

Vision

To become an advanced learning Centre in the field of Computer Science and Engineering that make knowledgeable, skillful, socially responsible and ethical professionals.

Mission

To provide matured engineering graduates, who can serve nation and solve real world problems, with strong moral and professional convictions and interdisciplinary research capabilities.

Department of Computer Science and Engineering

I B.Tech. I Semester

S. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	
1	HS	19AC15T	Functional English and Life Skills	3	0	0	3
2	BS	19AC14T	Engineering Chemistry	2	1	0	3
3	BS	19AC11T	Algebra and Calculus	3	1	0	4
4	ES	19A511T	Problem Solving and C Programming	3	0	0	3
Lab Courses							
5	BS	19AC14L	Engineering Chemistry Lab	0	0	3	1.5
6	ES	19A511L	C Programming Lab	0	0	3	1.5
7	HS	19AC15L	Communicative English Lab	0	0	3	1.5
8	ES	19A512L	IT Workshop	0	0	2	1
9	MC	19AC16T	Environmental Science	3	0	0	0
				14	02	11	18.5

I B. Tech. II Semester

S. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	
1	ES	19A221T	Basic Electrical & Electronics Engineering	3	0	0	3
2	ES	19A324T	Engineering Graphics & Design	1	0	3	2.5
3	ES	19A521T	Python Programming	3	0	0	3
4	BS	19AC22T	Applied Physics	2	1	0	3
5	BS	19AC21T	Differential Equations and Vector Calculus	3	1	0	4
Lab Courses							
6	ES	19A221L	Basic Electrical and Electronics Engineering Lab	0	0	3	1.5
7	ES	19A521L	Python Programming Lab	0	0	3	1.5
8	BS	19AC22L	Applied Physics Lab	0	0	3	1.5
9	ES	19A325L	Engineering Workshop and Advanced IT Workshop	0	0	3	1.5
				12	02	15	21.5

II B.Tech I Semester

S. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	
1	PC	19A531T	Database Management Systems	3	0	0	3
2	PC	19A532T	Data Structures through Python	3	0	0	3
3	PC	19A533T	Digital Logic Design and Computer Organization	3	0	0	3
4	BS	19AC33T	Discrete Mathematics	3	0	0	3
5	PC	19A534T	Web Programming	2	0	0	2
6	BS	19AC34T	Life Sciences for Engineers	2	0	0	2
7	MC	19AC37T	Constitution of India	3	0	0	0
Lab Courses							
8	PC	19A531L	Database Management Systems Lab	0	0	2	1
9	PC	19A532L	Data Structures through Python Lab	0	0	3	1.5
10	PC	19A534L	Web Programming Lab	0	0	2	1
				18	0	9	19.5

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II B. Tech. I Semester

S. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	
1	BS	19AC43T	Probability and Statistics	2	1	0	3
2	PC	19A541T	Artificial Intelligence	3	0	0	3
3	PC	19A542T	Design and Analysis of Algorithms	3	0	0	3
4	PC	19A543T	Formal Languages and Automata Theory	3	0	0	3
5	PC	19A544T	Object Oriented Programming Using Java	3	0	0	3
6	PC	19A545T	Operating Systems	3	0	0	3
7	PC	19A546T	Software Engineering	3	0	0	3
Lab Courses							
8	PC	19A542L	Design and Analysis of Algorithms Lab	0	0	2	1
9	PC	19A544L	JAVA Lab	0	0	2	1
10	PC	19A547L	Operating Systems Lab and Artificial Intelligence Lab	0	0	3	1.5
11	MC	19AC45T	Essence of Indian Traditional Knowledge	3	0	0	0
				23	1	8	24.5

III Year I Semester

S. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	
1	PC	19A551T	Advanced JAVA Programming	3	-	-	3
2	PC	19A552T	Computer Networks	3	-	-	3
3	PC	19A553T	Data Warehousing & Data Mining	3	-	-	3
4	PE	19A55AT	Advanced Databases	3	-	-	3
		19A55BT	Artificial Neural Networks				
		19A55CT	Cryptography & Network Security				
		19A55DT	Principles of Programming Languages				
5	PE	19A55ET	Distributed Systems	3	-	-	3
		19A55FT	Computer Graphics				
		19A55GT	Linux Programming				
		19A55HT	Software Project Management				
6	OE	19A55IT	Cloud Computing	3	-	-	3
		19A55JT	Cyber Security				
		19A55KT	Human Computer Interaction				
		19A55LT	R Programming				
Lab Courses							
7	HS	19AC51L	General Aptitude	-	-	2	1
8	PC	19A551L	Advanced JAVA Programming lab	-	-	2	1
9	PC	19A554L	Data Mining and Computer Networks Lab	-	-	2	1
10	HS	19AC53T	Universal Human Values – II	1	1	0	2
				19	1	6	23

III Year II Semester

S. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	
1	ES	19A461T	Microprocessor & Interfacing	3	-	-	3
2	PC	19A561T	Compiler Design	3	-	-	3

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3	PC	19A562T	Object Oriented Analysis and Design	2	-	-	2
4	PE	19A56AT	.Net Technologies	3	-	-	3
		19A56BT	Machine Learning				
		19A56CT	Mobile Communications				
		19A56DT	Performance Evaluation of Computer Systems				
5	PE	19A56ET	Advanced Computer Architecture	3	-	-	3
		19A56FT	High Performance Computing				
		19A56GT	Software Testing Methodologies				
		19A56HT	Visual programming				
6	OE	19A16GT	Basic Civil Engineering	3	-	-	3
		19A16HT	Water Resources and Conservation				
		19A26GT	Energy Management and Conservation				
		19A26HT	Fuzzy Logic and Neural Networks				
		19A36ET	Introduction to Mechatronics				
		19A36FT	Fundamentals of Robotics				
		19A36GT	Non-Conventional Sources of Energy				
		19A46GT	Electronic Circuits and Its Applications				
19A46HT	Basics of Communication Systems						
Lab Courses							
7	ES	19A461L	Microprocessor & Interfacing & Compiler Design Lab	-	-	3	1.5
8	PC	19A563L	Mobile Application Development lab	-	-	2	1
9	HS	19AC62L	Professional Communication Skills Lab	-	-	3	1.5
10	INTERN	19A564I	Innovative project / Socially relevant project / Entrepreneurship / Internship	-	-	-	2
				17	0	12	23

IV Year I Semester

S. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	
1	PC	19A571T	Advanced Web Programming	2	-	-	2
2	PC	19A572T	Internet of Things	2	-	-	2
3	HS	19A373T	Management Science	3	-	-	3
4	PE	19A57AT	Big Data	3	-	-	3
		19A57BT	Deep Learning				
		19A57CT	Design Patterns				
		19A57DT	Mobile Ad hoc Networks				
5	OE	19A57GT	OE-3 (MOOC)	3	-	-	3
Lab Courses							
7	PC	19A571L	Advanced Web Programming Lab	-	-	3	1.5
8	PC	19A573L	IoT & CASE Tools Lab	-	-	3	1.5
9	PW	19A574P	Project Phase-I	-	-	-	2
				13	0	06	18

IV Year II Semester

S. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	
1	OE	19A18DT	Disaster Management	3	-	-	3
		19A18ET	Building Planning and Construction				
		19A28DT	Battery Energy Storage Systems				
		19A28ET	System Modeling and Simulation				
		19A38ET	Entrepreneurship Development				
		19A38FT	Optimization in Engineering				

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		19A38GT	Total Quality Management				
		19A48DT	Introduction to Digital Design				
		19A48ET	Industrial Electronics				
2	PE	19A58AT	Cognitive Science	3	-	-	3
		19A58BT	Data Sciences				
		19A58CT	Software Architecture				
		19A58DT	Wireless Sensor Networks				
Lab Courses							
3	PW	19A581P	Project Phase II				8
				6	0	0	14

List of Value-added courses offered by CSE

1. Business Intelligence and Data Analytics
2. Data Analytics using R tool/Python
3. Mobile app development using JQuery
4. Ruby on Rails
5. Game design and development using unity 3D
6. Amazon Web services

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Functional English and Life Skills
Category	HS
Course Code	19AC15T
Year	I B. Tech
Semester	I Semester (Common to CE, ME, CSE)

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives:

- To focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
- To impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays
- To provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing
- To build self-confidence, encourage critical thinking, foster independence and help people to communicate more effectively.

Unit 1 9

Reading: *On the Conduct of Life* by William Hazlitt

Life Skills: 'Values and Ethics' with reference to Rudyard Kipling's poem 'If'

Grammar and Vocabulary: Content words and function words; word forms: verbs, nouns, adjectives and adverbs; nouns: countables and uncountables; singular and plural; basic sentence structures; simple question form - wh-questions; word order in sentences.

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

Unit 2 9

Reading: *The Brook* by Alfred Tennyson

Life Skills: 'Self-Improvement' with reference to George Bernard Shaw's speech 'How I Became a Public Speaker'

Grammar and Vocabulary: Cohesive devices - linkers, sign posts and transition signals; use of articles and zero article; prepositions.

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

Unit 3 9

Reading: *The Death Trap* by Saki

Life Skills: 'Time Management' with reference to an extract from Seneca's letter to his friend 'On Saving Time'

Grammar and Vocabulary: Verbs - tenses; subject-verb agreement; direct and indirect speech, reporting verbs for academic purposes.

Writing: Summarizing - identifying main idea/s and rephrasing what is read; avoiding redundancies and repetitions.

Unit 4 9

Reading: *Chindu Yellamma*

Life Skills: 'Innovation' with reference to the life of 'Muhammad Yunus'

Grammar and Vocabulary: Quantifying expressions - adjectives and adverbs; comparing and contrasting; degrees of comparison; use of antonyms

Writing: Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables

Unit 5 9

Reading: *Politics and the English Language* by George Orwell

Life Skills: 'Motivation with reference to RanjanaDeve's article 'The Dancer with a White Parasol'

Grammar and Vocabulary: Editing short texts – identifying and correcting common errors in grammar and usage (articles,

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Engineering Chemistry
Category	BS
Couse Code	19AC14T
Year	I B. Tech
Semester	I Semester

Lecture Hours	Tutorial Hours	Practical	Credits
2	1	0	3

Course Objectives:

- To instruct electrode potential and differentiation of different electrodes and their applications.
- To impart knowledge on the basic concepts of battery technology.
- To familiarize various sources of renewable energy and explain the construction of photovoltaic cells.
- To explain how to synthesize different polymers and differentiate polymers based on properties.
- To introduce different types of nano-materials, its instrumental techniques and compare molecular machines and molecular switches.

Unit 1 Electrochemical Energy Systems - I 9

Introduction-Origin of electrode potential, Electrode Potentials, Measurement of Electrode Potentials, Nernst Equation for a single electrode, EMF of a cell, Types of Electrodes or Half Cells-Hydrogen and Calomel electrode, Electrochemical Cell, Galvanic Cell vs. Electrolytic Cell, Electrochemical conventions, Types of Ion Selective Electrodes- glass membrane electrode, polymer membrane electrodes, solid state electrodes, gas sensing electrodes (classification only), Concentration Cells.

Unit 2 Electrochemical Energy Systems – II 9

Basic concepts, battery characteristics, classification of batteries, Important applications of batteries, Classical batteries-dry/Leclanche cell, Modern batteries-zinc air, lithium cells-Li MnO₂ cell- challenges of battery technology. Fuel cells- Introduction - classification of fuel cells – hydrogen and oxygen fuel cell, propane and oxygen fuel cell- Merits of fuel cell

Unit 3 Energy Sources and Applications 9

Solar energy – Introduction - Physical and Chemical properties of Silicon- Production of Solar Grade Silicon from Quartz - Doping of Silicon- p and n type semiconductors- PV cell / solar cell- Manufacturing of Photovoltaic Cells using Chemical Vapor Deposition Technique-applications of solar energy.

Unit 4 Polymer Chemistry 9

Introduction to polymers, functionality of monomers, chain growth and step growth polymerization, coordination polymerization, copolymerization (stereospecific polymerization) with specific examples and mechanisms of polymer formation.

Plastics - Thermoplastics and Thermosettings, Preparation, properties and applications of – Bakelite, urea-formaldehyde, Nylon-6,6 Elastomers–Buna-S, Buna-N–preparation, properties and applications.

Conducting polymers – polyacetylene, polyaniline – mechanism of conduction and applications.

Unit 5 Nanomaterials and Molecular Machines & Switches 9

Nanomaterials: Introduction to nanomaterial: nanoparticles, nanocluster, carbon nanotube (CNT) and nanowires. Chemical synthesis of nanomaterials: sol-gel method. Characterization: Principle and applications of scanning electron microscope (SEM) and transmission electron microscope (TEM).

Molecular machines & Molecular switches: Rotaxanes and Catenanes as artificial molecular machines, prototypes – linear motions in rotaxanes, an acid-base controlled molecular shuttle, a molecular elevator, autonomous light-powered molecular motor, systems based on catenanes, molecular switches – introduction, cyclodextrin-based switches, in and out switching, back and forth switching.

Prescribed Text Books

1. P.C. Jain and M. Jain, Engineering Chemistry, 15/e, Dhanapat Rai & Sons, Delhi (2014).

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2. B.K. Sharma, Engineering Chemistry, Krishna Prakashan, Meerut.

References Text Books:

1. O G Palanna, Engineering Chemistry, Tata McGraw Hill Education Private Limited, (2009)
2. Sashi Chawla, A Textbook of Engineering Chemistry, Dhanapath Rai and sons, (2003)
3. B.S Murthy and P. Shankar, A Text Book of NanoScience and NanoTechnology, University Press (2013).
4. S.S. Dara, A Textbook of Engineering Chemistry, S.Chand& Co, (2010)
5. N. Krishna Murthy and Anuradha, A text book of Engineering Chemistry, Murthy Publications (2014).
6. K. SessaMaheshwaramma and MridulaChugh, Engineering Chemistry, Pearson India Edn services, (2016)

Course Outcomes:

Student will be able to

Blooms Level of Learning

1. list different types of electrodes, illustrate the construction of concentration cells, explain the significance of electrode potentials, and classify ion selective electrodes L3
2. classify different types of cells, explain the concepts involved in the construction of lithium cells, compare the merits of different fuel cells and apply redox principles for construction of batteries and fuel cells L3
3. list different renewable sources of energy, compare p and n type semiconductors, explain how photovoltaic cells convert light into energy and illustrate the construction of PV cell L3
4. explain the preparation, properties, mechanism of conduction and applications of different types of polymers L3
5. explain the synthesis and instrumental analysis of different types of nanomaterials and distinguish between molecular switches and molecular machines L4

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19AC14T.1	3	2										2
19AC14T.2	3	2		2								2
19AC14T.3	2	2		2								2
19AC14T.4	3	2										
19AC14T.5	3	2		2								

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Algebra and Calculus
Category	BS
Couse Code	19AC11T
Year	I B.Tech.
Semester	I Semester (Common to CE, EEE, ME, ECE & CSE)

Lecture Hours	Tutorial Hours	Practical	Credits
3	1	0	4

Course Objectives:

- This course will illuminate the students in the concepts of calculus and linear algebra.
- This course will 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 Matrix Operations and Solving Systems of Linear Equations 9
Rank of a matrix by echelon form - solving system of homogeneous and non-homogeneous linear equations by rank method - Eigen values and Eigen vectors - their properties.

Unit 2 9
Cayley-Hamilton theorem (without proof) - finding inverse and power of a matrix by Cayley-Hamilton theorem - diagonalization of a matrix, quadratic forms and nature of the quadratic forms - reduction of quadratic form to canonical forms by orthogonal transformation

Unit 3 Functions of several variables 9
Partial derivatives - total derivatives - chain rule - change of variables – Jacobian - maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers for three variables.

Unit 4 Mean value theorems and curve tracing 9
Taylor's and Maclaurin's theorems (without proofs) – simple problems.
Curve tracing – Cartesian and polar curves.

Unit 5 Multiple Integrals and Special Functions 9
Double integrals: Evaluation - change of order of integration - change of variables (Cartesian to polar) - areas enclosed by plane curves and Evaluation of triple integral.
Beta and Gamma functions and their properties - relation between beta and gamma functions.

Prescribed 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.
3. Higher Engineering Mathematics, Ramana B.V., Tata McGraw

Course Outcomes:

Student will be able to	Blooms Level of Learning
1. Apply the knowledge to solve System of linear equations.	L3
2. Develop the use of matrix algebra techniques that is needed by engineers for practical applications	L3
3. Classify the functions of several variables which is useful in optimization	L4
4. Understand mean value theorems to real life problems and will understand the applications of curve tracing	L2
5. Solve important tools of calculus in higher dimensions and be familiar with 2-dimensional, 3- dimensional coordinate systems and also learn the utilization of special functions	L3

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CO-PO Mapping:

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Problem Solving and C programming
Category	ES
Course Code	19A511T
Year	I B. Tech
Semester	I Semester (Common to CE, EEE, ME, ECE & CSE)

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives:

- Understanding the steps in problem solving and formulation of algorithms to problems.
- Develop programming skills as a means of implementing an algorithmic solution with appropriate control and data structures.
- Develop intuition to enable students to come up with creative approaches to problems.
- Develop programs using pointers, structures and unions
- Manipulation of text data using files

Unit 1 9

Problem Solving: Steps to solve problems, algorithm, Pseudo code, Flowchart with examples, Program Development Environments.

Introduction to programming: Programming languages and generations.

Introduction to C: Introduction, structure of C program, keywords, identifiers, Variables, data types, constants, I/O statements, operators, precedence and associativity

Unit 2 9

Introduction to decision control statements: Selective, looping and nested statements, jumping statements.

Arrays: Introduction, declaration of arrays, accessing and storage of array elements, searching (linear and binary search algorithms) and sorting (selection and bubble) algorithms, multidimensional arrays, matrix operations.

Unit 3 9

Strings: Declaration and Initialization, String Input / Output functions, String manipulation functions.

Functions: Types of functions, recursion, scope of variables and storage classes.

Preprocessor Directives: Types of preprocessor directives, examples.

Unit 4 9

Pointers: Understanding computer's memory, introduction to pointers, declaration pointer variables, pointer arithmetic, pointers and strings, array of pointers, function pointers, dynamic memory allocation, advantages and drawbacks of pointers.

Unit 5 9

Structures: Structure definition, initialization and accessing the members of a structure, nested structures, array of structures, structures and functions, structures and pointers, self-referential structures, unions and enumerated data types.

Files: Introduction to files, file operations, reading and writing data on files, error handling during file operations.

Prescribed Text Books

1. C Programming and Data Structures. B.A. Forouzan, R. F.Gilberg, Cengage learning, Indian edition.
2. C and Data Structures, E.Balaguruswamy, Tata McGraw Hill.
3. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education.

Reference Text Books

1. LET US C, Yeswanth Kanitkar, Ninth Edition, BPB Publication
2. Byron Gottfried, Schaum's" Outline of Programming with C", McGraw-Hill.

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3. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.
4. A K Sharma "Computer Fundamentals and Programming", 2nd Edition, University Press, 2018.
5. PradeepDey and Manas Ghosh, "Programming in C", Oxford Press, 2nd Edition, 2017
6. ReemaTharaja "Introduction to C Programming", Second Edition, OXFORD Press, 2015.

Course Outcomes:

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

- | | Blooms Level of Learning |
|--|--------------------------|
| 1. Formulate solutions to problems and represent those using algorithms/Flowcharts. | L3 |
| 2. Choose proper control statements and use arrays for solving problems. | L3 |
| 3. Decompose a problem into modules and use functions to implement the modules. | L4 |
| 4. Apply and use allocation of memory for pointers and solve the problems related to manipulation of text data using files and structures. | L3 |
| 5. Develop the solutions for problems using C programming Language. | L6 |

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A511T.1	1	2	2	3		1							3		
19A511T.2	3	3	3	3	3				1				3		
19A511T.3	3	2	1	2	1				1			2	3		
19A511T.4	2	3	2	2	3				1		1	2	3		
19A511T.5	3	2	2	2	2				1			2	3		

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Engineering Chemistry Laboratory
Category	BS
Course Code	19AC14L
Year	I B. Tech
Semester	I semester

Lecture Hours	Tutorial Hours	Practical	Credits
0	0	3	1.5

Course Objectives:

- To familiarize the students with the basic concepts of Engineering Chemistry lab
- To train the students on how to handle the instruments.
- To demonstrate the digital and instrumental methods of analysis.
- To expose the students in practical aspects of the theoretical concepts.

LIST OF EXPERIMENTS

Any TEN of the following experiments must be performed

1. Determination of Zinc by EDTA method.
2. Estimation of active chlorine content in Bleaching powder
3. Determination of copper by Iodometry
4. Estimation of ferrous iron by Dichrometry
5. Preparation of Phenol-Formaldehyde resin
6. Determination of Fe (II) in Mohr's salt by potentiometric method
7. Determination of chromium (VI) in potassium dichromate
8. Conduct metric titration of Acid mixture against Strong base
9. Determination of strength of an acid by pH metric method
10. Determination of viscosity of a liquid
11. Determination of sulphuric acid in lead-acid storage cell
12. Preparation of TiO₂/ZnO nano particles
13. Determination of surface tension of a liquid
14. Preparation of Urea-Formaldehyde resin
15. SEM/TEM analysis of nano materials

Prescribed Text Books

1. Mendham J, Denney RC, Barnes JD, Thomas M and Sivasankar B Vogel's Quantitative Chemical Analysis 6/e, Pearson publishers (2000).
2. N.K Bhasin and Sudha Rani Laboratory Manual on Engineering Chemistry 3/e, Dhanpat Rai Publishing Company (2007).

Course Outcomes:

Student will be able to	Blooms Level of Learning
1. Explain the functioning of instruments such as pH meter, conductivity meter and potentiometer.	L2
2. Estimate Zn, Cr, Fe & Cu and other metals in various compounds	L2
3. Determine physical properties of liquids	L4
4. Synthesize and characterize polymers and nano materials using SEM	L5

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CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19AC14L.1	3	2	2									
19AC14L.2	3	2	2	2								
19AC14L.3	3	2	2	2								
19AC14L.4	3	2	2	2								

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
(An Autonomous Institution)

Title of the Course	C Programming Lab
Category	ES
Course Code	19A511L
Year	I B.Tech
Semester	I Semester (Common to CE, EEE, ME, ECE & CSE)

Lecture Hours	Tutorial Hours	Practical	Credits
0	0	3	1.5

Course Objectives: This course will

- Setting up programming environment
- Develop Programming skills to solve problems
- Use of appropriate C programming constructs to implement algorithms.
- Identification and rectification of coding errors in program
- Develop applications in a modular fashion
- Manage data using files

Minimum number of FOUR programmes from each exercise are to be done students

Exercise 1 (week-1): Data types, Variables, Constants and Input and Output.

Exercise 2:(week-2): Operators, Expressions and Type Conversions.

Exercise 3:(week-3): Conditional Statements [two way and multipath].

Exercise 4:(week-4): Loop Control Statements. [for, while and do-While]

Exercise 5:(week-5): Unconditioned JUMP Statements- break, continue, goto.

Exercise 6:(week-6): Declaring Arrays, Referencing Arrays, Array Subscripts. Using for loop for sequential Access.

Exercise 7:(week-7): Multidimensional Arrays

Exercise 8:(week-8): String Basics, String Library Functions and Array of Strings.

Exercise 9:(week-9): Simple user defined functions, Parameter passing methods- pass by value, pass by reference.

Exercise 10:(week-10): Storage classes- Auto, Register, Static and Extern

Exercise 11:(week-11): Recursive Functions, Preprocessor commands.

Exercise 12:(week-12): Array Elements as Function Arguments.

Exercise 13:(week-13): Pointers and structures.

Exercise 14:(week-14): Dynamic memory allocation and error handling.

Exercise 15:(week-15): File handling

Recommended Systems/Software Requirements: Intel based desktop PC with ANSI C/ TURBO C Compiler and Supporting Editors

Prescribed Text Books:

1. C and Data Structures, E. Balaguruswamy, Tata McGraw Hill
2. Let Us C, Yeswanth Kanitkar, Ninth Edition, BPB Publication

References:

1. <https://www.cprogramming.com/>
2. <https://www.mycplus.com/tutorials/c-programming-tutorials>

Course Outcomes:

Student will be able to

1. Identify and setup program development environment
2. Implement the algorithms using C programming language constructs
3. Identify and rectify the syntax errors and debug program for semantic errors
4. Solve problems in a modular approach using functions
5. Implement file operations with simple text data

Blooms Level of Learning

L2
L3
L3
L4
L4

Department of Computer Science and Engineering

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A511L.1	3	2	-	2	2	-	-	-	2	2	1	-	3		
19A511L.2	2	2	-	-	-	-	-	-	1	-	-	-	3		
19A511L.3	3	3	3	3	-	-	-	-	1	-	-	3	3		
19A511L.4	3	3	3	3	-	-	-	-	-	-	-	3	3		
19A511L.5	3	3	3	3	-	-	-	-	-	-	-	3	3		

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Communicative English Lab
Category	HS
Couse Code	19AC15L
Year	I B. Tech
Semester	I Semester (common to CE, ME, CSE)

Lecture Hours	Tutorial Hours	Practical	Credits
0	0	3	1.5

Course Objectives:

- Students will learn better English pronunciation
- Students will be trained to use language effectively in every day conversations
- Students will be trained to make formal oral presentations using effective strategies in professional life
- Students will be exposed to a variety of self-instructional, learner friendly modes of language learning

Pronunciation 6

Introduction to English speech sounds

Listening Comprehension: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions. Answering a series of questions about main idea and supporting ideas after listening to audio texts. Listening for global comprehension and summarizing what is listened to.

Speaking 24

Situational Dialogues (Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions - Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.)

Oral Presentations: Formal oral presentations on topics from academic contexts - Formal presentations using PPT slides with graphic elements, deliver an enthusiastic and well-practiced presentation

Describing people and situations (learn new adjectives, practice describing themselves and others, describe objects using proper adjectives, use details in pictures to make predictions orally, describing situations, Integrate and evaluate information presented in diverse media visually and orally

Reading 6

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

Minimum Requirement:

1. Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.
2. Communication Skills Lab with movable chairs and audio-visual aids with a P.A System, a T. V. an LCD projector, a digital stereo –audio & video system and camcorder etc.

Prescribed Text Book: Lab Manual developed by Faculty Members of AITS Rajampet

Suggested Software:

1. Loose Your Accent in 28 days, CD Rom, Judy Ravin
2. Sky Pronunciation Suite
3. Clarity Pronunciation Power – Part I
4. Learning to Speak English - 4 CDs

Course Outcomes:

Student will be able to	Blooms Level of Learning
1. Neutralize their pronunciation of English sounds, and their accent	L3
2. Adopt effective listening skills for better comprehension of English, spoken by native speakers	L2
3. Illustrate themselves in social and professional context effectively	L3
4. Improve their public speaking skills and make technical presentations confidently	L4

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- Describe people and situations using adjectives effectively
- Assess and Deduct data from graphs/pie charts/tables

L3

L3

CO-PO Mapping:

[illegible]

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Title of the Course	IT Workshop
Category	ES
Course Code	19A512L
Year	I B. Tech
Semester	I Semester

Lecture Hours	Tutorial Hours	Practical	Credits
0	0	2	1

Course Objectives: This course will

- Demonstrate the disassembling and assembling of a personal computer system.
- Demonstrate the Installation the operating system and other software required in a personal computer system.
- Introduce connecting the PC on to the internet from home and workplace and effectively usage of the internet, Usage of web browsers, email, newsgroups and discussion forums.
- Introduce the usage of Productivity tools in crafting professional word documents, excel spreadsheets and power point presentations.

List of Experiments

Preparing your Computer

Task 1: Learn about Computer: Identify the internal parts of a computer, and its peripherals. Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.

Task 2: Assembling a Computer: Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem correctly by various methods available (eg: beeps). Students should record the process of assembling and troubleshooting a computer.

Task 3: Install Operating System: Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process.

Task 4: Operating System Features: Students should record the various features that are supported by the operating system(s) installed. They have to submit a report on it. Students should be able to access CD/DVD drives, write CD/DVDs, access pen drives, print files, etc. Students should install new application software and record the installation process.

Networking and Internet

Task 5: Networking: Students should connect two computers directly using a cable or wireless connectivity and share information. Students should connect two or more computers using switch/hub and share information. Crimping activity, logical configuration etc should be done by the student. The entire process has to be documented.

Task 6: Browsing Internet: Student should access the Internet for Browsing. Students should search the Internet for required information. Students should be able to create e-mail account and send email. They should get acquaintance with applications like Facebook, skype etc. If Intranet mailing facility is available in the organization, then students should share the information using it. If the operating system supports sending messages to multiple users (LINUX supports it) in the same network, then it should be done by the student. Students are expected to submit the information about different browsers available, their features, search process using different natural languages, and creating e-mail account.

Task 7: Antivirus: Students should download freely available Antivirus software, install it and use it to check for threats to the computer being used. Students should submit information about the features of the antivirus used, installation process, about virus definitions, virus engine etc.

Productivity tools

Task 8: Word Processor: Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the colour, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc. Students should be able to prepare project cover pages, content sheet and chapter pages at the end of the task using the features studied. Students should submit a user manual of the word processor considered.

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Task 9: Spreadsheet: Students should be able to create, open, save the application documents and format them as per the requirement. Some of the tasks that may be practiced are Managing the worksheet environment, creating cell data, inserting and deleting cell data, format cells, adjust the cell size, applying formulas and functions, preparing charts, sorting cells. Students should submit a user manual of the Spreadsheet application considered.

Task 10: Presentations: creating, opening, saving and running the presentations, selecting the style for slides, formatting the slides with different fonts, colours, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyperlinking, running the slide show, setting the timing for slide show. Students should submit a user manual of the Presentation tool considered.

Prescribed Text Books:

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. Upgrading and Repairing PC's, 22nd Edition, Scott Muller QUE, Pearson Education.
3. Comdex Information Technology Course Kit, Vikas Gupta, WILEY Dreamtech.
4. MOS 2010 Study Guide for Microsoft Word, Excel, PowerPoint, and Outlook Exams, 1st Edition, Joan Lambert, Joyce Cox, Microsoft Press

Reference Books:

1. IT Essentials PC Hardware and Software Companion Guide, CICSO Networking Academy
2. Network Your Computer & Devices Step by Step 1st Edition, Ciprian Rusen, Microsoft Press
3. Troubleshooting, Maintaining & Repairing PCs, 5th Edition, Bigelow, TMH
4. Introduction to computers, Peter Norton, 6/e, Mc Graw Hill

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|---|--------|
| 1. Recognize the peripherals of a computer; perform assembling and disassembling of various components of a computer. | L1, L3 |
| 2. Describe and perform installation and un-installation of Windows and Linux operating systems and also perform troubleshooting of various hardware and software components. | L2, L3 |
| 3. Use Web browsers to access Internet, Search Engines. | L3 |
| 4. Use word processor, spread sheet, presentation and data storage tools. | L3 |

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A512L.1	3	3	1		3							3	2		
19A512L.2	3	3	1		3							3	2		
19A512L.3	3	3	1		3							3	2		
19A512L.4	3	3	1		3							3	2		

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Title of the Course	Environmental Science
Category	MC
Course Code	19AC16T
Year	I B. Tech
Semester	I Semester (Common to ME, CE, CSE)

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	0

Course Objectives:

- To make the student to get awareness on environment and understand the importance of protecting natural resources.
- To enable the student to know the importance of ecosystems and biodiversity for future generations.
- To make the student to know pollution problems due to the day to day activities of human life to save earth from the inventions by the engineers.
- To enable the student to acquire skills for identifying and solving the social issues related to environment.
- To enable the student to understand the impact of human population on the environment.

Unit 1 Multidisciplinary Nature of Environmental Studies 9

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, dams and their 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 – Food resources: Changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity – Land Resources: Land degradation, soil erosion - Energy resources: Renewable and non-renewable energy resources, use of alternate energy resources.

Unit 2 Ecosystems, Biodiversity, and its Conservation 9

ECOSYSTEMS: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers –Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).
BIODIVERSITY AND ITS CONSERVATION : Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Hot-spots of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit 3 Environmental Pollution and Solid Waste Management 9

ENVIRONMENTAL POLLUTION: Definition, Causes, effects and control measures of: Air Pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards.
SOLID WASTE MANAGEMENT: Causes, effects and control measures of urban waste – Role of an individual in prevention of pollution – Pollution case studies.

Unit 4 Social Issues and the Environment 9

SOCIAL ISSUES AND THE ENVIRONMENT: From Unsustainable to Sustainable development – Water conservation, rain water harvesting, Environmental ethics: Issues and possible solutions –global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust – 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.

Unit 5 Human Population and the Environment

9

HUMAN POPULATION AND THE ENVIRONMENT: 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/ grassland/hill/mountain – Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, and birds – river, hill slopes, etc.,

Prescribed Text Books:

1. Text book of Environmental Studies for undergraduate courses, Erach Bharucha for University Grant Commission, University press, New Delhi, 2004.
2. Environmental Studies, Palaniswamy, Second edition, Pearson education, New Delhi, 2014.

Reference Text Books:

1. Environmental Studies, Benny Joseph, Second edition, McGraw Hill Education (India) Private Limited, New Delhi, 2013
2. Environmental Studies from crisis to cure, R. Rajagopalan, Oxford University Press, New Delhi, 2015
3. Environmental Studies: A Text Book for Undergraduates, Dr. K. Mukkanti, S. Chand and Company Ltd, New Delhi, 2010
4. Ecology, Environmental Science and Conservation, J.S. Singh, S.P. Singh and S.R. Gupta, S. Chand and Company Ltd, New Delhi, 2014
5. A Text book of Environmental Studies, Shashi Chawla, Tata McGraw Hill Education, India, 2012

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|---|----|
| 1. Explain how natural resources should be used. | L2 |
| 2. Identify the importance of protection of different ecosystems and biodiversity for future generations. | L3 |
| 3. List out the causes, effects and control measures of environmental pollution. | L1 |
| 4. Demonstrate knowledge to the society in the proper utilization of goods and services. | L2 |
| 5. Outline the interconnectedness of human dependence on the earth's ecosystems. | L2 |

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19AC16T.1	1	1				3	3	1				3
19AC16T.2	1	2				3	3	1				3
19AC16T.3		1				3	3	1				3
19AC16T.4	2					3	3	1				3
19AC16T.5	1					3	3	1				3

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Unit 1	Electrical Circuits	9
Basic definitions, types of elements, ohms law, resistive, inductive, capacitive networks, Series-parallel circuits, Star and Delta transformations, and Kirchhoff's laws.		
Unit 2	DC Machines	9
DC Generator: Constructional Details of DC machine, Principle of operation, emf equation, types of generators, applications.		
DC Motor: principle of operation, torque equation, types, losses and efficiency, applications.		
TEST: Brake test, Swinburne's test and Speed control methods.		
Unit 3	AC Machines	9
1- Φ Transformer: Principle of operation, emf equation, losses, efficiency and regulation. OC and SC tests.		
Alternator: Principle of operation of alternators-Regulation by synchronous impedance method.		
3- Φ Induction Motor: Principle of operation of induction motor.		
TEST: Brake Test on 3- ϕ induction motor.		
Unit 4	Diode and Transistors	9
Diode: PN junction diode, symbol, V-I characteristics, applications, Half wave, full wave and bridge rectifiers.		
Transistors: PNP and NPN junction transistors, characteristics of CE configuration, Transistor as an amplifier.		
Unit 5	Electric Heating and CRO	9
Induction Heating: Theory of induction heating, applications in industries.		
Dielectric Heating: Theory of dielectric heating and its industrial application.		
CRO: Block diagram of CRO, Principle of CRT (cathode ray tube), applications of CRO, voltage, current and frequency measurements.		

L1

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- | | |
|---|-------|
| 2. Identify the types of DC-Machines and their applications. | L1,L3 |
| 3. Explain the principle operation of Transformer, Induction Motor. | L2 |
| 4. Identify the semi-conductor devices. | L1 |
| 5. Explain the types of heating and working principle of CRO. | L2 |

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19A221T.1	2	2	-	2	-	-	-	-	2	-	2	-
19A221T.2	2	3	2	2	-	-	-	-	2	-	2	-
19A221T.3	2	3	2	2	-	-	-	-	2	-	2	-
19A221T.4	2	2	-	3	-	-	-	-	2	-	2	-
19A221T.5	2	2	-	3	-	-	-	-	2	-	2	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Engineering Graphics & Design
Category	ES
Course Code	19A324T
Year	I B. Tech
Semester	II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
1	0	3	2.5

Course Objectives:

- To learn engineering drawing sketches and dimensioning.
- To learn basic engineering drawing formats.
- To increase ability for communicating with engineers around the world.
- To prepare the student for future Engineering positions.

PART – A Manual Drawing

Unit 1 Introduction

Theory Hours: 05 Practice sessions: 04

Principles of Engineering Graphics and their significance - Lettering – Geometrical constructions - Curves used in Engineering Practice: Conic Sections– General method only. Special methods: Ellipse – Oblong method, Arcs of circle method, concentric circles method – Parabola - Rectangle method and Tangent method – Rectangular Hyperbola.

Unit 2 Cycloidal Curves

Theory Hours: 03 Practice Sessions: 06

Cycloid, Epicycloid and Hypocycloid (treatment of simple problems only)
Involute – Square, Pentagon, Hexagon and Circle.

Unit 3 Projections of Points and Lines

Theory Hours: 05 Practice Sessions: 04

Projections of Points and Projections of Lines-inclined to one reference plane - inclined to both reference planes, finding the True lengths.

Unit 4 Projections of Planes

Theory Hours: 04 Practice Sessions: 05

PROJECTIONS OF PLANES: Projections of regular Plane surfaces inclined to one reference plane and both reference planes.

Unit 5 Projections of Solids & Conversion of Views

Theory Hours: 05 Practice Sessions: 05

Projections of Solids: Projections of Regular Solids – Cylinder, Cone, Prism and Pyramid - inclined to one reference and both reference planes.

Conversion of Views: Conversion of Isometric views to Orthographic Views and Conversion of Orthographic views to Isometric views.

PART – B : Computer Aided Drafting (For Internal Evaluation Weightage only)

Theory Hours: 03 Practice Sessions: 03

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, stretching, fillets, arrays, dimensions. Dimensioning principles and conventional representations. Free hand sketches on isometric views to orthographic views.

Prescribed Text Books:

1. Engineering Drawing, N.D. Bhatt, Charotar Publishers, Edition 2016
2. Engineering Drawing, K.L. Narayana, P. Kanniah, Scitech Pub, Edi 2016

Reference Books:

1. Engineering Drawing and Graphics, Venugopal/ New age, Ed 2015.

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2. Engineering Drawing, Johle, Tata McGraw-Hill. Ed 2014
3. Engineering Drawing, Shah and Rana, 2/e, Pearson Education Ed 2015

Course Outcomes:

Student will be able to,

Blooms Level of Learning

1. Understand the concepts of Conic Sections.
2. Understand the concept of Cycloidal Curves, Involute and the application of industry standards.
3. Understand the Orthographic Projections of Points and Lines and are capable to improve their visualization skills, so that they can apply these skills in developing the new products.
4. Understand and apply Orthographic Projections of Planes.
5. Understand and analyze the Orthographic Projections of Solids and conversion of isometric views to orthographic views vice versa.

L1, L2

L2, L3

L2, L3

L1, L2, L3

L3, L4

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19A324T.1	3	-	-	-	-	3	2	-	1	2	-	-
19A324T.2	3	-	-	-	-	3	2	-	1	2	-	-
19A324T.3	3	2	-	-	-	3	2	-	1	2	-	-
19A324T.4	3	2	-	-	-	3	2	-	1	2	-	-
19A324T.5	3	-	2	-	2	2	-	3	3	-	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Python Programming
Category	ES
Course Code	19A521T
Year	I B,Tech
Semester	II Semester (Common to CE, ME, & CSE)

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will

- To learn basics of computational problem solving, python programming and basic control structures.
- To understand python programming basic constructs like lists, dictionaries, sets and functions
- To learn module design and usage of text files in python programming
- To understand basics of object-oriented programming.
- To understand elementary data structures like linked list, stacks and queues.

Unit 1 9
Computational problem solving, Introduction to python programming language, literals, variables and identifiers, operators, expressions and data types.
Control Structures: Control structure importance, Boolean expressions, selection control, and iterative control.

Unit 2 9
Lists: List structures, lists in python, iterating over lists in python, more on python lists
Dictionaries and sets: Dictionary type in python, Set data type
Functions: Program routines, more on functions

Unit 3 9
Module Design: Modules, Top-Down design, python modules
Text Files: Text File, Using Text files, string processing, exception handling

Unit 4 9
Objects and their usage: software objects
Introduction to Object oriented programming: class, three fundamental features of object oriented programming, encapsulation-what is encapsulation, defining classes in python.

Unit 5 9
Data structures: Introduction to abstract data types, Single Linked List-traversing, searching, prepending, and removing nodes, Stacks-implementing using python list & linked list, Queues-implementing using python list & linked list.

Prescribed Text Books:

1. Introduction to Computer Science Using Python: A Computational Problem-Solving Focus, Charles Dierbach.
2. Data Structures and Algorithms using Python, Rance D.Necaise, Wiley Publications.

Reference Books:

1. Python Programming using problem solving approach, ReemaThareja, Oxford University press
2. Python Programming: An Introduction to Computer Science, John Zelle, Franklin,Beedle & Associates Inc.,3rd Edition
3. Think Python: How to think like a computer Scientist, Allen Downey 2nd Edition O'Reilly Publications.
4. Problem solving with algorithms and data structures using python, Bradley Miller, David L.Ranum, Franklin, Beedle& Associates incorporated, independent publishers.
5. Learning Python, Mark Lutz, O'Reilly Publications 5th Edition
6. Learn Python the Hard Way: A Very Simple Introduction to the Terrifyingly Beautiful World of Computers and Code Zed Shaw,Zed Shaw's Hard Way Series, Third Edition
7. Automate the Boring Stuff with Python: Practical Programming for Total Beginners, Al Sweigart, 1st Edition.

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Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|---|-------|
| 1. Understand computational problem solving and basic elements of python programming. | L1 |
| 2. Understand and apply python programming basic constructs like lists, dictionaries, sets and functions. | L1,L3 |
| 3. Illustrate module design and usage of text files in python programming | L3 |
| 4. Understand apply basics of object-oriented programming in python. | L1,L3 |
| 5. Understand and demonstrate elementary data structures. | L1,L3 |

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A521T.1	3		3									3	3	3	
19A521T.2	3		3	3								3	3	3	
19A521T.3	3		3	3								3	3	3	
19A521T.4	3		3	3								3	3	3	
19A521T.5	3		3	3								3	3	3	

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Applied Physics
Category	BS
Course Code	19AC22T
Year	I B. Tech
Semester	II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
2	1	0	3

Course Objectives:

- To impart knowledge in basic concepts of wave optics, electromagnetic theory and fiber optics.
- To explain the significant concepts of dielectrics, magnetic materials, semiconductors and superconductors in the field of engineering and their potential applications.
- To familiarize the applications of nanomaterials relevant to engineering branches.

Unit 1 Wave Optics 9
Interference-Principle of Superposition-Interference of light- Conditions for sustained Interference -Interference in thin films (reflected light)-Newton's Rings-Determination of Wavelength- Engineering applications of interference.
Diffraction-Fraunhofer Diffraction-Single and double slit Diffraction -Diffraction Grating – Grating Spectrum -Determination of Wavelength-Engineering applications of diffraction.
Polarization-Polarization by double refraction-Nicol's Prism--Half wave and Quarter wave plate- Engineering applications of Polarization.

Unit 2 Dielectric and Magnetic materials 9
Introduction-Dielectric polarization-Dielectric polarizability- Susceptibility and Dielectric constant- Types of polarizations: Electronic and Ionic (quantitative), Orientation polarizations(qualitative) -Frequency dependence of polarization-Lorentz(internal) field-Claussius -Mosotti equation-Applications of Dielectrics - ferroelectricity.
Introduction- Magnetic dipole moment-Magnetization-Magnetic susceptibility and permeability- Origin of permanent magnetic moment -Classification of Magnetic materials-Weiss theory of ferromagnetism (qualitative)-Hysteresis-soft and hard magnetic materials-Magnetic device applications (Magnetic bubble memory).

Unit 3 Electromagnetic Waves and Fiber Optics 9
Divergence and Curl of Electric and Magnetic Fields-Gauss theorem for divergence and stoke's theorem for curl-Maxwell's Equations(quantitative)- Electromagnetic wave propagation (non conducting medium)-Poynting's Theorem (qualitative).
Introduction to Optical Fibers-Total Internal Reflection-Critical angle of propagation-Acceptance angle-Numerical Aperture-Classification of fibers based on Refractive index profile,- Propagation of electromagnetic wave through optical fiber – modes-importance of V number-attenuation-Block diagram of fiber optic communication- Medical Applications-Fiber optic Sensors.

Unit 4 Semiconductors 9
Origin of energy bands - Classification of solids based on energy bands – Intrinsic semi conductors - density of charge carriers-Fermi energy – Electrical conductivity - extrinsic semiconductors - P-type & N-type - Dependence of Fermi energy on carrier concentration and temperature- Direct and Indirect band gap semiconductors-Hall effect- Hall coefficient - Applications of Hall effect - Drift and Diffusion currents – Einstein's relation - Applications of Semiconductors.

Unit 5 Superconductors and Nano materials 9
Superconductors-Properties- Meissner effect -Types of Superconductors - BCS Theory-Josephson effect (AC & DC) - Applications of superconductors.
Nano materials – significance of nanoscale - properties of nanomaterials: physical: mechanical, magnetic, Optic, Thermal - synthesis of nanomaterials: top-down-ball milling-Bottom-up-Chemical vapor deposition- characterization of nanomaterials: X-ray diffraction (XRD) - Scanning Electron Microscope (SEM) - Applications of Nano materials.

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Prescribed Text Books

1. M.N. Avadhanulu, P. G. Kshirsagar & TVS. Arunmurthy "A Text book of Engineering Physics", S. Chand Publications, 11th edition, 2019
2. H. K. Malik & A. K. Singh "Engineering Physics", - McGraw Hill Publishing Company Ltd, 2018

Reference Text Books:

1. T Pradeep "A Text book of Nano Science and Nano Technology"- Tata Mc Graw Hill 2013
2. David J. Griffiths, "Introduction to Electrodynamics"- 4/e, Pearson Education, 2014
3. Gerd Keiser "Optical Fiber Communications"- 4/e, Tata McGrawHill ,2008
4. Charles Kittel "Introduction to Solid State Physics", Wiley Publications, 2011
5. S.M.Sze "Semiconductor devices-Physics and Technology"-Wiley, 2008

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | | |
|----|---|---------|
| 1. | Explain the concepts of interference, diffraction and polarization and identify their applications in engineering field. | L2 & L3 |
| 2. | Summarize the various types of polarization of dielectrics, classification of magnetic materials and the applications of dielectric and magnetic materials. | L2 |
| 3. | Apply electromagnetic wave propagation in different guided media and Explain fiber optics concepts in various fields with working principle. | L3 & L2 |
| 4. | Outline the properties of various types of semiconductors and identify the behavior of semiconductors in various fields. | L2 |
| 5. | Explain various concepts of superconductors and nanomaterials with their applications in various engineering branches. | L2 |

CO-PO Mapping:

[illegible]

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Title of the Course	Differential Equations and Vector Calculus
Category	BS
Couse Code	19AC21T
Year	I B.Tech
Semester	II Semester (Common to CE, EEE, ME, ECE & CSE)

Lecture Hours	Tutorial Hours	Practical	Credits
3	1	0	4

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 Linear Differential Equations of Higher Order 9
Definitions-complete solution-operator D-rules for finding complimentary function-inverse operator-rules for finding particular integral for RHS term of the type e^{ax} , $\sin ax / \cos ax$, polynomials in x , $e^{ax} \sin ax / e^{ax} \cos ax / e^{ax} x^n$, $x \sin ax / x \cos ax$ -method of variation of parameters.

Unit 2 Equations Reducible to Linear Differential Equations and Applications 9
Cauchy's and Legendre's linear equations-simultaneous linear equations with constant coefficients.
Applications: Electrical Circuits – L-C and L-C-R Circuit problems.

Unit 3 Partial Differential Equations 9
Formation of PDEs by eliminating arbitrary constants and arbitrary functions-solutions of first order linear and non-linear PDEs using Charpits method-solutions of boundary value problems by using method of separation of variables.

Unit 4 Vector differentiation and integration 9
Scalar and vector point functions-vector operator del, del applies to scalar point functions-Gradient-del applied to vector point functions-Divergence and Curl-del applied twice to scalar point function-Line integral-circulation-work done-surface integral-flux-volume integral

Unit 5 Vector integral theorems 9
Green's theorem in the plane (without proof) - Stoke's theorem (without proof) - Divergence theorem (without proof)- Applications.

Prescribed 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. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd.,2002
3. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.

Course Outcomes:

Student will be able to	Blooms Level of Learning
1. Solve the differential equations related to various engineering fields.	L3
2. Formulate and solve the higher order differential equation by analyzing physical situations.	L3
3. Identify solution methods for partial differential equations that model physical processes.	L3
4. Interpret the physical meaning of different operators such as gradient, curl and divergence and estimate the work done against a field, circulation and flux using vector	L2

calculus.

5. Evaluate double and triple integrals using Green's, Stoke's and Divergence theorem.

L3

CO-PO Mapping:

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Basic Electrical and Electronics Engineering Lab
Category	ES
Course Code	19A221L
Year	I B. Tech
Semester	II semester

Lecture Hours	Tutorial Hours	Practical	Credits
0	0	3	1.5

Course Objectives:

- To impart knowledge and practical exposure on various elements of electrical circuits, operational aspects of various electrical machines and electronic circuits.

List of Experiments

Perform any ten experiments out of the following.

Experiment 1	Pre-determination of efficiency of DC shunt Machine working as Motor as well as Generator (Swinburne's Test)
Experiment 2	Determination of Performance Characteristics of DC Shunt Motor (Brake Test)
Experiment 3	Speed Control of DC Shunt Motor (Armature Control Method and Field Control Method)
Experiment 4	Determination of Performance Characteristics of Three Phase Squirrel Cage Induction Motor (Brake Test)
Experiment 5	Predetermination of efficiency and regulation of Single Phase Transformer at different power factors (OC and SC test on single phase transformers)
Experiment 6	Study of V-I Characteristics of PN junction Diode.
Experiment 7	Determination of Ripple Factor and Regulation of Half Wave Rectifier with and without Capacitive filter.
Experiment 8	Determination of Ripple Factor and Regulation of Full Wave Rectifier with and without Capacitive filter.
Experiment 9	Study of Input and Output Characteristics of Bipolar Junction Transistor in Common Emitter Configuration.
Experiment 10	Study of Cathode Ray Oscilloscope. (CRO)
Experiment 11	Determination of V-I Characteristics of ZENER Diode.
Experiment 12	Study of Frequency response of a single stage CE amplifier

Course Outcomes:

Student will be able to	Blooms Level of Learning
1. Apply the conceptual knowledge of various electrical machines to understand their operation and control aspects through practical investigations.	L3
2. Apply the conceptual knowledge of semiconductor devices to analyze the electronic circuits through practical investigations.	L3
3. Apply ethics and norms of the engineering practices while exercising experimental investigations.	L3
4. Function effectively as an individual and as a member in a team	L1
5. Communicate effectively in verbal and written forms	L1

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CO-PO Mapping:

[illegible]

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Title of the Course	Python Programming Lab
Category	ES
Course Code	19A521L
Year	I Year
Semester	II Semester (Common to CE, ME, & CSE)

Lecture Hours	Tutorial Hours	Practical	Credits
0	0	3	1.5

Course Objectives: This course will

- To practice basics of computational problem solving, python programming and basic control structures.
- To practice python programming basic constructs like lists, dictionaries, sets and functions
- To practice module design and usage of text files in python programming
- To practice basics of object oriented programming and elementary data structures.

List of Experiments

1. Install Python ecosystem and execute "Hello World" program.
2. Practice
 - a. Python literals, variables, identifiers and data types
 - b. Python operators
 - c. Input and output statements.
 - d. Control statements
3. Practice Python Programs on Numbers
 - a. Prime Numbers
 - b. Armstrong Numbers
 - c. Fibonacci Numbers and Series
 - d. Sum of squares for the first n natural numbers.
 - e. Reverse of a number
4. Implement python program on temperature conversion
5. Implement the python program to convert age in seconds.
6. Practice python programs on various types of triangle patterns
7. Implement python programs to find factorial and Fibonacci number using recursion
8. Practice python programs on lists
9. Practice python programs on sets and dictionaries
10. Practice python programs on functions and their implementation
11. Practice any one python program on module design
12. Practice python programs on text files, string processing
13. Practice python program on exception handling
14. Implement python programs on
 - i) Stacks ii) Queues
15. Implement Single linked list data structure.

Prescribed Text Books:

1. Introduction to Computer Science Using Python: A Computational Problem-Solving Focus, Charles Dierbach
2. Data Structures and Algorithms using Python , RanceD.Necaise, Wiley Publications

Reference Books:

1. Python Programming using problem solving approach, ReemaThareja, Oxford University press
2. Python Programming: An Introduction to Computer Science, John Zelle, Franklin,Beedle&Associates Inc., 3rd Edition
3. Think Python: How to think like a computer Scientist, Allen Downey 2nd Edition O'Reilly Publications.
4. Problem solving with algorithms and data structures using python, Bradley Miller, David L.Ranum, Franklin, Beedle& Associates incorporated, independent publishers.
5. Learning Python, Mark Lutz, O'Reilly Publications 5th Edition

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6. Learn Python the Hard Way: A Very Simple Introduction to the Terrifyingly Beautiful World of Computers and Code Zed Shaw,Zed Shaw's Hard Way Series, Third Edition
7. Automate the Boring Stuff with Python: Practical Programming for Total Beginners, Al Sweigart, 1st Edition.

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|--|----|
| 1. Use python basic concepts to develop problems to solve computational problems. | L3 |
| 2. Apply lists, dictionaries, sets and functions in python programming. | L3 |
| 3. Experiment module design and text files in python programming | L3 |
| 4. Solve problems using object-oriented concepts, elementary data structures in python programming | L3 |

CO-PO Mapping:

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course Applied Physics Lab
Category BS
Course Code 19AC22L
Year I B. Tech
Semester II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
0	0	3	1.5

Course Objectives:

- Understand the concepts of interference, diffraction and their applications and 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 15 experiments, any 10 experiments must be performed in a semester

List of Experiments

1. Determination of the thickness of the wire using wedge 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. Dispersive power of a diffraction grating
5. Resolving power of a grating
6. Determination of dielectric constant by charging and discharging method.
7. Magnetic field along the axis of a circular coil carrying current.
8. Determination of the self-inductance of the coil (L) using Anderson's bridge.
9. Study of variation of B versus H by magnetizing the magnetic material (B-H curve)
10. Determination of the numerical aperture of a given optical fiber and hence to find its acceptance angle
11. Measurement of magnetic susceptibility by Gouy's method
12. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall effect.
13. Determination of the resistivity of semiconductor by Four probe method
14. Determination of the energy gap of a semiconductor
15. Measurement of resistance with varying temperature.

Reference Text Book:

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

Course Outcomes:

Student will be able to	Blooms Level of Learning
1. Operate various optical instruments and estimate various optical parameters.	L2
2. Estimate the Various magnetic parameters	L2
3. Measure properties of a semiconductors	L3
4. Determine the properties dielectric materials and optical fiber materials	L3

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19AC22L.1	3											
19AC22L.2	3	1			2							
19AC22L.3	2				2							
19AC22L.4	3	2			2							

Advanced IT Workshop

Course Objectives: This course will be able

- To learn basic command line interface commands on operating system
- To learn the usage of Internet for productivity and self-paced lifelong learning
- To apply different types of conversions on Multimedia concepts
- To utilize Cloud based productivity enhancement and collaboration tools

Networking and Internet

Task 1: Networking Commands:

- ping, ssh, ifconfig, scp, netstat, ipstat, nslookup, traceroute, telnet, host, ftp, arp, wget, route, windows DOS commands

Task 2: Internet Services:

- Web Browser usage and advanced settings like LAN, content, privacy, extensions/plugins
- Google search techniques (text based, voice based)
- Email creation and usage

Task 3:

- Creating a Digital Profile on LinkedIn or Twitter or Github
- Desktop sharing like Team viewer

Productivity Tools

Task 4: Productivity Tools:

- Archival and Compression tools
- Photo editing tools
- Audio players, recording using Mic
- Video players

Office Tools -Cloud based productivity enhancement and collaboration tools:

Task 5:

- Store, sync, and share files with ease in the cloud
 - Google Drive
- Document creation and editing text documents in your web browser
 - Google docs

Task 6:

- Handle task lists, create project plans, analyze data with charts and filters
 - Google Sheets
- Create pitch decks, project presentations, training modules
 - Google Slides

Task 7:

- Manage event registrations, create quizzes, analyze responses
 - Google Forms
- Web-based service providing detailed information about geographical regions and sites around the world. Explore the globe by entering addresses and coordinates
 - Google Maps and Earth

References:

1. http://www.googleguide.com/advanced_operators_reference.html
2. File Archivers: https://en.wikipedia.org/wiki/File_archiver . Comparison of filearchivers: https://en.wikipedia.org/wiki/Comparison_of_file_archivers
3. Image editing: https://en.wikipedia.org/wiki/Image_editing Comparison of raster graphics editors: https://en.wikipedia.org/wiki/Comparison_of_raster_graphics_editors
4. https://en.wikipedia.org/wiki/Optical_character_recognition
5. Audio editing software: https://en.wikipedia.org/wiki/Audio_editing_software Comparison of free software for audio: https://en.wikipedia.org/wiki/Comparison_of_free_software_for_audio
6. Video editing software: https://en.wikipedia.org/wiki/Video_editing_software Comparison of video editing software: https://en.wikipedia.org/wiki/Comparison_of_video_editing_software
7. Cloud computing, productivity and collaboration tools, software and products offered by Google: https://en.wikipedia.org/wiki/G_Suite,

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8. G Suite Learning Center: <https://gsuite.google.com/learning-center/products#!/>
9. http://www.googleguide.com/advanced_operators_reference.html

Course Outcomes:

Student will be able to

1. Demonstrate operations on operating system using commands
2. Understand the web browser usage and apply it for network settings
3. Use the Internet for productivity like creating accounts
4. Apply transformations on Multimedia content
5. Utilize Cloud services such as Google forms, sheets etc

Blooms Level of Learning

L3
L2, L3
L3
L3
L3

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19A325L.1	3											
19A325L.2	3	3	2	2								
19A325L.3	3	3	3		3							
19A325L.4	3	3	2		3							
19A325L.5	3	3	3		3							

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Database Management Systems
Category	PC
Course Code	19A531T
Year	II B. Tech
Semester	I Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will

- To understand the role and uses of DBMS in an organization.
- To understand fundamental concepts of Database Management Systems like database design, database languages, and database-system implementation.
- To construct simple and moderately advanced database queries using Structured Query Language (SQL).
- Understand and successfully apply logical database design principles, including E-R diagrams and database normalization techniques.
- To provide detailed knowledge of transaction, concurrency and recovery strategies of DBMS.

Unit 1 : INTRODUCTION 9
Database-System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Data Storage and Querying, Transaction Management, Data Base Architecture, Database Users and Administrators, History of Database Systems.

Unit 2 : 9
DATABASE DESIGN: Database Design and ER Diagrams, Entities, Attributes and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design with the ER Model, Case study: The Internet Shop.
THE RELATIONAL MODEL: Introduction to the Relational Model, Integrity Constraints over Relations, Enforcing Integrity Constraints, Querying Relational Data, Logical Data Base Design: ER to Relational

Unit 3 : SQL AND PL/SQL 9
Introduction to SQL, Data Definition Commands, Data Manipulation Commands, Select Queries, Virtual Tables: Creating View, Altering View, Updating View, Destroying View, Relational Set Operators, SQL Join Operators, Sub Queries and Correlated Queries, Aggregate Functions, Procedural SQL: Stored Procedures, Stored Functions, Triggers, Cursors

Unit 4 : 9
Introduction to Schema Refinement: Problems Caused by Redundancy, Decompositions, Problems Related to Decomposition, Functional Dependencies, Reasoning about FDs, Normal Forms: 1NF, 2NF, 3NF, BCNF, Properties of Decomposition: Lossless Join Decomposition, Dependency Preserving Decomposition, Multivalued Dependencies, 4 NF

Unit 5 : 9
ACID Properties: Consistency and Isolation, Atomicity and Durability, Transactions and Schedules, Concurrent Execution of Transactions, Lock-Based Concurrency Control, Performance of Locking, Transaction Support in SQL.

Prescribed Text Books:

1. Silberschatz, Korth, Sudarshan, Database System Concepts. McGraw Hill, 5th Edition.
2. RaghuRamaKrishnan, Johannes Gehrke, Database Management Systems, McGraw Hill, Third Edition.
3. Peter Rob, A. Ananda Rao, Carlos Coronel, Database Management Systems, CENGAGE Learning.

Reference Books:

1. Elmasri,Navate, Fundamentals of Database Systems. Pearson Education.
2. C.J.Date, Introduction to Database Systems. Pearson Education.

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Course Outcomes:

Student will be able to

Blooms Level of Learning

1. memorize and recall the basic concepts of Database Systems to examine the applications of database systems
2. Demonstrate an Entity-Relationship (E-R) model from specifications and to convert the transformation of the conceptual model into corresponding logical data structures
3. illustrate database concepts in structure query languages
4. Analyze the problems with redundancies and eliminate redundancies in a database schema using normalization.
5. Judge the need of concurrency control in transaction management concepts in database systems.

L1

L2

L3

L4

L5

CO-PO Mapping:

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Data Structures Through Python
Category	PC
Course Code	19A532T
Year	II B.Tech
Semester	I Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives:

- To learn the basics of object-oriented programming in python language.
- To learn handling of exceptions and python basic data structures.
- To analyze algorithms and understand sets, maps, linked list using python programming
- To apply recursion in python programming and understand hashing operation
- To learn the implementation of binary trees, binary search trees and AVL trees.

Unit 1 9

Review of object oriented programming, Classes and Objects: Introduction, defining classes, creating objects ,data abstraction and through classes, class method and self argument, the `__init__()` method, class variables and object variables, the `__del__()` method, special methods, public and private members, private methods, calling a class method from another class method, built-in functions to check ,get, set and delete class attributes, built-in class attributes, garbage collection, class and static methods.

Inheritance: Introduction, Inheriting classes in python, types of inheritance, abstract classes and interfaces.

Unit 2 9

Operator overloading: Introduction, implementing operator overloading.

Error and Exception handling: introduction, handling exceptions, multiple except blocks, multiple exceptions in a single block, the else clause, raising exceptions, instantiating exceptions, handling exceptions in invoked functions, built-in and user defined exceptions, the finally block, Assertions in python.

Abstract Data types: Review of abstract data type, iterators.

Arrays: Array structure, python list, and two dimensional arrays.

Unit 3 9

Sets and Maps: Sets, maps, multi-dimensional arrays.

Algorithm Analysis: Complex analysis, evaluating the python list, amortized cost, evaluating the set ADT

Linked Lists: Review single linked list, double linked list, circular linked list.

Unit 4 9

Recursion: Recursive functions, properties of recursion, recursion works, recursive applications-recursive binary search, towers of Hanoi, exponential operation.

Hash Tables: Introduction, hashing, separate chaining, hash functions, the hashmap abstract data type.

Sorting: Merge sort, Quick sort

Unit 5 9

Binary Trees: The Tree structure, the binary tree, priority queues-heaps, heap sort.

Search trees: The binary search tree, search tree iterators, AVL trees

Prescribed Text Books:

1. Python Programming using problem solving approach, Reema Thareja, Oxford University press
2. Data Structures and Algorithms using Python, RanceD. Necaie, Wiley Publications

Reference Books:

1. Core Python Programming, R. Nageswara Rao, Dream Tech Press (Wiley India), 2017 Edition

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2. Problem solving with algorithms and data structures using python, Bradley Miller, David L. Ranum, Franklin, Beedle & Associates incorporated, independent publishers.
3. Data Structures and Algorithms in Python, Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser, Wiley Publications
4. Learn Python the Hard Way: A Very Simple Introduction to the Terrifyingly Beautiful World of Computers and Code Zed Shaw, (Zed Shaw's Hard Way Series, Third Edition
5. Python Programming: An Introduction to Computer Science, John Zelle, Franklin, Beedle & Associates Inc., 3rd Edition
6. Dive into Python 3, Mark Pilgrim, Apress publications

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | | |
|----|--|-------|
| 1. | learn the basics of object-oriented programming in python language. | L1 |
| 2. | learn handling of exceptions and python basic data structures. | L1 |
| 3. | analyze algorithms and understand sets, maps, linked list using python programming | L2,L4 |
| 4. | apply recursion in python programming and understand hashing operation | L2,L3 |
| 5. | learn the implementation of binary trees, binary search trees and AVL trees. | L1 |

CO-PO Mapping:

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Digital Logic Design and Computer Organization
Category	PC
Course Code	19A533T
Year	II B.Tech
Semester	I Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will

- Illuminate the student to understand the basic concepts of digital number systems and their conversions
- Allow the students to Design and analyze combinational and sequential logic circuits through formulation of logic functions, Boolean algebra minimization
- Impart the students to understand the internal organization and operations of a computer
- Enable the students to acquire knowledge about the concepts of processor logic design and memory organization
- Allow the students to familiarize the concepts related to IO organization.

Unit 1 : BASIC STRUCTURE OF COMPUTERS 9
Computer Types, Functional units, Basic operational concepts, Bus structures, Software, Performance, multiprocessors and multi computers, Data Representation: Binary Numbers, Fixed Point Representation. Floating – Point Representation. Number base conversions, Octal and Hexadecimal Numbers, complements, Signed binary numbers, Binary codes.

Unit 2 : DIGITAL LOGIC CIRCUITS 9
DIGITAL LOGIC CIRCUITS - I: Basic Logic Functions, Logic gates, universal logic gates, Minimization of Logic expressions, Combinational Circuits.
DIGITAL LOGIC CIRCUITS - II: Flip-Flops, Registers, Shift Registers, Binary counters, Decoders, Multiplexers, Programmable Logic Devices.

Unit 3 : 9
COMPUTER ARITHMETIC: Algorithms for fixed point and floating point addition, subtraction, multiplication and division operations, Hardware Implementation of arithmetic and logic operations.
INSTRUCTION SET & ADDRESSING: Memory Locations and Addresses, Machine addresses and sequencing, Various Addressing Modes, Instruction Formats, Basic Machine Instructions.

Unit 4 : 9
PROCESSOR ORGANIZATION: Introduction to CPU, Register Transfers, Execution of Instructions, Multiple Bus Organization, Hardwired Control, Micro programmed Control
MEMORY ORGANIZATION: Concept of Memory, RAM, ROM memories, memory hierarchy, cache memories, virtual memory, secondary storage, memory management hardware.

Unit 5 : INPUT / OUTPUT ORGANIZATION 9
Introduction to I/O, Interrupts- Hardware, Enabling and disabling Interrupts, Device Control, Direct memory access, buses, Interface Circuits, Standard I/O Interfaces.

Prescribed Text Books:

1. Computer Organization – Carl Hamacher, Zvonko Vranesic, Safwat Zaky, 5th Edition, McGraw Hill
2. Computer Architecture and Organization- An Integrated Approach, Miles Murdocca, Vincent Heuring, Second Edition, Wiley India
3. Computer Systems Architecture – M.Moris Mano, 3rd Edition, Pearson

Reference Books:

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson.
2. Computer- organization and Design- David A. Paterson and John L. Hennessy-Elsevier

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3. Fundamentals of Computer Organization and Design, - Sivarama Dandamudi Springer Int. Edition
4. Digital Design – Third Edition, M. Morris Mano, Pearson Education/PHI

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|---|--------|
| 1. Identify the basic structure and functional units of a digital computer | L1 |
| 2. Solve problems based on computer arithmetic | L1,L3 |
| 3. Design, Analyze and evaluate different digital circuits using Boolean algebra | L1, L4 |
| 4. understand instruction structure and Analyze the effect of addressing modes on the execution time of a program | L2, L4 |
| 5. Understand concepts related to Processor, memory organization and Select appropriate interfacing standards for I/O devices | L1, L4 |

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A533T.1	3	3	3									3	3		
19A533T.2	3	3	3	2	3				2			3	3		2
19A533T.3	3	3				1					3	3	3		2
19A533T.4		3		3	3				3			3			3
19A533T.5		3	3	2					3		2	3	3		3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Discrete Mathematics
Category	BS
Course Code	19AC33T
Year	II B.Tech
Semester	I Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will

- Simplify and evaluate basic logic statements and Express a logic sentence in terms of predicates, quantifiers with logical connectives.
- Facilitate to solve problems using operations on sets, functions and recurrence relations to analyze algorithms.
- Make to understand algebraic structures and solve counting problems by applying elementary counting technique.
- Enhance to learn core ideas of graph theory and traversal techniques.

Unit 1 : MATHEMATICAL LOGIC 9

Statements and Notation, Connectives, Statement Formulas and Truth Tables, Conditional and Bi-conditional, Well-Formed Formulas, Tautologies, Equivalence of Formulas, Duality Law, Tautological Implications, Normal Forms, Validity using Truth Tables, Rules of Inference, Consistency of Premises and Indirect Method of Proof, Automatic Theorem Proving, Predicates, The Statement Function, Variables and Quantifiers, Predicate Formulas, Free and Bound Variables, The Universe of Discourse.

Unit 2 : RELATIONS AND FUNCTIONS 9

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, Partial Ordering, Hasse Diagram. Functions, Composition of Functions.

Unit 3 : 9

ALGEBRAIC STRUCTURES: Algebraic Systems, Simple Algebraic Systems and General Properties, Semi Groups and Monoids, Groups, Subgroups, Homomorphism, Isomorphism

ELEMENTARY COMBINATORICS: Basics of Counting, Combinations and permutations, Binomial Coefficients, The Binomial and Multinomial Theorems, The Principle of Inclusion-Exclusion, Pigeonhole Principle and its Applications.

Unit 4 : RECURRENCE RELATIONS 9

Generating Functions of Sequences, Calculating Coefficients of Generating Functions, Recurrence Relations, Solving Recurrence Relations by Substitution and Generating Functions, The Method of Characteristic Roots, Solutions of Inhomogeneous Recurrence Relations.

Unit 5 : GRAPH THEORY 9

Basic Concepts, Representation of Graphs, Isomorphism and Subgraphs, Spanning Trees, Planar Graphs, Euler's Formula, Multigraphs and Euler circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

Prescribed Text Books:

1. J.P.Tremblay, R.Manohar, Discrete Mathematical Structures with Applications to Computer Science. TMH (UNITS 1 & 2).
2. J.L.Mott,A.Kandel, T.P.Baker,Discrete Mathematics for Computer Scientists &Mathematicians. Prentice Hall (UNITS 3,4 & 5)

Reference Books:

1. Thomas Koshy, Discrete Mathematics with Applications. Elsevier.
2. N. Chandrasekaran, M. Umaparvathi, Discrete Mathematics,PHI Learning Pvt. Ltd.
3. BernandKolman, Roberty C. Busby, Sharn Cutter Ross, Discrete Mathematical Structures. Pearson Education/PHI.
4. Malik &Sen, Discrete Mathematical Structures Theory and application.

5. Garry Haggard and others, Discrete Mathematics for Computer science, Thomson.

Course Outcomes:

Student will be able to

Blooms Level of Learning

1. Understand and apply the logic statements and express logic sentences in terms of predicates, quantifiers and logical connectives. L2,L4
2. Demonstrate the relations, functions and determine their properties. L3
3. Understand the basic concepts of algebraic structures and analyze permutations, combinations, Pigeon hole principle and its applications. L2,L4
4. Understand the various types of recurrence relations and apply the methods to find out their solutions. L2,L3
5. Define and analyze data numerically and/or graphically. L1,L4

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19AC33T.1	3	3	3									3	3	3	
19AC33T.2	3	3	3	3								3	3	3	
19AC33T.3	3	3	3	3								3	3	3	
19AC33T.4	3	3	3	3								3	3	3	
19AC33T.5	3	3	3	3		1	1					3	3	3	

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Web Programming
Category	PC
Course Code	19A534T
Year	II B. Tech
Semester	I Semester

Lecture Hours	Tutorial Hours	Practical	Credits
2	0	0	2

Course Objectives: This course will make the students

- Interpret and use HTML concepts in developing the web pages
- Use the CSS to design web pages.
- Interpret the JavaScript programming language
- Interpret the JavaScript framework using JQuery

Unit 1 : 7
Structuring Documents for the Web-A Web of Structured Documents, Introducing HTML5, Tags and Elements, Attribute Groups Core Attributes, Internationalization, Core Elements ,Basic Text Formatting, Understanding Block and Inline Elements, Grouping Content, Working with Lists, Text Processing tags, Links and Navigation :Basic Links, Understanding Directories and Directory Structures, Understanding URLs, Creating In-Page Links with the <a> Element.

Unit 2 : Images, Audio, and Video, Tables, Forms 7
Images, Audio, and Video -Adding Images Using the Element, Using Images as Links Adding Flash, Video, and Audio to Your Web Pages Tables: Introducing Tables, Basic Table Elements and Attributes, adding a Caption to a Table, Grouping Sections of a Table, Nested Tables, Accessible Tables. Forms: Introducing Forms, creating a Form with the <form> Element, Form Controls, Creating Labels for Controls and the <label> Element, Structuring Your Forms with <fieldset> and <legend> Elements, Focus, Disabled and Read-Only Controls, Sending Form Data to the Server, Creating More Usable Form Fields.

Unit 3 : Cascading Style Sheets, Introduction to XML 7
Cascading Style Sheets: Introducing CSS, Where You Can Add CSS Rules, CSS Properties Controlling Text, Text Formatting, Text Pseudo-Classes, Styling Text, Selectors Lengths, Introducing the Box Model, An Example Illustrating the Box Model, Links, Backgrounds, Lists, Tables, And Miscellaneous Properties.
Introduction to XML: Difference between HTML and XML, Basic structure and Syntax of XML Document, DTD, sample examples.

Unit 4 : Learning JavaScript 7
Learning JavaScript-Introduction to JavaScript, How to Add a Script to Your Pages, comments in JavaScript, Create an External JavaScript ,The Document Object Model, JavaScript Programming console, General Programming Concepts, Variables, Operators, String Operators (Using + with Strings), Functions, Conditional Statements, Looping, Events, Built-in Objects.

Unit 5 : Working with jQuery 7
Working with jQuery: introduction to jQuery, adding jQuery to Your Page, jQuery Basics, jQuery and the DOM, Managing Events with jQuery, Ajax with jQuery, jQuery UI.

Prescribed Text Books:

1. Beginning HTML and CSS Rob Larsen, Wrox Programmer to Programmer.

Reference Books:

1. JavaScript and JQuery: Interactive Front-End Web Development, Jon Duckett, Wiley Publications
2. Web Design with HTML, CSS, JavaScript and jQuery Set, Jon Duckett, Wiley Publications
3. jQuery in Action, Bear Bibeault, Yehuda Katz, and Aurelio De Rosa, Third Edition, Manning Publications
4. <https://www.w3schools.com/>

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Course Outcomes:

Student will be able to

1. Interpret and Use the fundamental HTML markups when designing web pages.
2. Use and design the web pages with images, audio, videos, tables and form controls.
3. Use cascading style sheets and XML concepts to design web pages
4. Interpret and use JavaScript concepts in designing web pages
5. Interpret and use JQuery concepts in designing web pages.

Blooms Level of Learning

L2, L3, L5

L3, L5

L3, L5

L2, L3, L5

L2, L3, L5

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A534T.1	3	-	3	3	3	-	-	-	-	-	-	3	3	3	3
19A534T.2	-	-	3	3	3	-	-	-	-	-	-	3	3	3	3
19A534T.3	-	-	3	3	3	-	-	-	-	-	-	3	3	3	3
19A534T.4	3	-	3	3	3	-	-	-	-	-	-	3	3	3	3
19A534T.5	3	-	3	3	3	-	-	-	-	-	-	3	3	3	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Life Sciences for Engineers
Category	BS
Course Code	19AC34T
Year	II B.Tech.
Semester	I Sem (Common to CE, ME, CSE)

Lecture Hours	Tutorial Hours	Practical	Credits
2	0	0	2

Course Objectives:

- Introduce the molecular basis of life.
- Provide the basis for classification of living organisms.
- Describe the transfer of genetic information.
- Introduce the techniques used for modification of living organisms.
- Describe the applications of biomaterials

Unit 1 Living Organisms 6

Comparison of biological organisms with manmade systems, Classification of living organisms, Cellular basis of life, differences between prokaryotes and eukaryotes, classification on the basis of carbon and energy sources, molecular taxonomy.

Unit 2 Proteins and Enzymes 6

Water, Biomolecules, structure and functions of proteins and nucleic acids, hemoglobin, antibodies and enzymes, Industrial applications of enzymes, Fermentation and its industrial applications

Unit 3 Human Physiology 6

Bioenergetics, Respiration: Glycolysis and TCA cycle, Electron transport chain and oxidative phosphorylation, Mechanism of photosynthesis, Human physiology, neurons, synaptic and neuromuscular junctions

Unit 4 Genes and DNA 6

Mendel's laws, gene mapping, Mitosis and Meiosis, single gene disorders in humans, Genetic code, DNA replication, Transcription, Translation

Unit 5: RNA 6

Recombinant DNA Technology: recombinant vaccines, transgenic microbes, plants and animals, animal cloning, biosensors, biochips.

Prescribed Text Books

1. N. A. Campbell, J. B. Reece, L. Urry, M. L. Cain and S. A. Wasserman, "Biology: A global approach", Pearson Education Ltd, 2018.
2. Arthur T Johnson, Biology for Engineers, CRC press, 2011

Reference Books

1. Alberts Et.Al. The molecular biology of the cell, 6/e, Garland Science, 2014
2. E. E. Conn, P. K. Stumpf, G. Bruening and R. H. Doi, "Outlines of Biochemistry", John Wiley and Sons, 2009.
3. John Enderle and Joseph Bronzino Introduction to Biomedical Engineering, 3/e, 2012

Course Outcomes:

Student will be able to	Blooms Level of Learning
1. explain catalytic properties of enzymes.	L2
2. summarize application of enzymes and fermentation in industry.	L2
3. identify DNA as a genetic material in the molecular basis of information transfer.	L2
4. apply thermodynamic principles to biological systems.	L2

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5. analyze biological processes at the reductionist level. L4
6. identify the potential of recombinant DNA technology. L2

CO-PO Mapping:

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
(An Autonomous Institution)

Title of the Course	Constitution of India
Category	MC
Course Code	19AC37T
Year	II B. Tech
Semester	I Semester (Common to CE & CSE)

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	0

Course Objectives:

- To enable the student to understand the importance of constitution
- To understand the structure of executive, legislature and judiciary
- To understand philosophy of fundamental rights and duties
- To understand the autonomous nature of constitutional bodies like Supreme Court and high court controller and auditor general of india and election commission of india.
- To understand the central and state relation financial and administrative

Unit 1 9

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.

Unit 2 9

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

Unit 3 9

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

Unit 4 9

Local Administration - District's Administration Head - Role and Importance, Municipalities - Mayor and role of Elected Representative - CEO of Municipal Corporation PachayatiRaj: Functions PRI: Zila Panchayat, Elected officials and their roles, CEO Zila Panchayat: Block level Organizational Hierarchy - (Different departments), Village level - Role of Elected and Appointed officials - Importance of grass root democracy.

Unit 5 9

Election Commission: Election Commission- Role of Chief Election Commissioner and Election Commissionerate State Election Commission:, Functions of Commissions for the welfare of SC/ST/OBC and women

Prescribed Text Books

1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt. Ltd.. New Delhi
2. Subash Kashyap, Indian Constitution, National Book Trust

Reference Books

1. J.A. Siwach, Dynamics of Indian Government & Politics
2. D.C. Gupta, Indian Government and Politics
3. M.V. Pylee, India's Constitution

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Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|--|----|
| 1. Understand historical background of the constitution making and its importance for building a democratic India. | L2 |
| 2. Understand the functioning of three wings of the government i.e., executive, legislative and Judiciary. | L2 |
| 3. Understand the value of the fundamental rights and duties for becoming good citizen of India. | L2 |
| 4. Analyze the decentralization of power between central, state and local self-government. | L3 |
| 5. Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy | L4 |

CO-PO Mapping:

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Database Management Systems Lab
Category	PC
Course Code	19A531L
Year	II B. Tech
Semester	I Semester

Lecture Hours	Tutorial Hours	Practical	Credits
0	0	2	1

Course Objectives: This course will

- To Understanding Conceptual Database Management systems.
- To understand the principles of Data Modelling using Entity relationships to Database design.
- To Understand SQL, and its syntax for Various Key Constraints.
- To Use aggregate functions date time functions.
- To Use PL/SQL for implementing object level data

Week 1 2

Draw Relational Databases and ER Diagrams for the following applications.

- Student Information System, Student(Student No, Student Name, Address, Mobile No, Email ID, Institute Name, Branch Name, Fee, Mark1, Mark2, Mark3, Mark4, Mark5, TotalMarks, Percentage, Grade)
- Employee Information System, Employee (Employee ID, Employee Name, Address, Mobile No, Email ID, Organization Name, Employee Designation, Basic Salary, DA, HRA, Gross Salary, Deductions, Net Salary)
- Customer Information System Customer (Customer ID, Customer Name, Address, Mobile No, Email ID, Shop Name, Product Code, Product Name, Quantity, Cost per Unit, Total Bill, Discount, Net Bill)

Week 2 2

Write SQL queries to CREATE TABLES for various databases using DDL commands (i.e. CREATE, DESCRIBE, ALTER, DELETE, DROP).

Week 3 2

Write SQL queries to MANIPULATE TABLES for various databases using DML commands (i.e. INSERT, SELECT, UPDATE, DELETE, TRUNCATE).

Week 4 2

Write SQL queries to create VIEWS for various databases (i.e. CREATE VIEW, UPDATE VIEW, ALTER VIEW, and DELETE VIEW).

Week 5 2

Write SQL queries to perform RELATIONAL SET OPERATIONS (i.e. UNION, UNION ALL, INTERSECT, MINUS, CROSS JOIN, NATURAL JOIN).

Week 6 2

Write SQL queries to perform SPECIAL OPERATIONS (i.e. ISNULL, BETWEEN, LIKE, IN, EXISTS)

Week 7 3

Write SQL queries to perform JOIN OPERATIONS (i.e. CONDITIONAL JOIN, EQUI JOIN, LEFT OUTER JOIN, RIGHT JOIN, FULL OUTER JOIN)

Week 8 2

Write SQL queries to perform AGGREGATE OPERATIONS (i.e. SUM, COUNT, AVG, MIN, MAX).

Week 9 2

Write SQL queries to perform ORACLE BUILT-IN FUNCTIONS (i.e. DATE, TIME).

Week 10 2

Write SQL queries to perform KEY CONSTRAINTS (i.e. PRIMARY KEY, FOREIGN KEY, UNIQUE NOT NULL, CHECK, DEFAULT).

Week 11 2

Write PL/SQL programs for

- Calculating the factorial of given number.
- Finding the given number is Prime Number or not.
- Displaying the Fibonacci series up to an integer.

Week 12	2
a. Write PL/SQL program to implement Stored Procedure on table.	
b. Write PL/SQL program to implement Stored Function on table.	
Week 13	2
Write PL/SQL program to implement Trigger on table.	
Week 14	2
Write PL/SQL program to implement Cursor on table	

1. Raghurama Krishnan, JohannesGehrke, Data base Management Systems.TataMcGrawHill.
2. Peter Rob, AnandaRao and Carlos Corone, Database Management Systems.CengageLearning.
3. Rick F.VanderLans, Introduction to SQL.Pearson Education.
4. B.RosenZweig and E.Silvestrova,Oracle PL/SQL. Pearson Education.
5. Steven Feuerstein.OraclePL/SQL Programming.
6. Dr. P. S. Deshpande, SQL&PL/SQL for Oracle 10g. Black Book, DreamTech.
7. J. J. Patrick, SQL fundamentals. Pearson Education.
8. Raghurama Krishnan, JohannesGehrke, Data base Management Systems.TataMcGrawHill.

Student will be able to	Blooms Level of Learning
1. Implement ER-Diagrams for Various Applications	L3
2. Design database with Key Constraints and use the SQL commands such as DDL, DML, DCL, TCL to access data from database objects.	L6
3. Implement Views in order to retrieve information from the different kinds of the user.	L3
4. Implement Relational, Special, Join Operators, Oracle built-in functions and Aggregate functions.	L3
5. Execute PL/SQL Programming including stored procedures, stored functions, cursors, packages.	L3

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Data Structures Through Python Lab
Category	PC
Course Code	19A532L
Year	II B. Tech
Semester	I Semester

Lecture Hours	Tutorial Hours	Practical	Credits
0	0	3	1.5

Course Objectives:

- To practice the basics of object oriented programming in python language.
- To practice handling of exceptions and algorithm analysis in python programming
- To practice implementation of elementary data structures in python programming
- To understand trees and priority queues implementation in python programming
- To learn the implementation of maps, dictionaries, sorting and text processing operations.

Week1:

- Write python program to implement encapsulation and abstraction
- Write a python program to implement the usage of self-variable.
- Write a python program to implement class variables and object variables

Week2:

- Write a python program to illustrate `_del_()` method, `_repr_()` method, `_cmp_()` method and `_len_()` method.
- Write a python program to implement the access control.
- Write a python program to implement constructors and destructors.
- Write a python class that stores a string and all its status details such as number of upper case characters, vowels, consonants spaces etc.

Week 3:

- Write a python program to implement static variables and static methods.
- Write a python program to implement `super()`
- Write a python program to implement types of inheritance.
- Write a python program to implement the method overloading and method overriding.
- Write a python program to implement the abstract classes and interfaces.

Week4:

- Write a python program that has a class Point. Define another class Location which has two objects (Location and Destination) of class Point. Also define a function in Location that prints the reflection of Destination on the x axis.
- Write a python program to implement the Operator overloading.
- Write a python program to compare two Date objects.

Week5:

- Write a python program to implement exception handling.
- Write a python program to demonstrate except block, else clause, raising exceptions and instantiating exceptions.
- Write a python program to demonstrate user defined exceptions and assertions.

Week6:

- Write a python program to demonstrate single dimensional arrays and multi-dimensional arrays.
- Write python programs to demonstrate python lists
- Write a python program to demonstrate Set ADT and Map ADT

Week7:

Write a python programs to implement the following.

- Stack ADT
- Queue ADT
- Deque ADT

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Web Programming Lab
Category	PC
Course Code	19A534L
Year	II B.Tech
Semester	I Semester

Lecture Hours	Tutorial Hours	Practical	Credits
0	0	2	1

Course Objectives: This course will

- Students can easily develop web pages that are static
- Students can use CSS on webpages
- Students can use javascript to write client-side scripting programs

WEEK 1:	2
1. Create HTML Pages contains	
a. Basic text formatting Elements	
b. Block and Inline Elements	
WEEK 2:	2
2. Create Html pages Contains	
a. Different Types of LISTS	
b. Text Processing Tags	
WEEK 3:	2
3. Create HTML Pages Contains links and Navigation	
a. How to link between pages of your site	
b. How to link to other sites	
c. How to link to specific parts of a page in your site	
WEEK 4:	2
4. Create HTML Pages which can work with Images, Audio and Video elements	
WEEK 5:	2
5. Create HTML Pages contains Table element.	
WEEK 6:	2
6. Create HTML Pages with Form elements.	
WEEK 7:	2
7. Apply Different types of CSS to the HTML pages.	
a. Styling Text.	
b. Styling LINKS.	
c. Styling Backgrounds.	
d. Styling Lists.	
e. Styling Tables.	
WEEK 8:	2
8. Simple XML Script with DTD.	
WEEK 9:	2
9. Simple JavaScript Programs for the following	
a. Functions.	
b. Control Statements.	
c. Loop Statements.	
WEEK 10:	2
10. Handling JavaScript Events.	
a. Window Events.	
b. User Events (Actions performed on HTML FORM elements using Keyboard and Mouse)	

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WEEK 11:	2
11. Sample Java Script Programs to work with BUILT-IN Objects.	
WEEK 12:	2
12. Working with jQuery: Environment setting to work with jQuery	
a. Sample jQuery Programs to work with DOM.	
b. Event Handling	
WEEK 13:	2
13. Sample program for jQuery with Ajax.	
WEEK 14:	2
14. Sample web page with jQuery UI	

Prescribed Text Books:

1. Beginning HTML and CSS Rob Larsen, Wrox Programmer to Programmer.

Reference Books:

1. JavaScript and JQuery: Interactive Front-End Web Development, Jon Duckett, Wiley Publications
2. Web Design with HTML, CSS, JavaScript and jQuery Set, Jon Duckett, Wiley Publications
3. jQuery in Action, Bear Bibeault, Yehuda Katz, and Aurelio De Rosa, Third Edition, Manning Publications
4. <https://www.w3schools.com/>

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|--|--------|
| 1. Use basic HTML markups when designing web pages. | L3, L5 |
| 2. Use and design pictures, audio, video, tables and form controls on the web pages. | L3, L5 |
| 3. Use cascading style sheets to design web pages. | L3, L5 |
| 4. Use Javascript concepts to design webpages | L3, L5 |
| 5. Use jQuery concepts in designing web pages. | L3, L5 |

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A534L.1	-	-	3	3	3	-	-	-	-	-	-	3	3	3	3
19A534L.2	-	-	3	3	3	-	-	-	-	-	-	3	3	3	3
19A534L.3	-	-	3	3	3	-	-	-	-	-	-	3	3	3	3
19A534L.4	-	-	3	3	3	-	-	-	-	-	-	3	3	3	3
19A534L.5	-	-	3	3	3	-	-	-	-	-	-	3	3	3	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Probability and Statistics
Category	BS
Course Code	19AC43T
Year	II B.Tech
Semester	II Sem

Lecture Hours	Tutorial Hours	Practical	Credits
2	1	0	3

Course Objectives

- To familiarize the students with the foundations of probability and statistical methods
- To impart probability concepts and statistical methods in various applications Engineering

Unit 1: Introduction of statistics 8
Statistics Introduction-Mean- Median and Mode for ungrouped and grouped data.
Correlation-correlation coefficient –Karl Pearson's coefficient-Spearman's rank correlation

Unit 2: Probability 8
Probability-probability axioms-addition law and multiplicative law of probability- conditional probability-Baye's theorem.
Random variables-Discrete and continuous - Distributions functions- Mean and Variance.

Unit 3: Probability distributions 8
Probability distribution – Binomial and Poisson distribution - fitting - normal distribution-their properties.

Unit 4: 8
Estimation-Point estimation-Interval estimation of one Mean and two Means (small and large)-one Proportions and two Proportions (large).
Test of Hypothesis: Single mean-difference of means - single proportion-difference of proportions (large).

Unit 5: 8.
Student t-distribution test for single mean-two means and paired t-test,
Testing of equality of variances (F-test) - χ^2 test for goodness of fit - χ^2 test for independence of attributes.

Prescribed Text Books

1. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan Chand & Sons Publications, 2012.
2. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna publishers, 2017.

Reference Books

1. Miller and Freunds, Probability and Statistics for Engineers, 7/e, Pearson, 2008.
2. S. Ross, a First Course in Probability, Pearson Education India, 2002.
3. W. Feller, an Introduction to Probability Theory and its Applications, 1/e, Wiley, 1968

Course Outcomes:

Student will be able to	Blooms Level of Learning
1. Interpret the association of characteristics and through correlation tool	L2
2. Understand the basic concepts of Probability, random variables and apply discrete and continuous probability distributions	L2
3. Make use of the concepts of probability and their applications	L3
4. Design the components of a classical hypothesis test for large samples	L4
5. Infer the statistical inferential methods based on small sampling tests	L4

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CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19AC43T.1	3	3		2								2
19AC43T.2	2	3		2								2
19AC43T.3	3	2		2								3
19AC43T.4	3	3		2								3
19AC43T.5	2	3		2								2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Artificial Intelligence
Category	PC
Course Code	19A541T
Year	II B.Tech
Semester	II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will

- To comprehend the building blocks of AI in terms of intelligent agents.
- To understand the main approaches of artificial intelligence such as heuristic search, game search and logical inference.
- To know how decision theory and planning is processed on the agents.
- To verify the different types of objects in uncertain world for an agent
- To identify the solution in uncertain knowledge with reasoning.

Unit 1 : Introduction to Artificial Intelligence 9
Introduction to AI, History of AI, Emergence of Intelligent Agents, Intelligent Agents: PEAS- Representation for an Agent, Types of Agents, Types of Agent Environments, Concept of Rational Agent, Structure of Intelligent agents, Defining the Problem as a State Space Search, Problem Characteristics.

Unit 2 : Problem Solving 9
Solving problems by searching, Problem Formulation, Uninformed Search Techniques- DFS, BFS, Iterative Deepening, Comparing Different Techniques, Informed search methods – heuristic Functions, Hill Climbing, Simulated Annealing, A*, Performance Evaluation. Constrained Satisfaction Problems: Constraint Satisfaction Problems like – map Coloring, Crypt Arithmetic, Backtracking for CSP, Local Search.

Unit 3 : Knowledge and Reasoning 9
A knowledge Based Agent, Introduction To Logic, Propositional Logic, Reasoning in Propositional logic, First Order Logic: Syntax and Semantics, Extensions and Notational Variation, Inference in First Order Logic, Unification, Forward and Backward chaining, Resolution.

Unit 4 : Knowledge Engineering and Planning 9
Knowledge Engineering: Ontology, Categories and Objects, Mental Events and Objects.
Planning: Planning problem, Planning with State Space Search, Partial Order Planning, Hierarchical Planning, Conditional Planning.

Unit 5 : Uncertain Knowledge and Reasoning 9
Uncertain Knowledge and Reasoning: Uncertainty, Acting Under Uncertainty, Basic Probability Notation, The Axioms of Probability, Inference Using Full Joint Distributions, Independence, Bayes' Rule and Its Use, Belief Networks, Simple Inference in Belief Networks, Fuzzy Logic.

Prescribed Text Books:

1. Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, 2nd Edition, Pearson Publication.
2. Rich, E. and Knight, K., "Artificial Intelligence", Tata McGraw-Hill.

Reference Books:

1. George Luger, "AI-Structures and Strategies for Complex Problem Solving", 4/e, 2002, Pearson Education.
2. Robert J. Schalkoff, Artificial Intelligence: an Engineering approach, McGraw Hill, 1990.
3. Patrick H. Winston, Artificial Intelligence, 3rd edition, Pearson.

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Course Outcomes:

Student will be able to

1. Understand the importance of artificial Intelligence in real world environment
2. Apply the artificial intelligence algorithms for problem solving
3. Analyze the various reasoning and knowledge representation techniques
4. Solve the problems using classification and planning techniques
5. Apply knowledge and reasoning techniques in uncertain environment for obtaining solution

Blooms Level of Learning

L2

L3

L4

L3

L3

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A541T.1	3	3				3			3	2		2	3		
19A541T.2	3	3	3	3		3	2		3			2			
19A541T.3	3	3	3	3		3			3	2			3		
19A541T.4	3	3	3	3	1	3	2		3				3	2	2
19A541T.5	3	3	3	3		3			3				3	2	

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
(An Autonomous Institution)

Title of the Course	Design and Analysis of Algorithms
Category	PC
Course Code	19A542T
Year	II B.Tech
Semester	II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will

- Enhance to understand and analyze the performance of algorithms.
- Enable the students to study and apply algorithmic design techniques divide and conquer and greedy method.
- Make better understand the algorithmic design techniques in solving problems with dynamic programming method.
- Facilitate various algorithmic design techniques such as back tracking and branch and bound to solve problems.
- Make to learn about computational concepts

Unit 1 Introduction 9
Algorithm, Pseudo Code for algorithms, performance analysis-Space complexity, Time Complexity, Asymptotic Notation- Big Oh Notation, Omega Notation, Theta notation and Little Oh notation, Amortized complexity, Sets-Disjoint set operations, Union and Find algorithms.

Unit 2 : 9
DIVIDE AND CONQUER: General Method, applications- Binary Search, Quick sort, Merge Sort, Strassen's Matrix multiplication.
GREEDY METHOD: General Method, applications-Job sequencing with dead-lines, knapsack problem, Minimum-cost Spanning trees, Single source shortest path.

Unit 3 : Dynamic Programming 9
General Method, applications- Matrix Chain multiplication, Optimal Binary search trees, 0/1 Knapsack, All pairs shortest path, The Travelling person problem, Reliability design.

Unit 4 : 9
BACKTRACKING: General Method, applications- 8- queen problem, sum of subsets, graph coloring, Hamiltonian cycles.
BRANCH AND BOUND: General Method, applications-Travelling Sales Person (*), and 0/1 knapsack problem-LC Branch and Bound Solution, FIFO Branch and Bound solution.

Unit 5 : 9
Basic Concepts, nondeterministic algorithms, the classes-NP-Hard and NP Complete, Cook's Theorem

Prescribed Text Books:

1. Ellis Horowitz, Sartaj Sahni and Rajasekharam, Fundamentals of Computer Algorithms. Galgotia publications Pvt. Ltd.
2. Parag Himanshu Dave, Himanshu Bhalchandra Dave, Design and Analysis Algorithms. Pearson.
3. M.T. Goodrich and R. Tomassia, Algorithm Design: Foundations, Analysis and Internet Example. John Wiley and sons.

Reference Books:

1. R.C.T. Lee, S.S. Tseng, R.C. Chang and T. Tsai, Introduction to Design and analysis of Algorithms, A strategic approach. McGraw Hill.
2. Aho, Ullman and Hopcroft, Design and Analysis of algorithms. Pearson Education.

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Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|--|-------|
| 1. Understand and analyze the performance of algorithms in terms of time and space complexity. | L2,L4 |
| 2. Apply divide and conquer to solve searching and sorting problems and greedy method to solve job sequencing with deadline. | L3 |
| 3. Analyze dynamic programming technique to solve knapsack, shortest path, travelling sales person problems. | L4 |
| 4. Understand and solve different applications of backtracking, and branch and bound techniques. | L2,L3 |
| 5. Understand and remember concepts of computational theory | L1,L2 |

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A542T.1	3	3										3	3	3	3
19A542T.2	3	3	3	3								3	3	3	3
19A542T.3	3	3	3	3		3						3	3	3	3
19A542T.4	3	3	3	3		3						3	3	3	3
19A542T.5	3	3										3	3	3	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Formal Languages and Automata Theory
Category	PC
Course Code	19A543T
Year	II B.Tech
Semester	II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will

- To know the basic properties of Formal Languages, Deterministic and Non Deterministic Finite Automata.
- To Construct Finite Automata for regular expressions
- To Illustrate the Context free languages and grammars, Normalizing CFG.
- To differentiate the deterministic and nondeterministic PDA.
- Able to apply the properties of Turing machines to solve the real time problems.

Unit 1 Introduction 9
Strings, Alphabet, Language, Operations, Finite State Machine, definitions, Finite Automaton Model, Acceptance of Strings and Languages, Deterministic Finite Automata and Non-Deterministic Finite Automata, Chomsky hierarchy of languages, Transition Diagrams and Language Recognizers.
Finite Automata: NFA with ϵ transitions - Significance, acceptance of languages.
Conversions and Equivalence: Equivalence between NFA with and without ϵ transitions, NFA to DFA conversion, minimization of FSM, Equivalence between two FSMs
Finite Automata with output- Moore and Mealy machines.

Unit 2 Regular Languages 9
Regular sets, Regular Expressions, Identity Rules, Constructing Finite Automata for a given Regular Expressions, and Conversion of Finite Automata to Regular Expressions. Pumping lemma of regular sets, Closure Properties of Regular Sets (proofs not required).

Unit 3 Grammar Formalism and Context Free Grammars 9
Grammar Formalism: Regular Grammars-Right Linear and Left Linear Grammars, Equivalence between Regular Grammar and FA, Inter Conversion, Context free grammar, derivation trees, and sentential forms, Right Most and Left Most derivation of Strings.
Context Free Grammars: Ambiguity in Context Free Grammars. Minimization of Context Free Grammars, Chomsky Normal Form, Greibach Normal Form, Pumping Lemma for Context Free Languages. Enumeration of properties of CFL (proofs omitted).

Unit 4 Push down Automata 9
Push Down Automata, Definition, model, acceptance of CFL, acceptance by final state and acceptance by empty state and its equivalence. Equivalence of CFL and PDA, inter conversion. (Proofs not required). Introduction to DCFL and DPDA.

Unit 5 Turing Machine and Computability Theory 9
Turing Machine: Turing Machine, definition, model, design of TM, Computable functions, Recursively Enumerable Languages, Church's hypothesis, counter machine, types of Turing machines (proofs not required).
Computability Theory: Linear Bounded Automata and Context Sensitive Language, LR (0) grammar, Decidability of problems, Universal Turing Machine, Undecidability of Post Correspondence Problem, Turing reducibility.

Prescribed Text Books:

1. "Introduction to Automata Theory Languages and Computation". Hopcroft H.E. and Ullman J. D. Pearson Education.
2. "Introduction to Theory of Computation" - Sipser 2nd edition Thomson.

Reference Books:

Department of Computer Science and Engineering

1. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley
2. Introduction to languages and the Theory of Computation, John C Martin, TMH
3. "Elements of Theory of Computation", Lewis H.P. & Papadimitriou C.H. Pearson / PHI.
4. Theory of Computer Science and Automata languages and computation -Mishra and Chandrashekar, 2nd edition, PHI.
5. Theory of Computation, By K.V.N. SUNIT-ha and N.Kalyani

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|---|-------|
| 1. Understand Basic Concepts of Formal Languages, Deterministic and Nondeterministic Finite Automata with and without output. | L1,L2 |
| 2. Understand and Apply Regular Expressions in Real Time Applications | L2,L3 |
| 3. Analyze Regular Language and Context Free Grammar | L4 |
| 4. Illustrate Push Down Automata for a given Language | L3 |
| 5. Apply Mathematical and Formal Techniques for solving practical Problems through Turing Machine in Languages. | L3 |

CO-PO Mapping:

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Object Oriented Programming using JAVA
Category	PC
Course Code	19A544T
Year	II B.Tech
Semester	II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will be able to

- Understand and apply the concepts of OOP's using java and create console based applications.
- Understand, apply and analyze the reusability concepts like packages, interfaces, and exception handling
- Understand and implement the multi-threading and collection frame work in real time applications developed using JAVA.
- Understand and apply the Generic programming and Lambda Expressions.
- Apply and analyze the Collection Frame work

Unit 1 The Java Language: 9

The History and Evolution of Java, Java's Magic: The Bytecode, The Java Buzzwords, The Evolution of Java, Java SE 8. Object-Oriented Programming -Two Paradigms, Abstraction, The three OOP Principles, A First Simple Program-Entering the Program, Compiling the Program, Running the Program, Overview of Java, Data Types, Variables, Arrays, operators and control statements.

Classes and Objects: Class Fundamentals, Declaration of Objects, Assigning Object Reference Variables, Introducing Methods, Adding a Method to the Class, Returning a Value, Adding a Method That Takes Parameters, Constructors, Parameterized Constructors, The this Keyword, Instance Variable Hiding, Garbage Collection, The finalize() Method, Overloading Methods, Overloading Constructors, Using Objects as Parameters, A Closer Look at Argument Passing, Returning Objects, Recursion, Introducing Access Control, Understanding static, Introducing final, Arrays Revisited, Introducing Nested and Inner Classes, Exploring the String Class.

Unit 2 *Inheritance, packages and interfaces* 9

Inheritance :Inheritance Basics, Member Access and Inheritance, A Practical Example, Accessing super class members, Usage super key word, Creating a Multilevel Hierarchy, Accessing Constructors in inheritance, Method Overriding, Dynamic Method Dispatch, Abstract Classes, Using final with Inheritance. Object Class.

Packages and Interfaces: Packages, Defining a Package, Finding Packages and CLASSPATH, A Short Package Example, Access Protection, an Access Example, Importing Packages.

Interfaces: Defining an Interface, Implementing Interfaces, Nested Interfaces, Applying Interfaces, Variables in Interfaces, Interfaces Can Be Extended, Default Interface Methods, Default Method Fundamentals, A More Practical Example, Multiple Inheritance Issues, Use static Methods in an Interface, Final Thoughts on Packages and Interfaces.

Unit 3 Exception Handling & Multithreaded Programming 9

Exception Handling: Exception-Handling Fundamentals, Exception Types, Uncaught Exceptions, Using try and catch, Displaying a Description of an Exception, Multiple catch Clauses, Nested try Statements, throw, throws, finally, Java's Built-in Exceptions, Creating Your Own Exception Subclasses.

Multithreaded Programming: The Java Thread Model, Thread Priorities, Synchronization, Messaging, The Thread Class and the Runnable Interface, The Main Thread, Creating a Thread, Implementing Runnable, Extending Thread, Choosing an Approach, Creating Multiple Threads, Using isAlive() and join(), Thread Priorities, Synchronization Using Synchronized Methods, The synchronized Statement, Interthread Communication, Deadlock, Suspending, Resuming, and Stopping Threads, Obtaining A Thread's State, Using Multithreading.

Unit 4 *Generics and Lambda Expressions* 9

Generics :What Are Generics, Generics Work Only with Reference Types, A Generic Class with Two Type Parameters, The General Form of a Generic Class, Bounded Types, Using Wildcard Arguments, Bounded Wildcards Creating a Generic Method, Generic Constructors, Generic Interfaces, Raw, Generic Class Hierarchies, Using a Generic Superclass,

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course Operating Systems
Category PC
Course Code 19A545T
Year II B. Tech
Semester II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will

- To provide a grand tour of the operating system architecture and its functions. components
- To gain knowledge in process & thread synchronization, scheduling.
- To know the paging & memory management techniques.
- To understand memory, files, I/O and mass storage.
- To understand security issues related to OS.

Unit 1 9

Operating Systems Overview: Introduction, what operating systems do? Computer system Organization & architecture, Operating system operations, distributed systems, special purpose systems.

Systems structures: Operating system services, systems calls, types of System calls, system programs, operating system structure and generation.

Process Management: Process concepts, process Scheduling, operations on process, Process Scheduling Basic Concepts, Scheduling Criteria, scheduling algorithms, IPC, communication in Client-Server systems.

Unit 2 9

Multithreaded Programming: Overview, Multithreading models, thread libraries, thread issues and thread scheduling, multiprocessor scheduling.

Concurrency: Process synchronization, the critical-section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors, Synchronization examples, atomic transactions.

Unit 3 9

Principles of Deadlock: System model, deadlock characterization, deadlock prevention, detection and avoidance, recovery from deadlock.

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

Virtual Memory Management: Demand paging, page-replacement algorithms, Allocation of frames, Thrashing, Memory mapped files, Allocating Kernel Memory.

Unit 4 9

File System Interface: The concept of a file, Access Methods, Directory structure, File system mounting, File sharing, protection.

File System Implementation: File system structure, file system implementation, directory implementation, allocation methods, free-space management, Efficiency and performance.

Mass-storage Structure: Overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, swap-space management, RAID structure, stable-storage implementation, Tertiary storage structure.

Unit 5 : 9

I/O Systems: I/O Hardware, Application I/O interface, Kernel I/O Subsystem, Transforming I/O requests to hardware operations.

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

Security: The Security problem, program threats, system and network threats cryptography as a security tool, user authentication, implementing security defenses, firewalling to protect systems and networks, computer –security classifications.

Department of Computer Science and Engineering

Prescribed Text Books:

1. Operating System Concepts, Abraham Silberchatz, Peter B. Galvin, Greg Gagne, Eighth edition, John Wiley.
2. Operating Systems, A Concept based Approach-D.M.Dhamdhare, Second Edition, TMH.

Reference Books:

1. Operating Systems: Internals and Design Principles, Stallings, Sixth Edition–2009, Pearson Education
2. Modern Operating Systems, Andrew S Tanenbaum, Second Edition, PHI.
3. Operating Systems, S.Haldar, A.A.Aravind, Pearson Education.
4. Principles of Operating Systems, B.L.Stuart, Cengage learning, India Edition.

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|---|----|
| 1. Understand operating system functionalities, process concepts, scheduling criteria and scheduling algorithms. | L2 |
| 2. Apply the concepts of process synchronization in real computing problems. | L3 |
| 3. Analyze and investigate the local and global impacts of deadlocks and efficient utilization of memory Management techniques. | L4 |
| 4. Suggest appropriate file system and disk organizations for a variety of computing scenario. | L5 |
| 5. Evaluate security mechanisms in operating computing systems | L5 |

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A545T.1	3	3											3	2	
19A545T.2	3	3	2	2									3	2	
19A545T.3	3	3	2	2									3	2	
19A545T.4	3	3											3		
19A545T.5	3	3	2	2	1			1					3		

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course Software Engineering
Category PC
Course Code 19A546T
Year II B.Tech
Semester II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will

- Define software life cycle, and various process models.
- Describe the Requirements and their importance
- Understand the needs of Designs at different levels
- Demonstrate various testing strategies and interfaces
- Analyzing the development and maintenance of a project.

Unit 1 : 9

Software and Software Engineering: The Nature of Software, Software Engineering, Software Process, Software Engineering Practice, Software Myths.

Process Models: A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models.

Unit 2 : 9

Understanding Requirements: Requirements Engineering, Software Requirement Specification, Eliciting requirements, Developing Use Cases, Negotiating Requirements, and Validating Requirements.

Requirements Modeling: Requirements Analysis, Scenario-Based Modeling, UML Models That Supplement the Use Case, Data Modeling Concepts, CRC.

Unit 3 : 9

Design Concepts: Design within the Context of Software Engineering, Design Process, Design Concepts.

Architectural Design: Software Architecture, Architectural Genres, Architectural Styles, Architectural Design.

Component-Level Design: What is a Component, Designing Class-Based Components, Conducting Component-Level Design.

Unit 4 : 9

User Interface Design: The Golden Rules, User Interface Analysis and Design, Interface Design Steps.

Testing: Testing, Testing in the Large versus Testing in the Small, Unit Testing, Black-Box Testing, White-Box Testing, Debugging, Program Analysis Tools, Integration Testing, System Testing.

Unit 5 : 9

Software Project Management: Project Planning, Metrics for Project Size Estimation, Project Estimation Techniques, Staffing Level Estimation, Organization and Team Structures, Risk Management, Software Configuration Management
Software Reliability and Quality Management: Software reliability, Software Quality, Software Quality Management System, SEI Capability Maturity model levels.

Software Maintenance: Characteristics of Software Maintenance, Software Reverse Engineering, Software Maintenance Process Models, and Estimation of Maintenance cost.

Prescribed Text Books:

1. Software Engineering A Practitioner's Approach, Roger S. Pressman, Seventh Edition, 2009, Mc Graw Hill International Edition.
2. Fundamentals of Software Engineering, Rajib Mall, Fourth Edition, 2014, PH

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Reference Books:

1. Software Engineering, Ian Sommerville, Ninth edition, Pearson education.
2. Software Engineering : A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Software Engineering, A Precise Approach, PankajJalote, Wiley India,2010.
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|---|----|
| 1. Remember software process models importance. | L1 |
| 2. Describe the Knowledge on software requirements. | L2 |
| 3. Understand the software architecture with various design approaches. | L2 |
| 4. Demonstrate the various testing strategies. | L3 |
| 5. Analyze the maintenance of a software project. | L4 |

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A546T.1	2	-	2	-	-	-	-	-	-	-	-	-	-	-	-
19A546T.2	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
19A546T.3	-	-	3	-	2	-	-	-	-	-	-	-	2	-	-
19A546T.4	3	-	-	-	2	-	-	-	-	-	-	-	-	-	2
19A546T.5	3	-	-	-	-	-	-	-	3	-	3	-	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Design and Analysis of Algorithms Lab
Category	PC
Course Code	19A542L
Year	II B.Tech
Semester	II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
0	0	2	1

Course Objectives: This course will

- Understand apply and analyze the performance of algorithm techniques divide and conquer, greedy, dynamic programming, backtracking and branch and bound to solve various problems.

Divide and Conquer 6

Program 1: Sort a given set of elements using the Quicksort method and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n.

Program 2: Implement a parallelized 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.

Greedy Method 8

Program 3: Find Minimum Cost Spanning Tree of a given undirected graph Prim's algorithm.

Program 4: Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm.

Program 5: Implement the knapsack problem by Greedy algorithm.

Dynamic Programming 8

Program 5: Implement the 0/1 knapsack problem by Dynamic programming algorithm

Program 6: Find optimal ordering of matrix multiplication using Dynamic programming method.

Program 7: Implement dynamic programming algorithm to solve all pairs shortest path problem.

Program 8: Uses dynamic programming algorithm to solve the optimal binary search tree problem.

Backtracking 4

Program 9: Consider the problem of eight queens on an (8x8) chessboard. Two queens are said to attack each other if they are on the same row, column, or diagonal. Implements backtracking algorithm to solve the problem i.e. place eight non-attacking queens on the board.

Brach and Bound 4

Program 10: Implement the 0/1 knapsack problem using the Branch and bound algorithm.

Program 11: Implement the traveling sales person's problem using the Branch and Bound.

Prescribed Text Books:

1. Richard F.Gilberg, BehrouzA.Forouzan, Thomson, "Data Structures, A Pseudocode Approach with C++", 1st ed., Business Information Press, 2007.
2. D.S.Malik, Thomson, "Data Structures Using C++", 1st ed., Cengage Learning, 2007.
3. Ellis Horowitz, SatrajSahni and Rajasekharam, "Fundamentals of Computer Algorithms", 2nd ed., Galgotia publications pvt. Ltd, 2006.

Course Outcomes:

Student will be able to	Blooms Level of Learning
1. Apply divide and conquer to solve sorting problems and analyze performance analysis.	L3,L4
2. Apply greedy method to solve minimum cost spanning tree and knapsack problems.	L3
3. Understand and apply dynamic programming technique to solve optimal binary search tree, 0/1 knapsack and all pairs shortest path problems	L2,L3
4. Explain and apply backtracking strategy to solve 8-queens problem.	L2,L3

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5. Understand and illustrate branch and bound method to solve travelling sales person problem and 0/1 knapsack problem.

L1,L2,L3

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A542L.1	3	3	3	3								3	3	3	3
19A542L.2	3	3	3	3								3	3	3	3
19A542L.3	3	3	3	3		3						3	3	3	3
19A542L.4	3	3	3	3		3						3	3	3	3
19A542L.5	3	3	3	3								3	3	3	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course JAVA LAB
Category PC
Course Code 19A544L
Year II B. Tech
Semester II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
0	0	2	1

Course Objectives: This course will be able to

- Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
- Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- Aware of the important topics and principles of software development.
- Have the ability to write a computer program to solve specified problems.
- Use the Java SDK environment to create, debug and run simple Java programs

- | | |
|---|---|
| Week 1: | 2 |
| a) Write a Java program to display Fibonacci series between 1 to n. | |
| b) Write a Java program to perform the arithmetic operations using switch case statement. | |
| c) Write a Java program to calculate sum of 5 subjects and find percentage. | |
| Week 2 : | 2 |
| a) Write a Java program to display all strong numbers between 1 to n. | |
| b) Write a Java program to find multiplication of two matrices. | |
| c) Write a Java program to convert temperature from Centigrade to Fahrenheit and Fahrenheit to Centigrade | |
| Week 3 : | 2 |
| a) Write a Java program to implement the access control. | |
| b) Write a Java program to implement the constructor overloading. | |
| c) Write a Java program to implement the method overloading. | |
| Week 4 : | 2 |
| a) Write a Java program to find the factorial of a given number using recursion. | |
| b) Write a Java program to find whether the given string is palindrome or not. | |
| c) Write a Java program that reads a file and displays the file on the screen, with a line number before each line. | |
| Week 5 : | 2 |
| a) Write a Java program to implement the method overriding. | |
| b) Write a Java program to implement the multilevel inheritance. | |
| c) Write a Java program to implement dynamic method dispatch. | |
| Week 6 : | 2 |
| a) Write a java program for abstract class implementation. | |
| Note: - class Shape that contains an empty method named numberOfSides(). Provide three classes named Trapezoid, Triangle and Hexagon such that each one of the classes extends the class Shape. Each one of the classes contains only the method numberOfSides() that shows the number of sides in the given geometrical figures. | |
| b) Write a Java program to implement the package concept. | |
| c) Write a Java program to implement the multiple inheritance using interfaces. | |
| Week 7 : | 2 |
| a) Write a Java program to implement the exception handling mechanism. | |
| b) Write a Java program to implement the nested try statement. | |
| c) Write a Java program to implement the own exception class. | |
| Week 8 : | 2 |
| a) Write a Java program for multi-thread implementation. | |
| Note: 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. | |

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- b) Write a Java program to implement producer consumer problem using inter-thread communication mechanism.
 c) Write a Java program to use the `isAlive()` and `join()` methods.
- Week 9 : 2
 Any four programs on Generic Programming.
- Week 10 : 2
 Any four programs on Lambda expressions.
- Week 11 : 2
 a) Write a Java program to display the sum of all the integers of given line of integers using `StringTokenizer` class.
 b) Write a Java program to implement stack ADT.
- Week 12 : 2
 a) Write a Java program to convert infix expression into postfix form
 b) Write a Java program to evaluate the postfix expression.
- Week 13 : 2
 a) Write a program to implement queue ADT.
 b) Write a program to implement linkedlist

Prescribed Text Books:

1. H.M.Dietel and P.J.Dietel, Java How to Program 6th Edition, Pearson Education/PHI
2. Y.DanielLiang, Introduction to Java programming, Pearson Education, 6th Edition.
3. Cay Horstmann, Big Java, 2nd edition, Wiley Student Edition, Wiley India Private Limited.
4. Herbert Schildt, Java. The complete reference, TMH. 9th Edition.

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|--|--------|
| 1. Design and implement the programs to demonstrate classes, objects and encapsulation. | L1, L3 |
| 2. Demonstrate and implement the principles of inheritance, polymorphism, constructor overloading, and method overloading | L1, L3 |
| 3. Understanding the use of packages, creation of packages, importing the packages and the importance of the collection of framework | L1, L3 |
| 4. Implementation of multithread programming, Thread Priority, Exception Handling and Creation of own Exceptions. | L1, L3 |
| 5. Implement and demonstrate generic programming, lambda expressions and collection of framework. | L1, L3 |

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A544L.1	1	-	3	-	3	3	3	1	3	-	3	-	3	-	2
19A544L.2	-	-	3	3	3	-	3	-	-	-	3	-	3	-	2
19A544L.3	-	-	3	3	3	3	3	-	3	-	3	-	3	-	2
19A544L.4	-	-	3	-	3	3	3	1	3	-	3	-	3	-	2
19A544L.5	-	-	3	-	3	3	-	1	3	-	3	-	3	-	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
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Title of the Course	Operating Systems Lab and Artificial Intelligence Lab
Category	PC
Course Code	19A547L
Year	II B. Tech
Semester	II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
0	0	3	1.5

Operating Systems Lab

Course Objectives: The Students will understand how to write programs for

- Process scheduling and synchronization
- Detection and Avoidance of deadlocks
- Paging technique and its replacement algorithms
- File management techniques
- The threads, the process scheduling and synchronization

Week 1	3
Simulate multithreaded concept using the Pthreads API.	
Week 2	3
Simulate the following CPU scheduling algorithms a) FCFS b) SJF c) Round Robin d) Priority	
Week 3	3
Simulate synchronization of producer-consumer problem. Simulate process synchronization using a) Binary semaphore. b) Counting semaphore.	
Week 4	3
Simulate dining philosopher's problem solution using monitor. Simulate a) Bankers Algorithm for Dead Lock Avoidance b) Dead Lock Detection.	
Week 5 :	3
Simulate the following page replacement algorithms a) FIFO b) LRU c) LFU d) optimal Simulate Paging Technique of memory management.	
Week 6:	3
Simulate file Allocation strategies: a) Sequential b) indexed c) linked	
Week 7:	3
Simulate the following File Organization Techniques a) Single level directory b) Two level c) Hierarchical	

Prescribed Text Books:

1. Thomas W. Doeppner, Operating Systems In Depth: Design and Programming, John Wiley & Sons.
2. Dan Parks Sydow, Programming the Be Operating System: Writing Programs for the Be Operating System, O'Reilly.

Course Outcomes:

Student will be able to	Blooms Level of Learning
1. Understand the mechanism of threads.	L2
2. Analyze the process scheduling and synchronization	L4
3. Discover and solve the detection and avoidance of deadlocks.	L3
4. Analyze the Paging technique and its replacement algorithms	L4

5. Evaluate the file management techniques

L5

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A547L.1	3	3	1	1									3	3	
19A547L.2	3	3											3	3	
19A547L.3	3	3	1	1									3	3	
19A547L.4	3	3	1	1									3	3	
19A547L.5	3	3											3		

Artificial Intelligence Lab

Course Objectives: This course will be able to

- Analyze different artificial intelligence techniques
- Implement the main approaches of artificial intelligence such as heuristic search,, Constraint satisfaction problems
- Implement game playing algorithms

List of Experiments:

- Write a program to implement chatbot
- Write a program to implement Water jug problem
- Write a program to implement A* search
- Write a program to implement Crypt arithmetic using Constraint satisfaction problem
- Write a program to implement Hill climbing Search
- Write a program to implement 8-Puzzle game

(Note: Programs can be implemented using Java / Python / PROLOG)

References:

- Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, 2 nd Edition, Pearson Publication.
- George Lugar, "AI-Structures and Strategies for Complex Problem Solving", 4/e, 2002, Pearson Education.

Course Outcomes:

Student will be able to

- Analyze artificial intelligence techniques
- Solve problems using different heuristic search techniques
- Implement the algorithms for game playing

Blooms Level of Learning

L4

L3

L3

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A547L.1	3	3	3							2			2		
19A547L.1	3	3	3	2											
19A547L.3	3	3	3			2	2		2					2	

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES::RAJAMPET
(An Autonomous Institution)

Title of the Course	Essence of Indian Traditional Knowledge
Category	MC
Course Code	19AC45T
Year	II B.Tech
Semester	II Semester (Common to ME, CE, CSE)

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	0

Course Objectives:

- To facilitate the students with the concepts of Indian traditional knowledge and to make them understand the Importance of roots of knowledge system
- To understand the legal framework and traditional knowledge and biological diversity act 2002 and geographical indication act 2003.
- To focus on traditional knowledge and intellectual property mechanism of traditional knowledge and protection

Unit 1 9

Introduction to traditional knowledge: Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems.

Unit 2 9

Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge

Unit 3 9

Protection of traditional knowledge: the need for protecting traditional knowledge Significance of TK, Protection, value of TK in global economy, Role of Government to harness TK.

Unit 4 9

Traditional knowledge and intellectual property: Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

Unit 5 9

Traditional knowledge in different sectors: Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK.

Prescribed Text Books

1. Traditional Knowledge System in India, by Amit Jha, 2009.

Reference Books

1. Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012
 2. Knowledge Traditions and Practices of India, Kapil Kapoor, Michel Danino
- e-resources: <https://www.youtube.com/watch?v=LZP1StpYEPM>

Course Outcomes:

Student will be able to	Blooms Level of Learning
1. Understand the concept of Traditional knowledge and its importance	L2
2. Understand the need and importance of protecting traditional knowledge and apply it in daily lives	L2

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- | | |
|--|----|
| 3. Apply various enactments related to the protection of traditional knowledge. | L1 |
| 4. Understand the concepts of Intellectual property to protect the traditional knowledge | L2 |

CO-PO Mapping:

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Advanced Java Programming
Category : PC
Course Code : 19A551T
Year : III B. Tech.
Semester : I Semester

Lecture Hours
3

Tutorial Hours
0

Practical
0

Credits
3

Course Objectives: This course will able to

- Understand GUI Programming using JavaFX.
- Understand and Apply the JavaFX controls in GUI applications.
- Understand JDBC API.
- Understand server side programming using SERVLETS and JSP

Unit 1 : Introducing JavaFX GUI Programming: 9
JavaFX Basic Concepts -The JavaFX Packages, the Stage and Scene Classes, Nodes and Scene Graphs, Layouts, the Application Class and the Lifecycle Methods, Launching a JavaFX Application, A JavaFX Application Skeleton, Compiling and Running a JavaFX Program, The Application Thread.A Simple JavaFX Control: Label, Using Buttons and Events - Event Basics, Introducing the Button Control, Demonstrating Event Handling and the Button, Drawing Directly on a Canvas.

Unit 2 : Exploring JavaFX Controls: 9
Exploring JavaFX Controls: Using Image and Image View, Toggle Button, Radio Button, CheckBox, ListView, ComboBox, TextField, ScrollPane, TreeView. Introducing Effects and Transforms, Adding Tooltips, Disabling a Control.
JavaFX Menus: Menu Basics, An Overview of MenuBar, Menu, and MenuItem. Create a Main Menu, Add Mnemonics and Accelerators to Menu Items, Add Images to Menu Items, Use RadioMenuItem and CheckMenuItem, Create a Context Menu, Create a Toolbar, MenuDemo Program.

Unit 3 : JDBC API 9
JDBC API: Introduction to JDBC API. System Requirements. Types of JDBC Drivers. Creating a Database Table- Oracle Database. Connecting to a Database. Setting the Auto-Commit Mode. Committing and Rolling Back Transactions Transaction Isolation Level, JDBC-Types-to-Java-Types Mapping. Knowing About the Database. Executing SQL Statements. Processing Result Sets. Making Changes to a ResultSet. Handling Multiple Results from a Statement.

Unit 4 : Introducing Servlets 9
Introducing Servlets: Background, The Life Cycle of a Servlet. Servlet Development Options. Using Tomcat A Simple Servlet. Create and Compile the Servlet Source Code. Start Tomcat. Start a Web Browser and Request the Servlet. The Servlet API: The javax.servlet Package. Reading Servlet Parameters. The javax.servlet.httpPackage.
Handling HTTP Requests and Responses. Handling HTTP GET Requests. Handling HTTP POST Requests. Using Cookies .Session Tracking. Accessing Databases with JDBC using servlets.

Unit 5 : JSP Basics 9
JSP Basics: What's Wrong with Servlets? Running Your First JSP, How JSP Works, The JSP Servlet Generated Code, The JSP API, The Generated Servlet Revisited, Implicit Objects,JSP Syntax, Directives, Scripting Elements,

Standard Action Elements, Comments Converting into XML Syntax. Developing JSP Beans: Calling Your Bean from a JSP Page, A Brief Theory of JavaBeans, Making a Bean Available, Accessing Properties Using `jsp.getProperty` and `jsp.setProperty`, Setting a Property Value from a Request, JavaBeans Code Initialization.

Prescribed Text Books:

1. JAVA The Complete Reference 9th edition, Herbert Schildt Oracle Press(Unit-1,2,4).
2. Beginning java8 Apis extensions and libraries, Kishori Sharan, Apress (Unit-3)
3. Java for the Web with Servlets, JSP, and EJB: A Developer's Guide to J2EE Solutions By Budi Kurniawan.(Unit-5)

Reference Text Books:

1. Java 6 Programming, Black Book, Dreamtech
2. Java Server Programming, Java EE6 (J2EE 1.6), Black Book, Dreamtech
3. Advanced Java Technology, By M.T. Savaliya, Dreamtech

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|---|--------|
| 1. Understand JavaFX GUI Programming Concepts. | L1, L3 |
| 2. Apply JavaFX Controls and event handling in GUI applications. | L1, L3 |
| 3. Understand and apply JDBC API to retrieve data from Data Base. | L1, L3 |
| 4. Understand and apply Servlets in server side programming. | L1, L3 |
| 5. Understand and apply JSPs in developing web applications. | L1, L3 |

CO-PO Mapping:

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Computer Networks
Category : PC
Course Code : 19A552T
Year : III B. Tech.
Semester : I Semester

Lecture Hours
3

Tutorial Hours
0

Practical
0

Credits
3

Course Objectives: This course will able to

- Expose to the basic principles of the technology of data communications and networking
- Understand the concept of data communication and its components
- Comprehend the use of different types of transmission media and network devices, error detection and correction in transmission of data
- Analyze the routing algorithms and congestion control algorithms.

Unit 1 : *Introduction and Physical Layer* 9
Introduction: Data Communications, Networks, The Internet, Protocols and Standards, Network Models, Layered Tasks, The OSI Model, TCP/IP Protocol Suite, Addressing.
Physical Layer and Media: Data and Signals, Analog and Digital.
Transmission Media: Guided Media, Unguided Media
(Text Book-1 page No: 1 - 27, 57 - 96, 191 - 212)

Unit 2 : *Data Link Layer* 9
Data link layer: Error Detection and Correction, Framing, Flow and Error Control, Protocols, Noiseless Channels, Noisy Channels, HDLC, Point to Point Protocol, Multiple Access, Random Access, Controlled Access, Channelization, Wired LANs: Ethernet Wireless LANs: IEEE 802.11, Bluetooth.
Network Devices: Repeaters, Hubs, Bridges, Switches, Routers, and Gateways.
(Text Book-1 page No: 267-455)

Unit 3 : *Network Layer* 9
Network Layer: Logical Addressing, IPv4 Addresses, CIDR, Subnets, Classfull and special addressing, IPv6 Addresses, Transition from IPv4 to IPv6,
Network Layer: Address Mapping, ICMP, IGMP, ICMPv6, Delivery, Forwarding, Unicast Routing Protocols, Multicast Routing Protocols.
(Text Book-1 page No: 547-700)

Unit 4 : *Transport Layer* 9
Transport Layer: Process to Process Delivery: UDP, TCP and SCTP, Data Traffic, Congestion, Congestion Control, Two Examples, Quality of Service, Techniques to improve QoS.
(Text Book-1 page No: 701-841)

Unit 5 : *Application Layer* 9
Domain Name System: DNS, The DNS Name Space, Domain Resource Records, Name Servers
Electronic Mail: Architecture and Services, The User Agent, Message Formats, Message Transfer, Final Delivery
The World Wide Web: Architectural Overview, Static Web Pages, Dynamic Web Pages and Web Applications, HTTP: The Hypertext Transfer Protocol, The Mobile Web, Web Search.
(Text Book-2 page No: 661-695)

1. Behrouz A. Forouzan, "Data communication and Networking", Tata McGraw– Hill, Fifth Edition, 2013.
2. A. S. Tanenbaum, "Computer Networks", Pearson Education, Fifth Edition, 2013

1. James F. Kurose, Keith W. Ross, "Computer Networking: A Top-Down Approach Featuring the Internet", Pearson Education, 2005.
2. Larry L. Peterson, Peter S. Davie, "Computer Networks", Elsevier, Fifth Edition, 2012.
3. William Stallings, "Data and Computer Communication", Eighth Edition, Pearson Education, 2007.

Student will be able to	Blooms Level of Learning
1. Visualize the different aspects of networks, protocols and network design models.	L1
2. Examine various Data Link layer design issues and Data Link protocols.	L1
3. Analyze, Compare and select appropriate routing algorithms for a network	L2, L4, L5
4. Examine the various end to end protocols helps in analyzing and interpreting the quality of networks.	L3
5. Identify and analyze the various applications over internet	L1, L2

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Data Warehousing and Data Mining
Category : PC
Course Code : 19A553T
Year : III B. Tech.
Semester : I Semester

Lecture Hours
3

Tutorial Hours
0

Practical
0

Credits
3

Course Objectives: This course will able to

- Learn the types of the data to be mined and apply preprocessing methods on raw data.
- Sketch data warehouses and techniques for mining frequent patterns, associations, and correlations.
- Understand different classification algorithms and estimate the accuracy of algorithms.
- Inculcate knowledge on different clustering algorithms.
- Identify the various types of complex data and its applications.

Unit 1 : 8
INTRODUCTION: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining.
Data Preprocessing: Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

Unit 2 : 12
WARE HOUSING: Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, From Data Warehousing to Data Mining.
MINING ASSOCIATION RULES IN LARGE DATABASES: Basic Concepts and a Road Map, Efficient and Scalable Frequent Item set Mining Methods, Mining Various Kinds of Association Rules, and From Association Mining to Correlation Analysis.

Unit 3 : 11
CLASSIFICATION AND PREDICTION: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation, Other Classification Methods, Prediction, Classifier Accuracy.

Unit 4 : 12
CLUSTER ANALYSIS INTRODUCTION: Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.

Unit 5 : 10
MINING COMPLEX TYPES OF DATA AND DATA MINING APPLICATIONS: Mining Spatial Databases, Mining Multimedia Databases, Mining Text Databases, Mining the World Wide Web, Data Mining Applications.

Prescribed Text books:

1. Data Mining, Concepts and Techniques - Jiawei Han & Micheline Kamber Harcourt India.

Reference Text Books:

1. Data Mining Introductory and advanced topics, Margaret H Dunham, Pearson Education
2. Data Mining Techniques, Arun K Pujari, University Press.
3. Data Warehousing in the Real World, Sam Anahory & Dennis Murray. Pearson Edn Asia.

4. Data Warehousing Fundamentals, Paulraj Ponnaiah Wiley Student Edition.
5. The Data Warehouse Life cycle Tool kit, Ralph Kimball Wiley Student Edition.

Course outcomes

Student will be able to

Blooms Level of Learning

1. To understand and apply the data preprocessing techniques. L2, L3
2. To implement data warehouses and techniques for mining frequent patterns, associations, and correlations. L3
3. To solve different classification problems and estimate the accuracy of classification algorithms. L3
4. To understand and analyze different clustering techniques. L2,L4
5. To create various types of complex data such as spatial, text and multimedia. L6

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A553T.1	3	3	3		3						3			3	3
19A553T.2	3	3	3	3	3	3			2	3			3	3	
19A553T.3	3	3	3	3	3									2	2
19A553T.4	3	3			3								2		3
19A553T.5	3	3	3	3	2	2						2		2	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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Title of the Course : Advanced Databases
Category : PE
Course Code : 19A55AT
Year : III B. Tech.
Semester : I Semester

Lecture Hours
3

Tutorial Hours
0

Practical
0

Credits
3

Course Objectives: This course will able

- To learn basic concepts of Distributed Database System and Relational Database management system concepts.
- To acquire knowledge on Architecture model of Distributed Database System.
- To understand the characterization of query processing and decomposition.
- To inculcate the knowledge of distributed query optimization algorithms and transaction management.
- To know the concepts of distributed DBMS reliability and parallel database systems.

Unit 1 : Introduction: 11
Distributed Data Processing, Distributed Database System, Promises of DDBS, Problem areas. Overview of Relational DBMS: Relational Database Concepts, Normalization, Integrity rules, Relational data languages.

Unit 2 : Distributed DBMS Architecture: 9
Architectural Models for Distributed DBMS, DDBS Architecture. Distributed Database Design: Alternative Design Strategies, Distribution Design issues, Fragmentation, Allocation.

Unit 3 : Query Processing and decomposition: 9
Query Processing Objectives, Characterization of query processors, layers of query processing, query decomposition, Localization of distributed data.

Unit 4 : Distributed query Optimization: 9
Query optimization, centralized query, optimization, Distributed query optimization algorithms. Transaction Management: Definition, properties of transaction, types of transactions. Distributed concurrency control: Serializability, concurrency control Mechanisms & Algorithms, Time stamped & Optimistic concurrency control Algorithms, Deadlock Management.

Unit 5 : Distributed DBMS Reliability: 9
Reliability concepts and Measures, fault tolerance in Distributed systems, failures in Distributed DBMS, local & Distributed Reliability Protocols, site failures and Network partitioning. Parallel Database Systems: Database Series, Parallel Architecture, Parallel DBMS Techniques, Parallel exception problems, Parallel Execution for Hierarchical architecture.

Prescribed Text books:

1. M.Tamer OZSU and PatuckValduriez: Principles of Distributed Database Systems, Pearson Edn.Asia, 2001.

Reference Text books:

1. Stefano Ceri and Willipse Pelagatti: Distributed Databases, McGraw Hill.
2. Henry F Korth, A Silberchatz and Sudershan : Database System Concepts, MGH
3. Raghurama Krishnan and Johhanes Gehrke: Database Management Systems, MGH

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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Title of the Course : Artificial Neural Networks
Category : PE
Course Code : 19A55BT
Year : III B. Tech.
Semester : I Semester

Lecture Hours
3

Tutorial Hours
0

Practical
0

Credits
3

Course Objectives: This course will able to

- Understand the basics of ANN and comparison with Human brain.
- Acquire knowledge on Generalization and function approximation of various ANN architectures.
- Understand reinforcement learning using neural networks
- Acquire knowledge of unsupervised learning using neural networks.
- Apply data flow testing for software projects.

Unit 1 : INTRODUCTION: 8
Characteristics of neural networks, terminology, models of neuron, topology
Activation and synaptic dynamics- Activation dynamics models, synaptic dynamics models, learning methods, stability and convergence. Pattern recognition problem, basic functional units.

Unit 2 : 10
Feedforward neural networks- analysis of pattern association networks, classification networks, mapping networks.
FeedBack neural networks - introduction, analysis of linear auto associative Feed forward networks, analysis of pattern storage networks, stochastic networks and simulated annealing, Boltzmann machine

Unit 3 : Support Vector Machines and Radial Basis Function 8
Learning from Examples, Statistical Learning Theory, Support Vector Machines, SVM application to Image Classification, Radial Basis Function Regularization theory, Generalized RBF Networks, Learning in RBFNs, RBF application to face recognition..

Unit 4 : Attractor Neural Networks 8
Associative Learning Attractor Associative Memory, Linear Associative memory, Hopfield Network, application of Hopfield Network, Brain State in a Box neural Network, Simulated Annealing, Boltzmann Machine, Bidirectional Associative Memory.

Unit 5 : Self-organization Feature Map 8
Maximal Eigenvector Filtering, Extracting Principal Components, Generalized Learning Laws, Vector Quantization, Self-organization Feature Maps, Application of SOM, Growing Neural Gas.

Prescribed Text Books:

1. Introduction to Artificial Neural Systems-J.M. Zurada, Jaico Publications 1994. 2. Artificial Neural Networks-B. Yegnanarayana, PHI, New Delhi 1998.
2. Neural Networks A Classroom Approach-Satish Kumar, McGraw Hill Education (India) Pvt. Ltd, Second Edition.

Reference Text books:

1. Introduction to Artificial Neural Networks by Gunjan Goswami 3rd edition

Department of Computer Science and Engineering

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|---|------------|
| 1. Understand the role of neural networks in engineering, artificial intelligence, and cognitive modelling. | L1, L2 |
| 2. Understand the concepts and techniques of neural networks through the study of the most important neural network models. | L2 |
| 3. Evaluate whether neural networks are appropriate to a particular application (face recognition). | L1, L2, L3 |
| 4. Understand the concepts of attractor neural network | L2 |
| 5. Understand the concepts of self-organization feature map and its applications | L2 |

CO-PO Mapping:

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course Cryptography and Network Security
Category PE
Course Code 19A55CT
Year III B. Tech.
Semester I Semester
Branch CSE

Lecture Hours	Tutorial Hours	Practical	Credits
3	-	-	3

Course Objectives:

- This Course focuses on the fundamentals of cryptography and its application to network security.
- The course also focuses on the practical network security applications that have been implemented and are in use to provide email and web security.
- The learners also acquire knowledge of digital signature, authentication, firewalls, intrusion detection techniques.

Unit 1 Introduction to Computer Security Concepts 8
Computer Security Concepts, The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, Fundamental Security Design Principles, Attack Surfaces and Attack Trees, A Model for Network Security Standards

Unit 2 Block Ciphers and the Data Encryption 12
Standard
Traditional Block Cipher Structure, The Data Encryption Standard, A DES Example, AES Structure, An AES Example, Multiple Encryption and Triple DES, Electronic Codebook, Cipher Block Chaining Mode, Cipher Feedback Mode
Principles of Public-Key Cryptosystems, The RSA Algorithm, Diffie-Hellman Key Exchange

Unit 3 Cryptographic Data Integrity Algorithms and User 12
Authentication
Applications of Cryptographic Hash Functions, Two Simple Hash Functions, Hash Functions Based on Cipher Block Chaining, Secure Hash Algorithm. Message Authentication Requirements, Requirements for Message Authentication Codes, HMAC, Digital Signatures
User Authentication: Kerberos version 4

Unit 4 Network and Internet Security 8
Web Security Considerations, Transport Layer Security, Email Security, S/MIME, Pretty Good Privacy

Unit 5 IP Security and System Security 10
IP Security: IP Security Overview, IP Security Policy, Encapsulating Security Payload.
System Security: Intruders, Intrusion Detection, Password Management, Types of Malicious Software, Viruses, Virus Countermeasures, Worms, Distributed Denial of Service Attacks, Firewalls

Prescribed Text Books

1. William Stallings, Cryptography and Network security, Pearson Education, 4th ed.
2. William Stallings, Network Security Essentials (Applications and Standards), Pearson, Fourth Edition.

Reference Books

1. Charlie Kaufman, Radis Perlman and Mike Speciner, "Network Security – Private Communication in a Public World" 2nd ed., Pearson Education, 2003
2. J.W. Rittiaghouse and William M.Hancock, Cyber Security Operations Handbook, Elseviers.
3. Behrouz A. Forouzan, Cryptography & Network Security, McGraw Hill

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|---|--------|
| 1. Understand computer security concepts and security threats | L1, L2 |
| 2. Apply knowledge of encryption algorithms to protect data | L2, L3 |
| 3. Perform data integrity and user authentication | L3, L4 |
| 4. Examine security protocols for web security | L2, L3 |
| 5. Apply knowledge of IP security and system security | L2, L3 |

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A55CT.1	2											2			
19A55CT.2	3		3		3							3	3	3	
19A55CT.3	2		2		3							3	3	3	
19A55CT.4	3		3		3							3	3		3
19A55CT.5	3		3		3							3	3		3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Principles of Programming Languages
Category : PE
Course Code : 19A55DT
Year : III B. Tech.
Semester : I Semester

Lecture Hours
3

Tutorial Hours
0

Practical
0

Credits
3

Course Objectives: This course will able to

- Understand the types of programming languages, syntax and semantics.
- Demonstrate the principles of data types and expressions.
- Define compound statements and fundamentals of sub programs.
- Analyze data abstraction and Exception Handling in Ada, C++, Java.

Unit 1 : Preliminary Concepts 9

Preliminary Concepts: Reasons for studying concepts of programming languages, Programming domains, Language Evaluation Criteria, influences on Language design, Language categories.

Syntax and Semantics: General Problem of describing Syntax and Semantics, formal methods of describing syntax, BNF, EBNF for common programming language features, parse trees, ambiguous grammars, attribute grammars, Denotational semantics and axiomatic semantics for common programming language features.

Unit 2 : Data types 9

Data types :Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types, Names, Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization. Expressions: Arithmetic, relational and Boolean expressions, Short circuit evaluation mixed mode assignment, Assignment Statements.

Unit 3 : Control Structures 9

Control Structures: Compound Statements, Selection, Iteration, Unconditional Statements, guarded commands. Subprograms and Blocks: Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic sub-programs, parameters that are sub-program names, design issues for functions, user defined overloaded operators, co routines.

Unit 4 : Abstract Data types 9

Abstract Data types: Abstractions and Encapsulation, introductions to data abstraction, design issues, language examples, C++ parameterized ADT, Exception handling: Exceptions, exception Propagation, Exception handler in Ada, C++ and Java.

Unit 5 : Logic Programming Language 9

Logic Programming Language: Introduction and overview of logic programming, basic elements of prolog, application of logic programming.

Functional Programming Languages: Introduction, fundamentals of FPL, LISP, ML, Haskell, application of Functional Programming Languages and comparison of functional and imperative Languages.

Prescribed Text books:

1. Concepts of Programming Languages Robert W. Sebesta, Pearson Education, Eighth Edition 2008

1. Programming Languages-Ghezzi, 3/e, John Wiley.

Course Outcomes:

Blooms Level of Learning

- | | |
|--|--------|
| 1. Select the required programming language for their application. | L1, L3 |
| 2. Develop to summarize the principles of data types and expressions | L1, L3 |
| 3. Understand to make use of control structures and sub programs. | L2 |
| 4. Construct Abstract data types and Exception Handling. | L6 |
| 5. Compare different types of programming languages | L4 |

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Distributed Systems
Category : PE
Course Code : 19A55ET
Year : III B. Tech.
Semester : I Semester

Lecture Hours
3

Tutorial Hours
0

Practical
0

Credits
3

Course Objectives: This course will able to

- Learn the characteristics of distributed systems and system models.
- Acquire the depth knowledge on distributed objects and remote invocations.
- Apply various domain naming services.
- Compare the different issues of Global clocks, process states coordination and agreement.
- Analyze the optimistic concurrency control and distributed transactions.

Unit 1 : CHARACTERIZATION OF DISTRIBUTED SYSTEMS: 9
Introduction, Examples of Distributed systems, Resource sharing and web, challenges, System models: Introduction, Architectural and Fundamental models, networking and Inter-networking, Inter-process Communication.

Unit 2 : DISTRIBUTED OBJECTS AND REMOTE INVOCATION: 9
Introduction, Communication between distributed objects, RPC, Events and notifications, Case study-Java RMI. OPERATING SYSTEM SUPPORT: Introduction, OS layer, Protection, Processes and Threads, Communication and Invocation, Operating system architecture. Distributed File Systems-Introduction, File Service architecture.

Unit 3 : NAME SERVICES: 9
Introduction, Name Services and the Domain Name System, Case study of the Global Name Service. Peer to Peer Systems: Introduction, Napster and its legacy, Peer to Peer middleware, routing overlays.

Unit 4 : TIME AND GLOBAL STATES 9
Introduction, Clocks, events and Process states, Synchronizing physical clocks, logical time and logical clocks, global states, distributed debugging. COORDINATION AND AGREEMENT: Introduction, Distributed mutual exclusion, Elections, Multicast communication, consensus and related problems.

Unit 5 : TRANSACTIONS AND CONCURRENCY CONTROL: 9
Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering. DISTRIBUTED TRANSACTIONS: Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery, Replication-Introduction, Fault tolerant services, Transactions with replicated data.

Prescribed Text Books:

1. G Coulouris, J Dollimore and T Kindberg, *Distributed Systems Concepts and Design*, Pearson Education, 4thEd.

Department of Computer Science and Engineering

Course Outcomes:

Student will be able to

Blooms Level of Learning

1. Understand the characteristics of distributed systems and system models. L1
2. Describe knowledge on distributed objects and remote invocations L3
3. Use various domain naming services. L4
4. Distinguish different issues of Global clocks, process states coordination and agreement. L5
5. Estimate the optimistic concurrency control and distributed transactions. L5

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A55ET.1	-	-	3	-	-	3	3	-	-	-	-	3	3	3	-
19A55ET.2	-	2	-	-	-	3	3	-	-	-	3	3	3	-	3
19A55ET.3	-	2	3	2	-	3	-	-	-	-	3	3	3	3	-
19A55ET.4	-	-	3	-	-	-	-	-	-	-	3	-	-	3	3
19A55ET.5	-	-	3	2	-	-	-	-	-	-	-	3	3	3	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Computer Graphics
Category : PE
Course Code : 19A55FT
Year : III B. Tech.
Semester : I Semester

Lecture Hours
3

Tutorial Hours
0

Practical
0

Credits
3

Course Objectives: This course will able to

- Understand the applications in the real world and the graphics systems used in developing graphics.
- Design basic primitives (both 2D and 3D) using algorithms.
- Apply transformations on the objects.
- Apply clipping methods and viewing transformations

Unit 1: *Introduction:* 8

Applications: Usage of Graphics and their applications, Presentation Graphics- Computer Aided Design- Computer Art- Entertainment- Education and Training- Visualization- Image Processing- Graphical User Interfaces.

Overview of Graphics Systems: Video Display Devices - Raster Scan systems - Random Scan Systems - Graphics Monitors and Workstations - Input devices - Hard Copy Devices- Graphics Software.

Unit 2: 12

Output Primitives & its Attributes:

Points and Lines-Line Drawing Algorithms- Loading the Frame buffer- Line function- Circle-Generating Algorithms- Ellipse Generating Algorithms- Filled Area Primitives-Filled Area Functions- Cell Array- Character Generation.

Attributes of Output Primitives:

Line and Curve Attributes-Color and Gray scale levels- Area Fill Attributes- Character Attributes-Bundled Attributes- Inquiry Functions- Anti aliasing.

Unit 3: 12

Two Dimensional Geometric Transformations:

Basic Transformations – Matrix Representations - Homogeneous Coordinates - Composite Transformations - Other Transformations, Transformations between Coordinate Systems, Affine Transformations, and Transformation Functions.

Two-Dimensional Viewing:

The viewing Pipeline-Viewing Coordinate Reference Frame-Window-to-Viewport Coordinate Transformation-Two-Dimensional Viewing Functions-Clipping Operations-Point Clipping-Line Clipping-Polygon Clipping-Curve Clipping-Text and Exterior Clipping.

Structure And Hierarchical Modeling: Concepts of Structures and Basic models- Editing

Unit 4: 8

Three Dimensional Concepts and Object representations & Transformation:

3D display methods - 3D Graphics - Polygon Surfaces - Curved Lines and Surfaces - Quadratic Surfaces-Super Quadrics - Blobby Objects - Spline Representations - Cubic Spline methods -Bezier Curves and Surfaces – B-Spline Curves and Surfaces.

Three Dimensional Geometric and Modeling Transformations:

Translation – Rotation - scaling - Other Transformations - Composite Transformations – 3D Transformation Functions.

Unit 5:

8

Three-Dimensional Viewing:

Viewing Pipeline- Viewing Coordinates- Projections- View Volumes- General Projection Transformations- Clipping-Hardware Implementations- Three-Dimensional Viewing.

Visible Surface Detection Methods:

Classification of visible-surface detection algorithms, Back face method, Depth buffer method, Scan line method.

Prescribed Text Books:

1. Donald Hearn & M. Pauline Baker, "Computer Graphics C Version", 2004, Pearson Education, New Delhi,
2. Zhigang Xiang, Roy A Plastock, "Schaum's Outlines- Computer Graphics " adapted by P S Avadhani, 2nd Edition, McGraw Hill.

Reference Text books:

1. David F. Rogers, "Procedural Elements for Computer Graphics", 2003, Tata McGraw Hill New Delhi.
2. J.D.Foley, S.K Feiner, A Van Dam. F. H. John "Computer Graphics-Principles & Practice in C", 2004, Pearson Education.

Course Outcomes:

Student will be able to

Blooms Level of Learning

- Define computer graphics, applications and contemporary terminology, hardware components etc. L1
- Implement 2D and 3D objects using algorithms and apply attributes of primitives and anti – aliasing L3
- Apply geometric transformations on 2D and 3D objects. L3
- Apply viewing transformations on 2D and 3D objects. L3
- Explain visible surface methods. L2

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A55FT.1	3	-	-	-	-	-	-	-	-	-	-	-	3	3	3
19A55FT.2	3	3	3	-	3	-	-	-	-	-	-	3	3	3	3
19A55FT.3	3	3	3	-	3	-	-	-	-	-	-	3	3	3	3
19A55FT.4	3	3	3	-	3	-	-	-	-	-	-	3	3	3	3
19A55FT.5	3	3	3	-	3	-	-	-	-	-	-	3	3	3	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Linux Programming
Category : PE
Course Code : 19A55GT
Year : III B. Tech.
Semester : I Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will able to

- Understand and make effective use of Linux utilities and shell scripting language to solve problems.
- Learn the implementation in C some standard Linux utilities like mv, cp, ls etc...
- Develop the skills the necessary for systems programming including file system programming, process and signal management.
- Develop the skills inter-process communication, message queues and semaphores.
- Develop the basic skills required to write network programs using sockets and shared memory.

Unit 1 : INTRODUCTION TO LINUX UTILITIES AND SHELL PROGRAMMING 9

Linux Utilities: File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text Processing utilities and backup utilities. sed- scripts, operation, address, commands, applications, awk- execution, fields and records, scripts, operations, patterns, actions, associative arrays, string and mathematical functions, system commands in awk, applications.

Unit 2 : FILES AND DIRECTORIES 9

Files: File Concept, File types ,File system Structure, File meta data – Inodes, Kernel support for files, System calls for I/O operations – open, create, read, write, lseek, dup2. File status information – stat family, file and record locking, fcntl function, Links – Soft links & hard links – symlink, link, unlink.
Directories: creating, removing, changing directories – mkdir, rmdir, chdir, obtaining current working directory – getcwd, directory contents, scanning directories – opendir, readdir, closedir, rewinddir functions

Unit 3 : PROCESS AND SIGNALS 9

Process : Process concepts, layout of C program image in main memory, process environment –environment list, environment variables, getenv, setenv, Kernel support for process, process identification, process control- process creation. Replacing a process image, Waiting for a process, process termination, zombie process, orphan process, system call interface form process management – fork, vfork, exit, wait, waitpid, exec family, process groups, session and controlling terminal, difference between threads and processes.Signal- Introduction to signals, Signal generation and handling, Kernel support for signal, Signal function, unreliable signals, reliable signals, Kill, raise, alarm, pause, abort, sleep functions.

Unit 4 : INTER PROCESS COMMUNICATIONS, MESSAGE QUEUES AND SEMAPHORES 9

Inter Process Communications:- Introduction to IPC, IPC between processes on a single computer, IPC between processes on different systems, pipes – creating, IPC between related processes using Unnamed Pipes, FIFOs – creation, IPC between unrelated processes using FIFO (named pipes), difference between named and unnamed pipes, popen and pclose library functions.
Message Queues – kernel support for messages, APIs for Message Queues, client/server examples.
Semaphores – Kernel support for semaphores, APIs for semaphores, FILE locking with semaphores.

Unit 5 : SHARED MEMORY AND SOCKETS 9

Shared Memory: - Kernel support for Shared memory, APIs for shared memory, shared memory examples.

Sockets:- Introduction to Berkeley Sockets, IPC over a network, client/server model, Sockets Address Structure (UNIX Domain & Internet Domain), Socket System calls for connection oriented Protocol and connectionless protocol, Example client/server programs – single server-client connection, multiple simultaneous clients, socket options – setsockopt and fcntl system calls, comparison of IPC mechanisms.

Prescribed Text Books:

1. Unix System Programming using C++, T. Chan, PHI.
2. Unix concepts and Applications, 4th Edition, Sumitabha Das, TMH.
3. Linux System Programming. Robert Love, O'Reilly, SPD.
4. Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones, Wrox, Wiley India Edition.

Reference Text books:

1. Unix Network Programming, W.R.Stevens, PHI.
2. Unix and Shell Programming, B.A. Forouzan & R.F. Gilberg, Cengage Learning

Course Outcomes:

Student will be able to

Blooms Level of Learning

1. Understand the basic commands of Linux operating system and can write shell scripts L2
2. Create file systems and directories and operate them L6
3. Apply processes background and fore ground etc.. by fork() system calls L3
4. Understand message queues and can exercise inter-process communication L2
5. Analyze shared memory segments, pipes and network socket programming implementation. L4

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A55GT 1	3	3	3	3	-	-	-	-	-	-	3	3	3	3	3
19A55GT.2	3	3	3	3	-	-	-	-	-	-	3	3	3	3	3
19A55GT 3	3	3	3	3	-	-	-	-	-	-	3	3	3	3	3
19A55GT 4	3	3	3	3	-	-	-	-	-	-	3	3	3	3	3
19A55GT 5	3	3	3	3	-	-	-	-	-	-	3	3	3	3	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Software Project Management
Category : PE
Course Code : 19A55HT
Year : III B. Tech.
Semester : I Semester

Lecture Hours
3

Tutorial Hours
0

Practical
0

Credits
3

Course Objectives: This course will able to

- Understand the basics of the project management and requirements management throughout the product development cycle.
- Know the distinction between conventional and modern approaches for developing a software project.
- Learn about the life cycle phases and artifacts in software development process.
- Understand the importance of Work breakdown structures and responsibilities while working in a real time projects.
- know how to measure the software quality and risk management in a modern project profiles

Unit 1 : 9

Conventional Software Management: The waterfall model, conventional software Management performance.
Evolution of Software Economics: Software Economics, pragmatic software cost estimation. Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

Unit 2 : 9

The old way and the new: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.
Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases.
Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, pragmatic artifacts.

Unit 3 : 9

Model based software architectures: A Management perspective and technical perspective.
Work Flows of the process: Software process workflows, Iteration workflows.
Checkpoints of the process: Major mile stones, Minor Milestones, Periodic status assessments.

Unit 4 : 9

Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.
Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations.
Process Automation: Automation Building blocks, The Project Environment.

Unit 5 : 9

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

Prescribed Text books:

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

Reference Text Books:

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

Course Outcomes:

Student will be able to

Blooms Level of Learning

1. Understand the conventional software Management and Software Economics factors that affect the development of a software project. L2
2. Recognize Artifacts of the software process and can also use artifacts in Software Development lifecycle. L2, L3
3. Analyze the workflows and can create check points of process in a project management L4
4. Organize the work breakdown structures and assign the roles & responsibilities in a project organization for establishing an active network. L4
5. Apply project metrics in managing software project L3

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A55HT.1	2	-	-	2	-	-	-	-	-	-	3	-	3	3	3
19A55HT.2	-	3	3	-	3	3	-	-	3	3	3	-	3	3	3
19A55HT.3	-	3	3	-	3	-	-	-	-	-	3	-	3	3	3
19A55HT.4	-	3	-	-	3	3	-	1	3	3	3	-	3	3	3
19A55HT.5	2	-	3	2	3	-	-	-	-	-	3	1	3	3	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Cloud Computing
Category : OE
Course Code : 19A55IT
Year : III B. Tech.
Semester : I Semester

Lecture Hours
3

Tutorial Hours
0

Practical
0

Credits
3

Course Objectives: This course will able to

- Learn the new computing model this enables shared resources on demand over the Network.
- Understand about the pay-per-use scenarios.
- Apply the new kind of service models and deployment models.
- Analyze the virtualization technology and to improve cloud Storage systems.
- Develop Cloud security and cloud application model.

Unit 1 : 9

Introduction: Network centric computing and network centric content, Peer-to-peer systems, VCloud Computing: an old idea whose time has come, Cloud Computing delivery models & Services, Ethical issues, Cloud vulnerabilities, Challenges

Cloud Infrastructure: Amazon, Google, Azure & online services, open source private clouds. Storage diversity and vendor lock-in, intercloud, Energy use & ecological impact of data centers, service level and compliance level agreement, Responsibility sharing, user experience, Software licensing.

Unit 2 : 9

Cloud Computing: Applications & Paradigms, Challenges, existing and new application opportunities, Architectural styles of cloud applications, Workflows coordination of multiple activities, Coordination based on a state machine model -the Zoo Keeper, The Map Reduce programming model, Apache Hadoop,

Applications: Healthcare, Energy systems, transportation, manufacturing, Education, Government, mobile communication, application development.

Unit 3 : 9

Cloud Resource Virtualization: Definition, merits and demerits, types & Techniques, Layering, Virtual machine monitors, Hardware support for virtualization Case study: Xen -aVMM based on paravirtualization, Optimization of network virtualization in Xen 2.0, vBlades-paravirtualization targeting a x86-64 Itanium processor, A performance comparison of virtual machines, The darker side of virtualization, Software fault isolation.

Unit 4 : 9

Cloud Resource Management: Policies and mechanisms for resource management, Stability of a two level resource allocation architecture, Feedback control based on dynamic thresholds, Coordination of specialized autonomic performance managers,

Storage systems :Evolution, Storage models, file systems, databases, General parallel File system, GFS, Hadoop, Locks & Chubby, TPS, NOSQL, BigTable.

Unit 5 : 9

Cloud security: Risks, Security, privacy, Trust. Security of OS, VM, VMM, shared image, management OS.

Cloud Application Development: Amazon Web services, EC2 Instances, connecting clouds, Security rules, Launch and EC2 Linux instances.

Prescribed Text books:

1. Cloud Computing Theory and Practice – DAN C. Marinescu – ELSEVIER
2. Cloud Computing : A hands on Approach BaghaMadisetti

Reference Text Books:

1. Distributed and Cloud Computing, From Parallel Processing to the Internet of Things, Kai Hwang, Jack Dongarra, Geoffrey Fox. MK Publishers.
2. Cloud Computing: A Practical Approach, Anthony T. Velte, Toby J. Velte, Robert Elsenpeter, McGraw Hill, 2010

Course Outcomes:

Student will be able to

Blooms Level of Learning

1. Understand cloud computing and shared resources over the internet. L1
2. Illustrate different cloud applications in cloud platforms. L2
3. Make use of virtual machines and optimization of virtualization. L3
4. Analyze cloud resources and to choose storage system for computing clouds. L2
5. Examine Cloud security, and risks involved in developing cloud application. L3

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19B55IT.1	3	3	3	--	3	-	-	-	3	3	3	3	3	-	3
19B55IT.2	3		3	-	-	-	3	-	-	-	3	-	3	-	3
19B55IT.3	3	3	3	-	3	3	3	-	3	-	-	3	3	-	3
19B55IT.4	3	-	-	-	3	-	3	-	3	3	3	-	3	-	3
19B55IT.5	3	3	3	-	-	3	-	-	2	-	-	3	3	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Cyber Security
Category : OE
Course Code : 19A55JT
Year : III B.Tech
Semester : I Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will able to

- Remember Cyber Security architecture principles
- Compare different classes of attacks
- Understand about cybercrime with mobile and wireless devices
- Apply tools and methods used in cybercrime
- Understand about cyber security and social media marketing.

Unit 1 : INTRODUCTION: 11
Cybercrime:

Definition and Origins of the Word, Cybercrime and Information Security, Who are Cybercriminals?, Classifications of Cybercrimes, The Legal Perspectives, Indian Perspectives, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens

Cyber offenses:

Introduction of Criminal Planning and Criminal Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector Cloud Computing.

Unit 2 : CYBERCRIME MOBILE AND WIRELESS DEVICES: 9
Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones.

Unit 3 : TOOLS AND METHODS USED IN CYBERCRIME: 9
Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks, Phishing and Identity Theft: Introduction, Phishing, Identity Theft(ID Theft)

Unit 4 : CYBERCRIMES AND CYBER SECURITY: 10
Why Do We Need Cyber laws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario in India, Consequences of Not Addressing the Weakness in Information Technology Act, Digital Signatures and the Indian IT Act, Information Security Planning and Governance, Information Security Policy Standards, Practices, The information Security Blueprint, Security education, Training and awareness program, Continuing Strategies.

Unit 5 : UNDERSTANDING COMPUTER FORENSICS: 9
Introduction, Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber forensics and Digital Evidence, Forensics Analysis of E-Mail, Digital Forensics Life Cycle, Chain of Custody Concept, Network Forensics, Approaching a Computer Forensics Investigation, Computer Forensics and Steganography, Relevance of the OSI 7 Layer Model to Computer Forensics.

Department of Computer Science and Engineering

Prescribed Text Books:

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole, Sunit Belapure, Wiley.
2. Principles of Information Security, MichealE.Whitman and Herbert J.Mattord, Cengage Learning.

Reference Text Books:

1. Information Security, Mark Rhodes, Ousley, MGH.
2. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press

Web References:

1. https://www.tutorialspoint.com/fundamentals_of_science_and_technology/cyber_crime_and_cyber_security.htm

Course Outcomes

Student will be able to

Blooms Level of Learning

- | | |
|---|----|
| 1. Remember Cyber Security architecture principles | L1 |
| 2. Compare different classes of attacks | L2 |
| 3. Understand about cybercrime with mobile and wireless devices | L2 |
| 4. Apply tools and methods used in cybercrime | L3 |
| 5. Understand about cyber security and social media marketing | L2 |

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
19A55JT.1	3	-	3	-	3	-	-	3	-	-	3	-	3	-	-
19A55JT.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3
19A55JT.3	3	-	-	-	-	-	-	3	-	-	-	-	3	-	3
19A55JT.4	3	3	3	-	3	-	-	-	-	-	3	-	-	3	-
19A55JT.5	-	-	3	-	3	-	-	-	-	-	3	-	-	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Human Computer Interaction
Category : OE
Course Code : 19A55KT
Year : III B.Tech
Semester : I Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will able to

- Understand the procedures, principles and significance of graphical user interfaces.
- Design, implement and evaluate graphical user interfaces.
- Learn patterns and modes of human computer interaction.
- Know how to use tools for human centred information system development.
- Learn the working of various components in the field of human computer interaction.

Unit 1 : INTRODUCTION: 9
Introduction

Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design.

The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

Unit 2 : DESIGN PROCESS & SCREEN DESIGNING 13

Design process – Human interaction with computers, importance of human characteristics, human considerations in design, Human interaction speeds, and understanding business junctions.

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

Unit 3 : WINDOWS & COMPONENTS 10

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls.

Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors

Unit 4 : TOOLS & METHODS 8

Software tools – Specification methods, interface – Building Tools.

Unit 5 : INTERACTION DEVICES 9

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

Prescribed Text Books:

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

Reference Text books:

1. Human – Computer Interaction. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, Pearson Education.
2. Interaction Design PRECE, ROGERS, SHARPS. Wiley Dreamtech

3. User Interface Design, Soren Lauesen, Pearson Education.
4. Human- Computer Interaction, D. R. Olsen, Cengage Learning.
5. Human- Computer Interaction, Smith – Atakan, Cengage Learning

Course Outcomes:

After completing of the course, the student will be able to:

Blooms Level of Learning

- | | |
|--|-------|
| 1. Describe key design principles of human computer interfaces. | L1 |
| 2. Apply and compare selected design methods at a basic level of competence. | L3,L4 |
| 3. Discuss HCI issues in different environments. | L2 |
| 4. Define good user interfaces. | L1 |
| 5. understand the working of interaction devices | L1,L3 |

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A55KT.1	3	3	-	-	-	-	-	-	-	-	-	3	3	-	3
19A55KT.2	3	3	3	1		3	-	-	-	-	-	3	3	-	3
19A55KT.3	3	3	3	-	2	-	-	-	-	-	-	3	3	2	3
19A55KT.4	3	2	-	-	2	3	-	-	-	-	-	3	3	2	3
19A55KT.5	3	2	-	-	-	3	-	-	-	-	-	3	3	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : R Programming
Category : OE
Course Code : 19A55LT
Year : III B. Tech.
Semester : I Semester

Lecture Hours
3

Tutorial Hours
0

Practical
0

Credits
3

Course Objectives: This course will able to

- Understand the basics in R programming in terms of constructs, control statements, string functions
- Understand the use of R for Big Data analytics
- Learn to apply R programming for Text processing
- Able to appreciate and apply the R programming from a statistical perspective

Unit 1 : Introduction 9
Introducing to R – R Data Structures – Help functions in R – Vectors – Scalars – Declarations – recycling – Common Vector operations – Using all and any – Vectorized operations – NA and NULL values – Filtering – Vectorised if-then else – Vector Equality – Vector Element names

Unit 2 : Matrices, Arrays And Lists 9
Creating matrices – Matrix operations – Applying Functions to Matrix Rows and Columns – Adding and deleting rows and columns – Vector/Matrix Distinction – Avoiding Dimension Reduction – Higher Dimensional arrays – lists – Creating lists – General list operations – Accessing list components and values – applying functions to lists – recursive lists

Unit 3 : Data Frames 9
Creating Data Frames – Matrix-like operations in frames – Merging Data Frames – Applying functions to Data frames – Factors and Tables – factors and levels – Common functions used with factors – Working with tables - Other factors and table related functions - Control statements – Arithmetic and Boolean operators and values – Default values for arguments - Returning Boolean values – functions are objects – Environment and Scope issues – Writing Upstairs - Recursion – Replacement functions – Tools for composing function code – Math and Simulations in R

Unit 4 : OOP 10
S3 Classes – S4 Classes – Managing your objects – Input/Output – accessing keyboard and monitor – reading and writing files – accessing the internet – String Manipulation – Graphics – Creating Graphs – Customizing Graphs – Saving graphs to files – Creating three-dimensional plots

Unit 5 : Interfacing 10
Interfacing R to other languages – Parallel R – Basic Statistics – Linear Model – Generalized Linear models – Non-linear models – Time Series and Auto-correlation – Clustering

Prescribed Text books:

1. Mark Gardener, "Beginning R – The Statistical Programming Language", Wiley, 2013
2. Robert Knell, "Introductory R: A Beginner's Guide to Data Visualisation, Statistical Analysis and Programming in R", Amazon Digital South Asia Services Inc, 2013.

Reference Text Books:

1. Norman Matloff , "The Art of R Programming: A Tour of Statistical Software Design", No Starch Press, 2011
2. Jared P. Lander, "R for Everyone: Advanced Analytics and Graphics", Addison-Wesley Data & Analytics Series, 2013

Course Outcomes:

Student will be able to

Blooms Level of Learning

1. Understand and apply the basics in R programming in terms of constructs, control statements, string functions L1, L3
2. Apply the functions on matrix rows and columns and list operations L1, L3
3. Work on Data frames and tabular type of DATA L1, L3
4. Understand and write reliable code using OOP concepts in R L1, L3
5. Understand and apply R Interfaces for Other languages L1,L3

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A55LT.1	3	3	3	3	3	-	-	-	-	-	-	3	3	3	-
19A55LT.2	-	3	3	3	3	-	-	-	-	-	-	3	3	3	3
19A55LT.3	3	3	3	3	3	-	-	-	-	-	-	3	3	3	3
19A55LT.4	3	3	3	3	3	-	-	-	-	-	-	-	3	3	-
19A55LT.5	3	3	3	-	3	-	-	-	-	-	-	3	3	3	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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Title of the Course	General Aptitude
Category	HS
Couse Code	19AC51L
Year	III B. Tech
Semester	I Semester
Branch	CE, ME & CSE

Lecture Hours	Tutorial Hours	Practical	Credits
0	0	2	1

Course Objectives:

- To equip students with aptitude and reasoning skills in order to help them succeed in competitive exams.
- To help students improve their knowledge of quantitative and reasoning skills, which in turn helps them comprehend and solve various mathematical problems in professional life.
- To equip students with English verbal and reasoning skills in order to help them succeed in exams like GRE, TOEFL and help them to do well in placement drives.
- To help students improve their knowledge of grammar, vocabulary and reasoning skills pertain to English.

Quantitative Aptitude:

Number Systems - HCF and LCM - Averages - Problems on ages– Percentages - Profit and loss - Simplification - Ratio and Proportion - Time and Work - Time and Distance - Simple interest and Compound interest –Calendar - Clocks – Mensuration: Area, Volume and Surface Areas - Data Interpretation: Tabulation, Line Graphs, Bar Graphs, Pie charts.

Reasoning:

Directions - Blood Relations - Series and Sequences - Odd man out - Coding and Decoding - Data Sufficiency-Logical deductions.

English for Competitive Examinations

Synonyms – Antonyms – Analogy – Words often confused, One-word substitutions – Idioms and Phrases – Homonyms – Spellings

Reading comprehension – Cloze tests

Articles – Prepositions – Tenses – Voice – Error spotting and correcting – Sentence improvement.

Rearrangement of jumbled words and jumbled sentences – word pairs – sentence completion

Prescribed Textbooks:

1. R.S. Agarwal, Quantitative Aptitude, S. Chand Publishers, New Delhi, 2005.
2. R. S. Agarwal, Verbal and Non-Verbal Reasoning, S. Chand Publishers, New Delhi, 1998.
3. Hari Prasad, "Objective English for Competitive Exams", TMH
4. R. S. Agarwal, "Objective English", S. Chand Publishers

Reference Books

1. Shakuntala Devi, Puzzles to Puzzle you, Orient Paper Backs Publishers (OPB), New Delhi, 2005.
2. Arun Sharma, How to Prepare for Quantitative Aptitude, TMH Publishers, New Delhi, 2003.
3. Sharon Weiner-Green, IrnK.Wolf, Barron's GRE, Galgotia Publications, New Delhi, 2006.
4. Shakuntala Devi, More Puzzles, OPB, New Delhi, 2006.

5. Ravi Narula, Brain Teasers, Jaico Publishing House, New Delhi, 2005.
6. George J Summers, Puzzles and Teasers, Jaico Publishing House, Mumbai, 2005

Course Outcomes:

Student will be able to

Blooms Level of Learning

1. demonstrate various principles involved in solving mathematical problems pertain to Quantitative functions.
2. decode information from charts and interpret their logical thinking in the aspects.
3. interrelate English vocabulary with the knowledge of synonyms, antonyms, idiomatic expressions and, accuracy in English spelling
4. apply knowledge of articles, prepositions, tenses and voice to correct errors or to improve sentences

CO-PO Mapping:

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Advanced JAVA Programming Lab
Category : PC
Course Code : 19A551L
Year : III B. Tech.
Semester : I Semester

Lecture Hours
0

Tutorial Hours
0

Practical
2

Credits
1

Course Objectives: This course will able to

- Understand and Apply the JavaFX controls in GUI applications.
- Understand and retrieve data from data base using JDBC API.
- Understand server side programming using SERVLETS and JSP

Week1 :

1. Create Simple JavaFX application skeleton.
2. Demonstrate a JavaFX label.
3. Demonstrate JavaFX events and buttons
4. Demonstrate drawing on canvas

Week2 :

1. Load and display an image. Demonstrate an image in a label. Use an image with a button.
2. Demonstrate a toggle button.
3. A simple demonstration of Radio Buttons and event handling.
4. Radio button example demonstrates how the currently selected button in a group can be obtained under program control, when it is needed, rather than responding to action or change events.

Week3:

1. Demonstrate Check Boxes.
2. Demonstrate a list view, adding scrollbars, enabling multiple selections in the list.
3. Demonstrate a combo box.

Week4:

1. Demonstrate a scroll pane
2. Demonstrate a TreeView
3. Demonstrate rotation, scaling, glowing, and inner shadow on JavaFX controls
4. Demonstrate different types of Menus

Week5:

Java Program to get connection with Oracle Database, execute SQL Statements and handling the Result set.

Week6:

1. Simple servlet program
2. Program to read servlet Parameters
3. Program to handle HTTP Get and POST Request using servlets

Week7:

1. Program for using Cookies in servlets.
2. Program for session tracking in servlets.
3. Program to access and perform operations on Database using servlets.

Week8:

1. Simple JSP Program
2. Program to call a Java Bean in JSP
3. Program to access properties Using jsp:getProperty and jsp:setProperty.
4. Simple JSP page with custom tags.

CO-PO Mapping:

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Data Mining and Computer Networks Lab
Category : PC
Course Code : 19A554L
Year : III B. Tech.
Semester : I Semester

Lecture Hours
0

Tutorial Hours
0

Practical
2

Credits
1

Course Objectives: This course will able to

- Organize different datasets with preprocessing techniques and perform association rule mining.
- Find the accuracy of different classifier models and classify different applicants.
- Analyze the cross-validation technique and construct a decision tree.
- Be familiar with network simulation tools.
- Have hands on experience on various networking protocols.

Data Mining Lab

CREDIT RISK ASSESSMENT

Description: The business of banks is making loans. Assessing the credit worthiness of an applicant is of crucial importance. You have to develop a system to help a loan officer decide whether the credit of a customer is good, or bad. A bank's business rules regarding loans must consider two opposing factors. On the one hand, a bank wants to make as many loans as possible. Interest on these loans is the banks profit source. On the other hand, a bank cannot afford to make too many bad loans. Too many bad loans could lead to the collapse of the bank. The bank's loan policy must involve a compromise: not too strict, and not too lenient.

To do the assignment, you first and foremost need some knowledge about the world of credit. You can acquire such knowledge in a number of ways.

1. Knowledge Engineering. Find a loan officer who is willing to talk. Interview her and try to represent her knowledge in the form of production rules.
2. Books. Find some training manuals for loan officers or perhaps a suitable textbook on finance. Translate this knowledge from text form to production rule form.
3. Common sense. Imagine yourself as a loan officer and make up reasonable rules which can be used to judge the credit worthiness of a loan applicant.
4. Case histories. Find records of actual cases where competent loan officers correctly judged when, and when not to, approve a loan application.

The German Credit Data: Actual historical credit data is not always easy to come by because of confidentiality rules. Here is one such dataset, consisting of 1000 actual cases collected in Germany. Credit dataset (original) Excel spreadsheet version of the German credit data (Down load from web).

In spite of the fact that the data is German, you should probably make use of it for this assignment. (Unless you really can consult a real loan officer!)

A few notes on the German dataset

- DM stands for Deutsche Mark, the unit of currency, worth about 90 cents Canadian (but looks and acts like a quarter).
- Owns telephone. German phone rates are much higher than in Canada so fewer people own telephones.
- Foreign worker. There are millions of these in Germany (many from Turrkey). It is very hard to get German citizenship if you were not born of German parents.
- There are 20 attributes used in judging a loan applicant. The goal is to classify the applicant into one of two categories, good or bad.

Week1 :

1. Demonstration of preprocessing on dataset creditg.arff.

Week2 :

2. Demonstration of Association Rule process using Apriori algorithm.

Week3:

3. One type of model that you can create is a Decision Tree - train a Decision Tree using the complete dataset as the training data. Report the model obtained after training and demonstrate the classification rule process using j48 algorithm.

Week4:

4. Check to see if the data shows a bias against "foreign workers" (attribute 20), or "personal-status" (attribute 9). One way to do this (perhaps rather simple minded) is to remove these attributes from the dataset and see if the decision tree created in those cases is significantly different from the full ceding dataset case which you have already done. To remove an attribute you can use the preprocess tab in Weka's GUI Explorer. Did removing these attributes have any significant effect? Discuss.

Week5:

5. Another question might be, do you really need to input so many attributes to get good results? Maybe only a few would do. For example, you could try just having attributes 2, 3, 5, 7, 10, 17 (and 21, the class attribute (naturally)). Try out some combinations. (You had removed two attributes in problem 7. Remember to reload the CREDIT_G ARFF data file to get all the attributes initially before you start selecting the ones you want.)

Week6:

6. Describe what cross-validation is briefly. Train a Decision Tree again using cross-validation and report your results. Does your accuracy increase/decrease? Why?

Computer Networks Lab

Week 1:

1. Simulate network topologies Star, Bus, Mesh and Ring using Packet Tracer Tool.
2. Implement the data link layer framing methods such as character, character stuffing and bit stuffing.

Week 2:

3. Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC CCIP.
4. Implement Dijkstra's algorithm to compute the Shortest path through a graph.

Week -3:

5. Implement and simulate algorithm for Distance vector routing protocol.
6. Implement and simulate algorithm for Link state routing protocol.

Week – 4:

7. Install network simulator NS-2 in any of the Linux operating system and simulate wired and wireless scenarios

Week-5

8. Using Wireshark observe data transferred in client server communication using UDP and identify the UDP datagram
9. Using Wireshark observe Three Way Handshaking Connection Establishment, Data Transfer and Three-Way Handshaking Connection Termination in client server communication using TCP.

Week -6:

10. Design and configure a network with multiple subnets with wired and wireless LANs using required network devices. Configure the following services in the network- TELNET, SSH, FTP server, Web server, File server, DHCP server and DNS server.
11. Implement Simple Mail Transfer Protocol.

Task Resources:

1. Andrew Moore's Data Mining Tutorials (See tutorials on Decision Trees and Cross Validation)
 - Decision Trees (Source: Tan, MSU)
 - Tom Mitchell's book slides (See slides on Concept Learning and Decision Trees)
 - Weka resources: Introduction to Weka (html version) (download ppt version)
 - Download Weka
 - Weka Tutorial
2. Computer Networks A Systems Approach-Larry L.Peterson and Bruce S.Davie,4th Edition .Morgan Kaufman

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|---|--------|
| 1. Organize different datasets with preprocessing techniques and apply association rule mining. | L2, L3 |
| 2. Find the accuracy of different classifier models and classify different applicants. | L2 |
| 3. Analyze the cross-validation technique and construct a decision tree. | L4,L6 |
| 4. Design simple data transmission using networking concepts and implement. | L6 |
| 5. Compare and analyze different existing protocols | L4 |

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A554L.1	3	3	3		3						2			3	3
19A554L.2	3	3	3	3	3	1			1	1			1	3	
19A554L.3	3	3	3	3	3									3	3
19A554L.4	3	3	3	3	3									3	3
19A555L.5	3	3	3		3						2			3	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course	Universal Human Values – II
Category	HS
Couse Code	19AC53T
Year	III B. Tech
Semester	I Semester
Branch	CE, ME, CSE

Lecture Hours	Tutorial Hours	Practical	Credits
1	1	-	2

Course Objectives:

- 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-reflection
- Development of commitment and courage to act

Unit 1 Course Introduction - Need, Basic Guidelines, Content and Process for Value Education 6

- 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
- Method 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! 6

- 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- 6
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 6
Coexistence

- Understanding the harmony in the Nature
- Interconnectedness and mutual fulfilment among the four orders of nature recyclability
- and self-regulation in nature
- Understanding Existence as Co-existence of mutually interacting units in all pervasive space
- Holistic perception of harmony at all levels of existence.

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

Unit 5 Implications of the above Holistic Understanding of Harmony on 6
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 eg. To discuss the conduct as an engineer or scientist etc.

Prescribed 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-

Reference Books

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amar kantik, 1999.
2. N. Tripathi, "Human Values", New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. Mohandas Karamchand Gandhi "The Story of My Experiments with Truth"
5. E. F. Schumacher. "Small is Beautiful"
6. Slow is Beautiful –Cecile Andrews
7. 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:

	Blooms Level of Learning
1. Students are expected to become more aware of themselves, and their surroundings (family, society, nature)	L2
2. They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.	L2
3. They would have better critical ability.	L2
4. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).	L2
5. It is hoped that they would be able to 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.	L2

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19AC53T.1												3
19AC53T.2												3
19AC53T.3												3
19AC53T.4												3
19AC53T.5												3

Assessment pattern for UHV-2

Assessment Pattern for Universal Human Values-II courses assessment is described hereunder.

UHV-2 course carries two credits. The assessment is to provide a fair state of development of the student, so participation in classroom discussions, self-assessment, peer assessment etc. will be used in evaluation.

A student has to secure 40% marks out of 100 in the CIE and SEE together to qualify for the award of the degree. The distribution shall be 50 marks for continuous internal assessment and 50 marks for semester end examination.

Internal evaluation shall be conducted for the course during semester and shall be evaluated for 50 marks and distributions of marks as follows:

- Assessment by faculty mentor: 10 marks

Department of Computer Science and Engineering

- Self-assessment: 10 marks
- Assessment by peers: 10 marks
- Socially relevant project/Group Activities/Assignments: 20 marks

Semester End examination is done for 50 marks and is of 2 hours duration. The question paper shall be of subjective type with 5 questions, one question from each unit, with internal choice. All the questions carry equal marks of 10 each.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Microprocessor & Interfacing
Category : ES
Course Code : 19A461T
Year : III B. Tech.
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will able

- To know the basic concepts of first 16 bit general purpose Microprocessor
- To learn the Programming and Interfacing Concepts of Microprocessors

Unit 1 : 8086 ARCHITECTURE & PROGRAMMING 13

Overview of 8085 processor architecture, Architecture of 8086 microprocessor, Register organization, Memory organization, Machine language instruction formats of 8086. Addressing modes of 8086, Instruction set of 8086, Assembler directives, Assembly language programs involving logical, branch and call instructions, sorting, evaluation of arithmetic expressions, string manipulation. Procedure and Macros.

Unit 2 : MEMORY INTERFACING 13

Pin diagram of 8086 - Minimum mode and maximum mode of operation, Timing diagrams. I/O Interfacing methods – I/O mapped I/O, Memory mapped I/O. Basic structure of SRAM and DRAM cell, Memory interfacing to 8086 (static RAM and EPROM). Need for DMA, Architecture of 8257 and interfacing with 8086.

Unit 3 : I/O INTERFACING & PROGRAMMABLE INTERRUPT CONTROLLER (8259) 12

Interfacing I/O ports – latches and buffers. 8255 PPI - Architecture, various modes of operation and interfacing to 8086. Seven segment Displays, Stepper motor, D/A, A/D converter interfacing. Data transfer methods-Programmed I/O, interrupt driven I/O. Interrupt structure of 8086, Vector interrupt table. Interrupt service routines. 8259 PIC architecture and interfacing, cascading of interrupt controller. Simple programs.

Unit 4 : PROGRAMMABLE INTERVAL TIMER/COUNTER (8253) & COMMUNICATION INTERFACE 07

Architecture of 8253 programmable interval timer/counter, mode of operations, interfacing with 8086. Asynchronous and synchronous data transfer schemes. Necessity of communication interfaces, 8251 USART architecture and interfacing, RS-232C. TTL to RS232C and RS232C to TTL conversion. Sample program of serial data transfer.

Unit 5 : ADVANCED MICROPROCESSORS 05

Introduction to 80286, salient features of 80386, Real and Protected mode Segmentation and Paging, salient features of Pentium and Pentium pro processors.

Prescribed Text Books:

1. Advanced microprocessor and peripherals- A.K. Ray and K.M.Bhurchandi, 2nd edition, TMH, 2000
2. Microprocessors and Interfacing- Douglas V.Hall, 2nd edition, 2007

Reference Text books:

1. The 8086 and 8088 Microprocessors- Walter A. Triebel, Avtar Singh, PHI, 4th Edition, 2003
2. Micro computer system 8066/8088 family Architecture, programming and Design-By Liu and GA Gibson,

Course Outcomes:

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Compiler Design
Category : PC
Course Code : 19A561T
Year : III B. Tech.
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will able to

- Describe the design of a compiler including its phases and components.
- Demonstrate top down parser.
- Organize bottom up parser and syntax directed translation.
- Evaluate conversion of popular programming language constructs into Intermediate code forms and symbol table format.
- Distinguish different optimization techniques and design object code generation algorithms in the design of compiler.

Unit 1 : Overview of Compilation 7
Phases of Compilation – Lexical Analysis, Regular Grammar and Regular Expression for common programming language features, pass and Phases of translation, Interpretation, Bootstrapping, data structures in compilation – LEX lexical analyzer generator.

Unit 2 : Top down Parsing 9
Context free grammars, Top down parsing – Backtracking, LL(1), Recursive Descent Parsing, Predictive parsing, Preprocessing steps required for predictive parsing.

Unit 3 : Bottom up parsing 12
Operator precedence, Shift Reduce parsing, SLR, CLR and LALR parsing, Error recovery in parsing, handling ambiguous grammar, YACC – automatic parser generator. Semantic analysis: Attributed grammars, Syntax directed translation, L-attributed definition, Top Down & Bottom Up evaluation of expressions, Type checking.

Unit 4 : Intermediate code generation 12
Intermediate forms of source Programs – abstract syntax tree, polish notation and three address codes. Conversion of popular Programming language Constructs into Intermediate code forms. Symbol Tables: Symbol table format, organization for block structures languages, hashing, tree structures representation of scope information. Block structures and non-block structure storage allocation: static, Runtime stack and heap storage allocation, storage allocation for arrays, strings and records.

Unit 5 : Code optimization and generation 9
Consideration for Optimization, Scope of Optimization, local optimization, loop optimization, frequency reduction, folding, DAG representation. Data flow analysis: Flow graph, data flow equation, global optimization, redundant sub expression elimination, Induction variable elements, Live variable analysis, Copy propagation, Machine dependent code optimization. Object code generation: Object code forms, register allocation and assignment generic code generation algorithms, DAG for register allocation.

Prescribed Text books:

1. Principles of compiler design -A.V. Aho. J.D.Ullman; Pearson Education.
2. Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University Press.

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Reference Text Books:

1. Lex&yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
2. Modern Compiler Design- Dick Grune, Henry E. Bal, Criel T. H. Jacobs, Wiley dreamtech.
3. Engineering a Compiler-Cooper & Linda, Elsevier
4. Compiler Construction, Loudon, Thomson. "Principles of Compiler Design", Aho. A.V & Ullman J.D, Narosa publications, 1985

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|--|----|
| 1. Understand the compiler implementation. | L2 |
| 2. Design top down parser | L4 |
| 3. Design bottom up parser and examine syntax directed translation. | L4 |
| 4. Implementation of the intermediate code forms and symbol table. | L5 |
| 5. Apply different optimization techniques and develop code generation algorithms in the design of compiler. | L3 |

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A561T.1	3	-	-	-	3	-	3	-	-	-	-	1	3	3	3
19A561T.2	-	3	-	3	3	2	-	-	-	-	2	-	-	3	-
19A561T.3	3	3	-	3	3	-	3	-	-	-	-	-	3	-	3
19A561T.4	3	3	2	3	-	-	3	-	-	-	-	-	3	-	3
19A561T.5	3	-	2	3	3	2	3	-	1	-	2	-	-	3	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Object Oriented Analysis and Design
Category : PC
Course Code : 19A562T
Year : III B. Tech.
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
2	0	0	2

Course Objectives: This course will Provide

- Introduction to modeling and overview of UML
- Designing Class & Object diagrams with the help of advanced structural modeling.
- Create use-case & interaction diagrams to model behavior of a Software system.
- Designing and implementing state machines using advanced behavioral modeling.
- Modeling subsystems using component and deployment diagrams.

Unit 1 : Introduction to UML and Basic Structural Modeling 9
Importance of modeling, principles of modeling, object oriented modeling, conceptual model of the UML, Architecture, and Software Development Life Cycle.
Classes, Relationships, common Mechanisms, and diagrams.

Unit 2 : Advanced Structural Modeling, Class & Object Diagrams 8
Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.
Terms, concepts, modeling techniques for Class & Object Diagrams. Design class diagram for Library information system.

Unit 3 : Basic Behavioral Modeling-I & II 8
Interactions, Interaction diagrams.
Use cases, Use case Diagrams, Activity Diagrams. Design Use cases, Use case diagrams, Interaction diagram and Activity diagram for library system.

Unit 4 : Advanced Behavioral Modeling 7
Events and signals, state machines, processes and Threads, time and space, state chart diagrams. Design state machine for different objects in library system.

Unit 5 : Architectural Modeling 7
Component, Deployment, Component diagrams and Deployment diagrams. Design & document of library system.

Text Books:

1. Grady Booch, James Rumbaugh, Ivar Jacobson: The Unified Modeling Language User Guide, Pearson Education.
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd.

Reference Text books:

1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY- Dreamtech India Pvt. Ltd.

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Course Outcomes:

Student will be able to

Blooms Level of Learning

1. Learn the fundamental principles of Object Oriented modeling L1
2. Understand class and object diagrams for software systems. L2
3. Identify the system behavior using use case and interaction diagrams. L2
4. Modeling states and state machines using advanced behavioral modeling. L3
5. Analyzing and implementing system architecture by using Architectural concepts. L3, L4

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A562T.1	2	2					1			3			3	-	-
19A562T.2	2	2		1					3				3	-	3
19A562T.3			3						3	3	2		-	-	3
19A562T.4			3		2				3	3			-	-	-
19A562T.5			3		2					3	2		3	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES, RAJAMPET
(An Autonomous Institution)

Title of the Course : .Net Technologies
Category : PE
Course Code : 19A56AT
Year : III B. Tech.
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This Course will able to:

- Understand ecosystem of .NET framework and basic Concepts of C#.Net.
- Understand and Apply object oriented programming concepts to develop C#.Net applications.
- Understand & Apply the basic window based controls.
- Apply window based programming to Build SDI&MDI Applications.
- Understand & Apply data base connectivity through ADO.NET and Implement server side programming concepts through ASP.NET framework.

UNIT-I: 9

Introduction to C#: .NET Framework, What is C#, writing a C# program, Variables and Expressions
Flow control – Branching & Looping.
Control structures in C#: Type conversion – Implicit & Explicit, Complex variable types- Arrays,
Structures & Enumerations, Functions, Error handling.

UNIT-II: 9

Introduction to OOP using C#: OOP Techniques – Inheritance, Polymorphism, Interfaces, Events Defining
classes, Defining class members –Member definitions, Collections, Generics –Using generics.

UNIT-III: 9

Basic windows programming: Controls –Button, Label, Link Label, TextBox, Radio Button, CheckBox,
RichTextBox, ListBox, CheckedListBox, ListView, TabControl

UNIT-IV: 9

Advanced windows programming: Menus, Toolbars, Single Document Interface (SDI), Multiple Document
Interface (MDI) application, Building MDI applications.

UNIT-V: 9

Introduction to ADO.NET and ASP.NET: ADO.NET – Data Access components, Database programming with
SQL SERVER .ASP.NET – Creating a simple page, Server controls.

Text Books:

1. Harsh Bhasin, Programming in C#, Oxford University Press 2014, New Delhi.
2. Karli Watson, Christian Nagel, Jacob Vibe Hammer, Jon D. Reid, Morgan Skinner, Daniel Kemper,
Beginning Visual C# 2012 Programming, Published by Jhon Wiley & sons, Inc.,
3. Dan Clark, Beginning C# Object Oriented Programming, New York, 2013, 2nd Edition.

Reference Books:

1. John Sharp, Microsoft Visual C# 2013 Step by Step, Microsoft Press, Washington,2013.Kogent,
ASP.NET 3.5 Black Book, Dream Tech Publications, 2010.
2. E. Balagurusamy, Programming in C#, Tata McGraw-Hill Publisher 2010, New Delhi, 3rd Edition.

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Course Outcomes:

Blooms Level of Learning

Student will be able to:

1. Understand the fundamentals of .NET framework and basic Concepts of C#.Net L2
2. Implement Object oriented programming concepts through C#.NET framework. L3
3. Apply window based controls to develop GUI Applications. L3
4. Understand the working of Advanced Window Programming to Build MDI Applications. L2
5. Understand & Apply ADO.NET to access data and data services from a database and ASP.NET to build dynamic sites and web applications. L2, L3

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A56AT.1	3	-	3	-	3	-	-	-	-	-	-	-	3	-	-
19A56AT.2	3	-	3	-	3	3	-	-	3	-	-	3	3	-	3
19A56AT.3	3	-	3	-	3	3	-	-	3	-	-	3	3	-	3
19A56AT.4	3	-	3	-	3	3	-	-	3	-	-	3	3	-	3
19A56AT.5	3	-	3	-	3	3	-	-	3	-	-	3	3	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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Title of the Course : Machine Learning
Category : PE
Course Code : 19A56BT
Year : III B. Tech.
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will able to

- Formulate machine learning problems corresponding to different applications.
- Understand machine learning algorithms along with their strengths and weaknesses.
- Understand the basic theory underlying machine learning.
- Apply machine learning algorithms to solve problems of moderate complexity.
- Understand different types of learning approaches.

Unit 1 : *Introduction* 9

Well-posed learning problems, Designing a learning system, Perspectives and issues in machine learning
Concept learning and the general to specific ordering – Introduction, A concept learning task, Concept learning as search, Find-S: finding a maximally specific hypothesis, Version spaces and the candidate elimination algorithm, Remarks on version spaces and candidate elimination, Inductive bias .

Unit 2 : *Decision Tree learning & Artificial Neural Networks* 9

Decision Tree learning – Introduction, Decision tree representation, Appropriate problems for decision tree learning, The basic decision tree learning algorithm, Hypothesis space search in decision tree learning, Inductive bias in decision tree learning, Issues in decision tree learning
Artificial Neural Networks – Introduction, Neural network representation, Appropriate problems for neural network learning, Perceptrons, Multilayer networks and the back propagation algorithm, Remarks on the back propagation algorithm, An illustrative example face recognition Advanced topics in artificial neural networks

Unit 3 : *Bayesian learning & Genetic Algorithms* 9

Bayesian learning – Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum likelihood and least squared error hypotheses, Maximum likelihood hypotheses for predicting probabilities, Minimum description length principle, Bayes optimal classifier, Gibbs algorithm, Naïve Bayes classifier, An example learning to classify text, Bayesian belief networks The EM algorithm
Genetic Algorithms – Motivation, Genetic Algorithms, An illustrative Example, Hypothesis Space Search, Genetic Programming, Models of Evolution and Learning, Parallelizing Genetic Algorithms

Unit 4 : *Learning Sets of Rules & Analytical Learning* 9

Learning Sets of Rules – Introduction, Sequential Covering Algorithms, Learning Rule Sets: Summary, Learning First Order Rules, Learning Sets of First Order Rules: FOIL, Induction as Inverted Deduction, Inverting Resolution
Analytical Learning - Introduction, Learning with Perfect Domain Theories: Prolog-EBG Remarks on Explanation-Based Learning, Explanation-Based Learning of Search Control Knowledge.

Unit 5 : *Combining Inductive and Analytical Learning & Reinforcement Learning* 9

Combining Inductive and Analytical Learning – Motivation, Inductive-Analytical Approaches to Learning, Using Prior Knowledge to Initialize the Hypothesis, Using Prior Knowledge to Alter the Search Objective, Using Prior Knowledge to Augment Search Operators,

Reinforcement Learning – Introduction, The Learning Task, Q Learning, Non-Deterministic Rewards and Actions, Temporal Difference Learning, Generalizing from Examples, Relationship to Dynamic Programming

Prescribed Text Books:

1. Machine Learning – Tom M. Mitchell, - MGH
2. Machine Learning: An Algorithmic Perspective, Stephen Marsland, Taylor & Francis (CRC)

Reference Text books:

1. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ Press.
2. Richard o. Duda, Peter E. Hart and David G. Stork, pattern classification, John Wiley & Sons Inc., 2001
3. Chris Bishop, Neural Networks for Pattern Recognition, Oxford University Press, 1995

Course Outcomes:

Student will be able to

Blooms Level of Learning

1. understand the basic knowledge about the key algorithms and theory that form the foundation of machine learning and computational intelligence L1
2. Learn and use different machine learning algorithms L2
3. apply various machine learning algorithms to neural network and genetic approaches L3
4. Design the classification, pattern recognition, optimization and decision problems using machine learning algorithms L4
5. Analyze different types of learning approaches. L5

CO-PO Mapping:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A56BT.1	3	3	3	1		1			1			3	3	3	
19A56BT.2	3		3		3							3	3	3	
19A56BT.3	3	3	3		3								3		
19A56BT.4	3	3	3									3	3		
19A56BT.5	3		3		3							3	3	3	

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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Title of the Course : Mobile Communications
Category : PE
Course Code : 19A56CT
Year : III B. Tech.
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will able to

- Understand the basic concepts of mobile computing.
- Learn the basics of mobile telecommunication system.
- Familiar with the network layer protocols and Ad-Hoc networks.
- Know the basis of transport and application layer protocols.
- Gain knowledge about different mobile platforms and application development.

Unit 1 : INTRODUCTION 9
Introduction to Mobile Computing – Applications of Mobile Computing- Generations of Mobile Communication Technologies- Multiplexing – Spread spectrum -MAC Protocols – SDMA- TDMA- FDMA- CDMA

Unit 2 : MOBILE TELECOMMUNICATION SYSTEM 9
Introduction to Cellular Systems - GSM – Services & Architecture – Protocols – Connection Establishment – Frequency Allocation – Routing – Mobility Management – Security – GPRS- UMTS – Architecture – Handover – Security

Unit 3 : MOBILE NETWORK LAYER 9
Mobile IP – DHCP – AdHoc– Proactive protocol-DSDV, Reactive Routing Protocols – DSR, AODV , Hybrid routing –ZRP, Multicast Routing- ODMRP, Vehicular Ad Hoc networks (VANET) –MANET Vs VANET – Security.

Unit 4 : MOBILE TRANSPORT AND APPLICATION LAYER 9
Mobile TCP– WAP – Architecture – WDP – TLS – WTP –WSP – WAE – WTA Architecture – WML

Unit 5 : MOBILE PLATFORMS AND APPLICATIONS 12
Mobile Device Operating Systems – Special Constraints & Requirements – Commercial Mobile Operating Systems – Software Development Kit: iOS, Android, BlackBerry, Windows Phone – MCommerce – Structure – Pros & Cons – Mobile Payment System – Security Issues

Prescribed Text books:

1. Jochen Schiller, – Mobile CommunicationsII, PHI, Second Edition, 2003.
2. Prasant Kumar Pattnaik, Rajib Mall, – Fundamentals of Mobile ComputingII, PHI Learning Pvt.Ltd, New Delhi – 2012

Reference Text Books:

1. Dharma Prakash Agarwal, Qing and An Zeng, "Introduction to Wireless and Mobile systems", Thomson Asia Pvt Ltd, 2005.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, – Principles of Mobile ComputingII, Springer, 2003.
3. William.C.Y.Lee, – Mobile Cellular Telecommunications-Analog and Digital SystemsII, Second Edition, TataMcGraw Hill Edition ,2006.

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4. C.K.Toh, —AdHoc Mobile Wireless NetworksII, First Edition, Pearson Education, 2002.
5. Android Developers : <http://developer.android.com/index.html>
6. Apple Developer : <https://developer.apple.com/>
7. Windows Phone DevCenter : <http://developer.windowsphone.com>
8. BlackBerry Developer : <http://developer.blackberry.com>

Course Outcomes:

Student will be able to

Blooms Level of Learning

1. understand the basics of mobile telecommunication systems L2
2. learn the generations of telecommunication systems in wireless networks L2
3. Determine the functionality of MAC, network layer and Identify a routing protocol for a given Ad hoc network L2
4. Analyze the functionality of Transport and Application layers L4
5. Identify the mobile applications using android/blackberry/ios/windows SDK L2

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A56CT.1	3	3									2	3	3		
19A56CT.2	3	3		3		3							3		
19A56CT.3	3	3	3		3	3	2			1		3	3	2	
19A56CT.4	3	3	3			3						3	3		
19A56CT.5		3	3	3	3		2					3	3	2	

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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Title of the Course : Performance Evaluation of Computer Systems
Category : PE
Course Code : 19A56DT
Year : III B. Tech.
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will able to

- Understand the mathematical and science fundamentals needed for performance evaluation of computer systems and metrics
- Study measurement techniques and tools such as workloads, arts of workload selection and Markov models
- Understand the simulation, simulation work flow and analysis of simulation results used for performance evaluation.
- Study analytical modeling such as *queuing* models including analysis of single queue, network of queues
- Study the analysis of computer architectures, computer network components, simulation modeling of local area networks

Unit 1 : *Introduction to Performance Evaluation* 9

The Art of Performance Evaluation, Professional Organizations, Journals, and Conferences, Performance Projects, Common Mistakes and How To Avoid Them: Common Mistakes In Performance Evaluation, A Systematic Approach To Performance Evaluation, Selection of Techniques And Metrics: Selecting An Evaluation Technique, Selecting Performance Metrics, Utility Classification Of Performance Metrics, Setting Performance Requirements

Unit 2 : *Workload and Markov Models* 9

Measurement Techniques And Tools: Types Of Workloads, Addition Instruction, Instruction Mixes, Kernels, Synthetic Programs, Application Benchmarks, Popular Benchmarks, The Art of Workload Selection: Services Exercised, Level Of Detail, Representativeness, Timeliness, Other Considerations In Workload Selection, Workload Characterization Techniques: Terminology, Averaging, Specifying Dispersion, Single-Parameter Histograms, Multi parameter Histograms, Principal-Component Analysis, Markov Models, Clustering

Unit 3 : *Simulation and Simulation Results* 9

Simulation: Introduction To Simulation, Common Mistakes In Simulation, Other Causes Of Simulation Analysis Failure, Terminology, Selecting A Language For Simulation, Types Of Simulations, Event-Set Algorithms, Analysis of Simulation Results: Model Verification Techniques, Model Validation Techniques, Transient Removal, Terminating Simulations, Stopping Criteria: Variance Estimation, Variance Reduction

Unit 4 : *Queuing Models and Network of Queues* 9

Queuing Models: Introduction To Queuing Theory, Queuing Notation, Rules For All Queues, Little's Law, Types Of Stochastic Processes, Analysis Of A Single Queue: Birth-Death Processes, M/M/1 Queue, M/M/M Queue, M/M/M/B Queue With Finite Buffers, Results For Other Queuing Systems, Queuing Networks: Open And Closed Queuing Networks, Product Form Networks, Queuing Network Models Of Computer Systems

Unit 5 : *Analysis of Computer Architectures and Computer Network Components* 9

Analysis of Computer Architectures: Introduction, Central Server Computer System, Multiple Server Computer

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ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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Title of the Course : Advanced Computer Architecture
Category : PE
Course Code : 19A56ET
Year : III B. Tech.
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will able to

- Learn Program, Network Properties of various parallel computer models.
- Know about new trends in Operating and designing various parallel computers.

Unit 1 : 9

Parallel Computer Models: - The state of computing-Multiprocessors and Multi computers- Multivector and SIMD Computers-PRAM and VLSI Models.

Program and Networks Properties: - Conditions of Parallelism- Program Partitioning and Scheduling- Program Flow Mechanisms-System Interconnect Architectures.

Principles of Scalable Performance: - Performance Metrics and Measures- Parallel Processing Applications-Speedup Performance Laws-Scalability Analysis and Approaches, Architectural Development Track.

Unit 2 : 9

Processors and Memory Hierarchy: - Advanced Processor Technology-Superscalar and Vector Processors-Memory Hierarchy Technology.

Bus, Cache and Shared Memory: - Bus Systems-Cache Memory Organizations-Shared-Memory Organizations.

Unit 3 : 11

Pipelining and Super Scalar Techniques: - Linear Pipeline Processors-Nonlinear Pipeline Processors-Instruction Pipeline Design.

Multiprocessors and Multi computers: -Multiprocessor System Interconnects-Cache Coherence and Synchronization Mechanisms-Message-Passing Mechanisms.

Unit 4 : 9

Multivector and SIMD Computers: - Vector Processing Principles-Multivector Multiprocessors-Compound Vector Processing-SIMD Computer Organizations-The Connection Machine CM-5.

Scalable, Multithreaded, and Dataflow Architectures: - Latency –Hiding Techniques-Principles of Multithreading-Scalable and Multithreaded Architectures- Dataflow and Hybrid Architectures.

Unit 5 : 9

Instruction Level Parallelism:- Introduction-Basic Design Issues-Problem Definition-Model of a Typical Processor- Operand Forwarding-Reorder Buffer-Register Renaming-Tomasulo's Algorithm- Branch Prediction-Limitations in Exploiting Instruction Level Parallelism-Thread Level Parallelism. Trends in Parallel Systems: - Forms of Parallelism-Case Studies: AMD Opteron, Intel Pentium Processors.

Prescribed Text books:

1. Advanced Computer Architecture- by Kai Hwang & Jotwani, 3rd Edition, McGraw-Hill Publications.

Reference Text Books:

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1. Advanced Computer Architecture, D.Sima, T.Fountain, P.Kacsuk, Pearson Education.
2. Computer Architecture A quantitative approach 3rd edition John L.Hennessy & David A. Patterson, Morgan Kaufmann (An Imprint of Elsevier).
3. Computer Architecture and parallel processing by Hwang and Briggs.

Course Outcomes:

Student will be able to

Blooms Level of Learning

1. Calculate performance measures of different parallel computers. L1, L3
2. Find the difference between parallel computer with and without shared-memory organization. L3
3. Analyze Instruction Pipeline and message passing techniques. L4
4. Find out differences between properties of Data Flow Architectures and other types. L3
5. Know about design issues of a processor and the parallelism used in various advanced processors. L2

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A56ET.1	3	3	3	-	-	-	-	-	-	-	-	-	3	3	-
19A56ET.2	3	3	3	3	-	-	-	-	-	-	-	-	3	3	-
19A56ET.3	3	3	3	3	1	-	-	-	-	-	-	-	-	-	-
19A56ET.4	3	3	3	-	-	2	-	-	-	-	-	-	-	-	-
19A56ET.5	3	3	3	-	-	2	-	-	-	-	-	1	3	3	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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Title of the Course : High Performance Computing
Category : PE
Course Code : 19A56FT
Year : III B. Tech.
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will able to

- Understand the concepts of different computing techniques.
- Apply grid computing concepts to learn OGSA.
- Analyze the concepts of cluster computing.
- Analyze the setup and administration of cluster.
- Create high availability clusters.

Unit 1 : INTRODUCTION: 9

Introduction: Cluster and Grid computing, Meta computing, Web services and Grid Computing, e-Governance and the Grid

Technologies and Architectures for Grid Computing: Issues in Data Grids, Functional requirements in Grid Computing, Standards for Grid Computing, Recent technologies trends in Large Data Grids.

Web Services and the Service Oriented Architecture: Service Oriented Architecture, SOAP and WSDL, Creating Web Services, Server Side.

Unit 2 : OGSA 9

OGSA and WSRF: OGSA for Resource Distribution, Stateful Web Services in OGSA, WSRF, WSRF Specification

Globus Toolkit: History, version, Applications, Approaches and Benefits, Infrastructure Management, Monitoring and Discovery, Security, Data Choreography and Coordination, GT4 Architecture, GT4 Containers.

The Grid and Databases: Requirements, Storage Request Broker, Integration of Databases with the Grid, Architecture of OGSA-DAI for offering Grid Database services.

Unit 3 : CLUSTER COMPUTING AND CLUSTER MIDDLEWARE 9

Cluster Computing: Approaches to Parallel Computing, Definition and Architecture of a Cluster, Categories of clusters.

Cluster Middleware: Levels and Layers of Single System Image, Design objectives, Resource Management and Scheduling, Cluster programming Environment and Tools.

Unit 4 : CLUSTER NETWORKING AND SETTING UP CLUSTER 9

Networking, Protocols and I/O for clusters: Networking and Interconnection/Switching Devices, Design Issues, Design Architecture, HiPPI, ATM, Myrinet, Memory Channel

Setting Up and Administering a Cluster: Setup of simple cluster, setting up nodes, clusters of clusters, System monitoring, Global Clocks Sync.

Unit 5 : HIGH AVAILABILITY AND PROCESS SCHEDULING 9

Cluster Technology for High Availability: High availability clusters, high availability parallel computing, types of failures and errors, cluster architectures and configurations for high availability, Failure/Recovery clusters.
 Process Scheduling: Job management System, Resource management system, policies of resource utilization, Scheduling policies.

Prescribed Text Books:

1. Grid and Cluster Computing by C.S.R. Prabhu, PHI .

Reference Text books:

1. Fundamentals of Grid Computing: Theory, Algorithms and Technologies (Chapman & Hall/Crc Numerical Analysis and Scientific Computing) 1st Edition.
2. High Performance Cluster Computing - Vol. 1 Raj Kumar Buyya Pearson Publications.
3. High Performance Cluster Computing: Programming and Applications, Volume 2 Raj Kumar Buyya Prentice Hall Publications.

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|--|----|
| 1. Understand the basic concepts of different computing techniques. | L1 |
| 2. Apply grid computing concepts to learn OGSA platform. | L3 |
| 3. Analyze the concepts of cluster computing and cluster middleware. | L4 |
| 4. Analyze the setup and administration of cluster. | L4 |
| 5. Examine high availability clusters and process scheduling. | L4 |

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A56GT.1	3	-	-	-	-	-	-	-	-	-	3	-	-	-	3
19A56GT.2	3	3	3	-	3	-	3	-	-	-	3	3	3	-	3
19A56GT.3	3	3	3	-	3	-	3	-	-	-	-	3	3	-	3
19A56GT.4	3	3	-	-	3	-	-	-	-	-	3	3	3	3	3
19A56GT.5	3	3	3	-	3	-	3	-	-	-	-	3	3	3	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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Title of the Course : Software Testing Methodologies
Category : PE
Course Code : 19A56GT
Year : III B. Tech.
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will able to

- understand the fundamental concepts of software testing, including software testing objectives, the taxonomy of bugs
- analyze testing techniques such as path testing and transaction flow testing
- understand the concepts of data flow testing and its applications
- build the paths and decision tables for a software project
- apply the concepts of State Graphs, Transition Testing and Graph Testing

Unit 1 : INTRODUCTION: 9
Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs.

Unit 2 : FLOW GRAPHS AND PATH TESTING: 9
Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

Unit 3 : TRANSACTION FLOW TESTING & DOMAIN TESTING 9
Transaction flows, transaction flow testing techniques. Dataflow testing: Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing. DOMAIN TESTING: Domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing.

Unit 4 : PATHS, PATH PRODUCTS AND REGULAR EXPRESSIONS 9
Path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection. LOGIC BASED TESTING: Overview, decision tables, path expressions, kv charts, and specifications.

Unit 5 : STATE, STATE GRAPHS AND TRANSITION TESTING 9
State graphs, good & bad state graphs, state testing, GRAPH MATRICES AND APPLICATION
Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools.

Prescribed Text Books:

1. Baris Beizer, *Software testing techniques*. Dreamtech, 2nd Ed.

Reference Text books:

1. Dr.K.V.K.K.Prasad, *Software Testing Tools*. Dreamtech.
2. Brian Marick, *The craft of software testing*. Pearson Education.

Course Outcomes:

Student will be able to	Blooms Level of Learning
1. Understand the concepts of software testing and taxonomy of bugs.	L1
2. Construct control flow graphs for different programs.	L3
3. Apply data flow testing for software projects.	L4

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- | | |
|--|----|
| 4. Build paths and decision tables for various problems | L5 |
| 5. Analyze state graphs for different problems and apply transition testing on them. | L4 |

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A56GT.1	-	-	-	-	-	-	-	-	3	-	3	-	-	-	3
19A56GT.2	3	3	3	-	3	-	-	-	3	-	3	3	3	-	3
19A56GT.3	3	-	3	-	3	-	-	-	-	-	-	3	3	-	3
19A56GT.4	3	3	-	-	3	-	-	-	3	-	3	3	3	2	3
19A56GT.5	3	3	3	-	3	-	-	-	-	-	-	3	3	2	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Visual Programming
Category : PE
Course Code : 19A56HT
Year : III B. Tech.
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will able to

- Understand the basic concepts of Windows programming
- know about develop applications using Visual Basic Programming
- learn the basic of Visual C++ Programming
- know about the Design windows programming and applications

Unit 1 : *WINDOWS PROGRAMMING* 9

The windows programming Model – Event driven programming – GUI concepts – Overview of Windows programming – Creating and displaying the window – Message Loop – windows procedure – WM_PAINT message – WM_DESTROY message – Data types – Resources – An Introduction to GDI – Device context – Text output – Scroll Bars – Keyboard – Mouse – Menus

Unit 2 : *VISUAL BASIC PROGRAMMING* 9

Visual Basic Applications – Form and properties – Variables and Constants – Variant type – Procedure scope – Main – Control statements – control arrays – Creating and using Controls – Menus and Dialogs – Programming fundamentals – Objects and instances – Debugging – Responding to mouse events – Drag and Drag drop events Responding to keyboard events – keypress, keyup, keydown events – Using grid control – Graphics controls – shape and line control – File system controls – Common dialog controls – Processing files – Accessing databases with the data controls..

Unit 3: *VISUAL C++ PROGRAMMING* 9

Visual C++ components – Introduction to Microsoft Foundation Classes Library – Getting started with AppWizard – Class Wizard – Event handling – Keyboard and Mouse events - WM_SIZE, WM_CHAR messages Graphics Device Interface - Pen, Brush, Colors, Fonts - Single and Multiple document interface - Reading and Writing documents - Resources – Bitmaps creation, usage of BMP and displaying a file existing as a BMP.

Unit 4 : *CONTROLS* 9

Dialog Based Applications, controls – Animate control, image list, CRect tracker – Tree control – CtabControl Dynamic controls – slider control – progress control – Inheriting CTreeView – CRicheditView – Modal Dialog, Modeless Dialog – CColorDialog – CFileDialog.

Unit 5 : *ADVANCED CONCEPTS* 9

Domain Name System – Simple Status bars – Splitter windows and multiple views – Dynamic Link Library – Data base Management with ODBC – TCP/IP – Winsock and WinInet, – ActiveX control – creation and usage Container class.

Reference Text Books:

1. Steve Holzner, "Visual C++ 6 programming", Wiley Dreamtech India Private Ltd., 2003.
2. Kate Gregory "Using Visual C++", Prentice Hall of India Pvt., Ltd., 1999.
3. Deitel, " Visual Basic 6.0 How To Program", Pearson Education, 1999.

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Prescribed Text books:

1. Charles Petzold, "Windows Programming", Microsoft press, 1996.
2. J. David Kruglirski, "Programming Microsoft Visual C++", Fifth Edition, Microsoft press, 1998.
3. Marion Cottingham "Visual Basic", Peachpit Press, 1999.

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|--|-----------|
| 1. Understand the concepts of Windows programming | L1,L2, L3 |
| 2. Develop applications using Visual Basic Programming | L1,L2, L3 |
| 3. Understand the basic of Visual C++ Programming | L1,L2, L3 |
| 4. Design windows programming and Applications | L2, L3 |
| 5. Develop Web based controls | L3 |

CO-PO Mapping:

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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Title of the Course: Basic Civil Engineering
Category : OE
Course Code : 19A16GT
Year : III B.Tech
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives:

- To give an understanding to the students of the vast breadth and numerous areas of engagement available in the overall field of Civil Engineering.
- To motivate the student to pursue a career in one of the many areas of Civil Engineering with deep interest and keenness.
- To expose the students to the various avenues available for doing creative and innovative work in this field by showcasing the many monuments and inspiring projects of public utility.

Unit 1 : (8hrs)

Basic Understanding: What is Civil Engineering/ Infrastructure? Basics of Engineering and Civil Engineering; Broad disciplines of Civil Engineering; Importance of Civil Engineering, Possible scopes for a career.

History of Civil engineering: Early constructions and developments over time; Ancient monuments & Modern marvels; Development of various materials of construction and methods of construction; Works of Eminent civil engineers

Unit 2 : (10hrs)

Overview of National Planning for Construction and Infrastructure Development; Position of construction industry vis-à-vis other industries, five year plan outlays for construction; current budgets for infrastructure works;

Fundamentals of Building Materials: Stones, bricks, mortars, Plain, Reinforced & Prestressed Concrete, Construction Chemicals; Structural Steel, High Tensile Steel, Carbon Composites; Plastics in Construction; 3D printing; Recycling of Construction & Demolition wastes.

Unit 3 : (10hrs)

Environmental Engineering & Sustainability: Water treatment systems; Effluent treatment systems; Solid waste management; Sustainability in Construction;

Geotechnical Engineering: Basics of soil mechanics, rock mechanics and geology; various types of foundations; basics of rock mechanics & tunnelling.

Unit 4 : (8hrs)

Hydraulics & Water Resources Engineering: Fundamentals of fluid flow, basics of water supply systems; Underground Structures; Underground Structures Multi-purpose reservoir projects.

Surveying & Geomatics: Traditional surveying techniques, Total Stations, Development of Digital Terrain Models; GPS, LIDAR;

Unit 5 : (8hrs)

Computational Methods, IT, IoT in Civil Engineering: Typical software used in Civil Engineering- Finite Element Method, Computational Fluid Dynamics; Computational Geotechnical Methods; highway design (MX), Building Information Modelling; Highlighting typical available software systems (STAAD, ETAB & AUTOCAD)

Prescribed Text Books:

1. Chudley, R., Greeno (2006), 'Building Construction Handbook' (6th ed.), R. Butterworth-Heinemann
2. Hydraulics and Fluid Mechanics, P M Modi and S M Seth, Standard Book House
3. Madhu, N, Sathikumar, R and Satheesh Gobi, Advanced Surveying: Total Station, GIS and Remote Sensing,

Department of Computer Science and Engineering

Pearson India, 2006.

4. Geotechnical Engineering: Principles and Practices of Soil Mechanics and Foundation Engineering (Civil and Environmental Engineering) by V.N.S. Murthy
5. Building Planning & Drawing by Dr N. Kumaraswamy and A.Kameswara Rao, Charitor Publications
6. Manoj, K. Arora and Badjatia, Geomatics Engineering, Nem Chand & Bros, 2011.

Reference Text books:

1. Various related updated & recent standards of BIS, IRC, ASTM, RILEM, AASHTO, etc.corresponding to materialsused for Civil Engineering applications
2. An Introduction to Geotechnical Engineering, by Holtz R.D. and Kovacs, W.D., Prentice Hall, NJ
3. K Subramanya, Water Resources Engineering through Objective Questions, Tata Mc-Graw Hill.
4. Introduction to Environmental Engineering and Science by Gilbert Masters, Prentice Hall, New Jersey.

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|---|----|
| 1. Identifying the various areas available to pursue and specialize within the overall field of Civil Engineering. | L3 |
| 2. Showcasing the many monuments, heritage structures, nationally important infrastructure, and impressive projects to serve as sources of inspiration. | L1 |
| 3. Highlighting the depth of engagement possible within each of these areas. | L3 |
| 4. Providing a foundation for the student to launch off upon an inspired academic pursuit into this branch of engineering. | L3 |

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A16GT.1						3			2			1	1	2	
19A16GT.2						3			2			1	1	2	
19A16GT.3						3			2			1	1	2	
19A16GT.4						3			2			1	1	2	

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course: Water Resources and Conservation
Category : OE
Course Code : 19A16HT
Year : III B.Tech
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives:

- To impart knowledge about the planning and management of water resources.
- To introduce the concepts of watershed management, integrated water resources management, environmental interaction of water resources and policies/framework related to water resources.
- To enable the students to understand the different components of water resources and water conservation techniques.

Unit 1 : (8hrs)

Historical profile on world water resources development; Global water resources, Hydrologic cycle, Watershed zoning, Interrelation of water resources with other natural resources and the environment, Water quantity and water budget, Water allocation and water scheduling; Water resources availability and demand.

Unit 2 : (10hrs)

Hydrologic Processes – evaporation, transpiration and precipitation; Water quality parameters, Water pollution – causes, effects and measures; Rainfall-Runoff analysis, Floods measurement, frequency analysis, design of peak flood and routing, Reservoir operation and design.

Unit 3 : (10hrs)

Water resource planning – concept, preliminary study, feasibility study, detailed planning, Design of water distribution system, Irrigation scheduling and techniques;

Water use sectors – Domestic, Industries and Agriculture, Sustainable water resources development, Integrated Water Resources Management (IWRM), Socio-economic aspects of water resources management, Rainwater Harvesting Watershed management.

Unit 4 : (9hrs)

Global Efforts on Water conservation, Think Globally Act Locally on water resources, Local water organizations, National Water Policy, World water organizations - WUGs, WUAs, UN, WWP, WWC, etc. Environmental discourse on dam Construction.

Unit 5 : (8hrs)

Water conservation Techniques: Protection of Water from Pollution, Redistribution of Water, Rational Use of Groundwater, Renovation of Traditional Water Sources, Use of Modern Irrigation Methods, Increasing Forest Cover, Change in Crop Pattern, Flood Management, Conserving Water in Industries, Conservation of water by Municipal authorities, Use rainwater effectively, Make effective use of soil water reserves, Take measures to avoid run off, Avoid wasting water through evaporation, Reduce water losses through drainage, Plan your irrigation, Contour Farming & Contour Ploughing

Prescribed Text Books:

1. Global Water Partnership (GWP), Integrated Water Resources Management, Background Papers No. 4, Technical Advisory Committee (TAC)..
2. Water Resources Systems Planning and Management, Vol. 51 by Jain, S.K. and V.P. Singh, Elsevier Science
3. Hierarchical Analyses of Water Resources Systems: Modeling and Optimization of Large scale systems by Haiman, McGraw-Hill, New York.
4. Water Resources Systems Planning and Management by Loucks D.P. and van Beek E., UNESCO Publishing,

Department of Computer Science and Engineering

The Netherlands.

Reference Text books:

1. Water Resources Systems Planning and Analysis by Loucks, D.P., J.R. Stedinger, and D.A. Haith, Prentice-Hall, N.J.
2. Hydrosystems Engineering and Management by Mays, L.W. and K. Tung, McGraw-Hill Inc., New York.

Course Outcomes:

Student will be able to	Blooms Level of Learning
1. Identify different problems related to water resources planning, management and development.	L3
2. Describe problems like water balance, rainfall-runoff analysis, water distribution networks, flood routing, irrigation scheduling, water pollution and other water related concerns	L2
3. Apply principles and guidelines to solve above mentioned problems.	L4
4. Understand different water conservation techniques, in order to save water for future	L2

CO-PO Mapping:

OE	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A16HT.1						2	3		2				1		3
19A16HT.2						2	3		2				1		3
19A16HT.3						2	3		2				1		3
19A16HT.4						2	3		2						3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course	Energy Management and Conservation
Category	OE2
Course Code	19A26GT
Year	III B.Tech
Semester	II Semester (Common to CE, ME & CSE)

Lecture Hours	Tutorial Hours	Practical	Credits
3	-	-	3

Course objective:

- To impart basic knowledge to the students about current energy scenario, energy conservation and management.
- To inculcate among the students systematic knowledge and skill about assessing the energy efficiency and energy management.

Unit-I Principles of energy management –

Organizing an energy management program – Initiating and managing an energy management program - Planning - Leading – Controlling – Promoting – Monitoring and reporting.

Unit-II Electrical energy management –

Energy efficient motors – Power factor improvement – Lighting and lighting system control – Energy saving opportunities.

Qualities and functions of energy managers – Qualities and functions of an energy manager – questionnaire - Check list for top management.

Unit-III Energy Scenario

6

Commercial and Non-commercial energy, primary energy resources, commercial energy production, final energy consumption, energy needs of growing economy, long term energy scenario, energy sector reforms, energy and environment, energy conservation and its importance, energy efficiency and its need, restructuring of the energy supply sector, energy strategy for the future, air pollution, climate change.

Unit-IV Energy Conservation:

Principles of Energy Conservation. Energy Conservation Act 2001 and its feature, Electricity Act -2003 and features, The Energy Conservation (Amendment)Act,2010 and its importance. Prominent organizations at Centre and state level responsible for its implementation. Energy Consumption pattern, Resource availability, Energy pricing, Energy Security.

Unit-V Basics of Energy, pricing and its uses in buildings

Electricity tariff, load management and maximum demand control, power factor Improvement, selection & location of capacitors.

Estimation of Energy use in buildings: Estimation of Energy use in a building, Heat gain and Thermal Performance of building envelope- steady and Non-Steady heat transfer through the glazed window and the wall-standard for thermal performance of building envelope, Evaluation of the overall Thermal Transfer.

Text Books :

1. "Energy Management" - W.R.Murphy&G.MckeyButterworths.
2. "Energy Management Hand Book" - W.C.Turner, John Wiley and Sons.
3. "Energy Management Principles" – Craig B Smith – Pergamon press

4. "Energy Conservation" - Paul O'Callaghan - Pergamon press.
5. S.C. Tripathy, "Utilization of Electrical Energy and Conservation", McGraw Hill, 1991

Course Outcomes:

Student will be able to	Blooms Level of Learning
1.To understand the Principles and organization of energy management	L2 &L4
2.To acquaintance with electrical energy management like energy saving opportunities and Power factor improvement.	L3
3.Analyze the current energy scenario and its importance in energy conservation	L4
4.Understand the concepts of Energy conservation and its features.	L2
5.Understand the estimation of Energy use in buildings.	L2

COs-POs-PSOs Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19A26GT.1	3	3	-	-	-	2	3	-	-	-	-	3
19A26GT.2	3	3	-	-	-	3	3	-	-	-	-	3
19A26GT.3	3	3	-	-	-	2	2	2	-	-	-	3
19A26GT.4	3	3	-	-	-	2	2	2	-	-	-	2
19A26GT.5	3	3	-	-	-	2	2	2	-	-	-	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES RAJAMPET
(AN AUTONOMOUS INSTITUTION)

Title of the course : Fuzzy Logic and Neural Network
Category : OE
Course code : 19A26HT
Year : III B.Tech
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical Hours	Credits
3	-	-	3

Course Objectives

- To understand the fundamental concepts of Artificial Neural network
- To Understand the concepts of different types Neural network architectures and training algorithms
- To understand the concepts of classical sets Fuzzy sets
- To understand the concepts Fuzzy logic controllers
- To gain knowledge in neuro- fuzzy control and its applications in power systems

Unit 1: Introduction to Artificial Neural Networks 12

Introduction, Biological Neuron, Biological Artificial Neuron model , Integrate-and-Fire Neuron Model, Spiking Neuron Model, Characteristics of neural networks , Historical developments, Neural network architectures, McCulloch-Pitts Model, Types of neuron activation functions, Learning methods(supervised, unsupervised, Reinforcement), Applications of Neural Networks.

Unit-2: Single layer and multi layer feed forward neural networks 12

Perceptron Models: Discrete, Continuous (concepts only), Perceptron Convergence theorem, Limitations of the Perceptron Model, Applications, ADALINE, MADALINE, Back Propagation Network, BP Learning Rule, Input Layer, Hidden Layer and output Layer computations, Radial Basis function network, Hetero associative memory neural and Auto associative memory net, applications.

Unit-3 Classical and Fuzzy sets 08

Introduction to classical sets, Fuzzy sets – Properties, Operations and Relations, Membership, Uncertainty, Fuzzy Relations, Cardinalities and Membership Functions.

Unit-4 Fuzzy Logic system and components 10

Fuzzification, Membership Value assignment, Development of Rule Base, Defuzzification to crisp sets, Defuzzification methods

Unit 5 Neural network and fuzzy logic applications to Power system 10

ANN Based Short Term Load Forecasting, Load Flow Studies, Fault diagnosis and Fuzzy Logic based Unit Commitment and load frequency control.

Text Books:

1. S.N.Sivanadam, S.N.Deepa *Principles of Soft Computing Techniques* , Wiley India publication.
2. JacekM.Zurada *Introduction to Artificial Neural Systems*, Jaico Publishing House, 1997.

Reference Books:

1. N. Yadaiah and S. BapiRaju, *Neural and Fuzzy Systems: Foundation, Architectures and Applications*, Pearson Education
2. James A Freeman and Davis S kapura, *Neural Networks* ,Pearson, 2002
3. Brok Kosko, *Neural Networks and Fuzzy Logic System* , , PHI Publications
4. Rajasekharan and Rai, *Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications* -

PHI Publication.

Course Outcomes: By the end of this course, students will be able to

1. Able to analyze and form Neural Networks For Different Problems
2. Able to Get the knowledge of Different Types of Neural Networks
3. Understand fuzzy concepts and fuzzy logic components
4. Able to apply Neural Networks for Electrical Systems.
5. Able to apply Fuzzy Logic for Electrical Systems

COs-POs-PSOs Mapping

Course Outcomes	Program Outcomes												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
19A26HT .1	1	1	1	1	1	-	-	-	1	1	1	1	1	1
19A26HT .2	2	3	2	2	3	-	-	-	2	2	2	2	2	2
19A26HT .3	-	2	-	-	-	-	-	-	-	-	2	-	-	2
19A26HT .4	-	-	-	3	-	-	-	-	-	-	-	3	-	2
19A26HT .5	2	3	2	2	2	-	-	-	2	2	2	2	2	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Introduction to Mechatronics
Category : OEC
Course Code : 19A36ET
Year : III Year
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	-	0	3

Course Objectives: This course will

- Familiarize the technologies behind modern mechatronic systems.
- Explain fundamentals for the development of fully automated system.
- Develop a robotic or automated systems focusing on the hardware and software integration.
- Demonstrate the development of mechatronic system and MEMS.

Unit 1 Introduction 09

Definition of Mechatronics, Need for Mechatronics in Industry, Objectives of mechatronics, mechatronics design process, Mechatronics key elements, mechatronics applications–Computer numerical control(CNC) machines, Tool monitoring systems, Flexible manufacturing system(FMS), Industrial Robots, Automatic packaging systems, Automatic inspection systems.

Unit 2 : Signal Conditioning 09

Introduction, hardware digital I/O, analog input – ADC resolution, speed channels filtering noise using passive components – resistors, capacitors – amplifying signals using OP amps – software – digital signal processing – low pass, high pass, notch filtering.

Unit 3 Sensors & Actuators 09

Sensors: Static characteristics & sensors, displacement, position and proximity sensors. Force and torque sensors, pressure sensors, flow sensors, temperature sensors, acceleration sensors, level sensors, selection criteria for sensors.

Actuators: Mechanical, electrical, hydraulic & pneumatic actuation systems characteristics and their limitations. Design of hydraulic & pneumatic circuits.

Unit 4 Microprocessors, Micro controllers and Programmable Logic Controllers 09

Architecture of of Microprocessor, Micro controller and Programmable Logic Controller, PLC Programming using ladder diagrams, logics, latching, sequencing, timers relays and counters, data handling, Analog input/output, selection of controllers.

Unit 5 Micro Electro Mechanical Systems(MEMS) 09

History, Effect of scaling, Fabrication Techniques: Oxidation, Physical Vapor disposition, Chemical Vapor Deposition, Lithography, Etching, Wafer bonding, LIGA, DRIE, and Applications: Labon chip.

Prescribed Text Books:

1. Mechatronics Electronics Control Systems in Mechanical and Electrical Engineering, WBolton, 3/e Pearson Education Press, 2018. ISBN: 9781292250977
2. Devadas Shetty and Richard A Kolk, Mechatronic System Design, 2/e, Cengage learning, 2010. ISBN: ISBN-13 : 978-1439061985
3. Clarence W. de Silva, Mechatronics an Integrated Approach, CRC Press, 2005. ISBN: 0203611640, 9780203611647

Reference Books:

1. James J Allen, Micro Electro Mechanical Systems Design, CRC Press, Taylor & Francis group, 2005. ISBN-10 : 9780824758240
2. Ganesh S Hedge, Mechatronics, Jones & Bartlett Learning, 2010. ISBN, 1934015296, 9781934015299

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|---|----|
| 1. Explain to role of mechatronics in industry and applications of mechatronics in automation industry. | L3 |
| 2. Understand signal conditioning and its application. | L4 |
| 3. Know the different types of sensors and actuators in industry. | L4 |
| 4. Understand the architecture of microprocessors, microcontrollers and PLC | L1 |
| 5. Illustrate the application of MEMS in industry. | L1 |

CO-PO Mapping:

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Fundamentals of Robotics
Category : OEC
Course Code : 19A36FT
Year : III Year
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	-	-	3

Course Objectives:

- To acquire the knowledge on Robotics and its performance
- To develop the ability of kinematics and dynamics of Robots
- To acquire the knowledge on trajectory planning and manipulator
- To develop the ability on various sensor integration on robot
- To develop the ability to use the programming and tools for operation of robot

Unit 1 Introduction to Robotics 11
Types and components of a robot, Classification of robots - Robotics, Robots-Anatomy, Structure and classification, Robot performance parameters – resolution, accuracy and repeatability, Arm and wrist configuration - Social issues and safety

Unit 2 Robot Kinematics and Dynamics 11
Description of links and joints, Kinematic modeling of manipulator, Translation and Rotation Representation, Coordinate transformation, Denavit - Hartenberg (DH) notation, Examples of DH notation, Jacobian, Singularity, and Statics.

Unit 3 Trajectory Planning and Manipulator 08
Control Terminology, Steps in trajectory planning, Joint space techniques, path description, Use of polynomials as interpolating function, various trajectories, Introduction to Cartesian space techniques.

Unit 4 End effectors, sensors and vision system 08
Tools as end effectors, Robot Grippers - Types of Grippers, Design aspect for gripper, Force analysis for various basic gripper system. Sensors for Robots - Characteristics of sensing devices, Classification, applications and selection of sensors. Robotic vision system, image acquisition, spatial and amplitude digitization, image processing and analysis.

Unit 5 Robot programming and applications 10
Robot applications in material handling, machine loading/unloading, assembly, inspection and processing. Robot Programming – Methods, Lead through methods, Robot Programming-Language overview, commands for elementary operations

Prescribed Text Books:

1. Saha, S.K., "Introduction to Robotics, 2nd Edition, McGraw-Hill Higher Education, New Delhi, 2014. , ISBN - 0070140014
2. Ghosal, A., "Robotics", Oxford, New Delhi, 2006. ISBN - 9780195673913
3. Niku Saeed B., "Introduction to Robotics: Analysis, Systems, Applications", PHI, New Delhi. 2001. ISBN - 0130613096

Reference Books:

1. Tsuneo Yoshikawa, Foundations of Robotics, MIT Press. Roy. 2010. ISBN - 0262514583
2. Mittal R.K. and Nagrath I.J., "Robotics and Control", Tata McGraw Hill. 2017, ISBN - 9780070482937
3. Mukherjee S., "Robotics and Automation", Khanna Publishing House, Delhi. 2017. 2017, ISBN - 9386173751

Course Outcomes:

Student will be able to

Blooms Level of Learning

1. Understand the concept of Robots, Structure and its specifications.
2. Solve robot forward and inverse kinematic problems.
3. Carry out trajectory planning and joint modeling for the simple robotic system.
4. Identify appropriate end effectors and sensors for particular application
5. Execute various steps robot programming and Knowledge will be gained on application of Robotics used in various sectors.

L2
L5
L4
L4
L4

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A36FT.1	3	3	3	-	-	3	3	3	-	-	-	-	-	-	-
19A36FT.2	2	2	2	-	-	2	-	2	-	-	-	-	-	-	-
19A36FT.3	1	1	1	-	-	-	-	1	-	-	-	-	-	-	-
19A36FT.4	1	1	1	-	-	-	-	1	-	-	-	-	-	-	-
19A36FT.5	2	-	2	-	-	2	-	2	-	2	-	-	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Non-conventional sources of energy
Category : OEC
Course Code : 19A36GT
Year : III Year
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	-	0	3

Course Objectives:

- To grasp the role and potential of new and renewable source
- To recognize the principle, storage and applications of solar energy
- To understand the sources and potentials of wind energy and also to comprehend the Principles of Bio-Conversion of bio-mass and bio-gas uses.
- To explain the principle, working procedure and types of geothermal energy, ocean energy and tidal & wave energy.
- To know the knowledge on direct energy conversion.

Unit 1 Principles Of Solar Radiation 09

Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on tilted surface, instruments for measuring solar radiation , potential in India

Unit 2 Solar Energy Collectors 09

Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors. Solar Energy Storage And Applications: Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion, potential in India.

Unit 3 Wind Energy 08

Sources and potential in India, horizontal and vertical axis wind mills, 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, and economic aspects, potential in India

Unit 4 Geothermal Energy 08

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, potential in India.

Unit 5 Direct Energy Conversion 09

Need for DEC, Carnot cycle, limitations, principles of DEC. Thermo-electric generators, Seebeck, Peltier and Joule Thomson effects, 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

Prescribed Text Books:

1. Tiwari and MK.Ghosal, Renewable energy resources: Basic principles and applications, Narosa publications 2005, ISBN 10: 1842651250 ISBN 13: 9781842651254
2. G.D. Rai, Non-Conventional Energy Sources, khanna publications, 2011, ISBN 10: 8174090738, ISBN 13: 9788174090737

Reference Books:

1. Twidell & Weir, Renewable Energy Sources, Routledge , 3rd Ed.2015,ISBN 9780367200756
2. Non Conventional Energy Resources, B.H.Khan, McGrawHill, 2015, ISBN 1259081397, 9781259081392

Course Outcomes:

Student will be able to	Blooms Level of Learning
1. Create awareness on role and potential of new and renewable source and basics of solar energy.	L2
2. acquire the knowledge on different types of collectors and storage systems of solar energy and their applications.	L2
3. Able to achieve sufficient knowledge on Wind energy and Bio-mass energy.	L2
4. Familiarize the student with the Geothermal and Ocean energy concepts and their potentiality	L2
5. Gain the knowledge on direct energy conversion	L2

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A37ET.1	3	2	-	-	-	3	3	-	-	-	-	3	-	-	-
19A37ET.2	3	3	-	1	3	3	-	-	-	-	-	3	-	-	-
19A37ET.3	3	2	3	-	-	3	3	-	-	-	-	3	-	-	-
19A37ET.4	3	3	-	-	3	3	-	-	-	-	-	3	-	-	-
19A37ET.5	3	3	-	-	3	3	-	-	-	-	-	3	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Electronic Circuits and its Applications
Category : OE
Course Code : 19A46GT
Year : III B.Tech
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: The course aims to provide the student with the ability

- To analyze and design the transistor and feedback amplifiers.
- To understand and analyze the concepts of oscillators, linear and nonlinear wave shaping circuits.

Unit 1 : SMALL SIGNAL ANALYSIS OF AMPLIFIERS 14

Introduction to h-parameter model, Small Signal model of BJT, Analysis of CB, CE and CC configurations using h-parameters – simplified hybrid model – miller's theorem – dual of miller's theorem. Analysis of Cascaded Transistor Amplifiers- RC Coupled amplifier, Frequency response of RC Coupled, Direct coupled and Transformer coupled amplifiers.

Unit 2 : FEEDBACK AMPLIFIERS 14

Concept of Feedback, Classification of feedback amplifiers, Transfer Gain with feedback, General characteristics of negative feedback amplifiers. Voltage series, voltage shunt, current series, and current shunt feedback amplifiers with discrete components (Topologies).

Unit 3 : OSCILLATORS 10

Condition for oscillations. Oscillator Types, Frequency and amplitude stability of oscillators, LC oscillators- Hartley and Colpitts oscillators, RC-phase shift and Wien bridge oscillators, Crystal Oscillators

Unit 4 : LARGE SIGNAL AMPLIFIERS 9

Classifications, Class A power Amplifiers- Direct coupled and Transformer Coupled, Class B power Amplifiers- Push-pull and Complementary Symmetry-Transistor power dissipation, Power and Efficiency calculations.

Unit 5 : LINEAR AND NON LINEAR WAVE SHAPING 12

High pass & low pass RC circuits, their response for sinusoidal, step, pulse, square, ramp and Exponential inputs. Diode and Transistor clippers and clampers, clamping circuit theorem.

Prescribed Text Books:

1. J. Millman and Christos C. Halkias- "Integrated Electronics", Mc Graw-Hill, 1972.
2. Robert T. Paynter- "Introductory Electronic Devices and Circuits", Pearson Education, 7th Edition.
3. J. Millman and H. Taub, "Pulse, Digital and Switching Waveforms", McGraw-Hill, second edition, 2007.

Reference Text books:

1. Robert L. Boylestad and Louis Nashelsky - "Electronic Devices and Circuits Theory", Pearson/Prentice Hall, 9th Edition, 2006.
2. Donald A. Neumann- "Electronic Circuit Analysis and Design", Mc Graw Hill.
3. Anand Kumar, "Pulse and Digital Circuits", PHI, 2005. Second Edition.

Department of Computer Science and Engineering

Course Outcomes:

Upon completion of the course, student can

Blooms Level of Learning

1. Analyze the single stage amplifiers using h-parameter model at low frequencies. L4
2. Understand the feedback amplifiers and oscillators. L2
3. Analyze the concepts of large signal amplifiers. L4
4. Design and analyze linear and nonlinear wave shaping circuits. L6

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A46GT.1	3	3	2	3	3	1	-	-	2	-	-	-	2	3	-
19A46GT.2	1	3	3	2	2	-	-	-	2	-	-	-	3	-	-
19A46GT.3	3	3	3	2	2	1	-	-	2	-	-	-	2	3	-
19A46GT.4	2	2	2	-	-	-	-	-	2	-	-	-	2	3	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : BASICS OF COMMUNICATION SYSTEMS
Category : OE
Course Code : 19A46HT
Year : III B.Tech
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will able to

- Design simple systems for generating and demodulating AM, DSB, SSB and VSB signals.
- Understand the concepts in Angle modulation for the design of communication systems.
- Design simple systems for generating and demodulating frequency modulated signals.
- Learn the concepts of random process and various types of noise.
- Analyze pulse modulation and sampling techniques.

Unit 1 : AMPLITUDE MODULATION 10

AMPLITUDE MODULATION: Introduction, Amplitude Modulation: Time & Frequency – Domain description, Switching modulator, Envelop detector. DOUBLE SIDE BAND-SUPPRESSED CARRIER MODULATION: Time and Frequency – Domain description, Ring modulator, Coherent detection, Costas Receiver, Quadrature Carrier Multiplexing.

SINGLE SIDE-BAND AND VESTIGIAL SIDEBAND METHODS OF MODULATION: SSB Modulation, VSB Modulation, Frequency Translation, Frequency- Division Multiplexing, Theme Example: VSB Transmission of Analog and Digital Television

Unit 2 : ANGLE MODULATION 10

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-Locked Loop: Nonlinear model of PLL, Linear model of PLL, Nonlinear Effects in FM Systems. The Super heterodyne Receiver

Unit 3 : RANDOM VARIABLES & PROCESS 10

RANDOM VARIABLES & PROCESS: Introduction, Probability, Conditional Probability, Random variables, Several Random Variables. Statistical Averages: Function of a random variable, Moments, Random Processes, Mean, Correlation and Covariance function: Properties of autocorrelation function, Cross-correlation functions.

NOISE: Shot Noise, Thermal noise, White Noise, Noise Equivalent Bandwidth

Unit 4 : NOISE IN ANALOG MODULATION 10

NOISE IN ANALOG MODULATION: Introduction, Receiver Model, Noise in DSB-SC receivers, Noise in AM receivers, Threshold effect, Noise in FM receivers, Capture effect, FM threshold effect, FM threshold reduction, Pre-emphasis and De-emphasis in FM

Unit 5 : DIGITAL REPRESENTATION OF ANALOG SIGNALS 10

DIGITAL REPRESENTATION OF ANALOG SIGNALS: Introduction, Why Digitize Analog Sources?, The Sampling process, Pulse Amplitude Modulation, Time Division Multiplexing, Pulse-Position Modulation, Generation of PPM Waves, Detection of PPM Waves, The Quantization Process, Quantization Noise, Pulse-Code Modulation: Sampling, Quantization, Encoding, Regeneration, Decoding, Filtering, Multiplexing , Application to Vocoder

Department of Computer Science and Engineering

Prescribed Text Books:

1.Communication Systems, Simon Haykins & Moher, 5th Edition, John Willey, India Pvt. Ltd, 2010,

Reference Text books:

- 1.Modern Digital and Analog Communication Systems, B. P. Lathi, Oxford University Press., 4th edition.
2. An Introduction to Analog and Digital Communication, Simon Haykins, John Wiley India Pvt. Ltd., 2008,
3. Principles of Communication Systems, H.Taub & D.L.Schilling, TMH, 2011.
4. Communication Systems, Harold P.E, Stern Samy and A.Mahmond, Pearson Edition, 2004.
5. Communication Systems: Analog and Digital, R.P.Singh and S.Sapre: TMH 2nd edition, 2007.

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|---|----|
| 1. Determine the performance of analog modulation schemes in time and frequency domains. | L4 |
| 2. Determine the performance of systems for generation and detection of modulated analog signals. | L4 |
| 3. Characterize analog signals in time domain as random processes and in frequency domain using Fourier transforms. | L3 |
| 4. Characterize the influence of channel on analog modulated signals | L3 |
| 5. Understand the characteristics of pulse amplitude modulation, pulse position modulation and pulse code modulation systems. | L2 |

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
19A46HT.1	3	1	-	-	-	1	-	-	-	3	-	2	3	2
19A46HT.2	3	3	1	-	-	1	-	-	-	2	-	2	3	2
19A46HT.3	2	3	-	1	-	2	-	-	-	2	-	2	3	2
19A46HT.4	2	1	3	-	-	2	-	-	-	2	-	2	3	2
19A46HT.5	3	3	1	-	-	1	-	-	-	2	-	2	3	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Microprocessor & Interfacing and Compiler Design Lab
Category : ES
Course Code : 19A461L
Year : III B. Tech.
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
0	0	3	1.5

MICROPROCESSOR & INTERFACING LAB

Course Objectives: This course will able

- To learn Assembly Language programming.
- To understand programmable peripheral devices and their Interfacing.

Experiment No. 1 :- Arithmetic operations.

Experiment No. 2 :- Signed Arithmetic operations.

Experiment No. 3 :- ASCII – Arithmetic operations.

Experiment No. 4 :- Identify the parity (even/Odd) of a given byte/word.

Experiment No. 5 :- String Operations

- Relocate a string of N words/bytes.
- Reverse String.
- Length of the String
- String Insertion
- String Deletion
- Scanning a byte/ word.

Experiment No. 6 :- Interfacing with 8255 PPI

- DAC Interfacing:
 - PWM generation in BSR mode
 - Triangular, sinusoidal and square wave generation in I/O mode.
- Stepper Motor Interfacing: Rotation in Clock wise and Anti-clock wise direction.

Course Outcomes:

Student will be

- | | |
|---|--------------------------------|
| 1. Able to write Assembly Language programs. | Blooms Level of Learning
L6 |
| 2. Able to understand the operations and applications of microprocessors | L2 |
| 3. Able to understand programmable peripheral devices and their Interfacing | L2 |

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A461L.1	3	-	-	-	2	2	-	-	1	-	-	-	1	-	-
19A451L.2	2	3	-	-	3	-	-	-	-	-	-	-	1	-	-
19A451L.3	3	-	-	-	-	-	-	-	-	-	-	1	1	-	1

Compiler Design Lab

Course Objectives: This course will able to

- Explain the importance of compiler design.
- Design and implementation of lexical analyzer using Lex tools.
- Design compiler components.
- Enlighten the student with knowledge base in compiler design and its applications.

Week1 :

Construct a Lexical Analyzer for validating identifiers, operators, comments, looping statements, key words.

Week2 :

Write a program to compute FIRST and FOLLOW sets.

Week3:

Write a program to construct a Recursive Parser.

Week4:

Write a program to construct a Recursive Descent Parser.

Week5:

Write a program to remove left factoring.

Week6:

Write a program to remove left recursion

Text Books:

1. Principles of compiler design -A.V. Aho. J.D.Ullman; Pearson Education.
2. Lex&yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly.

Course Outcomes:

Student will be able to

Blooms Level of Learning

1. Understand and define the role of lexical analyzer, use of regular expression and transition diagrams. L1, L3
2. Understand and use Context free grammar, and parse tree construction. L1, L3
3. Develop program for solving parser problems. L3

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A461L.1	-	-	3	-	3	-	-	-	-	3	3	-	3	-	-
19A461L.2	-	-	3	-	3	-	-	-	3	3	3	-	3	3	3
19A461L.3	-	-	3	-	3	-	-	-	3	-	3	3	3	-	3
19A461L.4	-	-	3	-	3	-	-	-	3	-	-	3	3	3	3
19A461L.5	-	-	3	-	3	-	-	-	-	3	-	3	3	3	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Mobile Application Development Lab
Category : PC
Course Code : 19A563L
Year : III B. Tech.
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
0	0	2	1

Course Objectives: This course will able to

- Understand develop Applications in android environment
- Develop user interface applications
- Develop data persistence, messaging, location based services.

Week1 :

Step by step installation of Android studio and understanding the development environment

Week2 :

- a) Create an Android application that shows Hello + name of the user and run it on an emulator.
- b) Create an application that takes the name from a text box and shows helloMessage along with the name entered in text box, when the user clicks the OK button.

Week3:

Create an application that has as button, when the user clicks the button it should display second activity which has edit text and an OK button. When user writes something on the edit text and clicks the OK button it should go back to first activity and display content of edit text in the form of toast.

Week4:

Create a screen that has input boxes for User Name, Password, and Address, Gender (radio buttons for male and female), Age (numeric), Date of Birth (Date Picket), State (Spinner) and a submit button. On clicking the submit button, print all the data below the Submit Button. Use (a) Linear Layout (b) Relative Layout and (c) Grid Layout or Table Layout.

Week5:

Develop an application that shows names as a list and on selecting a name it should show the details of the candidate on the next screen with a "Back" button. If the screen is rotated to landscape mode (width greater than height), then the screen should show list on left fragment and details on right fragment instead of second screen with back button. Use Fragment transactions and Rotation event listener.

Week6:

Develop an application that uses a menu with 3 options for dialing a number, opening a website and to send an SMS. On selecting an option, the appropriate action should be invoked using intents.

Week7:

Develop an application that inserts some notifications into Notification area

Week8:

Create an application to display images in gallery and Image Views.

Create an application to display analog and digital clock.

Week9:

Create an application that saves user information like name, age, gender etc. in shared preference and retrieves them when the program restarts.

Week10:

- a) Create an application that illustrates SMS messaging
- b) Create an application that illustrates sending E-mail.

Week11:

Develop an application that shows the current location's latitude and longitude continuously as the device is moving (tracking)

Prescribed Text Books:

1. Beginning Android programming with android studio 4th edition, J. F. DiMarzio, Published by John Wiley & Sons, Inc.

Reference Text Books:

1. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox), 2012

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|---|--------|
| 1. acquire practical knowledge on Android programming | L1, L2 |
| 2. Understand the implementation aspects of user interfaces. | L3 |
| 3. Apply of image view and persistent data services. | L4 |
| 4. Implement the messaging services in applications | L5 |
| 5. Deploy and implement the location based services in their applications | L5, L6 |

CO-PO Mapping:

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course Professional Communication Skills Lab
Category BS
Course Code 19AC62L
Year III B. Tech.
Semester II Semester
Branch CE, ME, CSE

Lecture Hours

-

Tutorial Hours

-

Practical

3

Credits

1.5

Résumé Preparation – structure, formats and styles – planning - defining career objective - projecting one's strengths and skills - creative self-marketing–sample resumes - cover letter

Interview Skills- concept and process - pre-interview planning – preparation - body language - answering strategies – frequently asked questions

Group Discussion –communicating views and opinions – discussing – intervening – agreeing and disagreeing –asking for and giving clarification - substantiating - providing solution on any given topic across a cross-section of individuals - modulation of voice and clarity - body language – case study

Oral Presentations (Individual& Team) – collection of data from various sources –planning, preparation and practice – attention-gathering strategies - transitions – handling questions from audience

Listening Comprehension – listening for understanding - responding relevantly

Learning Resources: AECS Lab Manual prepared by Dept of HS, AITS Rajampet

Course Outcomes:

Student will be able to

Blooms Level of Learning

1. express himself/herself fluently in social and professional contexts L4
2. demonstrate effective presentation skills L4
3. face interviews confidently L3
4. participate in meetings effectively L4
5. listen actively for better understanding L4

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19AC62L.1										3		3			
19AC62L.2										3		3			
19AC62L.3										3		3			
19AC62L.4										3		3			
19AC62L.5										3		3			

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Advanced Web Programming
Category : PC
Course Code : 19A571T
Year : IV B. Tech.
Semester : I Semester

Lecture Hours
2

Tutorial Hours
0

Practical
0

Credits
2

Course Objectives: This course will able to

- Know the working of different servers like XAMPP, WAMP and basics of PHP environment.
- Understand the basics and object oriented fundamentals of PHP.
- Apply gained knowledge of PHP for creating applications in client/server environment using PHP.
- Analyze different web based applications with PHP and database environment.
- Apply concepts of AJAX in web applications developed in PHP and MySQL.

Unit 1 : *Introduction to Web Technologies* 8
Introduction to Web servers like XAMPP (Bundle Server), WAMP (Bundle Server), Handling HTTP Request and Response, installations of above servers.
INTRODUCTION TO PHP: Downloading, installing, configuring PHP, Programming in a Web environment like XAMPP and WAMPP Bundle Servers. The anatomy of a PHP Page.

Unit 2 : OVERVIEW OF PHP DATA TYPES AND CONCEPTS: 10
Variables and data types, Operators, Expressions and Statements, Strings, Arrays and Functions.
OVERVIEW OF CLASSES, OBJECTS, AND INTERFACES: Creating instances using Constructors, Controlling access to class members, Extending classes, Abstract classes and methods, using interfaces, Using class destructors, File Handling and Using Exceptions

Unit 3 : PHP ADVANCED CONCEPTS: 10
Using Cookies, Using HTTP Headers, Using Sessions, Authenticating users, Using Environment and Configuration variables
CREATING AND USING FORMS: Understanding Common Form Issues, GET vs. POST, Validating form input, Working with multiple forms, and Preventing Multiple Submissions of a form.

Unit 4 : PHP AND DATABASE ACCESS: 10
Basic Database Concepts, Connecting to a MYSQL database, Retrieving and Displaying results, Modifying, Updating and Deleting data. MVC architecture.
Introducing PDO: Using PDO, Installing PDO, PDO's database support, Connecting to a DB server and selecting a database, Getting and setting attributes, Error Handling, Query Execution, Prepared statements, Retrieving data.

Unit 5 : INTRODUCTION To AJAXs 8
Introducing Ajax -From CGI to Flash to DHTML, Pros and Cons of Today's Web Application Environment, Enter Ajax, Ajax Requirements, Ajax Basics-HTTP Request and Response Fundamentals, The XMLHttpRequestObject, XMLHttpRequest Methods, XMLHttpRequest Properties, Cross-Browser Usage, Sending a Request to the Server, Ajax examples on Form validation and Database Operations.

Prescribed Text books:

1. Jason Gilmore .Beginning PHP and MySQL, Apress Publications (Dream tech.). 3rd edition.

2. Lee Babin, Nathan A Good, Frank M.Kromann and Jon Stephens .PHP 5 Recipes A problem Solution Approach.
3. Lee Babin Beginning Ajax with PHP From Novice to Professional, Apress Publications (Dream tech.). 3rd edition

Reference Text Books:

1. J.Lee and B.Ware .Open Source Web Development with LAMP using Linux, Apache, MySQL, Perl and PHP, (Addison Wesley) Pearson Education.
2. Julie Meloni and Matt Telles, PHP 6 Fast and Easy Web Development, Cengage Learning Publications.

Course Outcomes:

Student will be able to

Blooms Level of Learning

1. Use PHP environment in different types of web servers (XAMPP, WAMP) L3
2. Learn the basics and object oriented concepts of PHP. L1, L3
3. Use PHP concepts in development of client/server environment application. L1, L3
4. Analyze their understanding of PHP and MySQL to create, modify, add, and delete data in a database through a web page in web application. L1, L4
5. Perceive the fundamentals of AJAX to create good, effective and customized websites using PHP & MySQL. L3, L6

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A571T.1	-	-	-	-	3	-	-	-	3	-	-	3	3	-	-
19A571T.2	-	-	3	-	3	-	-	-	3	-	-	-	-	-	-
19A571T.3	-	-	-	-	3	-	1	-	3	-	-	-	3	-	2
19A571T.4	-	-	3	-	3	-	-	-	3	-	-	3	3	-	-
19A571T.5	1	-	3	-	3	-	-	-	3	-	-	3	3	-	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Internet of Things
Category : PC
Course Code : 19A572T
Year : IV B. Tech.
Semester : I Semester

Lecture Hours	Tutorial Hours	Practical	Credits
2	0	0	2

Course Objectives: This course will able to

- Understand the terminology, technology and its applications of IoT.
- Know the concept of M2M (machine to machine) with necessary protocols.
- Memorize the software platforms which are used for developing the applications.
- Learn the concepts of python programming language which is used to develop the IoT projects.
- Know the hardware platforms which is necessary to develop the IoT applications.

Unit 1 : Introduction to Internet of Things 8
Introduction to Internet of Things, History of IoT, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, IoT Levels & Deployment Templates, Applications of IoT.

Unit 2 : IoT and M2M & IoT Platforms Design Methodology 7
IoT and M2M: Introduction, M2M, Difference between IoT and M2M, SDN and NFV for IoT. IoT Platforms Design Methodology: Introduction, IoT Design Methodology.

Unit 3 : The Wireless Embedded Internet 8
Introduction to 6LoWPAN, The 6LoWPAN Architecture, The Basic 6LoWPAN Format, Addressing MQ telemetry transport for sensor networks (MQTT-S), ZigBee compact application protocol, Contiki and uIPv6, Wireless RFID Infrastructure.

Unit 4 : IoT Systems-Logical Design Using Python 8
Introduction, Installing Python, Python Data Types and Data Structures, Control Flow, Functions, Modules, Packages and File Handling.

Unit 5 : IoT Physical Devices and Endpoints 8
What is an IoT Device, Exemplary Device: Raspberry Pi, About the Board, Linux on Raspberry Pi, Raspberry Pi Interfaces, Programming Raspberry Pi with Python, Other IoT Devices

Prescribed Text Books:

1. Internet of Things, A Hands-On Approach, Arshdeep Bahga, Vijay Madisetti, University Press, 2015.
2. 6LoWPAN: The Wireless Embedded Internet, Zach Shelby and Carsten Bormann, Wiley publications, first edition, 2009. (Unit III).

Reference Text books:

1. The Internet of Things Connecting Objects to the Web, Hakima Chaouchi, Wiley publications, 2010.
2. Designing the Internet of Things, Adrian McEwen, Hakim Cassimally, Wiley 2014.
3. Enterprise IoT, A Definitive Handbook by Naveen Balani.

Course Outcomes:

Student will be able to

1. Understand the vision of IoT from a global context.

Blooms Level of Learning

L1

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Management Science
Category : HS
Course Code : 19A373T
Year : IV B. Tech.
Semester : I Semester (Common to CSE & ECE)

Lecture Hours	Tutorial Hours	Practical	Credits
3	-	0	3

Course Objectives:

- To understand the basic concepts of management and organization structures, types, merits and demerits.
- To give a clear idea about the plant layout and methods of production and understand the basic concepts of marketing and product life cycle.
- To understand the function of HR manager & industrial relations.
- To understand the concepts of Financial Management. Understand the concepts of PERT, CPM and how to draw the network diagram.
- To understand the concepts of MIS, TQM, JIT etc. Understand the importance of ethics in an organization.

Unit 1 Management and Organization Structure 10

Meaning, Nature, Importance Elements Of Management; Planning, Organizing, Staffing, Directing, Coordinating, Reporting, Budgeting- Systems Approach To Management Evolution Of Scientific Management, Modern Management. Principles Need Of Organization Structure- Types Of Organization Structure Line, Line And Staff, Functional And Matrix Organizations.

Unit 2 Operations Management & Marketing Management 10

Plant Location And Layout Methods Of Production (Job, Batch And Mass Production) Objectives Of Inventory Management- Need For Inventory Control- Method Of Inventory Management: EOQ, ABC Analysis - Core Concepts Of Marketing. Need, Want, Demand, Product, Value, Satisfaction, Marketing Mix- Product, Price, Place, Promotion, Product Levels – Product Life Cycle, – Channels Of Distribution.

Unit 3 Human Resources Management (Hrm) 10

Significance Of HRM, Basic Functions Of HR manager, HR planning Job evaluation and Recruitment Selection and Placement, Induction and Training. Performance Appraisal. Compensation. Industrial Relations.

Unit 4 Financial Management, Project Management (PERT/CPM): 10

Objectives, Scope, Techniques Of Investment Analysis, Pay Back Period, Accounting Rate Of Return, And Working Capital Cost Of Capital. Sources Of Financing. Network Drawing - Program me Evaluation And Review Technique (PERT) – Critical Path Method (CPM) – Probability Of Completing the project within given time Project Crashing (Simple Problems).

Unit 5 Advances in Management Practices 10

Basic Concepts And Overview Of Management Information System (MIS), Enterprise Resource Planning (ERP), Value Analysis, Just –In-Time (JIT), Total Quality Management (TQM) And Supply Chain Management. Overview Of Ethics-Nature And Objectives Of Ethics - Relationship Between Ethics And An Organization.

Prescribed Text Books:

1. Industrial Management by O.P.Khanna, 17 Edition, ISBN: 9788189928353, 9788189928353
2. Management Science by Aryasri, McGraw Hill Education India, ISBN: 9780070090279, 9780070090279
3. Manufacturing Organization and Management, 6th Edition, Pearson Education India, ISBN: 9788177582758,

9788177582758

Reference Books:

1. Stoner, Freeman, Gilbert, Management, Pearson Edu., 2005, 6th Ed. ISBN: 9788131707043, 8131707040
2. Panneer Selvam, Production and Operations Management. PHI, 2004. ISBN, 8120324528, 9788120324527

Course Outcomes:

Student will be able to

Blooms Level of Learning

1. Understand the basic concepts of management and organization. structures, types, merits and demerits L1
2. Give a clear idea about the plant layout and methods of production. Understand the basic concepts of marketing and product life cycle. L1
3. Understand the function of HR manager & industrial relations. L1
4. Understand the concepts of Financial Management. Understand the concepts of PERT, CPM and how to draw the network diagram. L3
5. Understand the concepts of MIS, TQM, JIT etc. and the importance of ethics in an organization L2

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A373T.1	3	3	3	-	3	-	-	-	3	-	3	-	2	-	-
19A373T.2	3	3	3	-	3	-	-	-	3	-	3	-	2	-	-
19A373T.3	3	3	3	-	-	-	-	-	3	-	3	-	2	-	-
19A373T.4	3	3	3	1	3	-	-	-	3	-	3	-	2	2	-
19A373T.5	-	3	3	-	3	1	1	-	3	1	3	-	2	2	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES: RAJAMPET
(An Autonomous Institution)

Title of the Course : Big Data
Category : PE
Course Code : 19A57AT
Year : IV B. Tech.
Semester : I Semester

Lecture Hours
3

Tutorial Hours
0

Practical
0

Credits
3

Course Objectives: This course will able to

- Impart Knowledge on Big Data storage, processing, querying and reporting.
- Study big data with Hadoop MapReduce framework
- Apply the tools and techniques of Big Data to improve performance, scalability and reliability of a business intelligence system.

Unit 1 : *Introduction To Big Data* 8
What is Big Data?, Why Big Data Matter?, Big Data Sources, Evaluation of Big Data, The nuts and bolts of Big Data, Best Practices for Big data analytics.
Meet Hadoop: Data Storage and Analysis, Comparison with Other Systems.

Unit 2 : 11
MapReduce: Analyzing the Data with Hadoop, Scaling Out, Hadoop Streaming, Hadoop Distributed File system.
Hadoop I/O: Data Integrity, Compression, Serialization, File-Based Data Structures.

Unit 3 : 8
How MapReduce Works: Anatomy of a MapReduce Job Run, Failures, Shuffle and Sort, Task Execution.
MapReduce Types and Formats: MapReduce Types, Input Formats, Output Formats.

Unit 4 : 9
MapReduce Features: Counters, Sorting, Joins, Side Data Distribution, MapReduce Library Classes.
Setting Up a Hadoop Cluster: Cluster Specification, Cluster Setup and Installation, SSH Configuration, Hadoop Configuration, Security, Benchmarking a Hadoop Cluster.

Unit 5 : *Tools for Big Data Pig and Hive* 9
Pig: Installing and Running Pig, Comparison with Databases, Pig Latin, User defined functions, data processing operators, Pig in practice.
Hive: Installing Hive, Running Hive, Comparison with Traditional Databases, HiveQL, Tables, Querying Data, User - Defined Functions.

Prescribed Text books:

1. Tom White, "*Hadoop: The Definitive Guide*," Oreilly and Yahoo Press, 3rd Edition, 2012.
2. Frank J. Ohlhorst, "*Big Data Analytics: Turning Big Data into Big Money*," Wiley Publication, December 2012.

Reference Text Books:

1. Kevin Roebuck, "*Big Data: High-Impact Strategies - What You Need to Know: Definitions, Adoptions, Impact, Benefits, Maturity, Vendors*," Tebbo Publisher, 2011.
2. Alex Holmes, "*Hadoop in Practice*," Manning Publications Publisher, 2012.

Department of Computer Science and Engineering

Course Outcomes:

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

Blooms Level of Learning

- | | |
|--|----|
| 1. Learn the basics of Big Data and its storage in hadoop compared with other data base system. | L1 |
| 2. Analyze the different types of data by using Mapreduce and HDFS framework | L4 |
| 3. Understand types and formats of mapreduce and anatomy of mapreduce job run. . | L2 |
| 4. Understand the features of mapreduce and understand the installation of hadoop in cluster mode. | L2 |
| 5. Analyze the data with hadoop related project Hive. | L4 |

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A57AT.1	3	3	-	-	-	-	-	-	-	-	-	-	3	-	-
19A57AT.2	3	3	3	-	-	3	-	-	-	-	-	3	3	3	3
19A57AT.3	3	3	3	3	-	3	-	-	-	-	-	3	3	3	3
19A57AT.4	3	3	3	3	2	-	-	-	-	-	-	3	3	-3	3
19A57AT.5	3	3	3	3	2	3	-	-	-	-	-	3	3	3	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Deep Learning
Category : PE
Course Code : 19A57BT
Year : IV B. Tech.
Semester : I Sem

Lecture Hours
3

Tutorial Hours
0

Practical
0

Credits
3

Course Objectives: This course will able to

- Recall the basic concepts of artificial neural networks and activation functions
- Remember machine learning basics and algorithms
- Understand the internal design of deep feedforward networks and learning
- Recognize Convolution and recurrent neural networks
- Illustrate the networks in different applications

Unit 1 : 8
Basics of artificial neural networks: characteristics of neural networks, Historical development, terminology, model of neuron, topology, basic learning laws
Activation and Synaptic Dynamics: Activation, synaptic dynamic models, learning methods, stability and convergence

Unit 2 : 8
Machine Learning Basics: learning algorithms, capacity, overfitting and underfitting., hyperparameters and validation sets, estimators, bias and variance, Bayesian statistics, supervised, unsupervised learning algorithms, stochastic gradient descent, building machine learning algorithm

Unit 3 : 8
Deep Feedforward Networks: learning XOR, Gradient- based learning, Hidden units, Architecture Design, back propagation and other differentiation algorithms
Regularization for deep learning- dataset augmentation, noise robustness, semi supervised learning, multitask learning.

Unit 4 : 8
Convolution networks- convolution operation, pooling, convolution and pooling as an infinitely strong prior, variants of basic convolution function, structured outputs, efficient convolution algorithms. Deep Recurrent networks,
Recurrent and recursive nets- recurrent neural networks, bidirectional RNNs, deep recurrent networks, recursive neural networks

Unit 5 : 8
Deep Learning applications: Large scale deep learning, computer vision, speech recognition, natural language processing

Prescribed Text Books:

1. Goodfellow, I., Bengio, Y., and Courville, A., Deep Learning, MIT Press, 2016
2. Yegnanarayana, B., Artificial Neural Networks PHI Learning Pvt. Ltd, 2009

Reference Text books:

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Design Patterns
Category : PE
Course Code : 19A57CT
Year : IV B. Tech.
Semester : I Semester

Lecture Hours
3

Tutorial Hours
0

Practical
0

Credits
3

Course Objectives: This course will able to

- Understand that design patterns are standard solutions to common software design problems.
- Use systematic approach that focus and describe abstract systems of interaction between classes, objects, and communication flow.
- Understand the design patterns that provide common solutions for various objectives of object oriented software applications.
- Understand how these patterns related to object- oriented design.

Unit 1 : INTRODUCTION 9
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.

Unit 2 : A CASE STUDY 9
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 and Hyphenation, Summary.

Unit 3 : CREATIONAL PATTERNS 9
Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

Unit 4 : STRUCTURAL PATTERN PART 9
Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy.

Unit 5 : BEHAVIORAL PATTERNS PART 9
Chain of Responsibility, Command, Interpreter, Iterator. Mediator, Memento, Observer, State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns. What to Expect from Design Patterns, A Brief History, The Pattern Community an Invitation, A Parting Thought.

Prescribed Text Books:

1. Design Patterns by Erich Gamma, Pearson Education

Reference Text books:

1. Pattern's in JAVA Vol-I by Mark Grand, Wiley DreamTech.
2. Pattern's in JAVA Vol-II by Mark Grand, Wiley DreamTech.
3. JAVA Enterprise Design Patterns Vol-III by Mark Grand, Wiley DreamTech.
4. Head First Design Patterns by Eric Freeman-Oreilly-spd
5. Design Patterns Explained by Alan Shalloway, Pearson Education

Department of Computer Science and Engineering

Course Outcomes:

Student will be able to

Blooms Level of Learning

1. Understand and identify appropriate patterns for design problems. L1, L3
2. Learn creational, structural, behavioral patterns. L1, L3
3. Apply key pattern-oriented software architecture techniques to develop reusable object-oriented software infrastructure and apps. L1, L3
4. Utilize Java programming language features and libraries to develop pattern oriented -oriented software L1, L3
5. Successfully apply concurrency patterns to achieve synchronization in Object oriented applications. L3

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A57CT.1	3	-	-	3	-	-	-	-	-	-	-	3	3	-	-
19A57CT.2	3	3	-	-	-	-	-	-	-	-	-	3	3	-	-
19A57CT.3	3	-	3	3	2	-	-	-	-	-	-	3	3	-	-
19A57CT.4	3	3	3	3	-		-	-	-	-	-	3	3	-	-
19A57CT.5	3	3	3	3	2	-	-	-	-	-	1	3	3	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Mobile Ad Hoc Networks
Category : PE
Course Code : 19A57DT
Year : IV B. Tech.
Semester : I Semester

Lecture Hours
3

Tutorial Hours
0

Practical
0

Credits
3

Course Objectives: This course will able to

- Acquire knowledge about Ad Hoc networks and mobility models.
- Understand the design issues and classifications of MAC protocols.
- Study about the classifications of routing protocols.
- Acquire knowledge about the QOS issues, Energy Management issues and challenges in Ad Hoc Networks.
- Study about Ad Hoc networks cross layer design and integration for 4G.

Unit 1 : *Introduction* 10
Introduction to Ad Hoc networks – definition, characteristics, features, applications. Characteristics of Wireless channel, Ad Hoc Mobility Models – Indoor and outdoor models.

Unit 2 : *Medium Access Protocols* 10
MAC Protocols: design issues, goals and classification. Contention based protocols – with reservation, scheduling algorithm, protocols using directional antennas. IEEE Standards: 802.11a, 802.11b, 802.11g, 802.15, HIPERLAN.

Unit 3 : *Network Protocols* 10
Routing Protocols: Design issues, goals and classification. Proactive Vs Reactive routing, Unicast routing algorithms, Multicast routing algorithms, Hybrid routing algorithm, Energy aware routing algorithm, Hierarchical routing, QoS aware routing.

Unit 4 : *End to End Delivery and Security* 10
Transport Layer: Issues in designing – Transport layer classification, Ad Hoc Transport protocols. Security issues in Ad Hoc networks: issues and challenges, network security attacks, secure routing protocols.

Unit 5 : *Cross Layer Design and Integration of Ad Hoc for 4G* 10
Cross Layer Design: Need for cross layer design, cross layer optimization, parameter optimization techniques, cross layer cautionary perspective. Integration of Ad Hoc with mobile IP network

Prescribed Text books:

1. C.Siva Ram Murthy and B.S.Manoj, Ad hoc Wireless Networks Architectures and protocols, 2nd edition, Pearson Education. 2007
2. Charles E. Perkins, Ad hoc Networking, Addison – Wesley, 2000

Reference Text Books:

1. Stefano Basagni, Marco Conti, Silvia Giordano and Ivan stojmenovic, Mobile adhoc networking, Wiley-IEEE press, 2004.
2. Mohammad Ilyas, The handbook of adhoc wireless networks, CRC press, 2002.
3. T. Camp, J. Boleng, and V. Davies “A Survey of Mobility Models for Ad Hoc Network

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Advanced Web Programming Lab
Category : PC
Course Code : 19A571L
Year : IV B. Tech.
Semester : I Semester

Lecture Hours	Tutorial Hours	Practical	Credits
0	0	3	1.5

Course Objectives: This course will able to

- Know the working of different servers like XAMPP, WAMP and basics of PHP environment
- know the basic concepts and techniques in building dynamic web pages
- Analyze different web based applications with PHP and database environment.
- Create a fully functional website with MVC architecture.

Week1 :

- 1) Installation of apache webserver
- 2) Installation of XAMPP Bundle Server
- 3) Installation of WAMP Bundle Server

Week2 :

Basic Programs in PHP using XAMPP server (from 2nd Unit)

Week3:

Object oriented concept examples using PHP (classes, inheritance, interfaces, etc)

Week4:

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

1) HOME PAGE:

The home page must contain three frames.

Top frame: Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below).

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

For e.g.: When you click the link "CSE" the catalogue for CSE Books should be displayed in the Right frame.

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

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Description of the Web Site			

Fig 1.1

2) LOGIN PAGE:

This page looks like below:



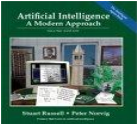





Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	<div style="text-align: right;"> Login : <input type="text"/> Password: <input type="password"/> </div> <div style="text-align: center; margin-top: 10px;"> <input type="button" value="Submit"/> <input type="button" value="Reset"/> </div>			

3) CATOLOGUE PAGE:

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

The details should contain the following:

1. Snap shot of Cover Page.
2. Author Name.
3. Publisher.
4. Price.
5. Add to cart button.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE		Book : XML Bible Author : Winston Publication : Wiely	\$ 40.5	
ECE		Book : AI Author : S.Russel Publication : Princeton hall	\$ 63	
EEE		Book : Java 2 Author : Watson Publication : BPB publications	\$ 35.5	
CIVIL		Book : HTML in 24 hours Author : Sam Peter Publication : Sam publication	\$ 50	

Note: Week 5 contains the remaining pages and their description

Week5:

4) CART PAGE:

The cart page contains the details about the books which are added to the cart. The cart page should look like this:

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	Book name	Price		Quantity
	Amount			
	Java 2	\$35.5		
	2	\$70		
	XML bible	\$40.5		1
		\$40.5		
	Total amount			\$130.5

5) REGISTRATION PAGE:

Create a "registration form" with the following fields

- 1) Name (Text field)
- 2) Password (password field)
- 3) E-mail id (text field)
- 4) Phone number (text field)
- 5) Sex (radio button)
- 6) Date of birth (3 select boxes)
- 7) Languages known (check boxes – English, Telugu, Hindi, Tamil)
- 8) Address (text area)

Week6:

VALIDATION:

Write *PHP Script* to validate the following fields of the above registration page.

6. Name (Name should contains alphabets and the length should not be less than 6 characters).
7. Password (Password should not be less than 6 characters length).
8. E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com)
9. Phone number (Phone number should contain 10 digits only).

Week7:

User Authentication: Assume four users user1,user2,user3 and user4 having the passwords pwd1,pwd2,pwd3 and pwd4 respectively. Write a PHP for doing the following.

Create a Cookie and add these four user id's and passwords to this Cookie.

Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies.

If he is a valid user(i.e., user-name and password match) you should welcome him by name(user-name) else you should display "You are not an authenticated user"

Week8:

Install a database(Mysql or Oracle).

Create a table which should contain at least the following fields: name, password, email-id, phone number(these should hold the data from the registration form).

Week9:

Write a PHP program to connect to that database and extract data from the tables and display them.

Experiment with various SQL queries.

Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page (week2).

Week10:

Write a PHP which does the following job:

Insert the details of the 3 or 4 users who register with the web site (week9) by using registration form.

Authenticate the user when he submits the login form using the user name and password from the database (similar to week8 instead of cookies).

Week11:

Create tables in the database which contain the details of items (books in our case like Book name, Price, Quantity, Amount) of each category. Modify your catalogue page (week 2) in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using PHP

Week 12:

HTTP is a stateless protocol. Session is required to maintain the state.

The user may add some items to cart from the catalogue page. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart. Multiple users can do the same thing at a time (i.e., from different systems in the LAN using the ip-address instead of localhost). This can be achieved through the use of sessions. Every user will have his own session which will be created after his successful login to the website. When the user logs out his session should get invalidated (by using the method `session.invalidate()`). Modify your catalogue and cart PHP pages to achieve the above mentioned functionality using sessions.

Week 13:

Introduce Simple AJAXs Script where ever it possible in the above website designed by PHP.

Note: Database programs can be developed in both MySQL and PDO concepts.

Text Books:

1. Jason Gilmore .Beginning PHP and MySQL, Apress Publications (Dream tech.). 3rd edition.
2. Lee Babin, Nathan A Good, Frank M.Kromann and Jon Stephens .PHP 5 Recipes A problem Solution Approach.
3. Lee Babin Beginning Ajax with PHP From Novice to Professional, Apress Publications (Dream tech.). 3rd edition

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|--|-------|
| 1. Use PHP environment in different types of web servers (XAMPP, WAMP) | L3 |
| 2. Apply the object oriented concepts using PHP. | L3 |
| 3. Use PHP concepts in development of client/server environment application. | L3 |
| 4. Analyze their understanding of PHP and MySQL to create, modify, add, and delete data in a database through a web page in web application. | L4 |
| 5. Perceive the fundamentals of AJAX to create good, effective and customized websites using PHP & MySQL. | L3,L6 |

Department of Computer Science and Engineering

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02	PS03
19A571L.1	-	-	-	-	3	-	-	-	3	-	-	3	3	-	-
19A571L.2	-	-	3	-	3	-	-	-	3	-	-	-	-	-	-
19A571L.3	-	-	-	3	3	-	1	-	3	-	-	-	3	-	2
19A571L.4	-	-	3	3	3	-	-	-	3	-	-	3	3	-	-
19A571L.5	1	-	3	3	3	-	-	-	3	-	-	3	3	-	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : IoT & CASE Tools Lab
Category : PC
Course Code : 19A573L
Year : IV B. Tech.
Semester : I Semester

Lecture Hours	Tutorial Hours	Practical	Credits
0	0	3	1.5

Course Objectives: This course will able to

- Understand the terminology, technology and its applications of IoT.
- Memorize the software platforms which are used for developing the applications.
- Learn the concepts of python programming language which was used to develop the IoT projects.
- Learn the concepts of Arduino IDE which is used to develop the IoT projects in Arduino Kits.
- Know the hardware platforms which is necessary to develop the IoT applications.

IoT Lab

Week1 :

Start Raspberry Pi, and try Various Linux Commands in Command Terminal Windows :
(is,cd,touch,mv,nm,man,mkdir,tar,gzip,cat,more,less,ps,sido,cron,chown,chgrp,ping etc)

Week2 :

Run Python Programs On Raspberry Pi

- Read your Name and Print Hello Message With name read two numbers, and Print their Sum, difference, Product and Division.
- Word and character count of a given String
- Area of a given Shape (rectangles , Triangle and Circle) Reading Shape and appreciate Values from Standard input
- Print a name “n” Times where name and n are read from standard input, using for and While loops.
- Handle divided by Zero Exception
- Print current time for ten minutes with an interval of 10 seconds

Week3:

Light an LED Through Python Programs.

Week4:

Flash an LED At a Given on Time And OFF Time Cycle, where the Two Times are Taken From a File.

Week5:

Access an Image Through a Pi Web Cam

Week6:

Detect the motion of an object using the PIR sensor.

Week7:

Blinking a multiple LED's Blink using ARDUINO IDE.

Week8:

Controlling the traffic light signals using ARDUINO IDE.

Week9:

Calculate the distance of an object with the help of UltraSonic Sensor in ARDUINO IDE.

Week10:

Detect the Moisture of an Soil using Soil Moisture sensor in Arduino IDE.

Week11:

- a) Controlling the Led blink using Switch.
- b) Measure the Temperature and humidity using DHT11 Sensor.

Prescribed Text Books:

4. The Internet of Things Connecting Objects to the Web, HakimaChaouchi, Wiley publications, 2010.
5. Designing the Internet of Things, Adrian McEwen, Hakim Cassimally, Wiley 2014.
6. Enterprise IoT, A Definitive Handbook by Naveen Balani.

Course Outcomes:

Student will be able to

Blooms Level of Learning

1. Use different types of sensors required for developing the IoT projects. L3
2. Identify the difference between different hardware and software platforms which is necessary to develop the IoT applications. L3
3. Create the IoT experiments in Arduino IDE. L6
4. Create the IoT experiments with the help of Python programs. L6
5. Design the IoT applications which maps to problems of real world Scenarios. L6

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A573L.1	-	-	-	3	3	3	1	1	-	-	-	1	3	2	3
19A573L.2	-	-	-	-	3	-	-	-	-	1	-	-	3	3	3
19A573L.3	-	-	3	3	3	-	-	-	-	-	-	-	3	3	3
19A573L.4	-	-	3	3		-	-	-	-	-	-	-	3	3	3
19A573L.5	1	1	3	3	3	3	-	-	-	-	-	-	3	3	3

CASE Tools Lab

Course Objectives: This course will able to

- Know the need of models in the software development process
- Understand the need of classes and identifying their behavior.
- Provide the knowledge of Use case and Interaction diagrams.
- Implement State Machines
- Design and Develop Subsystems

Case Study for ATM

Students are divided into batches of 5 each and each batch has to draw the following diagrams using UML for an ATM system whose description is given below.

The software to be designed will control a simulated automated teller machine (ATM) having a magnetic stripe reader for reading an ATM card, a customer console (keyboard and display) for interaction with the customer, a slot for depositing envelopes, a dispenser for cash (in multiples of Rs. 100, Rs. 500 and Rs. 1000), a printer for printing customer receipts, and a key-operated switch to allow an operator to start or stop the machine. The ATM will communicate with the bank's computer over an appropriate communication link.

(The software on the latter is not part of the requirements for this problem.)

The ATM will service one customer at a time. A customer will be required to insert an ATM card and enter a personal identification number (PIN) - both of which will be sent to the bank for validation as part of each transaction. The customer will then be able to perform one or more transactions. The card will be retained in the machine until the customer indicates that he/she desires no further transactions, at which point it will be returned - except as noted below.

The ATM must be able to provide the following services to the customer:

1. A customer must be able to make a cash withdrawal from any suitable account linked to the card, in multiples of Rs. 100 or Rs.500 or Rs. 1000. Approval must be obtained from the bank before cash is dispensed.
2. A customer must be able to make a deposit to any account linked to the card, consisting of cash and/or checks in an envelope. The customer will enter the amount of the deposit into the ATM, subject to manual verification when the envelope is removed from the machine by an operator. Approval must be obtained from the bank before physically accepting the envelope.
3. A customer must be able to make a transfer of money between any two accounts linked to the card.
4. A customer must be able to make a balance inquiry of any account linked to the card.
5. A customer must be able to abort a transaction in progress by pressing the Cancel key instead of responding to a request from the machine.

The ATM will communicate each transaction to the bank and obtain verification that it was allowed by the bank. Ordinarily, a transaction will be considered complete by the bank once it has been approved. In the case of a deposit, a second message will be sent to the bank indicating that the customer has deposited the envelope. (If the customer fails to deposit the envelope within the timeout period, or presses cancel instead, no second message will be sent to the bank and the deposit will not be credited to the customer.)

If the bank determines that the customer's PIN is invalid, the customer will be required to re-enter the PIN before a transaction can proceed. If the customer is unable to successfully enter the PIN after three tries, the card will be permanently retained by the machine, and the customer will have to contact the bank to get it back.

The student should take up the case study of ATM system and Model it in different views i.e. Use case view, logical view, component view, Deployment view.

- Design a Use case Diagram for ATM system
- Design a Sequence Diagram for ATM system
- Design a Collaboration Diagram for ATM system
- Design a Activity Diagram for ATM system
- Design a State Chart Diagram for ATM system
- Design a Class Diagram for ATM system,
- Design a Component Diagram for ATM system
- Design a Deployment Diagram for ATM system

Task 2:

The student should take up case study of any system on their own and Model all the above diagrams in different views.

Text Books:

1. Grady Booch, James Rumbaugh, Ivar Jacobson : The Unified Modeling Language User Guide, Pearson Education.
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd.

Course Outcomes:

Student will be able to

1. Know the basics of different diagrams and Relations.
2. Learn the importance of Class Diagram.
3. Draw the use case and interaction diagrams.

Blooms Level of Learning

L1
L2
L3,L4

4. Implementing state machines.

L3

5. Draw the component and deployment diagrams.

L3, L4

CO-PO mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A573L.1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-
19A573L.2	-	2	3	1	3	1	-	-	-	3	-	-	3	-	3
19A573L.3	-	-	3	-	-	-	-	-	3	3	3	3	-	-	3
19A573L.4	-	-	3	-	3	-	-	2	3	3	-	3	-	-	-
19A573L.5	-	-	3	-	3	-	-	2	-	3	3	3	3	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Civil Engineering

Title of the Course: DISASTER MANAGEMENT
Category : OE
Course Code : 19A18DT
Year : III Year
Semester : II Semester (Common to CE, ME, CSE)

Lecture Hours	Tutorial Hours	Practical	Credits
3	-	-	3

Course Objectives:

The course is intended to provide a general concept in the dimensions of disasters caused by nature beyond the human control as well as the disasters and environmental hazards induced by human activities with emphasis on disaster preparedness, response and recovery.

Unit 1 : (6hrs)
INTRODUCTION - Concepts and definitions: disaster, hazard, vulnerability, risk, capacity, prevention, mitigation).

Unit 2 : (10hrs)
DISASTERS - Disasters classification; natural disasters (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.); manmade disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills etc); hazard and vulnerability profile of India, mountain and coastal areas, ecological fragility.

Unit 3 : (9hrs)
DISASTER IMPACTS - Disaster impacts (environmental, physical, social, ecological, economical, political, etc.); health, psycho-social issues; demographic aspects (gender, age, special needs); hazard locations; global and National disaster trends; climate-change and urban disasters.

Unit 4 : (9hrs)
Disasters, Environment and Development - Factors affecting vulnerability such as impact of developmental projects and environmental modifications (including of dams, land-use changes, urbanization etc.), sustainable and environmental friendly recovery; reconstruction and development methods.
DISASTER RISK REDUCTION (DRR) - Disaster management cycle—its phases; prevention, mitigation, preparedness, relief and recovery; structural and non-structural measures; risk analysis, vulnerability and capacity assessment; early warning systems, Post-disaster environmental response (water, sanitation, food safety, waste management, disease control); Roles and responsibilities of government, community, local institutions, NGOs and other stakeholders; Policies and legislation for disaster risk reduction, DRR programmes in India and the activities of National Disaster Management Authority.

Unit 5 : (9hrs)
Disasters, Environment and Development - Factors affecting vulnerability such as impact of developmental projects and environmental modifications (including of dams, land-use changes, urbanization etc.), sustainable and environmental friendly recovery; reconstruction and development methods.

Prescribed Text Books:

1. Disaster Management Guidelines, GOI-UND Disaster Risk Program (2009-2012)
2. Damon, P. Copola, (2006) Introduction to International Disaster Management, Butterworth Heineman.

3. Gupta A.K., Niar S.S and Chatterjee S. (2013) Disaster management and Risk Reduction, Role of Environmental Knowledge, Narosa Publishing House, Delhi.
4. Murthy D.B.N. (2012) Disaster Management, Deep and Deep Publication PVT. Ltd. New Delhi.
5. Modh S. (2010) Managing Natural Disasters, Mac Millan publishers India LTD.

Reference Books:

1. <http://ndma.gov.in/> (Home page of National Disaster Management Authority).
2. <http://www.ndmindia.nic.in/> (National Disaster management in India, Ministry of Home Affairs).
3. Pradeep Sahni, 2004, Disaster Risk Reduction in South Asia, Prentice Hall.
4. Singh B.K., 2008, Handbook of Disaster Management: techniques & Guidelines, Rajat Publication.
5. Ghosh G.K., 2006, Disaster Management, APH Publishing Corporation.

Course Outcomes:

Student will be able to

Blooms Level of Learning

1. The students increase the knowledge and understanding of the disaster phenomenon and, its factors. L1
2. The students must learn various classification of disasters hazard and vulnerability profile of India. L4
3. The students will learn impacts, global and national disaster trends L2
4. The students will learn disaster management cycle and its phases and DRR programmes in India and activities of national disaster management academy. L3
5. The students should be able to analyze factors affecting vulnerability of developmental projects and environmental modifications for sustainable development. L6

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A18DT.1	-	-	-	-	2	1	-	2	2	2	-	-	-	-	-
19A18DT.2	1	-	-	-	-	-	-	2	3	3	-	2	-	-	-
19A18DT.3	1	-	-	-	-	3	-	3	2	2	-	-	-	-	-
19A18DT.4	-	-	-	-	-	-	-	3	3	3	-	2	-	-	-
19A18DT.5	1	-	-	-	-	-	2	3	-	-	-	3	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course: Building Planning and Construction
Category : OE
Course Code : 19A18ET
Year : IV B.Tech
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives:

- Teach to supervision of different types of masonry
- Illustrate the methodology in selection of materials, design and supervision of suitable type of floor and roof
- To ensure the student to be aware of building byelaws.
- To make the student to understand about principles of planning, standards and requirements of Residential building and Public building

Unit 1 : Building Byelaws and Regulations (8hrs)

Introduction –Terminology –Objectives of building byelaws –Floor area ratio (FAR) –Floor space Index (FSI) – Principles underlying building byelaws –classification of buildings –Open space requirements –built up area limitations –Height of Buildings –Wall thickness –lighting and ventilation requirement.

Unit 2 : *Planning of Residential buildings* (10hrs)

Minimum standards for various parts of buildings –requirements of different rooms and their grouping – characteristics of various types of residential buildings. Principles of planning- architectural principle, Aspects of planning within and with respect to surroundings, Modular planning concept.

Unit 3 : *Planning of Public buildings* (10hrs)

Planning of Educational institutions, hospitals, dispensaries, Office buildings, banks, industrial buildings, hotels and motels, buildings for recreation. Elements of Perspective Drawing: Definition, concept and single and two point perspective

Unit 4 : Building components & foundations (9hrs)

Building components: Lintels, Arches, and stair cases – Types. Different types of floors-Concrete, Mosaic, Terrazo floors, Pitched, flat and curved Roofs. Lean-to-Roof, Coupled Roofs, Trussed roofs- King and Queen Post Trusses. RCC Roofs.
Foundations: Shallow foundations – Spread, combined, strap and mat foundations.

Unit 5 : (8hrs)

Masonry: Types of masonry, English and Flemish bonds, Rubble and Ashlar masonry, cavity and partition walls. Finishings: Damp proofing- materials used. Plastering, pointing, white washing and distempering – Painting – Constituents of a paint – Types of paints – Painting of new/old Wood – Varnish – Form work and scaffolding.

Prescribed Text Books:

1. Building Planning & Drawing by Dr N. Kumaraswamy and A.Kameswara Rao, Charitor Publications.
2. Planning and Designing and Scheduling- Gurucharan Singh and Jagadish Singh – Standard Publishers.
3. Planning and Designing of Buildings – Y.S.Sane.
4. Building Construction by P.C. Varghese, Prentice-Hall of India private Ltd, New Delhi.

Department of Computer Science and Engineering

5. Building Construction by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) Ltd., New Delhi.
6. National Building Code of India.

Reference Text books:

1. Sikka, V.B. (2013), A Course in Civil Engineering Drawing, S. K. Kataria & Sons
2. R.Chudly "Construction Technology – Volumes I and II" 2nd Edition, Longman, UK, 1987.

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|--|----|
| 1. Understand Building Byelaws & regulations. | L2 |
| 2. Understand principles of planning, standards and requirements for residential building. | L2 |
| 3. Understand principles of planning, standards and requirements for public building. | L2 |
| 4. Summarize different types of masonry and foundations | L3 |
| 5. Understand different types of building components and finishing works | L2 |

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A18ET.1	-	-	-	-	-	3	1	-	2	-	-	-	-	2	3
19A18ET.2	-	-	-	-	-	3	1	-	2	-	-	-	-	2	3
19A18ET.3	-	-	-	-	-	3	1	-	2	-	-	-	-	2	3
19A18ET.4	-	-	-	-	-	3	1	-	2	-	-	-	-	2	3
19A18ET.5	-	-	-	-	-	3	1	-	2	-	-	-	-	2	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES RAJAMPET
(AN AUTONOMOUS INSTITUTION)

Title of the Course	Battery Energy Storage Systems
Category	OE
Course Code	19A28DT
Year	IV B. Tech
Semester	II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives:

- To enable the student to understand the need for Energy Storage.
- To learn sufficient knowledge about various Energy Storage Technologies.
- To deal with grid connected Battery Energy Storage System.
- To study the Challenges, Risk and Policy of Battery Energy Storage System.

Unit I Introduction to Energy Storage for Power Systems

Emerging needs for Electrical Energy Storage -Role of Energy Storage Systems-Applications. Overview of energy storage technologies: Thermal, Mechanical, Chemical, Electrochemical, Electrical-Efficiency of Energy Storage Systems.

Unit II Energy Storage Technologies

Storage Types - Components of a Battery Energy Storage System (BESS) - Energy Storage System Components -Grid Connection for Utility-Scale BESS Projects -Battery Chemistry Types -Lead-Acid (PBA) Battery - Nickel-Cadmium (Ni-Cd) Battery-Lithium-Ion (Li-Ion) Battery.

Unit III Grid Applications of Battery Energy Storage Systems

Scoping of BESS Use Cases - General Grid Applications of BESS -Technical Requirements -Round-Trip Efficiency - Response Time - Lifetime and Cycling - Sizing - Operation and Maintenance.

Unit IV Challenges and Risks

Grid Tariff Applications and Licensing Issues -Battery Safety - Challenges of Reducing Carbon Emissions - Battery Recycling and Reuse Risks -Examples of Battery Reuse and Recycling - Reuse of Electric Vehicle Batteries for Energy Storage - Recycling Process.

UNIT V Policy Recommendations

Frequency Regulation - Renewable Integration -Distribution Grids -Transmission Grids - Peak Shaving and Load Leveling – Microgrids

Text Books:

1. YongpingZhai. *Handbook on Battery Energy Storage System*Asian Development Bank.2018.
2. James M. Eyer, Joseph J.lannucci and Garth P. Corey .*Energy Storage Benefits and Market Analysis*, Sandia National Laboratories, 2004.
3. Jim Eyer, Garth Corey", *Energy Storage for the Electricity Grid: Benefits and Market Potential Assessment Guide*, Report, Sandia National Laboratories, Feb 2010.

Reference Books:

1. Doughty, D. H., and E. Peter Roth. 2012. A General Discussion of Li Ion Battery Safety. *Electrochemical Society Interface* 21 (2): 37–44. DOI: 10.1149/2.F03122if.

2. Electric Power Research Institute (EPRI). 2010. Electricity Energy Storage Technology Options: A White Paper Primer on Applications, Costs, and Benefits. Palo Alto, California, US. <http://large.stanford.edu/courses/2012/ph240/doshay1/docs/EPRI.pdf>
3. Enel Green Power. 2016. Integrating Renewable Power Plants with Energy Storage. 7 June. <http://www.ife.unibocconi.it/wps/wcm/connect/29b685e1-8c34-4942-8da3-6ab5e701792b/Slides+Lanuzza+7+giugno+2016.pdf?MOD=AJPERES&CVID=Ile7w78>.
4. Initial Operating Experience of the La Ola 1.2-MW Photovoltaic System. Sandia National Laboratories Report SAND2011-8848. Kane, Mark. 2015. Bosch Cooperates With BMW And Vattenfall In Second Life Battery Project. Inside EVs 9 February. <https://insideevs.com/bosch-cooperates-with-bmw-and-vattenfall-in-second-lifebattery-project/>

Course outcomes: At the end of the course the student will be able to

1. Understanding the need of the Energy Storage Systems.
2. Study and Analyse the function of each storage Technology, its Types.
3. Explore the Battery Energy Storage applications in Renewable energy systems and in Smart grid.
4. Study the Challenges, Risk and Policy recommendation of Battery Energy Storage Systems.

COs-POs-PSOs Mapping

Course Outcomes	Program Outcomes												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	2	1
19A28DT .1	2	-	-	1	-	-	1	-	1	-	-	-	1	-
19A28DT .2	2	2	1	1	-	-	1	-	-	-	-	-	1	-
19A28DT .3	2	1	1	1	-	-	1	-	2	-	-	-	1	1
19A28DT .4	2	1	1	1	-	-	2	-	1	-	-	-	2	1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES RAJAMPET
(AN AUTONOMOUS INSTITUTION)

Title of the course : System modeling and Simulation
Category : OE
Course code : 19A28ET
Year : IV B.Tech
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical Hours	Credits
3	-	-	3

Course Objectives

- To understand the basic system concepts and definitions of system.
- Techniques to model and to simulate various systems.
- To analyze a system and to make use of the information to improve the performance

Unit 1: Introduction to simulation models 10

Basic Simulation Modeling, Systems, Advantages and disadvantages of simulation, Models and Simulation, Discrete Event Simulation, Simulation of Single Server Queuing System, Simulation of Inventory System, Alternative approach to Modeling and Simulation

Unit-2: Simulation software 10

Comparison of Simulation Packages with Programming Languages, Classification of Software, Desirable Software Features, General Purpose Simulation Packages – Arena, Extend and Others, Object Oriented Simulation, Examples of Application Oriented Simulation Packages.

Unit-3 Building simulation models and time driven simulation models 08

Guidelines for Determining Levels of Model Detail, Techniques for Increasing Model Validity and Credibility, Modeling Time Driven Systems: Modeling Input Signals, Delays, System Integration, Linear Systems, Motion Control Models, Numerical Experimentation.

Unit-4 Exogenous signals and events and markov Process 12

Disturbance Signals, State Machines, Petri Nets & Analysis, System Encapsulation, MARKOV Process: Probabilistic Systems, Discrete Time Markov Processes, Random Walks, Poisson Processes, the Exponential Distribution, Simulating a Poisson Process, Continuous-Time Markov Processes.

Unit 5 Event driven models and system optimization 10

Simulation Diagrams, Queuing Theory, characteristics of queuing system, Simulating Queuing Systems, Types of Queues, Multiple Servers, System Identification, Searches, Multidimensional Optimization, Modeling and Simulation Mythology.

Text Books:

1. System Modeling & Simulation, an Introduction – Frank L. Severance, John Wiley & Sons, 2001.
2. Simulation Modeling and Analysis – Averill M. Law, W. David Kelton, TMH, 3rd Edition, 2003.

Reference Book:

1. Systems Simulation – Geoffrey Gordon, PHI, 1978.

Course Outcomes:

1. Define basic concepts in Modeling and Simulation.
2. Understand the fundamental logic, structure, components and management of simulation modeling & demonstrate knowledge of how to use arena

Department of Computer Science and Engineering

3. Classify various simulation models and give practical examples for each category
4. Generate and test random number varieties and apply them to develop simulation models
5. Analyze output data produced by a model and test validity of the model.
6. Perform statistical analysis of output from terminating simulation.

COs-POs-PSOs Mapping

Course Outcomes	Program Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
19A28ET .1	3	3	3	3	3	3	3	3	3	3	3	-
19A28ET .2	3	3	3	3	3	3	3	3	3	3	1	-
19A28ET .3	3	3	3	3	3	3	3	3	3	3	3	-
19A28ET .4	3	3	3	3	3	3	3	3	3	3	3	-
19A28ET .5	3	3	3	3	3	3	3	3	3	3	3	-
19A28ET .6	3	3	3	3	3	2	-	2	2	2	2	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Entrepreneurship Development
Category : OEC
Course Code : 19A38ET
Year : IV Year
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	-	-	3

Course Objectives:

- To develop and strengthen entrepreneurial quality and motivation in students
- To impart basic entrepreneurial skills and understanding to run a business efficiently and effectively.

Unit 1 Entrepreneurship 09
Entrepreneur – Types of Entrepreneurs – Difference between Entrepreneur and Intrapreneur
Entrepreneurship in Economic Growth, Factors Affecting Entrepreneurial Growth.

Unit 2 Motivation 09
Major Motives Influencing an Entrepreneur – Achievement Motivation Training, Self-Rating, Business Games, Thematic Apperception Test – Stress Management, Entrepreneurship Development Programs – Need, Objectives.

Unit 3 Business 10
Small Enterprises – Definition, Classification – Characteristics, Ownership Structures – Project Formulation – Steps involved in setting up a Business – identifying, selecting a Good Business opportunity, Market Survey and Research, Techno Economic Feasibility Assessment – Preparation of Preliminary Project Reports – Project Appraisal – Sources of Information – Classification of Needs and Agencies.

Unit 4 Financing And Accounting 09
Need – Sources of Finance, Term Loans, Capital Structure, Financial Institution, Management of working Capital, Costing, Break Even Analysis, Taxation – Income Tax, Excise Duty – Sales Tax.

Unit 5 Support To Entrepreneurs 09
Sickness in small Business – Concept, Magnitude, Causes and Consequences, Corrective Measures
- Business Incubators – Government Policy for Small Scale Enterprises – Growth Strategies in small industry
– Expansion, Diversification, Joint Venture, Merger and Sub Contracting

Prescribed Text Books:

1. Khanka. S.S., "Entrepreneurial Development" S.Chand & Co. Ltd., Ram Nagar, New Delhi, 2013. ISBN : 81-219-1801-4
2. Donald F Kuratko, "Entrepreneurship – Theory, Process and Practice", 9th Edition, Cengage Learning, 2014. ISBN-10: 1285051750

Reference Books:

1. Hisrich R D, Peters M P, "Entrepreneurship" 8th Edition, Tata McGraw-Hill, 2013. ISBN 1843769964
2. Mathew J Manimala, "Entrepreneurship theory at cross roads: paradigms and praxis" 2nd Edition Dream tech, 2005. ISBN 81-297-0260-6
3. Rajeev Roy, "Entrepreneurship" 2nd Edition, Oxford University Press, 2011. ISBN 10: 0198072635
4. EDII "Faulty and External Experts – A Hand Book for New Entrepreneurs Publishers: Entrepreneurship

Development", Institute of India, Ahmadabad, 1986. ISBN 0-07-026694-8

Course Outcomes:

Student will be able to

1. Understand the basic concepts of entrepreneurship
2. Understand the importance of motivation for entrepreneur
3. Gain knowledge and skills needed to run a business successfully.
4. Learn the concepts of financing and accounting
5. Understand the basic concepts of various supporting process

Blooms Level of Learning

- L2
L2 & L3
L3, L4 & L5
L3
L2

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A35KT.1	3	-	-	-	-	-	-	-	3	3	-	2	-	-	-
19A35KT.2	3	-	-	-	-	-	-	-	-	3	-	-	-	-	-
19A35KT.3	3	-	-	-	-	2	-	2	2	3	-	3	-	-	-
19A35KT.4	3	3	-	-	-	-	-	-	3	3	-	-	-	-	-
19A35KT.5	3	-	-	-	-	-	-	-	3	3	-	-	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Optimization in Engineering
Category : OEC
Course Code : 19A38FT
Year : IV Year
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	-	0	3

Course Objectives:

- To enable the students to the nature and scope of various decision making situations within business contexts, understand and apply operations research techniques to industrial applications.
- To learn the fundamental techniques of Operations Research and to choose a suitable OR technique to solve problem

Unit 1 12

Linear Programming: Problem Formulation, Graphical solution, Simplex method, Artificial variables techniques - Two-phase method, Big-M method – Duality Principle

Unit 2 12

Transportation Mode: Formulation, Optimal solution, unbalanced transportation problem, Degeneracy.
Assignment Model: Formulation, Optimal solution, Variants of Assignment Problem, Travelling Salesman problem.

Unit 3 09

Theory of Games: Introduction – minimax - maximin – Criterion and optimal strategy – Solution of games with saddle points – Rectangular games without saddle points – 2 X 2 games – m X 2, 2 X n & m x n games - Graphical method, Dominance principle

Unit 4 : 07

Waiting Lines: Introduction – single channel – Poisson arrivals – exponential service times – with infinite queue length models.

Simulation: Definition – Types of simulation models – phases of simulation– applications of simulation – Queuing problems – advantages and disadvantages – Simulation languages.

Unit 5 : 08

Inventory: Introduction – Single item – Deterministic models – Purchase inventory models with one price break and multiple price breaks

Dynamic Programming: Introduction – Bellman's Principle of optimality – Applications of dynamic programming- shortest path problem – linear programming problem

Prescribed Text Books:

1. PS Gupta, DS Hira, Operations Research, S Chand Publications, 10th Edition, 2016, ISBN-13978-8121902816
2. S.D. Sharma, Operations Research, Kedarnath and Ramnath Publications, 2012, ISBN-135551234001596

Reference Books:

1. Taha, *Introduction to Operations Research*. PHI, 10 th edition, 2016, ISBN-13978-0134444017

2. R. Panneerselvam, *Operations Research*. PHI Publ, 2nd edition, 2004, ISBN: 9788120319233

Course Outcomes:

Student will be able to

Blooms Level of Learning

1. Develop mathematical models of the real life situations and capable of solving them for obtaining best solutions L3
2. Solve the special cases of LPP like Transportation problems, Assignment and Travelling salesmen problems L3
3. Choose the best strategy out of the available strategies in the competition or game L3
4. Apply the fundamentals of waiting lines in real life situations and can Simulate queuing models L3
5. Understand and will apply the fundamentals of inventory in real life situations and can apply Dynamic Programming technique to solve the complex problems by breaking them into a series of sub-problems L3

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A38FT.1	3	2	-	2	-	-	-	-	-	-	-	-	-	-	-
19A38FT.2	3	2	2	-	-	-	2	-	-	-	-	-	-	-	-
19A38FT.3	3	2	2	-	-	-	2	-	-	-	-	-	-	-	-
19A38FT.4	3	2	2	-	-	2	2	-	-	-	-	-	-	-	-
19A38FT.5	3	2	-	-	-	2	2	-	-	-	-	-	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Total Quality Management
Category : OEC
Course Code : 19A38GT
Year : IV Year
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	-	0	3

Course Objectives:

- To introduce the students, the basic concepts of Total Quality Management.
- To expose with various quality issues in Inspection.
- To gain Knowledge on quality control and its applications to real time.
- To know the extent of customer satisfaction by the application of various quality concepts.
- To understand the importance of Quality standards in Production.

Unit 1 Introduction 10
Definition of Quality, Dimensions of Quality, Definition of Total quality management, Quality Planning, Quality costs – Analysis, Techniques for Quality costs, Basic concepts of Total Quality Management.

Unit 2 Historical Review 09
Quality council, Quality statements, Strategic Planning, Deming Philosophy, Barriers of TQM Implementation, Benefits of TQM, Characteristics of successful quality leader, Contributions of Gurus of TQM, Case studies.

Unit 3 TQM Principles 08
Customer Satisfaction – Customer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Employee Involvement – Motivation, Empowerment teams, Continuous Process Improvement – Juran Trilogy, PDCA Cycle, Kaizen, Supplier Partnership – Partnering, sourcing, Supplier Selection, Supplier Rating, Relationship Development, Performance Measures – Basic Concepts, Strategy, Performance Measure Case studies

Unit 4 TQM Tools 09
Benchmarking – Reasons to Benchmark, Benchmarking Process, Quality Function Deployment (QFD) – House of Quality, QFD Process, Benefits, Taguchi Quality Loss Function, Total Productive Maintenance (TPM) – Concept, Improvement Needs, FMEA – Stages of FMEA, The seven tools of quality, Process capability, Concept of Six Sigma, New Seven management tools, Case studies.

Unit 5 Quality Systems 08
Need for ISO 9000 and Other Quality Systems, ISO 9000: 2000 Quality System – Elements, Implementation of Quality System, Documentation, Quality Auditing, QS 9000, ISO 14000 – Concept, Requirements and Benefits, Case Studies.

Prescribed Text Books:

1. Dale H Besterfield, Total Quality Management, Fourth Edition, Pearson Education, 2018, ISBN: 9789332534452
2. Subburaj Ramaswamy, Total Quality Management, Tata Mcgraw Hill Education., 2012, ISBN: 1259001415, 9781259001413
3. Joel E. Ross, Total Quality Management, Third Edition, CRC Press, 2017, ISBN: 9781351407786

Reference Books:

1. Narayana V and Sreenivasan N.S, Quality Management – Concepts and Tasks, NewAge International, 1996, ISBN-10: 8122416802.
2. Robert L.Flood, Beyond TQM, First Edition, John Wiley & Sons Ltd, 1993, ISBN: 9780471939672.
3. Richard S. Leavenworth & Eugene Lodewick Grant, Statistical Quality Control, Seventh Edition, Tata Mcgraw Hill, 2015, ISBN, 0070241147, 9780070241145.
4. Samuel Ho , TQM – An Integrated Approach, Kogan Page Ltd, USA, 1995, ISBN: 9780749415617.

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|--|----|
| 1. Develop an understanding on quality Management philosophies and frameworks. | L2 |
| 2. Adopt TQM methodologies for continuous improvement of quality. | L3 |
| 3. Measure the cost of poor quality, process effectiveness and efficiency to identify areas for improvement. | L4 |
| 4. Apply benchmarking and business process reengineering to improve management processes. | L3 |
| 5. Determine the set of indications to evaluate performance excellence of an organization. | L3 |

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A37GT.1	2	-	-	-	-	2	2	-	-	-	2	1	-	-	-
19A37GT 2	2	2	-	2	-	2	-	-	-	1	2	1	-	-	-
19A37GT 3	1	2	-	2	-	-	-	1	1	1	2	1	-	-	-
19A37GT 4	1	-	-	-	-	1	-	-	-	-	2	1	-	-	-
19A37GT 5	1	-	-	-	-	-	-	-	-	-	2	2	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Introduction to Digital Design
Category : OE
Course Code : 19A48DT
Year : IV B.Tech.
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: The course aims to provide the student with the ability

- To get the knowledge on Number Systems and codes.
- To gain the knowledge on Boolean algebra.
- To acquire the knowledge of various circuits in Digital design.

Unit 1 : Number systems, Codes & Boolean Algebra 14

Philosophy of number systems – r , $(r-1)$'s complement, representation of negative numbers, binary arithmetic, binary codes, error detecting & error correcting codes, hamming codes. Boolean algebra: Fundamental postulates of Boolean algebra, Basic theorems and properties, digital logic gates, properties of XOR gate, universal gates.

Unit 2 : Switching Functions and Their Minimization 14

Switching Functions-Canonical and Standard forms, algebraic simplification using Boolean theorems, two level & Multilevel Realization of Boolean Functions using Universal Gates. Minimization: K-Map methods, Prime implicants, don't care combinations, Minimal SOP and POS forms, Tabular Method, Prime-Implicants chart, simplification rules

Unit 3 : Combinational Logic Design & Programmable Logic Devices 10

Design using conventional logic gates-Binary Adders, Subtractors, Ripple Adder, carry Look Ahead adder, Magnitude comparator, Encoder, Decoder, Multiplexer, De-Multiplexer, Code converters. PLD's: ROM, PROM, PLA, PAL, and Realization of Switching functions using PLD's. Comparison between PLA, PAL, ROM.

Unit 4 : Sequential Circuits 9

Classification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples), Basic flip-flops, Triggering and excitation tables, flip flop conversions, Steps in synchronous sequential circuit design, Design of modulo-N Synchronous counters – up/down counter, ring counter, Johnson counter

Unit 5 : FSM Minimization and ASM Chart 12

Finite state machine- capabilities and limitations, Mealy and Moore models and their conversions Sequence detector, Serial binary adder. Minimization of completely specified sequential machines-Partition techniques. Salient features of the ASM chart, Simple examples

Prescribed Text Books:

1. Morris Mano, Digital Design. Prentice Hall India, 3 rdEd.
2. ZVI Kohavi and Niraj K. Jha Switching & Finite Automata theory. Tata McGraw Hill, 3 rdEd.

Reference Text books:

1. Charles H. Roth, Fundamentals of Logic Design. Thomson Publications, 2004, 5 th Ed.
2. Fletcher, an Engineering Approach to Digital Design. Prentice Hall India.

3. Anand Kumar, Switching Theory and Logic Design. Prentice Hall India, 2008.

Course Outcomes:

Upon completion of the course, student can

Blooms Level of Learning

1. Understand different number systems conversions & Binary codes L2
2. Simplify Boolean functions & realize them using digital logic gates. L5
3. Design various combinational & sequential circuits. L6
4. Understand the Minimization techniques of Finite State Machine & the elements of ASM chart. L2

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A48DT.1	2	3	2	-	2	-	-	1	-	-	2	-	3	-	-
19A48DT.2	2	2	2	-	-	1	-	1	-	-	2	-	2	2	-
19A48DT.3	2	2	2	-	-	1	-	1	-	-	2	-	-	3	-
19A48DT.4	2	2	2	-	-	1	-	1	-	-	2	-	-	3	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : INDUSTRIAL ELECTRONICS
Category : OE
Course Code : 19A48ET
Year : IV B.Tech.
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will able to

- Power quality terminology, power quality issues, classification
- Different sources of power quality disturbances
- Harmonic distortion; Principles for controlling harmonics
- Power quality measuring equipment; Power quality monitoring standards
- Impact of distributed generation on power quality

Unit 1 : INTRODUCTION TO POWER QUALITY 8
Power Quality- definition, terminology, issues, evaluation procedure, responsibilities of the suppliers and users of electric power, power quality standards, CBEMA and ITI curves.

Unit 2 : POWER QUALITY DISTURBANCES 10
General classes of power quality problems- Impulsive and oscillatory transients. Long duration voltage variations - over voltage, under voltage, sustained interruption. Short duration voltage variations-interruption, sag, swell and outage. Sources of sags and interruptions, estimating voltage sag performance overview of mitigation methods.

Unit 3 : FUNDAMENTALS OF HARMONICS 10
Harmonic distortion, voltage versus current distortion, harmonics versus transients, power system quantities under non-sinusoidal conditions, harmonic indices. Harmonic sources from commercial and industrial loads. Effects of harmonic distortion. Applied harmonics - harmonic distortion evaluation, principles of controlling harmonics, and devices for controlling harmonic distortion. Harmonic filter design and standards on harmonics.

Unit 4 : POWER QUALITY MONITORING 9
Power quality benchmarking, monitoring considerations, choosing monitoring locations, permanent power quality monitoring equipment, historical perspective of power quality measuring instruments. Power quality measurement equipment-types of instruments, assessment of power quality measurement data, power quality monitoring standards.

Unit 5 : DISTRIBUTED GENERATION AND GRID INTERCONNECTION 8
Distributed generation -connection requirements and impacts on the network. Interaction and optimal location of DG-Eigen analysis and voltage interaction. Power quality in DG-Mitigation of voltage dip during motor start, harmonic effects with DG, voltage flicker and fluctuation. Islanding issues, distribution line compensation-heavy Load and Light load condition, real generation, protection issues for distributed generation, technologies for distributed generation, power quality impact from different DG types.

Prescribed Text Books:

1. Roger C. Dugan, Mark F. Mc Granaghan, Surya Santoso, H. Wayne Beaty, Electrical Power Systems Quality, 3rd edition, TMH Education Pvt. Ltd., 2012.

2. Arindam Ghosh, Gerard Ledwich, Power quality enhancement using custom power devices, Kluwer academic publishers, 2002

Reference Text books:

1. G.T. Heydt, *Electric Power Quality*, Stars in a circle Publications, 1991. USA.
2. Surajit Chattopadhyaya, Madhuchhanda Mitra, Samarjit Senugupta, *Electrical Power Quality*, Springer Dordrecht Heidelberg London New York.
3. Math H. J. Bollen, *Understanding Power quality problems*, IEEE Press, 2007.

Course Outcomes:

Student will be able to

Blooms Level of Learning

- | | |
|---|----|
| 1. Demonstrate knowledge on sources of power quality disturbances and issues, power quality monitoring and measuring instruments, power quality standards, effect of distributed generation on power quality. | L1 |
| 2. Analyze various power quality issues. | L3 |
| 3. Design a suitable harmonic filter for commercial and industrial loads. | L4 |
| 4. Investigate various power quality issues and provide feasible solutions for improvement of power quality. | L5 |
| 5. Select and use an appropriate equipment for monitoring and measurement of power quality. | L4 |

CO-PO Mapping:

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)

Title of the Course : Cognitive Science
Category : PE
Course Code : 19A58AT
Year : IV B. Tech.
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will able to

- Gain knowledge in basic human behavior, processing models in psychology
- Understand computational modeling of an image
- Design hypothesis using machine learning algorithms
- Understand neural network models for an human behavior

Unit 1 : *Introduction to Cognitive science* 9

The prehistory of cognitive science, The reaction against behaviorism in psychology, The theory of computation and the idea of an algorithm, Linguistics and the formal analysis of language, Information-processing models in psychology

Unit 2 : *The Integration Modelling* 9

Language and micro-worlds, Information processing in mental imagery, An interdisciplinary model of vision, Extending computational modeling to the brain, Mapping the stages of lexical processing

Unit 3 : *Information-processing models of the mind* 9

The physical symbol system hypothesis, From physical symbol systems to the language of thought, Expert systems, machine learning and the heuristic search hypothesis, ID3: An algorithm for machine learning, WHISPER: Predicting stability in a block world

Unit 4 : *Neural networks and distributed information processing* 9

Neurally inspired models of information processing, Single-layer networks and Boolean functions, Multilayer networks, Information processing in neural networks: Key features

Unit 5 : *Neural network models of cognitive processes* 9

Language and rules: The challenge for information-processing models, Language learning in neural networks Object permanence and physical reasoning in infancy, Neural network models of children's physical reasoning

Prescribed Text books:

1. Jose leuz Bermudz, Cognitive Science: An introduction to science of mind, 2nd Edition, Cambridge university press, 2014.
2. Jay Friedenberg, Gordon Silverman, Cognitive Science: An introduction to science of mind, Sage publications, 2006.

Reference Text Books:

1. Jose leuz Bermudz, Cognitive Science: An introduction to science of mind, 2nd Edition, Cambridge university press, 2014.
2. Jay Friedenberg, Gordon Silverman, Cognitive Science: An introduction to science of mind, Sage publications, 2006.

Student will be able to

Blooms Level of Learning

- L1
L3
L5
L3
L6

[illegible]

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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Title of the Course : Data Science
Category : PE
Course Code : 19A58BT
Year : IV B. Tech.
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will able to

- Provide knowledge and expertise to become a proficient data scientist.
- Fundamental knowledge of concepts underlying data science and give a hands-on experience with real-world data analysis.
- Demonstrate an understanding of statistics and machine learning concepts that are vital for data science.
- Demonstrates the importance of recommendation engines for data analysis.
- Critically evaluate data visualizations based on their design and use for communicating stories from data

Unit 1 : INTRODUCTION: 9

INTRODUCTION: What is Data Science? - Big Data and Data Science hype – and getting past the hype - Why now? – Datafication - Current landscape of perspectives – the Skill needed to do data science.

Statistical Inference - Populations and samples – Modeling - statistical modeling, probability distributions, fitting a model.

Unit 2 : DATA ANALYSIS AND ALGORITHMS 12

DATA ANALYSIS AND ALGORITHMS: Exploratory Data Analysis (EDA), tools for EDA, The Data Science Process, role of data scientist's, case study.

Algorithms: Machine Learning Algorithms, Three Basic Algorithms - Linear Regression - k-Nearest Neighbors (k-NN) - k-means – SVM, Naïve Bayes, Logistic Regression.

Unit 3 : EXTRACTING MEANING FROM DATA 9

EXTRACTING MEANING FROM DATA: Feature Selection – User Retention, Feature Generation and Extraction - Feature Selection algorithms – Filters; Wrappers; Decision Trees; Entropy, Random Forests. Google's Hybrid approach to Social Research.

Unit 4 : RECOMMENDATION ENGINES: 9

RECOMMENDATION ENGINES: Role of data in Building a User-Facing Data Product, Algorithmic ingredients of a Recommendation Engine, Bipartite graph, Nearest Neighbor algorithm and its problems.

Dimensionality Reduction: Singular Value Decomposition - Principal Component Analysis - Exercise: build your own recommendation system.

Unit 5 : DATA VISUALIZATION 12

DATA VISUALIZATION: Types of data visualization, plots, graphs and summary statistics, Data for visualization, Technologies for visualization.

Social Network Analysis- Data Engineering – MapReduce, Pregel, Hadoop, Next Generation Data Scientists- Applications of Data Science- Recent trends and development in Data Science.

Prescribed Text Books:

1. Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk from the Frontline. O'Reilly Edition, 2014.

Reference Text books:

1. Jure Leskovek, Anand Rajaraman and Jerey Ullman. Mining of Massive Datasets. v2.1 Cambridge University Press. 2014.
2. Kevin P. Murphy. Machine Learning: A Probabilistic Perspective. ISBN 0262018020. 2013.
3. Foster Provost and Tom Fawcett. Data Science for Business: What You Need to Know about Data Mining and Data-analytic Thinking. ISBN 1449361323. 2013.

Course Outcomes:

On completion of the course the student should be able to	Blooms Level of Learning
1. Understand the key concepts and notations in data science	L2
2. Implement the standard methods of data analysis, information retrieval and Machine learning.	L3
3. Demonstrate the problem of knowledge extraction as combinations of data filtration, analysis and exploration methods.	L3
4. Learn and distinguish the fundamental techniques for making personalized recommendations through nearest-neighbor techniques.	L4
5. Understand the importance of data visualization and the design and use of many visual components for effective communications and applications of data visualization in various domains.	L5, L6

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A58BT.1	3	-	-	-	-	-	-	-	3	-	-	3	3	-	-
19A58BT.2	3	3	3	-	3	-	-	-	3	-	3	3	3	3	3
19A58BT.3	3	3	3	-	3	-	-	-	3	-	3	3	3	3	3
19A58BT.4	3	-	3	-	3	-	-	-	3	-	-	3	3	3	3
19A58BT.5	3	3	3	-	3	-	-	-	3	-	3	3	3	3	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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Title of the Course : Software Architecture
Category : PE
Course Code : 19A58CT
Year : IV B. Tech.
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will able to

- Learn the fundamentals concepts of the software architecture.
- Acquire the knowledge of various architectural styles.
- Understand the Architectural structures of Shared Information System.
- Identify Formal Approaches to software architectures.
- Analyze implementation of Architectural Design Tools and providing solutions to real world software design problems.

Unit 1 : *Introduction to Software Architecture* 9
An Engineering Discipline for Software, Status of S/W Arch. Architecture Business Cycle, Where do Architectures come from. Software Processes and the Architecture Business Cycle, Features of Good Architecture.

Unit 2 : *Architecture Styles* 9
Pipes and Filters, Data Abstraction and Object Oriented organization, Even-based Implicit Invocation, Layered Systems, Registers, Interpreters, Process Control, Other Familiar Architectures, Heterogeneous Architectures.

Unit 3 : *Shared Information Systems* 9
Database Integration, Integration in Software Development Environments, Architectural Structures for Shared Information Systems.
Architectural Design Guidance: Guidance for User Interface Architectures, Case Study in Inter-Operability: World Wide Web.

Unit 4 : *Formal Models and Specifications* 9
Formalizing the Architecture of a Specific System, Architectural Style, Architectural Design Space, and Case Study of an Industry Standard Computing Infrastructure: CORBA.
Linguistic Issues: Requirements for Architecture-Description Language

Unit 5 : *Tools for Architectural Design* 9
A Universal Connector Language, Exploiting Style in Architectural Design Environment.
Software Product Lines: Overview, What makes software product lines work?, Architectures for Product Line, What makes Software Product Lines Difficult?

Prescribed Text books:

1. Mary Shaw, David Garlan, "S/W Arch. Perspective: on an Emerging Discipline", 1996, PHI.
2. Len Bass, Paul Elements, Rick Kazman, "Software Architecture in Practice", 1998, PEA.

Reference Text Books:

1. Garmus, Herros, "Measuring the Software Process: A Practical Guide to Functional Measure", 1996, PHI.
2. Carleton, "Meas. Software Process: Stat. Proce. Cont. for Software process Improvements", 1999, PEA.

Department of Computer Science and Engineering

3. W.Humphery, "Introduction to Team Software Process", 2002, PEA.
4. Peters, "Software Design: Methods and Techniques", 1981, Yourdon.
5. Gamma, Shaw, "An Introduction to Software Architecture", 1995, World Scientific.
6. Shaw, gamma, "Software Architecture", 1996, PHI.

Course Outcomes:

Student will be able to

Blooms Level of Learning

1. Understand the principles, techniques, and methods for design, analysis, and maintenance of software architectures L1, L2
2. Choose the Architectural style for designing their software. L1, L2
3. Integrate database with Software in Shared Environment and to do a case study in World Wide Web. L1, L2,L3
4. Categorize the Architectural Style and Design that are suited for Specific system. L1, L2
5. Use an Architectural Design Tools to improve System Quality. L1,L2,L3

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A58CT.1	3	3	-	-	-	-	-	-	-	-	3	3	3	-	-
19A58CT.2	3	3	2	-	3	-	-	-	-	-	-	-	3	-	-
19A58CT.3	3	3	2	3	3	-	1	-	3	1	3	3	3	-	-
19A58CT.4	-	-	-	3	3	-	-	-	3	-	3	3	3	1	2
19A58CT.5	-	3	-	3	3	-	-	-	3	-	3	3	3	-	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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Title of the Course : Wireless Sensor Networks
Category : PE
Course Code : 19A58DT
Year : IV B. Tech.
Semester : II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives: This course will able to

- Understand the basic concepts of wireless sensor network (WSN) and its applications.
- Analyze different wireless technologies.
- Develop new frameworks/protocols/methods for WSN.
- Illustrate the working principles of a WSN

Unit 1 : Introduction and overview of Wireless Sensor Networks 9
Background of Sensor Network Technology - Application of Sensor Networks - Basic overview of the technology - Basic Sensor Network Architectural Elements - Survey of Sensor Networks - Applications of Sensor Networks: Range of Applications - Examples of Category 2 WSN Applications - Examples of Category 1 WSN Applications - Taxonomy of WSN Technology.

Unit 2 : Basic Wireless Sensor Technology 9
Sensor Node Technology - Sensor Taxonomy - WN Operating Environment - WN Trends - Wireless Transmission Technology and Systems: Radio Technology Primer - Propagation and Propagation Impairments - Available Wireless Technologies - Campus Applications - MAN/WAN Applications.

Unit 3 : Medium Access Control Protocols for Wireless Sensor Networks 12
Fundamentals of MAC Protocols - Performance Requirements - Common Protocols - MAC Protocols for WSNs - Sensor-MAC Case Study - IEEE 802.15.4 LR - WPANs Standard Case Study - PHY Layer - MAC Layer. Routing Protocols for Wireless Sensor Networks: Data Dissemination and Gathering - Routing Challenges and Design Issues in Wireless Sensor Networks - Routing Strategies in Wireless Sensor Networks.

Unit 4 : Transport Control Protocols for Wireless Sensor Networks 12
Traditional Transport Control Protocols - Transport Protocol Design Issues - Examples of Existing Transport Control Protocols - Performance of Transport Control Protocols - Middleware for Wireless Sensor Networks: WSN Middleware Principles - Middleware Architecture - Existing Middleware.

Unit 5 : Network Management for Wireless Sensor Networks 9
Traditional Network Management Models - Network Management Design Issues - Example of Management Architecture: MANNA - Naming - Localization. Operating Systems for Wireless Sensor Networks: Design Issues - Examples of Operating Systems - Performance and Traffic Management: WSN Design Issues - Performance Modelling of WSNs - Case Study: Simple Computation of the System Life Span.

Prescribed Text books:

1. KazemSohraby, Daniel Minoli and TaiebZnati, Wireless Sensor Networks: Technology, Protocols, and Applications, John Wiley and Sons, 2011, ISBN: 9788126527304, 8126527307
2. Holger Karl and Andreas Willig, Protocols and Architectures for Wireless Sensor Networks, John Wiley and Sons, 2007, ISBN: 978-0471718161.

[illegible]

PROGRAM OUTCOMES

A graduate of Computer Science & Engineering will have ability to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/Development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Understand the working of new hardware/software architectures and components and design solutions for real time problems.

PSO2: Model the computer-based systems and design algorithms that explores understanding of the trade-offs involved on design choices.

PSO3: Design, develop and test system software and application software for distributed and centralized computing environments to varying domain and platforms.