

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

DEPT OF INFORMATION TECHNOLOGY



Course Structure & Syllabus for B.Tech – Information Technology R20 Regulations

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

Karakambadi Road, Tirupati-517507

Department of INFORMATION TECHNOLOGY

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

S.No	Course Code	Course Name	Category	L-T-P	Credits
1.	MA20ABS101	Linear Algebra and Calculus	BS	3-0-0	3
2.	CH20ABS103	Chemistry	BS	3-0-0	3
3.	CS20AES101	Problem Solving using C	ES	3-0-0	3
4.	EE20AES101	Basic Electrical & Electronics Engineering	ES	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.	CH20ABS104	Chemistry Lab	BS	0-0-3	1.5
8.	CS20AES102	Problem Solving using C Lab	ES	0-0-3	1.5
9.	EE20AES102	Basic Electrical & Electronics Engineering Lab	ES	0-0-2	1.5
10.	EG20AMC101	Speech & Oral Communication	MC	2-0-0	0.0
Total					19.5

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B. Tech I Year II Semester

II Semester (Theory - 5, lab – 4, MC – 2, HS-1)

S.No	Course Code	Course Name	Category	L-T-P/D	Credits
1.	MA20ABS201	Differential Equations and Vector Calculus	BS	3-0-0	3
2.	PH20ABS103	Applied Physics	BS	3-0-0	3
3.	EG20AHS101	Communicative English	HS	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.	EG20AHS102	Communicative English Lab	HS	0-0-3	1.5
8.	PH20ABS104	Applied Physics Lab	BS	0-0-3	1.5
9.	CS20AES202	Data Structures Lab	ES	0-0-3	1.5
10.	MA20AMC101	Logical Skills for Professionals-I	MC	2-0-0	0.0
11	*BA20AHS201	Mandatory course-I(AICTE Suggested) Universal Human Values	HS	3-0-0	3
12	BA20AMC201	Mandatory course-I(AICTE Suggested) Universal Human Values	MC	2-0-0	0
Total					22.5

*UHV is considered as Credit Based Course from 2021 Batch

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B. Tech II Year I Semester

III Semester (Theory - 5, lab – 3, SC-1, HS-1, MC - 3)

S. No	Course Code	Course Name	Category	L-T-P	Credits
1	MA20ABS303	Discrete Mathematics & Graph Theory	BS	3-0-0	3
2	EC20AES301	Digital Electronics & Microprocessors	ES	3-0-0	3
3	AM20APC303	Computer Organization & Architecture	PC	3-0-0	3
4	CS20APC303	Database Management Systems	PC	3-0-0	3
5	IT20APC301	Python Programming	PC	3-0-0	3
6	EC20AES302	Digital Electronics & Microprocessors Lab	ES	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	AM20ASC301	Skill oriented course-I Linux Administration	SC	1-0-2	2
10	*BA20AHS201	Mandatory course-I(AICTE Suggested) Universal Human Values (Lateral Entry Students only)	HS	3-0-0	3
11	CH20AMC201	Mandatory non-credit course-II Environmental Science	MC	2-0-0	0
12	EG20AMC301	Enhancing English Language Skills (Lateral Entry Students only)	MC	2-0-0	0
13	BA20AMC201	Mandatory course-I(AICTE Suggested) Universal Human Values	MC	2-0-0	0
Total					24.5

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B. Tech II Year II Semester

IV Semester (Theory - 5, lab - 3, SC-1 MC - 2, AC-1)

S. No	Course Code	Course Name	Category	L-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	AM20APC301	Design and Analysis of Algorithms	PC	3-0-0	3
		Humanities Elective-I			
5	BA20AHS301	Managerial Economics and Financial Analysis	HS	3-0-0	3
	BA20AHS302	Business Environment			
	BA20AHS303	Organizational Behaviour			
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	AM20APC302	Algorithms Lab	PC	0-0-3	1.5
9	IT20ASC401	Skill Oriented Course-II Exploratory Data Analysis with R	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
				Total	21.5
13	Industry/Research Internship minimum of 4 weeks (Mandatory)during summer vacation				
14	Honors / Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)			4-0-0	4

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B. Tech III Year I Semester

V Semester (Theory - 5, lab – 2, SC-1 MC - 3)

S. No	Course Code	Course Name	Category	L-T-P	Credits
1	IT20APC501	Computer Networks	PC	3-0-0	3
2	IT20APC503	Data Warehousing and Data mining	PC	3-0-0	3
3	IT20APC505	Formal Languages and Automata Theory	PC	3-0-0	3
		Open Elective –I			
4	CE20AOE501 EE20AOE501 ME20AOE501 EC20AOE501 CS20AOE501	Basics of Civil Engineering Introduction to Control Systems Industrial Automation Basic VLSI design Computer Applications using programming Tools	OE	3-0-0	3
5	IT20APE501 IT20APE502 IT20APE503	Professional Elective-I Software Engineering Cloud Computing No SQL Databases	PE	3-0-0	3
6	IT20APC502	Computer Networks Lab	PC	0-0-3	1.5
7	IT20APC504	Data Warehousing & Data Mining Lab	PC	0-0-3	1.5
8	EG20ASC301	Skill Oriented Course-III Soft Skills	SC	1-0-2	2
9	BA20AMC502	Mandatory non-credit course-IV Intellectual Property Rights & Patents	MC	2-0-0	0
10	CH20AMC301	Mandatory non-credit course-V Biology for Engineers	MC	2-0-0	0
11	IT20AMC501	Problem Solving and Programming (Lateral Entry Students only)	MC	2-0-0	0
12	IT20ATS501	Technical Seminar Presentation-I	TS	0-0-0	0.5
13	IT20ACS501	Evaluation of Summer Internship/Community service project (4 weeks)		0-0-0	1.5
				Total	22
14	Honors/Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)			4-0-0	4
15	Honors/Minor courses (NPTEL/MOOCs)			2-0-0	2

S.No	MOOCS-I Course List	Link
1	Data structures and Algorithms Using Java	https://onlinecourses.nptel.ac.in/noc22_cs92/preview
2	The Joy of Computing Using Python	https://onlinecourses.nptel.ac.in/noc22_cs122/preview
3	Programming in Modern C++	https://onlinecourses.nptel.ac.in/noc22_cs103/preview
4	Deep Learning for Computer Vision	https://onlinecourses.nptel.ac.in/noc22_cs76/preview

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B. Tech III Year II Semester

VI Semester (Theory - 5, lab – 3, SOC-1 MC - 3)

S. No	Course Code	Course Name	Category	L-T-P	Credits
1	IT20APC601	Mobile Application Development	PC	3-0-0	3
2	IT20APC603	Web Programming	PC	3-0-0	3
3	IT20APC605	Object Oriented Analysis Design & Testing	PC	3-0-0	3
4	IT20APE601 IT20APE602 IT20APE603	Professional Elective-II Compiler Design Machine Learning Natural language processing	PE	3-0-0	3
5	CE20AOE601 EE20AOE601 ME20AOE602 EC20AOE602 EG20AOE601	Open Elective-II Disaster Management Electrical Power Distribution Systems Power Generation Technologies Signal Processing Technical Communication and Presentation Skills	OE	3-0-0	3
6	IT20APC602	Mobile Application Development Lab	PC	0-0-3	1.5
	IT20APC604	Web Programming Lab	PC	0-0-3	1.5
8	IT20APC606	Object Oriented Analysis Design & Testing Lab	PC	0-0-3	1.5
9	IT20ASC601	Skill Oriented Course-IV Amazon Web Services/MOOC-1(NPTEL)	SC	1-0-2	2
10	BA20AMC501	Mandatory non-credit course-VI Constitution of India	MC	2-0-0	0
11	AM20AMC601	AI Tools Techniques & Applications (Lateral Entry Students only)	MC	2-0-0	0
12	MA20AMC301	Logical Skills for Professionals-II	MC	2-0-0	0.0
13	IT20ATS601	Technical Seminar Presentation-II	TS	0-0-0	0.5
14	Industrial/Research Internship (Mandatory) 1 Month during summer vacation				
	Total				22
15	Honors / Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)			4-0-0	4
16	Honors/Minor courses (NPTEL/MOOCs)			2-0-0	2

S.No	MOOCS-II Course List	Link
1	Python for Data Science	https://onlinecourses.nptel.ac.in/noc22_cs74/preview
2	Programming data structures and algorithms using python	https://onlinecourses.nptel.ac.in/noc22_cs70/preview
3	Big data computing	https://onlinecourses.nptel.ac.in/noc22_cs65/preview
4	Multi core computer architecture storage & interconnects	https://onlinecourses.nptel.ac.in/noc22_cs110/preview

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B. Tech IV Year I Semester
VII Semester (Theory - 6, lab – 0, SOC-1)

S. No	Course Code	Course Name	Category	L-T-P	Credits
1	IT20APE701 IT20APE702 IT20APE703	Professional Elective-III Block Chain Technology and Applications Ad hoc Sensor networks Internet of Things	PE	3-0-0	3
2	IT20APE704 IT20APE705 IT20APE706	Professional Elective-IV Software Project Management Deep Learning Cryptography & Network Security	PE	3-0-0	3
3	IT20APE707 IT20APE708 IT20APE709	Professional Elective-V Big data Analytics Human Computer Interaction Agile Methodologies	PE	3-0-0	3
4	CE20AOE701 EE20AOE701 ME20AOE702 EC20AOE703 CS20AOE702	Open Elective-III Air Pollution and Quality Control Embedded Systems Robotics in Industrial Usage Sensors & Systems Mobile Computing Techniques	OE	3-0-0	3
5	CE20AOE705 EE20AOE702 ME20AOE704 EC20AOE704 AM20AOE701	Open Elective-IV Low-Cost Housing Techniques Energy Storage Systems Introduction to Product Marketing Internet of Things Cyber Security Techniques	OE	3-0-0	3
6	BA20AHS701 BA20AHS705 BA20AHS706	*Humanities and Social Science Elective Business Ethics and Corporate Governance Management Science Strategic Management	HS	3-0-0	3
7	IT20ASC701	Skill Oriented Course-V MOOC-2 (NPTEL)/Advanced Web Programming	SC	1-0-2	2
8	IT20AIP701	Evaluation of Internship		0-0-0	3
9	IT20APW701	Project Work Stage -I	PW	0-0-0	2
10	IT20ATS701	Technical Seminar Presentation-III	TS	0-0-0	0.5
				Total	25.5
11	Honors/Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)			4-0-0	4

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Tech IV Year II Semester
VIII Semester (PROJECT WORK)

S. No	Course Code	Course Name	L-T-P	Credits
1	IT20APW801	Project Work Stage-II /Full Internship in industry (6 Months)	0-0-0	8.5
			Total	8.5

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Department of INFORMATION TECHNOLOGY

Semester-0

Induction Program: 2 weeks

(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

I YEAR I SEMESTER

SRI VENKATESWARA COLLEGE OF ENGINEERING, TIRUPATI
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I Year I Sem

L T P C
3 0 0 3

(MA20ABS101) LINEAR ALGEBRA AND CALCULUS

(Common to all branches)

Course Objectives:

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

UNIT -1

Matrices

Rank of a matrix by echelon form, normal form. Solving system of homogeneous and non- homogeneous linear equations. Eigen values and Eigenvectors and their properties, Cayley- Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem, Diagonalization of a matrix.

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 eigenvectors (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 behaviour 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 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 -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 is useful 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, TIRUPATI
(AUTONOMOUS)

I Year I Sem

L	T	P	C
3	0	0	3

(CH20ABS103) CHEMISTRY
(ECE, EEE, CSE, CSE (AI & ML), IT)

Course objectives:

- To impart the concept of soft and hard waters, softening methods of hard water
- To familiarize engineering chemistry and its applications
- To train the students on the principles and applications of electrochemistry
- To determine the polymer molecular weights and various applications of polymers
- To introduce instrumental methods

Unit 1: Water Technology

Introduction –Soft Water and hardness of water, Estimation of hardness of water by EDTA Method, Estimation of Dissolved Oxygen by Winkler's method -Boiler troubles– Priming, foaming, scale and sludge, Caustic embrittlement, Domestic treatment 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, reverse osmosis

Learning Outcomes:

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

- List the differences between temporary and permanent hardness of water (L1)
- Explain the principles of reverse osmosis and electrodialysis. (L2)
- Compare quality of drinking water with BIS and WHO standards. (L2)
- Illustrate problems associated with hard water - 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, super conductors: 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 nano tubes and Graphenes 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 behaviour and colour of coordination compounds (L3).
- Explain the band theory of solids for conductors, semiconductors and insulators (L2)
- Demonstrate the application of Fullerenes, carbon nano tubes and Graphenes nanoparticles (L2).

Unit 3: Electrochemistry 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,

pHmetry, Potentiometry- potentiometric titrations (redox titrations), concept of conductivity, conductivity cell, conductometric titrations (acid-base titrations).

Electrochemical sensors – potentiometric sensors with examples, amperometric sensors with examples.

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

Text Books:

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

Reference Books:

1. G.V.Subba Reddy, K.N.Jayaveera and C. Ramachandraiah, Engineering Chemistry, Mc Graw 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.

Course Outcomes:

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 electrochemical 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, TIRUPATI
(AUTONOMOUS)

I Year I Sem

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3 0 0 3

(CS20AES101) PROBLEM SOLVING USING C

(Common to All Branches of Engineering)

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 programs, variables and data types, C Tokens, Operators and Expressions, Type Conversions.

Learning Outcomes: The students will be able to

- 1) Develop solution through problem understanding and decomposition (L6).
- 2) Develop basic flowcharts for performing input and output and computations (L3).
- 3) Solve Numerical Problems using Flowgorithm (L3).
- 4) Use C basic concepts to write simple C programs (L3).

Unit 2

Control Statements: Selection Statements- If and Switch Statements

Iterative Statements: For, While and Do-While Statements, Break and Continue Statements.

Learning Outcomes: The students will be able to

- 1) Implement C program using Conditional statements (L2).
- 2) Implement C program using Iterative 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 Outcomes: The students will be able to

- 1) Writing Structured programs using Functions (L5).
- 2) Apply arrays concepts on real time 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, Preprocessors.

Learning Outcomes: The students will be able to

- 1) Use pointers to write c Programs (L3).
- 2) Understand the concepts of pre processors (L2).
- 3) Apply Dynamic Memory Allocation concepts on real time 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 of records, Command line Arguments

Learning Outcomes: The students will be able to

- 1) Use the concepts of structures and unions to write c programs (L3).
- 2) Apply various operations on Files (L6).

Text Books:

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

Reference Books:

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

Course Outcomes

- 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 appropriated for solving a problem (L6).

SRI VENKATESWARA COLLEGE OF ENGINEERING, TIRUPATI
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I Year I Sem

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3 0 0 3

(EE20AES101) BASIC ELECTRICAL & ELECTRONICS ENGINEERING

Part A: BASIC ELECTRICAL ENGINEERING

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

Course Objectives:

1. To introduce basics of electric circuits.
2. To teach DC and AC electrical circuit analysis.
3. To explain working principles of transformers and electrical machines.
4. 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.

Unit Outcomes:

The student will be able to

- Recall Kirchhoff 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.

Unit 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.

Unit Outcomes:

The student will be able to

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

Text Books:

1. D. P. Kothari and I. J. Nagrath - "Basic Electrical Engineering" - Tata McGraw Hill - 2010.
2. V.K. Mehta & Rohit Mehta, "Principles of Power System" – 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", 3rd Edition, 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 principle of operation of BJT in different configurations. (L2)
- Understand principle of operation of JFET, MOSFET. (L2)
- Understand 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 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.
4. Ramakanth A. Gayakwad, Op-Amps & Linear ICs, 4th Edition, Pearson, 2017.
5. R. P. Jain, Modern Digital Electronics,
6. 3rd Edition, Tata McGraw Hill, 2003.

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(AUTONOMOUS)

I Year I Sem

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(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: (Any 2)

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. Corner Dovetail Joint or Bridle Joint

Sheet Metal Working: (Any 2)

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: (Any 1)

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: (Any 2)

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

- 1) Parallel and series
- 2) Two-way switch
- 3) Godown lighting
- 4) Soldering of wires.

Foundry Practice: (Any 1)

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

1. Preparation of a green sand mould using single piece pattern
2. Preparation of a green sand mould using split piece pattern with core and demonstration of casting.

Welding Practice: (Any 1)

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

1. Lap joint, butt 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: (Any 1)

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 (Any 1)

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 using hand layup 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, V R B Publishers Private Limited, 2009.

ADDITIONAL LEARNING RESOURCES:

1. R. K. Jain, Production Technology, Khanna Publishers, 17th edition, 2012.
2. Kalpakjian, Serope, 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)
Make plastic components using proper raw material.

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(CS20AES103) IT Workshop
(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 Word Processor, SpreadSheets, Presentations and LaTeX
- To learn about networking of computers and use Internet facility for browsing and searching

Task 1: 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.

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

Task 3: 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.

Task 4: Installation of Device drivers: install supported device drivers for the system- printer drivers, audio and video drivers, Graphic card drivers, USB drivers, install new application software and record the process of installations.

Task 5: Networking: Connecting computers directly using a cable or wireless connectivity and share information, connecting computers using switch/hub or Local Area Network connection and share information, Wide Area Network Connection, crimping activity, logical configuration. The entire process has to be documented.

Task 6: Introduction to Web Design: Introduction to Web Design, Introduction to HTML tags, Cascading Style sheets and Applications using HTML and CSS.

Task 7: 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 the threats to the computer being used. Student should submit information about the features of the installation process and antivirus used.

Task 8: Introduction to Microsoft Office-1: Microsoft word, Operations on text data in word- inserting, deleting, Aligning, header, footer, font style, font type, bulleting and numbering, hyperlinking, inserting images, page setup, inserting images, writing equations, formatting Paragraphs, spell checking etc. Student should submit a user manual of the word processor

Task 9: Introduction to Microsoft Office-2: Microsoft Excel, Operation on data in Excel- creating, opening, saving the document as per the requirement, inserting, deleting the cell data, format the cell, creation of pivot table, applying the formulas and functions, preparing charts, converting .xls to csv, etc., Student should submit a user manual of the Spreadsheet.

Task 10: Introduction to Microsoft Office-3: Microsoft PowerPoint Presentation, creating, opening, saving the presentations, inserting and deleting the slides, styles for slides, 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 PowerPoint presentation.

Task 11: Introduction to LaTeX: LaTeX and its installation and different IDEs, Creating the document using Latex, content into sections using article and book class of Latex.

Task 12: Styling Pages: Reviewing and customizing different paper sizes and formats. Formatting text, creating basic table, adding simple and dashed border, merging rows 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 & Troubleshooting 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, ITL 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

- Internal parts of computers and Generation of Computers.
- Assemble and disassemble a computer from its parts and prepare the computer ready to use.

Installation process of different types Operating system for a computer by their

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(CH20ABS104) CHEMISTRY LAB

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

Course objectives:

- Interconnect two or more computers for information sharing.
- Access the Internet and browse it for required information.
- Prepare the documents using Word Processor, prepare spread sheet
- 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. Conduct microtitration 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 nanomaterial's 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

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)

Reference Books:

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

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(CS20AES102) PROBLEM SOLVING USING C LAB

(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

Experiments

1. Draw flowcharts for fundamental algorithms.
2. C Programs to demonstrate C-tokens.
3. C Programs on usage of operators.
4. C Programs to demonstrate Decision making and branching (Selection)
5. C programs to demonstrate different loops.
6. C programs to demonstrate 1-D arrays.
7. C programs to demonstrate multi-dimensional arrays.
8. C programs to demonstrate functions.
9. C programs on pointers.
10. C programs to perform operations on strings with String handling functions and without String handling functions.
11. C programs on structures and unions.
12. C programs to demonstrate files.

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.

Text Books:

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.

Reference Books:

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

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(EE20AES102) Basic Electrical & Electronics Engineering Lab

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

Part A: Electrical Engineering Lab

Course Objectives:

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

List of experiments: -

1. Verification of Kirchhoff laws.
2. Verification of Superposition 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. Brake test on 1 - Phase Induction Motor.
7. I – V Characteristics of Solar PV cell
8. Brake test on DC Shunt Motor.

Course Outcomes:

Student will be able to :

1. Verify Kirchoff's Laws & Superposition theorem.
2. Perform testing on AC and DC Machines.
3. Study I – V Characteristics of PV Cell

Part B: Electronics Engineering Lab

Course

Objectives:

- To verify the theoretical concepts practically from all the experiments.
- To analyze the characteristics of Diodes, BJT, MOSFET, UJT.
- To design the amplifier circuits from the given specifications.
- Exposed to linear and digital integrated circuits.

List Of Experiments:

1. PN Junction diode characteristics A) Forward bias B) Reverse bias.
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 Transistor in CB / CE configuration.
6. Frequency response of CE amplifier.
7. Inverting and Non-inverting amplifiers using Op-AMPs.
8. Verification of Truth Table of AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR gates using ICs.
9. Verification of Truth Tables of S-R, J-K& D flip flops using respective ICs.

Tools / Equipment Required: DC Power supplies, Multi meters, DC Ammeters, DC Voltmeters, AC Voltmeters, CROs, all the required active devices.

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 as rectifiers, clippers and clampers and other circuits.
- Design simple electronic circuits and verify its functioning.

Note: Minimum Six Experiments to be performed in each section.

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(EG20AMC101) SPEECH AND ORAL COMMUNICATION

(Mandatory Course)

UNIT-I

Story Telling (Narrate an interested story)

Biography description (Describe a freedom fighter/politician/athlete/celebrity etc.)

Speech sounds

Formal Conversation (Enact official Telephone conversation/Telephone interview etc.) Verb forms, Subject -Verb agreement, Vocabulary).

UNIT-II

Stress in Speech

English Puzzle solving (Finding cross words from table)

Fun with English (Speech through grammar-changing tense, voice of the sentences)

Open Talk with CM (Funny interview with class mates) Voice, Speech.

UNIT-III

Intonation If I'm a What would I do? (Students enact as... and describe their choices what they would

do?) Language Translation (Dialogues/jokes/proverbs/quotations-Regional language to English)

Mock Assembly (Students enact as speaker, MLA, CM and opposition leaders in Assembly)

Wh- Questions, Question tags.

UNIT-IV

Tongue twisters / pronounce it....

Humorous Play (Playing jokes/Telling funny dialogues in English) Celebrity Interview (Enact Play)Spotting Errors, Etiquettes

UNIT-V

News Reader (Prepare funny news and read on Dias) Film Review (A critique on regional language films by students)

Movie Script Narration (Subject -Verb agreement, Tenses)

Course Outcomes:

Achieving neutral accent and be free from mother tongue influence.

Hypothesizing small talks on general topics and learn critiquing skills by participating in Conversations.

Applying Vocabulary and using it in their day to day life.

Understanding and mastering in verbal and non-verbal communication.

Reference books:

K.R Lakshmi Narayanan, A Course book on English, SCITECH publications Pvt. Ltd,Hyd, 2009.

Sanjay Kumar & Pushp Lata, Communication skills, Oxford university press, New Delhi, 2019.

M Ashraf Rizvi, Effective Technical Communication, Tata McGraw- Hill, New Delhi, 2017.

Additional Learning Resources:

<https://www.bbc.co.uk/skillswise/english>

<https://www.nonstopenglish.com>

<https://www.grammarly.com/blog/>

I YEAR II SEMESTER

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I Year II Sem

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(MA20ABS201) DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

(Common to All Branches)

Course Objectives:

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

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, homogenous and non-homogenous, complimentary 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)

UNIT 3:**Partial Differential Equations**

Formation of a PDE, Linear partial differential equations of first order, non-linear PDEs of first order (standard forms). 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 a range of 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 ∇ , ∇ applies to scalar point functions-Gradient, ∇ 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 ∇ 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,
4. R.K.Jain and S.R.K.Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International.
5. B. V. Ramana, Higher Engineering Mathematics, McGraw Hill Education.
6. H. k Das, Er. RajnishVerma, 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)

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I Year II Sem

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(PH20ABS103) APPLIED PHYSICS

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

Course Objectives

- To make a bridge between the physics in school and engineering courses.
- 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 fibres 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 fundamentals 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 semiconductors. To give an impetus on the subtle mechanism of superconductors using the concept of BCS theory and their fascinating applications.

Unit-I

Wave Optics

Interference- Principle of superposition – Interference of light – Interference by division of wavefront and amplitude -Interference in thin films (Reflection Geometry) – Colors in thin films – Newton's Rings – Determination of wavelength and refractive index–Applications.

Diffraction- Introduction – Fresnel and Fraunhofer diffraction – Fraunhofer diffraction due to single slit, double slit and N-slits (qualitative) – Grating 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-II

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 applications of lasers (L3)
- Explain the working principle of optical fibers (L2)
- Classify optical fibers based on refractive index profile and mode of propagation (L2)

Unit-III

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-Ferro electricity- 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, Ferro Ferri, & 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 Claussius- Mosotti 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 IV

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 infinite 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) – E vs 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 – V

Semiconductors and Superconductors

Semiconductors- Introduction – Intrinsic semiconductors – Density of charge carriers – Electrical conductivity – Fermi level – Extrinsic semiconductors – Density of charge carriers – Dependence of Fermi energy on carrier concentration and temperature – Drift and diffusion currents – Einstein's equation – Direct and indirect band gap semiconductors – Hall effect – Hall coefficient – Applications of Hall effect.

Superconductors- Introduction – Concept & Properties of superconductors – Meissner effect – Type I and Type II superconductors – BCS theory – Josephson effects (AC and DC) – High T_c superconductors – Applications of superconductors.

Learning Outcomes:

At the end of this unit, the student will be able to Interpret the direct and indirect band gap semiconductors (L2)

- Identify the type of semiconductor using Hall effect (L2)
- Identify applications of semiconductors in electronic devices (L2)
- Explain how electrical resistivity of solids changes with temperature (L2)

- Classify superconductors based on Meissner's effect (L2)

Text books:

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

Reference Books:

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. Sahasrambudhe and Girish, University Press, 2010
4. Semiconductor physics and devices- Basic principle - Donald A, Neamen, McGraw Hill, 2011
5. Solid State Physics, A.J. Dekker, Macmillan Education UK, 1969
6. Kittel's Introduction to Solid State Physics, Charles Kittel, Wiley India Edition Paperback, 2019

SRI VENKATESWARA COLLEGE OF ENGINEERING, TIRUPATI
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I Year II Sem

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(EG20AHS101) COMMUNICATIVE ENGLISH

(Common to all Branches of Engineering)

Course Objectives

- To give inputs to students regarding effective listening skills for better comprehension of academic lectures and English spoken by native 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 role plays, 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 useful information.
- To offer relevant inputs regarding grammatical structures and vocabulary and encourage their appropriate use in speech and writing.

UNIT I

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 answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others. **Reading:** Skimming to get the main idea of a text; scanning to look for specific pieces of information. **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 oneself/others
- Employ suitable strategies for skimming and scanning to get the general idea of a text and 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 II

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 III

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 text clues for comprehension. **Writing:** Summarizing, Paragraph Writing

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 meanings of unfamiliar words using contextual clues
- Write summaries based on global comprehension of reading/listening texts
- Use correct tense forms, appropriate structures and a range of reporting verbs in speech and writing

UNIT IV

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 the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data.

Writing: Letter-writing, Essay-writing. **Grammar and Vocabulary:** Misplaced Modifiers, Synonyms and Antonyms, Essay-writing.

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

UNIT V

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

Course Outcomes

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

Web links

www.englishclub.com
www.easyworldofenglish.com
www.languageguide.org/english/
www.bbc.co.uk/learningenglish
www.eslpod.com/index.html
www.myenglishpages.com

Text Book:

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

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. 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 201

SRI VENKATESWARA COLLEGE OF ENGINEERING, TIRUPATI
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(CS20AES201) DATA STRUCTURES

(Common to all Branches of Engineering)

Course objectives:

- To familiarize with basic techniques of algorithm analysis.
- To familiarize Stacks, Queues using Arrays and Linked List.
- 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, Time and Space Complexity.

Stack, Stack operations, Implementation using arrays, applications of stack, Queue, Queue operations, Implementation using arrays, various Queue Structures, applications of queue.

Learning Outcomes:

Student should be able to

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

Unit 2

Linked lists: Single linked list, double linked list, circular linked list, operations on linked lists, Applications of Linked List.

Implementation of stack using Pointers, Implementation of Queue using Pointers.

Learning outcomes:

Student should be able to

1. Implement Stack and Queues using Pointers (L3)
2. Construct the linked lists for various applications (L

Unit 3

Searching Techniques: Linear Search ,Binary Search and Fibonacci Search.

Sorting Techniques: Selection Sort, Insertion sort, Merge Sort, Quick Sort, Heap sort.

Hash Tables: Hash Functions, Collision Handling Schemes, Applications.

Learning outcomes:

Student should be able to

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

Unit 4

Trees: Vocabulary and Definitions, Binary Tree, Implementation, Binary Tree Traversal, Binary Search Tree, Implementation, Balanced Search Trees: AVL Trees, Implementation, Splay Trees, Red- Black Trees.

Learning outcomes

Student should be able to

1. Explain the concept of a tree (L2)
2. Compare different tree structures (L4)
3. 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 Spanning Trees- Prim's Algorithm, Kruskal's Algorithm.

Learning outcomes:

Student should be able to

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

Text Books:

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, CareerMonk Publications.

Reference Books:

1. Fundamental of Data Structures in C, Horowitz, Sahani, Anderson-Freed, Second Edition, 2008, Universities Press.
2. Classic Data Structures, Debasis Samanta, Second Edition, 2009, PHI

Course Outcomes

- Analyze the problems using asymptotic notations. (L4)
- Apply Stack, Queues and linked list to solve different applications. (L3)
- Demonstrate suitable sorting techniques for the real world problem. (L4)
- Implement tree structures in different patterns of representation of data. (L3)
- Analyze the given problem using graph traversal techniques. (L4)

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(ME20AES102) ENGINEERING DRAWING

(Common to all Branches of Engineering)

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: I

Introduction to Engineering Drawing:

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

- Conic sections (General Method only) including Rectangular Hyperbola
- Cycloid, Epicycloid and Hypocycloid Involutives

Learning Outcomes:

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

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

Unit: II

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 surfaces inclined 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.
- Differentiate between projected length and true length and find the true length of the lines.
- Draw the projection of regular plane surfaces.

Unit: III

Projections of solids: Projections of regular solids inclined to one or both planes by rotational 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.
- Draw the projection of solid inclined to one plane.
- Draw the projection of solids inclined to both the planes.

Unit: IV

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.
- Obtain the true shapes of the sections of prism, cylinder, pyramid and cone
- Draw the sectional views of prism, cylinder, pyramid and cone.

Unit: V

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.
- Draw the development of regular solids such as prism, cylinder, pyramid and cone.
- Obtain the development of sectional parts of regular shapes.

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, Copy Right, 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, Copy Right, 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)

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(ME20AES103) ENGINEERING GRAPHICS LAB

(Common to all Branches of Engineering)

- 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 AutoCAD: 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 (4 No's)
2. Practice exercise using editing commands (4 No'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 (4 No's)
2. Practice exercises on Isometric Projections (4 No's)

Text Books:

1. K. Venugopal, V. Prabhu Raja, Engineering Drawing + Auto Cad, New Age International Publishers.
2. Engineering Drawing, ND Bhat, Charotar Publishing House.
3. Textbook on Engineering Drawing, K.L Narayana, SciTech Publishers.
4. D. M. Kulkarni, A. P. Rastogi, A. K. Sarkar, Engineering Graphics with AutoCAD, PHI Learning Private Limited, New Delhi, Revised edition, 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** isometric projections of simple solids (L3)

Interpret **and comprehend with drafting packages for engineering practice**

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(EG20AHS102) COMMUNICATIVE ENGLISH LAB

(Common to all Branches of Engineering)

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, and Group Discussions and Public speaking
- To equip students with knowledge of the use of computers in resume preparation, report-writing, format-making etc.

Unit I

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

Unit II

1. Role Play/ Conversational Practice
2. JAM

Unit III

1. Group Discussion- types, process, and language and body language
2. Debate –arguing in favor of and against a topic- logical questioning

Unit IV

1. Oral/ Poster Presentations –structure, preparation and visual aids and delivery
2. Resume-Writing – definition, formats and practice

Unit V

1. Interview Skills –basics of interviews -kinds of interviews- preparation – and performance
2. Film/book review- structure, language and practice

Course Outcomes

After completing the course,

The students will be:

1. Able to handle and excel in a variety of self-instructional, learner-friendly modes of language learning
2. Able to employ better stress and intonation patterns and utter English sounds correctly
3. Able to avoid the impact of mother tongue in English and neutralize their accent
4. Able to participate with skill and confidence in Group Discussions, Interviews and Public Speaking
5. Able to use computers in resume preparation, report-writing, and format-making etc.

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(PH20ABS104) APPLIED PHYSICS LAB

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

- 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 semiconductor.
- 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 wavelength by plane diffraction grating method
4. Determination of dispersive power of prism.
5. Determination of wavelength 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.

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)

References

1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"-
S Chand Publishers, 2017.
2. <http://vlab.amrita.edu/index.php> -Virtual Labs, Amrita University

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(CS20AES202) DATA STRUCTURES LAB
(Common to All Branches of Engineering)

- To strengthen the ability to identify and apply the suitable data structure for the given real-world problem

Experiments

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 operations on Single, Double and Circular Linked Lists.
4. Develop a program to perform operations of Stack and Queue using Linked Lists
5. Develop programs to implement Stack applications.
6. Implement Circular Queues.
7. Implement various Searching techniques.
8. Develop programs for different Sorting techniques
9. Develop a 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.

Text Books:

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, CareerMonk 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)

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(*BA20AHS201) UNIVERSAL HUMAN VALUES)

(Mandatory Course)

Unit -I

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 correct priority

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 -II

Understanding Harmony in the Human Being - Harmony in Myself!

Understanding human being as a co-existence of the sentient 'I' and the material 'Body'

Understanding the needs of Self ('I') and 'Body' - 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

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 -III

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 foundational 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

Human Goals

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

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

Unit -IV

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

Understanding the harmony in the Nature

Interconnectedness and mutual fulfilment among the four orders of nature recyclability and self-regulation in nature.

Understanding Existence as Co-existence of mutually interacting units in all pervasive Space, Holistic perception of harmony at all levels of existence.

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

Unit -V

Implications of the above Holistic Understanding of Harmony on Professional Ethics

Natural acceptance of human values

Definitiveness of Ethical Human Conduct

Basis for Humanistic Education, Humanistic Constitution and Humanistic universal order.

Competence in professional ethics: 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: as socially and ecologically responsible engineers, technologists and managers. b. At the level of society: as mutually enriching institutions and organizations

Sum up: Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions

E.g. To discuss the conduct as an engineer or scientist etc.

Text Book

R R Gaur, R Asthana, G P Bagaria, "A Foundation Course in Human Values and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1

R R Gaur, R Asthana, G P Bagaria, "Teachers' Manual for A Foundation Course in Human Values and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

Reference Books

Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amar kantik, 1999.

A. N. Tripathi, "Human Values", New Age Intl. Publishers, New Delhi, 2004.

The Story of Stuff (Book).

Mohandas Karamchand Gandhi "The Story of My Experiments with Truth"

E. F. Schumacher. "Small is Beautiful"

Slow is Beautiful –Cecile Andrews

J C Kumarappa "Economy of Permanence"

Pandit Sunderlal "Bharat Mein Angreji Raj"

Dharampal, "Rediscovering India"

Mohandas K. Gandhi, "Hind Swaraj or Indian Home Rule"

India Wins Freedom

Course Outcomes

By the end of the course,

Students are expected to become more aware of themselves, and their surroundings (family, society, nature)

They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.

They would have better critical ability.

They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).

SRI VENKATESWARA COLLEGE OF ENGINEERING, TIRUPATI
(AUTONOMOUS)

I Year II Sem

L T P C
2 0 0 0

(MA20AMC101) LOGICAL SKILLS FOR PROFESSIONALS-I
(Mandatory Course)

- 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 averages 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 teams 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 down stream

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 dialogue or conversation

based on puzzles

UNIT 5:**Directions:**

The right and left directional movement

The directional reference point

The directions of sun rays and shadow

Problems on ages:

Find the ages at present

Find the ages in future, Find the ages in past

Analogy:

Alphabet analogy

Number analogy

Text Books:

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:

Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of Averages - Percentages - Ratio

Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of Partnership - Simple Interest and Compound Interest and time and stance.

Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of time and work, problems on trains and Boats and streams

Analyze the techniques in series, coding and decoding and blood relations

Analyze the techniques in directions, problems on ages and analog

II YEAR I SEMESTER

SRI VENKATESWARA COLLEGE OF ENGINEERING, TIRUPATI
(AUTONOMOUS)

B. Tech II-I Sem.

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

Course Objectives:

- To describe logical sentences 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 power set, 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 semigroups 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 Semi groups.(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 roots and Generating functions.(L3)

UNIT – V: Graph Theory:

Graphs: Basic Concepts, Isomorphism and Sub graphs, Planar Graphs, Euler's Formula, Multi graphs 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)

Text Books:

- J P Trembly and R Manohar, "Discrete Mathematical Structures with Applications to Computer Science", 1st Edition, McGraw Hill, 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 H Rosen, "Discrete Mathematics and Its Applications (SIE)", 7th Edition, Mc Graw-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, Cenegage Learning, 2012.
- L Liu and D P Mohapatra, "Elements of Discrete Mathematics, A computer Oriented approach", 4th edition, Mc Graw-Hill, 2018.
- Dr. D.S. Chandrasekharaiah, "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).

SRI VENKATESWARA COLLEGE OF ENGINEERING, TIRUPATI
(AUTONOMOUS)

B.Tech III SEM

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

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 1

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 2

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 combinationalcircuits using PLD's.(L6)

Unit 3

Sequential Logic Circuits :Sequential Circuits, Latches ,Flipflops: RS, D, JK, Master Slave JK, T Flip-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 4

Introduction to 8085 & 8086 Microprocessor: 8085 microprocessor Review (brief details only), 8086 Architecture –Block Diagram, register organization 8086, Flag register of 8086 and its functions, Pin diagram 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 5

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.

Learning Outcomes:

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

Text Books:

1. M. Morris Mano, Michael D. Ciletti, Digital Design, Pearson Education, 5th Edition, 2013
2. Advanced microprocessors and peripherals-A.K Ray and K.M. Bhurchandani, TMH, 2nd edition, 2006

References:

1. Switching Theory and Logic Design –A. Anand Kumar, PHI learning Pvt.Ltd.2013.
2. N.Senthil Kumar, M .Saravanan ,S.Jeevanathan ,Microprocessor and Microcontrollers, Oxford Publishers,2010.

Course Outcomes:

After the completion of the course, students will be 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

SRI VENKATESWARA COLLEGE OF ENGINEERING, TIRUPATI
(AUTONOMOUS)

B. Tech II-I Sem.

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(AM20APC303) COMPUTER ORGANIZATION & ARCHITECTURE
(CSE, CSM & IT)

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 interconnecting 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 micro programmed 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, Array Processors, 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)

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 cache memory and virtual memory (L2)
- Understand the importance and tradeoffs of different types of memories (L2)
- Design algorithms to exploit pipelining and multiprocessors (L4)
- Identify pipeline hazards and possible solutions to those hazards (L2)

TEXT BOOKS:

1. M.Morris Mano, "Computer System Architecture", 3rd Edition, Pearson Education
2. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, "Computer Organization", 5th Edition, McGraw Hill Education, 2013.

REFERENCE BOOKS:

1. Themes and Variations, Alan Clements, "Computer Organization and Architecture", CENGAGE Learning.
2. Smruti Ranjan Sarangi, "Computer Organization and Architecture", McGraw Hill Education.
3. John P. Hayes, "Computer Architecture and Organization", McGraw Hill Education

SRI VENKATESWARA COLLEGE OF ENGINEERING, TIRUPATI
(AUTONOMOUS)

B.Tech II-I Sem

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

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 Multi valued 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 constraints like domain, 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)
- Understand 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 Nonvolatile Storage, Early Lock Release and Logical Undo Operations.

Learning outcomes:

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

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

Course Outcomes

Students will be able to

- Design a database for a real 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)
- Pose queries to retrieve the information from database (L3)

TEXT BOOKS:

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 RamezElmasri PEA
2. "**Database Principles Fundamentals of Design Implementation and Management**", Carlos
3. Coronel, Steven Morris, Peter Robb, Cengage Learning.
4. Raghurama Krishnan, Johannes Gehrke, "**Database Management Systems**", 3/e, TMH

SRI VENKATESWARA COLLEGE OF ENGINEERING, TIRUPATI
(AUTONOMOUS)

B. Tech II-I Sem.

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(IT20APC301) PYTHON PROGRAMMING
(CSE, CSM & IT)

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 Data Type, I/O functions,

Assigning Value to a Variable, Multiple Assignments, Writing Simple Programs in Python, Formatting

Number and Strings, Python Inbuilt 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 String Operators, String Operations.

Lists: Creating Lists, Accessing the Elements of a List, Negative List Indices, List Slicing [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 on Pythonic Exception Handling.

File Handling: Need of File Handling, Text Input and Output, The seek() Function, Binary Files, 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

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_init_Method (Constructor), Passing an Object as Parameter to a Method, _del_() (Destructor Method),

Class Membership Tests, Method Overloading, Operator Overloading, Inheritance, The Object Class.

Case study: The turtle module, Simple Repetition, Encapsulation, Generalization, Interface 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).

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).

Text books:

1. Programming and problem solving with Python by Ashok NamdevKamthane, Amit Ashok Kamthane (2018): McGraw Hill Education (India) Private Limited.
2. Allen B. Downey, "Think Python", 2nd edition, SPD/O'Reilly, 2016.
3. Python 3 for Absolute Beginners, Tim Hall and J-P Stacey, Apress.

Reference Books:

- R. Nageswara Rao, "Core Python Programming", 2nd edition, Dreamtech Press, 2019.
- Python Pocket Reference 5ed: Python in Your Pocket, Mark Lutz, 2014.

e-Resources:

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

SRI VENKATESWARA COLLEGE OF ENGINEERING, TIRUPATI
(AUTONOMOUS)

B. Tech II-I Sem

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(EC20AES302) DIGITAL ELECTRONICS & MICROPROCESSORS LAB
(CSE, CSM & IT)

Course Objectives:

- To understand and analyze the concepts of Logic Gates and Boolean functions.
- To understand and analyze Combinational Logic and Sequential Logic Circuits
- To understand and analyze the logic circuits using Programmable Logic Devices.
- Apply knowledge and demonstrate programming proficiency using various addressing modes and instruction sets of 8086 & 8051.

List of Experiments:

Note: Minimum of 12 experiments shall be conducted from both the sections:

Hardware: DIGITAL ELECTRONICS (Any 6 Experiments):

1. Realization of NOT, AND, OR, EX-OR gates with only Universal gates.
2. Karnaugh map Reduction and Logic Circuit Implementation.
3. Verification of DeMorgan's Laws.
4. Implementation of Half-Adder and Half-Subtractor.
5. Implementation of Full-Adder and Full-Subtractor.
6. Four Bit Binary Adder
7. Implementation of 4*1 Multiplexer and 8*1 Multiplexer.
8. Verification of state tables of D flip-flop , JK flip-flop,T flip-flop.

Software: MICROPROCESSORS & MICROCONTROLLERS (Any 6 Experiments)

- 1 .Programs using arithmetic and logical operations
2. Programs for code conversions.
3. ASCII Arithmetic Addition and Subtraction.
4. Searching for an element in an Array.
5. Sorting in Ascending and Descending Orders.
6. Finding Largest and Smallest elements from an array.
7. Reversing a string.
8. String Comparison
- 9.** Block Move.
10. Arithmetic and logical operations using 8051,
11. Sorting in Ascending and Descending Orders using 8051,

Course Outcomes:

After Completion of this course, the student will be able to:

- Analyze the concepts of Logic Gates and Boolean functions.
- Analyze Combinational Logic and Sequential Logic Circuits.
- Analyze the logic circuits using Programmable Logic Devices.
- 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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(CS20APC304) DATABASE MANAGEMENT SYSTEMS LAB
(CSE, CSM & IT)

Course Objectives:

This course is designed to

- Use SQL commands to create, update, modify and retrieve data from the data bases.
- 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

1. Practice DDL and DML Queries
2. Perform various SQL queries on LIKE, AND, OR, NOT AND BETWEEN operations.
3. Perform various SQL queries on select clause, where clause, pattern matching, Order by and Group by.
4. SQL Queries on Set operations, Aggregate functions and Join Operations.
5. Perform DCL, TCL Queries, and Constraints with Primary and Foreign Keys.
6. Design and Create University Library Database using ER diagram and Schema Diagram.
7. Design and create a university database consisting of the following tables Department, Course, Instructor and Student using ER Modelling and Schema Diagram.
8. Create various tables like Branch, banking system with constraints using a Schema diagram.

9. PL/SQL program using controls Structures.
10. Program to implement Procedures and Functions.
11. Program to implement Triggers.
12. Program to implement Cursors.

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 real life systems using Oracle (L5).
- Learning of SQL queries on the real-life systems (L4).
- Execution of PL/SQL programs for different problems (L6).
- Implementation of procedure, function, trigger and cursor concepts in PL/SQL (L4).

Web References:

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

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(IT20APC302) PYTHON PROGRAMMING LAB
(CSE, CSM & IT)

Course Objectives:

- To train the students in solving 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 problem solving.

Laboratory Experiments

1. Install Python Interpreter and use it to perform different Mathematical Computations. Try to do all the operations present in a Scientific Calculator
2. Write a function that draws a grid like the following:

```
+ - - - - + - - - +  
| | |  
| | |  
| | |  
| | |  
+ - - - - + - - - +  
| | |  
| | |  
| | |  
| | |  
+ - - - - + - - - - +
```

3. Write a function that draws a Pyramid with # symbols

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

.Up to 15 hashes at the bottom

4. Using turtles concept draw a wheel of your choice

5. Write a program that draws Archimedean Spiral

6. 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 at least Ten letters of the alphabet.

1. The time module provides a function, also named time that returns the current Greenwich Mean Time
2. 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.

8. 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.

9. Write a program that evaluates Ackermann function

10. 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`.

11. 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.

12. Given a text of characters, Write a program which counts number of vowels, consonants and special characters.

13. 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.

14. Given rows of text, write it in the form of columns.

15. Given a page of text. Count the number of occurrences of each letter (Assume case insensitivity and don't consider special characters). Draw a histogram to represent the same

16. 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 into 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

18. Write a program that reads a file, breaks each line into words, strips whitespace and punctuation from the words, and converts them to lowercase.

19. Go to Project Gutenberg (<http://gutenberg.org>) and download your favorite out-of-copyright 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.

20. 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.

21. 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 checksum, they probably have the same contents.

22. Consider turtle object. Write functions to draw triangle, rectangle, polygon, circle and sphere. Use object oriented approach.

23. Write a program illustrating the object oriented features supported by Python.

24. 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 categorising them into distinction, first class, second class, third class and failed.

25. 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.

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

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).

Reference Books:

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

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(AM20ASC301) LINUX ADMINISTRATION (Skill Oriented Course)

(CSE, CSM & IT)

Course Objectives:

- To familiarize basic concepts of shell programming
 - To learn shell programming.
 - To practice basic administration skills.
 - To demonstrate use of system calls
 - To demonstrate Inter process communication
1. Practice session: practice use of some basic Linux commands. Document the syntax and semantics of the commands like man, passwd, tty, script, clear, date, cal, cp, mv, ln, rm, unlink, mkdir, rmdir, du, df, mount, umount, find, unmask, ulimit, ps, who.
 2. Study and Practice on various commands like cat, tail, head, sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, tar, cpio.
 3. Write a shell script that accepts a name from user and displays whether it is a file, directory or something else.
 4. Write a shell script that creates users
 5. Write a shell script that searches for a given string in a file
 6. Write a shell script that compiles all C files in your home directory and creates executable files
 7. Write a shell script that given a filename as argument, deletes all even lines in a file
 8. Implement the grep command in C language
 9. Write a shell script that removes duplicate lines from a file
 10. Write a shell script that enhances find command by adding error messages that explain why the command failed.

11. Write a shell script to backup files in a specified directory
12. Write a shell script that finds all links to a file
13. Write an awk script to count the number of lines in a file that do not contain vowels.
14. Write an awk script to find the number of characters, words and lines in a file.
15. Write C programs that illustrate communication between two unrelated processes using named pipe (FIFO).
16. Write a C program in which a parent writes a message to a pipe and the child reads the message.
17. Write a C program (sender.c) to create a message queue with read and write permissions to write 3 messages to it with different priority numbers.
18. Write a C program (receiver.c) that receives the messages (from the above message queue) and displays them.
19. Configure mail server and file server.
20. Write Client and Server programs in C for connection oriented communication between Server and Client processes using Unix Domain sockets to perform the following: Client process sends a message to the Server Process. The Server receives the message, reverses it and sends it back to the Client. The Client will then display the message to the standard output device.

Course Outcomes:

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

- Understand shell script to create files and handle text documents. (L2)
- Analyze various methodologies in Linux administration. (L3)
- Implementation of IPC through shell programming in the Linux environment. (L5)
- Create child processes and background processes. (L5)

References:

1. "Unix and Shell programming", B.A.Forouzan and R.F.Gilberg, Cengage Learning.
2. "Beginning Linux Programming", 4th Edition, N.Matthew, R.Stones,Wrox, Wiley
3. "Advanced Unix Programming", N.B.Venkateswarulu, BS Publications.
4. "Unix and Shell Programming", M.G. Venkatesh Murthy, Pearson Education.
5. "Unix Shells by Example", 4th Edition, Ellie Quigley, Pearson Education.
6. "Sed and Awk", O.Dougherty&A.Robbins,2nd edition,SPD.
7. "Unix shell Programming", S.G.Kochan and P.Wood,3rd edition, Pearson Education.

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(CH20AMC201) ENVIRONMENTAL SCIENCE
(Common to All Branches)

Course Objectives:

- To make the students to get awareness 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 human life.
- 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 webs 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 – Bio-geographical 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 the 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 their 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 wild life 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, hill slopes.

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:

- Text book of Environmental Studies for Undergraduate Courses ErachBharucha for University Grants Commission, Universities Press.
- Palaniswamy, "Environmental Studies", Pearson education.
- S.AzeemUnnisa, "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, "Text book 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
- waste land reclamation. (L3)
- Apply the concepts of population explosion, value education and welfare programmes in society. (L3)

II YEAR II-SEMESTER

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(MA20ABS401) NUMERICAL METHODS, PROBABILITY & STATISTICS
(Common to CIVIL, ME, EEE, CSE, AI&ML, IT)

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 – I: 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 unequal 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 Freunds, 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, R K Jain and S R K 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.
1. Erwin kreyszig, Advanced Engineering Mathematics, 9/e, John Wiley & Sons, 2006.
- 2.Kandasamy, K. Thilagavathy, S. Gunavathy, Numerical Methods, S. Chand & Company, 2nd Edition, Reprint 2012.
- 3.S. Ranganatham, Dr. M. V. S. S. N. Prasad, Dr. V. Ramesh Babu, Numerical Analysis, S. Chand Publications, 2015
- 4.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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(CS20APC401) OBJECT ORIENTED PROGRAMMING THROUGH JAVA
(CSE, CSM & IT)

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 swing controls.

UNIT - I

Introduction to OOP: OOP principles, Java Buzzwords, Implementing Java program, JVM, Data Types, Variables, Type conversions and Casting, Operators, Control statements, Arrays. Classes, Objects, Methods, Constructors, this keyword, static keyword, Overloading Methods and Constructors, Argument passing, 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 functions and its usage (L1).

UNIT – II

Inheritance: Basics, Using Super, Creating Multilevel hierarchy, Method overriding, Dynamic Method Dispatch, Using Abstract classes, Using final with inheritance

Interfaces: Definition, Implementing Interfaces, Extending Interfaces, Nested Interfaces, 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 sub classes.

I/O and Other Topics: – I/O basics, Reading Console input, Writing console Output, The Print Writer class, Reading and writing files, Automatically closing a file, enumerations, type wrappers.

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, Inter thread communication.

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

Applets- Definition, Life Cycle 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 , Swing Buttons, JScrollPane, JComboBox, JTable.

Learning Outcomes:

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

- Understand the GUI programming (L1).

Course Outcomes:

After completion of the course the student will be able

- To solve real world 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 handle events generated by user interactions (L4).

Text Books:

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

Reference Books:

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.

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(IT20APC401) OPERATING SYSTEMS

(CSE, CSM & IT)

Course Objectives:

- Understand basic concepts and functions of operating systems.
- Understand the processes, threads and scheduling algorithms.
- Provide good insight on various memory management techniques.
- Expose the students with different techniques of handling deadlocks.
- Explore the concept of file-system and its implementation 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 data Structures, 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, System Boot.

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, Implicit threading, Threading Issues, Examples.

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

Inter-process Communication: Race conditions, Critical Regions, Mutual exclusion with busy waiting, Sleep and wakeup, Semaphores, Mutexes, Monitors, Message passing, Barriers, Classical IPC Problems - Dining philosopher's problem, Readers and writers problem.

Learning Outcomes:

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

- Improving CPU utilization through multi programming 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 memory allocation, segmentation, paging, structure of the page table.

Virtual memory: demand paging, page-replacement, Allocation of frames, Thrashing, Memory-Mapped Files, 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, deadlock characterization, 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, Allocation Methods, Free-Space management. **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 file systems 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, Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights, Capability- Based systems, Language – Based Protection

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

Case Studies: Linux, Microsoft Windows.

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 countermeasures to security attacks.(L2)
- Outline protection and security in Linux and Microsoft Windows. (L2)

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)

Text Books:

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

Reference Books:

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>

SRI VENKATESWARA COLLEGE OF ENGINEERING, TIRUPATI

(AUTONOMOUS)

B. Tech II-II Sem.

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(AM20APC301) DESIGN AND ANALYSIS OF ALGORITHMS

(CSE, CSM & IT)

Course Objectives:

- Demonstrate the importance of the complexity of a given algorithm.
- Illustrate various algorithm design techniques.
- Make use of data structures and/or algorithmic design techniques in solving new problems.
- Explain the advanced algorithm design and analysis techniques.
- Identify and understand basic computability concepts and the complexity classes P, NP, and NP-Complete.

UNIT I

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

Divide and Conquer: General method, Binary Search, Finding the maximum and minimum, Merge sort, Quick Sort, Selection sort, 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 Design using Recursion. (L4)
- Apply divide and conquer strategy for design of various algorithms. (L3)
- Compare complexities of Merge sort, 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-source shortest 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 well known 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, Graphcoloring 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 backtracking algorithms. (L2)
- Apply backtracking strategy to solve N – queens' problem, Sum of subsets problem and Knapsack problem. (L3)

UNIT IV

Branch and Bound: The method, Travelling salesperson, 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 Salesperson 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 complexity of solution.(L3)

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 their solution.
- Able to prove that a certain problem is NP-Complete.

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, Mc Graw Hill.
3. Data structures and Algorithm Analysis in C++, Allen Weiss, Second edition,

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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.

Learning Outcomes:

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

- Students can understand the basic terms and concepts related to economics and managerial economics.
- It describes decision making process of a firm.
- Students are able to understand the relationship between price and demand.
- Students can understand the techniques involved in forecasting the Demand.

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 - Laws 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.

Learning Outcomes:

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

- Students can understand the various levels of production function.
- It demonstrates the methods of costing a product.
- Students are able to understand the Break even point of an organization.
- It explains the merits and demerits of increase in the scale of production.

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 – Joint Stock Companies - Public Sector Enterprises – New Economic Environment- Economic Liberalization – Privatization - Globalization. GST and Demonetization.

Learning Outcomes:

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

- Students can understand about different types of Market structures.
- They are able to find what are the determinants of different markets.
- Able to get information about various Pricing strategies.
- Students can understand about various business structures in India.

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 - Trading Account – Profit & Loss Account – Balance Sheet (with simple adjustments). Financial Analysis – Ratios – Liquidity, Leverage, Profitability, and Activity Ratios (simple problems).

Learning Outcomes:

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

- It explains basic concepts of Accounting.
- Students can understand preparation of Final Accounts.
- It describes the cycle of Accounting.
- Students can understand the importance of Ratios in measuring the financial position of a company

UNIT V

CAPITAL AND CAPITAL BUDGETING

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

Learning Outcomes:

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

- Students are able to understand the procurement of funds and its effective utilisation.
- It describes the Time value of money.
- Students are able to understand the difference between working capital and capital budgeting.
- Students can understand the various types of finance.

Course Outcomes:

- Should be able to understand managerial economics and demand analysis.
- Should be able to analyze decisions relating to production and cost analysis.
- Should be able to evaluate market structures and forms of business.
- Should be able to assess financial statements and ratios.
- Should be able to apply capital budgeting methods.

TEXT BOOKS:

1. Managerial Economics 3/e, Ahuja H.L, S.Chand, 2013.
2. Financial Management, I.M.Pandey, Vikas Publications, 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 Age International, 2013.
3. Accounting and Financial Management, 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.

Learning Outcomes:

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

- Students can understand the basic terms and concepts Business Environment.
- It describes decision making process of Business Activities.
- Students are able to understand the environmental analysis.
- Students can understand the Scope of business, characteristics of business

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.

Learning Outcomes:

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

- Students can understand the various Economic Environment.
- It demonstrates the Economic policies- new industrial policy
- Students are able to understand the Monetary and fiscal policies.
- It explains the merits and demerits Liberalization, Privatization and Globalization

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

Learning Outcomes:

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

- Students can understand about and impact of culture on business.
- They are able to find culture and globalization, social responsibilities of business
- Able to get information about various social audit, business ethics and corporate governance
- Students can understand about Demographic environment

UNIT-IV**Political Environment:-**

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

Learning Outcomes:

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

- It explains basic concepts and Functions of state- economic roles of government
- Students can understand - government and legal environment
- It describes The constitutional environment
- Students can understand the rationale and extent of state intervention.

UNIT-V

Natural and Technological Environment:

Innovation, technological leadership and followership, sources 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.

Learning Outcomes:

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

- Students are able to understand the Innovation, technological leadership and followership
- It describes the , impact of technology on globalization
- Students are able to understand the , transfer of technology, time lags in technology introduction
- Students can understand the Management of technology; Features and Impact of technology

Course Outcomes:

- Should be able to Discuss the types of Business Environment, its scope and its analysis along with characteristics of business.
- Should be able to Explain the effects of government policy on the economic environment and insurance industry
- Should be able to Outline how Society and Cultural environment impacts on business environment.
- Should be able to Describe how Political environment is utilized in business
- Should be able to Explain the Natural and technological framework that regulates business.

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 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

Introduction to Organization Behaviour:-

Introduction to organization, organization and managers, manager' 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

Learning Outcomes:

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

- Students can understand the basic terms and concepts related to economics and managerial economics.
- It describes decision making process of a firm.
- Students are able to understand the relationship between price and demand.
- Students can understand the techniques involved in forecasting the Demand.

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)

Learning Outcomes:

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

- Students can understand the various levels of production function.
- It demonstrates the methods of costing a product.
- Students are able to understand the Break even point of an organization.
- It explains the merits and demerits of increase in the scale of production.

UNIT-III**Interpersonal behaviour:-**

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

Learning Outcomes:

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

- Students can understand about different types of Market structures.
- They are able to find what are the determinants of different markets.
- Able to get information about various Pricing strategies.
- Students can understand about various business structures in India.

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 group behaviour, concept of team vs. group, types of teams, building and managing effective teams, leadership theories and styles, power and politics, conflict and negotiation.

Learning Outcomes:

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

- It explains basic concepts of Accounting.
- Students can understand preparation of Final Accounts.
- It describes the cycle of Accounting.
- Students can understand the importance of Ratios in measuring the financial position of a company.

UNIT-V

Organizational behavior:

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

Learning Outcomes:

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

- Students are able to understand the procurement of funds and its effective utilisation.
- It describes the Time value of money.
- Students are able to understand the difference between working capital and capital budgeting.
- Students can understand the various types of finance.

Course Outcomes:

- Should be able to understand managerial economics and demand analysis.
- Should be able to analyze decisions relating to production and cost analysis.
- Should be able to evaluate market structures and forms of business.
- Should be able to assess financial statements and ratios.
- Should be able to apply capital budgeting methods.

Textbooks:

- Pardeshi, P. C., Organizational Behaviour & Principles & Practice Of Management, Nirali publication

References:

- Robbins, S. P/ Judge, T. A/ Sanghi, S., Organizational Behavior, Pearson Publication
- Aswathappa, K., Organisational Behaviour– Text and Problem, Himalaya Publication

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(CS20APC402) OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB
(CSE, CSM & IT)

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

Week 1:

- Read the marks of a student in 4 subjects and find grade.
- Program to check a number is Armstrong or not.
- Program to display prime numbers from m to n.

Week 2:

- Define a class Rectangle with data member's length and width. Write methods to find perimeter and area of a rectangle. (class and object)
- Create a class Account with data members name, accno and balance. Use appropriate methods to perform various operations like deposit, withdraw, balance Check.
- Create a class Student with appropriate data and methods using constructor.

Week 3:

- Create overloaded methods to find volume of Sphere, Cylinder & Cone.
- To sort given list of elements in ascending order.
- Read two matrices of size $m \times n$, $p \times q$, perform the multiplication of matrices.

Week 4:

- Check a string is palindrome or not.
- Given a string and an int 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)→"llollollo

repeatEnd("Hello",2)→"lolo"

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 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 HashSet 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.

Week 10:

- Create a JTable 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

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

- Recognize the Java programming environment (L3).
- Select appropriate programming construct 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).

Text Books:

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

Reference Books:

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.

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(IT20APC402) OPERATING SYSTEMS LAB

(CSE, CSM & IT)

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 round robin algorithm with time slice equivalent to weight.
4. Implement priority scheduling algorithm. While executing, no process should wait for more than 10 seconds. If waiting time is more than 10 seconds, 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 shared memory 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) First fit b) Worst fit c) Best fit
11. Simulate the following page replacement algorithms
a) FIFO b) LRU c) LFU etc.,
12. Simulate Paging Technique of memory management
13. Simulate Bankers Algorithm for Dead Lock 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) Two level c) Hierarchical d) DAG

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 shared memory process. (L4)
- Design new scheduling algorithms. (L6)

Reference Books:

1. Peter B. Galvin, Greg Gagne "Operating System Concepts", Abraham Silberchatz, Eighth Edition, John Wiley.
2. Stallings "Operating Systems: 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 6. 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>

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(AM20APC302) ALGORITHMS LAB

(CSE, CSM & IT)

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 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-2 MERGE SORT**

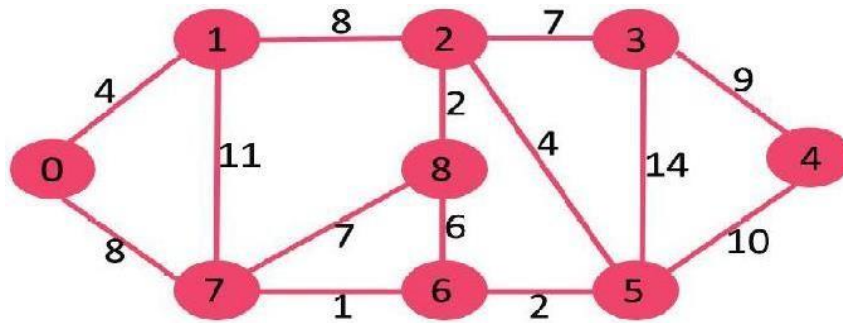
Implement merge sort algorithm to sort a given set of elements and determine the time required to sort the elements. Repeat the experiment for different values of n , the number of elements in the list to be sorted and plot a graph of the time taken versus n . The elements can be read from a file or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

- **Week-3 KNAPSACK PROBLEM**

Implement 0/1 Knapsack problem using Dynamic Programming.

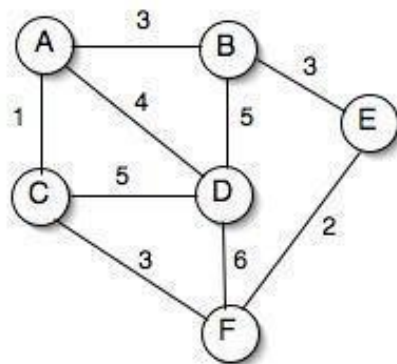
- **Week-4 SHORTEST PATHS ALGORITHM**

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**

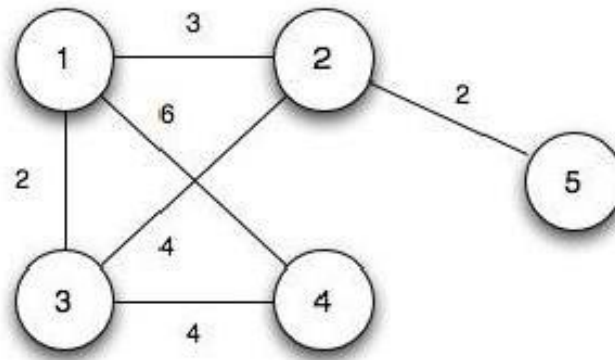
Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's



algorithm.

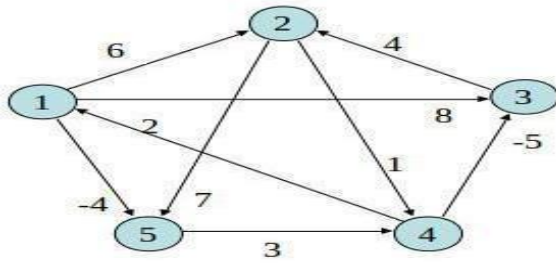
- **Week-6 MINIMUM COST SPANNING TREE**

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



- Week-7 ALL PAIRS SHORTEST PATHS**

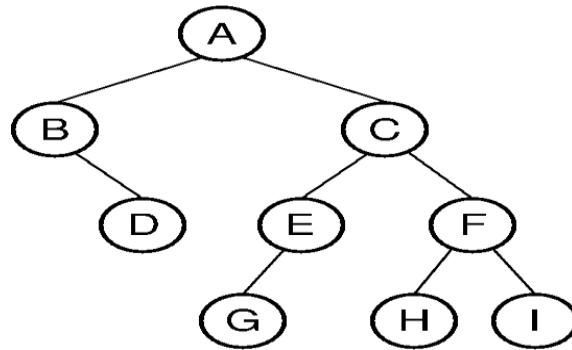
Implement All-Pairs Shortest Paths Problem using Floyd's algorithm.



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

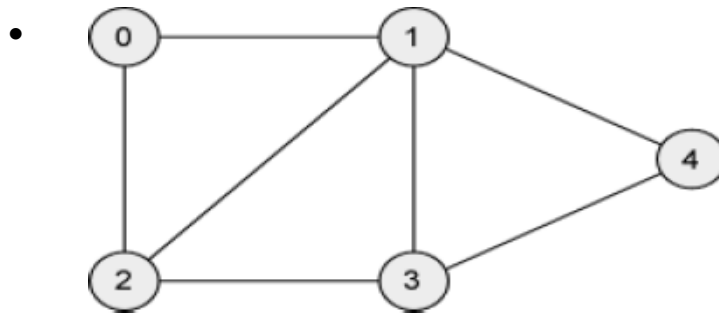
- Week-8 TREE TRAVERSALS**

Perform various tree traversal for a given tree

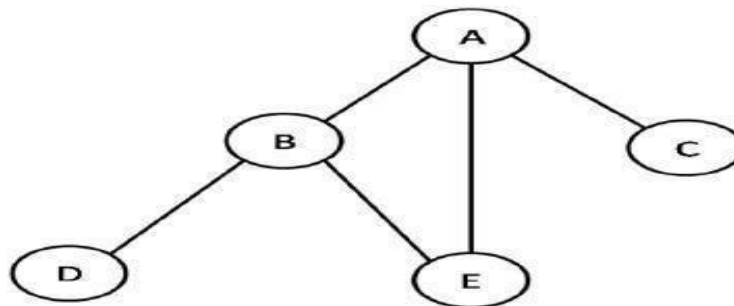


- **Week-9 GRAPH TRAVERSALS**

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 SUB SETS 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 Back Tracking.

Week-13 STRING MATCHING

- a. Implement naïve string matching algorithm.
- b. Implement Rabin-karp string matching algorithm.
- c. Implement knuth-Morris-Pratt algorithm.
- d. Implement finite automata string matching algorithm.

Course outcomes

- Apply the Divide and Conquer strategy to solve searching, sorting problems
- Analyze the efficiency of Greedy and Dynamic Programming design techniques to solve the optimization problems.
- Relate Backtracking technique for solving constraint satisfaction problems.

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 Wiley and Sons, 2006.

SRI VENKATESWARA COLLEGE OF ENGINEERING, TIRUPATI
(AUTONOMOUS)

B. Tech II-II Sem

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(IT20ASC401) EXPLORATORY DATA ANALYSIS USING R
(CSE, CSM & IT)

Course Objectives:

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

R AS CALCULATOR APPLICATION

1. Using with and without R objects on console
2. Using mathematical functions on console
3. Write an R script, to create R objects for calculator application and save in a specified location in disk.

DESCRIPTIVE STATISTICS IN R

4. Write an R script to find basic descriptive statistics using summary, str, quartile function on mtcars& cars datasets.
5. Write an R script to find subset of dataset by using subset (), aggregate () functions on iris dataset.

READING AND WRITING DIFFERENT TYPES OF DATASETS

5. Reading different types of data sets (.txt, .csv) from Web and disk and writing in file in specific disk location.

7. Reading Excel data sheet in R.

8. Reading XML dataset in R.

VISUALIZATIONS

9. Find the data distributions using box and scatter plot.

10. Find the outliers using plot.

11. Plot the histogram, bar chart and pie chart on sample data.

CORRELATION AND COVARIANCE

12. Find the correlation matrix.

13. Plot the correlation plot on dataset and visualize giving an overview of relationships among data on iris data.

14. Analysis of covariance: variance (ANOVA), if data have categorical variables on iris data.

REGRESSION MODEL

15. Import a data from web storage. Name the dataset and now do Logistic Regression to find out relation between variables that are affecting the admission of a student in a institute based on his or her GRE score, GPA obtained and rank of the student. Also check the model is fit or not. Require (foreign), require (MASS).

Course Outcomes:

- Understand fundamental and applied mathematical and statistical knowledge, methodologies and modern computational tools (L2).
- Extract an interpretation of data using exploratory data analysis (L5).
- Visualize and plot graphical representations of data (L4).

Reference Books:

- Yanchang Zhao, "R and Data Mining: Examples and Case Studies", Elsevier, 1st Edition, 2012

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: R Software , R Studio Software

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B. Tech II-II Sem

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(CS20AMC401) DESIGN THINKING FOR INNOVATION (Mandatory Course)
(CSE, CSM & IT)

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 in services 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 Principles of design thinking.(L3)

Unit –II

Stages in design thinking, Benefits of Design thinking, design thinking and innovation, case studies.

Immersion: Preliminary immersion, In Depth immersion.

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 problems in the immersion stage (L4)

Unit-III

Analysis and Synthesis: 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)

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)

Reference Books:

- Christoph Meinel and Larry Leifer, "Design Thinking", Springer, 2011
- AdersRiiseMaehlum, "Extending the TILES 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", Harper Collins publication, 2009
- <http://www.algarytm.com/it-executives-guide-to-design-thinking:e-book>.
- Marc stickdorn and Jacob Schneider, "This is Service Design Thinking", Wiely, 2011
- Pahl and Vietz, "Engineering Design", Springer, 2007

III YEAR I-SEMESTER

SRI VENKATESWARA COLLEGE OF ENGINEERING, TIRUPATHI

(AUTONOMOUS)

BTech III-I Sem

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(IT20APC501) COMPUTER NETWORKS

Course Objectives:

- 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

Unit – 1: 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 ComputerNetworking and the Internet

Learning Outcomes:

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

- Enumerate the hardware components of a computer network (L1)
- List the layers of a Computer Network (L1)
- Identify the performance metrics of a computer network (L3)

Unit – 2: Application Layer

Principles of Network Applications, The web and HTTP, File transfer: FTP, Electronic mail in the internet, DNS-The Internet's Directory Service, Peer-to-Peer Applications

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 (L2)

Unit – 3 : Transport Layer

Introduction and Transport-Layer Services, Multiplexing and De-multiplexing, Connectionless Transport: UDP, Principles of Reliable Data transfer, Connection-Oriented Transport: TCP, Principles of Congestion Control, 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 – 4 :The Network Layer

Introduction, Virtual Circuit and Datagram Networks, The Internet Protocol(IP): Forwarding and Addressing in the Internet, Routing Algorithms, Routing in the Internet, Broadcast and Multicast Routing

Learning outcomes:

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

- Compare routing algorithms (L4)
- Design routing algorithms (L6)
- Extend the existing routing protocols (L2)

Unit – 5 :The Link Layer: Links, Access Networks, and LANs

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 Center Networking, Retrospective: A Day in the Life of a Web Page 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)

Course Outcomes:

Upon completion of the course, the students should 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. Assess critically the existing routing protocols (L5)
4. Explain the functionality of each layer of a computer network (L2)
5. Choose the appropriate transport protocol based on the application requirements (L3)

Text Books:

1. James F. Kurose, Keith W. Ross, "Computer Networking: A Top-Down Approach", 6th edition, Pearson, 2019.

References:

1. Forouzan, "Datacommunications and Networking", 5th Edition, McGraw Hill Publication.
2. Andrew S.Tanenbaum, David j.wetherall, "Computer Networks", 5th Edition, PEARSON.
3. Youlu Zheng, Shakil Akthar, "Networks for Computer Scientists and Engineers", OxfordPublishers, 2019

SRI VENKATESWARA COLLEGE OF ENGINEERING , TIRUPATHI
(AUTONOMOUS)

BTech III-I Sem

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(IT20APC503) DATA WAREHOUSING AND DATA MINING

Course Objectives:

This course is designed to:

- Familiarize with mathematical foundations of data mining tools.
- Introduce classical models and algorithms in data warehouses and data mining.
- Investigate the kinds of patterns that can be discovered by association rule mining, classification and clustering.
- Explore data mining techniques in various applications like social, scientific and Environmental context.

UNIT I:

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.

Learning Outcomes:

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

- Identify the component of Data warehouse (L1)
- Create the architecture of Data warehouse (L6)
- Apply different types of OLAP operations (L3)

UNIT II:

Introduction to Data Mining Systems – Knowledge Discovery Process – Data Mining Techniques – Issues – applications- Data Objects and attribute types, Statistical description of data, Data Preprocessing – Cleaning, Integration, Reduction, Transformation and discretization, Data Visualization, Data similarity and dissimilarity measures.

Learning Outcomes:

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

- Summarize the data processing steps (L2)
- Apply data cleaning process (L3)

UNIT III:

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.

Learning Outcomes:

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

- Understand Association Rules(L2)
- Apply different Mining Methods (L3)
- Review Classification using Frequent Patterns (L2)

UNIT IV:

Decision Tree Induction – Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines – Lazy Learners – Model Evaluation and Selection-Techniques to improve Classification Accuracy. Clustering Techniques – Cluster analysis-Partitioning Methods – Hierarchical Methods – Density Based Methods – Grid Based Methods – Evaluation of clustering – Clustering high dimensional data- Clustering with constraints, Outlier analysis-outlier detection methods.

Learning Outcomes:

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

Creating Decision Tree (L6)

Evaluate Classification techniques (L5)

UNIT V: R PROGRAMMING

R programming : introduction, Features Of R, How to Run R, Variables in R, Constants in R, Arithmetic Operators, Relational Operators, Logical Operators, Data types in R, Data Objects In R.

Learning Outcomes:

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

Investigate RStudio (L4)

Explain different operations in R (L2)

Course Outcomes:

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

Design a Data warehouse system and perform business analysis with OLAP tools (L6).

Apply suitable pre-processing and visualization techniques for data analysis (L3)

Apply frequent pattern and association rule mining techniques for data analysis (L3)

Design appropriate classification and clustering techniques for data analysis (L6)

Infer knowledge from raw data (L4)

Text Books:

1. Jiawei Han and Micheline Kamber, —Data Mining Concepts and Techniques, Third Edition, Elsevier, 2012.
2. R Programming for Data Science by Roger D. Peng

References:

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.

SRI VENKATESWARA COLLEGE OF ENGINEERING,TIRUPATHI

(AUTONOMOUS)

B.Tech – III-I Sem

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(IT20APC505) FORMAL LANGUAGES AND AUTOMATA THEORY

Course Objectives:

This course is designed to:

1. Introduce languages, grammars, and computational models
2. Explain the Context Free Grammars
3. Enable the students to use Turing machines
4. Demonstrate decidability and un-decidability for NP Hard problems

UNIT – I: Finite Automata

Why Study Automata Theory? The Central Concepts of Automata Theory, Automation, Finite Automata, Transition Systems, Acceptance of a String by a Finite Automata, DFA, Design of DFAs, NFA, Design of NFA, Equivalence of DFA and NFA, Conversion of NFA into DFA, Finite Automata with E-Transition, Minimization of Finite Automata, Mealy and Moore Machines, Applications and Limitation of Finite Automata.

Learning Outcomes:

- At the end of the unit, students will be able to:
- Distinguish DFA and NFA.
- Construct DFA for an input string.
- Perform minimization of Automata.
- Compare Moore and Mealy Machines.

UNIT – II: Regular Expressions

Regular Expressions, Regular Sets, Identity Rules, Equivalence of two Regular Expressions, Manipulations of Regular Expressions, Finite Automata, and Regular Expressions, Inter Conversion, Equivalence between Finite Automata and Regular Expressions, Pumping Lemma, Closers Properties, Applications of Regular Expressions, Finite Automata and Regular Grammars, Regular Expressions and Regular Grammars.

Learning Outcomes:

- At the end of the unit, students will be able to:
- Construct regular expression for the given Finite Automata.
- Construct finite automata for the given regular expression.
- Apply closure properties on regular expressions.

UNIT – III: Context Free Grammars

Formal Languages, Grammars, Classification of Grammars, Chomsky Hierarchy Theorem, Context Free Grammar, Leftmost and Rightmost Derivations, Parse Trees, Ambiguous Grammars, Simplification of Context Free Grammars-Elimination of Useless Symbols, E- Productions and Unit Productions, Normal Forms for Context Free Grammars-Chomsky Normal Form and Greibach Normal Form, Pumping Lemma, Closure Properties, Applications of Context Free Grammars.

Learning Outcomes:

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

Define Context Free Grammar.

Distinguish Chomsky Normal Form and Greibach Normal form.

Apply Pumping Lemma theorem on Context Free Grammar.

UNIT – IV: Pushdown Automata

Pushdown Automata, Definition, Model, Graphical Notation, Instantaneous Description Language Acceptance of pushdown Automata, Design of Pushdown Automata, Deterministic and Non – Deterministic Pushdown Automata, Equivalence of Pushdown Automata and Context Free Grammars Conversion, Two Stack Pushdown Automata, Application of Pushdown Automata.

Learning Outcomes:

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

List the applications of Pushdown Automata.

Construct Pushdown Automata for context free grammar.

UNIT – V: Turing Machine

Turing Machine, Definition, Model, Representation of Turing Machines-Instantaneous Descriptions, Transition Tables and Transition Diagrams, Language of a Turing Machine, Design of Turing Machines, Techniques for Turing Machine Construction, Types of Turing Machines, Church's Thesis, Universal Turing Machine, Restricted Turing Machine.

Decidable and Undecidable Problems: NP, NP-Hard and NP-Complete Problems.

Learning Outcomes:

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

List types of Turing Machines.

Design Turing Machine.

Formulate decidability and undecidability problems.

Course Outcomes:

Students will be able to:

- Explain formal machines, languages and computations (L2)
- Design finite state machines for acceptance of strings (L6)
- Develop context free grammars for formal languages (L3)
- Build pushdown automata for context free grammars (L3)
- Apply Turing machine for solving problems (L3)
- Validate decidability and undecidability (L6)

TEXT BOOKS:

1. Introduction to Automata Theory, Languages and Computation, J.E.Hopcroft, R.Motwani and J.D.Ullman, 3rd Edition, Pearson, 2008.
2. Theory of Computer Science-Automata, Languages and Computation, K.L.P. Mishra and N.Chandrasekaran, 3rd Edition, PHI, 2007.

REFERENCE BOOKS:

1. Formal Language and Automata Theory, K.V.N. Sunitha and N.Kalyani, Pearson, 2015.
2. Introduction to Automata Theory, Formal Languages and Computation, Shyamalendu Kandar, Pearson, 2013.
3. Theory of Computation, V. Kulkarni, Oxford University Press, 2013.
4. Theory of Automata, Languages and Computation, Rajendra Kumar, McGraw Hill, 2014.

SRI VENKATESWARA COLLEGE OF ENGINEERING, TIRUPATI
(AUTONOMOUS)

III Year I Sem

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(CE20AOE501) BASICS OF CIVIL ENGINEERING

Course Objectives:

- Understanding Relevance of Civil Engineering in the overall infrastructural development of the country
- Categorize various Types of buildings, selection of site for buildings
- Obtain knowledge about various techniques adopted in Importance, objectives and principles of surveying
- Become aware of various methods of Modern construction materials
- Understand the Building Construction in various methods

UNIT-I

General Introduction to Civil Engineering: Relevance of Civil Engineering in the overall infrastructural development of the country. Responsibility of an engineer in ensuring the safety of built environment. Brief introduction to major disciplines of Civil Engineering like Transportation Engineering, Structural Engineering, Geo-technical Engineering, Water Resources Engineering and Environmental Engineering.

Learning Outcomes:

After completion of this unit, students should

- Able to know various specialisations in Civil Engineering
- Responsibility of an engineer in ensuring the safety of built environment

UNIT-II

Introduction to buildings: Types of buildings, selection of site for buildings, components of a residential building and their functions. Building rules and regulations: Relevance of NBC, KBR & CRZ norms (brief discussion only). Building area: Plinth area, built up area, floor area, carpet area and floor area ratio for a building as per KBR.

Learning Outcomes:

After completion of this unit, students should

- Able to know various types of buildings.
- Able to know various types building regulations and rules

UNIT-III

Surveying: Importance, objectives and principles. Construction materials, Conventional construction materials: types, properties and uses of building materials: bricks, stones, cement, sand and timber Cement concrete: Constituent materials, properties and types. Steel: Steel sections and steel reinforcements, types and uses.

Learning Outcomes:

After completion of this unit, students should

- Able to know importance of Surveying.
- Able to know various materials used for construction.

UNIT-IV

Modern construction materials:- Architectural glass, ceramics, Plastics, composite materials, thermal and acoustic insulating materials, decorative panels, waterproofing materials. Modern uses of gypsum, pre-fabricated building components (brief discussion only).

Learning Outcomes:

After completion of this unit, students should

- Able to know importance new construction materials.
- Able to know various materials used for construction.

UNIT-V

Building Construction: Foundations: Bearing capacity of soil (definition only), functions of foundations, types – shallow and deep (brief discussion only). Load bearing and framed structures. Brick masonry: - Header and stretcher bond, English bond & Flemish bond random rubble masonry. Roofs and floors: - Functions, types; flooring materials (brief discussion only).

Learning Outcomes:

After completion of this unit, students should

- Able to know different types of foundations
- Able to know various masonry bonds.

Course Outcomes:

After studying this course, students will be able to:

- Understand various Civil Engineering in the overall infrastructural development
- Identify various types of buildings
- Understand the process of management of surveying
- Apply various Modern construction materials
- Obtain awareness on various Modern construction materials

Text Books:

1. Rangwala, S. C., Essentials of Civil Engineering, Charotar Publishing House 2015
2. 2Mckay, W.B. and Mckay, J. K., Building Construction, Volumes 1 to 4, Pearson
3. IndiaEducation Servicesedition 2019

Reference Books:

1. G Shanmugam, M S Palanichamy, Basic Civil and Mechanical Engineering, McGraw Hill Education; First edition, 2018

Benjamin,J.,Basic Mechanical Engineering,Pentex Books,9th Edition,2018

SRI VENKATESWARA COLLEGE OF ENGINEERING, TIRUPATI
(AUTONOMOUS)

III Year I Sem

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(EE20AOE501) INTRODUCTION TO CONTROL SYSTEMS

Course Objectives:

To make the students learn about:

- The effect of feedback, the use of block diagram algebra and Mason's gain formula to find the overall transfer function
- Transient and steady state response and time domain specifications
 - The concept of stability by Routh's stability criterion and Root loci
 - Frequency domain specifications, Bode diagrams and Nyquist plots
 - State space modeling of Control system and the concept of controllability and observability.

UNIT – I

CONTROL SYSTEMS CONCEPTS

Open loop and closed loop control systems and their differences- Classification of control systems, Feedback characteristics, Block diagram reduction methods – Signal flow graphs – Reduction using Mason's gain formula. Principle of operation of DC and AC Servo motor, Transfer function of DC servo motor –AC servo motor, Synchros.

Learning Outcomes:

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

- Write the differential equations for mechanical and electrical systems(L3)
- Obtain the transfer function from block diagrams, servo motors and signal flow graphs (L4)

UNIT-II

TIME RESPONSE ANALYSIS

Step Response - Impulse Response - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems – Time domain specifications – Steady state response -

Learning Outcomes:

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

- Analyze the time domain specifications(L4)
- Calculate the steady state errors(L4)

UNIT– III**STABILITY ANALYSIS IN TIME DOMAIN**

The concept of stability – Routh’s stability criterion – Stability and conditional stability – limitations of Routh’s stability. The Root locus concept - construction of root loci-effects of adding poles and zeros to $G(s)H(s)$ on the root loci.

Learning Outcomes:

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

- Analyze the concept of stability in time domain(L4)
- Apply the concept of Routh’s stability and Root locus in time domain (L5)

UNIT– IV**FREQUENCY RESPONSE ANALYSIS**

Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Stability Analysis from Bode

Plots. Polar Plots- Phase margin and Gain margin-Stability Analysis.

Learning Outcomes:

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

- Evaluate the frequency domain specifications from Bode, Polar and Nyquist plots (L5)
- Deducing transfer functions from Bode Plots(L4)
- Understand difference between Phase and Gain margins (L2)

UNIT– V**STATE SPACE ANALYSIS OF CONTINUOUS SYSTEMS**

Concepts of state, state variables and state model, state models - , Transfer function from state model, Solving the Time invariant state Equations- State Transition Matrix and it’s Properties, The concepts of controllability and observability.

Learning Outcomes:

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

- Understand the concept of state space, controllability and observability (L2)
- Obtain the transfer function from state space and vice versa (L4)
- Understand the state transition method of solving time invariant state equations (L2)

Text Books:

1. Katsuhiko Ogata, "Modern Control Engineering", 5th edition, Prentice Hall of India Pvt. Ltd., 2010.
3. J. Nagrath and M. Gopal, "Control Systems Engineering" 5th edition, New Age International (P) Limited Publishers, 2007.

Reference Books:

1. M. Gopal, "Control Systems Principles & Design" 4th Edition, McGraw Hill Education, 2012.
2. B. C. Kuo and Farid Golnaraghi, "Automatic Control Systems" 8th edition, John Wiley and sons, 2003.
4. Joseph J Distefano III, "Feedback and Control Systems", Allen R Stubberud & Ivan J Williams, 2nd Edition, Schaum's outlines, McGraw Hill Education, 2013.
6. Graham C. Goodwin, "Control System Design" Stefan F. Graebe and Mario E. Salgado, Pearson, 2000.
8. Gene F. Franklin, "Feedback Control of Dynamic Systems", J.D. Powell and Abbas Emami-Naeini, 6th Edition, Pearson, 2010.

Course Outcomes:

After completing the course, the student should be able to:

CO-1: Understand the concepts of control systems classification, feedback effect and Apply the concepts of Block diagram reduction, Signal flow graph

CO-2: Analyse time response analysis, error constants, and stability characteristics of a given mathematical model using different methods.

CO-3: Apply the concepts of RH and Root locus for stability calculations

CO-4: Analyze system behavior of the system in frequency domain. Frequency response characteristics, Bode, Nyquist, Polar plots for stability calculations

CO-5: Analyze system behavior based on the state space analysis of that system. controllability and observability

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III Year- I Sem

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(CS20AOE501) COMPUTER APPLICATIONS USING PROGRAMMING TOOLS

Open Elective – I

Course Objectives

- Able to know about “The necessity of Software & their applications in Food Industries”
- Able to Implement the Programs in ‘C’ to perform various operations that are related to Food Industries.

UNIT – I

Computerization, Importance of Computerization in food industry and IT applications in food industries. Computer operating environments and information system for various types of food industries. Introduction to Bar charts and Pie charts & the procedure to develop bar charts and pie charts on given Data.

Learning Outcomes:

At the end of unit, students will be able to understand the following

- Computerization, Importance of Computerization in food industry and IT applications in food industries.
- Computer operating environments and information system for various types of food industries.
- Introduction to Bar charts and Pie charts & the procedure to develop bar charts and pie charts on given Data.

UNIT – II

Introduction to Software & Programming Languages, Properties, Differences of an Algorithm and Flowcharts, Advantages and disadvantages of Flowcharts & Algorithms. Introduction, Fundamentals & advantages of ‘C’. Steps in learning ‘C’ (Character set, Identifiers, Keywords) Steps in learning ‘C’ (Data types, Constants, Variables, Escape sequences).

Learning Outcomes:

At the end of unit, students will be able to understand the following

- Introduction to Software & Programming Languages, Properties, Differences of an Algorithm and Flowcharts
- Advantages and disadvantages of Flowcharts & Algorithms. Introduction, Fundamentals & advantages of 'C'.
- Steps in learning 'C' (Character set, Identifiers, Keywords)
- Steps in learning 'C' (Data types, Constants, Variables, Escape sequences).

UNIT – III

Steps in learning 'C' (Operators, Statements) Steps in learning 'C' (Header Files, Input & Output functions: Formatted I/O functions, Unformatted I/O functions). Basic Structure of a simple 'C' program. Decision Making/Control Statements. Branching, Concept of Looping & Looping statements.

Learning Outcomes:

At the end of unit, students will be able to understand the following

- Steps in learning 'C' (Operators, Statements)
- Steps in learning 'C' (Header Files, Input & Output functions: Formatted I/O functions, Unformatted I/O functions).
- Basic Structure of a simple 'C' program. Decision Making/Control Statements.
- Branching, Concept of Looping & Looping statements.

UNIT – IV

Concept of Functions (Defining a function & Function Prototypes, Types of functions: Library functions & User defined functions. Concept of various types of User Defined Functions (i.e., About 4 types). Concept of Arrays & Types of Arrays (Single, Double and Multi-Dimensional Arrays). Concept of a String Library Functions.

Learning Outcomes:

At the end of unit, students will be able to understand the following

- Concept of Functions (Defining a function & Function Prototypes, Types of functions: Library functions & User defined functions).
- Concept of various types of User Defined Functions (i.e., About 4 types).
- Concept of Arrays & Types of Arrays (Single, Double and Multi-Dimensional Arrays).
- Concept of a String Library Functions.

UNIT – V

Concept of Pointers, Structures & Unions. Introduction to Data Structures, Types of Data Structures (Primary & Secondary Data Structures) Concept of Linked Lists, Types of Linked Lists & Basic operations on linked Lists. Concept of Stacks & Operations on Stacks (PUSH & POP Operations) Concept of Queues and types of Queues Operations on a Queue (ENQUEUE & DEQUEUE Operations)

Learning Outcomes:

At the end of unit, students will be able to understand the following

- Concept of Pointers, Structures & Unions. Introduction to Data Structures, Types of Data Structures (Primary & Secondary Data Structures)
- Concept of Linked Lists, Types of Linked Lists & Basic operations on linked Lists.
- Concept of Stacks & Operations on Stacks (PUSH & POP Operations)
- Concept of Queues and types of Queues Operations on a Queue (ENQUEUE & Dequeue Operations)

Course Outcomes

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

- know about the various steps which are related to computer and Software and their application in Food Industries
- know about the various steps which are necessary to implement the programs in 'C'

TEXT BOOKS

1. Yeswanth Kanethkar, Let us 'C'
2. Balaguruswamy E., "Computer Programming in 'C'"
3. Mark Allen Waite, "Data Structures"

REFERENCES

1. M. S Excel 2000, Microsoft Corporation
2. M. S. Office – Microsoft Corporation
3. Verton M.V. "Computer concepts for Agri Business", AVI Pub. Corp., West Port, USA.

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(IT20APE501) SOFTWARE ENGINEERING
Professional Elective - I

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 carry out procedural and object oriented 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

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.

Software project management:

Project planning, project estimation, COCOMO, Halstead's Software Science, project Scheduling, staffing, Organization and team structure, risk management, configuration Management.

Unit Outcomes:

Student should be able to

- Recognize the basic issues in commercial software development.
- Summarize software lifecycle models.
- Infer Workout project cost estimates using COCOMO and schedules using PERT and GANTT charts.

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, IEEE 830 guidelines, representing complex requirements using decision Tables and decision trees, overview of formal system development techniques. Axiomatic Specification, algebraic specification.

Unit Outcomes:

Student should be able to

- Identify basic issues in software requirements analysis and specification.
- Develop SRS document for sample problems using IEEE 830 format.
- Develop algebraic and axiomatic specifications for simple problems.

Unit – III: Software Design

Good Software Design, Cohesion and coupling, Control Hierarchy: Layering, Control Abstraction, Depth and width, Fan-out, Fan-in, 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 user Interface, User Guidance and Online Help, Mode-based Vs Mode-less Interface, Types of user Interfaces, Component-based GUI development, User interface design methodology: GUI design Methodology.

Unit Outcomes

Student should be able to

- Identify the basic issues in software design.
- Apply the structured, object oriented analysis and design (SA/SD) technique.
- Recognize the basic issues in user interface design.

Unit – IV : Coding and Testing

Coding standards and guidelines, code review, software documentation, Testing, Black Box Testing, White Box Testing, debugging, integration testing, Program Analysis Tools, system testing, performance testing, regression testing, Testing Object Oriented Programs.

Unit Outcomes:

Student should be able to

- Identify the basic issues in coding practice.
- Recognize the basic issues in software testing. □ Design test cases for black box and white box testing.

Unit – V: Software quality, reliability, and other issues

Software reliability, Statistical testing, Software quality and management, ISO 9000, SEI Capability maturity model (CMM), Personal software process (PSP), six sigma, Software quality

Metrics, CASE and its scope, CASE environment, CASE support in software life cycle, Characteristics of software maintenance, Software reverse engineering, Software maintenance

Processes model, Estimation maintenance cost. Basic issues in any reuse program, Reuse Approach, Reuse at organization level.

Unit Outcomes:

Student should be able to

- Summarize various methods of software quality management.
- Instruct the quality management standards ISO 9001, SEI CMM, PSP, and Six Sigma.
- Outline software quality assurance, quality measures, and quality control.
- Identify the basic issues in software maintenance, CASE support, and software reuse.

Course outcomes:

Student should be able to

Obtain basic software life cycle activity skills.

Design software requirements specification 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.

Text Book:

1. Rajib Mall, "Fundamentals of Software Engineering", 5th Edition, PHI, 2018.
2. Pressman R, "Software Engineering- Practioner Approach", McGraw Hill.

Reference Books:

1. Somerville, "Software Engineering", Pearson 2.
2. Richard Fairley, "Software Engineering Concepts", Tata McGraw Hill.
3. Jalote Pankaj, "An integrated approach to Software Engineering", Narosa

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(IT20APE502) CLOUD COMPUTING
Professional Elective - I

Course Objectives:

This course is designed to:

- Define cloud services and models
- Demonstrate design the architecture for new cloud application.
- Explain how to re-architect the existing application for the cloud.

Unit-I: Introduction to Cloud Computing, 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 networking, Network function virtualization, Map Reduce, Identity and Access Management, Service Level Agreements, Billing.

Learning Outcomes

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

- Outline the Cloud characteristics and models.(L2)
- Classify different models, different technologies in cloud.(L2)

Unit-II: Cloud Services and Platforms: Compute Services, Storage Services, Database Services, Application Services, Content Delivery Services, Analytics Services, Deployment and Management Services, Identity and Access Management Services, Open Source Private Cloud Software, Apache Hadoop, Hadoop MapReduce Job Execution, Hadoop Schedulers, Hadoop Cluster Setup.

Learning Outcomes:

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

- Summarize the Services and Platform of cloud.(L2)
- Demonstrate Hadoop Cluster Setup. (L2)

Unit-III: Cloud Application Design: Design Considerations, Reference Architectures, Cloud Application Design Methodologies, Data Storage Approaches, Multimedia Cloud: Introduction, Case Study: Live Video Streaming App, Streaming Protocols, Case Study: Video Transcoding APP.

Learning Outcomes:

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

Design and build cloud applications. (L6)

Describe the multimedia cloud. (L2)

Unit-IV: Python for Amazon Web Services, Python for Google Cloud Platform, Python for Windows Azure, Python for MapReduce, Python Packages of Interest, Python Web Application Framework – Django, Designing a RESTful Web API.

Learning Outcomes:

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

Select different cloud services from different vendors (L2)

Utilize Python language to access cloud services (L3)

Unit-V: Cloud Application Development in Python, Design Approaches, Image Processing APP, Document Storage App, MapReduce App, Social Media Analytics App, Cloud Application Benchmarking and Tuning, Cloud Security, Cloud Computing for Education.

Learning Outcomes:

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

Investigate different Cloud applications. (L4)

Design cloud applications using Python. (L6)

Course Outcomes:

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

- Outline the procedure for Cloud deployment (L2)
- Distinguish different cloud service models and deployment models (L4)
- Compare different cloud services. (L5)
- Design applications for an organization which use cloud environment. (L6)

Textbooks:

1. Arshadeep Bhaga, Vijay Madiseti, "Cloud Computing A Handson Approach", Universities Press, 2018.

References:

1. Chris Hay, Brian Prince, "Azure in Action" Manning Publications [ISBN: 9781935182481],2010.
2. Henry Li, "Introducing Windows Azure" Apress; 1 edition [ISBN: 978-14302-2469-3],2009.

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III Year - I Sem

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(IT20APE503) No SQL DATABASES

Professional Elective-I

Course Objectives:

The course is designed to:

Introduce No SQL and use of four types of NoSQL Databases

Outline the three different styles of aggregate-oriented data models and how they differ.

Understand the detailed architecture, define objects, load data, query data and performance tune Column-oriented NoSQL databases

Improve programmer productivity by using a database that better matches an application's needs.

UNIT I

Introduction to NoSQL: Definition and Introduction, Sorted Ordered Column-Oriented Stores, Key/Value Stores, Document Databases, Graph Databases, Examining Two Simple Examples, Location Preferences Store, Car Make and Model Database, Working With Language Bindings.

Learning Outcomes:

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

Understand the fundamentals of NoSQL(L2)

Examine the concepts with two simple examples(L5)

UNIT II

Interacting with NoSQL: If NoSql Then What, Language Bindings For NoSQL Data Stores, Performing Crud Operations, Creating Records, Accessing Data, Updating And Deleting Data

Learning Outcomes:

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

Understand language bindings for NoSQL Data Stores(L2)

Explain how to perform various operations on Data(L2)

UNIT III

NoSQL Storage Architecture: Working With Column-Oriented Databases, Hbase Distributed Storage Architecture, Document Store Internals, Understanding Key/Value Stores in Memcached and Redis, Eventually Consistent Non-Relational Databases.

Learning Outcomes:

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

- Demonstrate the working with Column-Oriented Databases(L2)

- Understand Key

UNIT IV

NoSQL Stores: Similarities Between Sql And Mongodb Query Features, Accessing Data From Column- Oriented Databases Like Hbase, Querying Redis Data Stores, Changing Document Databases, Schema Evolution In Column-Oriented Databases, Hbase Data Import And Export, Data Evolution In Key/Value Stores.

Learning Outcomes:

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

- List the Similarities between Sql And Mongodb Query Features(L1)

- Explore accessing Data From Column- Oriented Databases Like Hbase(L5)

- Illustrate Hbase Data Import and Export(L2)

- Demonstrate Schema evolution in Column-Oriented Databases(L2)

UNIT V

Indexing and Ordering Data Sets : Essential Concepts Behind A Database Index, Indexing And Ordering In Mongodb, Creating and Using Indexes In Mongodb, Indexing And Ordering In Couchdb, Indexing In Apache Cassandra.

Learning Outcomes:

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

- Learn essential concepts behind a Database index (L1)

- Compare indexing and ordering in Mongodb, Couchdb and Apache Cassandra (L4)

Course Outcomes:

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

Identify type of NoSQL database to implement business requirements(L3)

Apply NoSQL data modeling from application specific queries(L3)

Demonstrate Atomic Aggregates and de-normalization as data modelling techniques to optimize query processing(L2)

Improve data access performance via some combination of handling larger data volumes, reducing latency, and improving throughput(L6)

Separate parts of applications into services which allows you to introduce NoSQL into an existing application(L6)

Text Books:

- 1) Pramod Sadalage and Martin Fowler, NoSQL Distilled, Addison-Wesley Professional, 2012.
- 2) Dan McCreary and Ann Kelly, Making Sense of NoSQL, Manning Publications, 2013.

Reference Books:

- 1) Shashank Tiwari, Professional NoSQL, Wrox Press, Wiley, 2011, ISBN:978-0-470-94224-6
- 2) Gaurav Vaish, Getting Started with NoSQL, Packt Publishing, 2013.

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(AUTONOMOUS)

III Year - I Sem

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(IT20APC502) COMPUTER NETWORKS LAB

This course is designed to:

- Understand the different types of networks
- Discuss the software and hardware components of a network
- Enlighten the working of networking commands supported by operating system
- Impart knowledge of Network simulator 2/3
- Familiarize the use of networking functionality supported by JAVA
- Familiarize with computer networking tools.

List of Experiments

1. Study different types of Network cables (Copper and Fiber) and prepare cables (Straight and Cross) to connect Two or more systems. Use crimping tool to connect jacks. Use LAN tester to connect the cables. Install and configure Network Devices: HUB, Switch and Routers. Consider both manageable and non-manageable switches. Do the logical configuration of the system. Set the bandwidth of different ports. Install and Configure Wired and Wireless NIC and transfer files between systems in Wired LAN and WirelessLAN. Consider both adhoc and infrastructure mode of operation.
2. Work with the commands Ping, Tracert, Ipconfig, pathping, telnet, ftp, getmac, ARP, Hostname, Nbtstat, netdiag, and Nslookup
3. Use Sniffers for monitoring network communication (Ethereal)
4. Find all the IP addresses on your network. Unicast, Multicast, and Broadcast on your network.
5. Use Packet tracer software to build network topology and configure using Distance vector routing protocol.
6. Use Packet tracer software to build network topology and configure using Link State routing protocol.
7. Using JAVA RMI Write a program to implement Basic Calculator
8. Implement a Chatting application using JAVA TCP and UDP sockets.

9. Hello command is used to know whether the machine at the other end is working or not. Echo command is used to measure the round trip time to the neighbour. Implement Hello and Echo commands using JAVA.

10. Use Ethereal tool to capture the information about packets.

11. Install Network Simulator 2/3. Create a wired network using dumbbell topology.

12. Attach agents, generate both FTP and CBR traffic, and transmit the traffic. Vary the data rates and evaluate the performance using metric throughput, delay, jitter and packet loss.

13. Create a static wireless network. Attach agents, generate both FTP and CBR traffic, and transmit the traffic. Vary the data rates and evaluate the performance using metric throughput, delay, jitter and packet loss.

14. Create a mobile wireless network. Attach agents, generate both FTP and CBR traffic, and transmit the traffic. Vary the data rates and evaluate the performance using metric throughput, delay, jitter and packet loss.

Course outcomes:

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

- Design scripts for Wired network simulation (L6)
- Design scripts of static and mobile wireless networks simulation (L6)
- Analyze the data traffic using tools (L4)
- Design JAVA programs for client-server communication (L6)
- Construct a wired and wireless networks using the real hardware (L3)

Reference Books:

1. Shivendra S. Panwar, Shiwen Mao, Jeong-dong Ryoo, and Yihan Li, "TCP/IP Essentials A Lab-Based Approach", Cambridge University Press, 2004.
2. Cisco Networking Academy, "CCNA1 and CCNA2 Companion Guide", Cisco Networking Academy Program, 3rd edition, 2003.
3. Ns Manual, Available at: <https://www.isi.edu/nsnam/ns/ns-documentation.html>, 2011.

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III Year - I Sem

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(IT20APC504) DATA WAREHOUSING AND MINING LAB

Course Objectives:

This course is designed to:

- Understand the mathematical basics quickly and covers each and every condition of data mining
- in order to prepare for real-world problems
- Explore various classes of algorithms that will be covered to give a foundation to further apply
- knowledge to diverse deeper into the different flavors of algorithms
- Have awareness about packages and libraries of R and also familiar with functions used in R
- For visualization
- Use R programming to conduct analytics on large real life datasets
- Familiarize students with various statistical measures Viz. Mean, Mode, Median...

List of Experiments:

1. Implement all basic R commands. Interact data through .csv files (Import from and export to .csv files).
2. Get and Clean data using swirl exercises. (Use 'swirl' package, library and install that topic from swirl).
3. Visualize all Statistical measures (Mean, Mode, Median, Range, Inter Quartile Range etc., using Histograms, Boxplots and ScatterPlots).
4. Create a data frame with the following structure.

EMP ID	EMP NAME	SALA RY	START DATE
1	XYZ	5000	01-11-2013
2	ABC	7500	05-06-2011
3	PQR	10000	21-09-1999
4	IJK	9500	13-09-2005
5	EFG	4500	23-10-2000

- a) Extract two column names using column name.
- b) Extract the first two rows and then all columns.
- c) Extract 3rd and 5th row with 2nd and 4th column.

5. Write R Program using 'apply' group of functions to create and apply normalization function on each of the numeric variables/columns of iris dataset to transform them into
 - i) 0 to 1 range with min-max normalization.
 - ii) a value around 0 with z-score normalization.
6. Create a data frame with 10 observations and 3 variables and add new rows and columns to it using 'rbind' and 'cbind' function.
7. Write R program to implement linear and multiple regression on 'mtcars' dataset to estimate the value of 'mpg' variable, with best R^2 and plot the original values in 'green' and predicted values in 'red'.
8. Demonstration of apriori algorithm on various data sets with varying confidence (%) and support (%).
9. Demonstrate the Classification Techniques using sample data Decision Tree, ID3 or CART.
10. Demonstrate k-means clustering using R.
11. Demonstrate k-medoids clustering using R.
12. Demonstrate density based clustering on iris dataset.
13. Demonstrate decision trees using 'readingSkills' dataset.
14. Demonstrate decision trees using 'iris' dataset using package party and 'rpart'.

Course Outcomes:

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

Extend the functionality of R by using add-on packages(L2)

Examine data from files and other sources and perform various data manipulation tasks on them(L4)

Demonstrate Code statistical functions in R(L2)

Apply R Graphics and Tables to visualize results of various statistical operations on data(L3)

Apply the knowledge of R being gained to data analytics for real life applications(L3)

Text Books:

1) R and Data Mining: Examples and Case Studies, 1st ed, Yanchang Zhao, Springer, 2012.

2) R for Everyone, Advanced Analytics and Graphics, 2nd ed, Jared Lander, Pearson, 2018.

E-Resources:

1) www.r-tutor.com

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III Year - I Sem

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(EG20ASC301) SOFT SKILLS
SOC - III

Course Objectives

To develop awareness in students of the relevance and importance of soft skills
To provide students with interactive practice sessions to make them internalize soft skills

To develop Time management, Positive thinking & Decision making skills
To enable to manage stress effectively
To enable them to develop employability skills

UNIT- I

INTRODUCTION

ON

Definition – Scope – Importance- – Methods of improving soft skills – Limits- Analysis – Interpersonal and intrapersonal skills - Verbal and Non-verbal skills.

Learning Outcomes:

At the end of the module, the learners will be able to
Understand the importance of soft skills
Identify the methods of improving soft skills
Analyze various soft skills in different situations
Distinguish various soft skills
Apply various soft skills in day to day life and in workplace

UNIT – II

INTRAPERSONAL SKILLS

Knowing self/temperaments/traits - Johari windows – quotient skills(IQ, EQ, SQ), creativity, decision-making- Attitude – Confidence Building - Positive Thinking –Time Management – Goal setting.

Learning Outcomes:

At the end of the module, the learners will be able to
Understand self and its temperament.
Apply various techniques to know the self.
Develop positive thinking
Develop creative thinking and decision-making skills
Apply self-knowing tools in day to day and professional life.

UNIT – III

INTERPERSONALSKILLS

Leadership Skills – Negotiation skills -- Team-building – Crisis Management –
Event Management –Ethicsand Etiquettes.

Learning Outcomes:

At the end of the module, the learners will be able to
Understand the importance of interpersonal skills
Analyze various tactics in negotiation skills.
Develop team building
spirit.Develop crisis
management
Apply interpersonal skills through etiquettes.

UNIT – IV

VERBAL

SKILLS

Importance of verbal skills in corporate climate, Listening skills –Mother Tongue
Influence (MTI) - Speaking skills – Public speaking - Oral presentations - Writing skills
–E-mail etiquettes – Memos - Indianism

Learning Outcomes:

At the end of the module, the learners will be able to
Understand the importance of verbal skills in corporate climate.

Explain the need of listening skills.
Explore MTI and suggest remedies to avoid it.
Interpret various contexts of speaking.
Apply verbal skills in personal and professional life.

UNIT – V

NON-VERBAL SKILLS

Importance of body language in corporate culture – body language-Facial expressions – eye contact – posture gestures – Proxemics – Haptics – Dress Code – Paralanguage – Tone, pitch, pause& selection of words

Learning Outcomes:

At the end of the module, the learners will be able to
Comprehend the importance of non-verbal communication.
Expound the need of facial expressions, postures and gestures.
Analyze proxemics,haptics etc.
Understand the importance of dress code.
Apply various techniques to use para language

Course Outcomes

Recognize the importance of verbal and non verbal skills
Develop the interpersonal and intrapersonal skills
Apply the knowledge in setting the SMART goals and achieve the set goals
Analyze difficult situations and solve the problems in stress-free environment
Create trust among people and develop employability skills

Text Books

1. Meenakshi Raman &ShaliniUpadhyay " Soft Skills",Cengage Learning, 2018.
2. S. Balasubramaniam, "Soft Skills for Interpersonal Communication", Orient BlackSwan, 2017.

References

1. Barun K. Mitra, "Personality Development and Soft Skills", –OXFORD Higher Education2018.
2. AlkaWadkar, "Life Skills for Success ", Sage Publications 2016.
3. Robert M Sheffield, "Developing Soft Skills", Pearson, 2010.
4. DianaBooher, "Communicate With Confidence",Tata McGrawhill, 2012.

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III Year - I Sem

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**(CH20AMC301) BIOLOGY FOR ENGINEERS
(Mandatory Non-Credit Course - V)**

Course Objectives: To provide basic understanding about life and life Process. Animal and plant systems. To understand what biomolecules are, their structures and functions. Application of certain biomolecules in Industry.

Brief introduction about human physiology and bioengineering.

To understand hereditary units, i.e. DNA (genes) and RNA and their synthesis in living organism.

How biology Principles can be applied in our daily life using different technologies.

Brief introduction to the production of transgenic microbes, Plants and animals.

Unit I: Introduction to Basic Biology

Cell as Basic unit of life, cell theory, Cell shapes, Cell structure, Cell cycle. Chromosomes. Prokaryotic and eukaryotic Cell. Plant Cell, Animal Cell, Plant tissues and Animal tissues, Brief introduction to five kingdoms of classification.

Unit Outcomes:

After completing this unit, the student will be able to

Summarize the basis of life. (L1)

Understand the difference between lower organisms (prokaryotes) from higher organisms (eukaryotes). (L2)

Understand how organisms are classified. (L3)

Unit II: Introduction to Biomolecules

Carbohydrates, lipids, proteins, Vitamins and minerals, Nucleic acids (DNA and RNA) and their types. Enzymes, Enzyme application in Industry. Large scale production of enzymes by Fermentation.

Unit Outcomes:

After completing this unit, the student will be able to

Understand what are biomolecules? their role in living cells, their structure, function and how they are produced. (L1)

Interpret the relationship between the structure and function of nucleic acids. (L2)

Summarize the applications of enzymes in industry. (L3)

Understand what is fermentation and its applications of fermentation in industry. (L4)

Unit III: Human Physiology

Nutrition: Nutrients or food substances. Digestive system, Respiratory system, (aerobic and anaerobic Respiration). Respiratory organs, respiratory cycle. Excretory system.

Unit Outcomes:

After completing this unit, the student will be able to

Understand what nutrients are (L1)

Understand the mechanism and process of important human functions (L2 & L3)

Unit IV: Introduction to Molecular Biology and recombinant DNA Technology

Prokaryotic gene and Eukaryotic gene structure. DNA replication, Transcription and Translation. rDNA technology. Introduction to gene cloning.

Unit Outcomes:

After completing this unit, the student will be able to

Understand and explain about gene structure and replication in prokaryotes

dEukaryotes (L1)

How genetic material is replicated and also understands how RNA and proteins are synthesized. (L2)

Understand about recombinant DNA technology and its application in different fields. (L3)

Explain what is cloning. (L4)

Unit V: Application of Biology

Brief introduction to industrial Production of Enzymes, Pharmaceutical and therapeutic Proteins, Vaccines and antibodies. Basics of biosensors, biochips, Bio fuels, and Bio Engineering. Basics of Production of Transgenic plants and animals.

Unit Outcomes:

After completing this unit, the student will be able to Understand.

How biology is applied for production of useful products for mankind.(L1)

What are biosensors, biochips etc. (L2)

Understand transgenic plants and animals and their production (L3)

Course Outcomes:

After studying the course, the student will be able to:

Explain about cells and their structure and function. Different types of cells and basics for classification of living Organisms.

Explain about biomolecules, their structure and function and their role in the living organisms. How biomolecules are useful in Industry.

Briefly about human physiology.

Explain about genetic material, DNA, genes and RNA how they replicate, pass and preserve vital information in living Organisms.

Know about application of biological Principles in different technologies for the production of medicines and Pharmaceutical molecules through transgenic microbes, plants and animals.

Text books:

1. P.K.Gupta, Cell and Molecular Biology, 5th Edition, Rastogi Publications -
2. U. Satyanarayana. Biotechnology, Books & Allied Ltd 2017

Reference Books:

1. N. A. Campbell, J. B. Reece, L. Urry, M. L. Cain and S. A. Wasserman, "Global Approach", Pearson Education Ltd, 2018.
2. T Johnson, Biology for Engineers, CRC press, 2011
3. J.M. Walker and E.B. Gingold, Molecular Biology and Biotechnology 2nd ed.. Panima Publications. PP 434.

SRI VENKATESWARA COLLEGE OF ENGINEERING ,TIRUPATHI

(AUTONOMOUS)

III Year - I Sem

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(IT20AMC501) PROBLEM SOLVING AND PROGRAMMING FOR LE (Common to All Branches of Engineering)

- 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 real word 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 programs, variables and data types, C Tokens, Operators and Expressions, Type Conversions.

Learning Outcomes: The students will be able to

- 1) Develop solution through problem understanding and decomposition (L6).
- 2) Develop basic flowcharts for performing input and output and computations (L3).
- 3) Solve Numerical Problems using Flowgorithm (L3).
- 4) Use C basic concepts to write simple C programs (L3).

Unit 2

Control Statements: Selection Statements- If and Switch Statements

Iterative Statements: For, While and Do-While Statements, Break and Continue Statements.

Learning Outcomes: The students will be able to

- 1) Implement C program using Conditional statements (L2).
- 2) Implement C program using Iterative 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 Outcomes: The students will be able to

- 1) Writing Structured programs using Functions (L5).
- 2) Apply arrays concepts on real time 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, Preprocessors.

Learning Outcomes: The students will be able to

- 1) Use pointers to write c Programs (L3). Understand the concepts of pre processors (L2).
- 3) Apply Dynamic Memory Allocation concepts on real time 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 of records, Command line Arguments

Learning Outcomes: The students will be able to

- 1) Use the concepts of structures and unions to write c programs (L3).
- 2) Apply various operations on Files (L6).

Text Books:

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

Reference Books:

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

Course Outcomes

- 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 appropriated for solving a problem (L6).

III YEAR

II SEMESTER

SRI VENKATESWARA COLLEGE OF ENGINEERING ,TIRUPATHI
(AUTONOMOUS)

III Year - II Sem

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(IT20APC601) MOBILE APPLICATION DEVELOPMENT

COURSE OBJECTIVES:

This course is designed to:

Facilitate students to understand android SDK

Help students to gain a basic understanding of Android application

developmentInculcate working knowledge of Android Studio development

tool

UNIT-I: Introduction to Android: The Android Platform, Android SDK, Eclipse Installation,Android Installation, Building you First Android application, Understanding Anatomy of Android Application, Android Manifest file.

Learning Outcomes:

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

Make use of the Android platform (L3)

Create and Run Android project using SDK

(L6)Define the Anatomy of Android

Application. (L1)

UNIT-II: Android Application Design Essentials: Anatomy of an Android applications, Android terminologies, Application Context, Activities, Services, Intents, Receiving and Broadcasting Intents, Android Manifest File and its common settings, Using Intent Filter, Permissions

Learning Outcomes:

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

1. Explain the terminology used in Android applications (L2)
2. Develop first level Android applications that can accept information from the users (L3)
3. Illustrate the Android Manifest File and its common settings (L2)

UNIT-III: **Android User Interface Design Essentials:** User Interface Screen elements, Designing User Interfaces with Layouts, Drawing and Working with Animation.

Learning Outcomes:

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

- Design Android application screen with various elements for improving usersex
- Develop Android application with animations (L6)

UNIT-IV: **Testing Android applications,** Publishing Android application, Using Android preferences, Managing Application resources in a hierarchy, working with different types of resources.

Learning Outcomes:

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

Demonstrate Testing and publishing of their developed Android applications in the internet.(L2)

Explain how to manage Application resources in a hierarchy (L2)

UNIT V: **Using Common Android APIs:** Using Android Data and Storage APIs, Managing data using Sqlite, Sharing Data between Applications with Content Providers, Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs, Deploying Android Application to the World.

Learning Outcomes:

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

- Develop top end applications that work with data storing and sharing facility.(L6)
- Interpret and Develop applications based on customer perspective(L5)
- Utilize various Android API's for improving users experience(L3)

Course Outcomes

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

- Identify various concepts of mobile programming that make it unique from programmingFor other platforms (L3)
- Evaluate mobile applications on their design pros and cons. (L5)
- Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces.(L3)
- Develop mobile applications for the Android operating system that use basic andadvanced phone features. (L6)
- Demonstrate the deployment of applications to the Android marketplace for distribution. (L2)

TEXT BOOKS:

1. Lauren Darcey and Shane Conder, "Android Wireless Application Development", PearsonEducation, 2nd ed. (2011)

REFERENCE BOOKS:

1. Reto Meier, "Professional Android 2 Application Development", Wiley India Pvt Ltd
2. Mark L Murphy, "Beginning Android", Wiley India Pvt Ltd
3. Android Application Development All in one for Dummies by Barry Burd, Edition: I

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(IT20APC603) WEB PROGRAMMING

- Giving the students the insights of the Internet programming and how to design and implement complete applications over the web.
- It covers the notions of Web servers and Web Application Servers, Design Methodologies with concentration on Object-Oriented concepts, Client-Side
- Programming, Server-Side Programming, Active Server Pages, Database Connectivity to web applications, Adding Dynamic content to web applications,
- Programming Common Gateway Interfaces, Programming the User Interface for the web applications

UNIT I:

Web Basics and Overview: Introduction to Internet, World Wide Web, Web Browsers, URL, MIME, HTTP, Web Programmers Tool box.

HTML Common tags: List, Tables, images, forms, frames, Cascading Style Sheets (CSS) & its Types. Introduction to Java Script, Declaring variables, functions, Event handlers (onclick, on submit, etc.,) and Form Validation.

Learning Outcomes:

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

Create standard tags of HTML tags and Knowing the features of designing static webpages. (L6)

List different types of CSS to design webpage attractively. (L1)

Utilize different tools like Adobe Dream weaver and Microsoft Frontpage.(L3)

UNIT II:

Introduction to XML: Document type definition, XML Schemas, Presenting XML , Introduction to XHTML, Using XML Processors: DOM and SAX.

PHP: Declaring Variables, Data types, Operators, Control structures, Functions.

Learning Outcomes:

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

Explain different types of client side scripting. (L2)

Construct dynamic webpages using DHTML.(L6)

Illustrate validation for webpages.(L2)

UNIT III:

Web Servers and Servlets: Introduction to Servlets, Lifecycle of a Servlet, JSDK, Deploying Servlet, The Servlet API, The javax. Servlet Package, Reading Servlet parameters, Reading Initialization parameters. The javax. servlet HTTP package, Handling Http Request& Responses, Cookies and Session Tracking.

Learning Outcomes:

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

Analyze the importance of Server side scripting. (L4)

Demonstrate deployment of the application using Tomcat Server.(L2)

Experiment with Storing and Retrieving data from JDBC. (L3)

UNIT IV:

Database Access: Database Programming using JDBC, JDBC drivers, Studying Javax.sql.* package, Connecting to database in PHP, Execute Simple Queries, Accessing a Database from a Servlet. Introduction to struts frameworks.

Learning Outcomes:

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

Understand how XML interacts with different applications. (L1)

Develop PHP Programs using WAMP and XAMPP Server.(L3)

Examine background applications using XSL and XSLT.(L4)

UNIT V:

JSP Application Development: The Anatomy of a JSP Page, JSP Processing. JSP Application Design and JSP Environment, JSP Declarations, Directives, Expressions, Scripting Elements, implicit objects. Java Beans: Introduction to Beans, Deploying java Beans in a JSP page.

Learning Outcomes:

Explain the importance of AJAX Architecture.

Integrate and test web services.

Course Outcomes:

1. Analyze a web page and identify its elements and attributes.
2. Create web pages using XHTML and Cascading Styles sheets.
3. Installation and usage of Server software's.
4. Database Connectivity to web applications
5. Build web applications using Servlet and JSP

TEXT BOOKS:

1. Web Programming, building internet applications, Chris Bates 2nd edition, WILEYDreamtech (UNITs 1,2)
2. Core SERVLETS ANDJAVASERVER PAGES VOLUME 1: CORE TECHNOLOGIES By Marty Hall and Larry Brown Pearson (UNITs 3, 4,5)

REFERENCE BOOKS:

1. Programming world wide web-Sebesta, Pearson Education,2007.
2. Internet and World Wide Web – How to program by Dietel and Nieto
PHI/ Pearson Education Asia.

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III Year - II Sem

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(IT20APC605) OBJECT ORIENTED ANALYSIS DESIGN & TESTING

Course Objectives:

This course is designed to:

Understand the basic concepts of object-oriented techniques

Build the Model of the software system using UML diagrams

Elucidate design patterns as templates for good design

Learn the object-oriented methodology in software design

Explore testing techniques for object-oriented software

Unit – 1:

Basic concepts

Basic concepts: objects, classes, abstract classes, data types, ADT, inheritance, polymorphism, encapsulation and information hiding, aggregation, composition, association, dynamic binding, object-oriented principles.

Learning Outcomes:

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

Recognize basic issues of object-orientation (L2)

Identify class relations from problem statements (L4)

Construct principles of object-orientation (L6)

Unit – 2:

Modelling Using UML

UML Diagrams: Use case diagrams, class diagrams, various relationships among classes: generalization, association, aggregation, composition, dependency etc., object diagram, UML packages, activity diagram, state machine diagram, communication diagram sequence diagram, interaction overview diagram, component diagram, deployment diagram.

Learning outcomes:

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

Describe the basic syntax and semantics of UML (L2)

Develop modeling of the user's view using use case diagrams (L3)

Design class diagram and object-diagrams (L6)

Summarize behavioral modeling of a given problem using sequence diagram, collaboration diagram,
and state chart diagram (L2)

Unit – 3:

Design Patterns

Basic pattern concepts, Types of patterns, some common design patterns such as Expert, Observer, Façade, MVS, MVC, Creator, Publish-Subscribe, Proxy etc.

Learning outcomes

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

Identify the basic issues in reusable design (L4)

Recognize the basic design patterns (L2)

Unit – 4:

Designing using UML

Overview of OOAD methodology, Use case model development, Domain modelling, Identification of entity objects, Brooch's object identification method, Interaction modelling, CRC cards, Applications of the analysis and design process, object-oriented design principles. OOD goodness criteria, CK Metrics, LK Metrics, MOOD Metrics, Code Refactoring

Learning outcomes:

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

Interpret domain modeling (L2)

Develop sequence diagram for any given use case (L3)

Design class diagram for a given problem (L6)

Unit – 5:

Testing Object Oriented Software

Challenges in testing object-oriented software, Implications of object-oriented Features in testing object-oriented software, Importance of grey-box testing of object-oriented software, Coverage analysis, State-based testing, Class testing, Scenario-Based Test Design, Fault-Based Testing Integration Testing:

Thread-based integration Strategies, Use-based integration Strategies, Cluster Testing, Validation Testing, System Testing, Testing tools.

Learning outcomes:

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

Design unit test cases (L6)

Design integration test cases (L6)

Select appropriate tool to carry out testing (L2)

Course outcomes:

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

Analyze the problem from object-oriented perspective (L4)

Model complex systems using UML Diagrams (L3)

Choose the suitable design patterns in software design (L5)

Adapt Object-Oriented Design Principles (L6)

Identify the challenges in testing object-oriented software. (L3)

Text Book:

1. Rajib Mall, "Fundamentals of Software Engineering", 5th Edition, PHI, 2018

Reference Books:

1. Rumbaugh and Blaha, Object-oriented Modeling and design with UML, Pearson, 2007

2. Bernd Bruegge and, Allen H. Dutoit, Object-Oriented Software Engineering Using UML, Patterns, and Java, Pearson, 2009

SRI VENKATESWARA COLLEGE OF ENGINEERING,TIRUPATHI

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III Year - II Sem

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(IT20APE601) COMPILER DESIGN

Professional Elective-II

Course Objectives:

Teach the concepts related to assemblers, loaders, linkers and editors

Introduce the basic principles of the compiler construction

Explain the Concept of Context Free Grammars, Parsing and various Parsing Techniques.

Expose the process of intermediate code generation.

Instruct the process of Code Generation and various Code optimization techniques

Course Outcomes:

After completion of the course, students will be able to

Differentiate the various phases of a compiler

Design code generator

Apply code optimization techniques

Identify the tokens and verify the code

UNIT I Introduction

Introduction: The structure of a compiler, the science of building a compiler, programming language basics **Lexical Analysis:** The Role of the Lexical Analyzer, Input Buffering, Recognition of Tokens, The Lexical-Analyzer Generator Lex, Finite Automata, From Regular Expressions to Automata, Design of a Lexical-Analyzer Generator, Optimization of DFA-Based Pattern Matchers.

Learning Outcomes:

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

Identify the phases of a Compiler (L2)

Outline the syntax rules (L1)

Identify the tokens in a program. (L3)

Explain the process of lexical analysis (L2)

UNIT II Syntax Analysis

Introduction, Context-Free Grammars, Writing a Grammar, Top-Down Parsing, Bottom-Up Parsing, Introduction to LR Parsing: Simple LR, More Powerful LR Parsers, Using Ambiguous Grammars and Parser Generators.

Learning Outcomes:

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

Examine the syntax of program constructs (L4)

Evaluate the correctness of a program (L5)

UNIT III Syntax-Directed Translation

Syntax-Directed Translation: Syntax-Directed Definitions, Evaluation Orders for SDD's, Applications of Syntax-Directed Translation, Syntax-Directed Translation Schemes, Implementing L-Attributed SDD's. **Intermediate-Code Generation:** Variants of Syntax Trees, Three-Address Code, Types and Declarations, Type Checking, Control Flow, Switch-Statements, Intermediate Code for Procedures.

Learning Outcomes:

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

Explain the process of syntax directed translation (L1)

Develop intermediate code (L6)

UNIT IV Code Generation

Code Generation: Issues in the Design of a Code Generator, The Target Language, Addresses in the Target Code, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, A Simple Code Generator, Peephole Optimization, Register Allocation and Assignment, Dynamic Programming Code-Generation.

Learning Outcomes:

- At the end of the module, the learners will be able to
- Generate code (L6)
- Create optimized code (L6)

UNIT V Machine-Independent Optimization

Machine-Independent Optimization: The Principal Sources of Optimization, Introduction to Data Flow Analysis, Foundations of Data-Flow Analysis, Constant Propagation, Partial-Redundancy Elimination, Loops in Flow Graphs

Learning Outcomes:

- At the end of the module, the learners will be able to
- Explain the process of Data flow Analysis (L1)
- Develop Machine Independent optimized code (L6)

Textbooks:

1. Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, "Compilers Principles, Techniques and Tools",
2. 2nd Edition, Pearson. JNTUA B.Tech. R20 Regulations

Reference Books:

1. Yunlin Su, Song Y. Yan, "Principles of Compilers", Springer, 2012.
2. Andrew W. Appel, "Modern Compiler Implementation in JAVA", 2nd edition, Cambridge University Press, 2004.
3. Lex & Yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
4. Compiler Construction, Loudon, Thomson.

Online Learning Resources:

1. <https://nptel.ac.in/courses/106108052/>
2. <http://openclassroom.stanford.edu/MainFolder/CoursePage.php?course=Compilers>

SRI VENKATESWARA COLLEGE OF ENGINEERING, TIRUPATHI
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III Year - II Sem

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(IT20APE602) MACHINE LEARNING
Professional Elective-II

Course Objectives:

This course is designed to:

- Understand the basic theory underlying machine learning
- Formulate machine learning problems corresponding to different applications.
- Illustrate a range of machine learning algorithms along with their strengths and weaknesses
- Apply machine learning algorithms to solve problems of moderate complexity.
- Understand how Machine Learning imbibes the philosophy of Human learning.

UNIT I

Introduction: Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

Learning Outcomes:

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

- Explore how to build computer programs that improve their performance at some task through experience. (L6).
- Interpret Decision tree learning as practical methods for inductive inference. (L2)

UNIT II

NEURAL NETWORKS AND GENETIC ALGORITHMS: Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evolution and Learning.

Learning Outcomes:

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

Appraise artificial neural networks as one of the most effective learning methods currently known to interpret complex real-world sensor data, (L5).

Illustrates the use of the genetic algorithm approach, and examine the nature of its hypothesis space search. (L2)

UNIT III

BAYESIAN AND COMPUTATIONAL LEARNING: Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

Learning Outcomes:

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

Illustrate the principles of Probability for classification as an important area of Machine Learning Algorithms. (L2)

Analyze sample complexity and computational complexity for several learning Problems (L4)

UNIT IV

INSTANCE BASED LEARNING: K- Nearest Neighbor Learning – Locally weighted Regression – RadialBases Functions – Case Based Learning.

Learning Outcomes:

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

Infer that the Instance based algorithms can be used to overcome memory complexity and overfitting problems. (L2).

UNIT V

ADVANCED LEARNING : Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set– First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning

Learning Outcomes:

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

Infer that the combined methods outperform both purely inductive and purely analytical learning methods. (L2)

Recognize the importance of Reinforcement Learning in the industry.

Course Outcomes:

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

Identify machine learning techniques suitable for a given problem. (L3)

Solve the real world problems using various machine learning techniques. (L6)

Apply Dimensionality reduction techniques for data preprocessing. (L3)

Explain what is learning and why it is essential in the design of intelligent machines. (L2)

Implement Advanced learning models for language, vision, speech, decision making etc. (L1)

Text Books:

- 1) T.M. Mitchell, "Machine Learning", McGraw-Hill, 1997.

Reference Books:

- 1) Ethern Alpaydin, "Introduction to Machine Learning", MIT Press, 2004.
- 2) Stephen Marsland, "Machine Learning -An Algorithmic Perspective", Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series, 2014.
- 3) Andreas C. Müller and Sarah Guido "Introduction to Machine Learning with Python: A Guide for Data Scientists", Oreilly.

e-Resources:

- 1) Andrew Ng, "Machine Learning Yearning"
<https://www.deeplearning.ai/machine-learning-yearning/>

Shai Shalev-Shwartz , Shai Ben-David, "Understanding Machine Learning: From Theory to Algorithms" , Cambridge University Press

<https://www.cse.huji.ac.il/~shais/UnderstandingMachineLearning/index.html>

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(IT20APE603) NATURAL LANGUAGE PROCESSING

Professional Elective - II

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.

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, Thematic roles, Speech acts & embedded sentences, Defining semantics structure model theory.

Language Modeling

Introduction, n-Gram Models, Language model Evaluation, Parameter Estimation, LanguageModel Adaption, Types of Language Models, Language-Specific 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. Anusaraka or Language Accessor: Background, Cutting the Gordian Knot, The Problem, Structure of Anusaraka System, User Interface, Linguistic Area, Giving up Agreement in Anusarsaka Output, Language Bridges.

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 Datasets.

Learning Outcomes:

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

Apply Machine Translation techniques. (L3)

Elaborate Multilingual Information Retrieval and Multilingual AutomaticSummarization. (L6)

Course Outcomes:

Upon completion of the course, the students should 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)

TEXT BOOKS:

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,Vineetchaitanya,Prentice –Hall of India.

REFERENCES BOOKS:

1. Charniack, Eugene, Statistical Language Learning, MIT Press, 1993.
2. Jurafsky, Dan and Martin, James, Speech and Language Processing, 2nd Edition, PrenticeHall, 2008.
3. Manning, Christopher and Henrich, Schutze, Foundations of Statistical Natural Language Processing, MIT Press, 1999.

SRI VENKATESWARA COLLEGE OF ENGINEERING, TIRUPATI
(AUTONOMOUS)

III Year II Sem

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3 0 0 3

(CE20AOE601) DISASTER MANAGEMENT

Open Elective - II

Course Objectives:

The objective of this course is to:

- Give the basic knowledge of Natural Hazards and disasters.
- Develop an awareness of the chronological phases of natural disaster response and rescue relief operations.
- Understand the 'relief system' and the 'disaster victim.'
- Describe the three planning strategies useful in mitigation.
- Identify the regulatory controls used in hazard management.
- Understand the tools of post-disaster management.

UNIT – I

Introduction:

Hazards, Disasters, Disaster Management, Disaster Management cycle – Five priorities for action.**Natural Hazards and Disaster Management:**Floods, droughts, Earthquakes, global warming, cyclones & Tsunamis, landslides, Post Tsunami hazards along the Indian coast, landslides.

Learning outcomes:

At the end of unit, students will be able to

- Gain the basic knowledge about hazards and disasters.
- Know about the natural hazards and its management.
- Understand about the global warming, cyclones and tsunami

UNIT II

Man-Made Disaster and Management:

Case study methods of the following: Fire hazards, transport hazards, biological hazards, waste management, post disaster, bio terrorism -threat in mega cities.

Learning outcomes:

At the end of unit, students will be able to

- Know about the fire hazards and solid waste management.
- Gain knowledge about transport and biological hazards.

UNIT – III**Risk and Vulnerability:**

Building codes and land use planning, social vulnerability, environmental vulnerability, and sustainable development, climate change risk rendition, financial management of disaster – related losses.

Learning outcomes:

At the end of unit, students will be able to

- Know about the regulations of building codes and land use planning related
- to risk and vulnerability.
- Understand about the financial management of disaster and related losses

UNIT – IV**Role of Technology in Disaster Managements:**

Disaster management for infra structures, taxonomy of infra-structure – treatment plants and process facilities-electrical substations- roads and bridges- mitigation programme for earth quakes –multimedia technology in disaster risk management and knowledge in disaster reduction.

Learning outcomes:

At the end of unit, students will be able to

- Know about the technological aspects of disaster management.
- Understand the multimedia technology in disaster risk management.
- Get knowledge about the factors for disaster reduction.

UNIT – V**Emerging approaches in Disaster Management**

- Pre- disaster stage (preparedness)
- Emergency Stage
- Post Disaster stage-Rehabilitation.

Learning outcomes:

At the end of unit, students will be able to

- Gets knowledge about three planning strategies useful in mitigation?
- Understand about preparedness and rehabilitation stage.

Course Outcomes (CO):

On completion of the course the students will be able to

- Know the different types of disasters and their effects on environment.
- Have the knowledge about Causes of disasters.
- Gain knowledge about disaster management through engineering applications.
- Explain the process of risk management
- Distinguish between the different approaches needed to manage pre- during and
- post disaster periods

Textbooks:

1. Rajib shah & R R Krishnamurthy "Disaster Management" – Global Challenges
2. and Local Solutions' Universities press. (2009),
3. Tushar Bhattacharya, "Disaster Science & Management" Tata McGraw Hill
4. Education Pvt. Ltd., New Delhi.
5. Jagbir Singh "Disaster Management" – Future Challenges and Opportunities
6. ' I K International Publishing House Pvt. Ltd. (2007),

Reference Books:

1. Harsh. K .Gupta "Disaster Management edited", Universities press, 2003
2. Donald Hyndman & David Hyndman "Natural Hazards & Disasters" – Cengage Learning

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(EE20AOE601) ELECTRICAL POWER DISTRIBUTION SYSTEMS

Course Objectives:

The student has to acquire knowledge about:

- The classification of distribution systems
- The technical aspects and design considerations in DC and AC distribution systems and their comparison
- Technical issues of substations such as location, ratings and bus bar arrangements
- The causes of low power factor and methods to improve power factor
- The principles in Distribution automation

UNIT – I

LOAD MODELING AND CHARACTERISTICS

Introduction to Distribution Systems, Load Modelling and Characteristics. Coincidence Factor, Contribution Factor Loss Factor - Relationship between the Load Factor and Loss Factor. Classification of Loads (Residential, Commercial, Agricultural and Industrial) and Their Characteristics.

UNIT – II

CLASSIFICATION OF DISTRIBUTION SYSTEMS

Classification of Distribution Systems - Comparison of DC vs AC and Under-Ground vs Over-Head Distribution Systems- Requirements and Design Features of Distribution Systems. Design Considerations of Distribution Feeders: Radial and Loop Types of Primary Feeders, Voltage Levels, Feeder Loading, Basic Design Practice of the Secondary Distribution System.

UNIT – III

SUBSTATIONS

Location of Substations: Rating of Distribution Substation, Service Area within Primary Feeders. Benefits Derived Through Optimal Location of Substations. Classification of Substations: Air Insulated Substations - Indoor & Outdoor Substations: Substation Layout showing the Location of all the Substation Equipment. Bus Bar Arrangements in the Sub-Stations: Simple Arrangements Like Single Bus Bar, Sectionalized Single Bus Bar.

UNIT – IV

POWER FACTOR IMPROVEMENT

Voltage Drop and Power-Loss Calculations: Derivation for Voltage Drop and Power Loss in Lines, Manual Methods of Solution for Radial Networks, Three Phase Balanced Primary Lines. Causes of Low P.F -Methods of Improving P.F -Phase Advancing and Generation of Reactive KVAR Using Static Capacitors-Most Economical P.F. for Constant KW Load and Constant KVA Type Loads, Numerical Problems. Capacitive Compensation for Power-Factor Control - Effect of Shunt Capacitors (Fixed and Switches)

UNIT – V

DISTRIBUTION AUTOMATION

Distribution Automation (DA) – Project Planning – Definitions – Communication Sensors- Supervisory Control and Data Acquisition (SCADA) – Consumer Information Service (CIS) – Geographical Information System (GIS) – Automatic Meter Reading (AMR) – Automation Systems.

Course Outcomes: Student should be able to:

- Compute the various factors associated with power distribution
- Make voltage drop calculations in given distribution networks
- Learn principles of substation maintenance
- Compute power factor improvement for a given system and load
- Understand implementation of SCADA for distribution automation

TEXT BOOKS:

1. Electric Power Distribution Engineering, Turan Gonen, CRC Press, 3rd Edition, 2014.
2. Electric Power Distribution, A.S. Pabla, Tata Mc Graw Hill (India) Pvt. Ltd., 6th Edition, 2011.

REFERENCE BOOKS:

1. Electric Power Distribution Automation, Dr. M. K. Khedkar and Dr. G. M. Dhole, University Science Press, 2010.
2. Electrical Power Distribution Systems, V. Kamaraju, Jain Book Depot. 2012.
3. Electrical Power Systems for Industrial Plants, Kamalesh Das, JAICO Publishing House, 2008.

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(EG20AOE601) TECHNICAL COMMUNICATION AND PRESENTATION SKILLS

Open Elective - II

Course Objectives:

To develop awareness in students of the relevance and importance of technical communication and presentation skills.

To prepare the students for placements

To sensitize the students to the appropriate use of non-verbal communication

To train students to use language appropriately for presentations and interviews

To enhance the documentation skills of the students with emphasis on formal and informal writing

UNIT - I:

Basics of Technical Communication – Introduction – Objectives & Characteristics of Technical Communication – Importance and need for Technical communication - LSRW Skills – Barriers to effective communication

Learning Outcomes:

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

Understand the importance of LSRW skills

Identify and overcome the barriers to effective communication

Realize the need and importance of technical communication

UNIT -II

Informal and Formal Conversation - Verbal and Non-verbal communication –Kinesics, Proxemics, Chronemics, Haptics, Paralanguage

Learning Outcomes:

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

State the difference between formal and informal conversation.

Apply the knowledge of the difference between the verbal and non-verbal communication

Evaluate the different aspects of non-verbal communication.

UNIT -III

Written communication – Differences between spoken and written communication – Features of effective writing –Advantages and disadvantages of spoken and written communication- Art of condensation- summarizing and paraphrasing

Learning Outcomes:

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

Know the difference between written and spoken communication

Apply the awareness of features of effective writing.

Implement the understanding of summarizing and paraphrasing.

UNIT -IV

Presentation Skills – Nature and importance of oral presentation – Defining the purpose –Analyzing the audience - Planning and preparing the presentation, organizing and rehearsing the presentation –Individual and group presentations - Handling stage fright

Learning Outcomes:

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

State the importance of presentation skills in corporate climate.

Analyze the demography of the audience.

Plan, prepare and present individual and group presentations.

UNIT -V

Interview Skills – The Interview process –Characteristics of the job interview – Pre-interview preparation techniques – Projecting the positive image – Answering Strategies

Learning Outcomes:

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

Identify the characteristics of the job interview.

Understand the process of Interviews.

Develop a positive image using strategies in answering FAQs in interviews

Course Outcomes

Understand the importance of effective technical communication

Apply the knowledge of basic skills to become good orators

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(IT20APC604) WEB PROGRAMMING LAB

COURSE OBJECTIVES:

- To enable the student to program web applications using the following technologies HTML, Javascript ,XML, PHP ,Tomcat Server, Servlets ,JSP, Beans and Struts.

Week 1

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

- 1) **HOME PAGE:** The static home page must contain three frames.
- 2) **LOGIN PAGE**
- 3) **CATALOGUE PAGE:** The catalogue page should contain the details of all the books available in the web site in a table.
- 4) **REGISTRATION PAGE**

Week 2

Develop and demonstrate the usage of inline, internal and external style sheet using CSS.

Week 3

Write JavaScript to validate the following fields of the Registration page.

1. **First Name** (Name should contain alphabets and the length should not be less than 6 characters).
2. **Password** (Password should not be less than 6 characters length).
3. **E-mail id** (should not contain any invalid and must follow the standard pattern name@domain.com)
4. **Mobile Number** (Phone number should contain 10 digits only).
5. **Last Name and Address** (should not be empty).

Week 4

Develop and demonstrate JavaScript with POP-UP boxes and functions for the following problems:

a) Input: Click on Display Date button using onclick() function Output: Display **date** in the text box

b) Input: A number n obtained using **prompt** Output: **Factorial** of n number using **alert**

Week 5

a) Input: A number n obtained using **prompt**

Output: A **multiplication table** of numbers from 1 to 10 of n using **alert**

b) Input: A number n obtained using **prompt** and add another number using **confirm**

Output: **Sum** of the entire n numbers using **alert**

Week 6

Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next in the list. Add CSS to customize the properties of the font of the capital (color, bold and font size).

Week 7

Write an XML file which will display the Book information which includes the following:

- 1) Title of the book
- 2) AuthorName
- 3) ISBNnumber
- 4) Publishername

5) Edition

6) Price

Write a **Document Type Definition (DTD)** to validate the above XML file. Display the XML file as follows.

The contents should be displayed in a table. The header of the table should be in color GREY. And the Author names column should be displayed in one color and should be capitalized and in bold. Use your own colors for remaining columns. Use XML schemas XSL and CSS for the above purpose.

Note: Give at least for 4 books. It should be valid syntactically

Week 8

Develop and demonstrate PHP Script for the following problems:

- a) Write a PHP Program to display current Date, Time and Day.
- b) Write a PHP Script to check whether the given number is Palindrome or not
- c) A web application that takes name and age from an HTML page. If the age is less than 18, it should send a page with -Hello <name>, you are not authorized to visit the site||message, where <name> should be replaced with the entered name. Otherwise it should send -Welcome <name> to this site||message.

Week 9

Implement the following web applications using Servlets

- (i) A web application that takes a name as input and on submit it shows a hello <name> page where name is taken from the request. It shows the start time at the right top corner of the page and provides a logout button. On clicking this button, it should show a logout page with Thank You <name> message with the duration of usage (hint: Use session to store name and time).

- (i) Write a PHP Program to display current Date, Time and Day.

- (i) A web application that takes name and age from an HTML page. If the age is less than 18, it should send a page with -Hello <name>, you are not authorized to visit the site||message, where <name> should be replaced with the entered name. Otherwise it should send -Welcome <name> to this site||message.

- (iv) A web application that lists all cookies stored in the browser on clicking -List

Cookies button. Add cookies if necessary.

Week 10

Execute simple queries with Database using (a) PHP, (b) Servlets

Week 11

Implement the following web applications using JSP

- (i) Write a PHP Program to display current Date, Time and Day.
- (ii) A web application that takes name and age from an HTML page. If the age is less than 18,
it should send a page with -Hello <name>, you are not authorized to visit this site message,
where
<name> should be replaced with the entered name. Otherwise it should send
-Welcome <name> to this site message.
- (iii) Write a program for deploying **Java Beans** in a JSP page.

Week 12

Write a program to design a simple calculator using (a) JavaScript (b) PHP (c) Servlet and
(d) JSP.

TEXT BOOKS:

1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP — Steven Holzner, Tata McGraw-Hill

REFERENCE BOOKS:

1. Web Programming, building internet applications, Chris Bates 2nd edition, Wiley Dreamtech
2. Java Server Pages — Hans Bergsten, SPDO'Reilly
3. Java Script, D.Flanagan, O'Reilly, SPD.
4. Beginning Web Programming-Jon Duckett WROX.

5. Programming world wide web, R.W.Sebesta, Fourth Edition,Pearson.
6. Internet and World Wide Web — How to program, Dietel and Nieto,Pearson.

Course Outcomes:

- Use WAMP Stack for webapplications
- Use Tomcat Server for Servlets andJSPs
- Write simple applications with Technologies like HTML, Javascript, AJAX, PHP,Servlets andJSPs
- Connect to Database and getresult

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(IT20APC602) MOBILE APPLICATION DEVELOPMENT LAB

Course Objectives:

To understand fundamentals of android operating systems.

Illustrate the various components, layouts and views in creating android applications

To understand fundamentals of android programming.

Course Outcomes:

Create data sharing with different applications and sending and intercepting SMS.

Develop applications using services and publishing android applications.

To demonstrate their skills of using Android software development tools

1. Setting Up the Development Environment

Download/Install the SDK

For in-depth instructions, visit Android Installation Documentation. Otherwise perform the following steps.

Go to <http://developer.android.com/sdk/index.html>.

Unpack to a convenient location - Remember the full path to this location, we will refer to it as <android_sdk_dir> for the rest of the lab.

o <android_sdk_dir> would then be

/home/<username>/android_dir.

Add the path to the <android_sdk_dir>/tools directory to your system PATH

o Windows:

1. Right-click My Computer.
2. Click Properties.
3. Click Advanced tab.
4. Click Environment Variables button.
5. Double Click Path under System Variables.

6. Add ; <android_sdk_dir>/tools;<android_sdk_dir>/platform-tools to the end of the Variable Values text field.

Navigate to your <android_sdk_dir>/tools directory and type android.
Add the appropriate components. See step 4
in <http://developer.android.com/sdk/installing.html>.

Test your installation by running adb from the command line. If you did everything right, you should get a long list of help instructions.

Download/Install the Eclipse Plugin

It is recommended that you use Eclipse 3.4 or later

o Lab Machines - Fedora Eclipse based on 3.4.2

The version of Eclipse used by the lab machines is missing a vital component and requires adding an additional Eclipse plugin in order to use the Android plugin:

1. Click the menu Help -> Software Updates.
 2. Click the tab Available Software -> Add Site button.
 3. Enter [http:// download.eclipse.org/releases/ganymede](http://download.eclipse.org/releases/ganymede) into the Location field.
 4. Click OK button.
 5. Enter WST Common UI into the search/text box at the top of the window (give it a second, it tries to search as you type and its kind of slow).
 6. Click the checkbox next to WST Common UI.
 7. Click the Install button.
 8. Click the Next button.
 9. Accept the terms, click Finish.
 10. Restart Eclipse.
 11. Follow the steps in the next bullet 3.4 Ganymede.
- o Eclipse 3.4 Ganymede:
1. Click the menu Help -> Software Updates.
 2. Click Available Software tab -> Add Site button.

3. Enter <https://dl-ssl.google.com/android/eclipse> into the "Location" field.
4. Click OK button.
5. Click the checkbox next to Developer Tools.
6. Click the Install button.
7. Click the Next button.
8. Accept the terms, click Finish.
9. Restart Eclipse.

o Eclipse 3.5 Galileo:

1. Click Help -> Install New Software .
2. Click Add... button.
3. Enter a name for the site into the Name field.
4. Enter [https://dl-ssl/google.com/android/eclipse/](https://dl-ssl.google.com/android/eclipse/) into the Location field.
5. Click OK button.
6. Click the checkbox next to Developer Tools.
7. Click the Next button.
8. Accept the terms, click Finish.
9. Restart Eclipse.

☐ Point Eclipse to <android_sdk_dir>:

1. Click the menu Window -> Preferences.
2. Click Android from the Hierarchy view on the left hand side.
3. Enter <android_sdk_dir> into the SDK Location field.
4. Click the Apply button.
5. Click the OK button.

Download/Install the SDK Platform Components

At the time of writing this lab there are eight different versions of the Android Platform available, ranging from 1.1 to 2.2. It is best practice to develop for the oldest platform available that still provides the functionality you need. This way you can be that your application will be supported by as many devices as possible. However, you will still want to download newer versions of the platforms so that you can test your applications against these as well. Due to the size of each platform component you will only be required to download and develop on one platform for the whole class.

We will target the highest platform that the G1 phones support, Android 1.6 (API 4). Before we can begin developing we must download and install this platform:

Select the menu Window -> "Android SDK and AVD Manager", or click on the black phone shaped icon in the toolbar.

Select Available Packages on the left hand side.

Expand the Google Android site in the "Site, Packages, and Archives" Tree.

Check the following items:

- o SDK Platform Android 1.6, API 4 Revision 3

- o Google APIs by Google Inc., Android API 4, Revision 2

- o *NOTE: Those of you developing on Lab Machines should follow these instructions:* <http://sites.google.com/site/androidhowto/how-to-1/set-up-the-sdk-on-lab-machines-linux>.

Click Install Selected.

Accept the Terms for all packages and click Install Accepted.

We're now ready to develop our application.

2. Create "Hello World" Application

- Create a new Android Project

- Run "Hello World" on the Emulator

- On a Physical Device

- Greeting the User

3. Create Application by Using Widgets

- Creating the Application by using the Activity class

- (i) onCreate()

- (ii) onStart()

- (iii) onResume()

- iv) onPause()

- (v) onStop()

- (vi) onDestroy()

- (vii) onRestart()

Creating the Application by using Text Edit control.

Creating the Application Choosing Options

- (i) CheckBox
- (ii) RadioButton
- (iii) RadioGroup
- (iv) Spinner

4. Create Application by Using Building Blocks for Android Application Design

Design the Application by using

- (i) Linear Layout
- (ii) Relative Layout
- (iii) Absolute Layout

Create the Application to play the Audio and Video clips.

5. Create Application by Using Building Menus and Storing Data

Design the Application for Menus and Action Bar

Design the application to display the Drop-Down List Action Bar

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(IT20APC606) OBJECT-ORIENTED ANALYSIS DESIGN & TESTING LAB

Course Objectives:

This course is designed to:

- Understand and define the context and the external interaction with the System
- Identify the principle objects in the system
- Develop the design models
- Familiarize with usage of open-source UML Case tools
- Apply testing tools Viz. Cobertura...
- Laboratory Experiments

1. Initial Familiarization to a UML CASE tool such as the free tool Argo UML
2. Drawing Class diagram for a very simple problem such as the following in Argo UML and generating skeletal code in Java and C++
 - A country has a capital city
 - A dining philosopher uses a fork
 - A file is an ordinary file or a directory file
 - Files contain records
 - A class can have several attributes
 - A relation can be association or generalization
 - A polygon is composed of an ordered set of points
 - A person uses a computer language on a project
3. Use UML tool (such as Argo UML) for use case modeling for a given problem

4. Use UML tool (such as Argo UML) for development of domain model for a given problem
5. Use UML tool (such as Argo UML) to develop sequence and collaboration diagrams for a given problem [2 Classes]
6. Use UML tool (such as Argo UML) to develop state model for a given problem
7. Generate C++/Java skeletal code for the design solution developed for a given problem
8. Complete the skeletal code generated by UML tool (such as Argo UML) to generate complete code [2 Classes]
9. Perform class level testing and measure coverage using tools such as Cobertura
10. Develop integration test cases from Sequence diagram and perform integration testing.

Course Outcomes

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

Design use case, sequence and collaboration diagrams (L6)

Develop the different models to document an Object-oriented design. (L3)

Demonstrate class level and system integration testing (L2)

Text Book:

1. Rajib Mall, "Fundamentals of Software Engineering", 5th Edition, PHI, 2018
(Chapters 7 and 8)

Reference Books:

1. Rumbaugh and Blaha, Object-oriented Modeling and design with UML, Pearson, 2007
2. Bernd Bruegge and, Allen H. Dutoit, Object-Oriented Software Engineering Using UML, Patterns, and Java, Pearson, 2009

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(BA20AMC501) CONSTITUTION OF INDIA
(Mandatory non-credit course-VI)

Course Objectives :

The objective of this course is

- To Enable the student to understand the importance of constitution
- To understand the structure of executive, legislature and judiciary
- To understand philosophy of fundamental rights and duties
- To understand the autonomous nature of constitutional bodies like Supreme Court and high court controller and auditor general of India and Election Commission of India.
- To understand the central-state relation in financial and administrative control

UNIT-I

Introduction to Indian Constitution – Constitution -Meaning of the term - Indian Constitution- Sources and constitutional history - Features– Citizenship – Preamble - Fundamental Rights and Duties - Directive Principles of State Policy.

Learning Outcomes:-

After completion of this unit student will

Understand the concept of Indian constitution

Apply the knowledge on directive principle of state policy
Analyze the History and features of Indian constitution
Learn about Preamble, Fundamental Rights and Duties

UNIT-II

Union Government and its Administration Structure of the Indian Union -

Federalism - Centre- State relationship – President's Role, power and position - PM and Council of ministers - Cabinet and Central Secretariat –Lok Sabha - Rajya Sabha - The Supreme Court and High Court
- Powers and Functions

Learning Outcomes:-

After completion of this unit student will

Understand the structure of Indian government
Differentiate between the state and central government
Explain the role of President and Prime Minister
Know the Structure of supreme court and High court

UNIT-III

State Government and its Administration - Governor - Role and Position -CM and Council of ministers - State Secretariat-Organization Structure and Functions

Learning Outcomes:-

After completion of this unit student will

- Understand the structure of state government
- Analyze the role of Governor and Chief Minister
- Explain the role of State Secretariat
- Differentiate between structure and functions of state secretariat

UNIT-IV

Local Administration - District's Administration Head - Role and Importance - Municipalities - Mayor and role of Elected Representatives -CEO of Municipal Corporation Pachayati Raj - Functions- PRI -Zilla Parishath - Elected officials and their roles - CEO,Zilla Parishath - Block level Organizational Hierarchy - (Different departments) - Village level - Role of Elected and Appointed officials - Importance of grass root democracy

Learning Outcomes:-

After completion of this unit student will

- Understand the local Administration
- Compare and contrast district administration's role and importance
- Analyze the role of Mayor and elected representatives of Municipalities
- Learn about the role of Zilla Parishath block level organization

UNIT-V

Election Commission - Election Commission- Role of Chief Election Commissioner and Election Commissionerate - State Election Commission -Functions of Commissions for the welfare of SC/ST/OBC and Women

Learning Outcomes:-

After completion of this unit student will

Know the role of Election Commission

Contrast and compare the role of Chief Election commissioner and Commissionerate

Analyze the role of state election commission

Evaluate various commissions viz SC/ST/OBC and women

Course Outcomes:

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

Understand historical background of the constitution making and its importance for building a democratic India.

Understand the functioning of three wings of the government i.e., executive, legislative and judiciary.

Understand the value of the fundamental rights and duties for becoming good citizen of India.

Analyze the decentralization of power between central, state and local self-government

Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.

REFERENCES:

1. J.A. Siwach, "Dynamics of Indian Government & Politics".
2. H.M.Sreevai, "Constitutional Law of India", 4th edition in 3 volumes

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(AM20AMC601) AI TOOLS TECHNIQUES & APPLICATIONS

UNIT-I:

ARTIFICIAL INTELLIGENCE: Introduction, Definition of AI, Goals of AI, Turing Test, Applications of AI, AI Programming Languages; Introduction, Intelligent Systems, the Concept of rationality, types of Agents, Environments and its properties, PEAS.

Learning Outcomes:

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

1. classify various AI Applications. (L2)
2. list the AI Languages. (L1)
3. explain various types of Agents. (L2)

UNIT-II:

SEARCH STRATEGIES: Introduction, Brute Force or Blind Search, Breadth-First Search, Depth-First Search, Hill Climbing, Best-First Search.

MACHINE LEARNING: Introduction, Machine Learning Process, Feature Engineering- Feature Extraction, Feature Selection, Feature Engineering Methods, Feature Engineering, Data Visualization Line Chart, Bar Chart, Pie Chart, Histograms, Scatter Plot, Seaborn-Distplot, joint plot.

Learning Outcomes:

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

1. apply informed search techniques to problems. (L3)
2. interpret the features using feature engineering. (L2)
3. analyse the data using different visualization techniques. (L4)

UNIT-III:

REGRESSION: Simple Regression, Multiple Regression, Model Assessment-Training Error, Generalized Error, Testing Error, Bias-Variance Tradeoff

CLASSIFICATION: Linear Classification, Logistic Regression, Decision Trees Learning Outcomes:

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

1. analyze different classification models and make recommendations towards learning. (L4)
2. solve real world data using classification techniques. (L3)
3. understand different regression models and about its problems. (L2)

UNIT-IV:

CLUSTERING: K-Means Clustering. EXPERT SYSTEMS: Introduction, Need and Justification of ES, Knowledge Representation, Knowledge Acquisition and Variation, Utilization and Functionality, Basics of Prolog.

Learning Outcomes:

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

1. understand the concept of clustering over classification. (L2)
2. distinguish between expert systems and traditional systems. (L2)
3. identify different applications of expert systems. (L3)

UNIT-V:

ARTIFICIAL NEURAL NETWORKS (ANNs): Biological Neuron, Types of ANN, Optimization Techniques, Vanishing Gradient Problem, Exploding Gradient Problem, Weight Initialization. CONVOLUTION NEURAL NETWORKS(CNNs): Introduction, Components of CNN Architecture Convolution Layer(with example), Pooling/Down sampling Layer, Flattening Layer, Fully Connected Layer; Rectified Linear Unit Layer, Exponential Linear Unit, Unique Properties of CNN, Architectures of CNNs, Applications of CNN.

Learning Outcomes:

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

1. understand the architecture of an artificial neuron. (L2)
2. illustrate different artificial neural network architecture. (L2)
3. analyse the effect of different activation functions of a CNN unit. (L4)

Course Outcomes:

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

CO1: Demonstrate various AI applications, languages and Intelligent Agents. CO2:

Solve problems using search strategies and understand the basic process of

Machine Learning. CO3: Apply classification and regression algorithms on real world data.

CO4: Develop an expert system.

CO5: Comprehend the structure of an artificial neural network and identify the building blocks of a convolutional neural network

TEXT BOOKS:

1. Dr.Nilakshi Jain, Artificial Intelligence, As per AICTE: Making a System Intelligent, Wiley Publications, 1st Edition,2019.

2. Vijayvargia, Abhishek, Machine Learning with Python: An Approach to Applied Machine Learning, BPB Publications; 1st edition,2018.

3. Dr.S.Lovelyn Rose, Dr. L.Ashok Kumar, Dr.D.Karthika Renuka, Deep Learning using Python, Wiley India Pvt. Ltd 2019.

REFERENCES:

1. Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, Pearson Publications, 4th Edition, 2020.

2. Saroj Kaushik, Artificial Intelligence, Cengage Learning India, 2011.

WEB REFERENCES: 1. <https://keras.io/> 2. <https://ai.google/> 3.

<https://www.coursera.org/learn/neural-networks-deep-learning#syllabus> 4.

https://swayam.gov.in/nd1_noc19_me71/preview

IV YEAR I SEMESTER

SRI VENKATESWARA COLLEGE OF ENGINEERING ,TIRUPATHI
(AUTONOMOUS)

BTech IV-I Sem

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(IT20APE701) BLOCK CHAIN TECHNOLOGY AND APPLICATIONS

Professional Elective -III

Course Objectives:

This course is designed to:

Understand the philosophy of Blockchain and the cutting edge technology behind its functions

Illustrate how to setup Ethereum tools

Explain the key vocabulary and concepts used in Blockchain for Business

UNIT-I

Blockchain concepts: Blockchain, Blockchain application example: Escrow, Blockchain stack, from web 2.0 to the next generation decentralized web, domain specific Blockchain application, Blockchain benefits and challenges. Blockchain application templates: Blockchain application components, design methodology for Blockchain applications, Blockchain applications templates

Learning Outcomes:

After completing this Unit, students will be able to

Outline the benefits and challenges of Block chain(L2)

Design the Blockchain applications(L6)

UNIT-II

Setting up Ethereum development tools: Ethereum clients, Ethereum languages, Test RPC, Mist Ethereumwalle, meta mask, web3 JavaScript API, truffle. Ethereum Accounts: Ethereum Accounts, keypairs, working with EOA Accounts, working with contract accounts.

Learning Outcomes:

After completing this Unit, students will be able to

Illustrate the use of Ethereum development tools(L2)

Create Ethereum accounts and work with them (L6)

UNIT-III

Smart contracts: Smart contract, structure of a contract, setting up and interacting with a contract using Geth client, setting up and interacting with a contract using Mist Wallet

Learning Outcomes:

After completing this Unit, students will be able to

Make use of smart contracts(L3)

Distinguish setting up and interacting with a contract using Geth client and Mist Wallet.(L4)

UNIT-IV

Smart contracts (continued): Smart contract examples, Smart contract patterns. Decentralized Applications: implementing Dapps, case studies,

Learning Outcomes:

After completing this Unit, students will be able to

Illustrate the Smart contract examples and patterns(L2)

Develop Decentralized applications.(L6)

UNIT-V

Mining: Consensus on Blockchain network, mining, Block validation, state storage in Ethereum.

Learning Outcomes:

After completing this Unit, students will be able to

Define Consensus on Blockchain network(L1)

Demonstrate State Storage in Ethereum(L2)

Course outcomes:

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

Create customized blockchain solutions (L6)

Make use of the specific mechanics of Ethereum(L3)

Experiment with Smart contracts (L3)

Develop Enterprise applications using Blockchain(L6)

Text book:

1. Arshadeepbahga, Vijay madiseti, "Blockchain Applications A hands-on approach", VPT 2017.
2. *Chandramouli Subramanian*, Asha A George, Abhilash K A and MeenaKarthikeyan, "Blockchain Technology", Universty Press, 2021

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(IT20APE702) AD HOC SENSOR NETWORKS
Professional Elective -III

Course Objectives:

This course is designed to:

- Introduce the concepts of Adhoc and Sensor Networks.
- Explain Routing algorithms suitable for Adhoc Networks.
- Understand the transport protocols for Adhoc networks
- Familiarize with the security issues of adhoc and sensor networks

Unit I: IEEE 802 Networking Standard. Fundamentals of WLANs, IEEE 802.11 standard. What is Wireless Internet?, Mobile IP, Cellular and Adhoc Wireless Networks, Applications of Adhoc Networks, Issues in Ad Hoc Wireless Networks, Ad Hoc Wireless Internet.

Learning Outcomes:

After completing this Unit, students will be able to

- Explain different wireless networks. (L2)
- Examine wireless LAN Standard IEEE 802.11.(L4)

Unit II: Issues in Designing a MAC Protocol for Ad Hoc Wireless Networks, Design Goals of a MAC Protocol for Ad Hoc Wireless Networks, Classification of MAC Protocols, Contention- Based Protocols, Contention-Based Protocols with Reservation Mechanisms, Contention-Based MAC Protocols with Scheduling Mechanisms, MAC Protocols that used Directional Antennas, Other MAC Protocols.

Learning Outcomes:

After completing this Unit, students will be able to

Identify the limitations of existing MAC protocols when applied to adhoc networks. (L3)

Analyze the existing MAC Protocols for Adhoc networks.(L3)

Unit III: Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classification of Routing Protocols, Table-Driven Routing Protocols, On-Demand Routing Protocols, Hybrid Routing Protocols, Hierarchical Routing Protocols, Power-Aware Routing Protocols.

Learning Outcomes:

After completing this Unit, students will be able to

Compare different routing protocols.(L2)

Choose the routing protocol based on network characteristics.(L5)

Unit – IV Multicast Routing in Ad hoc Wireless Networks- Issues in Designing a Multicast Routing Protocol, Operation of Multicast Routing Protocols, An architecture reference model for multicast routing protocols, Classifications of Multicast Routing Protocols, Tree-Based Multicast Routing Protocols, Mesh-Based Multicast Routing Protocols, Summary of Tree and Mesh-Based Protocols. Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions. TCP over Ad Hoc Wireless Networks, Other Transport Layer Protocols for Ad Hoc Wireless Networks.

Learning Outcomes:

After completing this Unit, students will be able to

Interpret the issues in designing a multicast Routing Algorithm(L2)

Propose new Transport protocols for adhoc networks(L6)

Unit V: Security in Ad Hoc Wireless Networks, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management, Secure Routing in Ad Hoc Wireless Networks.

Wireless Sensor Networks- Introduction, Sensor Network Architecture, Data Dissemination, Data Gathering, MAC Protocols for Sensor Networks, Location Discovery, Quality of a Sensor Network, Evolving Standards, Other issues.

Learning Outcomes:

After completing this Unit, students will be able to

Define the sensor networks.(L1)

Identify the need for security in Adhoc and Sensor networks.(L3)

Course outcomes:

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

List the design issues for Adhoc and sensor networks(L1)

Analyze the use of TCP in Wireless networks.(L4)

Justify the need for new MAC Protocols for Adhoc networks.(L5)

Extend the existing protocols to make them suitable for Adhoc Networks.(L2)

Evaluate the performance of Protocols in Adhoc and sensor networks.(L5)

Design new Protocols for Adhoc and Sensor networks.(L6)

Text Book:

1. Murthy, C. Siva Ram, and B. S. Manoj. Ad hoc wireless networks: Architectures and protocols. Pearson Education India, 2004.

References:

1. Carlos De Moraes Cordeiro, Dharma Prakash Agrawal "Ad Hoc & Sensor Networks: Theory and Applications", World Scientific Publishing Company, 2006.

2. Feng Zhao and Leonides Guibas, "Wireless Sensor Networks", Elsevier Publication - 2002.
3. Holger Karl and Andreas Willig "Protocols and Architectures for Wireless Sensor Networks", Wiley, 2000

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(IT20APE703) INTERNET OF THINGS
Professional Elective -III

Course Objectives:

Understand the basics of Internet of Things and protocols.

Discuss the requirement of IoT technology

Introduce some of the application areas where IoT can be applied.

Understand the vision of IoT from a global perspective, understand its applications,

Determine its market perspective using gateways, devices and data management

Course Outcomes:

After completion of the course, students will be able to

Understand general concepts of Internet of Things.

Apply design concept to IoT solutions

Analyze various M2M and IoT architectures

Evaluate design issues in IoT applications

Create IoT solutions using sensors, actuators and Devices

UNIT I

Introduction to IoT

Definition and Characteristics of IoT, physical design of IoT, IoT protocols, IoT communication models, IoT Communication APIs, Communication protocols, Embedded Systems, IoT Levels and Templates

Learning Outcomes:

After completing this Unit, students will be able to

Explain IoT architecture. [L2]

Interpret the design principles that govern connected devices [L2]

Summarize the roles of various organizations for IoT [L2]

Interpret the significance of Prototyping [L2]

UNIT II

Prototyping IoT Objects using Microprocessor/Microcontroller

Working principles of sensors and actuators, setting up the board – Programming for IoT, Reading from Sensors, Communication: communication through Bluetooth, Wi-Fi.

Learning Outcomes:

After completing this Unit, students will be able to

Explain the basics of microcontrollers [L2]

Outline the architecture of Arduino [L2]

Develop simple applications using Arduino [L3]

Outline the architecture of Raspberry Pi [L2]

Develop simple applications using Raspberry Pi [L3]

Select a platform for a particular embedded computing application [L3]

UNIT III

IoT Architecture and Protocols

Architecture Reference Model- Introduction, Reference Model and architecture, IoT reference Model, Protocols- 6LowPAN, RPL, CoAP, MQTT, IoT frameworks- Thing Speak.

Learning Outcomes:

After completing this Unit, students will be able to

Interpret different protocols and compare them [L2]

Select which protocol can be used for a specific application [L3]

Utilize the Internet communication protocols for IoT applications [L3]

Select IoT APIs for an application [L3]

Design and develop a solution for a given application using APIs [L6]

Test for errors in the application [L4]

UNIT IV

Device Discovery and Cloud Services for IoT

Device discovery capabilities- Registering a device, Deregister a device, Introduction to Cloud Storage models and communication APIs Web-Server, Web server for IoT.

Learning Outcomes:

After completing this Unit, students will be able to

Plan the business model [L6]

Predict the market value [L6]

Build the product [L6]

UNIT V :

UAV IoT

Introduction to Unmanned Aerial Vehicles/Drones, Drone Types, Applications: Defense, Civil, Environmental Monitoring; UAV elements and sensors- Arms, motors, Electronic Speed Controller(ESC), GPS, IMU, Ultra sonic sensors; UAV Software –Arudpilot, Mission Planner, Internet of Drones(IoD)- Case study FlytBase.

Learning Outcomes:

After completing this Unit, students will be able to

- Outline the manufacturing techniques [L2]
- Adapt the Ethics of the IoT[L6]

Course outcomes:

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

- Choose the sensors and actuators for an IoT application (L1)
- Select protocols for a specific IoT application (L2)
- Utilize the cloud platform and APIs for IoT applications (L3)
- Experiment with embedded boards for creating IoT prototypes (L3)
- Design a solution for a given IoT application (L6)

Textbooks:

1. Vijay Madiseti and ArshdeepBahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014.
2. Handbook of unmanned aerial vehicles, K Valavanis; George J Vachtsevanos, New York, Springer, Boston, Massachusetts : Credo Reference, 2014. 2016.

Reference Books:

1. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014.
 2. ArshdeepBahga, Vijay Madiseti - Internet of Things: A Hands-On Approach, Universities JNTUA B.Tech. R20 Regulations Press, 2014.
 3. The Internet of Things, Enabling technologies and use cases – Pethuru Raj, Anupama C. Raman, CRC Press.
 4. Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1st Edition, Apress Publications, 2013
 5. Cuno Pfister, Getting Started with the Internet of Things, O'Reilly Media, 2011, ISBN: 978-1-4493-9357-1
 6. DGCA RPAS Guidance Manual, Revision 3 – 2020
 7. Building Your Own Drones: A Beginners' Guide to Drones, UAVs, and ROVs, John Baichtal
- Online Learning Resources:
1. <https://www.arduino.cc/>
 2. <https://www.raspberrypi.org/>
 3. <https://nptel.ac.in/courses/106105166/5>
 4. <https://nptel.ac.in/courses/108108098/4>

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(IT20APE704) SOFTWARE PROJECT MANAGEMENT
Professional Elective -IV

Course Objectives:

The course should enable the student

- Teach the specific roles within a software organization as related to project and process management.
- Describe the principles, techniques, methods & tools for model-based management of software projects, assurance of product quality and process adherence (quality assurance), as well as experience-based creation & improvement of models (process management).
- Introduce the basic infrastructure competences (e.g., process modelling and measurement).
- Explain the basic steps of project planning, project management, quality assurance, and process management and their relationships.

UNIT I

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

Learning Outcomes:

At the end of the Unit, student should be able to:

- Understand basic steps to build a 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 II

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

Learning Outcomes:

At the end of the Unit, student should be able to:

- Analyze software estimation and to reduce the size of software (L4).
- Illustrate the principles for improving the team effectiveness (L2).
- Estimate costs and schedules, and overall productivity using a smaller team (L5).
- Choose the practices for conventional software engineering (L1).
- Understand Principles of modern software management (L2).

UNIT III

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

Learning Outcomes:

At the end of the Unit, student should be able to:

- Select life cycle model based on requirements, users (L3).
- Can organize distinct sets of artifacts (L3).
- Develop and justify the artifacts for the product (L6).

UNIT IV

Work Flows of the process: Software process workflows, Inter Trans workflows. Checkpoints of the Process: Major Mile Stones, Minor Milestones, Periodic status assessments. Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Interaction planning process, Pragmatic

planning. Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations. Process Automation: Automation Building Blocks, the Project Environment

Learning Outcomes:

At the end of the Unit, student should be able to:

- Organize the hierarchy for work breakdown structures (L3).
- Select general guidelines for iterations in planning process (L3).
- Discuss default roles in software line of business organization (L6).
- Identify discrete states for project environment artifacts (L3).

UNIT V

Project Control and Process instrumentation: The server care Metrics, Management indicators, quality indicators, life cycle expectations pragmatic Software Metrics, Metrics automation. Tailoring the Process: Process discriminates, Example. Future Software Project Management: Modern Project Profiles Next generation Software economics, modern Process transitions. Case Study: The Command Center Processing and Display System-Replacement (CCPDS-R)

Learning Outcomes:

At the end of the Unit, student should be able to:

- Determine quality of software products using software metrics (L4).
- Measure change traffic over time (L5).
- Apply software economics for modern projects (L3).
- Analyze the command center processing (L4).

Course Outcomes:

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

- Describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project. (L1)
- Compare and differentiate organization structures and project structures. (L4)
- Implement a project to manage project schedule, expenses and resources with the application of suitable project management tools. (L3)
- Design software projects (L6)

Text Books:

1. Software Project Management, Walker Royce, Pearson Education.
2. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, TataMc-Graw Hill.

Reference Books:

1. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006.
2. Head First PMP, Jennifer Greene & Andrew Stellman, O'Reilly, 2007.
3. Software Engineering Project Management, Richard H. Thayer & Edward Yourdon, second edition, Wiley India, 2004.
4. Agile Project Management, Jim Highsmith, Pearson education, 2005. The art of Project management,

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(IT20APE705) DEEP LEARNING
Professional Elective-IV

Course Objectives:

This course is designed to:

- Demonstrate the major technology trends driving Deep Learning
- Build, train and apply fully connected deep neural networks
- Implement efficient (vectorized) neural networks
- Analyze the key parameters and hyper parameters in a neural network's architecture

UNIT I

Linear Algebra: Scalars, Vectors, Matrices and Tensors, Matrix operations, types of matrices, Norms, Eigen decomposition, Singular Value Decomposition, Principal Components Analysis. **Probability and Information Theory:** Random Variables, Probability Distributions, Marginal Probability, Conditional Probability, Expectation, Variance and Covariance, Bayes' Rule, Information Theory. **Numerical Computation:** Overflow and Underflow, Gradient-Based Optimization, Constrained Optimization, Linear Least Squares.

Learning Outcomes:

After completing this Unit, students will be able to:

- Understand linear algebra in the deep learning context (L2)
- Utilize probability and information theory in machine/deep learning applications(L3)

UNIT II

Machine Learning: Basics and Underfitting, Hyper parameters and Validation Sets, Estimators, Bias and Variance, Maximum Likelihood, Bayesian Statistics, Supervised and Unsupervised Learning, Stochastic Gradient Descent, Challenges Motivating Deep Learning. Deep Feedforward Networks: Learning XOR, Gradient-Based Learning, Hidden Units, Architecture Design, Back-Propagation and other Differentiation Algorithms.

Learning Outcomes:

After completing this Unit, students will be able to:

- Illustrate machine learning basics leads to deep learning(L2)
- Contrast super and unsupervised learning(L2)

UNIT III

Regularization for Deep Learning: Parameter Norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under-Constrained Problems, Dataset Augmentation, Noise Robustness, Semi-Supervised Learning, Multi-Task Learning, Early Stopping, Parameter Tying and Parameter Sharing, Sparse Representations, Bagging and Other Ensemble Methods, Dropout, Adversarial Training, Tangent Distance, Tangent Prop and Manifold Tangent Classifier. Optimization for Training Deep Models: Pure Optimization, Challenges in Neural Network Optimization, Basic Algorithms, Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates, Approximate Second-Order Methods, Optimization Strategies and Meta- Algorithms.

Learning Outcomes:

After completing this Unit, students will be able to:

- Evaluate Regularization Problems for Deep learning (L5)
- Apply optimization for Training Deep Learning models (L3)

UNIT IV

Convolutional Networks: The Convolution Operation, Pooling, Convolution, Basic Convolution Functions, Structured Outputs, Data Types, Efficient Convolution Algorithms, Random or Unsupervised Features, Basis for Convolutional Networks.

Learning Outcomes:

After completing this Unit, students will be able to:

- Appraise Basic Convolution Functions (L5)
- Develop Efficient Convolution Algorithms (L3)

UNIT V

Sequence Modeling: Recurrent and Recursive Nets: Unfolding Computational Graphs, Recurrent Neural Networks, Bidirectional RNNs, Encoder-Decoder Sequence-to-Sequence Architectures, Deep Recurrent Networks, Recursive Neural Networks, Echo State Networks, LSTM, Gated RNNs, Optimization for Long-Term Dependencies, Auto encoders, Deep Generative Models.

Learning Outcomes:

After completing this Unit, students will be able to:

- Illustrate Recurrent and Recursive Neural Networks (L2)
- Apply Auto encoders and Deep Generative Models (L3)

Course Outcomes:

After completing this course, students will be able to:

- Apply linear algebra and probability theory in the deep learning applications(L3)
- Elaborate the challenges and motivations to Deep learning (L6)
- Differentiate the architectures of deep neural network (L4)
- Build a convolutional neural network (L6)
- Build and train RNN and LSTMs(L6)

Text Books:

- 1) Ian Goodfellow, Yoshua Bengio, Aaron Courville, "Deep Learning", MIT Press,2016.
- 2) Josh Patterson and Adam Gibson, "Deep learning: A practitioner's approach", O'Reilly Media, First Edition, 2017.

Reference Books:

- 1) Fundamentals of Deep Learning, Designing next-generation machine intelligence algorithms, Nikhil Buduma, O'Reilly, Shroff Publishers, 2019.
- 2) Deep learning Cook Book, Practical recipes to get started Quickly, Douwe Osinga, O'Reilly, Shroff Publishers, 2019.

e-Resources:

- 1) <https://keras.io/datasets/>
<http://deeplearning.net/tutorial/deeplearning.pdf>

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(IT20APE706) CRYPTOGRAPHY & NETWORK SECURITY

Professional Elective-IV

This course is designed to:

- Introduce the basic categories of threats to computers and networks
- Illustrate various cryptographic algorithms.
- Demonstrate public-key cryptosystem.
- Discuss the fundamental ideas of public-key cryptography.
- Explore Web security threats and protection mechanisms

UNIT – I

Attacks on Computers and Computer Security: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security

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

Learning Outcomes

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

- Identify different types of Attacks (L3)
- Interpret various cryptography techniques (L5)
- Distinguish between cryptography and steganography (L4)

UNIT – II

Symmetric key Ciphers: Block Cipher principles & Algorithms (DES, AES, Blowfish), Differential and Linear Cryptanalysis, Block cipher modes of operation, Stream ciphers, RC4, Location and placement of encryption function, Key distribution

Asymmetric key Ciphers: Principles of public key cryptosystems, Algorithms (RSA, Diffie-Hellman, ECC), Key Distribution

Learning Outcomes

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

- Differentiate symmetric and asymmetric ciphers (L4)
- Explain the principles of public key cryptography (L2)
- Select the appropriate cryptographic algorithm based on the requirements and applications. (L5)

UNIT – III

Message Authentication Algorithms and Hash Functions: Authentication requirements, Functions, Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, CMAC, Digital signatures, knapsack algorithm.

Learning Outcomes

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

- Summarize authentication techniques (L2)
- Apply Hash algorithm for generating Digital signatures (L3)

UNIT – IV

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

IP Security: IP Security overview, IP Security architecture, Authentication Header, encapsulating security payload, combining security associations, key management.

Learning Outcomes

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

- Extend security for emails (L2)
- Examine IP security mechanisms (L4)

UNIT – V

Web Security: Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction

Intruders, Virus and Firewalls: Intruders, Intrusion detection, password management, Virus and related threats, Countermeasures, Firewall design principles, Types of firewalls

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

Learning Outcomes

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

- Design secure electronic transactions (L6)
- Explain different types of Firewalls (L2)

Course Outcomes

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

- Identify various type of vulnerabilities of a computer network (L2)
- Outline various security algorithms (L4)
- Design secure systems (L6)
- Investigate the threats and identify the solutions for threats (L4)

TEXT BOOKS:

1. William Stallings, "Cryptography and Network Security", 5th Edition, Pearson Education, 2011.
2. Atul Kahate, "Cryptography and Network Security", 2nd Edition, Mc Graw Hill, 2010.
3. Bernard Menezes "Network Security and Cryptography", 1st Edition, CENGAGE Learning, 2010.

REFERENCES:

1. C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, "Cryptography and Network Security", 1st Edition, Wiley India Pvt Ltd, 2011.
2. ForouzanMukhopadhyay "Cryptography and Network Security", 2nd Edition , Mc Graw Hill, 2010.
3. Mark Stamp, Wiley India, "Information Security, Principles and Practice", 2nd Edition, Wiley, 2011.

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(IT20APE707) BIG DATA ANALYTICS
Professional Elective-V

The course is designed to

- Understand the basic concepts and importance of Big Data
- Familiarize with the installation of Hadoop and how to analyze the Big Data
- Understand the design concepts of HDFS
- Provide good insight for developing a MapReduce applications
- Understand Hadoop environment.
- Explore the concepts of Pig, Hive, Spark and HBase

UNIT-I

Introduction to Big Data: What is Big Data? Why Big Data is Important? Meet Hadoop, Data, Data Storage and Analysis, Comparison with other systems, History of Apache Hadoop, Hadoop Ecosystem, VMWare Installation of Hadoop. Analyzing the Data with Hadoop, Scaling Out.

Learning Outcomes:

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

- Identify the characteristics of datasets. (L3)
- Compare trivial data and big data for various applications. (L4)
- Choose and implement various ways of selecting suitable model parameters.(L1)

UNIT- II

HDFS: The Design of HDFS, HDFS Concepts, The Command-Line Interface, Hadoop File systems, The Java Interface, Data flow.

MapReduce: Developing a MapReduce application, The Configuration API, Setting up the Development Environment, Running Locally on Test Data, Running on a Cluster

Learning Outcomes:

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

- Understand and apply scaling up Hadoop techniques and associated technologies.(L2)
- Estimate suitable test data. (L5)
- Apply the MapReduce application on a cluster.(L3)

UNIT-III

How MapReduce Works: Anatomy of a MapReduce, Job Run, Failures, Shuffle and Sort, Task Execution.

MapReduce Types and Formats: MapReduce Types, Input formats, output formats.

Learning Outcomes:

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

- Explore the Anatomy of MapReduce. (L5)
- Illustrate various input and output formats of MapReduce. (L2)
- List various MapReduce types.(L1)

UNIT-IV

Hadoop Environment: Setting up a Hadoop Cluster, Cluster specification, Cluster Setup and Installation, Hadoop Configuration, Security.

Pig: Installing and Running Pig, an Example, Comparison with Databases, Pig Latin, User-Defined Functions, Data Processing Operators.

Learning Outcomes:

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

- Show the cluster setup and installation.(L2)
- Demonstrate the Configure the Hadoop.(L2)
- Compare Hadoop with various Databases.(L5)

UNIT-V

Hive: Installing Hive, Running Hive, Comparison with traditional Databases, HiveQL, Tables, Querying Data.

Spark: Installing Spark, Resilient Distributed Datasets, Shared Variables, Anatomy of a Spark Job Run.

HBase: HBasics, Installation, clients, Building an Online Query Application.

Learning Outcomes:

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

- Explain various frameworks of Big Data. (L2)
- Compare Hive with traditional Databases.(L4)
- Learn how to build an online query application.(L1)

Course Outcomes:

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

- Explain the concepts and challenges of big data (L2)
- Determine why existing technologies are inadequate to analyze the large data. (L5)
- Outline the operations viz. Collect, manage, store, query, and analyze various forms of big data. (L2)
- Apply large-scale analytic tools to solve some of the open big data problems. (L3)
- Analyze the impact of big data for business decisions and strategies.(L4)
- Design different big data applications. (L6)

Text Books:

1. Tom White, "Hadoop: The Definitive Guide"Fourth Edition, O'reilly Media, 2015.
2. Big Data, Big Analytics: Emerging business intelligence and analytic trends for today's businesses, Michael Minnelli, Michelle Chambers, and Ambiga Dhiraj, Wiley Cio Series

Reference Books:

1. Glenn J. Myatt, Making Sense of Data , John Wiley & Sons, 2007 Pete Warden,Big Data Glossary,O'Reilly, 2011.
2. Michael Berthold, David J.Hand, Intelligent Data Analysis, Spingers, 2007.
3. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos,Uderstanding Big Data :Analytics for Enterprise ClassHadoop and Streaming Data, McGraw Hill Publishing, 2012.
4. Anand Rajaraman and Jeffrey David UIIman, Mining of Massive Datasets Cambridge University Press, 2012.

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(IT20APE708) HUMAN COMPUTER INTERACTION
Professional Elective-V

Course Objectives:

- Gain an overview of Human-Computer Interaction (HCI), with an understanding of user interface design in general, and alternatives to traditional "keyboard and mouse" computing
- Become familiar with the vocabulary associated with sensory and cognitive systems as relevant to task performance by humans
- Be able to apply models from cognitive psychology to predicting user performance in various human-computer interaction tasks and recognize the limits of human performance as they apply to computer operation
- Be familiar with a variety of both conventional and non-traditional user interface paradigms

UNIT- I

Introduction: Importance of user Interface – definition, importance of good design, Benefits of good design, A brief history of Screen design.

The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics

Web user Interface - popularity, characteristics- Principles of user interface.

Learning Outcomes:

After completion of this unit student will
Understand the concept of user interface
Explain various types of graphical
systemsKnow about the importance of
design

UNIT- II

Design process – Understanding how people interact with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business functions.

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

Learning Outcomes:

After completion of this unit student will
Understand how people interact with computers
Explain the screen navigations
Analyze the information on web

UNIT- III

System menus: Structures of Menus, Functions of Menus, Content of Menus, Kinds of Graphical menus, Windows: Window characteristics, Components of a window, Windowpresentation styles, Types of windows, Windom management

Learning Outcomes:

After completion of this unit student will

- Understand about the menu's concepts

- Understand and explain the components of a window

UNIT- IV

Controls: Characteristics of device-based controls, Selecting the proper device-based controls, Operable controls, Text Entry/Read-only controls, Selection controls, Combination Entry/selection controls, Selecting the proper controls.

Learning Outcomes:

After completion of this unit student will

- Understand the role device controls

- Analyze difference between controls

UNIT- V

Graphics: Icons, Multimedia, Color-what is it, Color uses, Color and Human vision, Choosing colors, Testing: The purpose and importance of usability testing, Scope of testing, Prototypes, Kinds of Tests, Developing and conducting the test.

Learning Outcomes:

After completion of this unit student will

- Understand the concept of graphics

- Know the structure of human vision

- Understand the role of testing.

Course Outcomes:

- Find innovative ways of interacting with computers

- Help the disabled by designing non-traditional ways of interacting

- Use cognitive psychology in the design of devices for interaction

Text books:

1.The essential guide to user interface design||, Wilbert O Galitz,, Wiley, 2nd edition, 2013.

References:

—Designing the user interface||, 3rd Edition Ben Shneidermann, Pearson Education Asia.

—Human –Computer Interaction||, D.R.Olsen, Cengage Learning.

—Human – Computer Interaction||, I.Scott Mackenzie, Elsevier Publishers.

—Interaction Design||, Prece, Rogers, Sharps, Wiley Dreamtech.

—User Interface Design||, Soren Lauesen , Pearson Education.

—Human –Computer Interaction||, Smith - Atakan, Cengage Learning.

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(IT20APE709) AGILE METHODOLOGIES

Professional Elective - V

This course is designed to:

- Master the art of agile development.
- Understand how an iterative, incremental development process leads to faster delivery of more useful software.
- Elucidate the essence of agile development methods
- Explain the principles and practices of extreme programming

UNIT I:

Why Agile? , How to be Agile, Understanding XP, Values and Principles, Improve the Process, Eliminate Waste, Deliver Value.

Learning Outcomes:

After completing this Unit, students will be able to

- Appraise the importance of Agile and the philosophy behind being Agile (L5)
- Interpret the questions that helps to eliminate waste from the process and increase one's agility (L2)

UNIT II:

Practicing XP-Thinking, Pair Programming, Energized Work, Informative Workspace, RootCause Analysis, Retrospectives, Collaborating, Sit Together, Real Customer Involvement, Ubiquitous Language, Stand-Up Meetings,

Coding Standards, Iteration Demo, Reporting.

Learning Outcomes:

After completing this Unit, students will be able to

- Apply practices to excel as mindful developers (L3)

- Illustrate the eight practices to help a team and its stakeholders collaborate efficiently and effectively (L2)

UNIT III:

Releasing-Done Done, No Bugs, Version Control, Ten-Minute Build, Continuous Integration, Collective Code Ownership, Documentation.

Learning Outcomes:

After completing this Unit, students will be able to

- Examine pushing software into production (L4)

- Explain the importance of documentation in ensuring the long-term maintainability of the product at appropriate times. (L2)

UNIT IV:

Planning-Vision, Release Planning, Risk Management, Iteration Planning, Stories, Estimating.

Learning Outcomes:

After completing this Unit, students will be able to

- List the eight practices that allow to control the chaos of endless possibility (L1)

UNIT V:

Developing-Incremental Requirements, Customer Tests, Test-Driven Development, Refactoring, Incremental Design and Architecture, Spike Solutions, Performance Optimization.

Learning Outcomes:

After completing this Unit, students will be able to

Outline the practices that keep the code clean and allow the entire team to contribute to development. (L2)

Course outcomes:

Upon completion of the course, the students should be able to: Adopt

Extreme Programming (L1)

Create own agile method by customizing XP to a particular situation (L6)

Text Books:

1. James Shore and Shane Warden, "The Art of Agile Development", O'REILLY, 2007.

References:

1. Robert C. Martin, "Agile Software Development, Principles, Patterns, and Practices", PHI, 2002.
2. Angel Medinilla, "Agile Management: Leadership in an Agile Environment", Springer, 2012.
3. Bhuvan Unhelkar, "The Art of Agile Practice: A Composite Approach for Projects and Organizations", CRC Press.
4. Jim Highsmith, "Agile Project Management", Pearson education, 2004.

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(CE20AOE701) AIR POLLUTION AND QUALITY CONTROL
Open Elective - III

Course Objectives:

After studying this course, students will be able to:

- The objectives of the course are to understand the Air pollution Concepts
- Identify the source of air pollution
- To know about Air pollution Control devices and distinguish the Air quality monitoring devices

UNIT – I

Introduction to Air Pollution

Introduction: Sources, effects on ecosystems, classification and characterization of air pollutants, Air Pollution Episodes of environmental importance. Indoor air pollution – sources, Effects.

Learning outcomes:

- Understanding the basic Air pollution concepts
- Identifying the source of air pollution
- To understand the character of atmospheric pollutants and their effects

UNIT II

Effects of Air Pollution

Effects of Air pollutants on man, material and vegetation: Global effects of air pollution – Green House effect, Heat Islands, Acid Rains, Ozone Holes etc.

Learning outcomes:

- To know effects of air pollution on man

- To know effects of air pollution on material and vegetation

UNIT – III

Plume Behavior

Meteorology and plume Dispersion; properties of atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity, Influence of Meteorological phenomena on Air Quality-wind rose diagram.

Learning outcomes:

- Understand the composition and structure of atmosphere
- To Understand the wind rose diagram

UNIT – IV

Control Techniques

Particulate matter and gaseous pollutants- settling chambers, cyclone separators, scrubbers, filters & ESP.

Learning outcomes:

- Learning about air pollution control techniques
- Study on latest devices and advancements in existing devices
- Choose and design control techniques for particulate and gaseous emissions.

UNIT – V

Noise Pollution

Noise pollution–Sources, Measurements, effects and control, noise standards. Environmental issues, global episodes, laws, acts, protocols.

Learning outcomes:

- Learning about noise pollution.
- Understand the laws, acts and protocols related to noise pollution & control

Course Outcomes (CO):

After studying this course, students will be able to:

- Identify the major sources of air pollution
- Understand their effects on health and environment.

- Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models.
- Choose and design control techniques for particulate and gaseous emissions.
- Understand the noise pollution and control methods.

Textbooks:

1. Noel De Nevers, "Air Pollution Control Engineering" , Waveland Pr Inc 2016
2. Anjaneyulu Y, "Text book of Air Pollution and Contr ol Technologies", Allied Publishers
3. M.N. Rao and HVN Rao, Air Pollution, Tata McGraw Hill Publishers 2017

Reference Books:

1. Nevers, "Air Pollution Control Engineering", McGraw-Hill, Inc., 2000.
2. Dr. B.S.N. Raju, "Fundamentals of Air Pollution" Oxford & I.B.H.
3. T. Holgate, Hillel S. Koren, Jonathan M. Samet, Robert L. "Air Pollution and Health" Maynard publisher Academic Press.

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(EE20AOE701) EMBEDDED SYSTEMS

Open Elective - III

Course Objectives:

The objective of this course is to

- 1.** To understand the basics of an embedded system and RTOS.
- 2.** To introduce the typical components of an embedded system and different communication interfaces.
- 3.** To provide knowledge on the design process of embedded system

UNIT I - Introduction to Embedded Systems

Definition of Embedded System, Embedded Systems Vs General Computing Systems, History and classification of Embedded Systems, Major Application Areas, Characteristics and Quality Attributes of Embedded Systems.

UNIT II - Typical Embedded System

Core of the Embedded System - General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS), Memory - ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators, Communication Interface: Onboard and External Communication Interfaces

UNIT III - Embedded Firmware

Fundamental issues in hardware software co-design, Embedded Firmware Design Approaches and Development Languages.

UNIT-IV - RTOS based Embedded System Design

Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.

UNIT-V - Task Communication

Task Communication - Shared Memory, Message Passing, Remote Procedure Call and Sockets, Task Synchronization - Task Communication/Synchronization Issues, Task Synchronization Techniques, Device Drivers, Methods to Choose an RTOS.

Text Books:

1. Introduction to Embedded Systems - Shibu K.V, Mc Graw Hill.
2. An Embedded software primer - David E. Simon, Pearson Ed. 2005.

References:

1. Embedded Systems - Raj Kamal, TMH.
2. Embedded System Design - A Unified Hardware/Software Introduction - Frank Vahid, Tony d. Givargis, John Wiley, 2002.

Course Outcomes:

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

CO1: Understand the selection procedure of Processors in the embedded domain.

CO2: Explain different components of embedded system.

CO3: Design Procedure for Embedded Firmware.

CO4: Describe the role of Real time Operating Systems in Embedded Systems.

CO5: Evaluate the Correlation between task synchronization and latency issues.

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(CS20AOE702) MOBILE COMPUTING TECHNIQUES

Open Elective - III

Course Objectives:

- Understand mobile ad hoc networks, design and implementation issues, and available solutions.
- Acquire knowledge of sensor networks and their characteristics.

UNIT-I:

Wireless LANS and PANS: Introduction, Fundamentals of WLANS, IEEE 802.11 Standards, HIPERLAN Standard, Bluetooth, Home RF.

Wireless Internet:

Wireless Internet, Mobile IP, TCP in Wireless Domain, WAP, Optimizing Web over Wireless.

UNIT-II:

AD HOC Wireless Networks: Introduction, Issues in Ad Hoc Wireless Networks, AD Hoc Wireless Internet.

MAC Protocols for Ad Hoc Wireless Networks: Introduction, Issues in Designing a MAC protocol for Ad Hoc Wireless Networks, Design goals of a MAC Protocol for Ad Hoc Wireless Networks, Classifications of MAC Protocols, Contention - Based Protocols, Contention - Based Protocols with reservation Mechanisms, Contention – Based MAC Protocols with Scheduling Mechanisms, MAC Protocols that use Directional Antennas, Other MAC Protocols.

UNIT -III:

Routing Protocols: Introduction, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classification of Routing Protocols, Table –Driven Routing Protocols, On – Demand Routing Protocols, Hybrid Routing Protocols, Routing Protocols with Efficient Flooding Mechanisms, Hierarchical Routing Protocols, Power – Aware Routing Protocols.

Transport Layer and Security Protocols: Introduction, Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions, TCP Over Ad Hoc Wireless Networks, Other Transport Layer Protocol for Ad Hoc Wireless Networks, Security in Ad Hoc Wireless Networks, Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Key Management, Secure Routing in Ad Hoc Wireless Networks.

UNIT –IV:

Quality of Service: Introduction, Issues and Challenges in Providing QoS in Ad Hoc Wireless Networks, Classification of QoS Solutions, MAC Layer Solutions, Network Layer Solutions, QoS Frameworks for Ad Hoc Wireless Networks.

Energy Management: Introduction, Need for Energy Management in Ad Hoc Wireless Networks, Classification of Ad Hoc Wireless Networks, Battery Management Schemes, Transmission Power Management Schemes, System Power Management Schemes.

UNIT –V:

Wireless Sensor Networks: Introduction, Sensor Network Architecture, Data Dissemination, Data Gathering, MAC Protocols for Sensor Networks, Location Discovery, Quality of a Sensor Network, Evolving Standards, Other Issues.

Course Outcomes:

- Students able to use mobile computing more effectively
- Students gain understanding of the current topics in MANETs and WSNs, both from an industry and research point of views.
- Acquire skills to design and implement a basic mobile ad hoc or wireless sensor network via simulations.

TEXT BOOKS:

Ad Hoc Wireless Networks: Architectures and Protocols - C. Siva Ram Murthy and B.S.Manoj, PHI, 2004.

Wireless Ad- hoc and Sensor Networks: Protocols, Performance and Control - Jagannathan Sarangapani, CRC Press

REFERENCE BOOKS:

Ad hoc Mobile Wireless Networks – Subir Kumar sarkar, T G Basvaraju, C Puttamadappa, Auerbach Publications,2012.

Wireless Sensor Networks - C. S. Raghavendra, Krishna M. Sivalingam, 2004, Springer.

Ad- Hoc Mobile Wireless Networks: Protocols & Systems, C.K. Toh , Pearson Education.

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(CE20AOE705) LOW COST HOUSING TECHNIQUES

Open Elective-IV

Course Objectives:

- The objective of the course is to:
- Have comprehensive knowledge of planning, design, evaluation, construction and financing of housing projects.
- Focuses on cost effective construction materials and methods.
- Enable students to identify low cost housing techniques.
- Have knowledge on alternative building materials for low cost housing.
- Give the knowledge on principles of sustainable housing policies and programmes.
- Enable students in a position to adopt the suitable techniques in rural and disaster prone areas.

UNIT – I

Introduction to Housing scenario

Definition of Basic Terms – House, Home, Household, Apartments, Multi storied Buildings, Special Buildings, Objectives and Strategies of National Housing Policies including Slum Housing Policy. Status of urban housing - Status of Rural Housing

Learning Outcomes:

At the end of the unit student can

- Understand the basics of housing and housing programmes.
- Get knowledge on slum housing policies and slum improvement.

UNIT – II

Development and adoption of low cost housing technology

Introduction - Adoption of innovative cost effective construction techniques - Adoption of precast elements - Adopting of total prefabrication of mass housing in India- General remarks on pre-cast roofing/flooring systems - Fly ash gypsum thick for masonry - Stone Block masonry - Adoption of precast R.C. plank and join system for roof/floor in the building.

Learning Outcomes:

At the end of the unit student can

- Gain Knowledge about the usage of various low cost housing techniques.
- Adopt the suitable techniques in rural and urban housing.
- Understand the adoption of innovative cost effective construction techniques

UNIT – III

Alternative building materials for low cost housing

Introduction - Substitute for scarce materials – Ferrocement - Gypsum boards - Timber substitutions - Industrial wastes - Agricultural wastes

Low cost Infrastructure services:

Introduce - Present status - Technological options - Low cost sanitation - Domestic wall -Water supply, energy.

Learning Outcomes:

At the end of the unit student can

- Understand the various types of alternative building materials like ferrocement, gypsum boards.
- Gain knowledge about the alternative building materials for low cost housing.
- Understand the low cost infrastructure services and water supply.

UNIT – IV

Rural Housing:

Introduction traditional practice of rural housing continuous - Mud Housing technology - Mud roofs - Characteristics of mud - Fire treatment for thatch roof - Soil stabilization - Rural Housing programs.

Learning Outcomes:

At the end of the unit student can

- Understand the rural housing and rural housing programs.
- Gain the knowledge about mud housing technology and mud roofs.

UNIT – V**Housing in Disaster prone areas:**

Introduction – Earthquake - Damages to houses - Traditional prone areas - Type of Damages and Repairs of non-engineered buildings - Repair and restore action of earthquake Damaged non-engineered buildings recommendations for future constructions.

Learning Outcomes:

At the end of the unit student can

- Get knowledge about disasters like earthquakes, floods, cyclones.
- Understand the types of damages on non-engineering buildings.
- Get knowledge about Repair and restore action on damaged non-engineered buildings.
- Analyse the safety requirements and strengthening measures of disaster prone area.

Course Outcomes (CO):

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

- Understand the planning, design, evaluation, construction and financing of housing projects with cost effective housing techniques.
- Have knowledge on living condition of slum, slum housing policies, and slum improvement.
- Know the usage of various low cost housing techniques.
- Understand about alternative building materials for low cost housing and Rural housing.
- Adopt the suitable techniques in rural and disaster prone areas by using locally available materials.

Textbooks:

1. A.K.Lal "Hand book of Low Cost Housing"– New Age International publishers.
2. G.C. Mathur "Low cost Housing".

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(EE20AOE702) ENERGY STORAGE SYSTEMS

Open Elective-IV

Course Objectives:

- To understand the need for energy storage
- To understand about the fundamentals of ESS
- To know about types, features and benefits of ESS
- To know about various management and control including market potential of ESS
- To study about various applications of ESS

UNIT – I: Fundamentals of ESS

Definitions, Characteristics of ESS, Electricity and roles of ESSs, Emerging needs in ESS, Classification of ESSs, Roles of Electrical storage technologies

UNIT – II: Types and features of ESS Technologies

Mechanical storage systems, Electromechanical storage systems, Chemical energy storage, Electrical storage systems, Thermal storage systems, standards for EES, Comparison of ESS technology storage systems, Power and discharge duration, Energy and power density, Storage operating cost, Power quality, Reactive power capability

UNIT – III: Storage Benefits

Definitions, Applications, specifications, benefits, Electric energy time shift, Electric supply capacity, reserve capacity, voltage support, Electric service power quality and reliability, Incidental benefits, energy losses, access charges, Risk, dynamic operating benefits, p.f. correction, reduced air emissions, flexibility, energy benefits

UNIT – IV: EES Market and Management

Utility and Consumer use, Measurement and Control hierarchy, Internal configurations, External connections, Battery SCADA, Market potential, estimation, role of aggregators,

Maximum market potential estimates, Demand change management, Time-of-use energy cost management, storage modularity

UNIT – V: Applications of EES

Power Vs Energy, Capacity Vs energy applications, specific power and discharge durations, Electric supply applications, ancillary service applications, End user/utility customer applications, Distributed energy storage applications, Locational, Non-locational and incidental applications

Course Outcomes:

CO1: To get exposed to latest technology of ESS

CO2: To understand the Principle, features and benefits of ESS

CO3: To understand about marketing and management strategies of ESS in working environment in future

CO4: To distinguish wide variety of applications of EES for practical applications

CO5: To know about latest technology applications of Battery SCADA, which is going to be vital in future applications, trend in new and renewable energy sources

Text Books:

1. James M. Eyer, Joseph J. Iannucci and Garth P. Corey, "Energy Storage Benefits and Market Analysis", Sandia National Laboratories, 2004.

2. IEC Market Strategy Board, "The Electrical Energy Storage" White paper.

Reference Book:

1. Jim Eyer, Garth Corey, "Energy Storage for the Electricity Grid: Benefits and Market Potential Assessment Guide, Report, Sandia National Laboratories", Feb 2010.

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(AM20AOE701) CYBER SECURITY TECHNIQUES
Open Elective -IV

Course Objectives:

This course is designed to:

- Understand essential building blocks and basic concepts of cyber security
- Explore Web security and Network security
- Explain the measures for securing the networks and cloud
- Understand privacy principles and policies
- Describe the legal issues and ethics in computer security

UNIT I

Introduction: Introduction to Computer Security, Threats, Harm, Vulnerabilities, Controls, Authentication, Access Control, and Cryptography, Authentication, Access Control, Cryptography.
Programs and Programming: Unintentional (Non-malicious) Programming Oversights, Malicious Code—Malware, Countermeasures.

Learning Outcomes:

After completing this Unit, students will be able to

Explain Vulnerabilities, threats and. Counter measures for computer security[L2]
Interpret the design of the malicious code [L2]

UNIT II

Web Security: User Side, Browser Attacks, Web Attacks Targeting Users, Obtaining User or Website Data, Email Attacks.

Operating Systems Security: Security in Operating Systems, Security in the Design of Operating Systems, Rootkit.

Learning Outcomes:

After completing this Unit, students will be able to

Outline the attacks on browser, Web and email. [L2]

Explain the security aspects of Operating Systems. [L3]

UNIT III

Network Security: Network Concepts, Threats to Network Communications, Wireless Network Security, Denial of Service, Distributed Denial-of-Service Strategic Defenses: Security Countermeasures, Cryptography in Network Security, Firewalls, Intrusion Detection

and Prevention Systems, Network Management .

Cloud Computing and Security: Cloud Computing Concepts, Moving to the Cloud, Cloud Security Tools and Techniques, Cloud Identity Management, Securing IaaS.

Learning Outcomes:

After completing this Unit, students will be able to

Identify the network security threats and attacks. [L3]

Design the Counter measures to defend the network security attacks. [L6]

Analyze the security tools and techniques for Cloud computing [L4]

UNIT IV

Privacy: Privacy Concepts, Privacy Principles and Policies, Authentication and Privacy, Data Mining, Privacy on the Web, Email Security, Privacy Impacts of Emerging Technologies, Where the Field Is Headed.

Management and Incidents: Security Planning, Business Continuity Planning, Handling Incidents, Risk Analysis, Dealing with Disaster.

Learning Outcomes:

After completing this Unit, students will be able to

Interpret the need for Privacy and its impacts of Emerging Technologies. [L2]

Explain how to handle incidents and deal with Disaster. [L2]

UNIT V

Legal Issues and Ethics: Protecting Programs and Data, Information and the Law, Rights of Employees and Employers, Redress for Software Failures, Computer Crime, Ethical Issues in Computer Security, Incident Analysis with Ethics, Emerging Topics: The Internet of Things, Economics, Computerized Elections, Cyber Warfare.

Learning Outcomes:

After completing this Unit, students will be able to

Adapt legal issues and ethics in computer security. [L6]

Elaborate on the Emerging topics. [L6]

Course Outcomes:

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

Illustrate the broad set of technical, social & political aspects of Cyber Security and security management methods to maintain security protection (L2)

Assess the vulnerabilities and threats posed by criminals, terrorist and nation states to national infrastructure (L5)

Identify the nature of secure software development and operating systems (L3)

Demonstrate the role security management in cyber security defense (L2)

Adapt the legal and social issues at play in developing solutions. (L6)

Text Books:

- 1) Pfleeger, C.P., Security in Computing, Prentice Hall, 2010, 5th edition.
- 2) Schneier, Bruce. Applied Cryptography, Second Edition, John Wiley & Sons, 1996

Reference Books:

- 1) Rhodes-Ousley, Mark. Information Security: The Complete Reference, Second Edition, Information Security Management: Concepts and Practice, McGraw-Hill, 2013.
- 2) Whitman, Michael E. and Herbert J. Mattord. Roadmap to Information Security for IT and Infosec Managers. Boston, MA: Course Technology, 2011.

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(BA20AHS701) BUSINESS ETHICS AND CORPORATE GOVERNANCE
Humanities & Social Sciences Elective

Course Objectives :

The objectives of this course are

- To make the student understand the principles of business ethics
- To enable them in knowing the ethics in management
- To facilitate the student role in corporate culture
- Impart knowledge about the fair trade practices
- Encourage the student in knowing them about the corporate governance

UNIT -I

INTRODUCTION – Meaning - Nature and Scope – Loyalty and Ethical Behavior, Values across Cultures; Business Ethics – Ethical Practices in Management. Types of Ethics – Characteristics – Factors influencing, Business Ethics – Importance of Business Ethics - Arguments for and against business ethics Basics of business ethics Corporate Social Responsibility – Issues of Management – Crisis Management

Learning Outcomes:

After completion of this unit student will

- Understand the meaning of loyalty and ethical Behavior
- Explain various types of Ethics
- Know about the factors influencing business ethics
- Understand the corporate social responsibility of management

UNIT –II

ETHICS IN MANAGEMENT

Introduction – Ethics in HRM – Marketing Ethics – Ethical aspects of Financial Management- Technology Ethics and Professional ethics. The Ethical Value System, Universalism, Utilitarianism, Distributive Justice, Social Contracts, Individual Freedom of Choice, Professional Codes; Culture and Ethics – Ethical Values in different Cultures, Culture and Individual Ethics.

Learning Outcomes:

After completion of this unit student will

- Understand the meaning of Marketing Ethics
- Analyze Differentiate between Technical ethics and professional ethics
- Know about the ethical value system
- Understand the Code and culture

UNIT-III

ROLE OF CORPORATE CULTURE IN BUSINESS

Meaning – Functions – Impact of corporate culture – cross cultural issues in ethics, Emotional Honesty – Virtue of humility – Promote happiness – karma yoga – proactive flexibility and purity of mind. The Ethical Value System – Universalism, Utilitarianism, Distributive Justice, Social Contracts, Individual Freedom of Choice, Professional Codes; Culture and Ethics – Ethical Values in different Cultures, Culture and Individual Ethics.

Learning Outcomes:

After completion of this unit student will

- Understand the corporate culture in business
- Analyze Ethical Value System Know about the ethical value system
- Know Universalism, Utilitarianism, Distributive Justice
- Differentiate Ethical Values in different Cultures

UNIT- IV

LAW AND ETHICS – Relationship between Law and Ethics, Other Bodies in enforcing Ethical Business Behavior, Social Responsibilities of Business – Environmental Protection, Fair Trade Practices, Fulfilling all Nation Safeguarding Health and wellbeing of Customers.

Learning Outcomes:

After completion of this unit student will

- Understand Law and Ethics
- Analyze Social Responsibilities of Business
- Know Environmental Protection and Fair Trade Practices
- Implementing National Safeguarding Health and wellbeing of Customers

UNIT –V

CORPORATE GOVERNANCE

Meaning – scope - Issues, need, corporate governance code, transparency & disclosure, role of auditors, board of directors and shareholders; Global issues of governance, accounting and regulatory frame work, corporate scams, committees in India and abroad, corporate social responsibility composition of BODs - Cadbury Committee – various committees - reports on corporate governance - Benefits and Limitations of Corporate Governance with living examples.

Learning Outcomes:

After completion of this unit student will

- Understand corporate governance code
- Analyze role of auditors, board of directors and shareholders
- Know accounting and regulatory frame work
- Implementing corporate social responsibility

Course Outcomes:

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

Understand business ethics and ethical practices in management.

Understand the role of ethics in management

Apply the knowledge in cross cultural ethics

Analyze law and ethics

Evaluate corporate governance

TEXT BOOKS:

1. Murthy CSV: "Business Ethics and Corporate Governance", HPH
2. Bholananth Dutta, S.K. Podder – "Corporation Governance", VBH.

REFERENCE BOOKS:

1. Dr. K. Nirmala, KarunakaraReaddy : "Business Ethics and Corporate Governance", HPH
2. H.R.Machiraju: "Corporate Governance"
3. K. Venkataramana, "Corporate Governance", SHBP.
4. N.M.Khandelwal : "Indian Ethos and Values for Managers"

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(BA20AHS705) MANAGEMENT SCIENCE
Humanities & Social Sciences Elective

Course objectives :

The objectives of this course are

- To provide fundamental knowledge on Management, Administration, Organization & its concepts.
- To make the students understand the role of management in Production
- To impart the concept of HRM in order to have an idea on Recruitment, Selection, Training & Development, job evaluation and Merit rating concepts
- To create awareness on identify Strategic Management areas & the PERT/CPM for better Project Management
- To make the students aware of the contemporary issues in management

UNIT- I

INTRODUCTION TO MANAGEMENT

Management - Concept and meaning - Nature-Functions - Management as a Science and Art and both. Schools of Management Thought - Taylor's Scientific Theory-Henry Fayol's principles - Elton Mayo's Human relations - Systems Theory - **Organizational Designs** - Line organization - Line & Staff Organization - Functional Organization - Matrix Organization - Project Organization - Committee form of Organization - Social responsibilities of Management.

Learning Outcomes:

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

- Understand the concept of management and organization
- Apply the concepts & principles of management in real life industry.
- Analyze the organization chart & structure for an enterprise.
- Evaluate and interpret the theories and the modern organization theory.

UNIT II

OPERATIONS MANAGEMENT

Principles and Types of Plant Layout - Methods of Production (Job, batch and Mass Production), Work Study - Statistical Quality Control - Deming's contribution to Quality. **Material Management** - Objectives - Inventory-Functions - Types, Inventory Techniques - EOQ-ABC Analysis - Purchase Procedure and Stores Management - **Marketing Management** - Concept - Meaning - Nature- Functions of Marketing - Marketing Mix - Channels of Distribution - Advertisement and Sales Promotion - Marketing Strategies based on Product Life Cycle.

Learning Outcomes:

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

- Understand the core concepts of Management Science and Operations Management
- Apply the knowledge of Quality Control, Work-study principles in real life industry.

- Evaluate Materials departments & Determine EOQ
- Analyze Marketing Mix Strategies for an enterprise.
- Create and design advertising and sales promotion

UNIT III

HUMAN RESOURCES MANAGEMENT (HRM)

HRM - Definition and Meaning – Nature - Managerial and Operative functions - Evolution of HRM - Job Analysis - Human Resource Planning(HRP) - Employee Recruitment-Sources of Recruitment - Employee Selection - Process and Tests in Employee Selection - Employee Training and Development - On-the- job & Off-the-job training methods - Performance Appraisal Concept - Methods of Performance Appraisal – Placement - Employee Induction - Wage and Salary Administration

Learning Outcomes:

At the end if the Unit, the learners will

- Understand the concepts of HRM in Recruitment, Selection, Training & Development
- Apply Managerial and operative Functions
- Analyze the need of training
- Evaluate performance appraisal
- Design the basic structure of salaries and wages

UNIT IV

STRATEGIC & PROJECT MANAGEMENT

Definition& Meaning - Setting of Vision - Mission - Goals - Corporate Planning Process - Environmental Scanning - Steps in Strategy Formulation and Implementation - SWOT Analysis - **Project Management** - Network Analysis - Programme Evaluation and Review Technique (PERT) - Critical Path Method (CPM) Identifying Critical Path - Probability of Completing the project within given time - Project Cost- Analysis - Project Crashing (Simple problems).

Learning Outcomes:

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

- Understand Mission, Objectives, Goals & strategies for an enterprise
- Apply SWOT Analysis to strengthen the project
- Analyze Strategy formulation and implementation
- Evaluate PERT and CPM Techniques
- Creative in completing the projects within given time

UNIT V

CONTEMPORARY ISSUES IN MANAGEMENT

The concept of Management Information System(MIS) - Materials Requirement Planning (MRP)

- Customer Relations Management(CRM) - Total Quality Management (TQM) - Six Sigma Concept - Supply Chain Management(SCM) - Enterprise Resource Planning (ERP) - Performance Management - Business Process Outsourcing (BPO) - Business Process Re- engineering and Bench Marking - Balanced Score Card - Knowledge Management.

Learning Outcomes:

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

- Understand modern management techniques
- Apply Knowledge in Understanding in modern
- Analyze CRM, MRP, TQM
- Evaluate Six Sigma concept and SCM

Course Outcomes:

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

- Understand the concepts & principles of management and designs of organization in a practical world
- Apply the knowledge of Work-study principles & Quality Control techniques in industry
- Analyze the concepts of HRM in Recruitment, Selection and Training & Development.
- Evaluate PERT/CPM Techniques for projects of an enterprise and estimate time & cost of project & to analyze the business through SWOT.
- Create Modern technology in management science.

TEXT BOOKS:

1. A.R Aryasri, "Management Science", TMH, 2013
2. Stoner, Freeman, Gilbert, Management, Pearson Education, New Delhi, 2012.

REFERENCES:

1. Koontz & Weihrich, "Essentials of Management", 6th edition, TMH, 2005.
2. Thomas N. Duening & John M. Ivancevich, "Management Principles and Guidelines", Biztantra.
3. Kanishka Bedi, "Production and Operations Management", Oxford University Press, 2004.
4. Samuel C. Certo, "Modern Management", 9th edition, PHI, 2008

SRI VENKATESWARA COLLEGE OF ENGINEERING, TIRUPATI
(AUTONOMOUS)

IV Year I Sem

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(BA20AHS706) STRATEGIC MANAGEMENT
Humanities & Social Sciences Elective

Course Objectives:

- To introduce the concepts of strategic management and understand its nature in Competitive and organizational landscape
- To provide an understanding of internal and external analysis of a firm/individual
- To provide understanding of strategy formulation process and framework
- Impart knowledge of corporate culture
- Encourage the student in understanding SWOT analysis BCG Matrix

UNIT-I

Introduction of Strategic Management: meaning, nature, importance and relevance.

The Strategic Management Process: – Corporate, Business and Functional Levels of strategy.

Vision, mission and purpose – Business definition, objectives and goals – Stakeholders in business and their roles in strategic management Balance score card.

Learning Outcomes:

After completion of this unit student will

- Understand the meaning and importance of strategic management
- Explain Strategic Management Process and Corporate, Business
- Know about the Business definition, objectives and goals
- Understand Stake holders their roles in strategic management

UNIT-II

External and Internal Analysis: The Strategically relevant components of a Company's External Environment Analysis, Industry Analysis - Porter's Five Forces model – Industry driving forces–Key Success Factors. Analyzing a company's resources and competitive position

Learning Outcomes:

After completion of this unit student will

- Understand the components of a Company's environment
- Explain External Environment Analysis, Industry Analysis
- Know how to analyze industry competition through the Porter's Five Forces model
- Analyze Key Success Factors in a company's competitive position

UNIT-III

Competitive Strategies: Generic Competitive Strategies: Low cost, Differentiation, Focus. Grand Strategies:

Stability, Growth (Diversification Strategies, Vertical Integration Strategies, Mergers, Acquisition & Takeover

Strategies, Strategic Alliances & Collaborative Partnerships), Retrenchment, Outsourcing Strategies. Tailoring

strategy to fit specific industry – Life Cycle Analysis -Emerging, Growing, and Mature & Declining Industries.

Learning Outcomes:

After completion of this unit student will

- Understand the Competitive Strategies
- Explain Stability, Growth Mergers, Acquisition & Takeover Strategies
- Know about the Retrenchment, Outsourcing Strategies
- Differentiate Life Cycle Analysis, Mature & Declining Industries

UNIT-IV

Strategy Implementation and control - Strategy implementation; Organization Structure –Matching structure and strategy Behavioral issues in implementation– Corporate culture–Mc Kinsey's 7s Framework. Functional issues – Functional plans and policies –Financial,

Marketing, Operations, Personnel, IT.

Learning Outcomes:

After completion of this unit student will

- Understand the Organization Structure
- Explain Matching structure and strategy
- Know about the Corporate culture
- Analyze Functional plans and policies

UNIT-V

Strategy Evaluation: Strategy Evaluation–Operations Control and Strategic Control-Relationship

between a Company's Strategy and its Business Model.- SWOT analysis – Value Chain Analysis

–Benchmarking-Portfolio Analysis: BCG Matrix– GE9 Cell Model.

Learning Outcomes:

After completion of this unit student will

- Understand the Operations Control and Strategic Control
- Explain Company's Strategy and its Business Model
- Know about the SWOT analysis

Course Outcomes

1. Demonstrate an appreciation of areas which are fundamental to the development of successful strategy
2. Outline and critique the major perspectives on the conduct of strategy
3. Explain and use the most common tools of strategic analysis
4. Demonstrate an understanding of, and ability to assess the complexities of strategic decision making
5. Understand functional areas and appreciate the role of functional areas in both the formulation and the implementation of a firm's vision, mission and strategy
6. Integrate strategic thinking into the holistic management of an organization

Textbooks:

- Strategic Management – J.S.Chandan & Nitish sen Gupta, Vikas
- Business Strategy: Managing Uncertainty, Opportunity, and Enterprise by J.C. Spender

References:

- Strategic Management Concepts and Cases, Fred. R David, PHI.
- Strategic Management, Hill, Ireand, manikutty, Cengage.
- Concepts in Strategic Management and Business Policy, Wheelen & Hunger, Pearson Education.
- Strategic Management – Text and Cases, V.S.P. Rao, Excel.
- Strategic Management – Theory and Application, Habergerg, Rieple, oxford .
- Strategic Management, P. Subba Rao, Himalaya.
- Business policy and strategic management, Sukul Lomash, P.K.Mishra, Vikas