ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET (AUTONOMOUS)

Department of Computer Science and Engineering

VISION AND MISSION OF THE DEPARTMENT

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.

PROGRAMME EDUCATIONAL OBJECTIVES

PEO1: Technical Competence: To disseminate inclusive knowledge of fundamentals of engineering and modern computing practices, through advanced curriculum, enabling the graduates to synthesize novel ideas.

PEO2: Learning Environment: To sensitize the graduates with the efficacy of continuous learning reinforced through student-centric pedagogy that inculcates creative talents to survive and thrive in the profession.

PEO3: Sustainable Skills: To nurture professional behavior and industry-specific acumen in the students to effectively operate and sustain in heterogeneous work environments.

PEO4: Ethical Behavior: To help the students understand the ramifications of emerging computing technologies and ethical application of technical expertise to resolve contemporary challenges for the welfare of the nation.

PROGRAMME 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.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

1. Understand the working of new hardware/software architectures and components and design solutions for real time problems.
2. Model the computer-based systems and design algorithms that explores understanding of the trade-offs involved on design choices.
3. Design, develop and test system software and application software for distributed and centralized computing environments to varying domain and platforms.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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Department of Computer Science and Engineering

I B.Tech - Zero Semester

Phase	Course Code	Name of the course	Lecture	Practical
Regular Phase	19A501	Proficiency classes: Familiarity with a computer	2	2
Regular Phase	19AC01	Proficiency classes: English Communication Skills	2	2
Regular Phase	19A502	Basics of Programming and Lab	3	2
Regular Phase	19AC02	Foundation classes in Mathematics	3	0
Regular Phase	19AC03	Foundation classes in Physics	3	2
Regular Phase	19AC04	Foundation classes in Chemistry	3	2
Regular Phase	19AC05	Universal Human Values	2	0
Regular Phase	19A301	Fundamentals of Engineering Drawing	1	0
Regular Phase	-	Physical education activities – Sports and Games	0	1
Non daily	-	Creative Arts		
Non daily	-	Lectures by eminent personalities		
Non daily	-	Visits to local area		
Non daily	-	Extra-curricular activities		

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET

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Department of Computer Science and Engineering
Course Structure for R19 Regulations
I Year 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		-	3
2	BS	19AC14T	Engineering Chemistry	3		-	3
3	BS	19AC11T	Algebra and Calculus	3	1	-	4
4	ES	19A511T	Problem Solving and C Programming	3		-	3
Lab Courses							
5	BS	19AC14L	Engineering Chemistry Lab	-	-	3	1.5
6	ES	19A511L	C Programming Lab	-	-	3	1.5
7	HS	19AC15L	Communicative English Lab	-	-	3	1.5
8	ES	19A512L	IT Workshop	-	-	2	1
9	MC	19AC16T	Environmental Science	3		0	0
				15	1	11	18.5

I Year II Semester

S. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	
1	ES	19A221T	Basic Electrical & Electronics Engineering	3	-	-	3
2	ES	19A324T	Engineering Graphics & Design	1	-	3	2.5
3	ES	19A521T	Python Programming	3	-	-	3
4	BS	19AC22T	Applied Physics	3	-	-	3
5	BS	19AC21T	Differential Equations and Vector Calculus	3	1	-	4
Lab Courses							
6	ES	19A221L	Basic Electrical and Electronics Engineering Lab	-	-	3	1.5
7	ES	19A521L	Python Programming Lab	-	-	3	1.5
8	BS	19AC22L	Applied Physics Lab	-	-	3	1.5
9	ES	19A325L	Engineering Workshop and Advanced IT Workshop	-	-	3	1.5
				13	1	15	21.5

II Year I Semester

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

II Year II Semester

S. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	
1	BS	19AC43T	Probability and Statistics	3	-	-	3
2	PC	19A541T	Artificial Intelligence	3	-	-	3
3	PC	19A542T	Design and Analysis of Algorithms	3	-	-	3
4	PC	19A543T	Formal Languages and Automata Theory	3	-	-	3
5	PC	19A544T	Object Oriented Programming Using Java	3	-	-	3
6	PC	19A545T	Operating Systems	3	-	-	3
7	PC	19A546T	Software Engineering	3	-	-	3
Lab Courses							
8	PC	19A542L	Design and Analysis of Algorithms Lab	-	-	2	1
9	PC	19A544L	JAVA Lab	-	-	2	1
10	PC	19A547L	Operating Systems Lab and Artificial Intelligence Lab	-	-	3	1.5
11	MC	19AC45T	Essence of Indian Traditional Knowledge	3			0
				24	0	7	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
				18	0	6	21

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
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	Enterprise 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	Enterprise 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				
		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

OPEN ELECTIVE COURSES (Offered by CSE to other departments)

S. No.	Category	Course Code	Course Title	Offered by	Offered to
1	OEC	19A56IT / 19A57ET	Artificial Intelligence	CSE	CE & ME / EEE & ECE
2	OEC	19A56JT / 19A57FT	Cyber Security	CSE	CE & ME / EEE & ECE
3	OEC	19A58ET	Internet of Things	CSE	ALL
4	OEC	19A58FT	Web Programming	CSE	ALL

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 Roils
5. Game design and development using unity 3D
6. Amazon Web services

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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: *ChinduYellamma*
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

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Unit 5
Reading: *Politics and the English Language b*y 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, prepositions, tenses, subject verb agreement)
Writing: Writing structured essays on specific topics using suitable claims and evidences

Prescribed Text Books
1. Language and Life published by Orient Black Swan (with CD).

Reference Books
1. English Grammar in Use: A Self Study Reference and Practice Book, Raymond Murphy, Fourth Edition, Cambridge Publications
2. English Grammar and Composition, David Grene, Mc Millan India Ltd

Course Outcomes:

Student will be able to	Blooms Level of Learning
1. read, scan and skim texts such as literary forms, journalistic articles and scientific readings for comprehension and retention	L2
2. exhibit self-confidence and innovative thinking and communicate more effectively	L3
3. understand the factors that influenceuse of grammar and vocabulary in speech and writing and formulate sentences with grammatical accuracy	L2
4. produce coherent and unified paragraphs with adequate support and detail	L4

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19AC15T.1	-	-	-	-	-	-	-	-	-	3	-	2
19AC15T.2	-	-	-	-	-	-	-	-	-	3	-	2
19AC15T.3	-	-	-	-	-	-	-	-	-	3	-	2
19AC15T.4	-	-	-	-	-	-	-	-	-	3	-	2

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
3	0	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 MnO_2 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).
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. SeshaMaheshwaramma and MridulaChugh, Engineering Chemistry, Pearson India Edn services, (2016)

Course Outcomes:

Student will be able to	Blooms Level of Learning
1. Enumerate different types of electrodes, electrochemical cells and their working	L1
2. Describe the constructing and working of different types of batteries and fuel cells	L2
3. Understand p and n type semiconductors and construction of PV cell	L2
4. explain the preparation, properties, mechanism of conduction and applications of different types of polymers	L4
5. explain the synthesis & analysis of different types of nanomaterials and compare molecular switches with 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

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19AC11T.1	3	3	-	-	-	-	-	-	-	-	-	3
19AC11T.2	3	2	-	-	-	-	-	-	-	-	-	3
19AC11T.3	3	3	-	-	-	-	-	-	-	-	-	2
19AC11T.4	3	3	-	-	-	-	-	-	-	-	-	2
19AC11T.5	3	3	-	-	-	-	-	-	-	-	-	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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Title of the Course	Problem Solving and C programming
Category	ES
Couse 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 associatively

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.
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
(An Autonomous Institution)

Title of the Course	Engineering Chemistry Lab
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 TiO_2/ZnOnano 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

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 programs from each exercise are to be done by students.

Exercise I: (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	Blooms Level of Learning
1. Identify and setup program development environment	L2
2. Implement the algorithms using C programming language constructs	L3
3. Identify and rectify the syntax errors and debug program for semantic errors	L3
4. Solve problems in a modular approach using functions	L4
5. Implement file operations with simple text data	L4

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
(An Autonomous Institution)

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
5. Describe people and situations using adjectives effectively	L3
6. Assess and Deduct data from graphs/pie charts/tables	L3

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19AC15L.1	-	-	-	-	-	-	-	-	-	2	-	1
19AC15L.2	-	-	-	-	-	-	-	-	-	1	-	2
19AC15L.3	-	-	-	-	-	-	-	-	3	3	-	3
19AC15L.4	-	-	-	-	-	-	-	-	3	2	-	1
19AC15L.5	-	-	-	-	-	-	-	-	1	3	-	3
19AC15L.6	-	-	-	-	-	-	-	-	-	2	-	1

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

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. Crimpling 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.

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	-	-

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

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

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

Title of the Course	Basic Electrical and Electronics Engineering
Category	ES
Course Code	19A221T
Year	I B. Tech
Semester	II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives:
- To impart the basic knowledge about the Electric circuits.
- To understand the working of various Electrical Machines.
- To know about various electronic devices.
- To understand the various parts of CRO.

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.

Prescribed Text Books:
1. K. Mehta, Principles of Electrical and Electronics Engineering. S. Chand & Co 2010.
2. T. Thyagarajan, Fundamentals of Electrical and Electronics Engineering. SciTech publications, 2011, 5th Ed

Reference Books:
1. M.S Naidu and S.Kamakshaiah, Introduction to Electrical Engineering. TMH Publications.
2. D.P Kothari and I.J Nagrath, Basic Electrical Engineering, TMH, 3rdEd.2010
3. Millman and Halkias, Electriconics devices and circuits

Course Outcomes:

Student will be able to	Blooms Level of Learning
1. Apply fundamental concepts to find response of electrical circuits.	L1
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
(An Autonomous Institution)

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)
Involutes – 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.
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.	L1, L2
2. Understand the concept of Cycloidal Curves, Involutes and the application of industry standards.	L2, L3
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.	L2, L3
4. Understand and apply Orthographic Projections of Planes.	L1, L2, L3
5. Understand and analyze the Orthographic Projections of Solids and conversion of isometric views to orthographic views vice versa.	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 Cours	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:

- 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 , 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

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. 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
3	0	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- Susceptability 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.

Prescribed Text Books

1. M.N. Avadhanulu, P. G. Kshirsagar & TVS. Arunmurthy "A Text book of Engineering Physics", S. Chand Publications,11th editioin,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:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19AC22T .1	3	2	2	-	-	-	-	-	-	-	-	-
19AC22T .2	3	2	2	-	-	-	-	-	-	-	-	2
19AC22T .3	3	2	2	-	-	-	-	-	-	-	-	2
19AC22T .4	3	1	-	-	-	-	-	-	-	-	-	-
19AC22T .5	3	2	2	-	-	-	-	-	-	-	-	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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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 calculus. L2
5. Evaluate double and triple integrals using Green's, Stoke's and Divergence theorem. L3

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19AC21T.1	3	3	-	-	-	-	-	-	-	-	-	2
19AC21T.2	3	3	-	-	-	-	-	-	-	-	-	2
19AC21T.3	3	3	-	-	-	-	-	-	-	-	-	3
19AC21T.4	3	3	-	-	-	-	-	-	-	-	-	2
19AC21T.5	3	3	-	-	-	-	-	-	-	-	-	3

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

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19A221L.1	3	-	-	3	-	-	-	-	-	-	-	-
19A221L .2	3	-	-	3	-	-	-	-	-	-	-	-
19A221L.3	-	-	-	-	-	-	-	3	-	-	-	-
19A221L.4	-	-	-	-	-	-	-	-	-	-	1	-
19A221L.5	-	-	-	-	-	-	-	-	-	-	1	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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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
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:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A521L.1	-	-	3	3	3	-	-	-	-	-	-	-	3	3	3
19A521L.2	-	-	3	3	3	-	-	-	-	-	-	-	3	3	3
19A521L.3	-	-	3	3	3	-	-	-	-	-	-	-	3	3	3
19A521L.4	-	-	3	3	3	-	-	-	-	-	-	-	3	3	3

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							

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES :: RAJAMPET
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Title of the Course	Engineering Workshop & Advanced IT Workshop
Category	ES
Course Code	19A325L
Year	I B. Tech
Semester	II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
0	0	3	1.5

Engineering Workshop

Course Objectives:

- To read and interpret job drawing, plan various operations and make assembly.
- To identify and select the hand tools and instruments used in various trades.
- To gain practical skills by performing the experiments in different trades of workshop.

Trades for exercises — Practice sessions: 24 Hrs

Carpentry shop– Two joints (exercises) from : Mortise and tenon T joint, Dove tail joint, Bridle T joint, middle lap T joint, Half Lap joint, cross lap joint, Corner Dovetail joint or Bridle Joint from soft wood stock.

Sheet metal shop– Two jobs (exercises) from: Tapered Tray, cylinder, conical funnel from out of 22 or 20 guage G.I. sheet

Fitting shop– Two jobs (exercises) from: square Fit, V-Fit, Semi-circular fit, dove tail fit from M.S. stock

House-wiring– Two jobs (exercises) from: Parallel and Series, Two way switch, Tube –Light connection, Stair case connection

Trades for demonstration:

- Plumbing
- Machine Shop
- Metal Cutting
- Soldering and Brazing

Reference Books:

1. Kannaiah P. and Narayana K.L., Workshop Manual, 3rd Edn, Scitech publishers.
2. John K.C., Mechanical Workshop Practice. 2nd Edn. PHI 2010.
3. Jeyapoovan T.and Pranitha S., Engineering Practices Lab Manual, 3rd Edn. Vikas Pub.2008.

Course Outcomes:

Student will be able to,	Blooms Level of Learning
1. Apply wood working skills in real world applications.	L3
2. Build different parts with metal sheets used in various appliances.	L3
3. Apply fitting operations in various assemblies.	L3
4. Apply basic electrical engineering knowledge for house wiring practice.	L3

CO-PO Mapping:

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

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,
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	Blooms Level of Learning
1. Demonstrate operations on operating system using commands	L3
2. Understand the web browser usage and apply it for network settings	L2, L3
3. Use the Internet for productivity like creating accounts	L3
4. Apply transformations on Multimedia content	L3
5. Utilize Cloud services such as Google forms, sheets etc	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.

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	L1
2. Demonstrate an Entity-Relationship (E-R) model from specifications and to convert the transformation of the conceptual model into corresponding logical data structures	L2
3. illustrate database concepts in structure query languages	L3
4. Analyze the problems with redundancies and eliminate redundancies in a database schema using normalization.	L4
5. Judge the need of concurrency control in transaction management concepts in database systems.	L5

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A531T.1	-	3	-	3	3	-	-	-	-	-	-	-	3	-	-
19A531T.2	-	3	3	3	3	-	-	-	-	-	-	-	3	-	3
19A531T.3	-	3	3	3	3	-	-	-	-	-	-	-	3	-	3
19A531T.4	-	3	3	3	3	-	-	-	-	-	-	-	3	-	3
19A531T.5	-	3	3	3	3	-	-	-	-	-	-	-	3	-	3

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

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. Necaise, Wiley Publications

Reference Books:

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

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A532T.1	3	3	3	-	-	-	-	-	-	-	-	2	3	-	-
19A532T.2	3	3	3	-	-	-	-	-	-	-	-	-	3	-	3
19A532T.3	3	3	3	-	3	-	-	-	-	-	-	2	3	-	3
19A532T.4	3	3	-	-	-	-	-	-	-	-	-	-	3	-	-
19A532T.5	3	3	3	-	3	-	-	-	-	-	-	-	3	-	3

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

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, ZvonkoVranesic, SafwatZaky, 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, 3rdEdition, Pearson

Reference Books:

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearon.
2. Computer- organization and Design- David A. Paterson and John L. Hennessy-Elsevier
3. Fundamentals or 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
(An Autonomous Institution)

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
(An Autonomous Institution)

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 <img> 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/

Course Outcomes:

Student will be able to	Blooms Level of Learning
1. Interpret and Use the fundamental HTML markups when designing web pages.	L2, L3, L5
2. Use and design the web pages with images, audio, videos, tables and form controls.	L3, L5
3. Use cascading style sheets and XML concepts to design web pages	L3, L5
4. Interpret and use JavaScript concepts in designing web pages	L2, L3, L5
5. Interpret and use JQuery concepts in designing web pages.	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
(An Autonomous Institution)

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

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19AC34T.1												
19AC34T .2												
19AC34T .3												
19AC34T.4												
19AC34T .5												
19AC34T .6												

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

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:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19AC37T.1	-	-	-	-	-	-	-	-	-	-	-	3
19AC37T.2	-	-	-	-	-	-	-	-	-	-	-	3
19AC37T.3	-	-	-	-	-	-	-	-	-	-	-	3
19AC37T.4	-	-	-	-	-	-	-	-	-	-	-	3
19AC37T.5	-	-	-	-	-	-	-	-	-	-	-	3

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

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.

a. 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)
b. 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)
c. 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

a. Calculating the factorial of given number.

b. Finding the given number is Prime Number or not.
c. 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

Prescribed Text Books:

1. Raghurama Krishnan, Johannes Gehrke, Data base Management Systems. TataMcGrawHill.
2. Peter Rob, Ananda Rao 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, Johannes Gehrke, Data base Management Systems. TataMcGrawHill.

Course Outcomes:

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

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A531L.1	-	3	3	3	3	-	-	-	-	-	-	-	3	-	-
19A531L.2	-	3	3	3	3	-	-	-	-	-	-	-	3	-	3
19A531L.3	-	3	3	3	3	-	-	-	-	-	-	-	3	-	3
19A531L.4	-	3	3	3	3	-	-	-	-	-	-	-	3	-	3
19A531L.5	-	3	3	3	3	-	-	-	-	-	-	-	3	-	3

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:

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

Week2:

a) Write a python program to illustrate _del_() method, _repr_() method, _cmp_() method and _len_() method.
b) Write a python program to implement the access control.
c) Write a python program to implement constructors and destructors.
d) 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:

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

Week4:

a) 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.
b) Write a python program to implement the Operator overloading.
c) Write a python program to compare two Date objects.

Week5:

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

Week6:

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

Week7:

Write a python programs to implement the following.

a) Stack ADT b) Queue ADT c) Deque ADT

Week8:

Write a python program to implement the following

a) Single linked list b)Doubly linked list c) Circular Linked list

Week9:

Demonstrate any three recursion applications

Week10:

Write a python program to perform operations on Hash tables.

Week11:

Demonstrate quick sort and merge sort.

Week12:

a) Write a python program to perform operations on Binary Trees.

b) Write a python programs to perform traversals on binary tree.

Week13:

a) Write python programs for priority queue implementation using Heaps.

b) Write a python program to implement Heap sort

Week14:

a) Write a python program to perform operations on binary search trees.

b) Write a python program to perform operations on 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.Necaise, Wiley Publications

Reference Books:

1. Core Python Programming, R.Nageswara Rao, Dream Tech Press (Wiley India), 2017 Edition
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. apply basics of object-oriented programming in python language.	L3
2. apply the handling of exceptions and algorithm analysis in python programming	L3
3. apply implementation of elementary data structures in python programming	L3
4. understand trees and priority queues implementation in python programming	L2
5. learn the implementation of maps, dictionaries, sorting and text processing operations.	L1

CO-PO Mapping:

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A532L.1	3	3	3	-	-	-	-	-	-	-	-	2	3	-	-
19A532L.2	3	3	3	-	-	-	-	-	-	-	-	-	3	-	3
19A532L.3	3	3	3	-	3	-	-	-	-	-	-	2	3	-	3
19A532L.4	3	3	-	-	-	-	-	-	-	-	-	-	3	-	-
19A532L.5	3	3	3	-	3	-	-	-	-	-	-	-	3	-	3

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)

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
3	0	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

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 Lugar, "AI-Structures and Strategies for Complex Problem Solving", 4/e, 2002, Pearson Education.
2. Robert J. Schalkolf, Artificial Intelligence: an Engineering approach, McGraw Hill, 1990.

3. Patrick H. Winston, Artificial Intelligence, 3rd edition, Pearson.

Course Outcomes:

Student will be able to	Blooms Level of Learning
1. Understand the importance of artificial Intelligence in real world environment	L2
2. Apply the artificial intelligence algorithms for problem solving	L3
3. Analyze the various reasoning and knowledge representation techniques	L4
4. Solve the problems using classification and planning techniques	L3
5. Apply knowledge and reasoning techniques in uncertain environment for obtaining solution	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
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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, SartajSahni and Rajasekharam, Fundamentals of Computer Algorithms. Galgotia publications Pvt. Ltd.
2. ParagHimanshu Dave, HimanshuBhalchandra Dave, Design and Analysis Algorithms. Pearson.
3. M.T. Goodrich and R.Tomassia, Algorithm Design: Foundations, Analysis and Internet Example. Johnwiley 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.

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 Є transitions - Significance, acceptance of languages.

Conversions and Equivalence: Equivalence between NFA with and without Є 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, Pumsping 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:

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. &Papadimition C.H. Pearson /PHI.
4. Theory of Computer Science and Automata languages and computation -Mishra and Chandrashekaran, 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 aynd 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:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A543T.1	3	3	-	3	-	-	-	-	-	-	-	-	-	3	3
19A543T.2	3	-	3	-	-	-	-	-	-	-	-	-	-	3	-
19A543T.3	3	-	3	-	-	-	-	-	-	-	-	-	-	3	-
19A543T.4	3	-	3	-	-	-	-	-	-	-	-	-	-	3	3
19A543T.5	3	3	3	3	-	-	-	-	-	-	-	-		3	3

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, A Generic Subclass, Run-Time Type Comparisons Within a Generic Hierarchy, Casting, Overriding Methods in a Generic Class, Type Inference with Generics, Erasure, Bridge Methods, Ambiguity Errors, Some Generic Restrictions, Type Parameters Can't Be Instantiated, Restrictions on Static Members, Generic Array Restrictions, Generic Exception Restriction .

Lambda Expressions: Introducing Lambda Expressions, Lambda Expression Fundamentals, Functional Interfaces, Some Lambda Expression Examples, Block Lambda Expressions, Generic Functional Interfaces, Passing Lambda Expressions as Arguments, Lambda Expressions and Exceptions, Lambda Expressions and Variable Capture, Method References, Method References to static Methods, Method References to Instance Methods, Method References with Generics, Constructor References, Predefined Functional Interfaces.

Unit 5 The Collection of Framework 9

java.util Package:

The Collections Framework: Collections Overview, The Collection Interfaces: The Collection Interface, The List Interface, The Set Interface, The Sorted Set Interface; The Collection Classes: The ArrayList Class, The LinkedList Class, The Hash SetClass, The LinkedHashSet Class, The TreeSet Class, The EnumSetClass, Accessing a Collection via an Iterator, Using an Iterator, The For-Each Alternative to Iterators, Spliterators, Storing User-Defined Classes in Collections, The Random Access Interface, Working with Maps, The Map Interfaces, The Map Classes, The Collection Algorithms. Arrays, The Legacy Classes and Interfaces, The Enumeration Interface, Vector, Stack, Dictionary, Hashtable, Properties, Using store( ) and load( ), Parting Thoughts on Collections, StringTokenizer, Scanner, The Scanner Constructors, ScanningBasics, Some Scanner Examples.

Prescribed Text Books:

1. Herbert Schildt.Java. The complete reference, TMH. 9thEdition.

Reference Books:

1. J.Nino and F.A. Hosch, An Introduction to programming and OO design using Java, John Wiley&sons.
2. Y. Daniel Liang, Introduction to Java programming, Pearson Education. 6th Edition
3. R.A. Johnson- Thomson, An introduction to Java programming and object oriented application development,
4. Cay.S.Horstmann and Gary,Cornell, Core Java 2, Vol. 1, Fundamentals, Pearson Education. 7thEdition,
5. Cay.S.Horstmann and GaryCornell Core Java 2, Vol 2, Advanced Features, Pearson Education. 7th Edition
6. P. Radha Krishna, Object Oriented Programming through Java,University Press.

Course Outcomes:

Student will be able to	Blooms Level of Learning
1. Understand and apply fundamentals of object-oriented programming features through Java Programming Language.	L1, L3
2. Apply and analyze reusability concepts like Inheritance, interfaces and packages in real time applications developed using JAVA	L3, L4
3. Acquire knowledge on multithreading, exception handling and apply the same in developing real time java based applications.	L1, L3
4. Understand and apply Generic Programming and Lambda Expressions	L1, L3
5. Understand and apply the Collection framework.	L1, L3

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
19A544T.1	3	3	-	-	-	-	-	-	-	-	-	-	3	-	-
19A544T.2	-	3	3	2	-	-	-	-	-	-	-	-	3	-	2
19A544T.3	3	3	3	2	-	-	-	-	-	-	-	-	3	-	2
19A544T.4	3	3	3	-	-	-	-	-	-	-	-	-	3	-	-
19A544T.5	3	3	3	-	-	-	-	-	-	-	-	-	3	-	3

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

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 form 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.

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.Dhamdhere, 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
(An Autonomous Institution)

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

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
(An Autonomous Institution)

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
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.
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 converts 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 6thEdition, Pearson Education/PHI
2. Y.DanielLiang,Introduction to Java programming, Pearson Education, 6thEdition.
3. Cay Horstmann,Big Java, 2ndedition, Wiley Student Edition, Wiley India Private Limited.
4. Herbert Schildt.Java. The complete reference, TMH. 9thEdition.

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
(An Autonomous Institution)

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'sproblem 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:

1. Write a program to implement chatbot
2. Write a program to implement Water jug problem
3. Write a program to implement A* search
4. Write a program to implement Crypt arithmetic using Constraint satisfaction problem
5. Write a program to implement Hill climbing Search
6. Write a program to implement 8-Puzzle game
   (Note: Programs can be implemented using Java / Python / PROLOG)

References:

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

Course Outcomes:

Student will be able to — Blooms Level of Learning

1. Analyze artificial intelligence techniques L4
2. Solve problems using different heuristic search techniques L3
3. Implement the algorithms for game playing 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
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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
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:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
19AC45T.1	-	-	-	-	-	-	-	-	-	-	-	3
19AC45T.2	-	-	-	-	-	-	-	-	-	-	-	3
19AC45T.3	-	-	-	-	-	-	-	-	-	-	-	3
19AC45T.4	-	-	-	-	-	-	-	-	-	-	-	3
19AC45T.5	-	-	-	-	-	-	-	-	-	-	-	3