

CIVIL ENGINEERING**Semester I (First year)**

Sl. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	C
1	BSC	20AC11T	Algebra and Calculus	3	0	0	3
2	BSC	20AC13T	Chemistry	3	0	0	3
3	HSC	20AC15T	Communicative English	3	0	0	3
4	ESC	20A312T	Engineering Drawing	1	0	4	3
5	ESC	20A511T	Problem Solving and C programming	3	0	0	3
6	BSC	20AC13L	Engineering Chemistry Lab	0	0	3	1.5
7	HSC	20AC15L	Communicative English Lab	0	0	3	1.5
8	ESC	20A511L	C Programming Lab	0	0	3	1.5
Total credits							19.5

Category	Credits
Basic Science courses	7.5
Engineering Science courses	7.5
Humanities and Social Sciences	4.5
Total Credits	19.5

Semester II (First year)

Sl. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	C
1	BSC	20AC21T	Differential Equations and Vector Calculus	3	0	0	3
2	BSC	20AC24T	Engineering Physics	3	0	0	3
3	ESC	20A323T	Engineering Mechanics	3	0	0	3
4	ESC		Basic Electronics and Electrical Engineering	3	0	0	3
5	ESC		Mechanical Engineering	0	0	3	3
6	ESC Lab		Basic electronics and electrical lab	0	0	3	1.5
7	ESC Lab	20A325L	Engineering Workshop & IT Workshop	0	0	3	1.5
8	BSC LAB	20AC24L	Engineering Physics Lab	0	0	3	1.5
	MC	20AC26T	Environmental Science				
Total credits							19.5

Category	Credits
Basic Science courses	7.5
Engineering Science courses	12
Total Credits	19.5

Semester III (Second year)

Sl. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	C
1	BSC	20AC31T	Partial Differential Equations and Numerical Methods	3	0	0	3
2	HSMC	20AC35T	MEFA	3	0	0	3
3	PCC	20A131T	Surveying	3	0	0	3
4	PCC	20A132T	Strength of materials	3	0	0	3
5	PCC	20A133T	Fluid mechanics & Hydraulic Engineering	3	0	0	3
6	PCC (Lab)	20A131L	Surveying Lab	0	0	3	1.5
7	PCC (Lab)	20A132L	Strength of materials Lab	0	0	3	1.5
8	PCC (Lab)	20A133L	Fluid mechanics Lab	0	0	3	1.5
9	SOC-1		Python programming and Lab	1	0	2	2
10	MC	20AC34T	Life Sciences for Engineers	0	0	0	0
Total credits							21.5

Category	Credits
Basic Science courses	3
Humanities	3
Professional core courses	13.5
Skill oriented course	2
Total Credits	21.5

Semester IV (Second year)

Sl. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	C
1	BSC	20AC41T	Probability and Statistics	3	0	0	3
2	ESC	20A141T	civil engineering Drawing	3	0	0	3
3	PCC	20A142T	Materials testing and Evaluation	3	0	0	3
4	PCC	20A143T	Engineering Geology	3	0	0	3
5	PCC	20A144T	Structural Analysis	3	0	0	3
6	ESC Lab	20A143L	Engineering Geology Lab	0	0	3	1.5
7	PCC Lab	20A145L	Hydraulics Engineering lab	0	0	3	1.5
8	PCC Lab	20A142L	Material Testing Lab				1.5
9	SOC-2	20A141L	Computer Aided civil engineering Drawing Lab	1	0	2	2
Total credits							21.5
Internship 2 Months (Mandatory) during summer vacation							

Category	Credits
Basic Science courses	3
Engineering Science courses	4.5
Professional core course	12
Skill oriented course	2
Total Credits	21.5

Semester V (Third year)

Sl. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	C
1	PCC	20A151T	Basic Reinforced concrete Design	3	0	0	3
2	PCC	20A152T	Environmental Engineering	3	0	0	3
3	PCC	20A153T	Hydrology & Water Resource Engineering	3	0	0	3
4	OEC	20A15AT	Disaster Management	3	0	0	3
		20A15BT	Instrumentation and Sensor technologies	3	0	0	3
		20A15CT	Watershed Management	3	0	0	3
5	PEC-1	20A15DT	Sustainable Construction Methods	3	0	0	3
		20A15ET	Advanced Structural Analysis				
		20A15FT	Remote Sensing and GIS				
6	PCC Lab	20A151L	Structural Analysis& Design lab (STAAD)	0	0	3	1.5
7	PCC Lab	20A152L	Environmental Engineering lab	0	0	3	1.5
8	MC	20AC53T	Essence of Indian Traditional Knowledge	2	0	0	0
9	SAC-3	20A154L	Surveying Lab-II/ BIM	1	0	2	2
Summer Internship 2 Months (Mandatory) after second year (to be evaluated during V semester)				0	0	0	1.5
Total credits							21.5
Internship 2 Months (Mandatory) during summer vacation							

Category	Credits
Professional core course	12
Professional elective course	3
Open elective course/ Job oriented	3
Skill advanced course/ soft skill course	2
Summer Internship	1.5
Total Credits	21.5

Semester VI (Third year)

Sl. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	C
1	PCC	20A161T	Transportation Engineering	3	0	0	3
2	PCC	20A162T	Engineering Estimation and costing	3	0	0	3
3	PCC	20A163T	Soil Mechanics	3	0	0	3
4	PEC-2	20A16AT	Advanced RCC Design	3	0	0	3
		20A16BT	Construction project Management				
		20A16CT	Advanced Environmental Engineering				
5	OEC-2		Oops Through Java	2	0	2	3
6	PCC Lab	20A165L	Structural Analysis& Design lab (E-Tabs)	0	0	3	1.5
7	PCC Lab	20A161L	Transportation Engineering lab	0	0	3	1.5
8	PCC Lab	20A163L	Soil Mechanics lab	0	0	3	1.5
9	MC	20AC62T	Constitution of India	2	0	0	0
10	SSC	20AC61L	Professional Communication skills				
Total credits							21.5
Industrial/Research Internship (Mandatory) 2 Months during summer vacation							

Category	Credits
Professional core course	13.5
Professional elective course	3
Open elective course	3
Skill advanced course/ soft skill course	2
Mandatory course	0
Industrial/Research Internship (Mandatory) 2 Months	-
Total Credits	21.5

Semester VII (Fourth year)

Sl. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	C
1	PEC-3	20A17AT	Design of Steel Structures	3	0	0	3
		20A17BT	Advanced Transportation Engineering				
		20A17CT	Bridge Engineering				
2	PEC-4	20A17DT	Foundation Engineering	3	0	0	3
		20A17ET	Finite Element methods				
		20A17FT	Design and Drawing of Irrigation structures				
3	PEC-5	20A17GT	Prestressed concrete	3	0	0	3
		20A17HT	Environmental Impact assessment & life cycle assessment				
		20A17IT	Ground Improvement Techniques				
4	OEC-3	20A17JT	MOOCS(self-discipline)	2	0	2	3
5	OEC-4	20A17KT	MOOCS (Inter disciplinary)	2	0	2	3
6	SAC	20A17LL	Project Management Lab (Primavera)	2	0	0	2
7	HSMC	20AC71T	Universal Human Values II	3	0	0	3
Industrial/Research Internship 2 Months (Mandatory) after third year (to be evaluated during VII semester)				0	0	0	3
						Total credits	23
Industrial/Research Internship (Mandatory) 2 Months during summer vacation							

Category	Credits
Professional elective course	9
Open elective course/ Job oriented	6
Humanities and Social Sciences	3
Skill advanced course/ soft skill course	2
Industrial/Research Internship	3
Total Credits	23

Semester VIII (Fourth year)

Sl. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	C
1	PROJ	20A18P	Project work, seminar and internship in industry	0	0	0	12
Internship (6 months)							
						Total credits	12

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Civil Engineering

Title of the Course Algebra and Calculus

Category BSC

Course Code 20AC11T

Year I B. Tech.

Semester I Semester

Branch Common to all branches of Engineering

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

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

Unit 1 Matrices 10

Rank of a matrix by echelon form, Normal form, Solving system of homogeneous and non-homogeneous linear equations, Eigen values and Eigen vectors and their properties.

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

- Find the rank, Eigen values and Eigenvectors of a matrix (L1)
- Solve systems of linear equations (L3)

Unit 2 Quadratic forms of matrices 8

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 form by orthogonal transformation.

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

- Apply Cayley-Hamilton theorem to find inverse and power of a matrix (L3)
- Identify special properties of a matrix, such as positive definite, etc., and use this information to facilitate the calculation of matrix characteristics (L3)

Unit 3 Mean Value Theorems & Multivariable calculus 10

Taylor's theorem and Maclaurin's theorem (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.

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

- Translate the given function as series of Taylor's and Maclaurin's (L2)
- Find partial derivatives numerically and symbolically and use them to analyze and interpret the way a function varies, and utilize Jacobian of a coordinate transformation to deal with the problems in change of variables (L3)
- Acquire the Knowledge of maxima and minima of functions of several variables (L1)

Unit 4 Multiple Integrals

8

Double integrals, change of order of integration, change of variables (Cartesian to polar), areas enclosed by plane curves, evaluation of triple integrals.

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

- Extend the definite integral to double and triple integrals in cartesian and polar coordinates (L2)
- Apply double integration techniques in evaluating areas bounded by region (L3)

Unit 5 Special Functions

8

Beta and Gamma functions and their properties, relation between beta and gamma functions, evaluation of definite integrals using beta and gamma functions.

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

- Understand the properties of beta and gamma functions and its relations (L2)
- Utilize the special functions in evaluating definite integrals (L3)

Prescribed Textbooks:

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

Reference Books:

1. B. V. Ramana, Higher Engineering Mathematics, Mc Graw Hill Education.
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
3. R.L. Garg Nishu Gupta, Engineering Mathematics Volumes-I &II, Pearson Education
4. H. K. Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand.

Course Outcomes:

At the end of the course, the 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

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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Department of Civil Engineering

Title of the Course Chemistry
Category BSC
Course Code 20AC13T
Year I Year
Semester I Semester
Branch Common to CE, CSE, AIDAS

Lecture Hours	Tutorial Hours	Practice Hours	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 explain how to synthesize different polymers and differentiate polymers based on properties.
- To introduce different types of instrumental techniques and molecular machines and molecular switches.

Unit 1 Electrochemical Energy Systems - I 10

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)

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

- explain the construction of different Ion selective electrodes (L4)
- solve problems based on cell potential and EMF(L3)
- apply Nernst equation for calculating electrode and cell potentials (L3)

Unit 2 Electrochemical Energy Systems - II 10

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

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

- explain the theory of construction of battery and fuel cells (L4)
- describe the working principle of Fuel cells (L2)
- summarize the applications of batteries (L4)

Unit 3 Polymer Chemistry

10

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 Preparation, properties, and applications of Buna-S, Buna-N. Conducting polymers – polyacetylene, polyaniline – mechanism of conduction and applications

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

- explain the preparation, properties and applications of Bakelite, and Nylon-6,6 (L4)
- illustrate the mechanism of conduction in polyacetylene and polyaniline (L3)
- discuss Buna-S and Buna-N elastomers and their applications (L2)

Unit 4 Instrumental Methods and their Applications

9

Electromagnetic spectrum. Absorption of radiation: Beer-Lambert's law.

Principle and applications of pH metry, Potentiometry, Conductometry, UV-Visible, IR Spectroscopy, Gas Chromatography (GC) Thin layer chromatography (TLC)

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

- distinguish the ranges of different types of spectral series in electromagnetic spectrum (L4)
- understand the principles of different analytical instruments (L2)
- differentiate between pH metry, potentiometry and conductometry (L4)

Unit 5 Molecular Machines & Switches

10

Molecular machines: Rotaxanes and Catenanes as artificial molecular machines, prototypes – linear motions in rotaxanes, an acid-base controlled molecular shuttle, a molecular elevator, an autonomous light-powered molecular motor, systems based on Catenanes.

Molecular switches – Introduction to molecular switches, Cyclodextrin-based switches, in and out switching, back and forth switching, displacement switching

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

- describe the mechanism involved in linear motion of Rotaxanes (L2)
- explain different types of switching in Cyclodextrins (L4)
- demonstrate the applications of Rotaxanes and Catenanes as artificial molecular machines (L2)

Prescribed Textbooks:

1. O.G. Palanna, Engineering Chemistry, 2/e, Tata McGraw Hill Education Private Limited, 2017.
2. P.C. Jain and M. Jain, Engineering Chemistry, 17/e, Dhanapat Rai & Sons, 2018

Reference Books:

1. Shashi Chawla, A textbook of Engineering chemistry, 3/e, Dhanapat Rai & Co, 2015.
2. Skoog, Holler, Crouch, Principles of Instrumental Analysis, 7/e, Cengage learning, 2018.
3. T. Ross Kelly, Molecular Machines, 1/e, Springer Berlin Heidelberg, 2005
4. Ben L. Feringa, Wesley R. Browne, Molecular Switches, 2/e, Wiley, 2011

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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Department of Civil Engineering

Title of the Course Communicative English

Category HSMC

Course Code 20AC15T

Year I Year

Semester I Semester

Branch Common to CE, ME, CSE, AIDAS

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

- To Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers
- To focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
- To Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations
- To impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays
- To provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing

Unit 1 9

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: *On the Conduct of Life* by William Hazlitt; Skimming to get the main idea of a text; scanning to look for specific pieces of information.

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

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

Learning Outcomes

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

- understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information

- ask and answer general questions on familiar topics and introduce oneself/others
- employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
- recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
- form sentences using proper grammatical structures and correct word forms

Unit 2

9

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

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

Reading: *The Brook by Alfred Tennyson*; Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

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

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

Learning Outcomes

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

- comprehend short talks on general topics
- participate in informal discussions and speak clearly on a specific topic using suitable discourse markers
- understand the use of cohesive devices for better reading comprehension
- write well-structured paragraphs on specific topics
- identify basic errors of grammar/ usage and make necessary corrections in short texts

Unit 3

9

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: *The Death Trap by Saki*; Reading a text in detail by making basic inferences -recognizing and interpreting specific context clues; strategies to use text clues for comprehension.

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

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

Learning Outcomes

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

- comprehend short talks and summarize the content with clarity and precision
- participate in informal discussions and report what is discussed
- infer meanings of unfamiliar words using contextual clues

- write summaries based on global comprehension of reading/listening texts
- use correct tense forms, appropriate structures and a range of reporting verbs in speech and writing

Unit 4

9

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: *Muhammad Yunus*; Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicate processes or display complicated data.

Writing: Writing structured essays on specific topics using suitable claims and evidence.

Grammar and Vocabulary: Quantifying expressions - adjectives and adverbs; comparing and contrasting; Voice - Active & Passive Voice

Learning Outcomes

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

- infer and predict about content of spoken discourse
- understand verbal and non-verbal features of communication and hold formal/informal conversations
- interpret graphic elements used in academic texts
- produce a coherent paragraph interpreting a figure/graph/chart/table
- use language appropriate for description and interpretation of graphical elements

Unit 5

9

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 - without the use of PPT slides.

Reading: *The Dancer with a White Parasol* by Ranjana Deve; Reading for comprehension.

Writing: Letter Writing: Official Letters/Report Writing

Grammar and Vocabulary: Editing short texts –identifying and correcting common errors in grammar and usage (articles, prepositions, tenses, subject verb agreement)

Learning Outcomes

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

- take notes while listening to a talk/lecture and make use of them to answer questions
- make formal oral presentations using effective strategies
- comprehend, discuss and respond to academic texts orally and in writing
- produce a well-organized essay with adequate support and detail
- edit short texts by correcting common errors

Prescribed Textbook:

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
3. Bailey, Stephen. Academic writing: A handbook for international students. Routledge, 2014.
4. Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018.
5. Raymond Murphy's English Grammar in Use Fourth Edition (2012) E-book
6. Hewings, Martin. Cambridge Academic English (B2). CUP, 2012.
7. Oxford Learners Dictionary, 12th Edition, 2011
8. Norman Lewis Word Power Made Easy- The Complete Handbook for Building a Superior Vocabulary (2014)
9. Speed Reading with the Right Brain: Learn to Read Ideas Instead of Just Words by David Butler

Course Outcomes:

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

Blooms Level of Learning

- | | |
|--|----|
| 1. understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English | L3 |
| 2. read, scan and skim texts such as literary forms, journalistic articles and scientific readings for comprehension and retention | L2 |
| 3. exhibit self-confidence and speak in formal and informal contexts | L3 |
| 4. apply grammatical knowledge in speech and writing and formulate sentences with accuracy | L2 |
| 5. 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
20AC15T.1										3		2
20AC15T.2										3		2
20AC15T.3										3		2
20AC15T.4										3		2
20AC15T.5										3		2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Civil Engineering

Title of the Course Engineering Drawing

Category ESC

Course Code 20A312T

Year I B.Tech

Semester I Semester

Branch Common for CE, EEE & ECE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
2	0	2	3

Course Objectives:

- To bring awareness that Engineering Drawing is the Language of Engineers.
- To familiarize how industry communicates technical information.
- To teach the practices for accuracy and clarity in presenting the technical information.
- To develop the engineering imagination essential for successful design.
- To provide the basic geometrical information to ignite the innovative design ideas.

Unit 1 Introduction to Drawing and Engineering Curves.

Theory Hours: 05
Practice sessions: 04

Introduction: Lettering–Geometrical Constructions–Construction of polygons by General method.

Conics: Ellipse, Parabola and Hyperbola (General method only). Special Methods: Ellipse - Concentric Circles method, Oblong method & Arcs of Circles method - Drawing tangent & normal to the conics.

Cycloidal Curves: Cycloid, Epi-cycloid, Hypo-cycloid (simple problems) - Drawing tangent & normal to the Cycloidal curves.

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

- Understand the significance of engineering drawing and understand the geometrical constructions, conventions used in the engineering drawing.
- Identify the curves obtained in different conic sections and able to draw different conic curves.
- Know and draw the different Cycloidal curves, also its practical application in engineering.

Unit 2 Projections of Points and Lines.

Theory Hours: 03
Practice sessions: 06

Projections of points - Projections of lines inclined to one reference plane, Projections of lines inclined to both reference planes. True lengths and Traces of lines.

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

- Understand the principles and elements of projection.
- Know how to draw the projections of points, lines.
- Differentiate between projected length and true length and also find the true length of the lines.

Unit 3 Projections of Planes.

Theory Hours: 05
Practice sessions: 04

Projection of planes inclined to one reference plane - and inclined to both the reference planes.

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

- Understand the projections of different geometrical regular plane surfaces.
- Identify and Construct the true shapes of the plane surfaces.
- Analyze the projections of plane surface inclined to both the planes.

Unit 4 Projections of Solids.

Theory Hours: 04
Practice sessions: 05

Projections Of simple Solids such as Cylinder, Cone, Prism and Pyramid - Axis Inclined to one reference plane, Axis inclined to both the reference planes.

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

- Understand different types of solids.
- Draw projection of simple solids.
- Draw the Projections of solids inclined to both the reference planes.

Unit 5 Isometric Projections & Conversion of Views.

Theory Hours: 04
Practice sessions: 05

Isometric Projections: Projections of Lines, Planes and Simple Solids – Prism, Pyramid, Cylinder and Cone in simple positions only.

nversion of Views: Conversions of Orthographic views in to Isometric views and Conversion of Isometric views to Orthographic views.

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

- Understand the pictorial views such as isometric views, orthographic views and also differentiate between Isometric Projection and View.
- Draw the Isometric views of simple plane surfaces and simple solids.
- Draw the conversions of Isometric Views in to Orthographic Views and Vice-versa.

Prescribed Text Books:

1. Engineering Drawing, N.D. Bhatt, Charotar Publishers, Edition2016
2. Engineering Drawing, K.L. Narayana, P. Kanniah, Scitech Pub, Edi2016

Reference Books:

1. Engineering Drawing and Graphics, Venugopal/ New age, Ed2015.
2. Engineering Drawing, Johle, Tata McGraw-Hill. Ed2014
3. Engineering Drawing, Shah and Rana, 2/e, Pearson Education Ed2015

Course Outcomes:

At the end of the course, the student will be able to	Blooms Level of Learning
6. Understand the concepts of ConicSections.	L1, L2
7. Understand the concept of Cycloidal Curves, Involutés and the application of industrystandards.	L2, L3
8. 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	L2, L3

the new products.

9. Understand and apply Orthographic Projections of Planes.

L1, L2, L3

10. Understand and analyze the Orthographic Projections of Solids and conversion of isometric views to orthographic views viceversa.

L3, L4

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
20A312T.1	3	-	-	-	-	3	2	-	1	2	-	-	-	-	-
20A312T.2	3	-	-	-	-	3	2	-	1	2	-	-	-	-	-
20A312T.3	3	2	-	-	-	3	2	-	1	2	-	-	-	-	-
20A312T.4	3	2	-	-	-	3	2	-	1	2	-	-	-	-	-
20A312T.5	3	-	2	-	2	2	-	3	3	-	-	3	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Civil Engineering

Title of the Course Problem Solving Through C programming

Category ES

Course Code 20A511T

Year I B. Tech

Semester I Semester

Branch Common to CE, EEE, ME, ECE & CSE

Lecture Hours	Tutorial Hours	Practice Hours	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 Problem Solving and Introduction to C (9)

Steps to solve problems, algorithm, Pseudo code, Flowchart with examples, Program Development Environments. Introduction to programming: Programming languages and generations.

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

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

- Identify situations where computational methods and computers would be useful.
- Approach the programming tasks using techniques learned and write pseudo-code.
- Choose the right data representation formats based on the requirements of the problem.
- Write the program on a computer, edit, compile, debug, correct, recompile and run it.

Unit 2 Introduction to decision control statements and Arrays (9)

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.

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

- Use the comparisons and limitations of the various programming constructs and choose the right one for the task in hand.
- Identify tasks in arrays with different techniques that are applicable and apply them to write programs.
- Design and implement operations on both single and Multidimensional arrays.

Unit 3 Strings and Functions (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.

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

- Implement and test the programs on strings using string manipulation functions.
- Analyze programming problems to choose when regular loops should be used and when recursion will produce a better program

Unit 4 Pointers (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.

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

- Identify tasks in which the dynamic memory allocation techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task.
- Design and develop Computer programs, analyzes, and interprets the concept of pointers and their usage.

Unit 5 Structures and Files (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.

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

- Define derived data types and use them in simple data processing applications.
- Develop and test C programs for simple applications using files.

Prescribed Text Books:

3. C Programming and Data Structures. B.A. Forouzan, R. F.Gilberg, Cengage learning, Indian edition.

4. C and Data Structures, E.Balaguruswamy, Tata McGraw Hill.
5. Programming in C and Data Structures, J.R.Hanly, Ashok N. Kamthane and A. Ananda Rao, Pearson Education.

Reference Books:

4. LET US C, Yeswanth Kanitkar, Ninth Edition, BPB Publication
5. Byron Gottfried, Schaum's" Outline of Programming with C", McGraw-Hill.
6. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.
7. A K Sharma "Computer Fundamentals and Programming", 2nd Edition, University Press, 2018.
8. PradeepDey and Manas Ghosh, "Programming in C", Oxford Press, 2ndEdition, 2017
9. ReemaTharaja "Introduction to C Programming", Second Edition, OXFORD Press, 2015

Course Outcomes:

At the end of the course, the student will be able to	Blooms Level of Learning
11. Formulate solutions to problems and represent those using algorithms/Flowcharts.	L3
12. Choose proper control statements and use arrays for solving problems.	L3
13. Decompose a problem into modules and use functions to implement the modules.	L4
14. Apply and use allocation of memory for pointers and solve the problems related to manipulation of text data using files and structures.	L3
15. Develop the solutions for problems using C programming Language.	L6

CO-PO Mapping:

SCO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
20A511T.1	1	2	2	3	-	1	-	-	-	-	-	-
20A511T.2	3	3	3	3	3	-	-	-	1	-	-	-
20A511T.3	3	2	1	2	1	-	-	-	1	-	-	2
20A511T.4	2	3	2	2	3	-	-	-	1	-	1	2
20A511T.5	3	2	2	2	2	-	-	-	1	-	-	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Civil Engineering

Title of the Course Engineering Chemistry Lab

Category BSC

Course Code 20AC13L

Year I Year

Semester I

Branch Common to CSE, AIDAS

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives:

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

List of experiments

From the following list, any 10 experiments must be performed in a semester

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. Conductometric 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 functional groups in the given organic compound
12. Thin layer chromatography

Prescribed Textbooks:

6. J. Mendham, R.C Denney, J.D Barnes, M. Thomas, B. Sivasankar Vogel's Quantitative Chemical Analysis 6/e, Pearson publishers, 2009.
7. N.K Bhasin and Sudha Rani Laboratory Manual on Engineering Chemistry 3/e, Dhanpat Rai Publishing Company 2009.

Course Outcomes:

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

Blooms Level of
Learning

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Civil Engineering

Title of the Course Communicative English Lab

Category HSMC

Course Code 20AC15L

Year I B. Tech.

Semester I Semester

Branch CE, ME, CSE & AIDAS

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives:

1. To learn better English pronunciation
2. To use language effectively in everyday conversations
3. To make formal oral presentations using effective strategies in professional life
4. To be exposed to a variety of self-instructional, learner friendly modes of language learning

Detailed Syllabus:

Pronunciation:

6

Introduction to English speech sounds

Learning Outcome:

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

- understand different accents spoken by native speakers of English and speak in intelligible way

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.

Learning Outcome:

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

- Adopt better strategies to listen attentively and comprehend attentively

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

Learning Outcomes:

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

- speak confidently in formal and informal contexts
- comprehend and produce short talks on general topics
- use specific vocabulary to describe different persons, places and objects

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.

Learning Outcome:

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

- Analyze data given in an infographic and write/speak about it

Minimum Requirements:

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 Textbook: 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
20AC15L.1	-	-	-	-	-	-	-	-	-	2	-	1
20AC15L.2	-	-	-	-	-	-	-	-	-	1	-	2
20AC15L.3	-	-	-	-	-	-	-	-	3	3	-	3
20AC15L.4	-	-	-	-	-	-	-	-	3	2	-	1
20AC15L.5	-	-	-	-	-	-	-	-	1	3	-	3
20AC15L.6	-	-	-	-	-	-	-	-	-	2	-	1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Civil Engineering

Title of the Course C Programming Lab

Category ES

Course Code 20A511L

Year I B. Tech

Semester I Semester

Branch Common to CE, EEE, ME, ECE & CSE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives:

- 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 using a modular programming and Manage data using files.

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

Data Types, constants, Input and Output and expressions

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

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

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

- Identify situations where computational methods and computers would be useful.
- Approach the programming tasks using techniques learned and write pseudo-code.
- Write the program on a computer, edit, compile, debug, correct, recompile and run it.

Decision control statements and Arrays

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

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

- Choose the right data representation formats based on the requirements of the problem.

- Use the comparisons and limitations of the various programming constructs and choose the right one for the task in hand.
- Identify tasks in arrays with different techniques that are applicable and apply them to write programs.
- Design and implement operations on both single and Multidimensional arrays.

Strings and Functions

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.

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

- Implement and test the programs on strings using string manipulation functions.
- Analyze programming problems to choose when regular loops should be used and when recursion will produce a better program

Pointers

Exercise 13:(week-13): Pointers, Dynamic memory allocation and error handling

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

- Design and develop Computer programs, analyzes, and interprets the concept of pointers and their usage.
- Identify tasks in which the dynamic memory allocation techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task.

Structures and Files

Exercise 14:(week-14): Structures

Exercise 15:(week-15): File handling

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

- Define structure data types and use them in simple data processing applications.
- Develop and test C programs for simple applications using files.

Prescribed Text Books:

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

Reference Books:

10. Let Us C, Yeswanth Kanitkar, Ninth Edition, BPB Publication

11. A K Sharma "Computer Fundamentals and Programming", 2nd Edition, University Press, 2018.
12. PradeepDey and Manas Ghosh, "Programming in C", Oxford Press, 2ndEdition, 2017
13. ReemaTharaja "Introduction to C Programming", Second Edition, OXFORD Press, 2015
14. <https://www.cprogramming.com/>
15. <https://www.mycplus.com/tutorials/c-programming-tutorials>

Course Outcomes:

At the end of the course, the student will be able to	Blooms Level of Learning
16. Identify and setup program development environment	L2
17. Implement the algorithms using C programming language constructs	L3
18. Identify and rectify the syntax errors and debug program for semantic errors	L3
19. Solve problems in a modular approach using functions	L4
20. Implement file operations with simple text data	L4

CO-PO Mapping:

CO	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
20A511L.1	3	2	-	2	2	-	-	-	2	2	1	-	3		
20A511L.2	2	2	-	-	-	-	-	-	1	-	-	-	3		
20A511L.3	3	3	3	3	-	-	-	-	1	-	-	3	3		
20A511L.4	3	3	3	3	-	-	-	-	-	-	-	3	3		
20A511L.5	3	3	3	3	-	-	-	-	-	-	-	3	3		

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Civil Engineering

Title of the Course Environmental Science

Category MC

Course Code 20AC16T

Year I

Semester I Semester

Branch CE, ME, CSE, AIDAS

Lecture Hours	Tutorial Hours	Practice Hours	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 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 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.

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

- Understand the importance of public awareness.
- Know about the various natural 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.

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

- Know about the concept of ecosystem.
- Know about the importance 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.

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

- Know about the different types of pollution.
- Know about various sources, effects and control measures of pollution.

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.

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

- Know about social issues related to environment.
- Know about importance of environmental acts.

Unit 5 Human Population and the Environment 7

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.

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

- Know about the effects of population explosion.
- Identify the natural assets and their relationship.

Prescribed Textbooks:

1. Perspectives in environmental Studies, Anubha Kaushik and C P Kaushik, New Age International Publishers, New Delhi, 2018.
2. A Textbook of Environmental Studies, Shashi Chawla, McGraw Hill Education, New Delhi, 2017.

Reference Books:

1. Environmental Studies by Benny Joseph, McGraw Hill Education, New Delhi, 2017.
2. A textbook of environmental studies, A Dhinakaran and B Sankaran, Himalaya Publishing House, Mumbai, 2017.
3. Fundamentals of environmental studies, Mahua Basu and S Xavier, Cambridge University Press, New Delhi, 2017.
4. Textbook of Environmental Studies for undergraduate courses, Erach Bharucha for University Grant Commission, University press, New Delhi, 2013.
5. A textbook of environmental studies, Vijay kumarTiwari, Himalaya Publishing House, Mumbai, 2017.

Course Outcomes:

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

Blooms Level
of Learning

- | | |
|---|----|
| 21. Explain how natural resources should be used. | L2 |
| 22. Identify the need to protect ecosystems and biodiversity for future generations. | L3 |
| 23. List out the causes, effects, and control measures of environmental pollution. | L1 |
| 24. Demonstrate knowledge to the society in the proper utilization of goods and services. | L2 |
| 25. Outline the interconnectedness of human dependence on the earth's ecosystems. | L2 |

CO-PO Mapping:

CO	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012
20AC16T.1	1	1				3	3	1				3
20AC16T.2	1	2				3	3	1				3
20AC16T.3		1				3	3	1				3
20AC16T.4	2					3	3	1				3
20AC16T.5	1					3	3	1				3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Civil Engineering

Title of the Course Differential Equations and Vector Calculus

Category BSC

Course Code 20AC21T

Year I B. Tech

Semester II Semester

Branch CE, EEE, ME, ECE, CSE & AIDS

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

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 with constant coefficients 10

Definitions-complete solution-operator D-rules for finding complimentary function-inverse operator-rules for finding particularintegral 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.

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

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

Unit 2 Equations reducible to Linear Differential Equations 8

Cauchy's and Legendre's linear equations, simultaneous linear equations with constant coefficients, Applications: Electrical Circuits – L-C and L-C-R Circuit problems.\

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

- Classify and interpret the solutions of linear differential equations (L4)
- Generalize and solve the higher order differential equation by analyzing physical situations (L3)

Unit 3 Partial Differential Equations 8

Formation of PDEs by eliminating arbitrary constants and arbitrary functions, solutions of first order linear and non-linear PDEs using Charpit's method, solutions of boundary value problems by using method of separation of variables.

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

- Apply the techniques to find solutions of standard PDEs (L3)
- Solve the boundary value problems (L3)

Unit 4 Vector Differentiation 8

Scalar and vector point functions, vector operator Del, Del applied to scalar point functions- Gradient, del applied to vector point functions-Divergence and Curl- del applied twice to scalar point function, vector identities.

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

- Apply del to Scalar and vector point functions (L3)
- Illustrate the physical interpretation of Gradient, Divergence and Curl (L2)

Unit 5 Vector integration 10

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

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

- Find the work done in moving a particle along the path over a force field (L1)
- Apply Green's, Stokes and Divergence theorem in evaluation of double and triple integrals (L3)

Prescribed Textbooks:

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

Reference Books:

1. B. V. Ramana, Higher Engineering Mathematics, Mc Graw Hill Education.
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
3. R.L. Garg Nishu Gupta, Engineering Mathematics Volumes-I &II, Pearson Education
4. H. K. Das, Er. Rajnish Verma, Higher Engineering Mathematics, S. Chand.

Course Outcomes:

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

Blooms Level
of Learning

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Civil Engineering

Title of the Course Engineering Physics

Category BSC

Course Code 20AC24T

Year I B. Tech.

Semester II Semester

Branch CE & ME

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

- To impart knowledge in basic concepts of mechanics, acoustics, and ultrasonics with their engineering applications
- To explain the significant concepts of dielectrics and magnetic materials in the field of engineering and their potential applications.
- To impart knowledge in basic concepts of LASERs and optical fibers along with its engineering applications.

Unit 1 Mechanics 9

Gradient of scalar, Divergence and Curl of vector field and their physical significance-rotational frames-conservative forces- $F = -\text{grad } V$, torque and angular momentum - Newton's laws in inertial and non-inertial frames of reference-rotating frame of reference with constant angular velocity-qualitative explanation of Foucault's pendulum-rigid body-angular velocity vector-centre of mass- gravitation law and Kepler's laws(qualitative).

Learning Outcomes: At the end of the unit, the student will be able to: <Please describe two/three learning outcomes of the unit>

- identify forces and moments in mechanical systems using scalar and vector techniques. (L3)
- interpret the equation of motion of a rigid rotating body (torque on a rigid body). (L3)
- extend Newton's second law for inertial and non-inertial frame of reference. (L2)

Unit 2 Acoustics and Ultrasonics 9

Acoustics: Introduction- reverberation-reverberation time-Sabine's formula- derivation using growth and decay method – Absorption coefficient and its determination –factors affecting acoustics of buildings and their remedies.

Ultrasonics: Introduction- Properties- Production of ultrasonics by magnetostriction and piezoelectric

methods - acoustic grating -Non Destructive Testing – pulse echo system through transmission and reflection modes - A,B and C – scan displays, Medical applications – Sonogram.

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

- explain how sound is propagated in buildings. (L2)
- analyze acoustic properties of typically used materials in buildings. (L4)
- identify the use of ultrasonics in different fields. (L3)

Unit 3 Dielectric and Magnetic materials 10

Introduction-Dielectric Polarization-Dielectric polarizability- Susceptibility and Dielectric constant- Types of polarizations: Electronic and Ionic (quantitative), Orientation polarizations(qualitative) -Frequency dependence of polarization-Lorentz(internal) field-Claussius -Mosotti equation-Applications of Dielectrics.

Introduction- Magnetic dipole moment-Magnetization-Magnetic susceptibility and permeability- Origin of permanent magnetic moment -Classification of Magnetic materials-Weiss domain theory of ferromagnetism (qualitative)-Hysteresis-soft and hard magnetic materials-Magnetic device applications.

Learning Outcomes: At the end of the unit, the student will be able to: <Please describe two/three learning outcomes of the unit>

- explain the concept of dielectric constant and polarization in dielectric materials. (L2)
- classify the magnetic materials based on susceptibility and their temperature dependence. (L2)
- apply the concept of magnetism and magnetic devices. (L3)

Unit 4 LASERs and Fiber Optics 10

Introduction-characteristics of lasers-spontaneous and stimulated emission of radiation-Einstein's coefficients-population inversion-pumping mechanism-Ruby laser- He-Ne laser-semiconductor laser-applications of lasers.

Introduction to Optical Fibers-Total Internal Reflection-Critical angle of propagation- Acceptance angle - Numerical Aperture-Classification of fibers based on Refractive index profile & modes (step index and Graded index optical fibers)-attenuation and optical fiber losses-Block diagram of fiber optic communication- Medical Applications.

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

- understand the basic concepts of laser light sources. (L2)
- Identify the Engineering applications of lasers. (L2)
- classify optical fibers based on refractive index profile and mode of propagation and identify the applications of optical fibers in medical, communication and other fields. (L2)

Unit 5 Sensors 8

Sensors:(qualitative description only): Different types of sensors and applications; Strain and Pressure sensors- Piezoelectric, magneto strictive sensors, Fibre optic methods of pressure sensing; Temperature sensors - bimetallic strip, pyroelectric detectors, Hall-effect sensor, smoke, and fire detectors.

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Civil Engineering

Title of the Course	Engineering Mechanics
Category	ESC
Course Code	20A323T
Year	I B.Tech
Semester	II Semester
Branch	Common to CE & ME

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

- To explain the effect of force and moment in the different engineering applications.
- To familiarize frictional forces in mechanical applications.
- To teach centre of gravity and moment of inertia of solids and surfaces.
- To understand the analysis of rigid bodies under dynamic conditions.

Unit 1 Introduction to Engineering Mechanics 8

Introduction to Engineering Mechanics: Composition and resolution of forces, parallelogram law, principle of transmissibility, types of force systems - concurrent and concurrent coplanar forces, resultant of coplanar force systems couple, moment of a force Varignon's theorem, concept of free body diagrams, concept of equilibrium of coplanar force and non-coplanar systems.

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

- Resolve the forces in mechanical systems (L2)
- Identify the moments and forces (L3)
- Draw free body diagram (L3)
- Demonstrate equilibrium of ideal system. (L2)

Unit 2 Analysis of Structures and Friction 9

Introduction to plane trusses, analysis of plane trusses by method of joints and method of sections.
 Friction: Laws of friction, types of friction, equilibrium of force systems involving frictional forces, wedge friction.
 Free body diagrams involving frictional forces.

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

- Identify different types of trusses. (L2)
- Analyze the plane trusses by method of joints and the method of sections. (L4)

Unit 3 Properties of Surfaces and Moment of Inertia 9

Properties of Surfaces and Volumes: Centroid and center of gravity, derivation of centroids from first moment of area, centroids of composite sections, center of gravity of common volumes - cylinder, cone, sphere, theorem of Pappus-guldinus.

Moment of Inertia: Area moment of inertia of plane and composite shapes, parallel axis theorem, perpendicular axis theorem, polar moment of inertia, mass moment of inertia of common volumes -thin plates, thin rod,

cylinder, cone, sphere, rectangular prism, radius of gyration.

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

- Identify the centre of gravity of composite sections. (L3)
- Determine the centre of gravity of common solids. (L3)
- Determine moment of inertia for composite volumes. (L3)

Unit 4 Kinematics

8

Equations of motion for rigid bodies, constant and variable acceleration, rectilinear and curvilinear motion, motion under gravity -projectile motion, use of rectangular coordinates, tangential and normal coordinates, radius of curvature, rotation of a rigid body about a fixed axis, introduction to plane motion.

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

- Write equations of motion for rigid bodies. (L3)
- Find velocity and acceleration in rectilinear and curvilinear motions (L4)
- Trace the path of projectile. (L3)

Unit 5 Kinetics and Ideal Systems

8

Kinetics: Principles of dynamics - Newton's Laws of motion, D'Alembert's principle in rectilinear translation, principle of work and energy.

Ideal Systems: Principle of conservation of energy, concept of power, conservation of linear and angular momentum, principle of momentum and impulse, impact - types of impact.

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

- Apply D'Alembert's principle in rectilinear translation. (L3)
- Estimate the work done by a force and work done by a couple. (L3)
- Relate principle of work and energy in dynamic systems. (L3)
- Make use of principle of momentum and impulse to dynamic bodies. (L4)

Prescribed Text Books:

1. A Nelson, Engineering Mechanics: Statics and Dynamics, McGraw Hill publications.
2. J.L.Meriam , L.G.Kraige , J.N.Bolton ,Engineering Mechanics-statics, Engineering Mechanics-Dynamics.
3. S SBhavikatti, Engineering Mechanics, New Age International.
4. RK Bansal , Engineering Mechanics, Laxmi Publications.

Reference Books:

19. Basudeb Bhattacharya., Engineering Mechanics, 2/e, Oxford University Press (India), 2015.
20. Irving Shames, G K M Rao, Engineering Mechanics: Statics and Dynam-ics, 4/e, Pearson, 2009
21. K L Kumar, Veenu Kumar, Engineering Mechanics, 4/e, Tata McGraw Hill, 2010.

Course Outcomes:

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

Blooms Level of Learning

- | | |
|--|-------|
| 31. Resolve forces and couples in mechanical systems | L3 |
| 32. Identify different types of trusses and analyze the plane trusses by method of joints and the method of sections | L2,L4 |

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
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Department of Civil Engineering

Title of the Course	Basic Electrical and Electronics Engineering
Category	ES
Course Code	20A223T
Year	I B.Tech
Semester	II

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives:

- To impart the basic knowledge about fundamental laws and electric circuits.
- To understand the working of various DC Machines.
- To understand the working of various AC Machines.
- To know about various electronic devices.
- To understand the various electrical installations and measuring instruments

Unit 1 Fundamental Laws and Electrical Circuits 9

Basic definitions - Voltage, current, power, energy, charge, flux, static and dynamic emf, Faraday's laws of electromagnetic induction, Fleming's right hand rule, Fleming's left hand rule, Lenz's law, Cork screw rule, Right hand thumb rule, Right hand palm rule, types of elements, ohms law, resistive, inductive, capacitive networks, Series-parallel circuits and Kirchhoff's laws.

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

- understand the fundamental laws of Electrical Engineering.
- understand the 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, Brake test, Swinburne's test and Speed control methods.

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

- understand construction and operation of DC machines
- analyze the performance of DC machines
- know the speed control methods of DC motor

Unit 3 AC Machines 9

1- Φ Transformer: Principle of operation, emf equation, losses, efficiency and regulation calculations using OC and SC tests. 3- Φ Alternator: Principle of operation of alternators-Regulation by synchronous impedance method. 3- Φ Induction Motor: Principle of operation of induction motor, Brake Test on 3- Φ induction motor.

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

- understand construction and operation of various AC machines
- analyze the performance of various AC machines

Diode: PN junction diode, symbol, v-i characteristics, applications, half wave, full wave and bridge rectifiers.
 Transistor: PNP and NPN transistor, characteristics of CE configuration.

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

- understand operating characteristics of PN junction diode
- know the applications of PN junction diode
- understand the operation of various types of BJTs
- understand operating characteristics of CE configuration of BJTs

Unit 5 Measuring Instruments and Electrical Installations 9

Introduction, Electrical and Electronic Instruments, Classification of Instruments, Multimeter, Function generator, CRO: Block diagram of CRO, Principle of CRT (Cathode Ray Tube), applications of CRO, voltage, current and frequency measurements using CRO.

Switch Fuse Unit (SFU), MCB, types of wires and cables, earthing, elementary calculations for energy consumption.

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

- know the types of measuring instruments.
- understand the construction and operation of measuring instruments.
- know the various electrical installations

Prescribed Text Books:

1. V.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
3. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
4. P.S. Dhogal "Basic Electrical Engineering with Numerical Problems" McGraw Hill, 2006.
5. A. Sudhakar and Shyam Mohan S Palli, "Circuits and Networks" McGraw Hill, 2018.

Reference Books:

1. M.S Naidu and S. Kamakshiah, Introduction to Electrical Engineering. TMH Publications.
2. D.P Kothari and I.J Nagrath, Basic Electrical Engineering, TMH, 3rd Ed. 2010
3. Millman and Halkias, Electronics devices and circuits
4. S. Salivahanan, N. Suresh Kumar, "Electronic Devices and Circuits" McGraw Hill, 2011.

Course Outcomes:

Student will be able to	Blooms Level of Learning
• impart the basic knowledge about the Electric circuits.	L1
• understand the working of various DC Machines and analyze their performance.	L1, L4
• understand the working of various AC Machines and analyze their performance.	L1, L4
• know about various electronic devices.	L1
• understand the various electrical installations and measuring instruments	L1

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
20A312T.1	2	2	-	2	-	-	-	-	2	-	2	-
20A312T.2	2	3	2	2	-	-	-	-	2	-	2	-
20A312T.3	2	3	2	2	-	-	-	-	2	-	2	-
20A312T.4	2	2	-	3	-	-	-	-	2	-	2	-
20A312T.5	2	2	1	3	-	-	-	-	2	-	2	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Civil Engineering

Title of the Course Basic Mechanical Engineering

Category ESC

Course Code 20A325T

Year I B.Tech

Semester II Semester

Branch CE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

- To introduce the students about the basic metal joining processes of mechanical engineering.
- To explore the different basic manufacturing processes and their operations.
- To introduce the components of IC engines and to explore working principles of air compressors.
- To understand the basic laws of thermo dynamics and principles of R&AC.
- To understand about different transmission systems and different earth moving machinery.

Unit 1 Metal Joining Processes: 08

Welding Processes: Introduction to welding, classification of welding processes, Oxyacetylene welding – equipment, welding fluxes and filler rods, Gas cutting, Introduction to arc welding – Manual metal arc welding. Submerged arc welding, TIG and MIG processes, soldering and brazing Importance, comparison and applications.

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

- Have knowledge about metal joining processes through different welding operations.
- Understand the gas cutting operations.
- Understand the soldering and brazing operations

Unit 2 Manufacturing Processes & Machining operations 09

Manufacturing Process: Basic description of the manufacturing processes – Sand Casting, Forging, Rolling, Extrusion and their applications.

Description about working with block diagram of Lathe and its operations.

Basic Machining operations: Drilling, Milling and Grinding machines and its operations.

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

- Understand the basic manufacturing processes through different operations.
- Understand the working principle of lathe machine and its operations.
- Understand the different machining operations.

Unit 3 IC Engines & Air compressors 08

Introduction, Classification and Main components of IC Engines, description and working of I.C. Engines – 4 stroke and 2 stroke engines – comparison.

Air Compressors: Working principles of air compressors – Reciprocating air compressor: single and multi-stage compression.

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

- Understand the components and classifications of IC engines.
- Understand the working principles of air compressors.

Unit 4 Basics of Heat Transfer & Refrigeration and air conditioning 09

Basics of Heat Transfer – conduction, convection & Radiation, basic laws of thermo dynamics – zero, first, second and third law.

Refrigeration and air conditioning: Terminology of refrigeration and air conditioning — Vapour compression and vapour absorption systems - Basic principles of air conditioning – Room air conditioning systems & Comfort air conditioning systems. Ducting – Different types of ventilation system.

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

- Understand the basic terminology of Heat transfer and laws of thermo dynamics.
- Understand the terminology of R&AC with different ducting types.

Unit 5 Transmission of power & Earth moving machines 08

Transmission of power: Belt, Rope, Chain and gear drive.

Earth moving machines and mechanical handling equipment – Bull dozers – Power shovels – Excavators – Concrete mixer – Belt and bucket conveyors.

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

- Understand the operations of transmission systems.
- Understand the working principles of earth moving machines and mechanical handling equipments.

Prescribed Text Books:

14. Manufacturing Technology: Vol. 1 - Foundry, Forming and Welding by Rao P.N., McGraw-Hill Education, ISBN: 9781259062575, 9781259062575
15. A Textbook of Thermal Engineering (Mechanical Technology), 15/e, ISBN: 9788121925730
16. R.S.Khurmi & J.K.Gupta, Theory of Mahines, S.Chand Publications, ISBN: 9788121925242

Reference Books:

22. Benjamin,J.,Basic Mechanical Engineering,Pentex Books,9th Edition,2018
23. Roy and Choudhary, Elements of Mechanical Engineering, Media Promoters &Publishers Pvt. Ltd., Mumbai.
24. Sawhney, G. S., Fundamentals of Mechanical Engineering, PHI
25. R.K.Rajput, Manufacturing Technology. Laxmi Publications, 2007
26. Hazrachoudary, Elements of workshop technology volume–1,IndianBook distributing company,Calcutta,2011
27. P L Ballaney, Theory of Machines, Khanna Publishers
28. Thomas Bevan, Theory of Machines, CBS

Course Outcomes:

At the end of the course, the student will be able to	Blooms Level of Learning
38. Understand the welding processes and working principles of different welding equipments.	L1, L2
39. Understand the different manufacturing processes and working principles of different machining equipments.	L1, L2
40. Understand the working principles of IC engines and air compressors.	L1, L2
41. Understand the laws of thermo dynamics and basic principles of air conditioning and methods of refrigeration.	L1, L2

42. Understand the operating principles of transmission systems and earth moving machinery.

L1, L2

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
20A325T.1	3	-	-	-	-	1	1	1	2	-	-	-
20A325T.2	3	-	-	-	-	1	1	1	2	-	-	-
20A325T.3	3	-	-	-	-	1	1	1	2	-	-	-
20A325T.4	3	-	-	-	-	1	1	1	2	-	-	-
20A325T.5	3	-	-	-	-	1	1	1	2	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET

(An Autonomous Institution)

Department of Civil Engineering

Title of the Course	Basic Electrical and Electronics Engineering Lab
Category	ES
Course Code	20A223L
Year	I B. Tech
Semester	II Semester

Lecture Hours	Tutorial Hours	Practical	Credits
3	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.

1. Determination of Performance Characteristics of DC Shunt Motor (Brake Test)
2. Speed Control of DC Shunt Motor (Armature Control Method and Field Control Method)
3. Determination of Performance Characteristics of Three Phase Squirrel Cage Induction Motor (Brake Test)
4. Predetermination of efficiency and regulation of Single Phase Transformer at different power factors (OC and SC test on single phase transformers)
5. Predetermination of efficiency of DC Shunt machine by indirect Test.(Swinburnes Test)
6. Verification of Kirchoff's Voltage and Current Law
7. Study of V-I Characteristics of PN junction Diode.
8. Determination of Ripple Factor and Regulation of Half Wave Rectifier with and without Capacitive filter.
9. Determination of Ripple Factor and Regulation of Full Wave Rectifier with and without Capacitive filter.
10. Study of Input and Output Characteristics of Bipolar Junction Transistor in Common Emitter Configuration.
11. Study of Cathode Ray Oscilloscope. (CRO)
12. Determination of V-I Characteristics of ZENER Diode.
13. 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 |

COs-POs-PSOs Mapping Table

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
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Learning Outcomes: At the end of the unit, the student will be able to apply basic electrical engineering knowledge for house wiring practice.

Trade 5 Demonstration

01

Any one trade of Plumbing • Machine Shop • Metal Cutting • Soldering and Brazing

Learning Outcomes: At the end of the unit, the student will be able to get the basic awareness of any of trade demonstrated.

Prescribed Text Books:

17. Kannaiah P. and Narayana K.L., Workshop Manual, 3rd Edn, Scitech publishers.
18. John K.C., Mechanical Workshop Practice. 2nd Edn. PHI 2010.

Reference Books:

29. Jeyapoovan T.and Pranitha S., Engineering Practices Lab Manual, 3rd Edn. Vikas Pub.2008.

Course Outcomes:

At the end of the course, the student will be able to	Blooms Level of Learning
43. Apply wood working skills in real world applications.	L3
44. Build different parts with metal sheets used in various appliances.	L3
45. Employ fitting operations in various assemblies.	L3
46. Execute basic electrical engineering knowledge for house wiring practice.	L3
47. Identify various operations and its applications from the demonstration.	L3

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
20A325L.1	3	-	1	-	1	-	-	-	-	-	-	1
20A325L.2	3	-	1	-	1	-	-	-	-	-	-	1
20A325L.3	3	-	1	-	1	-	-	-	-	-	-	1
20A325L.4	2	-	1	-	1	-	-	-	-	-	-	1
20A325L.5	3	-	1	-	1	-	-	-	-	-	-	1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Civil Engineering

Title of the Course Engineering Physics Lab

Category BSC

Course Code 20AC24L

Year I B. Tech.

Semester II Semester

Branch CE & ME

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives:

- Understand the role of Optical fiber parameters in engineering applications.
- Recognize the significance of laser and ultrasonics by studying its characteristics and its application in finding the particle size.
- Illustrate the semiconductor, magnetic and dielectric materials applications.
- Identify the various sensor applications.

List of Experiments

1. Determination of wavelength of LASER light using diffraction grating
2. Determination of particle size using LASER.
3. Determination of spring constant of springs using Coupled Oscillator
4. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall effect.
5. Determination of Dielectric constant of dielectric material using charging and discharging of capacitor.
6. Magnetic field along the axis of a circular coil carrying current.
7. Rigidity modulus of material of a wire-dynamic method (Torsional pendulum)
8. Determination of hysteresis loss by tracing B-H Curve of ferromagnetic material.
9. Determination of the numerical aperture of a given optical fiber and hence to find its acceptance Angle
10. Measurement of magnetic susceptibility by Gouy's method
11. Determination of ultrasonic velocity in liquid (Acoustic grating)
12. Determination of pressure variation using Strain Guage sensor.
13. Determination of temperature change using Strain Guage sensor.
14. Determination of pressure variations using optical fiber sensors.
15. Determination of temperature changes using optical fiber sensors.

References:

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

Course Outcomes:

Blooms
Level of

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

Learning

1. Understand the characteristics and behavior of various materials. L2
2. Estimate the basic characteristic quantities of LASER and ultrasonics L4
3. Exhibit an ability to use techniques and skills associated with modern engineering tools such as fiber optics and sensors. L4 & L5
4. Measure properties of a semiconductors, magnetic and dielectric materials. L5

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
20AC24L.1	3				2							
20AC24L.2	3											
20AC24L.3	3	2			2							
20AC24L.4	3	2			2							