ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Electrical and Electronics 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
3. Classify the functions of several variables which is useful in optimization	L4
4. Solve important tools of calculus in higher dimensions and be familiar with 2-dimensional, 3- dimensional coordinate systems	L3
5. Understand the properties of beta and gamma functions and its relations	L2

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
20AC11T.1	3	3										3
20AC11T.2	3	2										3
20AC11T.3	3	3										2
20AC11T.4	3	3										2
20AC11T.5	3	3										2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Electrical and Electronics Engineering

Title of the Course	Applied Physics
Category	BSC
Course Code	19AC12T
Year	I B. Tech.
Semester	I Semester
Branch	ECE, EEE / CSE & AIDAS

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

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

Unit 1 Wave Optics 9

Interference-Principle of Superposition-Interference of light- Conditions for sustained Interference - Interference in thin films (reflected light)-Newton's Rings-Determination of Wavelength- Engineering applications of interference.

Diffraction-Fraunhofer Diffraction-Single and double slit Diffraction -Diffraction Grating – Grating Spectrum - Determination of Wavelength-Engineering applications of diffraction.

Polarization-Polarization by double refraction-Nicol's Prism--Half wave and Quarter wave plate- Engineering applications of Polarization.

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

- explain the need of coherent sources and conditions for sustained interference and illustrate the concept of polarization of light and its applications. (L2)
- identify engineering applications of interference including homodyne and heterodyne detection. (L3)
- analyze the differences between interference and diffraction and classify ordinary and extraordinary polarized light. (L4)

Unit 2 Dielectric and Magnetic materials 11

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

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

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

- 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 3 Electromagnetic Waves and Fiber Optics 9

Divergence and Curl of Electric and Magnetic Fields-Gauss theorem for divergence and stoke's theorem for curl-Maxwell's Equations (quantitative)- Electromagnetic wave propagation (non-conducting medium)-

Poynting's Theorem.

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, Graded index optical fibers) – attenuation and losses in optical fibers-Block diagram of fiber optic communication-Medical Applications-Fiber optic Sensors.

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

- apply the Gauss' theorem for divergence and Stoke's theorem for curl. (L3)
- apply electromagnetic wave propagation in different guided media. (L3)
- 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 4 Semiconductors 8

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

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

- outline the properties of n-type and p-type semiconductors and charge carriers. (l2)
- interpret the direct and indirect band gap in semiconductors. (L2)
- identify the type of semiconductor using Hall effect. (L2)

Unit 5 Superconductors and Nano materials 8

Superconductors-Properties- Meissner's effect - Types of Superconductors - BCS Theory-Josephson effect (AC & DC)- Applications of superconductors.

Nano materials – significance of nanoscale - properties of nanomaterials: physical, mechanical, magnetic, Optical, Thermal - synthesis of nanomaterials: top-down - ball milling- Bottom-up - Chemical vapor deposition-characterization of nanomaterials: X-ray diffraction (XRD)- Scanning Electron Microscope (SEM) - Applications of Nano materials.

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

- explain how electrical resistivity of solids changes with temperature. (L2)
- classify superconductors based on Meissner's effect. (L2)
- Apply the basic properties of nanomaterials in various engineering branches. (L3)

Prescribed Textbooks:

1. M.N. Avadhanulu, P.G.Kshirsagar& TVS. Arun murthy "A Text book of Engineering Physics"-S.Chand Publications,11th editioin,2019
2. K Thyagarajan "Applied Physics"-McGraw Hill Education (India) Private Ltd,2019

Reference Books:

1. David J.Griffiths, Introduction to Electrodynamics, 4/e, Pearson Education,2014
2. T Pradeep, A textbook of Nano Science and Nano Technology, Tata McGrawHill 2013
3. Charles Kittel, Introduction to Solid State Physics, Wiley Publications,2011
4. Gerd Keiser, Optical Fiber Communications, 4/e, Tata McGrawHill ,2008

Course Outcomes:

At the end of the course, the student will be able to	Blooms Level of Learning
1. Explain the concepts of interference, diffraction and polarization and identify their applications in engineering field.	L2&L3
2. Summarize the various types of polarization of dielectrics**,** classification of magnetic materials and the applications of dielectric and magnetic materials.	L2
3. Apply electromagnetic wave propagation in different guided media and Explain fiber optics concepts in various fields with working principle.	L2& L3
4. Outline the properties of various types of semiconductors and identify the behavior of semiconductors in various fields	L2

5. Explain various concepts of superconductors and nanomaterials with their applications in various engineering branches. L2

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
20AC12T.1	3	2	2									
20AC12T.2	3	2	2									2
20AC12T.3	3	2	2									2
20AC12T.4	3	1										
20AC12T.5	3	2	2									2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Electrical and Electronics Engineering

Title of the Course Problem Solving through C programming
Category ESC
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 associatively.

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 choosethe 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:

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

Reference Books:

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

Course Outcomes:

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

CO-PO Mapping:

SCO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
20A511T.1	1	2	2	3	-	1	-	-	-	-	-	-	3	-	-
20A511T.2	3	3	3	3	3	-	-	-	1	-	-	-	3	-	-
20A511T.3	3	2	1	2	1	-	-	-	1	-	-	2	3	-	-
20A511T.4	2	3	2	2	3	-	-	-	1	-	1	2	3	-	-
20A511T.5	3	2	2	2	2	-	-	-	1	-	-	2	3	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Electrical & 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.

nics: 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.

cloidal 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

jections 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
1. Understand the concepts of Conic Sections.	L1, L2
2. Understand the concept of Cycloidal Curves, Involutes and the application of industry standards.	L2, L3
3. Understand the Orthographic Projections of Points and Lines and are capable to improve their visualization skills, so that they can apply these skills in developing the new products.	L2, L3
4. Understand and apply Orthographic Projections of Planes.	L1, L2, L3
5. Understand and analyze the Orthographic Projections of Solids and conversion of isometric views to orthographic views 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 Electrical and Electronics Engineering

Title of the Course Basic Electrical Engineering
Category ESC
Course Code 20A211T

Year I B.Tech
Semester I Semester
Branch EEE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

- understand the fundamental laws and circuit elements
- analyze the DC circuits.
- know the various measuring instruments and electrical installations
- understand the conventional power generation methods
- understand the solar and wind power generation methods

Unit 1 Fundamental Laws and Circuit Elements 9

Voltage, current, power, energy, charge, flux, emf ,static and dynamic emf, classification of magnets: permanent magnets and electro magnets, magnetic leakage, magnetic hysteresis, B-H curve, residual magnetism, 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.

Electrical circuit elements (R, L and C), Ohm's law, v-i relationships, classification of elements, voltage and current sources.

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

- understand the fundamental laws of Electrical Engineering.
- know the electrical circuit elements and their v-i relationships.
- know the electrical sources.

Unit 2 Analysis of DC Circuits 9

Network reduction techniques - series, parallel, star-delta transformation, Kirchhoff's current and voltage law, voltage division, current division, source transformation, analysis of simple circuits with dc excitation (Independent sources only).

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

- understand the network reduction techniques
- understand the Kirchhoff's laws
- solve the electrical circuits with dc excitation

Unit 3 Measuring Instruments and Electrical Installations 9

Introduction, Electrical and Electronic Instruments, Classification of Instruments, Multimeter, Function generator, Oscilloscope - Frequency Measurement, Phase Measurement.

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

Unit 4 Conventional Power Generation 9

Evolution of Power System and Present-Day Scenario. Structure of a power system, Thermal power station-layout and working principle, hydro power station, layout and working principle, Nuclear power station layout

and working principle Nuclear Fission and Chain Reaction- Nuclear Fuels- Principle of Operation of Nuclear Reactor.

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

- know the evolution of power system and present-day scenario
- understand the conventional power generation methods.

Unit 5 Solar and Wind Power Generation 9

Solar power generation - principle of solar Radiation, PV Cell, v-i characteristics. wind power Generation - construction of typical wind turbine - horizontal and vertical axis wind turbines.

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

- understand the electrical power generation using solar and wind power

Prescribed Text Books/ References:

1. D.P.Kothari and I.J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
2. D.C.Kulshreshta, "Basic Electrical Engineering", McGraw Hill, 2009.
3. P.S.Dhogal, "Basic Electrical Engineering with Numerical Problems" McGraw Hill
4. S.Salivahanan, N,Suresh Kumar, "Electronic Devices and Circuits" McGraw Hill, 2011.
5. A.Sudhakar and Shyammohan S Palli, "Circuits and Networks" McGraw Hill, 2018.
6. C.L Wadhwa, " Electric Power Generation,Distribution and Utilization", New Age Inter. (P) Ltd., 2005.
7. G.D. Rai, " Non Conventional Energy Sources" , Khanna Publishers, 2000.

Course Outcomes:

At the end of the course, the student will be able to	Blooms Level of Learning
1. understand the fundamental laws and circuit elements	L2
2. analyze the DC circuits.	L4
3. know the various measuring instruments and electrical installations	L2
4. understand the conventional power generation methods	L2
5. understand the solar and wind power generation methods	L2

CO-PO Mapping:

SCO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
20A211T.1	1	1	-	-	-	-	-	-	-	-	-	-	1	-	1
20A211T.2	1	1	-	-	-	-	-	-	-	-	-	-	1	-	1
20A211T.3	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-
20A211T.4	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-
20A211T.5	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Electrical and Electronics Engineering

Title of the Course C Programming Lab
Category ESC
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 I: (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, go to.
Exercise 6:(week-6):DeclaringArrays,ReferencingArrays,ArraySubscripts.UsingforloopforsequentialAccess.
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):Simpleuserdefinedfunctions,Parameterpassingmethods-passbyvalue,passbyreference.
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	
Exercise13:(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	
Exercise14:(week-14):Structures Exercise15:(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:

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

Reference Books:

1. Let Us C,Yeswanth Kanitkar, Ninth Edition, BPB Publication
2. A K Sharma “Computer Fundamentals and Programming”, 2nd Edition, University Press, 2018.
3. Pradeep Dey and Manas Ghosh, “Programming in C”, Oxford Press, 2nd Edition, 2017
4. Reema Tharaja “Introduction to C Programming”, Second Edition, OXFORD Press, 2015
5. https://www.cprogramming.com/
6. 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
1. Identify and set up program development environment	L2
2. Implement the algorithms using C programming language constructs	L3
3. Identify and rectify the syntax errors and debug program for semantic errors	L3
4. Solve problems in a modular approach using functions	L4
5. Implement file operations with simple text data	L4

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
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		

ANNAMACHRYA INSTITUTE OF TECHNOLOGY AND SCIENCES
(An Autonomous Institution)
Department of Electrical and Electronics Engineering

Title of the Course Applied Physics Lab
Category BSC
Course Code 20AC12L

Year I
Semester I/II
Branch ECE, EEE / CSE & AIDAS

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives:

- Learn the concepts of interference , diffraction and their applications and the role of optical fiber parameters in communication.
- Recognize the importance of energy gap in the study of conductivity and hall effect in a semiconductor.
- Know about the magnetic and dielectric materials applications.
- Apply the principles of semiconductors in various electronic devices.

List of Experiments

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

References:

1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- S ChandPublishers, 2017.
2. http://vlab.amrita.edu/index.php -Virtual Labs, Amrita University

Course Outcomes:

	Blooms Level of Learning
At the end of the course, student will be able to	
1. Operate various optical instruments and estimate various optical parameters.	L2
2. Estimate the various magnetic properties.	L4
3. Measure properties of semiconductors.	L4 & L5
4. Determine the properties of dielectric materials and optical fiber materials.	L5

CO-PO MAPPING:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

20AC12L.1	3											
20AC12L.2	3	1			2							
20AC12L.3	2				2							
20AC12L.4	3	2			2							

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Electrical and Electronics Engineering

Title of the Course	Engineering & IT Workshop
Category	ESC
Course Code	20A313L
Year	I B.Tech
Semester	I Semester
Branch	EEE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives:

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

Trade 1 Carpentry Shop 02

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

Learning Outcomes: At the end of the unit, the student will be able to apply wood working skills in real world applications.

Trade 2 Sheet metal shop 02

Two jobs (exercises) from: Tapered Tray, cylinder, conical funnel from out of 22 or 20 gauge G.I. sheet

Learning Outcomes: At the end of the unit, the student will be able to build different parts with metal sheets used in various appliances

Trade 3 Fitting shop 02

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

Learning Outcomes: At the end of the unit, the student will be able to apply fitting operations in various assemblies.

Trade 4 House-wiring 02

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

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 (Learning Hours)

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:

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

Reference Books:

1. 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
1. Apply wood working skills in real world applications.	L3
2. Build different parts with metal sheets used in various appliances.	L3
3. Employ fitting operations in various assemblies.	L3
4. Execute basic electrical engineering knowledge for house wiring practice.	L3
5. 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	PSO1	PSO2	PSO3
20A313L.1		-	1	-	1	-	-	-	-	-	-	1	-	-	-
20A313L.2		-	1	-	1	-	-	-	-	-	-	1	-	-	-
20A313L.3		-	1	-	1	-	-	-	-	-	-	1	-	-	-
20A313L.4		-	1	-	1	-	-	-	-	-	-	1	-	-	-
20A313L.5		-	1	-	1	-	-	-	-	-	-	1	-	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Electrical and Electronics 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 particular integral for RHS term of the type $e^{ax}, \sin ax / \cos ax$, polynomials in x, $e^{ax} \sin ax / e^{ax} \cos ax / e^{ax} x^n, x \sin ax / x \cos ax$ -method of variation of parameters.

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 NishuGupta, Engineering Mathematics Volumes-I &II, PearsonEducation
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. Solve the differential equations related to various engineering fields	L3
2. Generalize and solve the higher order differential equation by analyzing physical situations	L3
3. Identify solution methods for partial differential equations that model physical processes	L3
4. Understand the physical meaning of different operators such as gradient, curl and divergence	L2
5. Find the work done against a field, circulation and flux using vector calculus	L3

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
20AC21T.1	3	3										2
20AC21T.2	3	3										2
20AC21T. 3	3	3										3
20AC21T.4	3	3										2
20AC21T.5	3	3										3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Humanities and Sciences

Title of the Course Chemistry
Category BSC
Course Code 20AC23T

Year I Year
Semester II Semester
Branch EEE, ECE

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 MnO_2 cell- challenges of battery technology. Fuel cells - Introduction - classification of fuel cells – Hydrogen and Oxygen fuel cell, propane and oxygen fuel cell - Merits of fuel 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 (stereo specific polymerization) with specific examples and mechanisms of polymer formation.

Plastics - Thermoplastics and Thermo settings, 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

Course Outcomes:

At the end of the course, the student will be able to	Blooms Level of Learning
1. explain the significance of electrode potentials, classify ion selective electrodes, and list different types of electrodes	L4
2. compare various batteries, explain the concepts involved in the construction of lithium cells, different fuel cells and apply redox principles for construction of batteries and fuel cells.	L4
3. illustrate the mechanism of conduction in conducting polymers, and explain the preparation, properties, and applications of various polymers	L3
4. differentiate various analytical techniques	L4
5. compare molecular switches and molecular machines, and distinguish between molecular machines	L4

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
20AC23T .1	3	2										2
20AC23T .2	3	2										2
20AC23T .3	3	2										2
20AC23T .4	3	2										2
20AC23T .5	3	2										2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Electrical and Electronics Engineering

Title of the Course Communicative English
Category HSMC
Course Code 20AC25T

Year I Year
Semester II Semester
Branch ECE, EEE

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
20AC25T-1										3		2
20AC25T-2										3		2
20AC25T-3										3		2
20AC25T-4										3		2
20AC25T-5										3		2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET

(An Autonomous Institution)

Department of Electrical and Electronics Engineering

Title of the Course	Electrical Circuits
Category	ESC
Course Code	20A221T

Year	I B.Tech
Semester	II Semester
Branch	EEE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

- To learn a number of powerful engineering circuit analysis techniques such as nodal analysis, mesh analysis and graphical solution to electrical network
- To learn the concepts of reactance and impedance to analyse simple a.c. circuits and methods to calculate power and power factor
- To Comprehend three phase systems with balanced and unbalanced loads and power measurements
- To Solve different complex circuits Network theorems.
- To understand frequency response in electrical circuits and clear understanding of the important parameters of a magnetic circuit.

Unit 1	Network Analysis:	(9)

Mesh, Super Mesh, Nodal and Super Node analysis-Basic Definitions of Network Topology– Graph – Tree, Basic Cutset and Basic Tieset Matrices for Planar Networks –Problems, Network equilibrium equations using topology. Duality & Dual Networks-Problems.

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

- Develop the basic concepts of network analysis, which is the pre-requisite for all the electrical engineering subjects
- Use network techniques like node analysis and loop analysis to write equations for large linear circuits
- Analyze circuits using graph theory.

Unit 2	Fundamentals of 1-φ ac circuits:	(9)

Advantages of AC supply, Types of AC waveforms, Importance of Sine Wave, Basic definitions: Cycle. Time period, frequency, Peak value, peak –peak value. Determination of Average, R.M.S Values, Peak and Form Factor for different Periodic Waveforms, Phase and Phase Difference, j-notation, Steady State Analysis of R, L and C with Sinusoidal Excitation, Concept of Reactance, Impedance, Susceptance and Admittance, Real and Reactive Power, Complex Power, Concept of Power Factor. Analysis of Single Phase ac Circuits-Problems

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

- Understand and use the concepts of reactance and impedance to analyse simple a.c. circuits
- Calculate the power dissipation of an a.c. circuit, and understand the concept of power factor.

Unit 3	Three phase circuits:	(9)

Advantages of Three phase AC supply-Phase Sequence - Star and Delta Connections-Relation between line, phase voltages and currents in balanced Systems - Analysis of balanced three Phase Circuits - Measurement of active and reactive power in balanced and unbalanced three phase systems - Analysis of three phase unbalanced circuits - Two wattmeter method of measurement of three phase power.

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

- Understand 3-phase ac circuits for designing and analysis of power system networks.

Unit 4	Network Theorems	(9)
Superposition, Thevenin's, Norton's, Maximum Power Transfer, Millman's, Reciprocity, Substitution, Compensation and Tellegen's Theorems for DC and AC excitations		
Learning Outcomes: At the end of the unit, the student will be able to:		
• Understand network theorems to simplify the complex networks.		

Unit 5	Resonance &magnetically coupled circuits:	(9)
Resonance – Definition, Resonant frequency, bandwidth and Q-factor for series and parallel resonant circuits, Problems. Magnetically Coupled Circuits: Coupled circuits – self & mutual inductance, Dot convention, Coefficient of coupling-Analysis of Coupled Circuits		
Learning Outcomes: At the end of the unit, the student will be able to:		
• Explain the effect of resonance, and its implications for practical circuits		
• Design resonant circuits which are used in wireless transmission and communication networks		

Prescribed Text Books:

1. Sudhakar & Shyam Mohan s Palli. Circuits and Networks 5th Edition, Tata McGraw Edition(India) Private Limited, 2015.
2. A. Chakrabarti. Circuit Theory. 6th edition, Dhanpat Rai & Co, New Delhi, 2014.

Reference Books:

1. M.E. Van Valkenberg. Network Analysis. 3rd edition, Pearson Publications, New Delhi 2006.
2. William H. Hayt& Jack E. Kennedy & Steven M. Durbin. Engineering Circuit Analysis. 8th edition, TATA McGraw Hill Company, 2013.
3. J.A.Edminister&M.D.Nahvy. Theory and Problems of Electric Circuits. 4th Edition Schaums Outline series, New Delhi TATA McGraw Hill Company, 2004.
4. G. K. Mittal, Ravi Mittal. Network Analysis. 14th Edition, Khanna Publishers, New Delhi, 1997.
5. C. K. Alexander and M. N. O. Sadiku. Fundamentals of Electric Circuits. 5th Edition, Tata McGraw hill Publishing Company Limited, New Delhi, 2012.

Course Outcomes:	Blooms Level of Learning
At the end of the course, the student will be able to	
Apply the concepts of mesh and nodal analysis and analyze electrical circuits using graph theory.	L3
Acquire knowledge about single phase ac circuits	L2
Acquire knowledge about three phase ac circuits	L2
Analyze the circuit using Network simplification theorems.	L4
Analyze series, parallel resonant circuits and magnetic circuits.	L4

CO-PO Mapping:

SCO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
20A221T.1	3	2	-	-	-	-	-	-	-	-	-	-	3	-	-
20A221T.2	3	2	-	-	-	-	-	-	-	-	-	-	3	-	-
20A221T.3	3	2	-	-	-	-	-	-	-	-	-	-	3	-	-
20A221T.4	3	2	2	1	1	-	-	-	-	-	-	-	3	-	-
20A221T.5	3	2	2	1	-	-	-	-	-	-	-	-	3	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Electrical and Electronics Engineering

Title of the Course	**Fundamentals of Electronic Devices and Circuits**
Category	ESC
Course Code	20A222T

Year	I
Semester	II
Branch	EEE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:
• To understand the concepts of Diodes and their applications
• To understand the operation of BJT and its biasing concepts.
• To understand the small signal analysis of BJT.
• To understand the operation of FET and its biasing concepts .
• To understand the working principles of special purpose electronic diodes.

Unit 1	**Diodes and Applications**	
PN-junction diode, characteristics, applications - half wave, full wave and bridge rectifier, clippers, clampers, Zener diode, characteristics, applications - voltage regulator.		
Learning Outcomes: At the end of the unit, the student will be able to:		
• Understand operating characteristics of PN junction diode and Zener diode		
• Know the applications of PN junction diode and Zener diode		

Unit 2	**Transistor and Biasing**	
BJT construction and operation, configurations – DC load line analysis – operating point- Bias Stability - Need for Stabilization – Stabilization Factors (s,s^1,s^{11}) – Types of Biasing-Fixed Bias, Collector to Base bias, Emitter-Stabilized bias, Voltage Divider Bias.		
Learning Outcomes: At the end of the unit, the student will be able to:		
• understand the concepts of stability and biasing of BJT		
• find the stability factor of different biasing techniques of BJT		

Unit 3	**Single Stage Amplifiers**	
Single Stage Transistor Amplifier- Transistor Amplifying Action – Practical circuit of Transistor Amplifier-Classification of Amplifiers- Amplifier equivalent circuit – Concept of h-parameters – Analysis of CE, CB and CC Amplifiers – Comparisons of CE,CB and CC.		
Learning Outcomes: At the end of the unit, the student will be able to:		
• understand single stage transistor amplifier and it's operation.		
• understand the concepts of h-parameters		

Unit 4	**Field Effect Transistors & Its Biasing**	
Construction of JFETs – Characteristics – FET Biasing: Fixed Bias Configuration–Self Bias Configuration–Voltage Divider Biasing–Construction and Characteristics of MOSFETs–Depletion type MOSFETs–Enhancement type MOSFET		
Learning Outcomes: At the end of the unit, the student will be able to:		
• understand the characteristics of JFET and MOSFET		
• understand the biasing circuits of JFET and MOSFET		

Unit 5	Special Purpose Electronic Devices	
LED, Tunnel Diode, PIN Diode, SCR, UJT, Photo diode, Photo transistor, Varactor diode		
Learning Outcomes: At the end of the unit, the student will be able to		
• understand the construction and operation of different special purpose devices		
• identify different symbols of special purpose electronic devices.		

Prescribed Text Books:
1. Electronic Devices and Circuits, David A Bell, Fifth Edition, 2008, Oxford University Press.
2. Electronic Devices and Circuits, J. Millman and Halkias, 1991 edition, 2008,TMH.

Reference Books:
1. Electronic Devices and Circuit Theory, Robert L. Boylestad and Louis Nashelsky, 9th edition,PHI.
2. Principles of Electronics, V. K. Mehta, S. Chand Publications2004
3. Integrated Electronics, Analog and Digital Circuits and Systems, J. Millman and Halkias,TMH.
4. Micro Electronic Circuits, Sedra and Smith, Oxford University Press

Course Outcomes:	
At the end of the course, the student will be able to	Blooms Level of Learning
1. Understand the operation of Diode and its applications.	L2
2. Understand the BJT operation and its biasing concepts.	L2
3. Analyze the Small signal model of BJT.	L5
4. Understand the operation of FET and its biasing.	L2
5. Have the knowledge and usage of special purpose electronic devices in various applications.	L1

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	3	2	-	-	-	-	1	-	-	1	-	3	-	-
CO2	-	3	3	-	1	-	-	2	-	-	1	-	3	-	-
CO3	-	3	2	-	1	-	-	1	-	-	2	-	2	3	-
CO4	-	3	2	-	1	-	-	1	-	-	2	-	2	-	-
CO5	-	3	2	-	1	-	-	1	-	-	1	-	-	-	3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Electrical and Electronics Engineering

Title of the Course	Chemistry Lab
Category	BSC
Course Code	20AC23L
Year	I Year
Semester	II Semester
Branch	CSE, AIDAS / EEE, ECE

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:

1. J. Mendham, R.C Denney, J.D Barnes, M. Thomas, B. Sivasankar Vogel's Quantitative Chemical Analysis 6/e, Pearson publishers, 2009.
2. 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
1. Explain the functioning of instruments such as ph meter, conductivity meter and potentiometer.	L4
2. Estimate Zn, Cr, Fe, Cu and other functional groups in various samples	L2
3. Determine physical properties of liquids and synthesize polymers and nanomaterials	L3

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
20AC23L 1	3	2										2

20AC23L 2	3	2										2
20AC23L 3	3	2										2

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

Title of the Course	Electronic Devices and Circuits Lab
Lab Category	ESC
Course Code	20A222L
Year	I Year
Semester	II Semester (EEE)

Lecture Hours	Tutorial Hours	Practical	Credits
0	0	3	1.5

Course Objectives:

1. To identify the various electrical and electronic components and devices.
2. To analyze the performance of rectifier circuits in practical approach
3. To observe the characteristics of semiconductor devices.
4. To determine parameters like gain, impedances and band width of BJT and FET amplifier circuits.

List of the Experiments

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCBs, Diodes,BJTs,ActiveDevices,LowpowerJFETs,MOSFETs,Photodiode,Phototransistor, LEDs, SCR and UJT.
2. Study and operation of
   - Multi-meters (Analog and Digital)
   - Function Generator
   - Regulated Power Supplies
   - CRO
3. Verification of Kirchhoff's Voltage and Current Law.
4. Forward and Reverse Bias Characteristics of PN junction Diode and Zener Diode.
5. Half Wave Rectifier with and without filter.
6. Full Wave (Center trapped) Rectifier with and without filter.
7. Input and Output Characteristics of Transistor in CE Configuration.
8. JFET Characteristics.
9. MOSFET Characteristics
10. Frequency response of CE Amplifier.
11. SCR Characteristics.
12. LED Characteristics.

Course Outcomes:

Student will be able to	Blooms Level of Learning
1. Gain the practical knowledge of Diode, BJT, JFET, MOSFET and some special electronic devices.	L1
2. Design the amplifier circuits under given requirements.	L5

CO/PO	Po1	Po2	Po3	Po4	Po5	Po6	Po7	Po8	Po9	Po10	Po11	Po12	Pso1	Pso2
Co1	2	2	2	2	2	-	2	-	2	-	-	2	2	2
Co2	2	2	2	2	2	-	2	-	2	-	-	2	2	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Humanities and Sciences

Title of the Course	Communicative English Lab
Category	HSMC
Course Code	20AC25L
Year	I B. Tech.
Semester	II Semester
Branch	ECE & EEE

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
20AC25L-1	-	-	-	-	-	-	-	-	-	2	-	1
20AC25L-2	-	-	-	-	-	-	-	-	-	1	-	2
20AC25L-3	-	-	-	-	-	-	-	-	3	3	-	3
20AC25L-4	-	-	-	-	-	-	-	-	3	2	-	1
20AC25L-5	-	-	-	-	-	-	-	-	1	3	-	3
20AC25L-6	-	-	-	-	-	-	-	-	-	2	-	1

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Humanities and Sciences

Title of the Course Environmental Science
Category MC
Course Code 20AC26T

Year I
Semester II
Branch EEE, ECE

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

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
20AC26T.1	1	1				3	3	1				3
20AC26T.2	1	2				3	3	1				3
20AC26T.3		1				3	3	1				3
20AC26T.4	2					3	3	1				3
20AC26T.5	1					3	3	1				3

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Electrical and Electronics Engineering

Title of the Course Basic Electrical Engineering

Course Code 20A211T

Year I B.Tech
Semester I Semester
Branch EEE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:

- understand the fundamental laws and circuit elements
- analyze the DC circuits.
- know the various measuring instruments and electrical installations
- understand the conventional power generation methods
- understand the solar and wind power generation methods

Unit 1 Fundamental Laws and Circuit Elements 9

Voltage, current, power, energy, charge, flux, emf ,static and dynamic emf, classification of magnets: permanent magnets and electro magnets, magnetic leakage, magnetic hysteresis, B-H curve, residual magnetism, 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.

Electrical circuit elements (R, L and C), Ohm's law, v-i relationships, classification of elements, voltage and current sources.

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

- understand the fundamental laws of Electrical Engineering.
- know the electrical circuit elements and their v-i relationships.
- know the electrical sources.

Unit 2 Analysis of DC Circuits 9

Network reduction techniques - series, parallel, star-delta transformation, Kirchhoff's current and voltage law, voltage division, current division, source transformation, analysis of simple circuits with dc excitation (Independent sources only).

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

- understand the network reduction techniques
- understand the Kirchhoff's laws
- solve the electrical circuits with dc excitation

Unit 3 Measuring Instruments and Electrical Installations 9

Introduction, Electrical and Electronic Instruments, Classification of Instruments, Multimeter, Function generator, Oscilloscope - Frequency Measurement, Phase Measurement.

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

Unit 4 Conventional Power Generation 9

Evolution of Power System and Present-Day Scenario. Structure of a power system, Thermal power station- layout and working principle, hydro power station, layout and working principle, Nuclear power station layout and working principle Nuclear Fission and Chain Reaction- Nuclear Fuels- Principle of Operation of Nuclear Reactor.

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

- know the evolution of power system and present-day scenario
- understand the conventional power generation methods.

Unit 5 Solar and Wind Power Generation 9

Solar power generation - principle of solar Radiation, PV Cell, v-i characteristics. wind power Generation - construction of typical wind turbine - horizontal and vertical axis wind turbines.

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

- understand the electrical power generation using solar and wind power

Prescribed Text Books/ References:

1. D.P.Kothari and I.J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
2. D.C.Kulshreshta, "Basic Electrical Engineering", McGraw Hill, 2009.
3. P.S.Dhogal, "Basic Electrical Engineering with Numerical Problems" McGraw Hill
4. S.Salivahanan, N,Suresh Kumar, "Electronic Devices and Circuits" McGraw Hill, 2011.
5.A.Sudhakar and Shyammohan S Palli, "Circuits and Networks" McGraw Hill, 2018.
6. C.L Wadhwa, " Electric Power Generation,Distribution and Utilization", New Age Inter. (P) Ltd., 2005.
7. G.D. Rai, " Non Conventional Energy Sources" , Khanna Publishers, 2000.

Course Outcomes:

At the end of the course, the student will be able to	Blooms Level of Learning
1. understand the fundamental laws and circuit elements	L2
2. analyze the DC circuits.	L4
3. know the various measuring instruments and electrical installations	L2
4. understand the conventional power generation methods	L2
5. understand the solar and wind power generation methods	L2

CO-PO Mapping:

SCO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
20A211T.1	1	1	-	-	-	-	-	-	-	-	-	-	1	-	1
20A211T.2	1	1	-	-	-	-	-	-	-	-	-	-	1	-	1
20A211T.3	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-
20A211T.4	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-
20A211T.5	-	-	-	-	-	-	1	-	-	-	-	-	-	1	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET

(An Autonomous Institution)

Department of Electrical and Electronics Engineering

Title of the Course	Electrical Circuits
Course Code	20A221T

Year	I B.Tech
Semester	II Semester
Branch	EEE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:
• To learn a number of powerful engineering circuit analysis techniques such as nodal analysis, mesh analysis and graphical solution to electrical network
• To learn the concepts of reactance and impedance to analyse simple a.c. circuits and methods to calculate power and power factor
• To Comprehend three phase systems with balanced and unbalanced loads and power measurements
• To Solve different complex circuits Network theorems.
• To understand frequency response in electrical circuits and clear understanding of the important parameters of a magnetic circuit.

Unit 1	Network Analysis:	(9)
Mesh, Super Mesh, Nodal and Super Node analysis-Basic Definitions of Network Topology– Graph – Tree, Basic Cutset and Basic Tieset Matrices for Planar Networks –Problems, Network equilibrium equations using topology. Duality & Dual Networks-Problems.		
Learning Outcomes: At the end of the unit, the student will be able to:		
• Develop the basic concepts of network analysis, which is the pre-requisite for all the electrical engineering subjects		
• Use network techniques like node analysis and loop analysis to write equations for large linear circuits		
• Analyze circuits using graph theory.		

Unit 2	Fundamentals of 1-φ ac circuits:	(9)
Advantages of AC supply, Types of AC waveforms, Importance of Sine Wave, Basic definitions: Cycle. Time period, frequency, Peak value, peak –peak value. Determination of Average, R.M.S Values, Peak and Form Factor for different Periodic Waveforms, Phase and Phase Difference, j-notation, Steady State Analysis of R, L and C with Sinusoidal Excitation, Concept of Reactance, Impedance, Susceptance and Admittance, Real and Reactive Power, Complex Power, Concept of Power Factor. Analysis of Single Phase ac Circuits-Problems		
Learning Outcomes: At the end of the unit, the student will be able to		
• Understand and use the concepts of reactance and impedance to analyse simple a.c. circuits		
• Calculate the power dissipation of an a.c. circuit, and understand the concept of power factor.		

Unit 3	Three phase circuits:	(9)
Advantages of Three phase AC supply-Phase Sequence - Star and Delta Connections-Relation between line, phase voltages and currents in balanced Systems - Analysis of balanced three Phase Circuits - Measurement of active and reactive		

power in balanced and unbalanced three phase systems - Analysis of three phase unbalanced circuits - Two wattmeter method of measurement of three phase power.
Learning Outcomes: At the end of the unit, the student will be able to
• Understand 3-phase ac circuits for designing and analysis of power system networks.

Unit 4	Network Theorems	(9)
Superposition, Thevenin's, Norton's, Maximum Power Transfer,Millman's, Reciprocity, Substitution, Compensation and Tellegen's Theorems for DC and AC excitations		
Learning Outcomes: At the end of the unit, the student will be able to:		
• Understand network theorems to simplify the complex networks.		

Unit 5	Resonance &magnetically coupled circuits:	(9)
Resonance – Definition, Resonant frequency, bandwidth and Q-factor for series and parallel resonant circuits, Problems. Magnetically Coupled Circuits: Coupled circuits – self & mutual inductance, Dot convention, Coefficient of coupling-Analysis of Coupled Circuits		
Learning Outcomes: At the end of the unit, the student will be able to:		
• Explain the effect of resonance, and its implications for practical circuits		
• Design resonant circuits which are used in wireless transmission and communication networks		

Prescribed Text Books:

1. Sudhakar&Shyam Mohan s Palli. Circuits and Networks 5th Edition, Tata McGraw Edition(India) Private Limited, 2015.
2. A. Chakrabarti. Circuit Theory. 6th edition, DhanpatRai& Co, New Delhi, 2014.

Reference Books:

1. M.E. Van Valkenberg. Network Analysis. 3rd edition, Pearson Publications, New Delhi 2006.
2. William H. Hayt& Jack E. Kennedy & Steven M. Durbin. Engineering Circuit Analysis. 8th edition, TATA McGraw Hill Company, 2013.
3. J.A.Edminister&M.D.Nahvy. Theory and Problems of Electric Circuits. 4th Edition Schaums Outline series, New Delhi TATA McGraw Hill Company, 2004.
4. G. K. Mittal, Ravi Mittal. Network Analysis. 14th Edition, Khanna Publishers, New Delhi, 1997.
5. C. K. Alexander and M. N. O. Sadiku. Fundamentals of Electric Circuits. 5th Edition, Tata McGraw hill Publishing Company Limited, New Delhi, 2012.

Course Outcomes:	Blooms Level of Learning
At the end of the course, the student will be able to	
Apply the concepts of mesh and nodal analysis and analyze electrical circuits using graph theory.	L3
Acquire knowledge about single phase ac circuits	L2
Acquire knowledge about three phase ac circuits	L2
Analyze the circuit using Network simplification theorems.	L4
Analyze series, parallel resonant circuits and magnetic circuits.	L4

CO-PO Mapping:

SCO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
20A221T.1	3	2	-	-	-	-	-	-	-	-	-	-	3	-	-
20A221T.2	3	2	-	-	-	-	-	-	-	-	-	-	3	-	-
20A221T.3	3	2	-	-	-	-	-	-	-	-	-	-	3	-	-
20A221T.4	3	2	2	1	1	-	-	-	-	-	-	-	3	-	-
20A221T.5	3	2	2	1	-	-	-	-	-	-	-	-	3	-	-

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET
(An Autonomous Institution)
Department of Electrical and Electronics Engineering

Title of the Course	**Fundamentals of Electronic Devices and Circuits**
Course Code	20A222T

Year	I
Semester	II
Branch	EEE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
3	0	0	3

Course Objectives:
• To understand the concepts of Diodes and their applications
• To understand the operation of BJT and its biasing concepts.
• To understand the small signal analysis of BJT.
• To understand the operation of FET and its biasing concepts .
• To understand the working principles of special purpose electronic diodes.

Unit 1	**Diodes and Applications**	
PN-junction diode, characteristics, applications - half wave, full wave and bridge rectifier, clippers, clampers, Zener diode, characteristics, applications - voltage regulator.		
Learning Outcomes: At the end of the unit, the student will be able to:		
• Understand operating characteristics of PN junction diode and Zener diode		
• Know the applications of PN junction diode and Zener diode		

Unit 2	**Transistor and Biasing**	
BJT construction and operation, configurations – DC load line analysis – operating point- Bias Stability - Need for Stabilization – Stabilization Factors (s,s^1,s^{11}) – Types of Biasing-Fixed Bias, Collector to Base bias, Emitter-Stabilized bias, Voltage Divider Bias.		
Learning Outcomes: At the end of the unit, the student will be able to:		
• understand the concepts of stability and biasing of BJT		
• find the stability factor of different biasing techniques of BJT		

Unit 3	**Single Stage Amplifiers**	
Single Stage Transistor Amplifier- Transistor Amplifying Action – Practical circuit of Transistor Amplifier-Classification of Amplifiers- Amplifier equivalent circuit – Concept of h-parameters – Analysis of CE, CB and CC Amplifiers – Comparisons of CE,CB and CC.		
Learning Outcomes: At the end of the unit, the student will be able to:		
• understand single stage transistor amplifier and it's operation.		
• understand the concepts of h-parameters		

Unit 4	**Field Effect Transistors & Its Biasing**	
Construction of JFETs – Characteristics – FET Biasing: Fixed Bias Configuration–Self Bias Configuration–Voltage Divider Biasing–Construction and Characteristics of MOSFETs–Depletion type MOSFETs–Enhancement type MOSFET		
Learning Outcomes: At the end of the unit, the student will be able to:		

• understand the characteristics of JFET and MOSFET
• understand the biasing circuits of JFET and MOSFET

Unit 5	**Special Purpose Electronic Devices**	
LED, Tunnel Diode, PIN Diode, SCR, UJT, Photo diode, Photo transistor, Varactor diode		
Learning Outcomes: At the end of the unit, the student will be able to		
• understand the construction and operation of different special purpose devices		
• identify different symbols of special purpose electronic devices.		

Prescribed Text Books:
1. Electronic Devices and Circuits, David A Bell, Fifth Edition, 2008, Oxford University Press.
2. Electronic Devices and Circuits, J. Millman and Halkias, 1991 edition, 2008,TMH.

Reference Books:
1. Electronic Devices and Circuit Theory, Robert L. Boylestad and Louis Nashelsky, 9th edition,PHI.
2. Principles of Electronics, V. K. Mehta, S. Chand Publications2004
3. Integrated Electronics, Analog and Digital Circuits and Systems, J. Millman and Halkias,TMH.
4. Micro Electronic Circuits, Sedra and Smith, Oxford University Press

Course Outcomes:	
At the end of the course, the student will be able to	Blooms Level of Learning
1. Understand the operation of Diode and its applications.	L2
2. Understand the BJT operation and its biasing concepts.	L2
3. Analyze the Small signal model of BJT.	L5
4. Understand the operation of FET and its biasing.	L2
5. Have the knowledge and usage of special purpose electronic devices in various applications.	L1

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	3	2	-	-	-	-	1	-	-	1	-	3	-	-
CO2	-	3	3	-	1	-	-	2	-	-	1	-	3	-	-
CO3	-	3	2	-	1	-	-	1	-	-	2	-	2	3	-
CO4	-	3	2	-	1	-	-	1	-	-	2	-	2	-	-
CO5	-	3	2	-	1	-	-	1	-	-	1	-	-	-	3

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

Title of the Course	Fundamentals of Electronic Devices and Circuits Lab
Lab Category	ESC
Course Code	20A222L
Year	I Year
Semester	II Semester (EEE)

Lecture Hours	Tutorial Hours	Practical	Credits
0	0	3	1.5

Course Objectives:

1. To identify the various electrical and electronic components and devices.
2. To analyze the performance of rectifier circuits in practical approach
3. To observe the characteristics of semiconductor devices.
4. To determine parameters like gain, impedances and band width of BJT and FET amplifier circuits.

List of the Experiments

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCBs, Diodes,BJTs,ActiveDevices,LowpowerJFETs,MOSFETs,Photodiode,Phototransistor, LEDs, SCR and UJT.
2. Study and operation of
    - Multi-meters (Analog and Digital)
    - Function Generator
    - Regulated Power Supplies
    - CRO
3. Verification of Kirchhoff's Voltage and Current Law.
4. Forward and Reverse Bias Characteristics of PN junction Diode and Zener Diode.
5. Half Wave Rectifier with and without filter.
6. Full Wave (Center trapped) Rectifier with and without filter.
7. Input and Output Characteristics of Transistor in CE Configuration.
8. JFET Characteristics.
9. MOSFET Characteristics
10. Frequency response of CE Amplifier.
11. SCR Characteristics.
12. LED Characteristics.

Course Outcomes:

Student will be able to	Blooms Level of Learning
1. Gain the practical knowledge of Diode, BJT, JFET, MOSFET and some special electronic devices.	L1
2. Design the amplifier circuits under given requirements.	L5

CO/PO	Po1	Po2	Po3	Po4	Po5	Po6	Po7	Po8	Po9	Po10	Po11	Po12	Pso1	Pso2
Co1	2	2	2	2	2	-	2	-	2	-	-	2	2	2
Co2	2	2	2	2	2	-	2	-	2	-	-	2	2	2

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET

(An Autonomous Institution)

To Other Departments(CSE,AIDS,CE,ME)

Title of the Course	Basic Electrical and Electronics Engineering
Course Code	
Year	
Semester	

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-Φinduction 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		

Unit 4	Diode and Transistor	9
Diode: PN junction diode, symbol, v-icharacteristics, 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 Instrumentsand 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. Kulshreshta, "Basic Electrical Engineering", McGraw Hill, 2009.
4.P.S.Dhogal "Basic Electrical Engineering with Numerical Problems" McGraw Hill, 2006.
5.A.Sudhakar and Shyammohan S Palli, "Circuits and Networks" McGraw Hill, 2018.
Reference Books:
1. M.S Naidu and S.Kamakshaiah, Introduction to Electrical Engineering. TMH Publications.
2. D.P Kothari and I.J Nagrath, Basic Electrical Engineering, TMH, 3rdEd.2010
3. Millman and Halkias, Electriconics devices and circuits
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

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

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

Lecture Hours	Tutorial Hours	Practical	Credits
0 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.
Experiment 1 Pre-determination of efficiency of DC shunt Machine working as Motor as well as Generator (Swinburne's Test)
Experiment 2 Determination of Performance Characteristics of DC Shunt Motor (Brake Test)
Experiment 3 Speed Control of DC Shunt Motor (Armature Control Method and Field Control Method) Experiment 4 Determination of Performance Characteristics of Three Phase Squirrel Cage Induction Motor (Brake Test)
Experiment 5 Predetermination of efficiency and regulation of Single Phase Transformer at different power factors (OC and SC test on single phase transformers)
Experiment 6 Study of V-I Characteristics of PN junction Diode.
Experiment 7 Determination of Ripple Factor and Regulation of Half Wave Rectifier with and without Capacitive filter.
Experiment 8 Determination of Ripple Factor and Regulation of Full Wave Rectifier with and without Capacitive filter.
Experiment 9 Study of Input and Output Characteristics of Bipolar Junction Transistor in Common Emitter Configuration.
Experiment 10 Study of Cathode Ray Oscilloscope. (CRO)
Experiment 11 Determination of V-I Characteristics of ZENER Diode.
Experiment 12 Study of Frequency response of a single stage CE amplifier

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

COs-POs-PSOs Mapping Table

Course Outcomes	Program Outcomes												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3			3										
2	3			3										
3								3						
4											1			
5											1			

ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES RAJAMPET

(An Autonomous Institution)

To ECE Department

Title of the Course	Electrical Circuits and Technology
Course Code	
Year	II
Semester	i

Lecture Hours	Tutorial Hours	Practical	Credits
3	0	0	3

Course Objectives:
• To impart the knowledge about the basic concepts of circuit analysis and Transient Response.
• To inculcate the understanding about AC circuits and resonance
• To understand the concepts of two port networks.
• To understand the working of various Electrical Machines

Unit 1	Basic Electrical Circuits &DC Transient Analysis	9
BASIC ELECTRICAL CIRCUITS: Network Reduction Techniques, Star &Delta transformations, Source Transformation, Nodal & Mesh Analysis, Super Node & Super Mesh Concepts - Problems. TRANSIENT ANALYSIS: Transient Response of RL, RC & RLC Series Circuits for DC Excitation using differential equation approach.		
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 • Use network techniques like node analysis and loop analysis to write equations for large linear circuits		

Unit 2	Fundamentals of AC Circuits& Resonance	9
FUNDAMENTALS OF AC CIRCUITS: Advantages of AC Supply, Types of Wave Forms, Importance of Sinusoidal Wave Forms, Cycle, Time Period, Frequency & Amplitude, Determination of Average & RMS Value, Form Factor & Peak Factor for different Alternating Wave Form. RESONANCE: Resonant frequency, Band Width & Q-Factor for Series and Parallel RLC Network only.		
Learning Outcomes: At the end of the unit, the student will be able to		
• Understand and use the concepts of reactance and impedance to analyse simple a.c. circuits		
• Calculate the power dissipation of an a.c. circuit, and understand the concept of power factor.		
• Explain the effect of resonance, and its implications for practical circuits		
• Design resonant circuits which are used in wireless transmission and communication networks		

Unit 3	Two Port Networks	9
TWO PORT NETWORKS: Impedance, Admittance, Hybrid, Transmission (ABCD) Parameters, Conversion of one Parameter to another Parameter, Conditions for Reciprocity & Symmetry, Inter connection of Two Port Networks in Series, Parallel and Cascaded Configurations, Problems.		

Unit 4	D.C Machines	9
DC Generator: Constructional Features, Principle of operation, EMF Equation, Types, Magnetization Characteristics, Applications. DC Motor: Principle of operation, Back EMF, Torque Equation, Characteristics of DC Shunt Motor, Losses & Efficiency, Testing - Brake Test & Swinburne's Test - Speed control of DC shunt Motor, Applications..		
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 5	AC Machines	9
Single Phase Transformer: Principle of operation, Types, Constructional Features, EMF equation, Losses, Efficiency & Regulation, OC & SC Tests and Pre-Determination of Efficiency & Regulation. Three Phase Induction Motor: Principle of operation, Torque equation, Torque-slip characteristics, Brake test on three phase 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		

Prescribed Text Books:
1. Network Analysis by A. Sudhakar&Shyam Mohan S.Pillai, Tata McGraw Hill, 3 rd Edition, New Delhi, 2009.
2.T.Thyagarajan, Fundamentals of Electrical and Electronics Engineering. SciTech publications, 2011, 5th Ed
3. D. C. Kulshreshta, "Basic Electrical Engineering", McGraw Hill, 2009.
4.P.S.Dhogal "Basic Electrical Engineering with Numerical Problems" McGraw Hill, 2006.
5. A. Chakrabarti. Circuit Theory. 6 th edition, DhanpatRai& Co, New Delhi, 2014.
6.A.Sudhakar and Shyammohan S Palli, "Circuits and Networks" McGraw Hill, 2018.
Reference Books:
1. M.S Naidu and S.Kamakshaiah, Introduction to Electrical Engineering. TMH Publications.
2. D.P Kothari and I.J Nagrath, Basic Electrical Engineering, TMH, 3rdEd.2010
3. Millman and Halkias, Electriconics devices and circuits
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

COs-POs-PSOs Mapping Table

Course Outcomes	Program Outcomes												PSOs	
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**
1	2	2	-	2	-	-	-	-	2	-	2	-	2	2
2	2	3	2	2	-	-	-	-	2	-	2	-	2	3
3	2	3	2	2	-	-	-	-	2	-	2	-	2	3
4	2	2	-	3	-	-	-	-	2	-	2	-	2	2
5	2	2	1	3	-	-	-	-	2	-	2	-	2	2