ANNAMACHARYA UNIVERSITY

(Estd A.P. Private Universities (Establishment and Regulation) Act, 2016)

RAJAMPET-516126, Annamayya District, A.P, INDIA

ACADEMIC REGULATIONS (AU26), COURSE STRUCTURE AND SYLLABI

For the students admitted to

B.Sc., Honors Four-Year / Regular three- year Undergraduate Degree Programmes from the Academic Year 2026-27

ANNAMACHARYA UNIVERSITY

(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

RAJAMPET, Annamayya District, AP – 516126, INDIA

B.Sc. in Computer Science (Honors), AIML, AI&DA, Programming & Data Science

B.Sc. – I Year I Semester

Sl. No.	Category	Course Code	Course Title	Hours per Week			Credits
				L	T	P	C
1	BS	26BMAT11T	Matrices and Calculus	3	0	0	3
2	HSM	26BENG11T	Communicative English	3	0	0	3
3	PC	26BCOM11T	Computer Fundamental and Office Automation	3	0	0	3
4	PC	26BCOM12T	Problem Solving using C	3	0	0	3
5	HSM	26BENG12T	Human Values	3	0	0	3
6	HSM	26BENG11L	Communicative English Lab	0	0	4	2
7	PC	26BCOM11L	Computer Fundamental and Office Automation Lab	0	0	4	2
8	PC	26BCOM12L	Problem Solving using C Lab	0	0	4	2
Total				**15**	0	12	21

Category	Credits
Professional Core Courses	10
Basic Science Course	3
Humanities & Social Sciences and Management Courses	8

B.Sc.– I Year II Semester

Sl. No.	Category	Course Code	Course Title	Hours per Week			Credits
				L	T	P	C
1	BS	26BMAT21T	Probability Theory and Statistics	3	0	0	3
2	PC	26BCOM21T	Introduction to Python Programming	3	0	0	3
3	PC	26BCOM22T	Data Structures	3	0	0	3
4	PC	26BCOM23T	Computer Organization	3	0	0	3
5	BS	26BCHE22T	Environmental Studies	3	0	0	3
6	PC	26BCOM21L	Python Programming Lab	0	0	4	2
7	PC	26BCOM22L	Data Structures Lab	0	0	4	2
Total				14	0	**8**	**19**

Category	Credits
Professional Core Courses	13
Basic Science Courses	6

ANNAMACHARYA UNIVERSITY

(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)
(UNIVERSITY LISTED IN UGC AS PER THE SECTION 2(f) OF THE UGC ACT, 1956)
RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course:	Matrices and Calculus
Category:	BS
Course Code:	26BMAT11T
Branches:	**Computer Science (Honors), AIML, AI&DA, Programming & Data Science**
Semester:	I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives: The goal is to familiarize oneself with matrix theory and its applications, gain a solid understanding of partial derivatives and mean value theorems to tackle mathematical problems, and develop proficiency in vector differentiation and integration to address complex challenges effectively.

Course Outcomes:
At the end of the course, the student will be able to
1. understand the methods for solving the system of linear equations
2. utilize matrix algebra techniques for engineering applications.
3. analyze the functions of several variables to optimization techniques.
4. use scalar and vector point functions across a range of technical disciplines.
5. apply vector integral theorems in evaluating double and triple integrals

Unit 1 Matrices 12

Rank of a matrix by echelon form, normal form, solving system of homogeneous and non-homogeneous linear equations, Cayley-Hamilton theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton theorem.

Unit 2 Eigen values and Eigen vectors 8

Eigen values and Eigen vectors and their properties, diagonalization of a matrix, Quadratic forms and nature of the quadratic forms, reduction of quadratic form to canonical form by orthogonal transformation.

Unit 3 Mean Value Theorems & Multivariable calculus 8

Taylor's theorem and Maclaurin's theorem for one variable (without proofs) – Simple problems. Partial derivatives, total derivatives, chain rule, change of variables, Jacobian, Maxima and Minima of functions of two variables, method of Lagrange multipliers for three variables

Unit 4 Vector Differential Calculus 10

Scalar and vector point functions, vector operator Del, Gradient, Directional derivative, Divergence, Curl, Del applied twice to point functions, vector identities. Applications: Irrotational fields and solenoidal fields.

Unit 5 Vector Integral Calculus 10

Line integral, surface integral and volume integral. Green's theorem in the plane (without proof), verifications of Stroke's theorem (without proof) and Gauss's divergence theorem (without proof).

Prescribed Textbooks:

1. B.S. Grewal. *Higher Engineering Mathematics.* 44th Ed., Khanna Publishers, 2017.

Reference Books:

1. G. B. Thomas, Maurice D. Weir and Joel Hass. *Thomas' Calculus*, 14th Ed., Pearson Publishers, 2022.
2. R.K. Jain, S.R.K. Iyengar. *Advanced Engineering Mathematics.* 5th Ed., Narosa Publications.

ANNAMACHARYA UNIVERSITY

(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)
(UNIVERSITY LISTED IN UGC AS PER THE SECTION 2(f) OF THE UGC ACT, 1956)

RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course:	Communicative English
Category:	HSM
Course Code:	26BENG11T
Branches:	**Computer Science (Honors), AIML, AI&DA, Programming & Data Science**
Semester:	I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
2	1	0	3

Course Objectives: The primary goal of the Communicative English course is to develop students' listening, reading, speaking, and writing skills, enhancing their comprehension, oral presentation, and reporting abilities. It focuses on improving grammatical structures and vocabulary, equipping students with the proficiency needed for effective communication and preparing them to meet industry standards.

Course Outcomes:

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

1. understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
2. analyze literary forms, journalistic articles and scientific readings for comprehension and retention
3. demonstrate effective writing and speaking skills
4. apply grammatical knowledge in speech and writing and formulate sentences with accuracy
5. produce coherent and unified paragraphs with adequate support and detail

Unit 1 HUMAN VALUES: The Gift of the Magi (Short Story) 12

Listening: Identifying the topic, the context and specific pieces of information by listening to short audio texts and answering a series of questions.
Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests; introducing oneself and others.
Reading: Skimming to get the main idea of a text; scanning to look for specific pieces of information.
Writing: Mechanics of Writing-Capitalization, Spellings, Punctuation-Parts of Sentences.
Grammar: Parts of Speech, Basic Sentence Structures-forming questions
Vocabulary: Synonyms, Antonyms, Affixes (Prefixes/Suffixes), Root words.

Unit 2 NATURE: The Brook by Alfred Tennyson (Poem) 8

Listening: Answering a series of questions about main ideas and supporting ideas after listening to audio texts.
Speaking: Discussion in pairs/small groups on specific topics followed by short structure talks.
Reading: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.
Writing: Structure of a paragraph - Paragraph writing (specific topics)
Grammar: Cohesive devices - linkers, use of articles and zero article; prepositions.
Vocabulary: Homonyms, Homophones, Homographs.

Unit 3 BIOGRAPHY: Elon Musk 8

Listening: Listening for global comprehension and summarizing what is listened to.
Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed
Reading: Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension.
Writing: Summarizing, Note-making, paraphrasing
Grammar: Verbs - tenses; subject-verb agreement; Compound words, Collocations
Vocabulary: Compound words, Collocations

Unit 4 INSPIRATION: The Toys of Peace by Saki 10

Listening: Making predictions while listening to conversations/ transactional dialogues without video; listening with video.
Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions.
Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data.
Writing: Letter Writing: Official Letters, Resumes
Grammar: Reporting verbs, Direct & Indirect speech, Active & Passive Voice
Vocabulary: Words often confused, Jargons

Unit 5 MOTIVATION: The Power of Intrapersonal Communication (An Essay) 10

Listening: Identifying key terms, understanding concepts and answering a series of relevant questions that test comprehension.
Speaking: Formal oral presentations on topics from academic contexts
Reading: Reading comprehension.
Writing: Writing structured essays on specific topics.
Grammar: Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)
Vocabulary: Technical Jargon

Prescribed Textbooks:

1. *Pathfinder: Communicative English for Undergraduate Students.* 1st Ed., Orient Black Swan, 2023.

Reference Books:

1. Dubey, Sham Ji & Co. *English for Engineers.* Vikas Publishers, 2020.
2. Murphy, Raymond. *English Grammar in Use.* 4th Ed., Cambridge University Press, 2019.
3. Lewis, Norman. *Word Power Made Easy- The Complete Handbook for Building Superior Vocabulary.* Anchor, 2014.

Web Resources:
GRAMMAR:

1. www.bbc.co.uk/learningenglish
2. https://dictionary.cambridge.org/grammar/british-grammar/
3. www.eslpod.com/index.html
4. https://www.learngrammar.net/
5. https://english4today.com/english-grammar-online-with-quizzes/
6. https://www.talkenglish.com/grammar/grammar.aspx

VOCABULARY

1. https://www.youtube.com/channel/UC4cmBAit8i_NJZE8qK8sfpA

ANNAMACHARY UNIVERSITY

(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)
(UNIVERSITY LISTED IN UGC AS PER THE SECTION 2(f) OF THE UGC ACT, 1956)

RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course:	Computer Fundamentals and Office Automation
Category:	PC
Couse Code:	26BCOM11T
Branches:	**Computer Science (Honors), AIML, AI&DA, Programming & Data Science**
Year:	I Year
Semester:	I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives The This course aims to provide basic knowledge of computer fundamentals, memory and storage devices, hardware and software, and practical skills in using Microsoft Word, Microsoft PowerPoint, and Microsoft Excel for document creation, presentations, and data management to enhance computer literacy and office automation skills.

Course Outcomes: At the end of the course, the student will be able to

1. Understand the fundamentals of computers, input/output devices, and computer classifications.
2. Explain memory units, storage devices, hardware, and software concepts.
3. Create and format documents using Microsoft Word.
4. Design presentations using Microsoft PowerPoint.
5. Perform spreadsheet operations and data analysis using Microsoft Excel.

Unit 1 11

Introduction: Define Computer, Characteristics of Computers, Applications of Computers, and Generations of computers, Block Diagram, Classification of Computers, Input and Output Devices, Types of Monitors, Types of Printers.

Unit 2 10

Introduction: Types of Memories, Cache Memory, Magnetic Tapes, Optical Drives, USB Flash Drives, Mass Storage Devices, Software, Hardware, Classification of Software.

Unit 3 11

Introduction: Features of MS-Word, Parts of MS-Word, File Menu, Editing a document, Highlighting Text with Colors, applying Text Effects, Inserting WordArt, Formatting a document, Table menu, Headers and Footers, Mail Merge.

Unit 4 11

Introduction: Features of Power Point, File Menu, Creating a Presentation Using a Template, Inserting and Deleting Slides in a Presentation, Design menu, Slide Transitions, Animations, Slide Show.

Unit 5 12

Introduction: Features of MS-Excel, File Menu, Inserting rows and Columns, Deleting rows and columns, Types of Cell referencing, Types of Functions, Statistical Functions, Math Functions, Date and Time Functions, Types of Charts.

Textbook:

1. Reema Thareja. *Fundamentals of Computers.* 2nd Ed., Oxford University Press.

Reference Books:

1. I Randy Norde. Microsoft Office 365 In Practice, McGraw Hill Education.
2. V. Rajaraman. Fundamentals of Computers, PHI Learning.

ANNAMACHARYA UNIVERSITY

(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)
(UNIVERSITY LISTED IN UGC AS PER THE SECTION 2(f) OF THE UGC ACT, 1956)

RAJAMPET, Kadapa District, AP – 516126, INDIA

Title of the Course: **Problem Solving Using C**

Category: **PC**

Couse Code: **26BCOM12T**

Branches: **Computer Science (Honors), AIML, AI&DA, Programming & Data Science**

Year: **I Year**

Semester: **I Semester**

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives: The objective of this course is to develop problem-solving skills using algorithms, pseudo code, and flowcharts, and to build a strong foundation in C programming concepts such as variables, data types, operators, and input/output operations. It aims to enable students to use decision-making and looping statements to design logical programs, and to understand arrays and pointers for efficient data handling. The course also focuses on strings and functions to promote modular programming, and introduces structures and file handling for managing complex data and performing file operations. Overall, it prepares students to write efficient and structured C programs for real-world applications.

Course Outcomes: At the end of the course, the student will be able to

1. Understand problem-solving techniques and apply basic C programming concepts to develop simple programs.
2. Apply decision-making and looping constructs to design logical and efficient C programs.
3. Analyze the use of arrays and pointers for effective data storage and memory management.
4. Apply the concepts of strings and functions to develop modular C programs.
5. Understand and apply structures and file handling techniques to manage complex data and perform file operations.

Unit -1 **Problem Solving and Introduction to C** 11

Steps to solve problems, algorithm, Pseudo code, Flowchart with examples, **Introduction to C:** History of C, structure of C program, keywords, identifiers, Variables, data types, constants, I/O statements, Operators.

Unit- 2 **Decision control statements** 11

Decision Making and Branching Statements: Introduction, Decision making with if statement, Simple if Statement, The if-else Statement, Nesting of if-else Statements, The else-if Ladder, Switch Statement. Decision Making and Looping: Introduction, while Statement, do-while Statement, for Statement, Jumps in Loops.

Unit- 3 Arrays and Pointers 12

Arrays: Introduction, One-Dimensional Arrays, Declaration of One-dimensional arrays, Initialization of One-dimensional arrays, Two-Dimensional Arrays, Initialization and Declaration of Two-dimensional arrays, Matrix operations. Pointers: Introduction, Initialization and Declaration pointer variables, Accessing the Address of a variable.

Unit- 4 Strings and Functions 12

Strings: Declaration and Initialization, String Input / Output functions, String manipulation functions. Functions: Introduction, Declaration of a function, Call-by Value, Call-by Reference, Types of functions: No Arguments and no Return Values, Arguments but no Return Values, Arguments with Return Values, No Arguments but Return Value.

Unit -5 Structures and Files 12

Structures: Structure definition, Declaring Structure variables, Initialization and Accessing the members of a structure, Array of structures, structures and functions, structures within Structures. Files: Introduction to files, Defining and Opening a file, Closing a file, Input and Output Operations on files, Error handling during file operations.

Textbook:

1. E. Balagurusamy. *Programming in ANSI C*, *8th Ed*., McGraw Hill.

Reference Books:

1. Yashvanth Kanetkar. *LET US C.* 9th Ed., BPB Publication
2. Brian W. Kernighan and Dennis M. Ritchie. *The C Programming Language*, Prentice Hall of India.
3. Pradeep Dey. and Manas Ghosh. *Programming in C*, 2nd Ed., Oxford Press.

ANNAMACHARYA UNIVERSITY

(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)
(UNIVERSITY LISTED IN UGC AS PER THE SECTION 2(f) OF THE UGC ACT, 1956)

RAJAMPET, Kadapa District, AP – 516126, INDIA

Title of the Course:	Human Values
Category:	HSM
Course Code:	26BENG12T
Branches:	**Computer Science (Honors), AIML, AI&DA, Programming & Data Science**
Semester:	I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives: The course aims to help students recognize the vital interplay between values and skills, promoting sustained happiness and prosperity. It seeks to foster a holistic perspective on life and profession, encouraging value-based living through a clear understanding of human reality and existence. Additionally, the course emphasizes the ethical implications of such an understanding, fostering trustful behaviour, fulfilling human interactions, and a harmonious relationship with nature.

Course Outcomes:

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

1. comprehend the terms like Natural Acceptance, Happiness and Prosperity
2. analyze one's self, and one's surroundings (family, society, nature)
3. apply human values in enriching human relationships and human society.
4. analyze the need for universal human values and harmonious existence.
5. evaluate themselves as socially and ecologically responsible engineers.

Unit 1 Introduction to Value Education 12

Lecture1: Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education)
Lecture2: Understanding Value Education
Tutorial 1: Practice Session1: Sharing about oneself
Lecture 3: Self-Exploration as the Process for Value Education
Lecture4: Continuous Happiness and Prosperity – The Basic Human Aspirations
Tutorial 2: Practice Session2: Exploring Human Consciousness
Lecture 5: Happiness and Prosperity – Current Scenario
Lecture 6: Method to Fulfill the Basic Human Aspirations
Tutorial 3: Practice Session3: Exploring Natural Acceptance

Unit 2 Harmony in the Human Being 8

Lecture 7: Understanding Human being as the co-existence of the self and the body.
Lecture 8: Distinguishing between the needs of the self and the body
Tutorial 4: Practice Session4: Exploring the difference of needs of self and body.
Lecture 9: The body as an instrument of the self

Lecture 10: Understanding harmony in the self
Tutorial 5: Practice Session5: Exploring sources of imagination in the self
Lecture 11: Harmony of the self with the body
Lecture 12: Programme to ensure self-regulation and health
Tutorial 6: Practice Session 6: Exploring harmony of self with the body

Unit 3 Harmony in the Family and Society 8

Lecture 13: Harmony in the Family – the Basic Unit of Human Interaction
Lecture 14: 'Trust' – the Foundational Value in Relationship
Tutorial 7: Practice Session7: Exploring the Feeling of Trust
Lecture 15: 'Respect' – as the Right Evaluation
Tutorial 8: Practice Session 8: Exploring the Feeling of Respect
Lecture 16: Other Feelings, Justice in Human-to-Human Relationship
Lecture 17: Understanding Harmony in the Society
Lecture 18: Vision for the Universal Human Order
Tutorial 9: Practice Session9: Exploring systems to fulfil human goal

Unit 4 Harmony in the Nature/Existence 10

Lecture 19: Understanding Harmony in the Nature
Lecture 20: Interconnectedness, Self-Regulation and Mutual Fulfillment among the Four Orders of Nature
Tutorial 10: Practice Session 10: Exploring the Four Orders of Nature
Lecture 21: Realizing Existence as Co-existence at All Levels
Lecture 22: The Holistic Perception of Harmony in Existence
Tutorial 11: Practice Session11: Exploring Co-existence in Existence

Unit 5 Implications of the Holistic Understanding – a Look at Professional Ethics 10

Lecture 23: Natural Acceptance of Human Values
Lecture 24: Definitiveness of (Ethical) Human Conduct
Tutorial 12: Practice Session 12: Exploring Ethical Human Conduct
Lecture 25: A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order
Lecture 26: Competence in Professional Ethics
Tutorial 13: Practice Session13: Exploring Humanistic Models in Education
Lecture 27: Holistic Technologies, Production Systems and Management Models-Typical Case Studies
Lecture 28: Strategies for Transition towards Value-based Life and Profession
Tutorial 14: Practice Session14: Exploring Steps of Transition towards Universal Human Order

Practice Sessions for UNIT I – Introduction to Value Education
PS1 Sharing about Oneself
PS2 Exploring Human Consciousness
PS3 Exploring Natural Acceptance
Practice Sessions for UNIT II – Harmony in the Human Being
PS4 Exploring the Difference of Needs of Self and Body
PS5 Exploring Sources of Imagination in the Self
PS6 Exploring Harmony of Self with the Body
Practice Sessions for UNIT III – Harmony in the Family and Society
PS7 Exploring the Feeling of Trust
PS8 Exploring the Feeling of Respect
PS9 Exploring Systems to fulfil Human Goal
Practice Sessions for UNIT IV – Harmony in the Nature (Existence)

PS10 Exploring the Four Orders of Nature
PS11 Exploring Co-existence in Existence

Practice Sessions for UNIT V – Implications of the Holistic Understanding – a Look at Professional Ethics

PS12 Exploring Ethical Human Conduct
PS13 Exploring Humanistic Models in Education
PS14 Exploring Steps of Transition towards Universal Human Order

Prescribed Textbooks:

1. **The Textbook** - R R Gaur, R Asthana, G P Bagaria. *A Foundation Course in Human Values and Professional Ethics.* 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1.
2. The Teacher's Manual - R R Gaur, R Asthana, G P Bagaria. *Teachers' Manual for A Foundation Course in Human Values and Professional Ethics.* 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

Reference Books:

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

Web Resources:

1. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%201Introduction%20to%20Value%20Education.pdf
2. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%202-Harmony%20in%20the%20Human%20Being.pdf
3. https://fdp-si.aicte-india.org/UHV%201%20Teaching%20Material/D3S2%20Respect%20July%2023.pdf
4. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%205-Harmony%20in%20the%20Nature%20and%20Existence.pdf
5. https://fdp-si.aicte-india.org/UHV%20II%20Teaching%20Material/UHV%20II%20Lecture%202325%20Ethics%20v1.pdf
6. https://www.studocu.com/in/document/kiet-group-of-institutions/universal-humanvalues/chapter-5-holistic-understanding-of-harmony-on-professional-ethics/62490385https://onlinecourses.swayam2.ac.in/aic22_ge23/preview
7. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%203-Harmony%20in%20the%20Family.pdf

ANNAMACHARYA UNIVERSITY

(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)
(UNIVERSITY LISTED IN UGC AS PER THE SECTION 2(f) OF THE UGC ACT, 1956)

RAJAMPET, Kadapa District, AP – 516126, INDIA

Title of the Course:	Communicative English Lab
Category:	HSM
Course Code:	26BENG11L
Branches:	**Computer Science (Honors), AIML, AI&DA, Programming & Data Science**
Year:	**I Year**
Semester:	I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	4	2

Course Objectives:
The main objective of Communicative English Laboratory course is to provide students with a range of self-instructional and learner-friendly methods for enhancing their language skills. This course is designed to train students in fundamental communication abilities and prepare them effectively for job interviews.

Course Outcomes:
At the end of the course, the student will be able to
1. relate and differentiate the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension
2. develop effective communication skills through various verbal and non-verbal language learning practices
3. demonstrate professional skills by actively participating role-plays and descriptions
4. build an effective resonate and equip themselves with essential employability skills for professional success
5. enhance public speaking skills and deliver oral presentations with clarity and confidence

List of Topics
1. Phonetics: Vowels & Consonants
2. Just A Minute (JAM)
3. Role Play / Situational Dialogues
4. Oral Presentation/ Poster Presentation
5. Information Transfer
6. Describing people/objects/situations
7. Group Discussions
8. Email Writing
9. Resume Writing
10. Interview Skills

Suggested Software:
1. Walden Infotech
2. Sky Pronunciation Suite

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

Prescribed Textbooks:

1. Grant Taylor. *English Conversation Practice.* Tata McGraw-Hill Education India, 2016.
2. Hewing's, Martin. *Cambridge Academic English* (B2). CUP, 2012.
3. T. Balasubramanyam. *A Textbook of English Phonetics for Indian Students.* 3rd Ed., Trinity Press.

Web Resources:

Spoken English:

1. www.esl-lab.com
2. www.englishmedialab.com
3. www.englishinteractive.net
4. https://www.britishcouncil.in/english/online
5. http://www.letstalkpodcast.com/
6. https://www.youtube.com/c/mmmEnglish_Emma/featured
7. https://www.youtube.com/c/ArnelsEverydayEnglish/featured
8. https://www.youtube.com/c/engvidAdam/featured
9. https://www.youtube.com/c/EnglishClass101/featured
10. https://www.youtube.com/c/SpeakEnglishWithTiffani/playlists
11. https://www.youtube.com/channel/UCV1h_cBE0Drdx19qkTM0WNw

Voice & Accent:

1. https://www.youtube.com/user/letstalkaccent/videos
2. https://www.youtube.com/c/EngLanguageClub/featured
3. https://www.youtube.com/channel/UC_OskgZBoS4dAnVUgJVexc
4. https://www.youtube.com/channel/UCNfm92h83W2i2ijc5Xwp_IA

ANNAMACHARYA UNIVERSITY

(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)
(UNIVERSITY LISTED IN UGC AS PER THE SECTION 2(f) OF THE UGC ACT, 1956)

RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course:	Computer Fundamentals and Office Automation Lab
Category:	PC
Couse Code:	26BCOM11L
Branches:	**Computer Science (Honors), AIML, AI&DA, Programming & Data Science**
Year:	I Year
Semester:	I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	4	2

Course Objectives The course covers the fundamentals of computers, including their characteristics, generations, classifications, and input/output devices. It introduces memory types, storage devices, and the basic concepts of hardware and software. The syllabus also focuses on practical skills in MS Word for document creation and formatting, PowerPoint for designing presentations, and MS Excel for data handling, functions, and charts, helping students build essential computing skills.

Course Outcomes: At the end of the course, the student will be able to

1. To understand the fundamental concepts of computers, including their characteristics, classifications, generations, and input/output devices
2. To gain knowledge of memory types, storage devices, and the basic components of hardware and software systems.
3. To develop skills in creating, editing, and formatting documents using MS Word.
4. To learn how to design and deliver effective presentations using PowerPoint.
5. To build proficiency in using MS Excel for data management, functions, and chart creation.

List of Experiments:

Note: Any 10 Experiments to be performed

List of Experiments:

1. Draw and identify parts of the block diagram of a computer
2. Identify and classify different types of memory (primary, secondary, cache).
3. Using Word, write a letter to your higher official seeking 10-days leave.
4. Create a table and apply table operations using Ms-Word.
5. Creation of Resume using Ms-Word.
6. Create a Macro.
7. Create a Mail Merge.
8. Create a presentation and apply animations.
9. Using a spreadsheet, prepare your class Time Table.

10. Using a Spreadsheet, calculate the Gross and Net salary of employees.
11. Using a Spreadsheet calculate the student Result.
12. Using a Spread sheet calculate the current bill

Textbook:

1. Reema Thareja. *Fundamentals of Computers.* 2nd Ed., Oxford University Press.

ANNAMACHARYA UNIVERSITY

(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)
(UNIVERSITY LISTED IN UGC AS PER THE SECTION 2(f) OF THE UGC ACT, 1956)

RAJAMPET, Kadapa District, AP – 516126, INDIA

Title of the Course:	Problem Solving Using C Lab
Category:	PC
Couse Code:	26BCOM12L
Branch:	Computer Science (Honors), AIML, AI&DA, Programming & Data Science
Year:	I Year
Semester:	I Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	4	2

Course Objectives: The objective of this course is to introduce students to the fundamentals of C programming and develop problem-solving skills through programs involving basic operations, control statements, loops, arrays, and matrices. It also covers important concepts such as pointers, strings, structures, and file handling, along with call-by-value and call-by-reference, enabling students to understand memory management and data organization. Overall, the course aims to build logical thinking and prepare students to write efficient and structured C programs.

Course Outcomes: At the end of the course, the student will be able to

1. Understand and apply basic C programming concepts to solve simple computational problems.
2. Apply loops and decision-making statements to analyze and solve logical problems.
3. Analyze and apply matrix and array operations in C programs.
4. Understand and apply pointers, strings, and parameter passing techniques for efficient programming.
5. Apply and analyze structures and file handling techniques for data storage and management.

List of Experiments:

1. a) Write a C program for addition of three numbers.
   b) Write a C program for swapping of two numbers.
2. Write a C program to perform arithmetic operations.
3. Write a C program to find largest among three numbers.
4. a) W rite a C program to find factorial of given number.
   b) Write a C program for multiplication table.
5. a) Write a C program for matrix addition.
   b) Write a C program for matrix multiplication.
6. Write a C program on Pointers.
7. Write a C program to perform string operations.

8. a) Write a C program for Call-by-Value.
   b) Write a C program for Call-by-Reference
9. Write a C program on Structures
10. Write a C program on File Operations

Textbook:

1. E.Balagurusamy. *Programming in ANSI C, 8th Ed., McGraw Hill.*

Reference Books:

1. Yashvanth Kanetkar. *LET US C.* 9th Ed., BPB Publication
2. Brian W. Kernighan and Dennis M. Ritchie. *The C Programming Language*, Prentice Hall of India.
3. Pradeep Dey and Manas Ghosh. *Programming in C*, 2nd Ed., Oxford Press.

ANNAMACHARYA UNIVERSITY

(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)
(UNIVERSITY LISTED IN UGC AS PER THE SECTION 2(f) OF THE UGC ACT, 1956)

RAJAMPET, Kadapa District, AP – 516126, INDIA

Title of the Course:	Probability Theory and Statistics
Category:	BS
Course Code:	26BMAT21T
Branches:	**Computer Science (Honors), AIML, AI&DA, Programming & Data Science**
Year:	**I Year**
Semester:	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives: The aim is to introduce the fundamental concepts of probability theory and elucidate probability distributions for problem-solving. This includes describing measures of central tendency, explaining hypothesis testing and confidence intervals for large samples, and detailing the steps for hypothesis testing with small samples.

Course Outcomes:

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

1. describe the fundamental concepts of probability and random variables.
2. apply the probability distribution in real life problems
3. calculate the correlation between two variables
4. Apply estimation techniques and conduct hypothesis tests for large samples.
5. Analyze the effectiveness of various hypothesis testing methods for small samples to derive accurate conclusions

Unit 1 Probability and Random Variables 10

Probability - axioms of probability – addition theorem of probability - conditional probability- multiplication theorem of probability (without proof) - Baye's theorem.

Random variables - discrete and continuous - Distribution functions - Mean and Variance.

Unit 2 Probability distributions 6

Probability distributions – Binomial and Poisson distribution - fitting - normal distribution - their properties.

8

Unit 3 Introduction of statistics

Introduction of Statistics – Mean - Median and Mode for ungrouped and grouped data.

Correlation - correlation coefficient – Karl Pearson's coefficient - Spearman's rank correlation.

Unit 4 Estimation and Testing of hypothesis for large samples 10

Estimation - Point estimation - Interval estimation of one mean (small and large) - one Proportion (large).

Test of Hypothesis: Types of errors, one and two tailed tests, level of significance, single mean - difference of means - single proportion - difference of proportions (large).

Unit 5 Testing of hypothesis for small samples 10

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 Textbooks:

1. B.S. Grewal. *Higher Engineering Mathematics.44th Ed.,* Khanna Publishers,2017.

Reference Books:

1.Miller and Freund's*. Probability and Statistics for Engineers*.7th Ed., Pearson, 2008.
2. S.C. Gupta and V.K. Kapoor*. Fundamentals of Mathematical Statistics.11th Ed*., Sultan Chand & Sons
3.S. Ross. *a First Course in Probability.* Pearson Education India, 2002.
4. W. Feller. *An Introduction to Probability Theory and its Applications.* 1st Ed., Wiley, 1968.

ANNAMACHARYA UNIVERSITY

(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)
(UNIVERSITY LISTED IN UGC AS PER THE SECTION 2(f) OF THE UGC ACT, 1956)

RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course:	Introduction to Python Programming
Category:	PC
Couse Code:	26BCOM21T
Branches:	Computer Science (Honors), AIML, AI&DA, Programming & Data Science
Year:	I Year
Semester:	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives: This course introduces the fundamentals of Python programming, including syntax, control structures, and core data types such as lists, tuples, dictionaries, and strings. It develops problem-solving skills through functions, modules, and file handling, along with exception management. The course also provides a basic understanding of Object-Oriented Programming concepts, enabling students to design structured and efficient Python applications.

Course Outcomes:

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

1. Understand Python basics: literals, variables, operators
2. Apply control statements and loops
3. Apply List and Tuple Data Types
4. Apply python functions and modules
5. Apply OOP concepts: inheritance, polymorphism.

Unit 1 10

Introduction to python programming language, history of python, features of python, writing our first python program, literals, variables and identifiers, keywords, comments in python, Input and Output functions, operators, operator precedence and Associativity.

Unit 2 10

Control Structures: Control structure importance, Boolean expressions, selection control, and iterative control, nested looping statements, Transfer control statements

Unit 3 9

Lists and Tuple data type: creating List, Repetition of Lists, membership in Lists, List methods, Nested list, List comprehensions. Tuple: creating tuple, accessing tuple elements, basic operations on tuples, methods in tuples, Nested tuples. String Functions and its operations. Dictionaries and its methods.

Unit 4 10

Functions: Defining functions, calling a Functions, returning results from a function, Returning multiple values from a functions, Types of functions, formal and actual arguments, positional arguments, keyword arguments, default and variable length arguments, variable scope, lambda function, map and filter functions, recursive functions. Modules and packages

Unit 5 10

Files: Types of files in python, opening a file, closing a file, working with text files containing String. Exception Handling and Types of Exception Handling with examples. Introduction to OOP'S, features of OOPS, Classes and Objects, encapsulation, Abstraction, Inheritance, polymorphism

Textbook:

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

Reference Books:

1. Charles Dierbach. Introduction to Computer Science Using Python: A Computational Problem-Solving Focus. Wiley.
2. Reema Thareja. Python Programming using problem solving approach. Oxford University press

ANNAMACHARYA UNIVERSITY

(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)
(UNIVERSITY LISTED IN UGC AS PER THE SECTION 2(f) OF THE UGC ACT, 1956)
RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course:	Data Structures
Category:	PC
Course Code:	26BCOM22T
Branches:	Computer Science (Honors), AIML, AI&DA, Programming & Data Science
Year	I Year
Semester	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives: The objective of this course is to introduce the fundamental concepts of data structures and algorithms, including their definitions, classifications, and complexity analysis. It aims to develop skills in implementing linear and non-linear data structures such as arrays, linked lists, stacks, queues, trees, and graphs. The course emphasizes understanding abstract data types and their practical applications in problem solving. It also focuses on essential sorting and searching techniques, enabling students to design and analyze efficient algorithms for various computational tasks.

Course Outcomes:

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

1. Understand fundamental concepts of data structures, algorithms, and complexity analysis.
2. Apply arrays and linked lists for efficient data representation and operations.
3. Implement stacks and queues and solve problems using their applications.
4. Analyze trees and graphs and perform traversal and basic operations.
5. Implement and evaluate sorting and searching algorithms for efficient data handling.

Unit- 1 Introduction to Data Structures 11

Introduction: Data Structures - Definition, Characteristics of Data Structures, Basic Terminolc Classification of Data Structures, Algorithm: Definition and characteristics, Complexity analysis: Sp Complexity, Time Complexity, Abstract Data Types (ADT).

Unit- 2 Arrays and Linked Lists 11

Arrays: Introduction to Arrays, Representation of Arrays in Memory, Implementation, Operations, Applications. **Linked Lists:** Introduction to Linked List, Representation of Linked Lists, Implementation, Operations, Applications.

Unit-3 Stacks and Queues 12

Stack: Introduction to stack ADT, Implementation of stacks using array and Linked List. Application of stacks - converting Infix to Post Fix Notation - Evaluation of Post Fix Notation. **Queues:** Introduction to Queue, Implementation of Queues using array and Linked List, Application of Queues. Types of Queues- Circular Queues, De-queues, Priority Queue.

Unit- 4 Trees and Graphs 13

Trees: Tree Terminology, Binary Tree Representation, Traversal techniques, Binary Search Tree- Definition, Operations on a Binary Search Tree: Creation, Search, Insertion & deletion.
Graphs: Introduction to Graphs, Terminology, Representation (Adjacency Matrix, Adjacency List), Traversal of Graphs: DFS, BFS, Applications of Graphs.

Unit- 5 Sorting and Searching 10

Sorting: Bubble Sort, Selection Sort, Insertion Sort, Merge Sort, Radix Sort and Quick Sort,
Searching: Linear Search, Binary Search.

Textbook:

1. Reema Thareja. Data Structures Using C, 2nd Ed., Oxford.

Reference Books:

1. Mark Allen Weiss. Data Structures and algorithm analysis in C, 2nd edition., Pearson.
2. A.M.Tanenbaum, Y. Langsam, M.J.Augenstein. Data Structures using C, 2nd edition., Pearson.

ANNAMACHARYA UNIVERSITY

(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)
(UNIVERSITY LISTED IN UGC AS PER THE SECTION 2(f) OF THE UGC ACT, 1956)
RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course:	Computer Organization
Category:	PC
Course Code:	26BCOM23T
Branches:	Computer Science (Honors), AIML, AI&DA, Programming & Data Science
Year:	I Year
Semester:	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives: The course aims to provide a comprehensive introduction to the fundamental structure and operation of computer systems. It covers digital logic design, basic functional units, CPU architecture, memory organization, and input-output operations. The objective is to develop a clear understanding of how computer systems process data, executes instructions, and manages resources internally, enabling students to build a strong foundation.

Course Outcomes:

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

1. Understand the basic structure and functional units of a computer, generations of computers, and perform number system conversions.
2. Apply concepts of digital logic circuits, including logic gates, Boolean simplification using K-maps, and design of basic combinational and sequential circuits..
3. Explain the organization and working of the CPU, including registers, stack organization, instruction formats, and micro operations.
4. Analyze different types of memory systems, including RAM, ROM, cache memory, and auxiliary storage devices.
5. Understand input-output organization, including I/O interfaces, data transfer modes, interrupts, and DMA operations.

Unit 1 Basic Structure of Computers 12

Digital Computers, Basic Organization of a Computer, Functional Units, Generations of Computers: First Generation Computers, Second Generation Computers, Third Generation Computers, Fourth Generation Computers, Fifth Generation Computers.

Data Representation: Number Systems, Conversions of Binary to Decimal, Binary to Octal, Binary to Hexadecimal, Decimal to Binary.

Unit 2 Digital Logic Circuits 12

Basic Logic Gates, Universal Logic Gates, Simplification of Logic expressions using K-Map, Combinational Circuits: Half-Adder, Full-Adder, Flip-Flops: SR Flip-Flop, D-Flip-Flop, JK-Flip Flop, T Flip-Flop.

Unit 3 Central Processing Unit 11

Introduction, General Register Organization: Control word, Examples of Microoperations,

Stack organization: Register Stack, Instruction Formats: Three-Address Instructions, Two-Address Instructions, One-Address Instructions, Zero-Address Instructions

Unit 4 Memory Organization 12

Memory Hierarchy, Main Memory- RAM and ROM, Auxiliary Memory-Magnetic Disks, Magnetic Tape, Associative Memory-Hardware organization, Cache Memory- Associative Mapping.

Unit 5 Input-Output Organization 11

Peripheral Devices, Input-Output Interface – I/O Bus and Interface Modules, Modes of Transfer-Example of Programmed I/O, Interrupt-Initiated I/O, Direct Memory Access (DMA)- DMA controller, DMA transfer.

Textbook:

1. M. Moris Mano. *Computer System Architecture.* Revised 3rd Edition., Pearson.

Reference Books:

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky. *Computer Organization.* 5th Ed., McGraw Hill.
2. David A. Paterson and John L. Hennessy. *Computer- organization and Design*. Elsevier.

ANNAMACHARYA UNIVERSITY

(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)
(UNIVERSITY LISTED IN UGC AS PER THE SECTION 2(f) OF THE UGC ACT, 1956)
RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course:	Environmental Studies
Category:	BS
Course Code:	26BCHE21T
Branches:	**Computer Science (Honors), AIML, AI&DA, Programming & Data Science**
Semester:	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives: This course aims to raise awareness among students about the environment and the critical need to protect natural resources. It emphasizes the significance of ecosystems and biodiversity, while sensitizing students to the pollution challenges caused by everyday human activities. Additionally, the course equips students with the skills to identify and address social issues related to the environment.

Course Outcomes: At the end of the course, the student will be able to

1. explain how natural resources should be utilized with a focus on sustainability.
2. describe the need to protect ecosystems and biodiversity for future generations.
3. comprehend major pollution problems related to ecosystems.
4. apply quantitative reasoning skills in the proper utilization of goods and services.
5. analyze the interconnectedness of human dependence on Earth's ecosystems.

Unit 1 Multidisciplinary Nature of Environmental Studies 10

Definition, Scope and Importance – Need for Public Awareness. Natural resources: Renewable and non- renewable resources – Forest resources: Uses, deforestation– Water resources: Uses, floods, drought – Mineral resources: Uses, environmental effects of extracting mineral resources – Food resources: Impacts of overgrazing, problems with traditional agriculture, effects of modern agriculture – Land Resources: Land degradation, soil erosion Energy resources: Renewable and non-renewable energy resources.

Unit 2 Ecosystems, Biodiversity and its Conservation 10

Ecosystems: Producers, consumers and decomposers – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, lake ecosystem.
Biodiversity and Its Conservation: Definition – Value of biodiversity. Hot-spots of biodiversity – Threats to biodiversity – Conservation of biodiversity.

Unit 3 Environmental Pollution 8

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 and industrial wastes. e-waste: sources and health hazards. Need for e-waste management – recycling.

Unit 4 Social Issues and the Environment 10

Rain water harvesting, Environmental ethics: Issues and possible solutions – global warming, acid rain, ozone layer depletion – 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 8

Population explosion – Family Welfare Programmes – Environment and human health – Value Education – HIV/AIDS – Role of information Technology in Environment and human health, Field work – Visit to a local area to document environmental assets

Prescribed Textbooks:

1. Kaushik, Anubha, and C.P. Kaushik. *Perspectives in Environmental Studies*. 6th Ed., New Age International Publishers, 2018.

Reference Books:

1. Chawla, Shashi. *A Textbook of Environmental Studies*. McGraw Hill Education, 2017.
2. Joseph, Benny. *Environmental Studies*. 3rd Ed., McGraw Hill Education, 2017.
3. Dhinakaran, A., and B. Sankaran. *A Textbook of Environmental Studies*. Himalaya Publishing House, 2017.
4. Basu, Mahua, and S. Xavier. *Fundamentals of Environmental Studies*. Cambridge University Press, 2017.
5. Bharucha, Erach. *Textbook of Environmental Studies for Undergraduate Courses*. University Press, 2013.
6. Tiwari, Vijay Kumar. *A Textbook of Environmental Studies*. Himalaya Publishing House, 2017.

ANNAMACHARYA UNIVERSITY

(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)
(UNIVERSITY LISTED IN UGC AS PER THE SECTION 2(f) OF THE UGC ACT, 1956)
RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course:	Python Programming Lab
Category:	PC
Couse Code:	26BCOM21L
Branches:	Computer Science (Honors), AIML, AI&DA, Programming & Data Science
Year:	I Year
Semester:	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	4	2

Course Objectives: This course develops practical Python programming skills through hands-on exercises, covering core concepts like data types, operators, control structures, and data structures. It emphasizes modular pogramming with functions, recursion, modules, and packages, along with file handling and exception management. The course also introduces Object-Oriented Programming, including classes, inheritance, and polymorphism, to create structured and reusable programs.

Course Outcomes:

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

1. Demonstrate a strong understanding of Python fundamentals, including data types, variables, operators
2. Apply programming concepts to solve numerical and logical problems, such as prime numbers, Armstrong numbers, Fibonacci series, and string manipulations.
3. Develop modular and reusable code using functions, recursion, modules, and packages.
4. Handle files and exceptions effectively to create robust and error-free Python applications.
5. Implement Object-Oriented Programming concepts, including classes, objects, inheritance, and polymorphism, to design structured and maintainable programs.

List of Programs

Note: Students need to practice at least 10 Python programs.

1: Practice
   a) Python literals, variables, identifiers and data types
   b) Python operators

2: Practice Python Programs on Numbers
   a) Prime Numbers
   b) Armstrong Numbers
   c) Fibonacci Numbers and Series

3: Implement python programs using list and Tuples iterative over looping statements

4: Practice python programs on String handling functions

5: Practice any one python program on module design

6: Practice any one python program on functions and recursive functions

7: Practice any one python program on packages

8: Practice python programs on exception handling

9: Practice Python Programs on text files

10: Practice Python Programs on classes and objects
11: Practice Python Programs on inheritance
12: Practice Python Programs on polymorphism

Textbook:

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

Reference Books:

1. Charles Dierbach. *Introduction to Computer Science Using Python:* A Computational Problem-Solving Focus. Wiley.
2. Reema Thareja. *Python Programming using problem solving approach*. Oxford University press.

ANNAMACHARYA UNIVERSITY

(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)
(UNIVERSITY LISTED IN UGC AS PER THE SECTION 2(f) OF THE UGC ACT, 1956)

RAJAMPET, Annamayya District, AP – 516126, INDIA

Title of the Course:	Data Structures Lab
Category :	PC
Course Code:	26BCOM22L
Branches :	Computer Science (Honors), AIML, AI&DA, Programming & Data Science
Year:	I Year
Semester :	II Semester

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	4	2

Course Objectives: The objective of this course is to provide practical knowledge of data structures through hands-on programming exercises. It aims to develop skills in performing operations on arrays and linked lists for efficient data handling. The course focuses on implementing stacks and queues and applying them to problems like expression conversion. It also emphasizes tree traversal techniques and searching methods such as linear and binary search. Additionally, the course enhances problem-solving abilities through the implementation of various sorting algorithms.

Course Outcomes:

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

1. Perform operations on arrays such as traversal, insertion, deletion, and copying.
2. Implement and manipulate single linked lists for dynamic data handling.
3. Apply stack and queue operations, including solving problems like infix to postfix conversion.
4. Demonstrate binary search tree traversals and apply searching techniques like linear and binary search.
5. Implement and analyze various sorting algorithms such as bubble, insertion, quick and merge sort.

List of Experiments:

1. Write a program to read 'N' numbers of elements into an array and perform the following Operations on an array:
   a. Traversal
   b. Copying
   c. Insertion
   d. Deletion
2. Write a program to implement operations on Single Linked List.
3. Write a program to implement operations on Stack.
5. Write a program to convert a given infix expression to a postfix expression using stacks.
6. Write a program to implement operations on Queues.
7. Write a program for Binary Search Tree Traversals
8. Write a program to search an item in a given list using the following Searching Algorithms.
   a. Linear Search
   b. Binary Search.
9. Write a program for implementation of the following Sorting Algorithms.
   a. Bubble Sort
   b. Insertion Sort
10. Write a program for implementation of the following Sorting Algorithms.
    a. Quick Sort
    b. Merge Sort

Textbook:

1. Reema Thareja. *Data Structures Using C, 2nd Ed., Oxford*.

Reference Books:

1. Mark Allen Weiss. *Data Structures and algorithm analysis in C, 2nd Ed.*,Pearson.
2. A.M.Tanenbaum, *Y. Langsam, M.J.Augenstein. Data Structures using C, 2nd Ed., Pearson.*