes:

At the end of this unit, the student will be able to

- Explore the concepts in Hadoop MapReduce
- Analyze cloud application design.
- Understand the basic concepts of Python

UNIT-III

Python for Cloud computing

Python for Cloud: Python for Amazon web services, Python for Google Cloud Platform, Python for windows Azure, Python for Map Reduce, Python packages of Interest, Python webApplication Framework, Designing a RESTful web API.

Cloud Application Development in Python: Design Approaches, Image Processing APP, Document Storage App, MapReduce App, Social Media Analytics App.

At the end of this unit, the student will be able to

- Analyze how cloud computing can be implemented in different Application
- Recognize how python can be used in Cloud computing services.

UNIT-IV

Bigdata, multimedia and Tuning

BigData Analytics: Introduction, Clustering BigData, Classification of Bigdata Recommendation of Systems.

Multimedia Cloud: Introduction, Case Study: Live video Streaming App, Streaming Protocols, case Study: VideoTranscoding App.

Cloud Application Benchmarking and Tuning: Introduction, Workload Characteristics, Application Performance Metrics, Design Considerations for a Benchmarking Methodology, Benchmarking Tools, Deployment Prototyping, Load Testing & Bottle neck Detection case Study, Hadoopbench marking case Study.

Learning Outcomes:

At the end of this unit, the student will be able to

- Explore the concepts in BigData Analytics
- Analyze different apps that are used in MultimediaCloud.

- Understand the basic concepts Cloud Application Bench marking and Tuning

UNIT -V

Applications and Issues in Cloud Lecture 9 Hrs Cloud Security: Introduction, CSA Cloud Security Architecture, Authentication, Authorization, Identity Access Management, Data Security, Key Management, Auditing.

Cloud for Industry, Healthcare & Education: Cloud Computing for Healthcare, Cloud computing for Energy Systems, Cloud Computing for Transportation Systems, Cloud Computing for Manufacturing Industry, Cloud computing for Education

Legal Issues in Cloud Computing: Introduction, Data Privacy and security Issues, cloud contracting models, Jurisdictional issues raised by virtualization and data location, commercial and business considerations, Special Topics

Learning Outcomes:

At the end of this unit, the student will be able to

- Explore the concepts in cloud security
- Summarize how cloud computing can be applied in various fields.
- Understand the Legal Issues in Cloud Computing

Textbooks:

1. Cloud computing A hands-on Approach II By Arshdeep Bahga, Vijay Madiseti, Universities Press, 2018
2. Cloud Computing Principles and Paradigms: By Rajkumar Buyya, James Broberg, Andrzej Goscinski, Wiley, 2016
3. Reference Books:
4. Mastering Cloud Computing by Rajkumar Buyya, Christian Vecchiola, S Thamarai Selvi, TMH
5. Cloud computing A Hands-On Approach by Arshdeep Bahga and Vijay Madiseti.
6. Cloud Computing: A Practical Approach, Anthony T. Velte, Toby J. Velte, Robert Elsenpeter, Tata McGraw Hill, 2011.
7. Enterprise Cloud Computing, Gautam Shroff, Cambridge University Press, 2010.
8. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, George Reese, O'Reilly, 2011.
9. Essentials of Cloud Computing by K. Chandra Sekaran. CRC Press.

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(Ds20APC605) NaturalLanguageProcessing

Course Objectives:

This course is designed to:

- Explain and apply fundamental algorithms and techniques in the area of natural language processing (NLP)
- Discuss approaches to syntax and semantics in NLP.
- Examine current methods for statistical approaches to machine translation.
- Explore machine learning techniques used in NLP.

Course Outcomes:

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

- Build NLP applications using Python. (L6)
- Apply various Parsing techniques, Bayes Rule, Shannon game, Entropy and Cross Entropy. (L3)
- Explain the fundamentals of CFG and parsers and mechanisms in ATN's. (L2)
- Apply Semantic Interpretation and Language Modeling..(L3)
- Interpret Machine Translation and multilingual Information Retrieval systems and Automatic Summarization.(L2)

UNIT I:

Introduction to Natural language

The Study of Language, Applications of NLP, Evaluating Language Understanding Systems, Different Levels of Language Analysis, Representations and Understanding, Organization of Natural language Understanding Systems, Linguistic Background: An outline of English Syntax.

Learning Outcomes:

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

- Classify various NLP Applications(L2)
- Apply the logic by using Python Programming(L3)
- List the AI Languages(L1)
- Outline the Linguistic Background(L2)

Unit II:

Grammars and Parsing

Grammars and Parsing-Top-Down and Bottom-Up Parsers, Transition Network Grammars, Feature Systems and Augmented Grammars, Morphological Analysis and the Lexicon, Parsing with Features, Augmented Transition Networks, Bayes Rule, Shannon game, Entropy and Cross Entropy.

Learning Outcomes:

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

- Demonstrate the Top-Down and Bottom-Up Parsing techniques(L2)
- Apply Bayes Rule, Shannon game, Entropy and Cross Entropy.(L3).
- Develop game playing strategies using Shannon game. (L3)

UNIT III:

Grammars for Natural Language

Grammars for Natural Language, Movement Phenomenon in Language, Handling questions in Context Free Grammars, Hold Mechanisms in ATNs, Gap Threading, Human Preferences in Parsing, Shift Reduce Parsers, Deterministic Parsers.

Learning Outcomes:

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

- Classify Grammars for Natural Language(L2)
- Explain Hold Mechanisms in ATNs. (L2)
- Explain Human Preferences in Parsing. (L2)

UNIT IV:

Semantic Interpretation

Semantic & Logical form, Word senses & ambiguity, The basic logical form language, Encoding ambiguity in the logical Form, Verbs & States in logical form, Thematicroles, Speech acts & embedded sentences, Defining semantics structure model theory.Language Modeling Introduction,n-GramModels, Language model Evaluation, Parameter Estimation, Language Model Adaption, Types of Language Models, LanguageSpecific Modeling Problems, Multilingual and Crosslingual Language Modeling.

Learning Outcomes:

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

- Distinguish Language model Evaluation(L4)
- List the types of Language Models(L1)

UNIT V:

Machine Translation

Survey: Introduction, Problems of Machine Translation, Is Machine Translation Possible, Brief History, Possible Approaches, Current Status.

Multilingual Information Retrieval

Introduction, Document Preprocessing, Monolingual Information Retrieval, CLIR, MLIR, Evaluation in Information Retrieval, Tools, Software and Resources .Multilingual Automatic Summarization Introduction, Approaches to Summarization, Evaluation, How to Build a Summarizer, Competitions and Data sets.

Learning Outcomes:

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

- Apply Machine Translation techniques. (L3)
- Elaborate Multilingual Information Retrieval and Multilingual Automatic Summarization.(L6)

TEXTBOOKS:

1. James Allen, Natural language Understanding, 2nd Edition, 2003, Pearson Education.
2. Multilingual Natural Language Processing Applications: From Theory To Practice - Daniel M. Bikel and Imed Zitouni, Pearson Publications.
3. Natural Language Processing, A Paninian perspective, Akshar Bharathi, Vine etchaitanya, Prentice-Hall of India.

REFERENCES BOOKS:

1. Charniak, Eugene, Statistical Language Learning, MIT Press, 1993.
2. Jurafsky, Dan and Martin, James, Speech and Language Processing, 2nd Edition, Prentice Hall, 2008.
3. Manning, Christopher and Henrich, Schutze, Foundations of Statistical Natural Language Processing, MIT Press, 1999.

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(DS20APE601) DATA SCIENCE FOR BUSINESS

Course Objectives:

- Expose with the basic rudiments of business intelligence system
- Expose with different data analysis tools and techniques

Course Outcomes:

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

- Understand the fundamentals of business intelligence.
- Applying link to datamining with business intelligence.
- Apply various modelling techniques.
- Understand the data analysis and knowledge delivery stages.
- Apply business intelligence methods to various situations and decide on appropriate technique.

UNIT I

Introduction–Business problems and Data Science Solutions, Introduction to Predictive modeling: From Correlation to Supervised Segmentation

UNIT II

Fitting the Data- Fitting a Model to Data, Overfitting and its Avoidance

UNIT III

Similarity, Neighbors, and Clusters, Decision Analytic Thinking: What is a Good model

UNIT IV

Representing and Mining text, Decision Analytic Thinking II: Toward Analytic Engineering

UNIT V

Other Data Science Tasks and Techniques, Data Science and Business Strategy

Textbooks:

1. Foster Provost and Tom Fawcett, Data Science for Business, O'Reilly, 2013.

ReferenceBooks:

- Efraim Turban,Ramesh Sharda,Dursun Delen,“Decision Support and Business Intelligence Systems”,9th Edition,Pearson 2013.
- Larissa T.Moss, S.Atre,“Business Intelligence Road map:The Complete Project Life cycle

Of Decision Making”, Addison Wesley, 2003.

- Carlo Verellis, “Business Intelligence: Data Mining and Optimization for Decision Making”, Wiley Publications, 2009.
- David Loshin Morgan, Kaufman, “Business Intelligence: The Savvy Manager’s Guide”, Second Edition, 2012.

Online Learning Resources:

1. Edx: IBM Data Ware housing and BI Analytics

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(DS20APE602) Information Retrieval Systems

Course objectives:

- Gain a solid foundation in the fundamental principles of information retrieval, including indexing, querying, relevance, and retrieval models.
- Explore different search algorithms, indexing methods, and ranking strategies.
- Learn how to design and implement information retrieval systems.
- Understand the importance of user-centered design in building user-friendly search interfaces.

Course Outcomes:

1. Ability to apply IR principles to locate relevant information large collections of data
2. Ability to design different document clustering algorithms
3. Implement retrieval systems for web search tasks.
4. Design an Information Retrieval System for web search tasks.

Unit-I

Introduction to Information Retrieval Systems

Introduction to Information Retrieval Systems:

Definition of Information Retrieval System, Objectives of Information Retrieval Systems, Functional Overview, Relationship to Database Management Systems, Digital Libraries and Data Warehouses

Information Retrieval System Capabilities:

Search Capabilities, Browse Capabilities, Miscellaneous Capabilities

Unit-II

Cataloging and Indexing Cataloging and Indexing:

History and Objectives of Indexing, Indexing Process, Automatic Indexing,

Information Extraction

Data Structure:

Introduction to Data Structure, Stemming Algorithms, Inverted File Structure, N-Gram Data Structures, PAT Data Structure, Signature File Structure, Hypertext and XML Data Structures, Hidden Markov Models

Unit-III

Automatic Indexing

Automatic Indexing:

Classes of Automatic Indexing, Statistical Indexing, Natural Language, Concept Indexing, Hyper text Linkages

Document and Term Clustering:

Introduction to Clustering, Thesaurus Generation, Item Clustering,

Hierarchy of Clusters

Unit-IV

User Search Techniques:

Search Statements and Binding, Similarity Measures and Ranking, Relevance Feedback, Selective Dissemination of Information Search, Weighted Searches of Boolean Systems, Searching the INTERNET and Hypertext

Information Visualization:

Introduction to Information Visualization, Cognition and Perception, Information Visualization Technologies

Unit-V

Text Search Algorithms:

Introduction to Text Search Techniques, Software Text Search Algorithms, Hardware Text Search Systems

Multi media Information Retrieval:

Spoken Language Audio Retrieval, Non-Speech Audio Retrieval, Graph Retrieval, Imagery Retrieval, Video Retrieval

Textbook

1. Information Storage and Retrieval Systems–Theory and Implementation, Second Edition, Gerald J. Kowalski, Mark T.Maybury, Springer

References

1. Frakes, W.B., RicardoBaeza-Yates: Information Retrieval Data Structures and Algorithms,Prentice Hall,1992.
2. Information Storage & Retrieval By Robert Korfhage– John Wiley & Sons.
3. Modern Information Retrieval By Yates and Neto Pearson Education.

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(DS20APC603) Computer Networks

Course objectives:

This course is designed to

- Understand the basic concepts of Computer Networks.
- Introduce the layered approach for design of computer networks
- Familiarize with the applications of Internet
- Explore the network protocols used in Internet environment
- Explain the format of headers of IP, TCP and UDP
- Elucidate the design issues for a computer network

Course outcomes:

- List the layers of a Computer Network
- Design a Data Centre for an organization
- Identify the performance metrics of a computer network
- Select the appropriate transport protocol for an application

UNIT-I

Computer Networks and the Internet: What is the Internet ?, The Network Edge, The Network Core, Delay, Loss, and Throughput in Packet-Switched Networks, Protocol Layers and their Service Models, Networks under attack, History of Computer Networking and the Internet.

Learning outcomes:

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

- Enumerate the hardware components of a computer network
- List the layers of a Computer Network

UNIT-II:

The Layer: Links, Access Networks, and LANs Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols Introduction to the Link Layer, Error-Detection and -Correction Techniques, Multiple Access Links and Protocols, Switched Local Area Networks Link Virtualization: A Network as a Link Layer, Data Centre Networking, Retrospective: A Day in the Life of a WebPage Request.

Learning outcomes:

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

- Compare medium access protocols(L4)
- Classify the computer networks(L2)
- Design a Data Centre for an organization(L6)

UNIT-III

The Network Layer: Routing Algorithms, Inter networking, The Network Layer in The Internet.

Learning outcomes:

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

- Compare routing algorithms(L4)
- Design routing algorithms(L6)
- Extend the exist in routing protocols(L2)

UNIT-IV

Transport Layer: Connectionless Transport: UDP the Internet Transport Protocols: TCP, Congestion Control.

Learning outcomes:

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

- Design Congestion control algorithms(L6)
- Select the appropriate transport protocol for an application(L3)
- Identify the transport layer services(L3)

UNIT-V

Principles of Network Applications: The Web and HTTP, Electronic Mail in the Internet, DNS—The Internet's Directory Service, Peer-to-Peer Applications Video Streaming and Content Distribution Networks.

Learning outcomes:

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

- Design new applications of a computer network(L6)
- Analyze the application protocols(L4)
- Extend the existing applications

Course Outcomes:

Students will be able to:

1. Identify the software and hardware components of a Computer network(L3)
2. Develop new routing, and congestion control algorithms(L3)
3. Assesscritically the existin grouting protocols(L5)
4. Explain the functionality of each layer of a computernetwork(L2)
5. Choose the appropriate transport protocol based on the application

requirements (L3)

TEXTBOOKS:

4. Andrew S.Tanenbaum, David j.wetherall, "Computer Networks", 5th Edition, PEARSON.
5. James F.Kurose, Keith W.Ross, "Computer Networking: A Top-Down Approach", 6th edition, Pearson, 2019.

REFERENCE BOOKS:

1. Forouzan, "Data communications and Networking", 5th Edition, Mc Graw Hill Publication.
2. Youlu Zheng, Shakil Akthar, "Networks for Computer Scientists and Engineers", Oxford Publishers, 2016

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(DS20APC606) BIG DATA ANALYTICSLAB

Course Objectives

The course should enable the students to:

- Optimize business decisions and create competitive advantage with Big data analytics
- Practice java concepts required for developing map reduce programs.
- Impart the architectural concepts of Hadoop and introducing map reduce paradigm.
- Practice programming tools PIG and HIVE in Hadoop ecosystem.
- Implement best practices for Hadoop development.

1. Perform setting up and Installing Hadoop in its three operating modes.

i. Standalone.

ii .Pseudo distributed.

iii. Fully distributed.

b. Use web based tools to monitor your Hadoopsetup.

2. To Understand Overall programming architecture of Map Reduce API.

Implement Map Reduce Programming

3. To implement the following file management tasks in Hadoop:

i. Adding files and directories

ii. Retrieving files

iii. Deleting files Hint: A typical Hadoop workflow creates data files(such as log files) else where and copies the min to HDFS using one of the above command line utilities.

4. Store the basic information about students such as roll no. and name using various collection types Map.

5. Implement matrix multiplication with HadoopMap Reduce
6. To run a Grepprogram on Hadoop to understand Map Reduce Paradigm:
To count words in a given file, To view the output file, and To calculate execution time.
7. Installation of SPARK framework with or without Hadoop framework.
8. To study about the Hive commands using HQL(DDL and DML).

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(DS20APC604) CLOUD COMPUTING LAB

Course Objectives:

- Demonstrate application development using Cloud
- Explain features of Hadoop

Course Outcomes (CO):

On completion of this course, the students will be able to: Configure various virtualization tool ssuch as Virtual Box, VM ware workstation

- Design and deploy a web application in a PaaS environment
- Learn how to simulatea cloud environment to implement new schedulers.
- Install and use a generic cloud environment that can be used as a private cloud
- Manipulate large data sets in a parallel environment.

List of Experiments:

1. Install Virtual Box/VM ware Work station with different flavours of Linux or windows OS on top of windows operating systems.
2. Install a Ccompiler in the virtual machine created using virtual box and execute Simple Programs
3. Install Google App Engine. Create hello world app and other simple web applications using python/java.
4. Use GAE launcher to launch the web applications.
5. Simulate a cloud scenario using Cloud Sim and run a scheduling algorithm that is not present in Cloud Sim.
6. Find a procedure to transfer the files from one virtual machine to another virtual machine.

7. Find a procedure to launch virtual machine using try stack (Online Open stack Demo Version)
8. Install Hadoop single node cluster and run simple applications like word count
9. Establish an AWS account. Use the AWS Management Console to launch an EC2 instance and connect to it.
10. Develop a Guest book Application using Google App Engine
11. Develop a Serverless Web App using AWS
12. Design a Content Recommendation system using AWS
13. Design a Cloud based smart traffic management system
14. Design Cloud based attendance management system
15. Design E-learning cloud-based system
16. Using Amazon Lex build a

Chat References:

1. <https://www.vmware.com/products/workstation-pro/workstation-pro-evaluation.html>.
2. <http://code.google.com/appengine/downloads.html>
3. <http://code.google.com/appengine/downloads.html> [OnlineLearningResources/](#)

Virtual Labs: 1. Google Cloud Computing Foundations Course –Course (nptel.ac.in)

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(DS20APC606) Natural Language processing lab

Course Objectives:

- To introduce the students with the basics of NLP which will empower them for developing advanced NLP tools and solving practical problems in the field.

Course Outcomes (CO):

After completion of the course, students will be able to

- Understand approaches to syntax and semantics in NLP.
- Analyse grammar formal is mand context free grammars
- Apply the statistical estimation and statistical alignment models
- Apply Rule based Techniques, Statistical Machine translation (SMT), word alignment, phrase based translation
- Have the skills(experience) of solving specific NLP tasks, which may involve programming in Python, as well as running experiments on textual data.

List of Experiments:

1. Word Analysis
2. Word Generation
3. Morphology
4. N-Grams
5. N-Grams Smoothing
6. POSTagging: Hidden Markov Model
7. POSTagging: Viterbi Decoding
8. Building POSTagger
9. Chunking
10. Building Chunker

Refer: <https://nlp-iiith.vlabs.ac.in/List%20of%20experiments.html>

References:

1. James Allen, Natural Language Understanding, 2nd Edition, 2003, Pearson Education.
2. Natural Language Processing, Apaninian perspective, Akshar Bharathi, Vineet Chaitanya, Prentice-Hall of India.

Online Learning Resources/Virtual Labs:

1. Natural Language Processing in Tens or Flow|Coursera

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(AM20ASC601) WebApplication Development

Course Objectives:

- Learn web site development using HTML, CSS, Java Script.
- Understand the concepts of responsive web development using the bootstrap framework
- Make use of the JQuery javascript library to provide interactivity to the web sites.
- Discover how to use Google Charts to provide a better way to visualize data on a website
- 5. Learn Content Management Systems to speed the development process

Course Outcomes (CO):

After completion of the course, students will be able to

- Construct web sites with valid HTML, CSS, Java Script
- Create responsive Web designs that work on phones, tablets, or traditional laptops and wide screen monitors.
- Develop websites using JQuery to provide interactivity and engaging user experiences
- Embed Google chart tools in a website for better visualization of data.
- Design and develop web applications using Content Management Systems like Word Press Activities:

Module -1:

HTML: What is a browser?, What is HTML ?, Elements and Tags, Basic HTML5 structure, Meta data, <title>, Adding favicon, Comments, headings Task: Create a Basic HTML document

Module -2:

HTML (continued): Block-Level Elements & Inline Elements, Links (Understand Absolute vs Relative paths), Lists, Images, iframe (embed youtube video)

Task: Create your Profile Page

Module -3:

HTML (continued): Tables: <table>, <tr>, <th>, <td>, Attributes for each Table element

Task: Create a Class Time table (to merge rows/columns, use row span/col span)

Module -4:

HTML (continued): Form Elements: <input>, <select>, <textarea>, <button>, Attributes for each Form element

Task: Create a Student Hostel Application Form

Module -5:

Cascading Style Sheets (CSS): CSS Properties, Types of CSS, Selectors, box model, Pseudo-elements, z-index

Task: Make the Hostel Application Form designed in Module-4 beautiful using CSS (addcolors, backgrounds, change font properties, borders, etc.)

Module -6:

Bootstrap-CSS Framework: Layouts (Containers, Grid system), Forms, Other Components

Task: Style the Hostel Application Form designed in Module-5 still more beautiful using Bootstrap CSS (Re-size browser and check how the web page is played in mobile resolution)

Module -7:

HTTP & Browser Developer Tools: Understand HTTP Headers (Request & Response Headers), URL & its Anatomy, Developer Tools: Elements/Inspector, Console, Network, Sources, performance, Application Storage.

Task: Analyse various HTTP requests (initiators, timing diagrams, responses) and identify problems if any.

Module -8:

Javascript: Variables, Data Types, Operators, Statements, Objects, Functions, Events & Event Listeners, DOM.

Task: Design a simple calculator using Java Script to perform sum, product, difference, and quotient operations:

Module -9:

Dynamic HTML with Java Script: Manipulate DOM, Error Handling, Promises, async/await, Modules.

Task: Design & develop a Shopping Cart Application with features including Add Products, Update Quantity, Display Price (Sub-Total & Total), Remove items /products from the cart.

Module -10:

JQuery - A Javascript Library: Interactions, Widgets, Effects, Utilities, Ajax using JQuery. Task: Validate all Fields and Submit the Hostel Application Form designed in Module-6 using JQuery

Module -11:

Google Charts: Understand the Usage of Piechart, Bar Chart, Histogram, Area&Line Charts, Gantt Charts.

Task: Develop an HTML document to illustrate each chart with real-time examples.

Module -12:

Open Source CMS(Content Management System):What is a CMS?,Install CMS, Themes, Plugins.

Task: Develop an E-learning website using any CMS (for example WordPress)

References:

1. Deitel and Deitel Nieto,—Internet and World Wide Web-How to Programll , Prentice Hall,5th Edition,2011.
2. WebTechnologies,Uttam K.Roy,Oxford Higher Education.,1st edition, 10th impression, 2015.
3. Stephen Wynn and John Burke—Running a Perfect Website ll ,QUE, 2nd Edition,1999.
1. JeffreyC and Jackson,—WebTechnologies A Computer Science Perspective Pearson Education , 2011.
2. Gopalan N.P.and Akilandeswari J., —WebTechnology,Prentice Hall of India, 2011.
Online Learning Resources/VirtualLabs:
 - a. HTML: <https://html.spec.whatwg.org/multipage/>
 - b. HTML: <https://developer.mozilla.org/en-US/docs/Glossary/HTML5>
 - c. CSS: <https://www.w3.org/Style/CSS/>
 - d. Bootstrap-CSSFramework:<https://getbootstrap.com/>
 - e. Browser Developer Tools :
https://developer.mozilla.org/enUS/docs/Learn/Common_questions/What_are_browser_developer_tools
 - f. Javascript: <https://developer.mozilla.org/en-US/docs/Web/JavaScript>
 - g. JQuery: <https://jquery.com>
 - h. Google Charts: <https://developers.google.com/chart>
 - i. Wordpress: <https://wordpress.com>

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B.Tech-VI Sem

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(BA20AMC502) INTELLECTUAL PROPERTY RIGHTS

(Common to All Branches)

UNIT-1

INTRODUCTION TO IPR: Meaning of property, Origin, Nature, Meaning of Intellectual Property Rights – 2 hours Introduction to TRIPS and WTO. – 2 hours Kinds of Intellectual property rights—Copy Right, Patent, Trade Mark, Trade Secret and trade dress, Design, Layout Design, Geographical Indication, Plant Varieties and Traditional Knowledge.

UNIT-2

PATENT RIGHTS AND COPY RIGHTS— Origin, Meaning of Patent, Types, Inventions which are not patentable, Registration Procedure, Rights and Duties of Patentee, Assignment and licence, Restoration of lapsed Patents, Surrender and Revocation of Patents, Infringement, Remedies & Penalties. – 6 hours **COPY RIGHT—** Origin, Definition & Types of Copy Right, Registration procedure, Assignment & licence, Terms of Copy Right, Piracy, Infringement, Remedies, Copy rights with special reference to software

UNIT-3

TRADE MARKS— Origin, Meaning & Nature of Trade Marks, Types, Registration of Trade Marks, Infringement & Remedies, Offences relating to Trade Marks, Passing Off, Penalties. –4 hours Domain Names on cyber space. –2 hours

UNIT-4

DESIGN— Meaning, Definition, Object, Registration of Design, Cancellation of Registration, International convention on design, functions of Design. Semiconductor Integrated circuits and layout design Act-2000.

UNIT-5

BASIC TENENTS OF INFORMATION TECHNOLOGYACT-2000–ITAct- Introduction
E-Commerce and legal provisions E-Governance and legal provisions Digital
signature and Electronic Signature. Cybercrimes,

Course outcomes: The students once they complete their academic projects, they get awareness of acquiring the patent They also learn to have copyright for their innovative works. They also get the knowledge of plagiarism in their innovations which can be questioned legally.

TEXTBOOKS:

1. Intellectual Property Rights and the Law, Gogia Law Agency, by Dr. G.B. Reddy
2. Law relating to Intellectual Property, Universal Law Publishing Co, by Dr. B.L. Wadehra
3. IPR by P. Narayanan
4. Law of Intellectual Property, Asian Law House, Dr. S.R. Myneni.

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B.Tech-VII

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(DS20APE701) BLOCK CHAIN TECHNOLOGY

Course Objectives

- To introduce Bit coin and other crypto currencies.
- To study the algorithms and techniques in blockchain.
- To understand the practical aspects in the design of crypto currency
- To understand the function of Block chain sasa method of securing distributed ledgers.
- To design, code, deploy and execute a smart contract.

Course Outcomes:

On completion of the course the student will be able to

CO1: Explain the structure of a blockchain.

CO2: Analyze the incentive structure in a block chain based system.

CO3: Judge the scenario where "smart" contract is most appropriate.

CO4: Identify Basic knowledge of Bitcoin, Ethereum.

CO5: Apply Block chain in future use cases for security.

CO6: Understand the various Block Chain applications.

UNIT I

Introduction To Blockchain

Basics of block chain-Public Ledgers-Block Chains as Public Ledgers-Types of Block chains-Pillars of Block chain, Government Initiatives of Block Chain-Bitcoin-Smart Contracts

UNIT II

Architecture And Conceptualization Of Block Chain, Crypto Currencies

Block in a Block chain-find Transactions-Distributed Consensus-Proof of work, Stake, Space-Attacks on POW-Ethereum Pos/POW Hybrids-Crypto currency to

UNIT III

Crypto Primitives, Securing And Interconnecting Public And Private Block Chains

Hash Function and Merkle Tree-Security Properties-Security Considerations for block chain-Digital Signature-Public Key Cryptography-Bitcoin block chain incentive structures- Nash Equilibriums- evolutionary stable strategies,-and Pareto efficiency (game theory) Weaknesses and new Points of Failure Mitigation Methods Redundancies and fall-back methods

UNIT IV

Mining And Crypto Currencies-How To Use And Interact

Mining-Pools-Impact of CPU and GPU-Transaction in Bitcoin Network-Block Mining-Block propagation and blockrelay

UNIT V

Use Cases-Applications In Different Areas

Industry applications of Block chain-Block chain in Government-Government usecases-Preventing Cyber crime through block chain-Block Chain in defense, tax payments

Text/ReferenceBooks:

1. Mastering Bitcoin: Unlocking Digital Cryptocurrencies, by Andreas Antonopoulos O'Reilly, First Edition, 2014.
2. Block chain by Melanie Swa, O'Reilly Media 2015
3. Zero to Block chain-An IBM Redbooks course, by Bob Dill, David Smits-

- Provide students with a solid understanding of predictive analytics concepts, techniques, and methodologies, including the principles of data preprocessing, model selection.
- Equip students with practical skills to preprocess data effectively, select appropriate predictive models, and apply them to real-world datasets.
- Enable students to apply predictive analytics to solve complex business problems.
- Foster ethical considerations in predictive analytics, emphasizing unbiased modeling and responsible data usage.

Course outcomes:

- Develop the ability to preprocess and clean datasets for predictive modeling.
- Acquire skills in choosing appropriate predictive models, applying regression, classification, and other techniques.
- Gain the expertise to utilize predictive analytics for forecasting future trends, enabling evidence-based decision-making and strategic planning across various domains.

UNIT I:

Introduction to Predictive Analytics & Linear Regression: What and Why Analytics, Introduction to Tools and Environment, Application of Modeling in Business, Databases & Types of data and variables, Data Modeling Techniques, Missing imputations etc. Need for Business Modeling, Regression—Concepts, Blue property-assumptions-Least Square Estimation, Variable Rationalization, and Model Building etc.

Learning outcomes

After completing this course, learners should be able to:

- Apply predictive analytics tools to analyse real-life business problems.
- Demonstrate case-based practical problems using predictive analytics techniques to interpret model outputs.

UNIT II:

Logistic Regression: Model Theory, Model fit Statistics, Model Conclusion, Analytics applications to various Business Domain etc. Regression Vs Segmentation—Supervised and Unsupervised Learning, Tree Building — Regression, Classification, Overfitting, Pruning and complexity, Multiple Decision Trees etc.

Learning outcomes

After completing this course, learners should be able to:

- Demonstrate case-based practical problems using predictive analytics techniques to interpret model outputs.
- Exam ineregression, logistic regression, and forecasting using software tools such as MS Excel, SPSS, and SAS

UNITIII

Objective Segmentation: Regression Vs Segmentation—Supervised and Unsupervised Learning, Tree Building — Regression, Classification, Overfitting, Pruning and complexity, Multiple Decision Trees etc. Develop Knowledge, Skill and Competences Introduction to Knowledge skills & competences, Training & Development, Learning & Development, Policies and Record keeping.etc.

Learning outcomes

After completing this course, learners should be able to:

- Enable students to apply predictive analytics to solve complex business problems.
- Foster ethical considerations in predictive analytics, emphasizing unbiased modeling and responsible data usage.

UNIT IV

Time Series MethodsI Forecasting, Feature Extraction: Arima, Measures of Forecast Accuracy, STL approach, Extract features from generated model as Height. Average, Energy etc and Analyze for prediction.

Learning outcomes

After completing this course, learners should be able to:

- Equip students with practical skills to preprocess data effectively, select appropriate predictive models, and apply them to real-world datasets.
- Enable students to apply predictive analytics to solve complex business problems.

UNIT V

Descriptive Modeling: Data Preparation Issues with Descriptive Modeling- Principal Component Analysis (PCA) Algorithm- Applying PCA to New Data- PCA for Data Interpretation- Clustering Algorithms-The K-Means Algorithm The Kohonen SOM Algorithm

- Visualizing Kohonen Maps.

Learning outcomes

After completing this course, learners should be able to:

- Apply predictive analytics tools to analyse real-life business problems.
- Demonstrate case-based practical problems using predictive analytics techniques to interpret model outputs.
- Examine regression, logistic regression, and forecasting using software tools such as MS Excel, SPSS, and SAS

TextBooks

1. Student's Handbook for Associate Analytics-III.
2. Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie, or Die by Eric Siegel.

ReferencesBooks

1. Feature Engineering and Selection: A Practical Approach for Predictive Models by Mark Khun, Kjell Johnson.

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B.Tech-VII

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Software Engineering and Software Project management

Course Objectives:

- To learn the basic concepts of software engineering and life cycle models
- To explore the issues in software requirements specification and enable to write SRS documents for software development problems
- To elucidate the basic concepts of software design and enable to carryout procedural and objectoriented design of software development problems
- To understand the basic concepts of black box and white box software testing and enable to design test cases for unit, integration, and system testing
- To reveal the basic concepts in software project management

Course Outcomes (CO):

After completion of the course, students will be able to

- Obtain basic software life cycle activity skills.
- Design software requirements specifications for given problems.
- Implement structure, object oriented analysis and design for given problems.
- Design test cases for given problems.
- Apply quality management concepts at the application level.

UNIT- I

Basic concepts in software engineering and software project management

Basic concepts: abstraction versus decomposition, evolution of software engineering techniques, Software development life cycle (SDLC) models: Iterative waterfall model, Prototype model, Evolutionary model, Spiral model, RAD model, Agile models.

Learning Outcomes:

At the end of the Unit, student should be able to:

- To learn the basic concepts of software engineering and lifecycle models
- To explore the issues in software requirements specification and enable to write SRS documents for software development problems

UNIT-II

Requirements analysis and specification

The nature of software, The Unique nature of Webapps, Software Myths, Requirements gathering and analysis, software requirements specification, Traceability, Characteristics of a Good SRS Document, IEEE830 guidelines, representing complex requirements using decision tables and decision trees, Overview of formal system development techniques, axiomatic specification, algebraic specification.

Learning Outcomes:

At the end of the Unit, student should be able to:

- To explore the issues in software requirements specification and enable to write SRS documents for software development problems

UNIT- III Software Design

Good Software Design, Cohesion and coupling, Software design approaches, object oriented vs.function oriented design.Overview of SA/SD methodology, structured analysis,Data flow diagram, Extending DFD technique to real life systems, Basic Object oriented concepts, UML Diagrams, Structured design, Detailed design, Design review, Characteristics of a good userinterface, Mode-based vs Mode-less Interface, Types of user interfaces, Component-based GUI development,User interface design methodology:GUI design methodology.

At the end of the Unit, student should be able to:

- To elucidate the basic concepts of software design and enable to carryout procedural and object oriented design of software development problems

UNIT IV

Conventional Software Management: conventional software Management performance. Evolution of Software Economics: Software Economics, pragmatics software cost estimation.

Learning Outcomes:

At the end of the Unit, student should be able to:

- Understand basic steps to build software. (L2).
- Estimate the cost of software by using cost estimation models(L5).
- Compute the size of software by using SLOC and function points(L3).

UNIT V

Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving

required quality,

Peer in spections. The old way and the new: The principles of conventional software engineering, principles of modern software management, transitioning to an iterative process.

Learning Outcomes:

At the end of the Unit, student should be able to:

- Estimate the cost of software by using cost estimation models(L5)
- To reveal the basic concepts in software project management

Textbooks:

1. RajibMall, "Fundamentals of Software Engineering",5th Edition, PHI, 2018.
2. Pressman R,"Software Engineering-Practioner Approach",Mc Graw Hill.
3. Software Project Management,Walker Royce, Pearson Education.
4. Software Project Management,Walker Royce,Pearson Education.

ReferenceBooks:

1. Somerville,"Software Engineering", Pearson2.
2. Richard Fairley, "Software Engineering Concepts",Tata Mc Graw Hill.
3. Jalote Pankaj,"An integrated approach to Software Engineering", Narosa
4. Software Project Management, Bob Hughes & Mike Cotterell,fourth edition,Tata Mc-GrawHill.
5. Software Project Management, Bob Hughes & Mike Cotte rell , fourth edition,Tata Mc-Graw Hill.

Online Learning Resources :
<https://nptel.ac.in/courses/106/105/106105182/http://peterindia.net/SoftwareDevelopment.html>

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B.Tech-VII

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DEEP LEARNING

Course Objectives:

Students will be able:

1. To understand complexity of Deep Learning algorithms and their limitations
2. To be capable of performing experiments in Deep Learning using real-world data.

Course Outcomes:

1. Implement deep learning algorithms, understand neural networks and traverse the layers of data
2. Learn topics such as convolutional neural networks, recurrent neural networks, training deep network and high-level interfaces
3. Understand applications of Deep Learning to Computer Vision
4. Understand and analyze Applications of Deep Learning to NLP

UNIT-I

Introduction: Feed forward Neural networks, Gradient descent and the back propagation algorithm, Unit saturation, the vanishing gradient problem, and ways to mitigate it. ReLU Heuristics for avoiding bad local minima, Heuristics for faster training, Nesterov accelerated gradient descent, Regularization, Dropout

UNIT-II

Convolutional Neural Networks: Architectures, convolution/pooling layers, Recurrent Neural Networks: LSTM, GRU, Encoder Decoder architectures. Deep Unsupervised Learning: Autoencoders, Variational Auto-encoders, Adversarial Generative Networks, Auto-encoder and DBM Attention and memory models, Dynamic Memory Models

UNIT- III

Applications of Deep Learning to Computer Vision: Image segmentation, object detection, automatic image captioning, Image generation with Generative adversarial networks, video to

Text with LSTM models, Attention Models for computer vision tasks

UNIT-IV

Applications of Deep Learning to NLP: Introduction to NLP and Vector Space Model of Semantics, Word Vector Representations: Continuous Skip-Gram Model, Continuous Bag-of-Words model (CBOW), Glove, Evaluations and Applications in word similarity

UNIT-V

Analogy reasoning: Named Entity Recognition, Opinion Mining using Recurrent Neural Networks: Parsing and Sentiment Analysis using Recursive Neural Networks: Sentence Classification using Convolutional Neural Networks, Dialogue Generation with LSTMs. **TEXT BOOKS:**

1. Deep Learning by Ian Good fellow, Yoshua Bengio and Aaron Courville, MIT Press.
2. The Elements of Statistical Learning by T.Hastie, R. Tibshirani, and J. Friedman, Springer.
3. Probabilistic Graphical Models.Koller, and N. Friedman, MIT Press.

REFERENCEBOOKS:

1. Bishop,C,M.,Pattern Recognition and Machine Learning,Springer,2006.
2. Yegnanarayana,B., Artificial Neural Networks PHI LearningPvt.Ltd,2009.
3. Golub,G.,H.,and VanLoan, C. F., Matrix Computations, JHU Press,2013.
4. Satish Kumar,Neural Networks: A Classroom Approach,Tata McGraw-Hill Education,2004

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B.Tech-VII

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(DS20APE705) PROCESS MINING

Course Objectives:

- Discuss the basic concepts of Processmining
- Demonstrate how to apply process mining

Course Outcomes:

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

- To Learn Transparency Isa Prerequisite for Digital Transformation
- Understand Process Modelling and Analysis
- To learnand apply process discovery techniques
- Applying processmininge
- Analysis of Lasagna and Spaghetti process and future of processmining.

UNIT I

Introduction

Introduction: Process Miningina Nutshel I, Purpose: Identifying the Right UseCases, Challenges, Pitfalls, and Failures. Process Mining, RPA, BPM, and DTO.

UNIT II Process Mining: The Missing Link- Limitations of Modelling, Process Mining, Analysingan Example Log, Play-In, Play-Out, andReplay, Positioning Process Mining. ProcessModellingand Analysis: The Art of Modelling, Process Models, Model-BasedProcess Analysis.

UNIT III

Process Discovery: A Simple Algorithm for Process Discovery, Rediscovering Process Models, Challenges.

Advanced Process Discovery Techniques: Characteristics, Heuristic Mining, Genetic Process Mining, Region-Based Mining, Inductive Mining.

UNIT IV

Process Mining Software:

Process Mining Not Included, Different Types of Process Mining

Tools, ProM: An Open-Source Process Mining Platform, Commercial Software.

Process Mining in the Large: Big Event Data, Case-Based Decomposition, Activity-Based Decomposition, Process Cubes, Streaming Process Mining

UNIT V Analyzing “Lasagna Processes”

Characterization, UseCases, Approach, Applications

Analyzing “Spaghetti Processes”- Characterization, Approach, Applications

Outlook: Future of Process Mining-Academic View: Development of the Process Mining Discipline.Business View: Towards a Digital Enabled Organization

Textbooks:

1. Reinkemeyer, Lars."Process mining in action."Principles, Use Cases and Outlook, SantaBarbara,2020.
2. Aalst, Wilvander."Datascience in action."Process mining. Springer, Berlin, Heidelberg,2016.

ReferenceBooks:

1. Ferreira, Diogo R. Aprimeron process mining: Practical skills with python and graph viz. Cham: Springer International Publishing,2017.
2. Burattin, Andrea. "Process mining techniques in business environments." volume 207 of Lecture Notes in Business Information Processing. Springer International Publishing, 2015.
3. Huser, Vojtech."Process mining: Discovery, conformance and enhancement of business processes."2012.

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(DS20APE706) **ADVANCED DATABASES**

Course Objectives:

- Define entity relationship model and transaction processing system.
- Understand various database designs.
- Describe the distributed and centralized data base processing.
- Describe distributed data base concepts and models.
- Understand various framework design in database technology.

Course outcomes:

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

CO1: Design various databases by using data models.

CO2: Query and manage data bases for storing and retrieving.

CO3: Distinguish between centralized and distributed data bases.

CO4: Implement applications involving complex transaction processing.

CO5: Implement query evaluation and query optimization.

UNIT-I

History of Data base Systems. Data base System Applications, data base System VS file System. data Models–the ER Model–Relational Model–Other Models–Data base Languages–DDL– DML. Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views–Destroying/ altering Tables and Views. Introduction of Object Database Systems, Structured Datatypes, operations on structure data, Encapsulation and ADTS, Inheritance.

UNIT-II

Data base design for ORDBMS, ORDBM Simplementation and challenges, OODBMS, comparison of RDBMS, OODBMS and ORDBMS. Introduction to Parallel databases, architectures for parallel databases, Parallel Query Evaluation – data partitioning and parallelising sequential operator evaluation code, Parallelizing individual operations, and parallel Query optimization.

UNIT-III

Introduction to distributed databases; features of distributed databases vs centralized databases, Why distributed data bases, DDBMS, levels of transparency-reference architecture for DDB, types of data fragmentation, distribution transparency for read-only and update applications, distributed database access primitives, Integrity Constraints in Distributed databases

UNIT-IV

Distributed database design: Framework for distributed database design, the design of database fragmentation, allocation offragments; Distributed Query processing: Equivalence of transformations for queries, transforming global queries into fragment queries, distributed grouping and aggregation functions, parametric queries.

UNIT-V

A framework for query optimization, join queries and general queries. non-join queries in a distributed DBMS, joins in a distributed DBMS, cost-based query optimization. DBMS Vs IR systems, Introduction to Information retrieval, Indexing for text search, web search engine, managing text in a DBMS, a data model for XML, Querying XML data, and efficient evaluation of XML queries.

Textbooks

1. Raghurama Krishnan and Johannes Gehrke, "Database Management Systems", 3rd Edition, TMH, 2006.
2. SCeriand GPelagatti, "Distributed databases principles and systems", 1st Edition, TMH, 2008.

References

1. Silberschatz, Korth, "Database System Concepts", 6th Edition, TMH, 2010.
2. ElmasriR, Navathe SB, Somayajulu DVLN, and GuptaSK, "Fundamentals of Database Systems", 5th Edition, Pearson Education, 2009.
3. C.J. Date, "Introduction to Database Systems", 8th Edition, Pearson Education, 2009.

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(DS20APE707) Video Analytics

Course Objectives:

- To gain a working knowledge with image and video processing.
- To understand the analytics on video.
- To apply the knowledge to develop applications that use video analytics.

Course Outcomes:

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

- Implement the algorithms available for performing analysis on video data and address the challenges.
- Implement approaches for identifying and tracking objects and person with motion-based algorithms.
- Analyze approaches for action representation and recognition.
- Identify, Analyze and apply algorithms for developing solutions for real world problems.

UNIT 1

Introduction and Fundamentals: Image feature extraction: Feature point detection, Scale Invariant Feature Transform, Edge Detection, Color features. Pattern recognition and Machine learning: SVM and AdaBoost. Background Modeling and Subtraction: Kernel Density Approximation, Background Modeling and Subtraction Algorithms.

UNIT II

Object Detection and Tracking: Pedestrian detection by boosting local shape features: Tree learning algorithms, Edgelet features. Occluded pedestrian detection by part combination. Pedestrian tracking by Associating Detection Responses.

UNIT III

Vehicle Tracking and Recognition: Joint tracking and Recognition framework, Joint appearance-motion generative model, Inference algorithm for joint tracking and recognition. Human Motion Tracking: Image feature representation, Dimension reduction and Movement dynamics learning.

UNIT-IV

Human action recognition: Discriminative Gaussian Process dynamic model. Face Recognition and Gait Analysis: Overview of Recognition algorithms–Human Recognition using Face, Face Recognition from still images, Face Recognition from video.

UNIT-V

Video Segmentation and Key Frame Extraction: Introduction, Applications of Video Segmentation, Shot Boundary Detection, Pixel-based Approaches, Block-based Approaches, Histogram-based Approaches, Clustering-based Approaches, Performance Measures, Shot Boundary Detection, Key-frame Extraction.

Text Books

1. Francesco Camastra, Alessandro Vinciarelli, " Machine Learning for Audio, Image and Video Analysis", Springer Nature, Second Edition, 2015.
2. Yunqian Ma, Gang Qian, " Intelligent Video Surveillance: Systems and Technology ", CRC Press, First Edition,2009.
3. Fredrik Nilsson, Communications Axis, "Intelligent Network Video: Understanding Modern Video Surveillance Systems", CRC Press, Second Edition,2017.

Reference Books

1. Anthony C.Caputo, " Digital Video Surveillance and Security", Butterworth-Heinemann, Second Edition,2014.
2. Herman Kruegle,"CCTV Surveillance: Video Practices and Technology", Butterworth Heinemann, Second Edition, 2006.
3. Amit K.Roy-Chowdhury, Rama Chellappa, S. Kevin Zhou, Al Bovik, "Recognition of Humans and Their Activities Using Video (Synthesis Lectures on Image,Video,and Multimedia Processing)", Taxmann Publications Private Limited, 2005.
4. Richard Szeliski, "Computer Vision: Algorithms and Applications", Springer, First Edition,2010
5. David A.Forsyth, JeanPonce," Computer Vision-A Modern Approach",Pearson Education,Second Edition, 2015.

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(DS20APE708) BUSINESS INTELLIGENCE

Course Objectives:

The student should be made to:

1. Be exposed with the basic rudiments of business intelligence system
2. Understand the modeling aspects behind Business Intelligence
3. Understand of the business intelligence life cycle and the techniques used in it
4. Be exposed with different data analysis tools and techniques

Course Out comes:

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

CO1: Understand the essentials of BI & data analytics and the corresponding terminologies K

CO2 : Analyze the steps involved in the BI-Analytics process

CO3: Illustrate competently on the topic of analytics

CO4: Understand & Implement the K-Means Clustering with Iris Dataset

CO5: Demonstrate the real time scenario (Casestudy) by using BI & Analytics techniques

UNIT I : BUSINESS INTELLIGENCE Effective and timely decisions – Data, information and knowledge – Role of mathematical models – Business intelligence architectures: Cycle of a business intelligence analysis – Enabling factors in business intelligence projects – Development of a business intelligence system– Ethics and business intelligence.

UNIT II: KNOWLEDGE DELIVERY

The business intelligence user types, Standard reports, Interactive Analysis and Ad Hoc Querying , Parameterized Reports and Self-Service Reporting , dimensional analysis , Alerts / Notifications ,Visualization : Charts , Graphs ,Widgets , Scorecards and Dashboards,Geographic Visualization, Integrated Analytics, Considerations: Optimizing the Presentation for the Right Message.

UNIT III: EFFICIENCY

Efficiency measures – The CCR model: Definition of target objectives-Peergroups- Identification of good operating practices; cross efficiency analysis – virtual inputs and outputs –Other models.Pattern matching-cluster analysis,outlier analysis

UNIT IV:

Business intelligence applications: Marketing models: Relational marketing, Salesforce management Logistic and production models: Supply chain optimization, Optimization models for logistic splanning, Revenue management systems.

Data envelopment analysis: Efficiency measures, Efficient frontier, The CCR model,

Data envelopment analysis: Efficiency measures, Efficient frontier, The CCR model, Identification of good operating practices

UNIT V: Knowledge Management: Introduction to Knowledge Management, Organizational Learning and Transformation, Knowledge Management Activities, Approaches to Knowledge Management, Information Technology (IT) In Knowledge Management, Knowledge Management Systems Implementation, Roles of People in Knowledge Management.

Artificial Intelligence and Expert Systems: Concepts and Definitions of Artificial Intelligence , Artificial Intelligence Versus Natural Intelligence , Basic Concepts of Expert Systems , Applications of Expert Systems , Structure of Expert Systems , Knowledge Engineering , Development of Expert Systems

TextBooks:

1. Carlo-Vercellis, "Business Intelligence Data Mining and Optimization for Decision-Making", First Edition
2. DrewBentely, "Business Intelligence and Analytics", @2017 Library Pres., ISBN:978-1-9789-2136-8

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(DS20APE709) CRYPTOGRAPHY & NETWORK SECURITY

Course Objectives:

This course an training students to master the:

- The concepts of classical encryption techniques and concepts offinite fields and number theory
- Working principles, a dutilities of various cryptographic algorithms including secret key cryptography, hashes, and message digests, and public key algorithms
- Design issues and working principles of various authentication protocols, PKI standards
- Various secure communication standards including Kerberos, IPsec, TLS and email
- Concepts of cryptographic utilities and authentication mechanisms to design secure applications

CourseOutcomes:

- After completion of the course, students will be able to
- Identify information security goals, classical encryption techniques and acquire fundament alknowledge on the concepts offinite fields and number theory
- Compare and apply different encryption and decryption techniques to solve problems related to confidentiality and authentication
- Apply the knowledge of cryptographic check sums and evaluate the performance of different message digest algorithms for verifying the integrity of varying message sizes.

- Apply different digital signature algorithms to achieve authentication and create secure applications
- Apply network security basics , analyse different attacks on networks and evaluate the performance of firewalls and security protocols like TLS,IPSec,and PGP
- Apply the knowledge of cryptographic utilities and authentication mechanisms to design secure applications

UNIT I

Computer and Network Security Concepts: Computer Security Concepts, The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Network Security , Classical Encryption Techniques : Symmetric Cipher Model , Substitution Techniques ,Transposition Techniques ,Steganography, Block Ciphers : Traditional Block Cipher Structure,The Data Encryption Standard , Advanced Encryption Standard : AES Structure , AES Transformation Functions

UNIT II NumberTheory:

The Euclidean Algorithm, Modular Arithmetic, Fermat's and Euler's Theorems, The Chinese Remainder Theorem, Discrete Logarithms, Finite Fields: Finite Fields of the Form $GF(p)$, Finite Fields of the Form $GF(2^n)$.

Public Key Cryptography: Principles, Public Key Cryptography Algorithms, RSA Algorithm, Diffie Hellman Key Exchange, Elliptic Curve Cryptography.

UNIT III

Cryptographic Hash Functions: Application of Cryptographic Hash Functions, Requirements & Security, Secure Hash Algorithm, Message Authentication Functions, Requirements & Security, HMAC & CMAC.

Digital Signatures: NIST Digital Signature Algorithm, Distribution of PublicKeys, X.509 Certificates, Public-KeyInfrastructure

UNIT IV

User Authentication: Remote User Authentication Principles, Kerberos. Electronic Mail Security: Pretty Good Privacy (PGP)AndS/MIME.

IP Security: IP Security Overview, IP Security Policy, Encapsulating Security Payload, Combining Security Associations, Internet Key Exchange.

UNITV

Transport Level Security: Web Security Requirements, Transport Layer Security (TLS), HTTPS, Secure Shell (SSH) Firewalls: Firewall Characteristics and Access Policy, Types of Firewalls, Firewall Location and Configurations.

Textbooks:

1. Cryptography and Network Security-William Stallings, Pearson Education, 7th Edition.
2. Cryptography, Network Security and Cyber Laws – Bernard Menezes, Cengage Learning , 2010 edition.

Reference Books:

1. Cryptography and Network Security-Behrouz A Forouzan,
Debdeep Mukhopadhyaya, Mc-GrawHill, 3rd Edition, 2015.
2. Network Security Illustrated, Jason Albanese and Wes Sonnenreich, MGH Publishers , 2003.

Online Learning Resources:

1. <https://nptel.ac.in/courses/106/105/106105031/lecture>
2. Dr. Deb deep Mukhopadhyay IIT Kharagpur
[Video Lecture]
3. <https://nptel.ac.in/courses/106/105/106105162/lectureDr.SouravMukhopadhyay> IIT Kharagpur
[Video Lecture]
4. <https://www.mitel.com/articles/web-communication-cryptography-and-network-security-web> articles by Mitel Power Connections

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B.Tech-VII Sem

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(DS20ASC701) DIGITAL & SOCIAL MEDIA MARKETING

Course Objectives:

This course takes an in-depth look at the relationship between media and human behavior, and examines how organizations capitalize on social media, and these consumer-to-consumer interactions, to support the marketing efforts.

Course Outcomes:

After completion of the course, students will be able to

- Understand what social media is, the various channels through which it operates, and its role in marketing strategy
- Use principles of consumer and social psychology to develop social media content and campaigns that engage consumers
- Draw on knowledge about word-of-mouth marketing to develop effective approaches for propagating ideas , messages , products , and behaviors across social networks
- Measure the impact of a social media campaign in terms of a specific marketing objective

UNIT I: Introduction, Search Engine optimization Lecture 9Hrs

Marketing Goes Digital: Introduction, Digital isn't the only option, Non-Marketing digital marketers, Personalization, Viral Marketing, Paid, earned and owned, Content marketing, Influencers, Affiliate marketing, Attribution, Public relations and reputation management, Integrated marketing communications, Gaming, Legal Considerations, Strategic digital marketing, Digital marketing Objectives

Search Engine optimization:

Introduction, How search engines work, Keyword selection, On-site optimization, Off-site optimization, Strategic search engine optimization, Third-party search engine ranking

Activity1: (Search Engine Optimization)

Perform the following activities in relation to On Page -Search Engine Optimization.

1. Submit your site to Google Search Console: Take a screenshot of successful message.
2. Create XMLMap. Submit to Google Search Console: Take a screenshot of successful message.
3. Install Yoast SEO Plug-in. Perform SEO Analysis. Take screenshot of the report
4. Perform Readability Analysis of the post that you created in Activity1

Website Review:

Part:1. Question1

Using Yoast SEO. Take a screenshot of the report

5. Use keyword Planner tool. Select 10 Important Keyword for your website. Take screenshot of this list.

UNIT II: WebsiteDevelopment Lecture8Hrs

Website Development: Introduction, Web presence ownership, management and development, Usability, The basics, Content development, The B2B website, The global web presence

Activity2: Buy Domain Name and Web Hosting

You need to buy a domain name and web hosting to build your own websites which is very important

JNTUA B.Tech. R20 Regulations to have hands-on experience with SEO and other digital marketing techniques.

UNIT III: E-commerce

Lecture 9Hrs

E-commerce: Introduction, Multi-channel retailing, Fulfilment, Comparison shopping engines, e-market places and third-party shopping websites, The e-commerce website

Advertising online: Introduction, Programmatic advertising, Objectives and management, Online adformats, Search advertising, Network advertising, Landing pages

Activity-3 : (Website Review)

1. Create a Website of your own
2. Add a new post to your website, a topic should be related to your Website.
3. Add a contact us form in the website (Use Contact Form7 Plug-in).
4. Create Home page of your Website using Elementor Plug-in.
5. Add Slider to any page of your website
6. Create top Menu of your website

UNIT IV:Email marketing

Lecture 8Hrs

Email marketing: Introduction, Email as a medium for direct marketing, Email as a medium for marketing messages, Email news letters

Activity 4: Email Marketing

All the questions are with respect to Mail Chimp

1. Create a new Audience. Add 10 Dummy Subscribers to the audience list using any of the following methods

1. Manual
2. Copy Paste from the file
3. CSV or tab-delimited text file

2. Make sure your list includes, First Name, Last name, Phone (Dummy), Tag, Address and Gender. Please also mention which method you have used. Take a screenshot of the list. Upload to your website. Send the URL of Page.

3. Create a sign up form using "Form Builder Option". Objective should be collecting the emails for your Digital Marketing Training Institute. Share the URL of Sign up form

4. Create an embedded form. Embed this form in any page of your website. Share the link of the page. Objective should be collecting the emails only.

5. Suppose you are offering Training on Digital Marketing. Create a 1 Column – Full Width Template by using atleast five Blocks in the template. Share the URL of that template

6. Select "Art News letter" and customize it a news letter from digital marketing training institute. You may include the text / message as per your wish.

Activity 5: Email Marketing

All the questions are with respect to Mail Chimp

1. Take the audience list. Create two segments based on gender. Take the screen shot of each segment and Upload to your website. Send the URL of Page.

2. Create a group based on interest in your audience. It should be visible in Signup form. Take the screenshot and Upload to your website. Send the URL of Page.

3. Create a dummy campaign using mail chimp to promote Digital marketing services. Share the URLs of the Campaign. Use may use any template as per your wish.

4. Create a dummy 'plain text campaign' on any subject. Take a screenshot of Desktop and Mobile preview. Upload to your website. Send the URL of Page.

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5. Create a pop-up form for your website. Share the URL of your website.

UNIT V : Marketing on Social media

Lecture 9Hrs

Marketing on social media: Introduction, Blogging, Consumer reviews and ratings, Social networking, Social sharing, Social media service and support, Strategic marketing on social media , Measure and monitor

Activity6: SocialMedia Marketing

Assume a product . You want to advertise it. Prepare the advertisement and do the marketing on Facebook.

Activity 7: Twitter and LinkedIn

Experiment with Twitter and

LinkedIn

Activity 8: YouTube

All the students put together create a YouTube Channel. Upload videos.

Optimize it.

Activity 9: Logo, Banner, Video Prepare logo, banner, and Video for assumed product / organization

Activity10: WhatsApp

Prepare a publicity video and market it on WhatsApp

Textbooks:

1. Alan Charlesworth, "DigitalMarketing: A Practical Approach", 3rd Edition, 2018

Reference Books:

1. Digital and Social Media Marketing: Emerging Applications and Theoretical Development, Nripendra P. Rana 2019

2. Digital Marketing Paperback – 6 August 2020 by

Seema Gupta

3. Online Learning Resources:

1 Advanced Certificate in Digital Marketing and Communication | MICA, upGrad