SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

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

Accredited by NBA| Permanently Affiliated to JNTUA)

Karakambadi Road, Tirupati-517507

B.Tech CSE (AI & ML)

Course Structure& Syllabus under

R20 Regulations

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)
Karakambadi Road, TIRUPATI – 517507

Semester-0
Induction Program
(Common for all branches)

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

SRI VENKATESWARA COLLEGE OF ENGINEERING

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Computer Science &Engineering (AI&ML)

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

S.No	Course No	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
				Total	**19.5**

B.Tech II Semester
(Theory – 5, Lab – 5)

S.No	Course No	Course Name	Category	L-T-P/D	Credits
1.	MA20ABS201	Differential Equations and Vector Calculus	BS	3-0-0	3
2.	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.	BA20AMC201	Universal Human Values	MC	3-0-0	0
10.	BA20AHS201*	Universal Human Values	HS	3-0-0	*3
11.	MA20AMC101	Logical Skills for Professionals–I	MC	2-0-0	0
Total					**19.5**

*UHV is considered as Credit Based Course From 2021 Batch.

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Computer Science and Engineering (AI&ML)

B. Tech II Year I Semester
(Theory – 5, Lab-3,SC-1,MC-2)

S.No	**Course No**	**Course Name**	**Category**	**L-T-P**	**Credits**
1.	MA20ABS303	Discrete Mathematics & Graph Theory	BS	3-0-0	3
2.	AM20APC301	Design and Analysis of Algorithms	PC	3-0-0	3
3.	AM20APC303	Computer Organization and 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.	AM20APC302	Algorithms Lab	PC	0-0-3	1.5
7.	CS20APC304	Database Management Systems Lab	PC	0-0-3	1.5
8.	IT20APC302	Python Programming Lab	PC	0-0-3	1.5
9.	AM20ASC301	Skill Oriented Course-I Linux Administration	SC	1-0-2	2
10.	CH20AMC201	Mandatory non-credit course-II Environmental Science	MC	2-0-0	0
11	EG20AMC301	Enhancing English Language Skills(Lateral Entry Students only)	MC	2-0-0	0
11	BA20AHS201	Mandatory course (AICTE Suggested): Universal Human Values(Lateral Entry Students only)	HS	3-0-0	*3
				Total	**21.5**

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Computer Science and Engineering (AI&ML)

B. Tech II Year II Semester
(Theory – 5,Lab – 3, SC-1,MC-2)

S. No	Course No	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	EC20AES301	Digital Electronics & Microprocessors	ES	3-0-0	3
5	BA20AHS301	Humanities Elective-I Managerial Economics and Financial Analysis	HS	3-0-0	3
	BA20AHS302	Business Environment			
	BA20AHS303	Organizational Behavior			
6	CS20APC402	Object Oriented Programming Through Java Lab	PC	0-0-3	1.5
7	IT20APC402	Operating Systems Lab	PC	0-0-3	1.5
8	EC20AES302	Digital Electronics & Microprocessors Lab	ES	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**
Community Service Project – After the end of the IV Semester – 4 Weeks – 1.5 Credits					
Honors/Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)				0-0-2	0

SRI VENKATESWARA COLLEGE OF ENGINEERING

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Karakambadi Road, TIRUPATI–517507

Computer Science and Engineering (AI&ML)

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

S.N	Course No	Course Name	Category	L-T-P	Credits
1	AM20APC501	Artificial Intelligence	PC	3-0-0	3
2	AM20APC503	Data Warehousing and Data mining	PC	3-0-0	3
3	AM20APC504	Formal Languages and Compiler Design	PC	3-0-0	3
4	CE20AOE501 EC20AOE501 EE20AOE501 ME20AOE502	**Open Elective-I** Basics of civil engineering Basic VLSI Design Introduction to control Systems Solar and wind energy systems	OE	3-0-0	3
5	AM20APE501 AM20APE502 AM20APE503	**Professional Elective-I** Computer Networks Digital Image Processing No SQL Databases	PE	3-0-0	3
6	AM20APC502	Artificial Intelligence& Data Mining Tools Lab	PC	0-0-3	1.5
7	AM20APC505	Compiler Design Lab	PC	0-0-3	1.5
8	EG20ASC301	**Skill Oriented Course-IV** Soft Skills	SC	1-0-2	2
9	BA20AMC501	**Mandatory non-credit course-IV** Constitution of India	MC	2-0-0	0
10	CH20AMC301	**Mandatory non-credit course-V** Biology for Engineers	MC	2-0-0	0
11	AM20ATS501	Technical Seminar Presentation-I	TS		0.5
12	AM20ACS501	Community Service Project	CS		1.5
13	IT20AMC501	Problem solving & Programming (Lateral Entry students only)	MC	2-0-0	0
Total					**22**
14	Honors/Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)		4-0-0 4		4
15	Honors/Minor courses (NPTEL/MOOCS)		2-0-0		2

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

Computer Science and Engineering (AI & ML)

B. Tech III Year II Semester

(Theory – 5, Lab – 3, SC-1, MC-1)

S. No	Course No	Course Name	Category	L-T-P	Credits
1	AM20APC601	Big Data Analytics	PC	3-0-0	3
2	AM20APC603	Machine Learning	PC	3-0-0	3
3	AM20APC605	Natural Language Processing	PC	3-0-0	3
4	AM20APE601 AM20APE602 AM20APE603	**Professional Elective-I** Cloud computing Computer Applications using programming Tools and Techniques Software Project Management	PE	3-0-0	3
5	ME20AOE501 EE20AOE503 EC20AOE602 CE20AOE603	**Open Elective-II** Industrial Automation Renewable Energy Resources Signal Processing Water Resources Planning & Management	OE	3-0-0	3
6	AM20APC602	Big Data Analytics Lab	PC	0-0-3	1.5
7	AM20APC604	Machine Learning Lab	PC	0-0-3	1.5
8	AM20APC606	Natural language processing Lab	PC	0-0-3	1.5
9	AM20ASC601	**Skill Oriented Course-V** Full stack development-1	SC	1-0-2	2
10	BA20AMC502	**Mandatory non-credit course-V** Intellectual Property Rights & Patents	MC	2-0-0	0
11	AM20ATS601	Technical Seminar Presentation II	TS		0.5
12	AM20AMC601	AI Tools Techniques & Applications (for LE Students only)	MC		0
13	MA20AMC301	Logical Skills for Professionals - II	MC	2-0-0	0
14	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

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Computer Science and Engineering (AI & ML)

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

S. No	Course No	Course Name	Category	L-T-P	Credits
1	AM20APE701 AM20APE702 AM20APE703	**Professional Elective-III** Intelligent Information Retrieval Systems Internet of Things Recommender Systems	PE	**3-0-0**	3
2	AM20APE704 AM20APE705 AM20APE706	**Professional Elective-IV** Block Chain Technology Data Visualization Ethical Hacking	PE	3-0-0	3
3	AM20APE707 AM20APE708 AM20APE709	**Professional Elective-V** Agile Methodologies Deep Learning Design Patterns	PE	3-0-0	3
4	CE20AOE701 EE20AOE603 ME20AOE602 EC20AOE702	**Open Elective-III** Air Pollution and Quality Control Optimization Techniques Through MATLAB Power Generation Techniques Principles of Communication Engineering	OE	3-0-0	3
5	EE20AOE701 EC20AOE705 CE20AOE705 ME20AOE702	**Open Elective-IV** Emebedded Systems Introduction to Image Processing Low Cost Housing Techniques Robotics in Industrial Usage	OE	3-0-0	3
6	BA20AHS701 BA20AHS705 BA20AHS706	**Humanities Elective-II** Business Ethics and Corporate Governance Management Science Strategic Management	HS	3-0-0	3
7	AM20ASC701	**Skill Oriented Course-V** Full stack development-2	SC	1-0-2	2
8	AM20AIP701	Internship	IP		3
9	AM20APW701	**Project Work Stage-I**	PW		2
10	AM20ATS701	Technical Seminar Presentation-III	TS		0.5

			25.5
11	Honors / Minor courses (The hours distribution can be 3-0-2 or 3-1-0 also)	4-0-0	4

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(Autonomous)

Computer Science and Engineering (AI & ML)

B. Tech IV Year II Semester

S. No	Course No	Course Name	Category	L-T-P	Credits
1	AM20APW801	Project work Stage -II or Full internship in industry	PW	0-0-0	8.5
			Total		**8.5**

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech-I Sem

L	T	P	C
3	0	0	3

(MA20ABS101) LINEAR ALGEBRA & 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 Eigen vectors and their properties, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem, Diagonalisation of a matrix.

Learning Outcomes:

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

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

Unit -2:

Mean Value Theorems

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

Learning Outcomes:

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

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

Unit -3:

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 variables. (L1)
- Utilize Jacobian of a coordinate transformation to deal with the problems in change of variables. (L3)

Unit -4:

Multiple Integrals

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

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. RajnishVerma, Higher Engineering Mathematics, S. Chand.
6. N. Bali, M. Goyal, C. Watkins, Advanced Engineering Mathematics, Infinity Science Press.

Course Outcomes:

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

- Develop the use of matrix algebra techniques that is needed by engineers for practical applications. (L6)
- Utilize mean value theorems to real life problems. (L3)
- Familiarize with functions of several variables which are 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

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B.Tech 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. Super capacitors: Introduction, Basic Concept-Classification – Applications.

Nano chemistry: Introduction, classification of nano materials, properties and applications of Fullerenes, carbon nano tubes and Graphene's nanoparticles.

Learning Outcomes:

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

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

PH metry,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 Thermo settings, 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:

3. Jain and Jain, Engineering Chemistry, 16/e, DhanpatRai, 2013.
4. Peter Atkins, Julio de Paula and James Keeler, Atkins' Physical Chemistry, 10/e, Oxford University Press, 2010.

Reference Books:

5. G.V.Subba Reddy, K.N.Jayaveera and C. Ramachandraiah, Engineering Chemistry, Mc Graw Hill, 2020.
6. D.Lee, Concise Inorganic Chemistry, 5/e, Oxford University Press, 2008.
7. 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)

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	L	T	P	C
B.Tech-I Sem	**3**	**0**	**0**	**3**

(CS20AES101) PROBLEM SOLVING USING C

(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 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 Program, C Tokens-Variables and Data Types, Operators, Expressions and Type Conversions.

Learning Outcomes:

The students will be able to

- Develop solution through problem understanding and decomposition (L6).
- Develop basic flowcharts for performing input and output and computations (L3).
- Solve Numerical Problems using Flowgorithm (L3).
- 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.

Jump Statements:break and continue statements.

Learning Outcomes:

The students will be able to

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

- Writing Structured programs using Functions (L5).
- 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, Preprocessor Directives.

Learning Outcomes:

The students will be able to

- Use pointers to write c Programs (L3).
- Understand the concepts of preprocessors (L2).
- Apply Dynamic Memory Allocation concepts on 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, Command-line Arguments

Learning Outcomes:

The students will be able to

- Use the concepts of Structures and Unions to write C programs (L3).
- 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, Ellot 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:

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

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

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

	L	T	P	C
B.Tech-I Sem	**3**	**0**	**0**	**3**

(EE20AES101) BASIC ELECTRICAL & ELECTRONICS ENGINEERING
Part A: BASIC ELECTRICAL ENGINEERING
(Civil, Mechanical, CSE, CSE (AI&ML) and IT)

Course Objectives:

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

Unit-1: DC & AC Circuits

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

Learning Outcomes:

The student will be able to

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

Unit-2: DC & AC Machines

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

Learning Outcomes:

The student will be able to

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

Unit-3: Basics of Power Systems

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

Learning Outcomes:

The student will be able to

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

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:

3. L. S. Bobrow - "Fundamentals of Electrical Engineering" - Oxford University Press - 2011.
4. E. Hughes - "Electrical and Electronics Technology" - Pearson - 2010.
5. 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)
- dentify 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& LouisNashlesky, Electronic Devices&Circuit Theory, PearsonEducation,2007.

Reference Books:

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

Course Outcomes:

3. Explain the theory, construction, and operation of electronic devices. (L2)
4. Apply the concept of science and mathematics to explain the working of diodes and its applications, working of transistor and to solve the simple problems based on the applications. (L2)

5. Analyze small signal amplifier circuits to find the amplifier parameters(L5)
6. Design small signal amplifiers using proper biasing circuits to fix up proper Q point. (L5)
7. Distinguish features of different active devices including Microprocessors. (L3)

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(Autonomous)

L	T	P	C
0	0	3	1.5

B.Tech I Sem

(ME20AES101) ENGINEERING WORKSHOP

(Common to all Branches)

Course Description:

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

Course Objectives:

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

Wood Working: (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. 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 switch3) Go down 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 Componentand do the following exercises;

1. Use of injection moulding machine
2. FRP composite preparation 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. Kalpakjain, Serope, Manufacturing Engineering and Technology, Pearson Education, 7th edition, 2014.

Course Outcomes:

After completion of this lab the student will be able to

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

SRI VENKATESWARA COLLEGE OF ENGINEERING

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	L	T	P	C
B.Tech I Sem	**0**	**0**	**3**	**1.5**

(CS20AES103) IT Workshop
(Common to All Branches of Engineering)

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, Spread Sheets, 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.

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, crimpling 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, hyper linking, 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.

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:

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

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B.Tech I Sem

L	T	P	C
0	0	3	1.5

(CH20ABS104) CHEMISTRY LAB

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

Course Objectives:

- Verify the fundamental concepts with experiments

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

List of Chemistry Experiments:

1. Determination of Hardness of a groundwater sample.
2. Estimation of Dissolved Oxygen by Winkler's method.
3. Conductometric titrationof (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 byIR.
11. Preparation of nano material's by precipitation.
12. Estimation of Ferrous Iron by Dichro metry.
13. PH metric titration of (i) strong acid vs. strong base, (ii) weak acid vs. strong base

Reference Books:

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

Course Outcomes:

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

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

B.Tech I Sem

L	T	P	C
0	0	3	1.5

(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.

Week-1: Draw flowcharts for fundamental algorithms.

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

Week-3:C Programs on usage of operators.

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

Week-5:C Programs to demonstrate different loops.

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

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

Week-8:C Programs to demonstrate functions.

Week-9:C Programs on pointers.

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

Week-11:C Programs on Structures and Unions.

Week-12:C Programs to demonstrate Files.

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, Ellot B. Koffman, Problem Solving and Program Design in C, 5/e, Pearson.

Course Outcomes:

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

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

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B.Tech I Sem

L	T	P	C
0	0	3	1.5

(EE20AES102) BASIC ELECTRICAL & ELECTRONICS ENGINEERING LAB

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

Part A: Electrical Engineering Lab

Course Objectives:

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

List of experiments: -

1. Verification of Kirchhoff 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.

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

Part B: Electronics Engineering Lab

Course Objectives:

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

List of Experiments:

1. PN Junction diode characteristics A) Forward 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, ACVoltmeters, 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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B.Tech I Sem

L	T	P	C
2	0	0	0

(EG20AMC101) SPEECH AND ORAL COMMUNICATION (Mandatory Course)

(Common to All Branches)

Course Objectives:

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

Detailed Syllabus:

Unit-1:

Story Telling (Narrate a story)

1. Biography description (Describe a freedom fighter/politician/athlete/celebrity etc.)
2. Speech sounds
3. Formal Conversation (Enact official Telephone conversation/Telephone interview etc.)
4. Verb forms, Subject -Verb agreement, Vocabulary).

Unit-2:

1. Stress in Speech
2. English Puzzle solving (Finding cross words from table)
3. Fun with English (Speech through grammar-changing tense, voice of the sentences)
4. Open Talk with CM (Funny interview with class mates) Voice, Speech.

Unit-3:

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

3. Language Translation (Dialogues/jokes/proverbs/quotations-Regional language to English)
4. Mock Assembly (Students enact as speaker, MLA, CM and opposition leaders in Assembly) Wh- Questions, Question tags.

Unit-4:

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

Unit-5:

News Reader (Prepare funny news and read on Dias)

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

Reference books:

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

Additional Learning Resources:

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

Course Outcomes:

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

B.Tech II Sem

L	T	P	C
3	0	0	3

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

Learning Outcomes:

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

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

Unit -5:

Vector integration

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

Learning Outcomes:

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

- Find the work done in moving a particle along the path over a force field. (L4)
- Evaluate the rates of fluid flow along and across curves. (L4)

- Apply Green's, Stokes and Divergence theorem in evaluation of double and triple integrals. (L3)

Text Books:

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

Reference Books:

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

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech I/II Sem

L	T	P	C
3	0	0	3

(PH20ABS103) APPLIED PHYSICS

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

Course Objectives:

- To identify the importance of the optical phenomenon i.e., interference, diffraction and polarization related to its engineering applications.
- To understand the mechanisms of emission of light, the use of lasers as light sources for low and high energy applications, study of propagation of light wave through optical fibers along with engineering applications.
- To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging microdevices.
- 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-1:

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 sustain ed interference. (L2)
- Identify engineering applications of interference. (L3)
- Analyze the differences between interference and diffraction with applications. (L4)
- Illustrate the concept of polarization of light and its applications. (L2)
- Classify ordinary polarized light and extraordinary polarized light. (L2)

Unit-2:

Lasers and Fiber optics

Lasers-Introduction – Characteristics of laser – Spontaneous and Stimulated emission of radiation – Einstein's coefficients – Population inversion – Lasing action – Pumping mechanisms – Nd-YAG laser–He-Ne laser– GaAs Laser – Applications of lasers.

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

Learning Outcomes:

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

- Demonstrate the basic concepts of LASER light Sources. (L2)
- Apply the concepts to learn the types of lasers. (L3)
- Identifies the Engineering 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)
- Identify the applications of optical fibers in various fields. (L3)

Unit-3:

Dielectric and Magnetic Materials

Dielectric Materials-Introduction – Dielectric polarization – Dielectric polarizability, Susceptibility and Dielectric constant – Types of polarizations: Electronic, Ionic and Orientational polarizations (Qualitative) – Lorentz internal field – Clausius-Mossottiequation-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 Clausius-Mossottirelation in dielectrics. (L2)
- Classify the magnetic materials based on susceptibility and their temperature dependence. (L2)
- Explain the applications of dielectric and magnetic materials. (L2)
- Apply the concept of magnetism to magnetic devices. (L3)

Unit-4:

Quantum Mechanics, Free Electron Theory and Band theory of Solids

Quantum Mechanics- Dual nature of matter – de-Broglie hypothesis- Heisenberg uncertainty principle(Qualitative) – Significance of wave function- Schrodinger's time independent and dependent wave equation – Particle in a one-dimensional 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-Pmodel. (L2)
- Classify the materials based on band theory. (L2)

Unit-5:

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 ofHall effect.

Superconductors- Introduction – Concept & Properties of superconductors – Meissner effect – Type I and Type II superconductors – BCS theory – Josephson effects (AC and DC) – High Tc 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 HillPublishers, 2019
3. Engineering Physics - Sanjay D. Jain, D. Sahasrambudhe and Girish, UniversityPress,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

Course Outcomes:

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

B.Tech II Sem

L	T	P	C
3	0	0	3

(EG20AHS101) COMMUNICATIVE ENGLISH
(Common to all Branches)

Course Objectives:

- To give inputs to students regarding effective listening skills for better comprehension of academic lectures and English spoken by native 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-1:

Lesson: On the Conduct of Life: William Hazlitt

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

Speaking: Asking and 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-2:

Lesson: The Brook: Alfred Tennyson

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

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

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

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

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

Learning Outcomes:

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

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

Unit-3:

Lesson: The Death Trap: Saki

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

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

Reading: Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use 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 -4:

Lesson: Muhammad Yunus

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

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

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

Writing: Letter writing, Essay writing.

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

Learning Outcomes:

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

- Infer and predict content of spoken discourse.
- Understand verbal and non-verbal features of communication and hold formal/informal conversations.
- Interpret graphic elements used in academic texts.
- Produce a coherent paragraph interpreting a figure/graph/chart/table.
- Use appropriate language for description and interpretation of graphical elements.

Unit-5:

Lesson: Politics and the English Language: George Orwell

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

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

Reading: Reading for comprehension.

Writing: Summary writing, Note making.

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

Learning Outcomes:

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

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

Web links

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

Text Books:

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

Reference Books:

2. Bailey, Stephen. Academic writing: A Handbook for International Students, Routledge, 2014.
3. Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking, Heinley ELT; 2nd Edition, 2018.

4. Raymond Murphy's English Grammar in Use, Fourth Edition (2012)E-book.
5. Hewings, Martin. Cambridge Academic English (B2). CUP, 2012.
6. Oxford Learners Dictionary, 12th Edition, 2011.
7. Norman Lewis Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary Goyal Reprint edition 2011.
8. Speed Reading with the Right Brain: Learn to Read Ideas Instead of Just Words by David Butler; 2nd edition 2014.

Course Outcomes:

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

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech II Sem

L	T	P	C
3	0	0	3

(CS20AES201) DATA STRUCTURES

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

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

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

Unit-2:

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

Learning outcomes:

Student should be able to

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

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

- Select sorting technique for a given sorting.(L3)
- 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

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

Unit-5:

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

Learning outcomes:

Student should be able to

- Recognize the importance of Graphs in solving real world problems. (L2)
- Apply various graph traversal methods to applications. (L3)
- 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 Samantha, 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)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech II Sem

L	T	P/D	C
1	0	2	2

(ME20AES102) ENGINEERING DRAWING

(Common to all Branches of Engineering)

Engineering drawing being the principal method of communication for engineers

Course Objectives:

To introduce and make the students

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

Unit-1:

Introduction to Engineering Drawing:

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

a) Conic sections (General Method only) including Rectangular Hyperbola.

b) Cycloid, Epicycloid and Hypocycloid.

c) Involutes.

Learning Outcomes:

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

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

Unit-2:

Projection of Points, Lines and Planes: Projection of Points in any quadrant, lines inclined to one or both planes, finding true lengths, angle made by line. Projections of regular plane 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. (L2)
- Differentiate between projected length and true length and find the true length of the lines. (L2)
- Draw the projection of regular plane surfaces. (L3)

Unit-3:

Projections of solids: Projections of regular solids inclined to one or both planes by 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. (L2)
- Draw the projection of solids inclined to one plane. (L3)
- Draw the projection of solids inclined to both the planes. (L3)

Unit-4:

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

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

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

Unit-5:

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

Learning Outcomes:

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

- Understand the meaning of development of surfaces. (L2)

- Draw the development of regular solids such as prism, cylinder, pyramid and cone.(L3)
- Obtain the development of sectional parts of regular shapes. (L4)

Text Books:

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

Reference Books:

1. Dr K. Prahlada Rao, Dr. S. Krishnaiah, Prof. A.V.S. Prasad, Engineering Graphics, Amaravati publications.
2. Dhanajay A Jolhe, Engineering Drawing, Tata McGraw-Hill, 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)

	L	T	P/D	C
B.Tech II Sem	**0**	**0**	**2**	**1**

(ME20AES103) ENGINEERING GRAPHICS LAB
(Common to all Branches of Engineering)

Course Objectives:

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

Introduction to 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 Bhatt, Charotar Publishing House.

3. 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. (L2)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech II Sem

L	T	P	C
0	0	3	1.5

(EG20AHS102) COMMUNICATIVE ENGLISH LAB

(Common to all Branches)

Course Objectives:

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

Unit-1:

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

Unit-2:

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

Unit-3:

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

Unit-4:

1. **Oral/ Poster Presentations:** Structure, preparation, visual aids and delivery.
2. **Resume Writing:** Definition, formats and practice.

Unit-5:

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

Suggested Software

Orel, Walden InfoTech, Young India Films.

Reference Books

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

Web Links

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

Course Outcomes:

After completing the course, the students will be:

1. Develop to handle and excel in a variety of self-instructional, learner-friendly modes of language learning. (L6)
2. Develop to employ better stress and intonation patterns and utter English sounds correctly. (L6)
3. Develop to avoid the impact of mother tongue in English and neutralize their accent. (L6)
4. Develop to participate with skill and confidence in Group Discussions, Interviews and Public Speaking. (L6)
5. Utilize the technical skills to prepare resume, report-writing, and format-making etc.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

	L	T	P	C
B.Tech II Sem	**0**	**0**	**3**	**1.5**

(PH20ABS104) APPLIED PHYSICS LAB

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

Course Objectives:

- Understands the concepts of interference, diffraction and their applications.
- Understand the role of optical fiber parameters in communication.
- Recognize the importance of energy gap in the study of conductivity and Hall Effect in a 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 fieldalongtheaxisof acircularcoilcarryingcurrent–StewartGee'smethod.
10. Study the variation of B versus H by magnetizing the magnetic material (B-Hcurve).

11. To determine the energy gap of a semiconductor by temperature by Four-Probe Method.

12. Determination of thermistor negative temperature coefficient of resistance.

References:

1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- S Chand Publishers,2017.

2. http://vlab.amrita.edu/index.php -Virtual Labs, Amrita University.

Course Outcomes:

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

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

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech II Sem

L	T	P	C
0	0	3	1.5

(CS20AES202) DATA STRUCTURES LAB

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

Course Objectives:

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

Tasks:

1. Demonstrate recursive algorithms with examples.
2. Develop a program to perform operations of a Stack and Queue using arrays.
3. Implement and perform different operations on Single, Double and Circular Linked Lists.
4. Develop a program to perform operations of Stack and Queue using Linked Lists.
5. Develop a program to implement Stack applications.
6. Implement Circular Queues.
7. Implement various Searching techniques.
8. Develop programs for different Sorting techniques.
9. 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)

B.Tech II Sem

L	T	P	C
3	0	0	3

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

Course Objectives:

The objective of the course is fourfold:

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

Unit -1:

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

- Purpose and motivation for the course, recapitulation from Universal Human Values-I.
- Self-Exploration–what is it? Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration.
- Continuous Happiness and Prosperity- A look at basic Human Aspirations.
- Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their 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 -2:

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.
- Programs to ensure Sanyam and Health.

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

Unit -3:

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

- Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the 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-4:

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

- 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-5:

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 Books:

1. 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.

2. 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:

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

Course Outcomes:

By the end of the course,

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

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech II Sem

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(MA20AMC101) LOGICAL SKILLS FOR PROFESSIONALS - I

(Mandatory Course)

Course Objectives:

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

Unit-1:

Averages:

- Find the 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 4^{th}, 3^{rd} 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 downstream.
- Find the speed of boat in still water and **averagespeed 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 post

Analogy:

- Alphabet analogy
- Number analogy

Text Books:

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

Reference Books:

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

Course Outcomes:

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

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B. Tech III Sem. **L T P C**

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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-ray 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-ray 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 algorithmto 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", Ist 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).

- Analyse the properties of Algebraic Structures to find the given sets are Semi group, Monoids and Groups (L4).
- Analyse the concepts of Generating and Recurrence relations for solving Homogeneous and In-Homogeneous equations (L4).
- Investigate the graphs are Isomorphic Graphs, Euler and Hamilton Graphs (L6).

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech III Sem. **L T P C**
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(AM20APC401) 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 andminimum, 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 forGraphs, Connected components and Spanning trees, Bi-connected components and DFS

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

Learning Outcomes:

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

- Define solution space tree. (L1)
- Illustrate graph search strategies: BFS, DFS and D-Search. (L2)
- Demonstrate the recursive and iterative 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.

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Learning Outcomes:

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

- Find optimal solution by applying various methods. (L1)
- Analyze the advantage of bounding functions in Branch and Bound technique to solve the Travelling Sales person problem.(L4)
- Apply the knowledge to find patterns in the given text.(L3)

UNIT V

NP – Hard and NP – Complete Problems: NP Hardness, NP Completeness, Consequences of being in P, Cook's Theorem, Reduction Source Problems, Reductions: Reductions for some known problems

Learning Outcomes:

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

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

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B. Tech III Sem.

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(CS20APC301) COMPUTER ORGANIZATION AND 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, IntegerDivision, 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 HillEducation

B.Tech III 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 ofDBMS (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 andintegrity (L4).
- Differentiate between various normal forms based on functionaldependency (L4).
- Apply normalization techniques to eliminateredundancy (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 relationalschema (L1)
- Develop queries using Relational Algebra andSQL (L6)
- Perform DML operations ondatabases (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 preventredundancy (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 RamezElmasriPEA
2. "**Database Principles Fundamentals of Design Implementation and Management**", Carlos Coronel, Steven Morris, Peter Robb, CengageLearning.
3. Raghurama Krishnan, Johannes Gehrke, "**Database Management Systems**", 3/e,TMH

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B. Tech III Sem. **L T P C**
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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 In-built Functions.

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

Learning Outcomes:

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

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

Unit – II

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

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

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

Learning Outcomes:

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

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

Unit - III

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

(AUTONOMOUS)

B. Tech III Sem

L	T	P	C
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(AM20APC402) 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-l QUICK SORT

Sort a given set of elements using the quick sort method and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the 1st to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can be generated using the random numbergenerator.

Week-2 MERGESORT

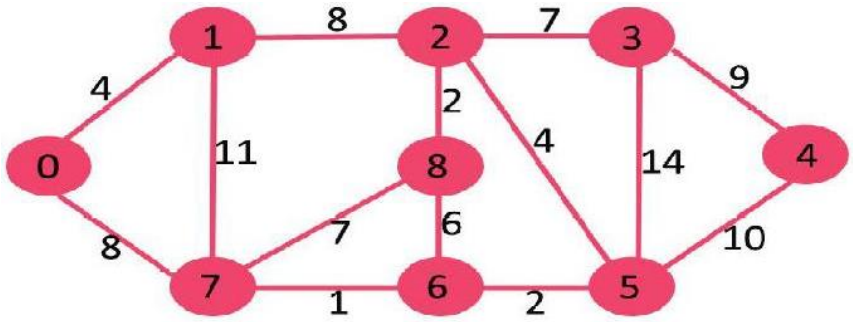
Implement merge sort algorithm to sort a given set of elements and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n. The elements can be read from a file or can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

Week-3 KNAPSACK PROBLEM

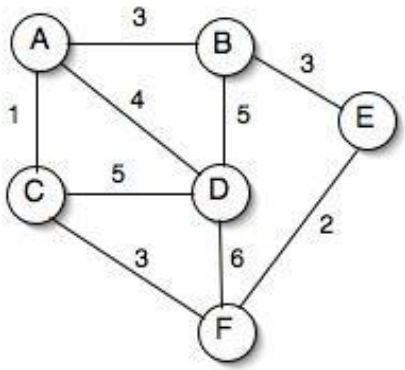
Implement 0/1 Knapsack problem using Dynamic Programming.

Week-4 SHORTEST PATHSALGORITHM

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



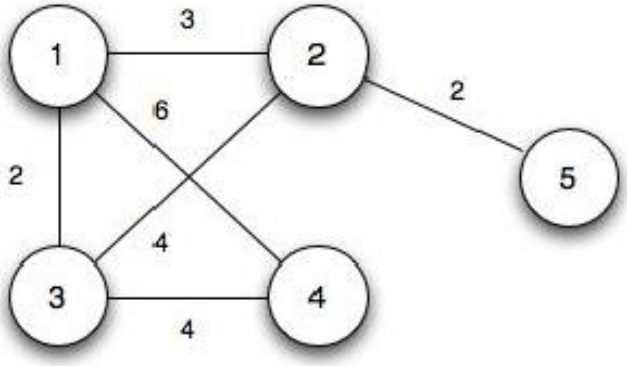
Week-5 MINIMUM COST SPANNINGTREE



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

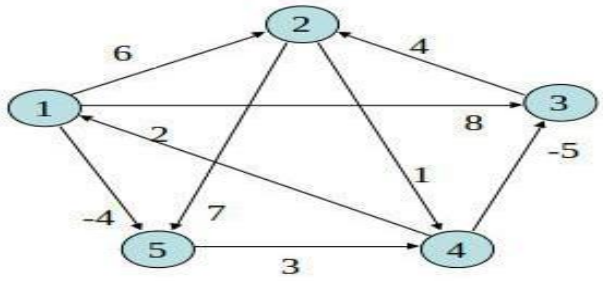
Week-6 MINIMUM COST SPANNINGTREE

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



Week-7 ALL PAIRS SHORTESTPATHS

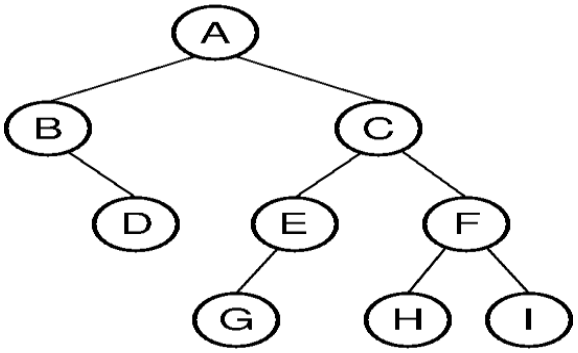
Implement All-Pairs Shortest Paths Problem using Floyd's algorithm.



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

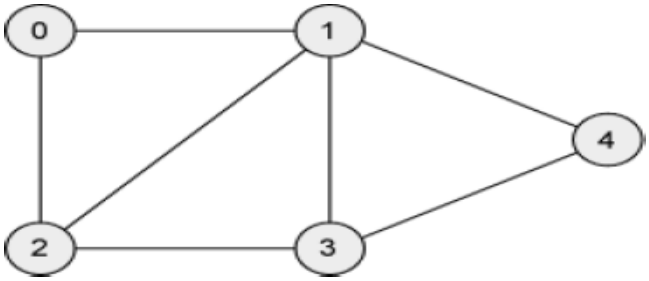
Week-8 TREETRAVERSALS

Perform various tree traversal for a given tree

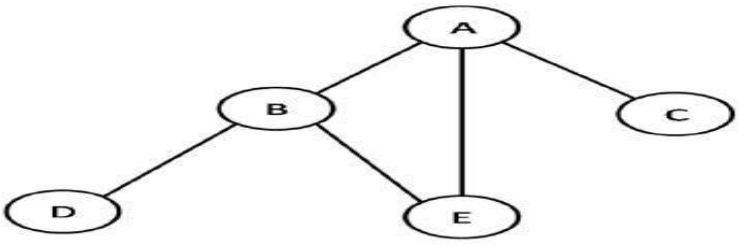


Week-9 GRAPHTRAVERSALS

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 DFSmethod.



Week-10 SUM OF SUB SETSPROBLEM

Find a subset of a given set S = {sl, s2,....., sn} 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 PERSONPROBLEM

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 QUEENSPROBLEM

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.(L3)
- Analyze the efficiency of Greedy and Dynamic Programming design techniques to solve the optimization problems.(L2)
- Relate Backtracking technique for solving constraint satisfaction problems.(L3)

Reference Books:

- Levitin A —Introduction to the Design and Analysis of Algorithms, Pearson Education, 2008.

- Goodrich, M.T. R Tomassia —Algorithm Design foundations Analysis andInternet Examples, John Wiley and Sons, 2006.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech III Sem **L T P C**

0 0 3 1.5

(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 functionsand 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.htm

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech III Sem. **L T P C**

0 0 3 1.5

(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.

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

```
>>> import time
>>> time.time()
1437746094.5735958
```

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

8. Given $n+r+1 <= 2^r$. 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/ π:

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 latter (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 <= YYYY <= 9999, 1 <= MM <= 12, 1 <= DD <= 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 <= HH <= 23, 0 <= MM <= 59, 0 <= SS <= 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. Dainel Y.Chen "Pandas for Everyone Python Data Analysis" Pearson Education, 2019

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech III Sem **L T P C**

1 0 2 2

(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, Elllie 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.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech III Sem

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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)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech III Sem

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(EG20AMC301) ENHANCING ENGLISH LANGUAGE SKILLS

COURSE OBJECTIVES:

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

UNIT- I

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

Learning Outcomes

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

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

UNIT – II

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

Learning Outcomes

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

- Make formal oral presentations using effective strategies
- Write formal letters and e-mail writing appropriately in formal contexts without any mistakes
- Use articles and use punctuation contextually.

UNIT – III

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

Learning Outcomes

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

- **U**nderstand non-verbal features of communication and holdFormal& informal conversations
- **U**se correct tense forms and structures in speech and writing
- Use grammatical structures aptly.

UNIT – IV

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

Learning Outcomes

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

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

UNIT – V

1. Group Discussions

2. Debate
3. Interview Skills

Learning Outcomes

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

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

COURSE OUTCOMES

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

REFERENCE BOOKS:

1. Krishna Mohan & NP Singh, Speaking English Effectively, 2nd Edition,2011.
2. MAshrafRizvi,EffectiveTechnicalCommunication,TataMcGraw-Hill,NewDelhi,2017.
3. Francis Soundararaj,Basics of Communication in English: Soft Skills for Listening, Speaking, Reading and Writing, New Delhi: Macmillan-2012.
4. ChaseR. Tarver&Kristin L. Johannsen, Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018.
5. Meenakshi Raman, Technical Communication, Oxford University Press,2008
6. Raymond Murphy, English Grammar in Use, Cambridge University Press,4th Edition,2012.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Sem **L T P C**

3 0 0 3

(MA20ABS401) NUMERICAL METHODS, PROBABILITY AND 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 – 1: Solution to algebraic and transcendental equations& Interpolation:

Solution of algebraic and transcendental equations: Bisection method, Newton-Raphson method and Regula-Falsi method.
Interpolation: Newton's forward and backward difference formulae. Interpolation with 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 $1/3^{rd}$ and $3/8^{th}$ 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), $\chi 2$ - 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.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9/e, John Wiley & Sons, 2006.
3. Kandasamy, K. Thilagavathy, S. Gunavathy, Numerical Methods, S. Chand & Company, 2nd
Edition, Reprint 2012.
4. S. Ranganatham, Dr. M. V. S. S. N. Prasad, Dr. V. Ramesh Babu, Numerical Analysis, S. Chand
Pulications, 2015
5. Dr. A. Singaravelu, Probability and Statistics, Meenakshi Agency, 2017

Course Outcomes:

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

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

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Sem **L T P C**

3 0 0 3

(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: Flow Layout, Border Layout, Grid Layout, Card Layout, and Limitations of AWT. SWINGS: JFrame, JPanel, J Component- J Label and Image Icon, J Text Field,J TabbedPane , Swing Buttons, JScrollPane, J ComboBox, J Table.

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.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Sem **L T P C**

3 0 0 3

(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 theOS 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

(AUTONOMOUS)

B.Tech IV SEM **LTPC 3003**

(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 Combination allogic circuits using Programmable Logic Devices.
- To understand the concepts of 8085, 8086 Microprocessor and 8051 Microcontroller.
- To Analyze Assembly Language Programming of 8086 & 8051.

UnitI

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, SimplificationofBooleanfunctions,SOPandPOSmethods– SimplificationofBooleanfunctions using K-maps and realization using Universal Gates.

Learning Outcomes:

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

Unit II

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

Learning Outcomes:

- Analyze combinational logic circuits (L4)
- Understand and Analyze the working principle of encoders ,decoders(L2)
- Design combinational circuits using PLD's.(L6)

Unit III

Sequential LogicCircuits : Sequential Circuits, Latches ,Flip flops: RS,D,JK, Master SlaveJK, 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)

UnitIV

Introduction to 8085 & 8086 Microprocessor: 8085 microprocessor Review(brief detail sonly),8086 Architecture –Block Diagram, register organization 8086, Flag register of8086 and its functions, Pin diagram of 8086, Minimum mode& Maximum mode operation of8086, Interruptsin 8086, Addressing modes of8086.

Learning Outcomes:

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

UnitV

Instruction Set of 8086 Microprocessor: Instruction set of 8086,Assemblerdirectives, Procedures and Macros,Simple programs involving arithmetic,logical,branchinstructions,Ascending, DescendingandBlockmoveprograms,String ManipulationInstructions.

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

LearningOutcomes:

- 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)

TextBooks:

1. M. MorrisMano, Michael D. Ciletti,Digital Design,PearsonEducation,5th Edition, 2013
2. Advancedmicroprocessorsandperipherals-A.KRayandK.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.

CourseOutcomes:

Afterthecompletionofthecourse,studentswillableto

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

CO2: To understand the concept of CombinationalLogicand SequentialLogic 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

(AUTONOMOUS)

B. Tech IV Sem **L T P C**

3 0 0 3

(BA20AHS301) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Course Objectives:

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

UNIT I

INTRODUCTION TO MANAGERIAL ECONOMICS

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

UNIT II

THEORY OF PRODUCTION AND COST ANALYSIS

Production Function- Least cost combination- Short-run and Long- run production function- Isoquants and Isocosts, MRTS - Cobb-Douglas production function - 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.

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.

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).

UNIT V

CAPITAL AND CAPITAL BUDGETING

Concept of Capital - Over and Undercapitalization – Remedial Measures - Sources of Shot 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)

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 Mangement, T.S.Reddy & Y. Hariprasad Reddy, Margham

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Sem **L T P C**

3 0 0 3

(BA20AHS302) BUSINESS ENVIRONMENT

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

UNIT-I

An Overview of Business Environment:-

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

UNIT-II

Economic Environment:

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

UNIT-III

Socio-Cultural Environment:-

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

UNIT-IV

Political Environment:-

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

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.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Sem **L T P C**

3 0 0 3

(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

UNIT-II

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

UNIT-III

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

UNIT-IV

Group behaviour:-
Introduction to group behaviour, foundations of group behaviour, concept of group and group dynamics, types of groups, formal and informal groups, theories of group formation, group norms, group cohesiveness, group decision making, inter 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.

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.

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

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IVSem **L T P C**

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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 Amstrong 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*n , p*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)→"llollolllo

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.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(AUTONOMOUS)

B. Tech IV Sem **L T P C**

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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

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B. Tech IVSem

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(EC20AES302)DIGITAL ELECTRONICS & MICROPROCESSORSLAB

(CSE,CSM&IT)

CourseObjectives:

- To understand and analyze the concepts ofLogic Gatesand Boolean functions.
- To understand and analyze CombinationalLogicand SequentialLogic 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.

ListofExperiments:

Note: Minimum of12 experiments shallbe conducted frombothtthe sections:

Hardware: DIGITAL ELECTRONICS (Any 6 Experiments):

1. Realization of NOT, AND, OR, EX-OR gates with only Universal gates.
2. Karnaugh map Reductionand Logic CircuitImplementation.
3. Verificationof DeMorgan's Laws.
4. Implementation ofHalf-Adder and Half-Subtractor.
5. Implementation ofFull-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. Sortingin Ascendingand DescendingOrders.
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. Sortingin Ascendingand DescendingOrders using 8051,

CourseOutcomes:

After Completion ofthiscourse,thestudentwill be able to:

- Analyze the concepts ofLogic Gatesand Boolean functions.
- Analyze CombinationalLogicand SequentialLogic 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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B. Tech IV Sem **L T P C**

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(IT20ASC401) EXPLORATORY DATA ANALYSIS WITH R

(CSE, CSM&IT) (Skill Oriented Course)

Course Objectives:

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

List of Experiments:

1: INTRODUCTION TO COMPUTING

a. Installation of R

b. The basics of R syntax, workspace

c. Matrices and lists

d. Subsetting

e. System-defined functions; the help system

f. Errors and warnings; coherence of the workspace

2: GETTING USED TO R: DESCRIBING DATA

a. Viewing and manipulating Data

b. Plotting data

c. Reading the data from console, file (.csv) local disk and web

d. Working with larger datasets

3: SHAPE OF DATA AND DESCRIBING RELATIONSHIPS

a. Tables, charts and plots.

b. Univariate data, measures of central tendency, frequency distributions, variation, and Shape.

c. Multivariate data, relationships between a categorical and a continuous variable,

d. Relationship between two continuous variables – covariance, correlation coefficients, comparing multiple correlations.

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

4: PROBABILITY DISTRIBUTIONS

a. Sampling from distributions – Binomial distribution, normal distribution

b. tTest, zTest, Chi Square test

c. Density functions

d. Data Visualization using ggplot – Box plot, histograms, scatter plotter, line chart, bar chart, heat maps.

5: EXPLORATORY DATA ANALYSIS

a. Demonstrate the range, summary, mean, variance, median, standard deviation, histogram, box plot, scatter plot using population dataset.

6: TESTING HYPOTHESES

a. Null hypothesis significance testing

b. Testing the mean of one sample

c. Testing two means

7: PREDICTING CONTINUOUS VARIABLES

a. Linear models

b. Simple linear regression

c. Multiple regression

d. Bias-variance trade-off – cross-validation

8: CORRELATION

a. How to calculate the correlation between two variables.

b. How to make scatter plots.

c. Use the scatter plot to investigate the relationship between two variables

9: TESTS OF HYPOTHESES

a. Perform tests of hypotheses about the mean when the variance is known.

b. Compute the p-value.

c. Explore the connection between the critical region, the test statistic, and the p-value

10: ESTIMATING A LINEAR RELATIONSHIP

Demonstration on a Statistical Model for a Linear Relationship

a. Least Squares Estimates

b. The R Function lm

c. Scrutinizing the Residuals

Course Outcomes:

- Install and use R for simple programming tasks (L3).
- Extract data from files and other sources and perform various data manipulation tasks on them (L3).
- Explore statistical functions in R (L4).
- Use R Graphics and Tables to visualize results of various statistical operations on data (L3).
- Apply the knowledge of R gained to data Analytics for real-life applications (L3).

Reference Books:

1. SandipRakshit, "Statistics with R Programming", McGraw Hill Education, 2018.

2. Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani, "AN Introduction to Statistical Learning: with Applications in R", Springer Texts in Statistics, 2017.

3. Joseph Schmuller, "Statistical Analysis with R for Dummies", Wiley, 2017.

4. K G Srinivasa, G M Siddesh, ChetanShetty, Sowmya B J, "Statistical Programming in R", Oxford Higher Education, 2017

Web References:

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

SOFTWARE REQUIREMENTS:

SOFTWARE: R Software , R Studio Software

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B. Tech IV Sem **L T P C**

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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
- Aders Riise Maehlum, "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

B. Tech IV Sem **L T P C**

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(MA20AMC401) ENGINEERING MATHEMATICS

(Common to All Branches of LE Students)

Course Objectives:

3. This course will illuminate the students in the concepts of calculus and linear algebra.
4. 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 realworld problems and their applications.

UNIT -1

Matrices

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,

Learning Outcomes:

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

5. 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

Linear differential equations of higher order

Definitions, complete solution, operator D, rules for finding complimentary function, inverse operator, rules for finding particular integral, method of variation of parameters, Applications to L-C-R Circuit problems.

Learning Outcomes:

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

- Identify the essential characteristics of linear differential equations with constant coefficients (L3)
- Solve the linear differential equations with constant coefficients by appropriate method (L3)

UNIT 4

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 -5

Vector Calculus

Vector differentiation

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

Vector integration

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

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. 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. RajnishVerma, 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)
- Solve the differential equations related to various engineering fields (L6) ☐
- Apply multiple integrals to find the area and volumes for different functions. (L3)
- Estimate the work done against a field, circulation and flux using vector calculus (L6)

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B. Tech V Sem **L T P C**
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(AM20APC501) ARTIFICIAL INTELLIGENCE

Course Objectives:

This course is designed to:

- Define Artificial Intelligence and establish the cultural background for study
- Understand various learning algorithms
- Explore the searching and optimization techniques for problem solving
- Provide basic knowledge on Natural Language Processing and Robotics

Unit – I:

Introduction: What is AI, Foundations of AI, History of AI, The State of Art.

Intelligent Agents: Agents and Environments, Good Behavior: The Concept of Rationality, The Nature of Environments, The Structure of Agents.

Learning Outcomes:

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

- Recognize the importance of Artificial Intelligence (L1)
- Identify how intelligent agent is related to its environment (L2)
- Build an Intelligent agent (L3)

Unit – II:

Solving Problems by searching: Problem Solving Agents, Example problems,

Searching for Solutions, Uninformed Search Strategies, Informed search strategies, HeuristicFunctions, Beyond Classical Search: Local Search Algorithms and Optimization Problems, Local Search in Continues Spaces, Searching with Nondeterministic Actions, Searching with partial observations, online search agents and unknown environments.

Learning Outcomes:

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

- Explain how an agent can formulate an appropriate view of the problem it faces. (L2)
- Solve the problems by systematically generating new states (L2)

- Derive new representations about the world using process of inference (L5)

Unit – III:

Natural Language for Communication: Phrase structure grammars, Syntactic Analysis, Augmented Grammars and semantic Interpretation, Machine Translation, Speech Recognition Perception: Image Formation, Early Image Processing Operations, Object Recognition by appearance, Reconstructing the 3D World, Object Recognition from Structural information Using Vision.

Learning Outcomes:

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

- Develop programs that translate from one language to another, or recognize spoken words.(L6)
- Explain the techniques that provide robust object recognition in restricted context.(L2)

Unit-IV:

Robotics: Introduction, Robot Hardware, Robotic Perception, planning to move, planning uncertain movements, Moving, Robotic software architectures, application domains Philosophical foundations: Weak AI, Strong AI, Ethics and Risks of AI, Agent Components, Agent Architectures, Are we going in the right direction, What if AI does succeed.

Learning Outcomes:

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

- Explain the role of Robot in various applications. (L2)
- List the main philosophical issues in AI. (L1)

Unit-V:

Uncertainty: Acting under Uncertainty, Basic Probability Notation, The axioms of Probability, Inference using Full joint Distribution, Temporal Models and Hidden Markov Models.

Learning Outcomes:

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

- Explain about Uncertainty(L2)
- Explain the techniques of Full joint Distribution and Temporals(L2)

Course outcomes:

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

- Apply searching techniques for solving a problem (L3)
- Design Intelligent Agents (L6)
- Develop Natural Language Interface for Machines (L6)
- Design mini robots (L6)
- Summarize past, present and future of Artificial Intelligence (L5)

Textbooks:

1. Stuart J.Russell, Peter Norvig, "Artificial Intelligence A Modern Approach", 3rd Edition,Pearson Education, 2019.

References:

1. Nilsson, Nils J., and Nils Johan Nilsson. Artificial intelligence: a new synthesis. Morgan Kaufmann, 1998.
2. Johnson, Benny G., Fred Phillips, and Linda G. Chase. "An intelligent tutoring system for the accounting cycle: Enhancing textbook homework with artificial intelligence." Journal of Accounting Education 27.1 (2009): 30-39.

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B.Tech V Sem

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(**AM20APC503**)**DATA WAREHOUSING AND DATA MINING**

Course Objectives:

- To understand data warehouse concepts, architecture, business analysis and tools
- To understand data pre-processing and data visualization techniques
- To study algorithms for finding hidden and interesting patterns in data
- To understand and apply various classification and clustering techniques using tools.

UNIT-1

DATA WAREHOUSING, BUSINESS ANALYSIS AND ON-LINE ANALYTICAL PROCESSING (OLAP) 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

DATA MINING – 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

DATA MINING - FREQUENT PATTERN ANALYSIS 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.

Learning Outcomes:

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

- Creating Decision Tree (L6)
- Evaluate Classification techniques (L5)

UNIT-V

Regression: Types of Regression: Linear Regression, Logistic Regression, Random Forest, Lasso Regression, Ridge Regression, Polynomial Regression, Application of Regressions

Learning Outcomes:

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

•understand different regression Methods

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.
- Apply suitable pre-processing and visualization techniques for data analysis
- Apply frequent pattern and association rule mining techniques for data analysis
- Apply appropriate classification and clustering techniques for data analysis

TEXT BOOK:

1. Jiawei Han and Micheline Kamber, —Data Mining Concepts and Techniques‖, Third Edition, Elsevier, 2012.

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.

B.Tech V Sem

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(AM20APC504) FORMAL LANGUAGES AND COMPILER DESIGN

Course Objectives:

- Introduce the student to the concepts of Theory of computation in computer science.
- The students should acquire insights into the relationship among formal languages, formal
- Grammars and automata.
- Classify machines by their power to recognize languages
- Understand the relationship between languages and their grammars.

UNIT – I

Formal Language and Regular Expressions: Languages, Definition Languages regular expressions, Finite Automata – DFA,NFA. Conversion of regular expression to NFA, NFA to DFA. Applications of Finite Automata to lexical analysis, lex tools.

Learning Outcomes:

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

- Recognize the importance of Artificial Intelligence (L1)
- Identify how FA is related to its environment (L2)
- Build an DFA and NFA (L3)

UNIT II

Context Free grammars and parsing: Context free grammars, derivation, parse trees, ambiguity LL(K) grammars and LL(1) parsing Bottom up parsing, handle pruning, LR Grammar Parsing, LALR parsing, parsing ambiguous grammars, YACC programming specification.

Learning Outcomes:

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

- Solve the problems of Parsers (L2)
- Understand the application of finite state machines, recursive descent, production rules, parsing, and language semantics(L1)

UNIT – III

Semantics: Syntax directed translation, S-attributed and L-attributed Grammars, Intermediate code – abstract syntax tree, translation of simple Statements and control flow statements. Context Sensitive features – Chomsky hierarchy of languages andre cognizers. Type checking, type conversions, equivalence of type expressions, overloading of functions and operations.

Learning Outcomes:

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

- Understand the Syntax Tree, Type Expressions and Type checking(L1)

UNIT – IV

Symbol table, Storage organization, storage allocation strategies scope access to now local names, parameters, language facilities for dynamics storage allocation. Code optimization Principal sources of optimization, optimization of basic blocks, peephole optimization, flow graphs, optimization techniques

Learning Outcomes:

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

- Understand the concepts of Storage allocation and optimization techniques(L1)
- Classify various storage allocation strategies and explain various data structures used in symbol tables(L3)

UNIT – V

Code generation: Machine dependent code generation, object code Forms, generic code generation algorithm, Register allocation and assignment. Using DAG representation of Block.

Learning Outcomes:

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

- Summarize various optimization techniques used for dataflow analysis

and generate machine code from the source code of a novel language(L3).

Course outcomes:

Upon completion of this course, the student should be able to:

- Explain deterministic and non-deterministic machines.
- Comprehend the hierarchy of problems arising in the computersciences.
- Design a deterministic finite-state machine to accept a specifiedlanguage.
- Explain how a compiler can be constructed for a simple context-free language.
- Determine a language's location in the Chomsky hierarchy (regularsets, Context-free,context-sensitive, and recursively enumerable languages).

Text Books:

1. John E. Hopcroft, Rajeev M & J D Ullman: "Introduction toAutomata Theory Languages &Computation", 3rd Edition, PearsonEducation, 2007.
2. Aho, Ullman, Ravisethi: "Compilers Principles, Techniques andTools", 2nd Edition, Pearson Education, 2009.

References:

1. Tremblay J P, Sorenson G P: "The Theory & Practice of Compilerwriting", 1st Edition, BSP publication, 2010.
2. Appel W & Andrew G M: "Modern Compiler Implementation inC", 1st Edition, Cambridge University Press, 2003.
3. Louden: "Compiler Construction, Principles & Practice", 1st Edition, Thomson Press, 2006.
4. Sipser Michael: "Introduction to Theory of computation", 1stEdition, Thomson, 2009

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B.Tech- V 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 aresidential 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 asper 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 buildingmaterials: 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 usesof 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 offoundations, 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 IndiaEducationServicesedition 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

(Autonomous)

B. Tech- V Sem

L	T	P	C
3	0	0	3

(EC20AOE501) BASIC VLSI DESIGN

Course Objectives:

1. Learn about the various processing steps involved in the fabrication of a nMOS, pMOS and CMOS transistors.
2. Learn about the various Design rules and Layout of MOS transistors.
3. Enable the students to learn about the Scaling Models and Scaling factors of MOS transistors.
4. Study the various examples of structured design.
5. Learn about the Testing concepts in VLSI Chip design.

Unit I

Review of Microelectronics and Introduction to MOS technology:

The IC era, Basic MOS transistors- Enhancement mode and Depletion mode transistor action, nMOS fabrication, CMOS fabrication-P-Well, N-Well and Twin-tub process, Drain-to-Source Current versus Voltage V_{DS} relationships, MOS transconductance, output conductance and Figure of Merit.

Unit II

MOS circuits and Design process:

The Pass transistor, nMOS inverter, Pull-up to Pull-down ratio of different cases, CMOS inverter and Latch-up in CMOS circuits, MOS layers, Stick diagrams-nMOS and CMOS design styles, Design rules and Layout- Lambda-based design rules, Contact cuts.

Unit III

Circuit Concepts and Scaling of MOS circuits:

Sheet resistance concept, Area Capacitance of layers and calculations, The Delay unit, Inverter delay, Driving large capacitance loads, Propagation delays and Wiring

capacitances, Scaling Models and Scaling factors, Scaling factors for various device parameters and its summary.

Unit IV

Subsystem Design:

Architectural issues, Switch logic, Gate restoring logic-The inverter, Two-input nMOS, CMOS and BiCMOS NAND and NOR gates and Other forms of CMOS logic.

Unit V

Test and Testability:

System partitioning, Layout and Testability, Reset/Initialization, Design for Testability, Testing Combinational Logic and Sequential Logic, Practical Design for Test guidelines, Scan Design Techniques and Built-In-Self-Test (BIST).

Text Books:

1. K.Eshraghian, D.A. Pucknell and S.Eshraghian, "Essentials of VLSI Circuits and Systems", Third Edition, PHI Learning Pvt. Ltd., 2019.
2. W.Wolf "Modern VLSI Design IP based design" Fourth edition, PHI Learning Pvt. Ltd., 2020.

References:

1. Mead, C.A and Conway, L.A., "Introduction to VLSI Systems", Addison –Wesley, USA, 1980.
2. Neil H. E. Weste & D.M.Harris, "CMOS VLSI Design-A Circuits and Systems Perspective", Fourth edition, Pearson Edition, 2020.

Course Outcomes:

CO1: Outline the processing steps in the fabrication of a nMOS, pMOS and CMOS structure.

CO2: Illustrate the Layout procedure of simple MOS circuit using Lambda based design rules.

CO3: Summarize the scaling effects of various key parameters of MOSFET devices.

CO4: Design various MOS based logic circuits.

CO5: Develop algorithms for automatic test generation for combinational and sequential circuits.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech- V Sem

L	T	P	C
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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 sate 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.
2. 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 FaridGolnaraghi, "Automatic Control Systems" 8th edition, John wiley and sons, 2003.
3. Joseph J Distefano III, "Feedback and Control Systems", Allen R Stubberud& Ivan J Williams, 2nd Edition, Schaum's outlines, McGraw Hill Education, 2013.
4. Graham C. Goodwin, "Control System Design" Stefan F. Graebe and Mario E. Salgado, Pearson, 2000.
5. 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.

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B.Tech - V Sem

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3	0	0	3

(ME20AOE502) SOLAR AND WIND ENERGY SYSTEMS

Prerequisites: Power Plant Engineering

Course Objectives:

- Familiarize with basics of solar radiation, available solar energy and its measurement.
- Familiarize with solar collectors, construction and operation of solar collectors.
- Understand solar energy conversion systems, applications and power generation.
- Familiarize the wind energy sources assessment
- Explain basics of designing aerofoil

UNIT – 1:

Solar radiation and collectors: Solar angles – Sun path diagrams – Radiation - extra terrestrial characteristics - measurement and estimation on horizontal and tilted surfaces - flat plate collector thermal analysis - testing methods-evacuated tubular collectors - concentrator collectors – classification - design and performance parameters - tracking systems - compound parabolic concentrators - parabolic trough concentrators - concentrators with point focus - Heliostats – performance of the collectors.

Solar thermal technologies: Principle of working, types, design and operation of - Solar heating and cooling systems - Thermal Energy storage systems – Solar Desalination – Solar cooker : domestic, community – Solar pond – Solar drying.

Learning Outcomes:

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

- Explain the basic concepts of solar radiation and solar collectors (L2)
- Develop sun path diagrams (L3)
- Explain the concepts of tracking systems (L2)
- Discuss the working principles of solar thermal technologies (L6)

- Develop design and operation of solar heating and cooling systems (L3)
- Explain the principles of thermal storage systems (L2).

UNIT – 2:

Solar PV fundamentals: Semiconductor – properties - energy levels - basic equations of semiconductor devices physics. Solar cells - p-n junction: homo and hetro junctions - metal-semiconductor interface - dark and illumination characteristics - figure of merits of solar cell - efficiency limits - variation of efficiency with band-gap and temperature - efficiency measurements - high efficiency cells – Solar thermo-photovoltaics.

SPV system design and applications: Solar cell array system analysis and performance prediction- Shadow analysis: reliability - solar cell array design concepts - PV system design - design process and optimization - detailed array design - storage autonomy - voltage regulation - maximum tracking - centralized and decentralized SPV systems - stand alone - hybrid and grid connected system - System installation - operation and maintenances - field experience - PV market analysis and economics of SPV systems.

Learning Outcomes:

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

- Explain the properties of a semiconductor (L2)
- Apply the principles of solar thermo photovoltaics (L3)
- Outline the applications of SPV system (L2)
- Analyze the performance of a solar cell array system (L4)
- Utilize centralized and decentralized SPV systems (L3)

UNIT – 3:

Introduction: Historical Perspectives on Wind Turbines- Indian Energy Scenario - Global Energy Scenario - Introduction to Indian Wind Industry - Wind Energy potential of India and Global Wind Installations.

Basics of Wind Resource Assessment: Power in the wind –Wind Characteristics - Measurement of wind using anemometers (cup anemometer, propeller anemometer, pressure plate anemometer, pressure tube anemometer, sonic anemometer and other remote wind speed sensing techniques) –Turbulence-Wind Power Density –Average wind speed calculation - Statistical models for wind data analysis (Weibull and Rayleigh

distribution). Energy estimation of wind regimes – Wind Rose, Wind Monitoring Station Siting and Instrumentation.

Learning Outcomes:

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

- Recall historical perspective of wind turbines(L1)
- Relate Indian and globalenergy requirements(L1)
- Interpret power in the wind (L2)
- Classify different wind speed measuring instruments(L2)
- Apply different statistical models for wind data analysis (L3)

UNIT – 4:

Wind Energy Conversion Systems: Types - Components of Modern Wind Turbine (HAWT and VAWT) - Fixed and Variable Speed operations - Power Control (Passive stall, Active pitch, Passive pitch and Active stall) - Electrical aspects of wind turbine, Safety of wind turbines.

Learning Outcomes:

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

- Utilize different wind parameters for design of rotor (L3)
- Make use of power curve for energy estimation (L3)
- List different components of modern wind turbine (L1)
- Explain how to control the power of a wind turbine (L2)
- Name different safety measures of wind turbine (L1)

UNIT – 5:

Wind Farm Design and Health (Condition) Monitoring: Planning of wind farm, Site selection, Micro siting, Grid Integration, Power evacuation, Wind Farm Feasibility Studies, Preparation of DPR, Environmental Benefits and Impacts.

Small Wind Turbines: Water pumping wind mills, offshore wind energy, Wind turbine testing, future developments.

Learning Outcomes:

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

- Plan the wind farm(L3)

- Analyze the feasibility of wind farm(L4)
- List the environmental benefits and impacts (L1)
- Explain about small wind turbines(L2)

Textbooks:

1. Goswami D.Y., Kreider, J. F. and Francis., "Principles of Solar Engineering', Taylor and Francis, 2000.
2. Chetan Singh Solanki, "Solar Photovoltatics – Fundamentals, Technologies and Applications", PHI Learning Private limited, 2011.

Reference Books:

1. Sukhatme S.P.,. Nayak.J.P, 'Solar Energy – Principle of Thermal Storage and collection", Tata McGraw Hill, 2008.
2. Sathyajith Mathew, Wind Energy Fundamentals, Resource Analysis and Economics, Springer Publications, (2006).
3. Wei Tong, Wind Power Generation and Wind Turbine Design, WIT Press,(2010)
4. Wind Power, Revised Edition: Renewable Energy for Home, Farm, and Business, Paul Gipe, 2004, Chelsea Green Publishing.
5. A.R. Jha, Wind Turbine Technology, CRC Press, (2010).

Course Outcomes:

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

- **Explain** the basic concepts of solar radiation and solar collectors (L2)
- **Develop** sun path diagrams (L3)
- **Explain** the properties of a semiconductor (L2)
- **Apply** the principles of solar thermo photovoltaics (L3)
- **Utilize** different wind parameters for design of rotor (L3)
- **Make** use of power curve for energy estimation (L3)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.TechV- Sem

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3	0	0	3

(AM20APE501) COMPUTER NETWORKS
(Professional Elective-I)

Course objectives:

This course is designed to

- Understand the basic concepts of Computer Networks.
- Introduce the layered approach for design of computer networks
- Familiarize with the applications of Internet
- Explore the network protocols used in Internet environment
- Explain the format of headers of IP, TCP and UDP
- Elucidate the design issues for a computer network

UNIT-I

Computer Networks and the Internet: What is the Internet?, The Network Edge, The Network Core, Delay, Loss, and Throughput inPacket-Switched Networks, Protocol Layers and their Service Models, Networks under attack, History of Computer Networking and the Internet.

Learning outcomes:

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

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

UNIT- II:

The Layer: Links, Access Networks, and LANs Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window Protocols Introduction to the Link Layer, Error-Detection and -Correction Techniques, Multiple Access Links and Protocols, Switched Local Area NetworksLink Virtualization: A Network as a Link Layer, Data Centre 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)

UNIT-III

The Network Layer: Routing Algorithms, Internetworking, The Network Layer in The Internet.

Learning outcomes:

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

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

UNIT-IV

Transport Layer: Connectionless Transport: UDP the Internet Transport Protocols: TCP, Congestion Control.

Learning outcomes:

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

- Design Congestion control algorithms (L6)
- Select the appropriate transport protocol for an application (L3)
- Identify the transport layer services (L3)

UNIT-V

Principles of Network Applications: The Web and HTTP, Electronic Mail in the Internet, DNS—The Internet's Directory Service, Peer-to-Peer Applications Video

Streaming and Content Distribution Networks.

Learning outcomes:

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

- Design new applications of a computer network (L6)
- Analyze the application protocols (L4)
- Extend the existing applications (L2)

Course Outcomes

Students will be able to :

1. Identify the software and hardware components of a Computer network (L3)
2. Develop new routing, and congestion control algorithms (L3)
3. 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:

4. Andrew S.Tanenbaum, David j.wetherall, "Computer Networks", 5th Edition, PEARSON.
5. James F. Kurose, Keith W. Ross, "Computer Networking: A Top-Down Approach", 6th edition, Pearson, 2019.

REFERENCE BOOKS:

1. Forouzan, "Datacommunications and Networking", 5th Edition, McGraw Hill Publication.
2. Youlu Zheng, Shakil Akthar, "Networks for Computer Scientists and Engineers", Oxford Publishers, 2016

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B.TechV Sem

L	T	P	C
3	0	0	3

(**AM20APE502**) **DIGITAL IMAGE PROCESSING**

Course Objective:

- The objective of this course is to provide the knowledge of image processing and pattern recognition and apply these concepts in image processing and recognition applications of having commercial values in industry and business management.

Unit 1:

Introduction: Digital Image Processing

Digital image representation, Digital image processing: Problems and applications, Elements of visual perception, Sampling and quantization, some basic relationships like Neighbors, Connectivity, Distance, Measures between pixels, Visual Perception

Learning Outcomes:

- Learnt about represent the Digital image
- Learnt about the Elements of visual representation.

Unit II:

Image Enhancement in Spatial Domain

Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic and Logic operations, Basics of Spatial Filters, Smoothening and Sharpening Spatial Filters, Combining Spatial Enhancement Methods

Learning Outcomes:

- Learnt different types of operations.
- Learnt different types of filters

Unit III:

Image Enhancement in the Frequency Domain

Introduction to Fourier Transform and the frequency Domain, Computing and Visualizing the 2D DFT, Smoothing and Sharpening using Frequency Domain Filters, Hadamard transform, Haar transform and Discrete Cosine transform, Fast Fourier Transform

Learning Outcomes:

- Learnt Fourier Transform and the frequency Domain
- Learnt different types of Transforms

Unit IV:

Image Restoration

The Image Degradation / Restoration Process, Noise Model based Restoration, Spatial filtering, Periodic Noise Reduction by Frequency Domain Filtering, Inverse filtering, Wiener filtering, Geometric Mean Filter **Color Processing:** Color Fundamentals, Color Models, Pseudo color based Image Processing, Color transformations, Smoothing and Sharpening operations

Learning Outcomes:

- Learnt different types of restoration process.
- Learnt different types of color processing.

Unit V:

Image Compression

Coding, Inter pixel and Psychovisual Redundancy, Image Compression models, Lossless and Lossy Compressions. **Morphological Image Processing :**Logic Operations involving binary images, Dilation and Erosion, Opening and Closing, The Hit-or-Miss Transformation **Image Segmentation:** Detection of Discontinuities, Edge linking and boundary detection, Thresholding, Region Based Segmentation

Learning Outcomes:

- Learnt coding and compression models.
- Learnt Morphological Image Processing .

Course Outcomes:

1.Thorough understanding of theoretical foundation of fundamental Digital Image manipulation and processing steps like acquisition; preprocessing; segmentation; Fourier domain processingSkills on exploration and appropriate use of image processing methods / tools for business and management applications

Text Book:

1. Rafael C. Gonzalez & Richard E. Woods, "Digital Image Processing", PHI (2010).

Reference Books:

1.K. Jain, "Fundamental of Digital Image processing", PHI (2011).

2.P. Monique and M. Dekker, "Fundamentals of Pattern recognition", CRC (2007).

3.M. James, "Pattern recognition", BSP (2008).

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B.Tech V Sem

L	T	P	C
3	0	0	3

(AM20APE503)No SQL DATABASES

Course Objectives:

•Introduce No SQL and use of four types of No SQL 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 No SQL 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 OrientedStores,Key/ValueStores,DocumentDatabases,GraphDatabases,ExaminingTwoSimple Examples, Location Preferences Store, Car Make and Model Database, Working With Language Bindings.

Learning Out comes:

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

- Understand the fundamentals of No SQL(L2)
- Examine the concepts with two simple examples(L5)

UNIT II

Interacting with No SQL:

If No Sql Then What, Language Bindings For No SQL 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 No SQL Data Stores(L2)
- Explain how to perform various operations on Data(L2)

UNITIII

NoSQLStorageArchitecture: WorkingWithColumn-OrientedDatabases,HbaseDistributed Storage Architecture, Document Store Internals, Understanding Key/Value Stores in Memo cache dandRedis, 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 Value stores(L1).

UNIT IV

No SQL 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 InKey/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

Couched, 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)
- CompareindexingandorderinginMongodb,CouchdbandApacheCassandra(L4)

Course Outcomes:

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

- Identify type of No SQL data baseto implement business requirements(L3)
- Apply No SQL data modeling from application specific queries(L3)
- Demonstrate Atomic Aggregates and de-normalization as data modeling techniques too ptimize 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 No SQL into an existing application(L6)

Text Books:

1) Pramod SadalageandMartinFowler,No SQLD istilled,Addison-WesleyProfessional,2012.
2) DanMcCrearyandAnnKelly,MakingSenseofNoSQL,ManningPublications,2013

References:

1) ShashankTiwari,ProfessionalNoSQL,WroxPress,Wiley,2011,ISBN:978-0-470-94224-6
2) Gaurav Vaish, Getting Started with NoSQL, Pact Publishing,2013.

B.Tech V Sem

L	T	P	C
3	0	0	3

(AM20APC502) ARTIFICIAL INTELLIGENCE AND DATA MINING TOOLS LAB

Course Outcomes (CO):

- Able to learn different logic programming languages
- Able to apply and analyze various problem-solving techniques an artificial intelligence problems.
- Acquire skill to identify the given problem and design the rule based systems.
- Develop better understanding to represent various real life problem domains using logic based techniques and use this to perform inference or planning.
- Understand the working knowledge in Lisp and demonstrate that for solving the artificial intelligent problems.

List of Programs

- Write simple fact for the statements using PROLOG.
- Write predicates One converts centigrade temperatures to Fahrenheit, the other checks if a temperature is below freezing.
- Write a program to solve the Monkey Banana problem.
- Write a program to solve 4-Queen problem.
- Write a program to implement Hill Climbing Algorithms.
- Demonstration of preprocessing on dataset student.arff
- Demonstration of Association rule Process on any dataset by using apriori algorithm
- Demonstration of classification rule process on any dataset by using naïve bayes algorithm
- Demonstration of clustering rule process on any dataset.
- Demonstrate performing Regression on dataset.

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B.Tech V Sem

L	T	P	C
3	0	0	3

(**AM20APC505)COMPILER DESIGN LAB**

Course Outcomes

1. Able to use lex and yacc tools for developing a scanner and a parser.

2. Able to design and implement LL and LR parsers.

List of Programs

1.Write a C program to implement the design of a Lexical analyzer to recognize the tokens defined by the given grammar.

2. Implement the lexical analyzer using JLex, flex or other lexical Analyzer generating tools.

3. Implement Predictive parsing algorithm

4. Write a C program to generate three address code.

5. Implement SLR(1) Parsing algorithm

6. Design LALR bottom up parser for the given language

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B.Tech V Sem

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(EG20ASC301)SOFTSKILLS
SOC – I

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

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 –Ethics and 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

VERBALSKILLS

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" SoftSkills",Cengage Learning, 2018.
2. S. Balasubramaniam, "Soft Skills for Interpersonal Communication", Orient Black Swan, 2017.

References

1. Barun K. Mitra, "Personality Development and Soft Skills", –OXFORD Higher Education 2018.
2. AlkaWadkar, "Life Skills for Success ", Sage Publications 2016.
3. Robert M Sheffield, "Developing Soft Skills", Pearson, 2010.
4. DianaBooher, "Communicate With Confidence", TataMcGrawhill, 2012.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech VI

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(BA20AMC501)MANDATORYCOURSE:CONSTITUTION OF INDIA

Course Objectives:

- To enable the student to understand the importance of constitution
- To understand the structure of executive, legislature and judiciary
- To understand philosophy off undamental 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.
- Tounderstandthecentral-staterelationinfinancialandadministrativecontrol

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

- Under stand 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–LokSabha–RajyaSabha - The Supreme Court and High Court-Powers

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 Highcourt

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 ChiefMinister
- 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 –ZillaParishath - Elected officials and their roles – CEO, ZillaParishath –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 ZillaParishath block level organization

UNIT-V

Election Commission-Election Commission-Roleof 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 commission sviz 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 ie., 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.

Textbooks:

1. J.A. Siwach,"DynamicsofIndianGovernment&Politics".
2. H.M.Sreevai,"ConstitutionalLawofIndia",4theditionin3volumes(UniversalLawPublication)

3. J.C.Johari, "Indian Government and Politics", Hans India

4. M.V.Pylee, "Indian Constitution", Durga Das Basu, Human Rights in Constitutional Law, Prentice–Hall of India Pvt. Ltd. New Delhi

References:

1. J.A. Siwach,"Dynamics of Indian Government & Politics".

2. H.M.Sreevai,"ConstitutionalLawofIndia",4theditionin3volumes(UniversalLawPublication)

3. J.C.Johari, "Indian Government and Politics",HansIndia

4. M.V.Pylee, "Indian Constitution", Durga DasBasu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd. New Delhi

E-RESOURCES:

- nptel.ac.in/courses/109104074/8
- nptel.ac.in/courses/109104045/
- nptel.ac.in/courses/101104065/
- www.hss.iitb.ac.in/en/lecture-details

  www.iitb.ac.in/en/event/2nd-lecture-institute-lecture-series-indian-constitution

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B.Tech V Sem **L T P C**
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(CH20AMC301)BIOLOGYFORENGINEERS
(Mandatory Non-Credit Course - V)

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

Brief introduction about human physiology and bioengineering.
Tounderstandhereditaryunits,i.e.DNA(genes)andRNAandtheirsynthesisinlivi ngorganism.
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 Out comes:

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 Bio molecules

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 bio molecules? their roleinlivingcells,theirstructure,functionandhowtheyareproduced.(L1)

Interpret the relationship between the structure and function of nucleic acids.(L2)
Summarize the applications of enzymes inindustry.(L3)
Understandwhatisfermentationanditsapplicationsoffermentationininindustry.(L4)

Unit III: Human Physiology

Nutrition: Nutrients or food substances. Digestive system, Respiratory system, (aerobic andanaerobicRespiration).Respiratoryorgans,respiratorycycle.Excretorysystem.

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 genestructure.DNA replication, Transcription and Translation. R DNA technology. Introduction to gene cloning.

Unit Out comes:

After completing this unit, the student will be able to
Understand and explain about gene structure and replication in prokaryotes and Eukaryotes (L1)How genetic material lis replicated and also understand show RNA and proteins are synthesized.(L2)
UnderstandaboutrecombinantDNAtechnologyanditsapplicationindifferentfields. (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 Out comes:

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 bio sensors, 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 cell sand their structure and function. Different type so f cell sand basics for classification of living Organisms.
Explain about bio molecules ,their structure and function and their role in the living organisms. How bio molecules 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,CellandMolecularBiology,5th Edition,RastogiPublications-
2. U.Satyanarayana. Biotechnology, Books&Allied Ltd2017

Reference Books:

1. N.A.Campbell,J.B.Reece,L.Urry,M.L.CainandS.A.Wasserman,"Biology:A GlobalApproach",PearsonEducationLtd,2018.
2. TJohnson,BiologyforEngineers,CRCpress,2011
3. J.M.WalkerandE.B.Gingold,MolecularBiologyandBiotechnology2nd ed..Pan imaPublications.PP434.
4. DavidHames,InstantNotesinBiochemistry–2016
5. Phil Tunner, A. Mctennan, A. Bates & M. White,Instant Notes – Molecular Biology –-2014

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B.Tech V Sem **L T P C**

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(IT20AMC501) PROBLEMSOLVINGAND PROGRAMMING FOR LE
(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 Structures.
- To familiar with Dynamic memory allocation concepts.
- To apply concepts of structures and files to solve real word problems.

Unit1

Introduction to Problem Solving: Problem solving Aspect, Problem identification, Problem understanding, Algorithm development, Solution planning ,flowcharts, flowgorithm.

Overview of C:

HistoryofC,CLanguageelements,BasicstructureofCprograms,variablesanddatatypes,CTokens,OperatorsandExpressions, 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 writes imple C programs(L3).

Unit2

Control Statements :Selection Statements-I f 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).

Unit3

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 Structure d programs using Functions(L5).
2) Apply arrays concept son real time applications(L6).

Unit4

Pointers: Declaration and Initialization of point ervariables, Point erarithmetic, Pointers and arrays, Pointer to pointer, Array of pointers, Pointers and functions, Dynamic memory allocation.

Strings: Introduction to Strings, Stringh and ling functions, Preprocessors.

Learning Outcomes: The students will be able to

1)Use pointers to write c Programs(L3).Understand th econcepts of preprocessors(L2).

3)Apply Dynamic Memory Allocation concepts on real time applications(L6).

Unit5

Structures: Introduction, Nested structures, Array of structures, Structures and functions, Unions. **Filesin C:**UsingFilesinC, Readdata from files, Writing data to files, Random accessto files ofrecords, Commandline Arguments

Learning Out comes: 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. ReemaThareja,ProgramminginC,OxfordUniversityPress,AICTEEdition,2018.
2. R.G.Dromey,"HowtoSolveitbyComputer".2014,Pearson.

Reference Books:

1. JeriR.Hanly,EllotB.Koffman,ProblemSolvingandProgramDesigninC,5/e,Pearson
2. B.A.ForouzanandR.F.Gilberg,ComputerScience:AStructuredProgrammingApproachUsingC,3/e,Cengage Learning,2007.
3. BrianWKernighan and DennisM Ritchie,The CProgramming Language, Second Edition, Prentice Hall Publication.
4. PaulDeitel,HarveyDeitel-CHowtoProgramwithanintroductiontoC++,EighthEdition,

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

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B.Tech VI Sem

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(AM20APC601) BIG DATA ANALYTICS

Course Objectives:

1. To understand the need of Big Data, challenges and different analytical architectures
2. Installation and understanding of Hadoop Architecture and its ecosystems
3. To understand the concepts of distributed file system and Map Reduce programming
4. To understand Big Data with Advanced architectures like spark.

Unit-I

Introduction Big Data and Hadoop Frame work

Data Storage and Analysis - Characteristics of Big Data – Big Data Analytics - Typical Analytical Architecture – Requirement for new analytical architecture – Challenges in Big Data Analytics – Need of big data frameworks, Installation of Hadoop in Virtual Environment, Introduction to Hadoop ecosystems, Business Intelligence vs. Data Analytics.

Hadoop Framework: Hadoop – Requirement of Hadoop Framework, Design principle of Hadoop –Comparison with other system, Hadoop Components, Hadoop Daemon's, Overview of Hadoop- comparing SQL databases and Hadoop, Distributed File System: HDFS, Design of HDFS writing files to HDFS Reading files from HDFS.

Learning Outcomes:

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

- Identify the characteristics of datasets. (L3)
- Compare trivial data and big data for various applications. (L4)
- Choose and implement various ways of selecting suitable model parameters.
- Understand and apply scaling up Hadoop techniques and associated technologies. (L2)
- Estimate suitable test data. (L5)
- Analyze the procedure of storing, retrieving and writing data in HDFS environment. (L3)

Unit-II

MapReduce Programming

Developing MapReduce Program Anatomy of MapReduce Code - Simple Map Reduce Program- counting thing, Map Reduce types and formats, MapReduce features, Combiner optimization, Map side join, Reduce Side Join, Secondary sorting, Pipelining MapReduce jobs.

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-III

Hadoop Environment: Setting up a Hadoop Cluster, Cluster specification, Cluster Setup and Installation, Hadoop Configuration, Security

Hadoop Ecosystems: Introduction to Hadoop ecosystem technologies: Serialization: AVRO, Co-ordination: Zookeeper, Databases: HBase, Hive, Scripting language: Pig, Streaming: Flink, Storm.

Learning Outcomes:

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

- Show the cluster setup and installation. (L2)
- Demonstrate the Configure the Hadoop. (L2)
- Compare Hadoop with various Databases. (L5)

Unit-IV

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

Learning Outcomes:

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

- Explain different types of NoSQL Databases.(L2)
- Illustrate the Emergence of NoSQL.(L2)
- Outline the application and Integration of NoSQL Databases.(L2)

Unit-V

Spark Framework

Overview of Spark – Hadoop vs Spark – Cluster Design – Cluster Management – performance, Application Programming interface(API): Spark Context, Resilient Distributed Datasets, Creating RDD,RDD Operations, Saving RDD - Lazy Operation – Spark Jobs-spark ML library.

Case Study: Data Analysis with Spark Shell

Writing Spark Application - Spark Programming in Scala, Python, R, Java - Application Execution.

Learning Outcomes:

- At the end of the unit, students will be able to:
- Explain the frameworks of Spark. (L2)
- Compare Hadoop and Spark(L4)
- Learn how to build an Spark application.(L1)

Course Outcomes:

- Understand and apply scaling up Hadoop techniques and associated technologies. (L2)
- Explore the Anatomy of MapReduce. (L5)
- Illustrate the Emergence of NoSQL.(L2)
- Compare Hadoop and Spark(L4)
- Explain the frameworks of Spark. (L2)

Text Books:

1. TomWhite,"Hadoop:TheDefinitiveGuide",O'Reilly,4thEdition,2015.
2. Donald Miner, Adam Shook, "Map Reduce Design Pattern", O'Reilly, 2012
3. Mike Frampton, "Mastering Apache Spark", Packt Publishing,2015.
4. Reference:
5. Nick Pentreath, Machine Learning with Spark, Packt Publishing, 2015.
6. Mohammed Guller, Big Data Analytics with Spark, Apress, 2015.

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B.Tech VI Sem

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(AM20APC603)MACHINE LEARNING

Course Objectives:

This course is designed to:

- Understand the basic theory underlying machine learning
- Formulatemachinelearningproblemscorrespondingtodifferentapplications.
- Illustratearangeofmachinelearningalgorithmsalongwiththeirstrengthsandweaknesses
- Applymachinelearningalgorithmstosolveproblemsofmoderatecomplexity.
- Understand how Machine Learning imbibes the philosophy of Human learning.

UNIT I

Introduction: Introduction to Machine Learning: Introduction. Different types of learning, Hypothesis space and inductive bias, Evaluation. Training and test sets, cross validation, Concept of over fitting, under fitting, Bias and Variance.

Linear Regression: Introduction, Linear regression, Simple and Multiple Linear regression, evaluating regression fit.

Learning Outcomes:

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

Understand Bias and Variance(L1)

Learn the basics of learning problems with hypothesis and version spaces(L1)

UNIT II

Decision tree learning: Introduction, Decision tree representation, appropriate problems for decision tree learning, the basic decision tree algorithm, hypothesis space search in decision tree learning, inductive bias in decision tree learning, issues in decision tree learning, Python exercise on Decision Tree.(Principal Component Analysis) , Python exercise on kNN and PCA.

Learning Outcomes:

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

- Understand how to evaluate models generated from data(L1)

UNIT III

Instance based Learning: K nearest neighbor, the Curse of Dimensionality, **Feature Selection:** forward search, backward search, univariate , multivariate feature selection approach, Feature reduction.

Probability and Bayes Learning(Move to Data Mining): Bayesian Learning, Naïve Bayes, Python exercise on Naïve Bayes, Logistic Regression.

Learning Outcomes:

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

UNIT IV

Support Vector Machine: Introduction, the Dual formulation, Maximum margin with noise, nonlinear SVM and Kernel function, solution to dual problem.

Artificial Neural Networks: Introduction, Biological motivation, ANN representation, appropriate, problem for ANN learning, Perception, multilayer networks and the back propagation algorithm;

Learning Outcomes:

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

- Understand the Support Vector Machine and Artificial Neural Networks algorithms(L1)

UNIT V

Ensembles: Introduction, Bagging and boosting, Random forest, Clustering: Introduction, K-mean clustering, agglomerative hierarchical clustering, Python exercise on k-mean clustering.

Learning Outcomes:

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

- Understand the Ensemble and clustering algorithms(L1)
- Apply Clustering Techniques to real world problems (L3)

Course Outcomes:

- Learn the basics of learning problems with hypothesis and version spaces(L2)
- Understand the features of machine learning to apply on real world problems(L1)
- Understand how to evaluate models generated from data(L1)
- Understand the Ensemble and clustering algorithms(L1)
- Apply Clustering Techniques to real world problems (L3)
- Understand how to evaluate models generated from data(L1)

TEXTBOOKS

1.Machine Learning. Tom Mitchell. First Edition, McGraw- Hill, 1997.

2.Alpaydin, Ethem. Introduction to machine learning. MIT press, 2020.

REFERENCES

1.Kevin P. Murphy, "Machine Learning: A Probabilistic Perspective", MIT Press, 2012

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B.Tech VI Sem

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(AM20APC605) NATURAL LANGUAGE PROCESSING

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, Shan non 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, Language Model Adaption, Types of Language Models, Language-Specific Modeling Problems ,Multilingual and Cross lingual 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 GordianKnot, The Problem, Structure of Anusaraka System, User Interface, Linguistic Area, Givingup 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 Automatic Summarization. (L6)

Course Outcomes:

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

- Build NLP applications using Python. (L6)
- Apply various Parsing techniques, Bayes Rule, Shannon game, Entropy and Cross Entropy. (L3)
- Explain the fundamentals of CFG and parsers and mechanisms in ATN's. (L2)
- Apply Semantic Interpretation and Language Modeling..(L3)
- Interpret Machine Translation and multilingual Information Retrieval systems and Automatic Summarization.(L2)

TEXTBOOKS:

1. James Allen, Natural language Understanding, 2nd Edition, 2003, Pearson Education.
2. Multilingual Natural Language Processing Applications: From Theory To Practice-Daniel M. Bikel and ImedZitouni, Pearson Publications.
3. Natural Language Processing, A Panini an perspective, Akshar Bharathi, Vineet chaitanya, Prentice–Hall of India.

REFERENCESBOOKS:

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

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B.Tech VI Sem

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(AM20APE601) CLOUD COMPUTING
Professional Elective – II

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, and Case Study: Video Trans coding 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 RES Tful 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, Map Reduce 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 Madisetti, "Cloud Computing A Handson Approach", Universities Press, 2018.

References:

1. Chris Hay, Brian Prince, "Azurein Action" Manning Publications [ISBN:9781935182481],2010.
2. HenryLi, "Introducing Windows Azure" A press; 1edition [ISBN:978-14302-2469-3],2009.

SRI VENKATESWARA COLLEGE OF ENGINEERING
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B.Tech VI Sem

(AM20APE602) COMPUTER APPLICATIONS USING PROGRAMMING TOOLS
Professional Elective-II

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

- ConceptofPointers,Structures&Unions.IntroductiontoDataStructures,TypesofData Structures(Primary&SecondaryDataStructures)
- 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. YeswanthKanethkar,Letus‘C’
2. BalaguruswamyE.,“Computer Programmingin‘C’”
3. Mark AllenWaise,“Data Structures”

REFERENCES

1. M.SExcel2000,MicrosoftCorporation
2. M.S.Office–Microsoft Corporation
3. VertonM.V.“Computer concepts for Agri Business”,AVIPub.Corp.,WestPort,USA.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech VI Sem

L	T	P	C
3	0	0	3

(AM20APE603) SOFTWARE PROJECT MANAGEMENT
Professional Elective -II

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, andprocess 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 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 organized is tint 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 theperspectives 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 theapplication 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, Tata Mc-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 Managent, Richard H. Thayer & Edward Yourdon, Second edition, Wiley India, 2004.
4. Agile Project Management, Jim Highsmith, Pearson education, 2004.

5. The art of Project management, Scott Berkun, O"Reilly, 2005.
6. Software Project Management in Practice, PankajJalote, Pearson Education,2002

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech- VI Sem

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(ME20AOE501) INTRODUCTION TO AUTOMATION

Pre-Requisite: Operation Research, Production & Operation Management

Course Objectives:

- To understand the basic concepts of Automation
- To understand the concepts of automation cycle and hardware components
- To gain knowledge about pneumatic and hydraulic devices
- To understand the concepts of sensors and actuators
- To know the use of Robotics used in industries automation

UNIT -I: Introduction to Automation Definition and fundamentals of automation, reasons for Automating, basic elements of an automated system: Power, Program and control system, safety, maintenance & repair diagnosis, error detection and recovery, Automation principles and strategies: USA principle, strategies of automation and production system, automation migration strategy

Learning Outcomes:

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

- To understand the fundamental concepts of automation and its basic elements
- To understand system safety requirements
- To understand about maintenance and repair strategies
- To know about production system automation

UNIT- II: Mechanization and Automation

Basic principles of Mechanization and automation, product cycle, hard Vs flexible automation, Capital- intensive Vs low cost automation. Types of systems-mechanical, electrical, hydraulic, pneumatic and hybrid systems, Automation using CAMS, Geneva mechanisms, gears etc.

Assembly line Automation: automated assembly systems, transfer systems, vibratory bowl feeders, non-vibratory feeders, part orienting, feed track, part placing & part escapement systems. Introduction to Material storage/ handling and transport systems, and its automation using AS/RS, AGVS and conveyors etc.

Learning Outcomes:

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

- To know about how to analyse the various automation methods

• To know about assembling and placing of various parts
• To distinguish between mechanization and automation of systems
• To know about material storage, handling and automation using various approaches

UNIT -III:

Pneumatics and hydraulics

Hydraulic and pneumatic devices-Different types of valves, Actuators and auxiliary elements in Pneumatics & hydraulics , their applications and use of their ISO symbols. Synthesis and design of circuits (up to 3 cylinders)–pneumatic, electro pneumatics and hydraulics. Design of Electro-Pneumatic Circuits using single solenoid and double solenoid valves; with and without grouping.

Learning Outcomes:

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

• To know design of various pneumatic and hydraulic components
• To understand about synthesis and design of Pneumatic circuits
• To understand about electro pneumatic circuits
• To design using various solenoid valves with and without grouping

UNIT -IV: Sensors & Actuators Sensors Selection of sensors (Displacement, temperature, acceleration, force /pressure) based on static and dynamic characteristics. Interfacing: Concept of interfacing, bit accuracy and sampling speed, amplifying electronics, and microcontroller. Actuators: Principle and selection of electro mechanical actuators (1) DC motors (2) Stepper Motors (3) Solenoid Actuators (4) Servo Motors (5) BLDC

Learning Outcomes:

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

• To know about selection of sensors and actuators based on dynamic characteristics
• To understand about necessity of interfacing sensors with Microcontroller
• To understand principle and selection of actuators
• To apply various electro mechanical actuators to certain machines

UNIT- V:

Robots and their applications

Introduction to robots, Types, Classifications, Selection of robots, Robot Degrees of freedom, Robot configuration, Accuracy and repeatability, Specification of a robot, Robot feedback controls: Point to point control and Continuous path control, Control system for robot joint, Adaptive control, Drives and transmission systems, End effectors, Industrial robot applications of robots

Learning Outcomes:

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

- To know about Robots, classification, selection and specifications
- To understand the use of robotics in industrial applications
- To know about various feedback controls of Robot
- To understand how adaptive control strategies can be used in Robots

TEXT BOOKS:

1. Stamatios Manesis and George Nikolakopoulos, "Introduction to Industrial Automation", CRC Press, 2018. 2. Frank Lamb, "Industrial Automation", Hands on, Mc Graw Hill Education, 2013.

REFERENCES:

1. Richerd L. Shell and Ernest L. Hall, "Hand Book of Industrial Automation", CRC Press, 2000.

- Through reading the text, references and discussion of cases students should be able to understand the fundamentals underlying the management of an Organization.
- Understand where the plant is to be located based on facilities available and what are the important factors affecting the facilities location of a plant, and plant layout.
- Determine work measurement techniques for time study.
- Recognize the importance of Inventory control to ensure their availability with minimum capital lock up.
- Understand the concepts of TQM, ISO, BIS etc.

Course Outcomes:

1. Understand the basic concepts of Industrial automation
2. Design and analysis of automation methods, placing and assembling of various parts
3. Design of various processing and control circuits using pneumatic and hydraulic elements
4. Selection of sensors based on the industrial application
5. Role of robotics in industrial applications

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech- VI Sem

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(EE20AOE503) RENEWABLE ENERGY RESOURCES (OPEN ELECTIVE)

Course Objectives:

1. Familiarize with basics of solar radiation, available solar energy and its measurement & Familiarize with solar collectors, construction and operation of solar collectors.
2. Understand solar energy conversion systems, applications and power generation &Familiarize the wind energy sources assessment
   To explain concept of various forms of renewable energy
3. To outline division aspects and utilization of renewable energy sources for both domestics and industrial applications
4. To analyse the environmental and cost economics of using renewable energy sources compared to fossil fuels

Unit -1:

Principles of Solar Radiation : Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

Unit -2:

Solar Energy Collection & Storage :

Solar Energy Collection: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

Solar Energy Storage and Applications :

Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications solar heating technique, solar distillation and drying, photovoltaic energy conversion

Unit -3:

Wind Energy & Bio-Mass :

Wind Energy : Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

Bio-Mass : Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C. Engine operation and economic aspects.

Unit -4:

Geothermal Energy & Ocean Energy:

Geothermal Energy : Resources, types of wells, methods of harnessing the energy, potential in India.

Ocean Energy : OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

Unit -5:

Direct Energy Conversion:

Direct Energy Conversion: Need for DEC, Carnot cycle, limitations, principles of DEC. Thermo-electric generators, Seebeck, Peltier and Joule Thomson effects, Figure of merit, materials, applications, MHD generators, principles, dissociation and ionization, hall effect, magnetic flux, MHD accelerator, MHD Engine, power generation systems, electron gas dynamic conversion, economic aspects. Fuel cells, principles, faraday's law's, thermodynamic aspects, selection of fuels and operating conditions.

Text Books:

1. Tiwari and Ghosal, Renewable energy resources, Narosa Publishing House-2004.
2. G.D. Rai, Non-Conventional Energy Sources, Khanna Publications-1988.

Reference Books:

1. Twidell & Weir, Renewable Energy Sources, Routledge; 3-e, 2015.
2. Sukhatme S.P.,. Nayak.J.P, 'Solar Energy – Principle of Thermal Storage and collection", Tata McGraw Hill, 2008.
3. Sathyajith Mathew, Wind Energy Fundamentals, Resource Analysis and Economics, Springer Publications, (2006).
4. Wei Tong, Wind Power Generation and Wind Turbine Design, WIT Press, (2010.)
5. Wind Power, Revised Edition: Renewable Energy for Home, Farm, and Business, Paul Gipe, 2004, Chelsea Green Publishing

Course Outcomes:

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

CO1: Explain the basic concepts of solar radiation and solar collectors

CO2: Develop the Bio - Energy Concepts

CO3: Explain the geothermal Energy ,Tidal and Wave Energy

CO4: Apply the principles of electrical technology to develop MHD power generator & Utilize different wind parameters for design of rotor

CO5: Make use of power curve for energy estimation and fuel cell Technology

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VI Sem

L	T	P	C
3	0	0	3

(EC20AOE602) SIGNAL PROCESSING

Course Objectives:

1. To introduce students to the basic idea of signal and system analysis and its characterization in time and frequency domains.
2. To present Fourier tools through the analogy between vectors and signals.
3. To teach concept of sampling and reconstruction of signals.
4. To analyze characteristics of linear systems in time and frequency domains.
5. To understand Laplace and z-transforms as mathematical tool to analyze continuous and discrete-time signals and systems.

UNIT I

SIGNALS & SYSTEMS:

Definition and classification of Signal and Systems (Continuous time and Discrete time), Elementary signals such as Dirac delta, unit step, ramp, sinusoidal and exponential and operations on signals. Analogy between vectors and signals-orthogonality-Mean Square error-Fourier series: Trigonometric & Exponential and concept of discrete spectrum

UNIT II

CONTINUOUS TIME FOURIER TRANSFORM:

Definition, Computation and properties of Fourier Transform for different types of signals. Statement and proof of sampling theorem of low pass signals.

UNIT III

SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS:

Linear system, impulse response, Response of a linear system, linear time-invariant (LTI) system, linear time variant (LTV) system, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, system bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Poly-Wiener criterion for physical realization, Relationship between bandwidth and rise time. Energy and Power Spectral Densities

UNIT IV

DISCRETE TIME FOURIER TRANSFORM:

Definition, Computation and properties of Fourier Transform for different types of signals.

UNIT V

LAPLACE TRANSFORM:

Definition-ROC-Properties-Inverse Laplace transforms-the S-plane and BIBO stability-Transfer functions-System Response to standard signals-Solution of differential equations with initial conditions.

The Z–TRANSFORM: Derivation and definition-ROC-Properties- Inverse Z-Transform-System analysis-Transfer function-BIBO stability-System.

TEXT BOOKS:

1. B. P. Lathi, "Linear Systems and Signals", Second Edition, Oxford University press.
2. A.V. Oppenheim, A.S. Willsky and S.H. Nawab, "Signals and Systems", Pearson, 2nd Edition.
3. A. Ramakrishna Rao, "Signals and Systems", 2008, TMH.

REFERENCES:

1. Simon Haykin and Van Veen, "Signals & Systems", Wiley, 2nd Edition.
2. B.P. Lathi, "Signals, Systems & Communications", 2009,BS Publications.

Course Outcomes:

CO1: Understand the mathematical description and representation of continuous-time and discrete-time signals and systems. Also understand the concepts of various transform techniques.

CO2: Apply sampling theorem to convert continuous-time signals to discrete-time signals and reconstruct back, different transform techniques to solve signals and system related problems.

CO3: Analyze the frequency spectra of various continuous-time signals using different transform methods.

CO4: Analyze the systems based on their properties and determine the response of them.

CO5: Analyze the frequency spectra of various discrete-time signals using different transform methods.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech-VI Sem

L	T	P	C
3	0	0	3

(CE20AOE603)Water Resources Planning &Management

Course Objectives:

This course

- Demonstrates Principles of Watershed Management
- Explains River basin Watershed Management Practices
- Imparts knowledge on conservation of water and its reuses
- Teaches the sustainable watershed approach
- Inculcates the knowledge of rainwater harvesting and GIS applications.

UNIT –I

Principles of Watershed Management: Basics concepts, Hydrology and water availability, Surface water, Groundwater, Conjunctive use, Human influences in the water resources system, Water demand, Integrated water resources system.

UNIT – II

River basin Watershed Management Practices in Arid and Semi-arid Regions, Watershed management through wells, Management of water supply - Case studies.

UNIT – III

Conservation of Water: Perspective on recycle and reuse, Waste water reclamation Social Aspects of Watershed Management: Community participation, Private sector participation, Institutional issues, Socio-economy, Integrated development, Water legislation and implementations.

UNIT –IV

Sustainable Watershed Approach: Sustainable integrated watershed management, natural resources management, agricultural practices, integrated farming, Soil erosion and conservation.

UNIT – V

Water Harvesting: Rainwater management - conservation, storage and effective utilization of rainwater, Structures for rainwater harvesting, roof catchment system, check dams, Geographical Information System and Remote Sensing in Watershed Management.

Course Outcomes (CO):

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

- Know the basic principles of watershed management.
- Know the river basin management practices
- Understand better different approaches for conservation of water.
- Identify sustainable watershed approach for resources management, prevention of soil erosion etc.,
- Different methods of rainwater harvesting management systems and role of GIS.

Textbooks:

1. Murthy, J.V.S., "Watershed Management in India", Wiley Eastern, New Delhi, 1994.

Reference Books:

1. Murty, J.V.S., "Watershed Management", New Age Intl., New Delhi 1998.
2. Allam, G.I.Y., "Decision Support System for Integrated Watershed Management", Colorado State University, 1994.
3. Vir Singh, R., "Watershed Planning and Management", Yash Publishing House, Bikaner,2000.
4. American Society of Civil Engineers, Watershed Management, American Soc. of Civil Engineers, New York, 1975

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech VI Sem

L	T	P	C
3	0	0	3

(AM20APC602)BIG DATA ANALYTICS LAB

COURSE OBJECTIVES

The course should enable the students to:

- Optimize business decisions and create competitive advantage with Big data analytics
- Practice java concepts required for developing map reduce programs.
- Impart the architectural concepts of Hadoop and introducing map reduce paradigm.
- Practice programming tools PIG and HIVE in Hadoop eco system.
- Implement best practices for Hadoop development.

1. Perform setting up and Installing Hadoop in its three operating modes. i. Standalone. ii. Pseudo distributed. iii. Fully distributed. b. Use web based tools to monitor your Hadoop setup.
2. To Understand Overall programming architecture of MapReduce API. Implement MapReduce Programming
3. To implement the following file management tasks in Hadoop: i. Adding files and directories ii. Retrieving files iii. Deleting files Hint: A typical Hadoop workflow creates data files (such as log files) elsewhere and copies them into HDFS using one of the above command line utilities.
4. Store the basic information about students such as roll no. and name using various collection types Map.
5. Implement matrix multiplication with Hadoop Map Reduce
6. To run a Grep program on Hadoop to understand MapReduce Paradigm: To count words in a given file, To view the output file, and To calculate execution time.
7. Installation of SPARK framework with or without Hadoop framework.
8. To study about the Hive commands using HQL (DDL and DML).

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech III-II Sem

L	T	P	C
3	0	0	3

(AM20APC604) MACHINE LEARNING LAB

Course Outcomes:

- Understand the mathematical and statistical prospectives of machine learning algorithms through python programming.
- Design and evaluate the unsupervised models through python in built functions.
- Evaluate the machine learning models pre-processed through various feature engineering algorithms by python programming.
- Design and apply various reinforcement algorithms to solve real time complex problems.

1. Basic exercises on Python Machine Learning Packages such as Numpy, Pandas and matplotlib.
2. Given a dataset. Write a program to compute the Covariance, Correlation between a pair of attributes. Extend the program to compute the Covariance Matrix and Correlation Matrix.
3. Given a set of sample points in N dimensional feature space. Write a program to fit the points with a hyper plane using Linear Regression. Calculate sum of residual error.
4. Write a program that provides option to compute different distance measures between two points in the N dimensional feature space. Consider some sample datasets for computing distances among sample points.
5. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
6. Write a program to implement k-Nearest Neighbor algorithm to classify the iris data set. Print both correct and wrong predictions. Python ML library classes can be used for this problem.
7. Write a program to implement feature reduction using Principle Component Analysis

8. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
9. Given a dataset for classification task. Write a program to implement Support Vector Machine and estimate it test performance.
10. Write a program to implement perceptions for different learning task.
11. Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.
12. Write a program to implement K means clustering algorithm. Select your own dataset to test the program. Demonstrate the nature of output with varying value of K.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech VI Sem

L	T	P	C
3	0	0	3

(AM20APC606) NATURAL LANGUAGE PROCESSING LAB

Course Objectives:

- To Develop algorithm for Semantics and Sentiment analysis using NLP.
- Train the students and researchers from basics to advanced NLP tools and techniques.
- To develop an Research ambience for product development and patenting.
- To transfer the novel technology to the industries for the benefit of society.
- Organize open scientific and technological competitions in the field of natural language processing.

1. Preprocessing of text (Tokenization, Filtration, Script Validation, StopWord Removal, Stemming)
2. Morphological Analysis
3. N-gram model
4. POS tagging
5. Chunking
6. Named Entity Recognition
7. Case Study based on Information Retrieval.
8. Virtual Lab on N-gram

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech VI Sem

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(AM20ASC601)FULL STACK DEVELOPMENT-I (Skill Oriented Course**)**

Course Outcomes:

At the end of the course, student will be

- Study and Implement WebPages using Basic and Advanced HTML.
- Differentiate between functionalities of Basic CSS and Advanced CSS.
- Implement basic JavaScript.
- Design Web pages using Ajax, j Query, PHP, PHP Advanced.

1.Explore Basic HTML Tags and Elements.

2.Familiarize with JS, and CSS, Animation using sample webpage.

3.Design a Webpage using advance HTML Form tags input–date, time, number, email, HTML5 Header And Footer, spell check and editable areas

4. Design a Webpage Demonstrating Drag and Drop Functionality.

5. Implement program demonstrating Local Storage and session storage.

6. Design a Webpage using Basic CSS Tags. Demonstrate Inline, Internal and External Style sheets using advanced CSS.
7. Design signup form to validate username, password, and phone numbers etc using Java script. Write a program to demonstrate Event Handling using JavaScript.(Minimum 3Events)
8. Design a Form using HTML and CSS and accept the data from it and insert it into Database using PHP.
9. Create a form with a text box asking to enter your favorite city with a submit button when the user enters the city and clicks the submit button another PHP page should be opened displaying "Welcome to the city".
10. Change a Content of webpage using AJAX. Perform Different Operations using JQUERY Selectors.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech –VI Sem **L T P C**
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(BA20AMC502)INTELLECTUAL PROPERTY RIGHTS

Course Objectives:

- This course introduces the student to the basics of Intellectual Property Rights, Copy Right Laws, Cyber Laws, Trade Marks and Issues related to Patents. The overall idea of the course is to help and encourage the student for startups and innovations

UNIT I

Introduction to Intellectual Property Law – Evolutionary past – Intellectual Property Law Basics – Types of Intellectual Property – Innovations and Inventions of Trade related Intellectual Property Rights – Agencies Responsible for Intellectual Property Registration – Infringement – Regulatory – Overuse or Misuse of Intellectual Property Rights – Compliance and Liability Issues.

UNIT II

Introduction to Copyrights – Principles of Copyright – Subject Matters of Copyright – Rights Afforded by Copyright Law –Copyright Ownership – Transfer and Duration – Right to Prepare Derivative Works –Rights of Distribution – Rights of performers – Copyright Formalities and Registration – Limitations – Infringement of Copyright – International Copyright Law-Semiconductor Chip Protection Act.

UNIT III

Introduction to Patent Law – Rights and Limitations – Rights under Patent Law – Patent Requirements – Ownership and Transfer – Patent Application Process and Granting of Patent – Patent Infringement and Litigation – International Patent Law – Double Patenting – Patent Searching – Patent Cooperation Treaty – New developments in Patent Law- Invention Developers and Promoters.

UNIT IV

Introduction to Trade Mark – Trade Mark Registration Process – Post registration procedures – Trade Mark maintenance – Transfer of rights – Inter parties Proceedings – Infringement – Dilution of Ownership of Trade Mark – Likelihood of confusion – Trade Mark claims – Trade Marks Litigation – International Trade Mark Law.

UNIT V

Introduction to Trade Secrets – Maintaining Trade Secret – Physical Security – Employee Access Limitation – Employee Confidentiality Agreement – Trade Secret Law – Unfair Competition – Trade Secret Litigation – Breach of Contract – Applying State Law.Introduction to Cyber Law – Information Technology Act – Cyber Crime and E-commerce – Data Security – Confidentiality – Privacy – International aspects of Computer and Online Crime.

Textbooks:

1. Deborah E.Bouchoux: "Intellectual Property". Cengage learning, New Delhi
2. Kompal Bansal &Parishit Bansal "Fundamentals of IPR for Engineers", BS Publications (Press)
3. Cyber Law. Texts & Cases, South-Western's Special Topics Collections

References:

1. Prabhuddha Ganguli: ' Intellectual Property Rights" Tata Mc-Graw – Hill, New Delhi
2. Richard Stim: "Intellectual Property", Cengage Learning, New Delhi.
3. R. Radha Krishnan, S. Balasubramanian: "Intellectual Property Rights", Excel Books. New Delhi.

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B.Tech VI Sem **L T P C**
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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. analyse 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, Utilisation 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

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B.Tech-VI Sem

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(MA20AMC301) Logical Skills for Professionals-II

(Mandatory Course)

Course Objectives:

- To learn the basic methods to find HCF, LCM Factors, Simplification, Pipes, Alligation or Mixture, Table, Bar Graphs and Pie Chart concepts.
- To understand the logic behind the Syllogism, Calender, Clocks and Number Series Analogy concepts.

UNIT –I

HCF, LCM Factors:

- Find the HCF and LCM of the given numbers by using Factorization method.
- Find the HCF and LCM of the given numbers by using Division method.

Simplification:

- Using BODAMS rule to find out the value of a given expression.
- Using Vernacular rule to find out the value of a given expression.

UNIT – II

Pipes

- Find the how much time taken to fill the tank by opening one pipe, two pipe and one after another.

Alligation or Mixture

- Using Ratio and proportion to solve the mixture problems.
- To find quickly calculate the price of a mixture, given that it is a mix of two elements having different prices.

UNIT – III

Table, Bar Graphs

- Find the Average sales of all branches for the respective years.
- Find the ratio of the total sales of respective branches.

Pie Charts

- Study the Pie chart and the table answer the questions based on them.

- Find the central angle of the components.

UNIT –IV

Syllogism

- Type-I: Different types of Venn diagrams with their implications.
- Type-II: Analyse the figure carefully and then answer certain questions regarding the given data.

UNIT – V

Calendars

- Find the day of the week on a given date
- Find the ordinary year and Leap year

Clocks

- Find the angle between the hour hand and minute hand of a clock.
- When the hands are at right angles.

Number Series Analogy

- Choosing a similarly related pair as the given number pair on the basis of the relation between the numbers in each pair.
- Choosing a number similar to a group of numbers on the basis of certain common properties that they possess..

Course Outcomes (CO):

- Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of HCF, LCM Factors and Simplification.
- Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of Pipes, Alligation or Mixture.
- Demonstrate knowledge basic mathematics to develop analytical skills to solving problems of Table, Bar Graphs and Pie Chart.
- Analyze the techniques in Syllogism.
- Analyze the techniques in Calendar, Clocks and Number Series Analogy concepts.

Textbooks:

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

Reference Books:

1. Quantitative Aptitude for Competitive Examinations, 14/e, 2010, AbhijitGuha, 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.

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B.Tech –VI Sem **L T P C**
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(BA20AMC502)INTELLECTUAL PROPERTY RIGHTS

Course Objectives:

- This course introduces the student to the basics of Intellectual Property Rights, Copy Right Laws, Cyber Laws, Trade Marks and Issues related to Patents. The overall idea of the course is to help and encourage the student for startups and innovations

UNIT I

Introduction to Intellectual Property Law – Evolutionary past – Intellectual Property Law Basics – Types of Intellectual Property – Innovations and Inventions of Trade related Intellectual Property Rights – Agencies Responsible for Intellectual Property Registration – Infringement – Regulatory – Overuse or Misuse of Intellectual Property Rights – Compliance and Liability Issues.

UNIT II

Introduction to Copyrights – Principles of Copyright – Subject Matters of Copyright – Rights Afforded by Copyright Law –Copyright Ownership – Transfer and Duration – Right to Prepare Derivative Works –Rights of Distribution – Rights of performers – Copyright Formalities and Registration – Limitations – Infringement of Copyright – International Copyright Law-Semiconductor Chip Protection Act.

UNIT III

Introduction to Patent Law – Rights and Limitations – Rights under Patent Law – Patent Requirements – Ownership and Transfer – Patent Application Process and Granting of Patent – Patent Infringement and Litigation – International Patent Law – Double Patenting – Patent Searching – Patent Cooperation Treaty – New developments in Patent Law- Invention Developers and Promoters.

UNIT IV

Introduction to Trade Mark – Trade Mark Registration Process – Post registration procedures – Trade Mark maintenance – Transfer of rights – Inter parties Proceedings – Infringement – Dilution of Ownership of Trade Mark – Likelihood of confusion – Trade Mark claims – Trade Marks Litigation – International Trade Mark Law.

UNIT V

Introduction to Trade Secrets – Maintaining Trade Secret – Physical Security – Employee Access Limitation – Employee Confidentiality Agreement – Trade Secret Law – Unfair Competition – Trade Secret Litigation – Breach of Contract – Applying State Law.Introduction to Cyber Law – Information Technology Act – Cyber Crime and E-commerce – Data Security – Confidentiality – Privacy – International aspects of Computer and Online Crime.

Textbooks:

4. Deborah E.Bouchoux: "Intellectual Property". Cengage learning, New Delhi
5. Kompal Bansal &Parishit Bansal "Fundamentals of IPR for Engineers", BS Publications (Press)
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4. Prabhuddha Ganguli: ' Intellectual Property Rights" Tata Mc-Graw – Hill, New Delhi
5. Richard Stim: "Intellectual Property", Cengage Learning, New Delhi.
6. R. Radha Krishnan, S. Balasubramanian: "Intellectual Property Rights", Excel Books. New Delhi.

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(AM20APE701) Intelligent Information Retrieval System

Course Objectives:

- Demonstrate genesis and diversity of information retrieval situations for text and hyper media
- Describe hands-on experience store, and retrieve information from www using semantic approache
- Analyze the performance of information retrieval using advanced techniques such as classification, clustering, and filtering over multimedia

Unit I

Introduction – Goals and History of IR – The Impact of the Web on IR – The Role of Artificial Intelligence (AI) in IR – Basic IR Models – Boolean and Vector Space Retrieval Models -Ranked Retrieval – Text similarity metrics – TF-IDF (term frequency/inverse document frequency) Weighting – Cosine Similarity.

Unit II

Metrics

Experimental Evaluation of IR – Performance metrics Recall, Precision and F measure - Evaluations on Benchmark Text Collections, Query Expansion

UNIT-III

Text Representation – Word Statistics – Zipf"s Law – Porter Stemmer – Morphology – Index Term Selection using Thesauri -Metadata and Markup Languages – Web Search Engines – Spidering – Metacrawlers – Directed Spidering – Link Analysis Shopping Agents.

UNIT-IV

Text Categorization- Rocchio, nearest neighbor, and naive Bayes. Applications to information filtering and organization. Using naive Bayes text classification for ad hoc retrieval. Improved smoothing for document retrieval.

UNIT-V

Text Clustering-Clustering algorithms: agglomerative clustering; k-means; expectation maximization (EM). Applications to web search and information organization.

Course Outcomes:

By the end of this course the student should:

- Understand the theoretical basis behind the standard models of IR.
- Understand the Experimental evaluation of IR.
- To be able to implement ,Text Representation.
- To be able to implement Text Categorization.
- To be Familiar with clustering algorithms.

Text books:

1 David A. Grossman, OphirFrieder, Information Retrieval – Algorithms and Heuristics, Springer, 2nd Edition(Distributed by Universal Press), 2004

2.Introduction to information retrieval by Christopher Manning,Prabhakar,Raghavan and Hinrich Schutze, Cambridge University Press,2009

3.. Richard K. Belew, "Finding Out About: A Cognitive Perspective on Search Engine Technology and the WWW", Cambridge University Press, 2001.

Reference Books:

1.Gerald J Kowalski, Mark T Maybury Information Storage and Retrieval Systems: Theory and Implementation, Springer, 2004.

2. SoumenChakrabarti, Mining the Web : Discovering Knowledge from Hypertext Data, Morgan – Kaufmann Publishers, 2002.

3. Christopher D Manning, PrabhakarRaghavan, HinrichSchutze, An Introduction to Information Retrieval By Cambridge University Press, England, 2009.

4. C. J. van Rijsbergen , "Information Retrieval".

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B.Tech VII Sem **L T P C**
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(AM20APE702) INTERNET OF THINGS

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

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:

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

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:

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

UNIT - III:

IOT Architecture and Protocols

Architecture Reference Model- Introduction, Reference Model and architecture, IOT reference Model, Protocols-6Low PAN, RPL, COAP, MQTT, IOT frame works-Thing Speak.

Learning Outcomes:

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

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:

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

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 Flyt Base.

Learning Outcomes:

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

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
- AnalyzevariousM2MandIoTarchitectures
- Evaluate design issues in IOT applications
- Create IOT solutions using sensors, actuators and Devices

Textbooks:

1. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-on-Approach)", 1stEdition,VPT,2014.
2. Handbook of unmanned aerial vehicles, K Valavanis; George J Vachtsevanos, New York, Springer, Boston, Massachusetts: Credo Reference, 2016.

Reference Books:

1. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1stEdition, Academic Press,2014.
2. Arshdeep Bahga, Vijay Madisetti - Internet of Things: A Hands-On Approach, UniversitiesJNTUAB.Tech.R20RegulationsPress,2014.
3. The Internet of Things, Enabling technologies and use cases – Pethuru Raj, Anupama C. Raman, CRCPress.
4. Francis da Costa, "Rethinking the Internet of Things: A Scalable Approach to ConnectingEverything",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. DGCARPAS 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
   https://nptel.ac.in/courses/108108098/4

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B.Tech VII Sem

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(AM20APE703) RECOMMENDER SYSTEMS

Course Objectives:

- Understand the basic concepts of recommender systems
- Solve mathematical optimization problems pertain to recommender systems
- Carry out performance evaluation of recommender systems based on various metrics
- Implement machine-learning and data-mining algorithms in recommender systems data sets.
- Design and implement a simple recommender system.
- Learn about advanced topics and current applications of recommender systems in other real time applications such as mobile computing.

Unit-I:

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

Learning Outcomes:

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

Unit-II

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

Learning Outcomes:

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

Unit-III

Content-based recommendation: High level architecture of content-based systems, Advantages and drawbacks of content based filtering, Item profiles, Discovering

features of documents, Obtaining item features from tags, Representing item profiles, Methods for learning user profiles, Similarity based retrieval, Classification algorithms.

Learning Outcomes:

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

Unit-IV

Knowledge based recommendation: Knowledge representation and reasoning, Constraint based recommenders, Case based recommenders. Hybrid approaches: Opportunities for hybridization, Monolithic hybridization design: Feature combination, Feature augmentation, Parallelized hybridization design: Weighted, Switching, Mixed, Pipelined hybridization design: Cascade Meta-level, Limitations of hybridization strategies. Evaluating Recommender System: Introduction, General properties of evaluation research, Evaluation designs, Evaluation on historical datasets, Error metrics, Decision-Support metrics, User-Centered metrics.

Learning Outcomes:

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

Unit-V

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

Learning Outcomes:

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

Recommended Books:

1. Jannach D., Zanker M. and FelFering A., Recommender Systems: An Introduction, Cambridge University Press(2011), 1st ed.
2. Ricci F., Rokach L., Shapira D., Kantor B.P., Recommender Systems Handbook, Springer(2011), 1st ed.
3. Manouselis N., Drachsler H., Verbert K., Duval E., Recommender Systems For Learning, Springer (2013), 1st ed.

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B.Tech VII Sem

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(AM20APE704) BLOCK CHAIN TECHNOLOGY
Professional Elective -IV

Course Objectives:

Understand the philosophy of Block chain and the cutting edge technology behind its functions Illustrate how to setup Ethereum tools Explain the key vocabulary and concepts used in Block chain for Business

UNIT-I

Block chain concepts: Block chain, Block chain application example: Escrow, Block chain stack, from web 2.0 to the next generation decentralized web, domain specific Block chain application, Block chain benefits and challenges.

Block chain application templates: Block chain application components, design methodology for Block chain applications, Block chain applications templates

Learning Outcomes:

After completing this Unit, students will be able to

- Outline the benefits and challenges of Block chain (L2)
- Design the Block chain applications (L6)

UNIT-II

Setting up Ethereum development tools: Ethereum clients, Ethereum languages, Test RPC, Mist Ethereum walle, 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 Get 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 of smart contracts(L3)
- Distinguish setting up and interacting with a contract using Get a 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 Block chain network, mining, Block validation, state storage in Ethereum.

Learning Outcomes:

After completing this Unit, students will be able to

- Define Consensus on Block chain 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 madisetti, "Blockchain Applications A hands-on approach", VPT2017.

2. *Chandramouli Subramanian*, Asha A George, Abhilash K A and Meena Karthi keyan,

"Blockchain Technology", Universty Press, 2021

REFERENCE BOOKS:

1."The Basics of Bitcoins and Block chains" An Introduction to Crypto currencies and the Technology that Powers Them, Antony Levis.

2.The Block chain Developer: A Practical Guide for Designing, Implementing, Publishing, Testing, and Securing Distributed Block chain-based Projects 1st ed. Edition

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B.Tech VII Sem

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(AM20APE705)Data Visualization
Professional Elective -IV

Course Objectives:

1. Provide background to understand various aspects of Data Visualization
2. Discuss various principles of visualizing heterogeneous types of data

Unit-I

Visual Queries: Process of Seeing, the Act of Perception, Design Implications, Distributed Cognition, Visual Search Strategies

Data and Visualization: Data Type, Coordinate Systems, Scale

Learning Outcomes:

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

Unit-II

Visualization Design: Amount, Distribution, Proportion, Trends, Time Series, Geospatial Narratives: Telling Stories with Data, Sequencing, Visualization Rhetoric, text visualization

Learning Outcomes:

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

Unit-III

Mapping and Cartography: The Cartogram, Value-by-Area mapping

Optimal Space Usage: Aspect Ratio Selection, Geometry & Aesthetics, Wilkinson's Algorithm and its extension

Learning Outcomes:

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

Unit-IV

Networks: Scalable, Versatile and Simple Constrained Graph Layout, Visualization of Adjacency, Multiple Network Analysis and Visualization, Visualizing Online Social Networks

Learning Outcomes:

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

Unit-V

Animation and Color: Trend Visualization, Transitions in Statistical Data Graphics, Graphs with Radial Layout, Cartoons, Color and Information, Info graphics

Learning Outcomes:

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

Course Outcomes

The students are expected to have the ability to:

1. Present data with visual representations for the target audience, task, and data
2. Analyze, critique, and revise data visualizations
3. Apply appropriate design principles in the creation of presentations and visualizations

Textbook

1. Tufte, E., (2001), The Visual Display of Quantitative Information, 2nd Edition, Graphics Press
2. Tufte, E., (1990), Envisioning Information, Graphics Press

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B.Tech IV-I Sem

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(AM20APE706) ETHICAL HACKING
Professional Elective -IV

Course Objectives:

- The aim of the course is to introduce the methodologies and framework of ethical hacking for enhancing the security.
- The course includes-Impacts of Hacking; Types of Hackers; Information Security Models; Information Security Program; Business Perspective; Planning a Controlled Attack; Framework of Steps (Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation, Deliverable and Integration)

UNIT – I :

Introduction: Hacking Impacts, The Hacker Framework: Planning the test, Sound Operations, Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation, Final Analysis, Deliverable, Integration Information Security Models: Computer Security, Network Security, Service Security, Application Security, Security Architecture Information Security Program: The Process of Information Security, Component Parts of Information Security Program, Risk Analysis and Ethical Hacking

Learning Outcomes:

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

UNIT – II :

The Business Perspective: Business Objectives, Security Policy, Previous Test Results, Business Challenges Planning for a Controlled Attack: Inherent Limitations, Imposed Limitations, Timing is Everything, Attack Type, Source Point, Required Knowledge, Multi-Phased Attacks, Teaming and Attack Structure, Engagement Planner, The Right Security Consultant, The Tester, Logistics, Intermediates, Law Enforcement.

Learning Outcomes:

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

UNIT – III :

Preparing for a Hack:Technical Preparation, Managing the Engagement Reconnaissance: Social Engineering, Physical Security, Internet Reconnaissance

Learning Outcomes:

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

UNIT – IV :

Enumeration:Enumeration Techniques, Soft Objective, Looking Around or Attack, Elements of Enumeration, Preparing for the Next Phase Exploitation: Intutive Testing, Evasion, Threads and Groups, Operating Systems, Password Crackers, RootKits, applications, Wardialing, Network, Services and Areas of Concern

Learning Outcomes:

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

UNIT -V :

Deliverable:The Deliverable, The Document, Overal Structure, Aligning Findings, Presentation Integration: Integrating the Results, Integration Summary, Mitigation, Defense Planning, Incident Management, Security Policy, Conclusion

Learning Outcomes:

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

Course Outcomes:

- Gain the knowledge of the use and availability of tools to support an ethical hack
- Gain the knowledge of interpreting the results of a controlled attack
- Understand the role of politics, inherent and imposed limitations and metrics for planning of a test
- Comprehend the dangers associated with penetration testing

TEXT BOOK

- James S. Tiller, "The Ethical Hack: A Framework for Business Value Penetration Testing", Auerbach Publications, CRC Press

REFERENCE BOOKS

- EC-Council, "Ethical Hacking and Countermeasures Attack Phases", Cengage Learning
- Michael Simpson, Kent Backman, James Corley, "Hands-On Ethical Hacking and Network Defense", Cengage Learning

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B.Tech IV-I Sem

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(AM20APE707) 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 ones agility(L2)

UNIT - II:

Practicing XP- honking, Pair Programming, Energized Work, Informative Workspace, Root Cause Analysis, Retrospectives, Collaborating, Sit Together, RealCustomerInvolvement,UbiquitousLanguage,Stand-UpMeetings,CodingStandards,IterationDemo,Reporting.

Learning Outcomes:

After completing this Unit, students will be able to

- Apply practices to excel as mindful developers(L3)
- Illustratetheeightpracticestohelpateamanditsstakeholderscollaborateefficiently 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 allows to control he 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. RobertC.Martin,"AgileSoftwareDevelopment,Principles,Patterns,andPractices",PHI,2002.
2. Angel Medinilla, "Agile Management: Leadership in an Agile Environment", Springer,2012.
3. Bhuvan Unhelkar, The Art of Agile Practice: Composite Approach for Projects and Organizations ",CRC Press.
4. JimHighsmith, "Agile Project Management ",Pearson education,2004.

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B.Tech VII Sem

L	T	P	C
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(AM20APE708) DEEP LEARNING
Professional Elective-V

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
- Analyzethekeyparametersandhyperparametersinaneuralnetwork'sarchitecture

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 Under fitting, 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 Feed forward 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 upper 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)

Text Books:

1.Deep Learning (Adaptive Computation and Machine Learning series) by Ian Goodfellow, Yoshua Bengio, Aaron Courville, Francis Bach

Reference Books:

1.Deep Learning for Natural Language Processing: Applications of Deep Neural Networks to Machine Learning Tasks by Pearson Learn IT

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B.Tech VII Sem

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(AM20APE709) DESIGN PATTERNS

Professional Elective-V

Course Objectives:

1. Understand the concept of Design patterns and its importance .
2. Understand the behavioral knowledge of the problem and solutions.
3. Relate the Creational, Structural , behavioral Design patterns.
4. Apply the suitable design patterns to refine the basic design for given context.

UNIT - I

Introduction: What Is a Design Pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

Learning Outcomes:

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

- Understand the concepts of Design Patterns(L1).
- Explore the concepts of how design patterns solves the design problems(L2).

UNIT - II

A Case Study: Designing a Document Editor: Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking andHyphenation.

Learning Outcomes:

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

- Understand Document Structure and Formatting (L1).

UNIT - III

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton.

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 - IV

Structural Patterns: Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy.

Learning Outcomes:

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

UNIT – V

Behavioral Patterns: Chain of Responsibility, Command, Interpreter, Iterator, Mediator,Memento, Observer, Strategy, Template Method, Visitor.

Learning Outcomes:

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

- Apply structural patterns to solve design problems.
- Construct design solutions by using behavioral patterns

Course Outcomes:

- Identify the appropriate design patterns to solve object oriented design problems(L1).
- Develop design solutions using creational patterns(L3).
- Apply structural patterns to solve design problems (L3).
- Construct design solutions by using behavioral patterns(L4).

Text Books :

1. Design Patterns By Erich Gamma, Pearson Education
2. Design Patterns Explained By Alan Shalloway,Pearson Education..
3. Meta Patterns designed by Wolf gang , Pearson.

References :

1. Head First Design Patterns By Eric Freeman-Oreilly-spd
2. JAVA Enterprise Design Patterns Vol-III By Mark Grand ,Wiley DreamTech.
3. Pattern"s in JAVA Vol-I By Mark Grand ,Wiley DreamTech.
4. Pattern"s in JAVA Vol-II By Mark Grand ,Wiley DreamTech.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech-VII Sem

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(CE20AOE701) Air Pollution and Quality Control

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 PrInc 2016
2. Anjaneyulu Y, "Text book of Air Pollution and Control 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.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech- VII Sem

L	T	P	C
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(EE20AOE603) OPTIMIZATION TECHNIQUES THROUGH MATLAB

(OPEN ELECTIVE)

Course Objectives

- Introduce basics of MATLAB
- Familiarize the fundamentals of optimization
- Explain single variable optimization using various methods
- Implement multi variable optimization using various methods
- Train various evolutionary algorithms.

UNIT -I

Introduction to MAT LAB: Overview, MATLAB Preliminaries, Basics of MATLAB, Beyond the Basics of MATLAB, Popular Functions and Commands, Plotting using MATLAB, Optimization with MATLAB.

UNIT -II

Introduction to Optimization: Statement of an optimization problem, Classifications of optimization Problems: Single variable optimization, Multi variable optimization with no constraints, Multi variable optimization with equality constraints, Multi variable optimization with inequality constraints, Convex and Concave programming.

UNIT -III

Single Variable Optimization: Finite difference method, Central difference method, Runge-Kutta method, interval halving method, golden section method with MATLAB code.

UNIT- IV

Multi Variable Optimization: Conjugate gradient method, Newton's method, Powell's method, Flectcher- Reeves method, Hook and Jeeves method, interior penalty function with

UNIT -V

Evolutionary Algorithms: Overview, Genetic Algorithms: Basics of Genetic Algorithms, Options in MATLAB, Multi Objective Optimization using Genetic Algorithms, Ant Colony Optimization, Simulated Annealing, Particle Swarm Optimization.

Course Outcomes:

After completion of this course the student can be able to

CO1: Use optimization terminology and concepts, and understand how to classify an optimization problem.

CO2: Apply optimization methods to engineering problems.

CO3: Implement optimization algorithms.

CO4: Compare different genetic algorithms.

CO5: Solve multivariable optimization problems.

TEXT BOOKS:

1. Rao V.Dukkipati, MATLAB: "An Introduction with Applications", Anshan, 2010.

2. Achille Messac, "Optimization in practice with MATLAB", Cambridge University Press, 2015.

3. Jasbir S Arora, "Introduction to optimum design", 2nd edition. Elsevier, 2004.

REFERENCES:

1. Cesar Perez Lopez, "MATLAB Optimization Techniques", Academic press, Springer publications, 2014.

2. Steven C.Chapra, "Applied Numerical Methods with MATLAB for Engineers and scientists": 4th edition, McGraw-Hill Education, 2018.

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B.Tech- VII Sem

L	T	P	C
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(ME20AOE602) POWER GENERATION TECHNOLOGIES

Pre-requisite: Thermal Engineering& Basic Mechanical Engineering

Course Objectives:

- Familiarize the sources of energy, power plant economics and environmental aspects.
- Outline the working components of different power plant.
- Explain renewable energy sources; characteristics, working principle, classify types, layouts, and plant operations.
- Impart types of nuclear power plants, and outline working principle and advantages and hazards.

UNIT – 1:

Introduction to the Sources of Energy Resources and Development of Power in India. Layouts of Steam, Hydel, MHD, and Nuclear Power Plants - Selection.

Power Plant Economics and Environmental Considerations: Capital Cost, Investment of Fixed Charges, Operating Costs, General Arrangement of Power Distribution, Definitions of Connected Load, Load Factor, Diversity Factor - Pollution Standards - Methods of Pollution Control.

Learning Outcomes:

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

- Outline sources of energy, compare and selectionof power plants. (L2)
- Explain cost factors, load and power distribution factors. (L2)
- Select tariff based on load and demand factors. (L3)
- Summarize the impact of power plant on the environment, pollution mitigation and regulations. (L2)

UNIT – 2:

Steam Power Plant: Introduction to Boilers- Modern High Pressure and Supercritical Boilers - Waste Heat Recovery, Fluidized Bed Boilers., Fuel and Handling Equipments, Types of Coals, Coal Handling, Choice of Handling Equipment, Coal Storage, Ash Handling Systems.

Combustion Process: Properties of Coal - Overfeed and Under Feed Fuel Beds, Types of Stokers, Pulverized Fuel Burning System and Its Components, Combustion Needs and Draught System, Cyclone Furnace, Design and Construction, Dust Collectors, Cooling Towers And Heat Rejection.

Learning Outcomes:

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

- Demonstrate latest high-pressure boilers, power plant cycles and their improvements. (l2)
- Explain various types of coals, coal handling operations (L2)
- Outline and compare types of feeders, stokers, combustion systems. (L2)
- Illustrate draught, dust collector, furnace, cooling tower and heat rejection systems. (L2)
- Evaluate pollution levels from power plants, pollution control methods, and application of pollution recorders. (L4)

UNIT – 3:

Diesel Power Plant: Diesel Power Plant, Construction, Plant lay out with auxiliaries, fuel storage.

Gas Turbine Plant: Introduction - Classification - Construction - Layout with Auxiliaries - Principles of Working Closed and Open Cycle Gas Turbines. Advantages And Disadvantages Combined Cycle Power Plants.

Learning Outcomes:

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

- Explain working principle and compare types of diesel power plant. (L2)
- Outline the diesel power plant layout with its supporting equipment. (L2)
- Illustrate the working principle of open cycle and closed cycle gas turbine. (L2)
- Demonstrate combined cycle power plants with benefits and shortcomings. (L2)

UNIT – 4:

Hydro Electric Power Plant: Waterpower - Hydrological Cycle / Flow Measurement - Drainage Area Characteristics - Hydrographs - Storage and Pondage - Classification of Dams and Spill Ways.

Hydro Projects And Plant: Classification - Typical Layouts - Plant Auxiliaries - Plant Operation Pumped Storage Plants.

Learning Outcomes:

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

- Explain hydrological cycle, infer flow measurements from hydrographs. (L2)

- Summarize working principle of hydroelectric power plant. (L2)
- Illustrate typical layout of hydroelectric power plant, and its auxiliary equipment's. (L2)

UNIT – 5:

Power from Non-Conventional Sources: Utilization of Solar Collectors- Working Principle, Wind Energy - Types of Turbines -Tidal Energy. MHD power Generation.

Nuclear Reactors : Nuclear Fuel - Nuclear Fission- Types of Nuclear reactors - Radiation Hazards and Shielding - Radioactive Waste Disposal.

Learning Outcomes

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

- Familiarize the source of Renewablel sources in India (L2)
- rinciple of nuclear power plants, nuclear fuels, and reactor operations. (L2)
- Outline the various types of nuclear reactors, their applications, and limitations. (L2)
- Summarize the hazards of nuclear reactors and significance of nuclear waste disposal. (L2)

Textbooks:

1. P.K. Nag, "Power Plant Engineering", 3rd edition, TMH, 2013.
2. Wakil, "Power plant technology", M.M.EI TMH Publications.

Reference Books:

1. Rajput, "A Text Book of Power Plant Engineering: 4th edition, Laxmi Publications, 2012.
3. Ramalingam, "Power plant Engineering", Scietech Publishers, 2013
4. P.C. Sharma, "Power Plant Engineering", S.K. Kataria Publications, 2012.
5. Arora and S.Domakundwar, "A course in Power Plant Engineering", Dhanpat Rai & Co (p).

Course Outcomes:

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

- **Outline** sources of energy, power plant economics, and environmental aspects. (L2)
- **Explain** power plant economics and environmental considerations. (L2)
- **Describe** working components of a steam power plant. (L2)
- **Illustrate** the working mechanism of gas turbine power plants. (L2)
- **Summarize** types of renewable energy sources and their working principle. (L2)

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech-VII Sem

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(EC20AOE702) PRINCIPLES OF COMMUNICATION ENGINEERING

Course Objectives:

1. To understand the concept of various modulation schemes and multiplexing.
2. To apply the concept of various modulation schemes to solve engineering problems.
3. To analyze various modulation schemes.
4. To evaluate various modulation scheme in real time applications.

UNIT I

Amplitude Modulation

Introduction, An overview of Electronic Communication Systems**.** Need for Frequency Translation, classification of modulation schemes, Amplitude Modulation: DSB-FC, DSB-SC, SSB-SC and VSB, Modulators and demodulators. The Super heterodyne Receiver.

UNIT II

Angle Modulation

Basic definitions, Frequency Modulation: Narrow Band FM, Wide Band FM, Transmission bandwidth of FM Signals, Generation of FM Signals, Demodulation of FM Signals, FM Stereo Multiplexing, Phase modulation, AM vs PM.

UNIT III

Pulse Modulation

Sampling Theorem, Quantization, Pulse Amplitude Modulation, Pulse Width Modulation, Pulse position modulation, Pulse code modulation.

Concept of Time Division Multiplexing, Frequency Division Multiplexing.

UNIT IV

Digital Modulation Digital Representation of Analog Signals. Phase shift keying-Binary Amplitude Shift Keying, Binary Phase Shift Keying ,Differential

phase shift keying, and Quadrature Phase Shift Keying, Frequency Shift Keying—Comparison.

UNIT V

MULTI-USER RADIO COMMUNICATION

Global System for Mobile Communications (GSM),Mobile &Cellular communication Concept – Overview of Multiple Access Schemes – Code division multiple access (CDMA) ,Frequency division multiple access (FDMA),Satellite Communication – Bluetooth.(Block diagram approach only).

Note: The main emphasis is on qualitative treatment. Complex mathematical treatment may be avoided.

Textbooks:

1. Herbert Taub, Donald L Schilling and Goutam Saha, "Principles of Communication Systems", 3rdEdition, Tata McGraw-Hill Publishing Company Ltd., 2008.
2. Simon Haykin, "Communication Systems", 4th Edition, John Wiley & Sons, 2004

References:

1. B. P. Lathi, Zhi Ding and Hari M. Gupta, "Modern Digital and Analog Communication Systems", 4th Edition, Oxford University Press, 2017.
2. K. Sam Shanmugam "Digital and Analog Communication Systems", Wiley India Edition, 2008.
3. Martin S.Roden, "Analog and Digital Communication System", 3rd Edition, Prentice Hall of India, 2002.

Course Outcomes:

CO1. Analyze and design of various continuous wave modulation and demodulation techniques.

CO2. Attain the knowledge about angle modulation and FM Transmitters and Receivers.

CO3. Analyze and design the various Pulse Modulation Techniques.

CO4. Understand the concepts of Digital Modulation Techniques and Baseband transmission.

CO5. Comprehend the principles of radio communication systems like GSM.CDMA, Bluetooth, Mobile and satellite communications etc.,

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech- VII Sem

L	T	P	C
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(EE20AOE701)EMBEDDED SYSTEMS (OPEN ELECTIVE)

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.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech- VII Sem

L	T	P	C
3	0	0	3

(EC20AOE705)INTRODUCTION TO IMAGE PROCESSING

Course Objectives:

1. To introduce fundamentals of Image Processing
2. To expose various relationships between pixels
3. To descript various intensity transformations in spatial domains.
4. To descript various spatial and frequency domains filters.
5. To dissimilate various segmentation and compression techniques for image processing.

Unit I

Fundamentals of Image Processing – I:

Introduction, A simple image model, Components of image processing system, Fundamental Steps in digital image processing, image sensing and acquisition, Applications of image processing.

Unit II

Fundamentals of Image Processing – II:

Image sampling and quantization, basic relationships between pixels – neighbourhood, adjacency, connectivity, distance measures, mathematical operations in image processing.

Unit III

Image Enhancement in spatial domain:

Introduction to gray level transformations, Point processing - Image negative, contrast stretching, intensity slicing, Bit plane slicing and grey level slicing, Histogram Processing, Histogram equalization and Specifications.

Unit IV

Image Enhancement in frequency domain:

Spatial Filtering, Smoothing filters, Sharpening filters, Enhancement in Frequency domain –image smoothing, image sharpening and Homomorphic filtering.

Unit V

Image Segmentation and compression:

Point, Line and Edge Detection, Fundamentals of Compression, Image compression model, Types of Redundancy – Coding, Inter pixel and Psycho visual, Lossless compression – Huffman coding, Shannon-Fano coding.

Text Books:

1. Rafael C. Gonzalez, Richard E woods and Steven L. Eddins, "Digital Image processing using MATLAB", Tata McGraw Hill, 2010.
2. S. Jayaraman, S.Esakkirajan, T.Veerakumar, "Digital Image processing", Tata McGraw Hill.

References:

1. Milan Sonka, Vaclav Hlavac, Roger Boule, Image Processing, Analysis, and Machine Vision, Third Edition, Cengage Learning, 2016.
2. William K. Pratt, "Digital Image Processing", John Wiley, 3rd Edition, 2004

Course Outcomes:

CO1: Understand fundamentals of digital image processing and apply engineering mathematics in processing of digital image.

CO2: Compute the relationship between the pixels in image processing

CO3: Analyze different image enhancement techniques in spatial domain.

CO4: Describe various image spatial filters and Analyze different image enhancement techniques in frequency domain

CO5: Analyze various techniques in image segmentation and apply various algorithms to perform image compression.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B.Tech - VII Sem

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(CE20AOE705)Low Cost Housing Techniques

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 rooting/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 Railways 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".
3. A.G. MadhavaRao, D.S. Ramachandra Murthy &G.Annamalai"Modern trends in housing in developing countries".

Reference Books:

1. Rajib Shaw "Disaster Management", Universities Press, India.
2. Tushar Bhattacharya "Disaster Science and Management", TMH Publications.
3. Neville A.M. "Properties of Concrete" –Pitman Publishing Limited, London.
4. Kiado, Rudhai.G"Light Weight Concrete", – Publishing home of Hungarian Academy of Sciences 1963.

SRI VENKATESWARA COLLEGE OF ENGINEERING

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B.Tech - VII Sem **L T P C**

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(ME20AOE702) ROBOTICS IN INDUSTRIAL USAGE

(Open Elective – IV)

Course Objectives:

The course should enable the students to:

I. Develop the knowledge in various robot structures and their workspace.

II. Develop the skills in performing kinematics analysis of robot systems.

III. Provide the knowledge of the dynamics associated with the operation of robotic systems.

IV. Provide the knowledge and analysis skills associated with trajectory planning.

V. Understand material handling and robot applications in industries.

UNIT– 1:

INTRODUCTION TO ROBOTICS:Introduction: Automation and robotic, an overview of robotics, classification by coordinate system and control systems; Components of the industrial robotics: Degrees of freedom, end effectors: Mechanical gripper, magnetic, vacuum cup and other types of grippers, general consideration on gripper selection and design.

Learning Outcomes:

1. Differentiate between automation and robotics.
2. Classify robots and describe its anatomy
3. Classify various grippers

UNIT – 2:

MOTION ANALYSIS AND KINEMATICS: Motion analysis: Basic rotation matrices, composite rotation matrices, Euler angles, equivalent angle and axis, homogeneous transformation, problems; Manipulator kinematics: D-H notations, joint coordinates and world coordinates, forward and inverse kinematics, problems.

Learning Outcomes

1. Discuss about motion analysis of robot.
2. Understand methods for calculating the kinematics and inverse kinematics of a robot manipulator.
3. Describe D-H notations, joint coordinates and. world coordinates
4. Discuss about homogeneous transformation.

UNIT – 3:

Differential kinematics: Differential kinematics of planar and spherical manipulators, Jacobians problems. Robot dynamics: Lagrange, Euler formulations, Newton-Euler formulations, problems on planar two link manipulators

1. Describe the differential kinematics of planar manipulators.
2. Illustrate Lagrange-Euler formulation.
3. Discuss jacobian and robot dynamics. 4.Illustrate Newton-Euler formulation.

UNIT – 4:

Trajectory planning: Joint space scheme, cubic polynomial fit, avoidance of obstacles, types of motion: Slew motion, joint interpolated motion, straight line motion, problems, Robot actuators and feedback components; Actuators: pneumatic and hydraulic actuators.

Learning Outcomes:

1.Describe joint space scheme.
2. Illustrate cubic polynomial fit.
3. Classify types of motion.

UNIT – 5:

Electric actuators: DC servo motors, stepper motors, feedback components: position sensors, potentiometers, resolvers and encoders, velocity sensors, tactile sensor; Robot application in manufacturing: Material handling, assembly and inspection

Learning Outcome:

1.Explain actuators and classify them.
2. Illustrate various robot applications in manufacturing.
3. Discuss the role of robots in material handling.
4. Explain work cell design.

5. Discuss the role of robots in assembly and inspection

Textbooks:

1. Groover M. P, "Industrial Robotics", TataMcGraw-Hill, 1 st Edition, 2013.

2. J.J Criag, "Introduction to Robotic Mechanics and Control", Pearson, 3rd Edition, 2013.

Reference Books:

1. Richard D. Klafter, "Robotic Engineering", Prentice Hall, 1st Edition, 2013.

2. Fu K S, "Robotics", McGraw-Hill, 1st Edition, 2013.

Course Outcomes:

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

CO1 Understand characteristic features of robots and usage of different grippers for industrial applications.

CO2 Understand direct and inverse kinematics of robot structure.

CO3 Illustrate Differential Kinematics of planar and spherical manipulators.

CO4 Understand classification of robot actuators and trajectory planning.

CO5 Remember material handling and applications in manufacturing.

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech VII

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(BA20AHS701)BUSINESS ETHICS AND CORPORATEGOVERNANCE

Course Objectives:

- To make the student understand the principles of business's ethics
- To enable them in knowing the ethics in management
- To facilitate the student role incorporate culture
- Impart knowledge about the fair trade practices
- Encourage the student in knowing them about the corporate governance

UNIT-I

BUSINESSETHICS ANDCORPORATEGOVERNANCE– 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 INMANAGEMENT– 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 EthicalValueSystemKnow abouttheethical value system
- KnowUniversalism,Utilitarianism,DistributiveJustice
- DifferentiateEthicalValues indifferentCultures

UNIT-IV

Leadership: Differences between Leader & Manager - Leadership – Leadership styles Leadership theories – Managerial Grid – Transactional Vs Transformational Leadership – Qualities of a good leader- Women Leadership in India.

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 Safe guarding Health and well being of Customers

UNIT-V

Organisational Behaviour–Organizing Process – Depart mentation Types - Decentralization– Making Organizing Effective – Organisational culture- Types of culture – Organisational Culture Vs Organizational climate - Conflict management - Change Management.

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 framework
- 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

Textbooks:

- MurthyCSV:"BusinessEthicsandCorporateGovernance",HPH
- BholananthDutta,S.K.Podder–"CorporationGovernance",VBH.

References:

- Dr.K.Nirmala,KarunakaraReaddy:"BusinessEthicsandCorporateGovernance",HPH
- H.R.Machiraju:"CorporateGovernance"

- K.Venkataramana, “CorporateGovernance”,SHBP.
- N.M.Khandelwal:“IndianEthosandValuesforManagers”

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VII Sem

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(BA20AHS705) MANAGEMENT SCIENCE

Course Objectives:

- 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 HR Min 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

INTRODUCTIONTOMANAGEMENT: Management-Conceptandmeaning-Nature-Functions-ManagementasaScienceandArtandboth. Schools of Management Thought - Taylor's Scientific Theory-Henry Fayol's principles –EltanMayo's Human relations - Systems Theory - Organisational Designs - Line organization - Line &StaffOrganization-FunctionalOrganization-MatrixOrganization-Project Organization-Committeeform of Organization – Social responsibilities of Management.

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 - PurchaseProcedureandStoresManagement-MarketingManagement-Concept-Meaning-Nature-Functionsof Marketing - Marketing Mix- Channels of Distribution –Advertisement and Sales Promotion-Marketing Strategies based on Product Life Cycle.

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

UNIT-IV

STRATEGIC&PROJECT MANAGEMENT: Differences between Leader & Manager - Leadership – Leadership styles Leadership theories – Managerial Grid – Transactional Vs Transformational Leadership – Qualities of a good leader- Women Leadership in India.

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.

Course Outcomes:

- 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 HR Min 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.

Textbooks:

- A.R.Aryasri,"Management Science", TMH,2013

- Stoner, Freeman, Gilbert, Management, Pearson Education, NewDelhi,2012.

References:

- Koontz & Weihrich, "Essentials of Management", 6thedition, TMH, 2005.
- Thomas N.Duening&JohnM.Ivancevich, "Management Principles and Guidelines", Biztantra.
- KanishkaBedi, "Production and Operations Management", Oxford University Press, 2004.
- SamuelC.Certo, "Modern Management", 9thedition,PHI,2005

SRI VENKATESWARA COLLEGE OF ENGINEERING

(Autonomous)

B. Tech- VII Sem

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(BA20AHS706) STRATEGICMANAGEMENT

Course Objectives:

- To introduce the concepts of strategic management and understand its nature in Competitive and organization all and scape
- Toprovideanunderstandingofinternalandexternalanalysisofafirm/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 the irrolesin 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 diving 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 For ces 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&TakeoverStrategies,StrategicAlliances&CollaborativePartnerships), 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&Nitishsen 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. SubbaRao, Himalaya.
- Business policy and strategic management, SukulLomash, P.K.Mishra, Vikas