B. Tech (R20) UCEV (Autonomous) *w.e.f* 2020-21

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

UNIVERSITY COLLEGE OF ENGINEERING VIZIANAGARAM

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

VIZIANAGARAM-535003, ANDHRA PRADESH, INDIA

B.Tech COURSE STRUCTURE (2020 Admitted batch)

I B.Tech I Semester

S. No	Course Code	Course Title	L	T	P	C
1	R2011BS01	Calculus and Differential Equations	3	0	0	3
2	R2012BS04	Applied Physics	3	0	0	3
3	R2011ES15	Problem Solving and Programming using C	3	0	0	3
4	R2011ES02	Electrical Engineering Workshop	1	0	4	3
5	R2012ES04	Electrical Circuit Analysis-I	3	0	0	3
6	R2012ES05A	Basic Electrical Simulation Lab	0	0	3	1.5
7	R2012BS04A	Applied Physics Lab	0	0	3	1.5
8	R2011ES13A	Problem Solving and Programming using C Lab	0	0	3	1.5

Total Credits= 19.5

Category	Credits
Basic Science Course	7.5
Engineering Science Courses	7.5+4.5=12
Humanities & Social Science	00
	19.5

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VIZIANAGARAM-535003, ANDHRA PRADESH, INDIA

B.Tech COURSE STRUCTURE (2020 Admitted batch)

I B.Tech II Semester

S. No	Course Code	Course Title	L	T	P	C
1	R2012BS02	Linear Algebra and Numerical Methods	3	0	0	3
2	R2011BS06	Applied Chemistry	3	0	0	3
3	R2012HS01	Communicative English	3	0	0	3
4	R2011ES13	Electronic Devices & Circuits	3	0	0	3
5	R2012ES06	Engineering Drawing	1	0	4	3
6	R2011BS06A	Applied Chemistry lab	0	0	3	1.5
7	R2012HS01A	English Communication Skills Lab	0	0	3	1.5
8	R2011ES13A	Electronic Devices & Circuits Lab	0	0	3	1.5
9	R2012MC01	Environmental Science	2	0	0	0

Total Credits = 19.5

Category	Credits
Basic Science Course	7.5
Engineering Science Courses	7.5
Humanities & Social Science	4.5
Total Credits	19.5

University College of Engineering Vizianagaram
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA

		L	T	P	C
I Year-I Semester		**3**	**0**	**0**	**3**

NAME OF THE SUBJECT: CALCULUS AND DIFFERENTIAL EQUATIONS

(Common to all branches)

Course Objectives:

(i) This course will illuminate the students in the concepts of calculus.
(ii) To enlighten the learners in the concept of differential equations and multivariable calculus.
(iii) 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 I: Sequences, Series and Mean value theorems: (10 hrs)

Sequences and Series: Convergence and divergence – Ratio test – Comparison tests – Integral test – Cauchy's root test – Alternate series – Leibnitz's rule.

Mean Value Theorems (without proofs): Rolle's Theorem – Lagrange's mean value theorem – Cauchy's mean value theorem – Taylor's and Maclaurin's theorems with remainders.

UNIT II: Differential equations: (15 hrs)

Linear differential equations – Bernoulli's equations – Exact equations and equations reducible to exact form

Non-homogeneous equations of higher order with constant coefficients with non-homogeneous term of the type e^{ax}, sin ax, cos ax, polynomials in x^n, e^{ax} V(x) and x^nV(x) – Method of Variation of parameters- Euler-Cauchy equation and Legender's equation

Applications: Orthogonal trajectories – Electrical circuits (RL, RC, RLC) – Simple Harmonic motion.

UNIT III: Partial differentiation: (10 hrs)

Introduction – Homogeneous function – Euler's theorem – Total derivative – Chain rule – Jacobian – Functional dependence – Taylor's and Mac Laurin's series expansion of functions of two variables.

Applications: Maxima and Minima of functions of two variables without constraints and Lagrange's method (with constraints).

UNIT IV: Multiple integrals: (8 hrs)

Double integrals – Change of order of integration - Double integrals in polar coordinates- Areas enclosed by plane curves- Triple integrals – Volume of solids – Change of variables to polar, spherical and cylindrical co-ordinates.

Applications: Finding Areas and Volumes.

UNIT V: Beta and Gamma functions: (5 hrs)

Introduction to Improper Integrals-Beta and Gamma functions- Properties - Relation between Beta and Gamma functions- Evaluation of improper integrals.

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

(i) Utilize mean value theorems to real life problems (L3)
(ii) Solve the differential equations related to various engineering fields (L3).
(iii) Familiarize with functions of several variables which are useful in optimization (L3)
(iv) Apply double and triple integration techniques in evaluating areas and volumes bounded by region (L3)
(v) Conclude the use of Beta and Gamma functions in evaluating improper integrals (L4)

Text Books:

1. **B. S. Grewal,** Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. **B. V. Ramana,** Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education.

Reference Books:

1. **Erwin Kreyszig,** Advanced Engineering Mathematics, 10th Edition, Wiley-India.
2. **Joel Hass, Christopher Heil and Maurice D. Weir,** Thomas calculus, 14th Edition, Pearson.
3. **Lawrence Turyn,** Advanced Engineering Mathematics, CRC Press, 2013.
4. **Srimantha Pal, S C Bhunia,** Engineering Mathematics, Oxford University Press.

B. Tech R20 Syllabus

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		L	T	P	C
I Year- I Semester		**3**	**0**	**0**	**3**
NAME OF THE SUBJECT :APPLIED PHYSICS					

(Common to CSE, ECE, EEE & IT)

Course Objectives:

The objectives of this course is to acquire knowledge on the

i. To identify the importance of the optical phenomenon i.e. interference, diffraction and polarization related to its Engineering applications.
ii. Understand the mechanism of emission of light, utilization of lasers as coherent light sources for low and high energy applications, study of propagation of light through optical fibers and their implications in optical communications.
iii. Enlightenment of the concepts of Quantum Mechanics and to provide fundamentals of deBroglie matter waves, quantum mechanical wave equation and its application, the importance of free electron theory for metals and band theory for crystalline solids. Metals- Semiconductors-Insulators concepts utilization of transport phenomenon of charge carriers in semiconductors.
iv. To explain the significant concepts of dielectric and magnetic materials that leads to potential applications in the emerging micro devices.
v. To understand the physics of Semiconductors and their working mechanism. To give an impetus on the subtle mechanism of superconductors using the concept of BCS theory and their fascinating applications.

UNIT - I: Wave Optics

Interference: Principle of superposition –Interference of light - Interference in thin films (Reflection Geometry) & applications - Colors in thin films- Newton's Rings- Determination of wavelength and refractive index.

Diffraction: Introduction - Fresnel and Fraunhofer diffraction - Fraunhofer diffraction due to single slit, double slit - N-slits (Qualitative) – Diffraction Grating - resolving power of Grating(Qualitative).

Polarization: Introduction-Types of polarization - Polarization by reflection and Double refraction - Nicol's Prism -Half wave and Quarter wave plates.

UNIT - II: Lasers and Fiber optics

Lasers: Introduction – Characteristics of laser – Spontaneous and Stimulated emissions of radiation – Einstein's coefficients and their relation – Population inversion – Lasing action - Pumping mechanisms – Ruby laser – He-Ne laser-Semiconductor laser - Applications of lasers.

Fiber optics: Introduction –Principle of optical fiber- Acceptance Angle - Numerical Aperture -Classification of optical fibers based on refractive index profile and modes –Block diagram of fiber optic communication.

UNIT - III: Quantum Mechanics, Free Electron Theory and Band theory

Quantum Mechanics: Dual nature of matter – Heisenberg's Uncertainty Principle – Significance and properties of wave function – Schrodinger's time independent and dependent wave equations– Particle in a one-dimensional infinite potential well-Quantum tunnellinng effect (qualitative).

Free Electron Theory: Classical free electron theory (Qualitative with discussion of merits and demerits) – Quantum free electron theory– Fermi energy-Equation for electrical conductivity based on quantum free electron theory –Fermi-Dirac distribution.

UNIT - IV: Dielectric and Magnetic Materials

Dielectric Materials: Introduction - Dielectric polarization - Dielectric polarizability, Susceptibility and Dielectric constant - Types of polarizations- Electronic (Quantitative), Ionic (Quantitative) and Orientation polarizations (Qualitative) - Lorentz internal field-Clausius-Mossotti equation.

Magnetic Materials: Introduction - Magnetic dipole moment - Magnetization-Magnetic susceptibility and permeability - Origin of permanent magnetic moment - Classification of magnetic materials: Dia, para, Ferro, antiferro & Ferri magnetic materials - Domain concept for Ferromagnetism (Qualitative) - Hysteresis - soft and hard magnetic materials-Applications.

UNIT - V: Semiconductors and Superconductors

Semiconductors: Introduction-Classification of solids - Intrinsic semiconductors – Density of charge carriers – Electrical conductivity – Fermi level – extrinsic semiconductors – density of charge carriers –Drift and diffusion currents – Einstein's equation- Hall effect – Hall coefficient –Applications of Hall effect.

Superconductors: Introduction – Properties of superconductors – Meissner effect – Type I and Type II superconductors – BCS theory (Qualitative) – Josephson effects (AC and DC) – SQUIDs.

Course Outcomes:

The students should be able to:

i. **Understand** the concepts of physical optics through the wave nature of light and **discuss** the phenomenal differences between interference, diffraction and polarization.
ii. **Describe** the basic laser physics, working of lasers, and principle of propagation of light in optical fibers.
iii. **Apply** the knowledge of basic quantum mechanics, to set up onedimensional Schrodinger's wave equation and **summarize** the importance of free electrons in determining the properties of metals.
iv. **Explain** the basics of dielectric and magnetic materials to synthesize new materials as per needs of engineering applications.
v. gain the **knowledge** of semiconductor bonding, semiconductor carrier properties and phenomenological **describe** the phenomenon of superconduction

Text Books:

1. M. N. Avadhanulu, P.G.Kshirsagar & TVS Arun Murthy" A Text book of Engineering Physics"- S.Chand Publications, 11th Edition 2019.
2. Engineering Physics" by D.K.Bhattacharya and Poonam Tandon, Oxford press (2015).
3. Applied Physics by P.K.Palanisamy SciTech publications.

Reference Books:

1. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley &Sons
2. Engineering Physics by M.R.Srinivasan, New Age international publishers (2009).
3. Shatendra Sharma, Jyotsna Sharma, " Engineering Physics", Pearson Education, 2018
4. Engineering Physics - Sanjay D. Jain, D. Sahasrabudhe and Girish, University Press
5. Semiconductor physics and devices- Basic principle – Donald A, Neamen, Mc Graw Hill
6. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning

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I Year-I Semester		L	T	P	C
		3	0	0	3
NAME OF THE SUBJECT: PROBLEM SOLVING AND PROGRAMMING USING C					

(Common to all branches)

Course Objectives:

The objectives of this course is to acquire knowledge on the

- To impart adequate knowledge on the need of programming languages and problem-solving techniques and develop programming skills.
- To enable effective usage of Control Structures and Implement different operations on arrays.
- To demonstrate the use of Strings and Functions.
- To impart the knowledge of pointers and understand the principles of dynamic memory allocation.
- To understand structures and unions and illustrate the file concepts and its operations.
- To impart the Knowledge Searching and Sorting Techniques.

UNIT-I

Introduction to Computer Problem Solving: Programs and Algorithms, Computer Problem Solving Requirements, Phases of Problem Solving, Problem. Solving Strategies, Top-Down Approach, Algorithm Designing, Program Verification, Improving Efficiency, Algorithm Analysis and Notations.

UNIT-II

Introduction to C Programming: Introduction, Structure of a C Program. Comments, Keywords, Identifiers, Data Types, Variables, Constants, Input/output Statements. Operators, Type Conversion.

Control Flow, Relational Expressions: Conditional Branching Statements: if, if-else, if-else—if, switch. Basic Loop Structures: while, do-while loops, for loop, nested loops, The Break and Continue Statements, goto statement.

UNIT-III

Arrays: Introduction, Operations on Arrays, Arrays as Function Arguments, Two dimensional Arrays, Multi dimensional arrays.

Pointers: Concept of a Pointer, Declaring and Initializing Pointer Variables, Pointer Expressions and Address Arithmetic, Null Pointers, Generic Pointers, Pointers as Function Arguments, Pointers and Arrays, Pointer to Pointer, Dynamic Memory Allocation, Dangling Pointer, Command Line Arguments,

UNIT-IV

Functions: Introduction, Function Declaration, Function Definition, Function Call, Categories of Functions, Passing Parameters to Functions, Scope of Variables, Variable Storage Classes. Recursion.

Strings: String Fundamentals, String Processing with and without Library

Functions, Pointers and Strings.

UNIT-V

Structures, Unions, Bit Fields: Introduction, Nested Structures, Arrays of Structures, Structures and Functions, Self-Referential Structures, Unions, Enumerated Data Type —Enum variables, Using Typedef keyword, Bit Fields.

Data Files: Introduction to Files, Using Files in C, Reading from Text Files, Writing to Text Files, Random File Access.

Course Outcomes:

At the end of the Course, Student should be able to:

i. Illustrate the Fundamental concepts of Computers and basics of computer programming.
ii. Use Control Structures and Arrays in solving complex problems.
iii. Develop modular program aspects and Strings fundamentals.
iv. Demonstrate the ideas of pointers usage.
v. Solve real world problems using the concept of Structures, Unions and File operations.

Text Books:

i. How to solve it by Computer, R. G. Dromey, and Pearson Education.
ii. Computer Programming. Reema Thareja, Oxford University Press
iii. Let us C , Yaswanth Kanetkar, 16th Edition,BPB Publication.

Reference Books:

i. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.
ii. Programming In C A-Practia1 Approach. Ajay Mittal, Pearson.
iii. C Programming — A Problem Solving Approach, Forouzan, Gilberg, Cengage.
iv. The C Programming Language, Dennis Richie And Brian Kernighan, Pearson Education.
v. Programming In C, Ashok Kamthane, Second Edition, Pearson Publication.

Web Links:

- http://www.c4learn.com/
- http://www.geeksforgeeks.org/c/
- http://nptel.ac.in/courses/122104019/
- http://www.learn-c.org/
- https://www.tutorialsyoint.com/cprogramming/

B. Tech R20 Syllabus

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I Year – I Semester		L	T	P	C
		1	0	4	3
NAME OF THE SUBJECT: ELECTRICAL ENGINEERING WORKSHOP					

Course Objectives:

The objectives of this course is to acquire knowledge

i. on the usage of measuring equipment
ii. in setting up simple wiring circuits
iii. on semiconductor devices and their assembling.

Any 10 of the following experiments are to be conducted

1. Study of various electrical tools & symbols.
2. Study of different types of cable/wires and switches, fuses and fuse carries, MCB ELCB, RCCB and MCCB with their specifications and usage
3. Practicing color coding to identify resistors and capacitors and understanding the usage of digital multi-meter.
4. Practicing Tube Light Wiring scheme.
5. Practicing Stair Case Wiring scheme.
6. Practicing Godown Wiring scheme.
7. Study of Moving iron, Moving Coil, Electro-dynamic and Induction type meters.
8. Practicing power distribution arrangement scheme through single phase MCB distribution board with ELCB, main switch and energy.
9. Study of Energy meter.
10. Measurement of Power in AC Circuit.
11. Study of different types of Earthing.
12. Identification of different types of semiconductor devices.
13. Practicing (i) Soldering and De-soldering
    (ii) Assembling components on PCB.
14. Study of CRO.
15. Assembling and Verification of circuits using breadboard.
16. Study and understanding of name plate details of various appliances.

Course Outcomes:

The students should be able to:

i. understand the limitations, tolerance, safety aspects of electrical systems and wiring.

ii. select wires/cables and other accessories used in different types of wiring.
make simple lighting and power circuits.

iii. measure current, voltage and power in a circuit.

Text Books:

i. Experiments in Basic Electrical Engineering by S.K.Bhattacharya, Rastogi –New Age International Ltd.

ii. Electrical work shop By R.P.Singh, 2nd edition, I.K. International Publishing House Pvt. Limited

References:

i. Electrical Design Estimating and Costing By K.B. Raina & S.K.Bhattacharya
Residential and Commercial Industrial Electrical systems Vol.3 by Joshi-TMH

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I Year – I Semester		L	T	P	C
		3	0	0	3
NAME OF THE SUBJECT: ELECTRICAL CIRCUIT ANALYSIS-I					

Course Objectives:

The objectives of this course is to acquire knowledge on the

i. concepts of passive elements, types of sources and various network reduction techniques and applications of electrical circuits.
ii. concept of magnetic coupled circuit.
iii. behavior of RLC networks for sinusoidal excitations.
iv. performance of R-L, R-C and R-L-C circuits with variation of one of the parameters and to understand the concept of resonance.
v. applications of network theorems for analysis of electrical networks.

UNIT-I

Introduction to Electrical Circuits

Basic Concepts of active and passive elements and their V-I relations, Sources (dependent and independent), Kirchhoff's laws, Network reduction techniques (series, parallel, series - parallel, star-to-delta and delta-to-star transformation), source transformation technique, nodal analysis and mesh analysis, Super node and Super mesh analysis, Principles of Duality.

UNIT-II

Magnetic Circuit

Basic definition of Magnetic Circuit, Magneto Motive Force, flux and reluctance - concept of self and mutual inductance, Dot convention – coefficient of coupling and composite magnetic circuit, Types of Coupling, analysis of series and parallel magnetic circuits.

UNIT-III

Single Phase A.C Systems

Periodic waveforms (determination of rms, average value, peak factor and form factor), concept of phase angle, phase difference – waveforms and phasor diagrams, lagging and leading networks, rectangular and polar forms of representations, steady state analysis of R, RL and RC circuits, power factor and its significance, real, reactive and apparent power, waveforms of instantaneous power and complex power.

UNIT-IV

Analysis of AC Networks

Extension of node and mesh analysis to AC networks, numerical problems on sinusoidal steady state analysis, series and parallel resonance, selectivity, band width and Quality factor, Current Locus diagrams of RL, RC and RLC circuits.

UNIT-V

Network theorems (DC & AC Excitations)

Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum-power transfer theorem, Reciprocity theorem, Millman's theorem, Tellegen's theorem and Compensation theorem.

Course Outcomes:

The students should be able to:

i. analyze various electrical networks in presence of active and passive elements
ii. understand circuits with dot conventions.
iii. explore RLC networks with sinusoidal excitation.
iv. analyze resonance conditions in electrical circuits.
v. verify various network theorems.

Text Books:

i. Engineering Circuit Analysis by William Hayt and Jack E.Kemmerley, McGraw Hill Company, 6^{th} edition.
ii. Network Analysis: Van Valkenburg; Prentice-Hall of India Private Ltd.

Reference Books:

i. Fundamentals of Electrical Circuits by Charles K.Alexander and Mathew N.O.Sadiku, McGraw Hill Education (India).
ii. Linear Circuit Analysis by De Carlo, Lin, Oxford publications.
iii. Electric Circuits – (Schaum's outlines) by Mahmood Nahvi & Joseph Edminister, adapted by K. Uma Rao, 5^{th} Edition – McGraw Hill.
iv. Electric Circuits by David A. Bell, Oxford publications.
v. Introductory Circuit Analysis by Robert L Boylestad, Pearson Publications.
vi. Circuit Theory (Analysis and Synthesis) by A.Chakrabarthi, Dhanpat Rai&Co.

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		L	T	P	C
I Year – I semester		**0**	**0**	**3**	**1.5**
NAME OF THE LAB: BASIC ELECTRICAL SIMULATION LAB(EEE)					

Course objectives:

The objectives of this course is to acquire knowledge on the

i. various basic operations on matrices.
ii. performance analysis of different types of periodic wave forms.
iii. principles of different types of theorems for analysis of networks.
iv. PN junction diode, half wave, full wave rectifiers and application of filters.

Any 10 of the following experiments are to be conducted

1. Practicing basic operations on Matrices.
2. Analysis of various signals and blocks (Addition, Subtraction, Integration and Differentiation, measurements etc.).
3. Generation of different types of Periodic waveforms (RMS, Average and Form Factor).
4. Verification of Kirchhoff's laws.
5. Steady State Response of Series and Parallel circuits.
6. Harmonic Analysis of periodic waveforms.
7. Verification of Superposition Theorem.
8. Verification of Thevenin's and Norton's Theorems.
9. Verification of Maximum Power Transfer Theorem.
10. Verification of Millman's Theorem.
11. Verification of Compensation Theorem.
12. Study of Diode characteristics. (Calculation of Diode Resistance)

Course Outcomes:

The student should be able to:

i. perform basic operations on matrices.
ii. verify different types of theorems on electrical networks.
iii. analyze the steady state performance of RLC Circuits.
iv. draw the characteristics of PN junction diode.

Textbooks:

i. Electronics & Circuit analysis using MATLAB, John O.Attia, CRC Press LLC, 1999

ii. Electric circuit fundamentals in MATLAB simulink , Mohammad Nuruzzaman

References:

i. MATLAB an introduction with applications, Amos Gilat, Wiley publications

ii. MATLAB Essentials for Problem Solving by Manoj khanna, Geeta Bhatt (author), Pawan kumar (author), PHI publications

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		L	T	P	C
I Year-I / II Semester		**0**	**0**	**3**	**1.5**
NAME OF THE LAB: APPLIED PHYSICS LAB					

(Common to CSE, ECE, EEE & IT)

Course Objectives:

The objectives of this course is to acquire knowledge on the

i. To **impart skills** in measurements with accurate error propagation.
ii. To **plan** the experimental procedure, **design** and to record and **analysis** results.
iii. To reach non trivial conclusions of significant of the experiments.
iv. To **develop** the skills to handle different instruments without taking erroneous readings and ability to enhance the skills to fabricate engineering and technical equipments.

List of experiments:

1. Determination of thickness of thin object by wedge method.
2. Determination of radius of curvature of a given plano convex lens by Newton's rings.
3. Determination of wavelengths of different spectral lines in mercury spectrum using diffraction grating in normal incidence configuration.
4. V-I Characteristics of a P-N Junction diode.
5. Determination of dielectric constant for different materials.
6. Study the variation of B versus H by magnetizing the magnetic material (B-H curve).
7. Determination of numerical aperture and acceptance angle of an optical fiber.
8. Determination of wavelength of Laser light using diffraction grating.
9. Estimation of Planck's constant using reverse photoelectric effect.
10. V-I Characteristics of a zener diode.
11. To determine the energy gap of a semiconductor using p-n junction diode.
12. Magnetic field along the axis of a current carrying circular coil by Stewart & Gee's Method.
13. Determination of Hall voltage and Hall coefficient of a given semiconductor using Hall Effect.
14. Measurement of resistance of a semiconductor with varying temperature.
15. Resistivity of a Superconductor using four probe method & Meissner effect.

Course Outcomes:

The students should be able to:

i. **Describe** the methodology of science and the relationship between observation and theory.
ii. **Develop** scientific problem solving skills, including organization of given information, identification and application of pertinent principles, quantitative solutions, interpreting results, and evaluating the validity of results.

iii. **Discover** of physics concepts in other disciplines such as mathematics, computer science, engineering, and chemistry.

iv. **Learn** to minimize contributing variables and recognize the limitations of equipment.

v. **Apply** conceptual understanding of the physics to general real-world situations.

vi. **Develop** interpersonal and communication skills including communicating in small groups, writing, working effectively with peers.

Reference Books:

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

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		L	T	P	C
I Year-I Semester		**0**	**0**	**3**	**1.5**
NAME OF THE LAB: PROBLEM SOLVING AND PROGRAMMING USING C LAB					

(Common to all branches)

Course Objectives:

The objectives of this course is to acquire knowledge on the

- To impart knowledge on basic Linux commands, various Editors, Raptor.
- To make the students understand the concepts of C programming.
- To nurture the students on Control Structures and develop different operations on arrays.
- To make use of String fundamentals and modular programming constructs.
- To implement programs using dynamic memory allocation.
- To explain the concepts of Structure, Unions and files for solving various problems.

List of Experiments:

1. Introduction to Algorithms and Flowcharts

1.1) Implement Algorithm Development for Exchange the values of Two numbers.

1.2) Given a set of n student's examination marks (in the range 0-100) make a count of the number of students that passed the examination. A Pass is awarded for all of 50 and above.

1.3) Given a set of n numbers design an algorithm that adds these numbers and returns the resultant sum. Assume N is greater than or equal to zero.

2. Introduction to C Programming

2.1) Basic Linux Commands.

2.2) Exposure to Turbo C, Vi, Emacs, Code Blocks IDE, Dev C++.

2.3) Writing simple programs using printf(), scanf() .

3. Raptor

3.1) Installation and Introduction to Raptor.

3.2) Draw a flow chart to find the Sum of 2 numbers.

3.3) Draw a flow chart to find Simple interest.

4. Basic Math

4.1) Write a C Program to convert Celsius to Fahrenheit and vice versa.

4.2) Write a C Program to find largest of three numbers using ternary operator.

4.3) Write a C Program to Calculate area of a Triangle using Heron's formula.

5. Control Flow- I

5.1) Write a C Program to Find Whether the Given Year is a Leap Year or not.

5.2) Write a C program to find the roots of a Quadratic Equation.

5.3) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide UsingSwitch...case.

6. Control Flow- II

6.1) Write a C Program to Find Whether the Given Number is Prime number or not.

6.2) Write a C Program to Find Whether the Given Number is Armstrong Number or not.

6.3) Write a C program to print Floyd Triangle.

7. Control Flow- III

7.1) Write a C program to find the sum of individual digits of a positive integer.

7.2) Write a C program to check whether given number is palindrome or not.

7.3) Write a C program to read two numbers, x and n, and then compute the sum of the geometric progression $1+x+x^2+x^3+\ldots\ldots\ldots\ldots+x^n$.

8. Arrays

8.1) Write a C program to search an element in the given array (Linear Search).

8.2) Write a C program to perform matrix addition.

8.3) Write a C program to perform matrix multiplication.

9. Pointers

9.1) Write a C Program to Perform Addition. Subtraction, Multiplication and Division of two numbers using Command line arguments.

9.2) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc () function.

9.3) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc () function.

10. Functions, Array & Pointers

10.1) Write a C Program to demonstrate parameter passing in Functions.

10.2) Write a C Program to find Fibonacci. Factorial of a number with recursion and without recursion.

10.3) Write a C Program to find the sum of given numbers with arrays and pointers.

11. Strings

11.1) Implementation of string manipulation operations with library function:

a. copy
b. concatenate
c. length
d. compare

I11.2) Implementation of string manipulation operations without library function:

a. copy
b. concatenate
c. length
d. compare

12. Structures

12.1) Write a C Program to Store Information of a book Using Structure.

12.2) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function.

13. Files

13.1) Write a C program to open a file and to print the contents of the file on screen.

13.2) Write a C program to copy content of one file to another file.

13.3) Write a C program to merge two files and store content in another file.

14. Application

Creating structures to capture the student's details save them in file in proper record format. search and prints the student details requested by the user.

Note: Draw the flowcharts using Raptor from Experiment 3 to Experiment 6.

Course Outcomes:

- Implement basic programs in C and design flowcharts in Raptor.
- Use Conditional and Iterative statements to solve real time scenarios in C.
- Implement the concept of Arrays and Modularity and Strings.
- Apply the Dynamic Memory Allocation functions using pointers.
- Develop programs using structures, and Files.

Text Books:

i. Let us C , Yaswanth Kanetkar, 16th Edition,BPB Publication.

ii. How to solve it by Computer, R. G. Dromey, and Pearson Education.

iii. Computer Programming. Reema Thareja, Oxford University Press

Reference Books:

i. Programming in C A-Practical Approach Ajay Mittal. Pearson Education.

ii. The C programming Language, Dennis Richie and Brian Kernighan, Pearson Education.

iii. Problem solving using C , K Venugopal,3'd Edition,TMG Publication.

Web Links:

1. https://www.hackerrank.com/
2. https://www.codechef.com/
3. https://www.topcoder.com/
4. https://code-cracker.github.io/
5. https://raptor.martincar1is1e.com/
6. httos://npte1.ac.in/courses/106105055/2

B. Tech R20 Syllabus

University College of Engineering Vizianagaram
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA

		L	T	P	C
I Year-II Semester		3	0	0	3
NAME OF THE SUBJECT: LINEAR ALGEBRA AND NUMERICAL METHODS					

(Common to all branches)

Course Objectives:

The objectives of this course is to acquire knowledge on the

(i) To instruct the concept of Matrices in solving linear algebraic equations

(ii) To elucidate the different numerical methods to solve nonlinear algebraic equations

(iii) To disseminate the use of different numerical techniques for carrying out numerical integration.

(iv) 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 – I: Systems of linear equations, Eigen values and Eigen vectors: (10 hrs)

Rank of a matrix by echelon form and normal form – Solving system of homogeneous and non-homogeneous linear equations – Gauss Elimination method – Eigenvalues and Eigen vectors and their properties.

Applications: Free vibration of a two-mass system.

UNIT – II: Cayley-Hamilton theorem and Quadratic forms: (10 hrs)

Cayley-Hamilton theorem (without proof) – Finding inverse and power of a matrix by Cayley-Hamilton theorem –Reduction to Diagonal form– Quadratic forms and nature of the quadratic forms – Reduction of quadratic form to canonical forms by orthogonal transformation.

Singular values of a matrix, singular value decomposition (Ref. Book – 1).

UNIT – III: Iterative methods: (8 hrs)

Introduction– Solutions of algebraic and transcendental equations : Bisection method–Secant method – Method of false position– Iteration method – Newton-Raphson method (One variable and simultaneous Equations)

Solutions of system of equations - Jacobi and Gauss-Seidel methods

Evaluation of largest eigenvalue –eigenvector using Power Method.

UNIT – IV: Interpolation: **(10 hrs)**

Introduction - Errors in polynomial interpolation – Finite differences– Forward differences– Backward differences –Central differences – Relations between operators – Newton's forward and backward formulae for interpolation – Interpolation with unequal intervals – Lagrange's interpolation formula– Newton's divide difference formula.

UNIT–V:Numerical integration and solution of differential equations with initial conditions:
(10 hrs)

Trapezoidal rule– Simpson's $1/3^{rd}$ and $3/8^{th}$ rule– Solution of differential equations with initial conditions by Taylor's series– Picard's method of successive approximations– Euler's method –Runge-Kutta method (second and fourth order) – Milne's Predictor and Corrector Method.

Course Outcomes: The student will be able to

(i) Develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)

(ii) Solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3)

(iii) Evaluate approximating the roots of polynomial and transcendental equations by different algorithms (L5)

(iv) Apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3)

(v) Apply different algorithms for approximating the solutions of ordinary differential equations to its analytical computations (L3)

Text Books:

(i) **B. S. Grewal,** Higher Engineering Mathematics, 43^{rd} Edition, Khanna Publishers.

(ii) **B. V. Ramana,** Higher Engineering Mathematics, 2007 Edition, Tata Mc. Graw Hill Education.

Reference Books:

(i) **David Poole,** Linear Algebra- A modern introduction, 4^{th} Edition, Cengage.

(ii) **Steven C. Chapra,** Applied Numerical Methods with MATLAB for Engineering and Science, Tata Mc. Graw Hill Education.

(iii) **M. K. Jain, S. R. K. Iyengar and R. K. Jain,** Numerical Methods for Scientific and Engineering Computation, New Age International Publications.

(iv) **Lawrence Turyn,** Advanced Engineering Mathematics, CRC Press.

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I Year-I / II Semester		L	T	P	C
		3	0	0	3

NAME OF THE SUBJECT: APPLIED CHEMISTRY

(Common to EEE, ECE, CSE, IT)

Knowledge of basic concepts of Chemistry for Engineering students will help them as professional engineers later in design and material selection, as well as utilizing the available resources.

Course Objectives:

- ***Importance*** of usage of plastics in household appliances and composites (FRP) in aerospace and automotive industries.
- ***Outline*** the basics for the construction of electrochemical cells, batteries and fuel cells. Understand the mechanism of corrosion and how it can be prevented.
- ***Explain*** the preparation of semiconductors and nanomaterials, engineering applications of nanomaterials, superconductors and liquid crystals.
- ***Recall*** the increase in demand for power and hence alternative sources of power are studied due to depleting sources of fossil fuels. Advanced instrumental techniques are introduced.
- ***Outline*** the basics of computational chemistry and molecular switches

.

UNIT I: POLYMER TECHNOLOGY **8 hrs**

Polymerisation:- Introduction, methods of polymerization (emulsion and suspension), mechanical properties.

Plastics: Compounding, fabrication (compression, injection, blown film and extrusion), preparation, properties and applications (PVC, polycarbonates and Bakelite), mention some examples of plastic materials used in electronic gadgets, recycling of e-plastic waste (waste to wealth).

Elastomers:- Introduction, preparation, properties and applications (Buna S, thiokol and polyurethanes).

Composite materials: Fiber reinforced plastics, conducting polymers, biodegradable polymers, biopolymers, biomedical polymers

UNIT II: ELECTROCHEMICAL CELLS AND CORROSION **10 hrs**

Single electrode potential, electrochemical series and uses of series, standard hydrogen electrode, calomel electrode, construction of glass electrode, batteries (Dry cell, Li ion battery and zinc air cells), fuel cells (H_2-O_2, CH_3OH-O_2, phosphoric acid and molten carbonate).

Corrosion:-Definition, theories of corrosion (chemical and electrochemical), galvanic corrosion, differential aeration corrosion, stress corrosion, galvanic series, factors influencing rate of corrosion, corrosion control (proper designing and cathodic protection), Protective coatings (surface preparation, cathodic coatings, anodic coatings, electroplating and electroless plating [nickel]), Paints (constituents, functions and special paints).

UNIT III: MATERIAL CHEMISTRY **10 hrs**

Part I ***: Non-elemental semiconducting materials****:-* Stoichiometric, controlled valency & chalcogen photo/semiconductors-preparation of semiconductors (distillation, zone refining, Czochralski crystal pulling, epitaxy, diffusion, ion implantation) - Semiconductor devices (p-n junction diode as rectifier, junction transistor).

Insulators & magnetic materials: electrical insulators-ferro and ferri magnetism-Hall effect and its applications.

Part II:

Nano materials:- Introduction, sol-gel method, characterization by (Brunauer Emmet Teller [BET]), (scanning electron microscopy [SEM]) and (transmission electron microscopy [TEM]), applications of graphene and fullerenes, carbon nanotubes (types, preparation and applications)

Liquid crystals:- Introduction-types-applications.

Super conductors:-Type –I, Type II-characteristics and applications

UNIT IV: SPECTROSCOPIC TECHNIQUES & NON-CONVENTIONAL ENERGY SOURCES **10 hrs**

Part A: **SPECTROSCOPIC TECHNIQUES**

Electromagnetic spectrum-UV (laws of absorption, instrumentation, theory of electronic spectroscopy, Frank-condon principle, chromophores and auxochromes, intensity shifts, applications), FT-IR [instrumentation and differentiation of sp, sp^2, sp^3 and IR stretching of functional groups (alcohols, carbonyls, amines) applications], magnetic resonance imaging and CT scan (procedure & applications).

Part B*: NON-CONVENTIONAL ENERGY SOURCES*

Design, working, schematic diagram, advantages and disadvantages of photovoltaic cell, hydropower, geothermal power, tidal and wave power, ocean thermal energy conversion.

UNIT V: ADVANCED CONCEPTS/TOPICS IN CHEMISTRY **8 hrs**

Computational chemistry: Introduction to computational chemistry, molecular modelling and docking studies and its applications.

Molecular switches**:** characteristics of molecular motors and 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

Course Outcomes

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

(i) ***Analyze*** the different types of composite plastic materials and ***interpret*** the mechanism of conduction in conducting polymers.

(ii) ***Utilize*** the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion.

(iii)***Synthesize*** nanomaterials for modern advances of engineering technology. Summarize the preparation of semiconductors; analyze the applications of liquid crystals and superconductors.

(iv)***Analyze*** the principles of different analytical instruments and their applications. Design models for energy by different natural sources.

(v) ***Obtain*** the knowledge of computational chemistry and molecular machines

Text Books:

1. P.C. Jain and M. Jain "**Engineering Chemistry**", 15/e, Dhanpat Rai & Sons, Delhi, (Latest edition).
2. Shikha Agarwal, "**Engineering Chemistry**", Cambridge University Press, New Delhi, (2019).
3. S.S. Dara, "**A Textbook of Engineering Chemistry**", S.Chand & Co, (2010).
4. Shashi Chawla, "Engineering Chemistry", Dhanpat Rai Publicating Co. (Latest edition).

Reference Books:

1. K. Sesha Maheshwaramma and Mridula Chugh, "**Engineering Chemistry**", Pearson India Edn.
2. O.G. Palana, "**Engineering Chemistry**", Tata McGraw Hill Education Private Limited, (2009).
3. CNR Rao and JM Honig (Eds) "**Preparation and characterization of materials**" Academic press, New York (latest edition)
4. B. S. Murthy, P. Shankar and others, "**Textbook of Nanoscience and Nanotechnology**", University press (latest edition)

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I Year-I / II Semester		L	T	P	C
		3	0	0	3
NAME OF THE SUBJECT: COMMUNICATIVE ENGLISH					

(Common to all branches)

Course Objectives

(i) Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers
(ii) Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
(iii) Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations
(iv) Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information
(v) Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing

UNIT I:

A Drawer full of happiness

Listening: Listening to short audio texts and identifying the topic. Listening to prose, prose and conversation.

Speaking: Asking and answering general questions on familiar topics such as home, family, work, studies and interests. Self introductions and introducing others.

Reading: Skimming text to get the main idea. Scanning to look for specific pieces of information.

Reading for Writing: Paragraph writing (specific topics) using suitable cohesive devices; linkers, sign posts and transition signals; mechanics of writing - punctuation, capital letters.

Vocabulary: Technical vocabulary from across technical branches (20) GRE Vocabulary (20) (Antonyms and Synonyms, Word applications) Verbal reasoning and sequencing of words.

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

Pronunciation: Vowels, Consonants, Plural markers and their realizations

UNIT II :

Nehru's letter to his daughter Indira on her birthday

Listening: Answering a series of questions about main idea and supporting ideas after listening to audio texts, both in speaking and writing.

Speaking: Discussion in pairs/ small groups on specific topics followed by short structured talks. Functional English: Greetings and leave takings. **Reading**: Identifying sequence of ideas; recognizing verbal techniques that help to link the ideas in a paragraph together.

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

Vocabulary: Technical vocabulary from across technical branches (20 words). GRE Vocabulary Analogies (20 words) (Antonyms and Synonyms, Word applications)

Grammar: Use of articles and zero article; prepositions.

Pronunciation: Past tense markers, word stress-di-syllabic words

UNIT III:

Stephen Hawking-Positivity 'Benchmark'

Listening: Listening for global comprehension and summarizing what is listened to, both in speaking and writing.

Speaking: Discussing specific topics in pairs or small groups and reporting what is discussed. Functional English: Complaining and Apologizing.

Reading: Reading a text in detail by making basic inferences - recognizing and interpreting specific context clues; strategies to use text clues for comprehension. Critical reading.

Reading for Writing: Summarizing - identifying main idea/s and rephrasing what is read; avoiding redundancies and repetitions. Letter writing-types, format and principles of letter writing.E-mail etiquette, Writing CV's.

Vocabulary: Technical vocabulary from across technical branches (20 words). GRE Vocabulary (20 words) (Antonyms and Synonyms, Word applications) Association, sequencing of words

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

Pronunciation: word stress-poly-syllabic words.

UNIT IV:

Liking a Tree, Unbowed: Wangari Maathai-biography

Listening: Making predictions while listening to conversations/ transactional dialogues without video (only audio); listening to audio-visual texts.

Speaking: Role plays for practice of conversational English in academic contexts (formal and informal) - asking for and giving information/directions. Functional English: Permissions, Requesting, Inviting.

Reading: Studying the use of graphic elements in texts to convey information, reveal trends/patterns/relationships, communicative process or display complicated data.

Reading for Writing: Information transfer; describe, compare, contrast, identify significance/trends based on information provided in figures/charts/graphs/tables.Writing SOP, writing for media.

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) (Antonyms and Synonyms, Word applications) Cloze Encounters.

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

Pronunciation: Contrastive Stress

UNIT V:

Stay Hungry-Stay foolish

Listening: Identifying key terms, understanding concepts and interpreting the concepts both in speaking and writing.

Speaking: Formal oral presentations on topics from academic contexts - without the use of PPT slides. Functional English: Suggesting/Opinion giving.

Reading: Reading for comprehension. RAP Strategy Intensive reading and Extensive reading techniques.

Reading for Writing: Writing academic proposals- writing research articles: format and style.

Vocabulary: Technical vocabulary from across technical branches (20 words) GRE Vocabulary (20 words) (Antonyms and Synonyms, Word applications) Coherence, matching emotions.

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

Pronunciation: Stress in compound words

Course Outcomes:

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

(i) Understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information

(ii) Ask and answer general questions on familiar topics and introduce oneself/others

(iii) Employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information

(iv) Recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs

(v) Form sentences using proper grammatical structures and correct word forms

Prescribed text books:

(i) "**Infotech English**", Maruthi Publications. (Detailed)

Reference Books

1. Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2014.
2. Chase, Becky Tarver. *Pathways: Listening, Speaking and Critical Thinking.* Heinley ELT; 2nd Edition, 2018.
3. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
4. Hewings, Martin. *Cambridge Academic English (B2)*. CUP, 2012
5. Martin Hewings , Advanced English Grammar, Cambridge university press
6. William Strunk JR. and E B White, Elements of Style, 4th Edition, Pearson
7. *Language and Life: A Skills Approach* Board of Editors, Orient Black Swan Publishers, India. 2018.
8. *Practical English Usage*, Michael Swan. OUP. 1995.
9. *Remedial English Grammar*, F.T. Wood. Macmillan.2007
10. *On Writing Well*, William Zinsser. Harper Resource Book. 2001
11. *Study Writing*, Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
12. *Communication Skills*, Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
13. *Exercises in Spoken English*, Parts. I-III. CIEFL, Hyderabad. Oxford University Press.
14. *Advanced English Grammar*, Martin Hewings. Cambridge University Press. 2016
15. *Elements of Style*, William Strunk and EB White. Pearson. 1999.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA

I Year – II Semester		L	T	P	C
		3	0	0	3
NAME OF THE SUBJECT: ELECTRONIC DEVICES AND CIRCUITS					

Course objectives:

The objectives of this course is to acquire knowledge on the

i. The basic concepts of semiconductor physics are to be reviewed.
ii. Study the physical phenomena such as conduction, transport mechanism and electrical characteristics of different diodes.
iii. The application of diodes as rectifiers with their operation and characteristics with and without filters are discussed and the principal of working and operation of Bipolar Junction Transistor and Field Effect Transistor and their characteristics are explained.
iv. The need of transistor biasing and its significance is explained. The quiescent point or operating point is explained.
v. Small signal equivalent circuit analysis of BJT and FET transistor amplifiers in different configuration is explained.

UNIT-I:

Semiconductor Physics : Insulators, Semiconductors, and Metals classification using energy band diagrams, mobility and conductivity, electrons and holes in intrinsic semi conductors and extrinsic semi conductors, drift and diffusion, charge densities in semiconductors, Hall effect, continuity equation, law of junction, Fermi Dirac function, Fermi level in intrinsic and extrinsic Semiconductors

UNIT-II:

Semiconductor Diodes:

Junction Diode Characteristics : Open circuited P-N junction, Biased P-N junction, P-N junction diode, current components in PN junction Diode, diode equation, V-I characteristics, temperature dependence on V-I characteristics, Diode resistance, Diode capacitance, energy band diagram of PN junction Diode.

Special Semiconductor Diodes: Zener Diode, Breakdown mechanisms, Zener diode applications, LED, Photodiode, Tunnel Diode (Construction, operation and characteristics of all the devices are required to be considered).

Rectifiers and Filters: Basic Rectifier setup, half wave rectifier, full wave rectifier, bridge rectifier, derivations of characteristics of rectifiers, rectifier circuits-operation, input and output waveforms, Filters, Inductor filter, Capacitor filter, comparison of various filter circuits in terms of ripple factors.

UNIT- III:

Transistor Characteristics: BJT: Junction transistor, transistor current components, transistor equation, transistor configurations, transistor as an amplifier, characteristics of transistor in Common Base, Common Emitter and Common Collector configurations, Ebers-Moll model of a transistor, punch through reach through, Photo transistor, typical transistor junction voltage values. FET: FET types, construction, operation, characteristics, parameters, MOSFET-types, construction, operation, characteristics, comparison between JFET and MOSFET.

UNIT- IV:

Transistor Biasing and Thermal Stabilization : Need for biasing, operating point, load line analysis, BJT biasing- methods, basic stability, fixed bias, collector to base bias, self bias, Stabilization against variations in VBE, Ic, and β, Stability factors, (S, S', S''), Bias compensation, Thermal runaway, Thermal stability.FET Biasing- methods and stabilization.

UNIT- V:

Small Signal Low Frequency Transistor Amplifier Models: BJT: Two port network, Transistor hybrid model, determination of h-parameters, conversion of h-parameters, generalized analysis of transistor amplifier model using h-parameters, analysis of CB, CE and CC amplifiers using exact and approximate analysis, comparison of transistor amplifiers. FET: Generalized analysis of small signal model, analysis of CG, CS and CD amplifiers, comparison of FET amplifiers.

Learning Outcomes:

The Student should be able to

i. understand the concepts of Semiconductor Technology.
ii. appraise the construction & operation of electronic devices.
iii. develop the biasing circuits using the electronic devices.
iv. model the amplifier circuits.
v. analyse the characteristics of the devices.

Text Books:

i. Electronic Devices and Circuits- J. Millman, C. Halkias, Tata Mc-Graw Hill, Second Edition.
ii. Electronics devices & circuit theory- Robert L.Boylestad and Loui Nashelsky, Pearson/Prentice hall, tenth edition

References Books:

i. Electronic Devices and Circuits- Salivahanan, Kumar, Vallavaraj, Tata Mc-Graw Hill, Second Edition..
ii. Electronic Devices and Circuits – David Bell, Oxford
iii. Electronic Devices and Circuits – An Introduction by Allen Mottershead, PHI publications

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I Year-II Semester		L	T	P	C
		1	0	4	3

NAME OF THE SUBJECT: ENGINEERING DRAWING

Course Objectives:

The objectives of this course is to acquire knowledge on the

i. To introduce the students to use drawing instruments and to draw engineering curves.

ii. To introduce the students to use orthographic projections, projections of points & simple lines. To make the students draw the projections of the lines inclined to both the planes.

iii. The objective is to make the students draw the projections of the plane objects in different positions with the reference planes.

iv. The objective is to make the students draw the projections of the various types of solids in different positions inclined to one of the planes.

v. The objective is to represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view.

UNIT - I:

Curves: Parabola, Ellipse and Hyperbola by general and special methods, cycloids, tangents & normals for the curves.

Scales: Plain scales, diagonal scales and vernier scales

UNIT - II:

Orthographic Projections: Reference plane, importance of reference lines, projections of points in various quadrants, projections of lines, line parallel to both the planes, line parallel to one plane and inclined to other plane.

Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclination and traces.

UNIT - III:

Polygons: Constructing regular polygons by general methods.

Projections of planes: regular planes perpendicular/parallel to one reference plane and inclined to the other reference plane; inclined to both the reference planes.

UNIT - IV:

Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one plane-Auxiliary views.

UNIT - V:

Conversion of isometric views to orthographic views and Conversion of orthographic views to isometric views.

Course Outcomes:

The students should be able to:

i. To make the student familiar with the techniques used for drawing various geometric elements used in engineering practice.

ii. The student can apply orthographic projections and project the points and lines parallel to one plane and inclined to both the planes.

iii. Prepare the drawings for construction of regular polygons and the projection of the planes inclined to both the planes.

iv. The student can prepare the drawings for the projections of the various types of solids in different positions inclined to one of the planes.

v. Ability to use the concepts of isometric views to orthographic views and vice-versa.

Text Books:

i. Engineering Drawing by N.D. Bhatt, Chariot Publications

ii. Engineering Drawing by Agarwal & Agarwal, Tata McGraw Hill Publishers

Reference Books:

i. Engineering Drawing by K.L.Narayana & P. Kannaiah, Scitech Publishers

ii. Engineering Graphics for Degree by K.C. John, PHI Publishers

iii. Engineering Graphics by PI Varghese, McGrawHill Publishers

iv. Engineering Drawing + AutoCad – K Venugopal, V. Prabhu Raja, New Age

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I Year-I/II Semester		L	T	P	C
		0	0	3	1.5

NAME OF THE LAB: APPLIED CHEMISTRY LAB

(Common to EEE,ECE,CSE,IT)

Course Objectives:

The objectives of this course is to acquire knowledge on the

(i) Normality , molaritiy ,theory of indicators used in different volumetric and chemical analysis.

(ii) Alkalinity and hardness of water by E DTA method.

(iii) Volumetric analysis-Red-Ox titrations of different chemical compounds.

(iv) Determination of concentration of acids and bases using conductometer and potentiometer

(v) Determination of P^H and color metric analysis

Introduction to Chemistry laboratory – Molarities, normality, primary, secondary standard solutions,
Volumetric titrations, quantitative analysis

1. Determination of HCl using standard Na_2CO_3 solution.
2. Determination of alkalinity of a sample containing Na_2CO_3 and NaOH.
3. Determination of Mn^{+2} using standard oxalic acid solution.
4. Determination of ferrous iron using standard $K_2Cr_2O_7$ solution.
5. Determination of Cu^{+2} using standard hypo solution.
6. Determination of temporary and permanent hardness of water using standard EDTA solution.
7. Determination of Fe^{+3} by a colorimetric method.
8. Determination of the concentration of acetic acid using sodium hydroxide (pH-metry method).
9. Determination of iso-electric point of amino acids using pH-metry method/conductometric method.
10. Determination of the concentration of strong acid vs strong base (by conductometric method).
11. Determination of strong acid vs strong base (by potentiometric method).
12. Determination of Mg^{+2} present in an antacid.
13. Determination of $CaCO_3$ present in an egg shell.

14. Estimation of Vitamin C.

15. Determination of phosphoric content in soft drinks.

16. Adsorption of acetic acid by charcoal.

17. Preparation of nylon-6, 6 and Bakelite (demonstration only).

18. Determination of Lead in drinking water.

19. Determination of percentage of copper in Brass.

Of the above experiments at-least 10 assessment experiments should be completed in a semester.

Course Outcomes:

(i) Student is exposed to volumetric titrations acquires some volumetric skills.

(ii) Student is able to analyze hard and soft water.

(iii) Student is exposed to volumetric skills of red-ox titrations with different indicators

(iv) Students can handle the instruments like conductometer, potentiometer in determinening the concentrations of acids and bases.

(v) Student is able to analyze the different chemical concentrations using colorimeter and P^H meter.

Reference Books

1. A Textbook of Quantitative Analysis, Arthur J. Vogel.

Engineering Chemistry by Jain and Jain; Dhanpat Rai Publicating Co. Latest edition

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I Year-I / II Semester		L	T	P	C
		0	0	3	1.5
NAME OF THE LAB: ENGLISH COMMUNICATION SKILLS LAB					

(Common to all branches)

Course Objectives

(i) To impart grammar as well as communication through pronunciation. By introduction, pure vowels, consonants, diphthongs, phonetic transcription, common errors in pronunciation.

(ii) To impart better knowledge on Stress. Stress of kinds- mono syllabic, di syllabic, poly syllabic, strong and weak forms of stress along with contrastive stress.

(iii) To impart learner grammar as well as communication through compound words, rhythm, intonation and accent neutralization

(iv) To impart learner grammar as well as communication through listening, by identifying the context and specific pieces of information to answer a series of questions in speaking

(v) To improve the spoken skills of students by making them read news papers in order to understand and identify key terms context they read .

UNIT I:

Vowels, Consonants, Pronunciation, Phonetic Transcription, Common Errors in Pronunciation,

UNIT II:

Word stress-di-syllabic words, poly-syllabic words, weak and strong forms, contrastive stress (Homographs)

UNIT III:

Stress in compound words, rhythm, intonation, accent neutralisation.

UNIT IV:

Listening to short audio texts and identifying the context and specific pieces of information to answer a series of questions in speaking.

UNIT V:

Newspapers reading; Understanding and identifying key terms and structures useful for writing reports.

Course Outcomes:

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

(i) The learner will improve phonetic understanding, transcription, common errors both in pronunciation and written English.

(ii) The learner will improve syllabic division, and how to use right stress in their pronunciation.

(iii) The learner will improve speaking skills with right intonation and rhythm and intonation and how to reduce mother tongue influence in English.

(iv) The learner will Improve speaking skills as well as listening skills by listening through the audio clips prescribed.

(v) The learner will Improve speaking skills along with reading skills.

Prescribed text book:

(i) "**InfoTech English**", Maruthi Publications.

References:

1. Exercises in Spoken English Part 1,2,3,4, OUP and CIEFL.
2. English Pronunciation in use- Mark Hancock, Cambridge University Press.
3. English Phonetics and Phonology-Peter Roach, Cambridge University Press.
4. English Pronunciation in use- Mark Hewings, Cambridge University Press.
5. English Pronunciation Dictionary- Daniel Jones, Cambridge University Press.
6. English Phonetics for Indian Students- P. Bala Subramanian, Mac Millan Publications.

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I Year – II Semester		L	T	P	C
		0	0	3	1.5

NAME OF THE LAB : ELECTRONIC DEVICES AND CIRCUITS LABORATORY

Course objectives:

The objectives of this course is to acquire knowledge on the

i. identification, specifications, testing of R, L, C Components (Colour Codes), Potentiometers, Coils, Gang condensers, Relays, Bread Boards.
ii. identification, specifications, testing of active devices, Diodes, BJTs, JFETs, LEDs, LCDs, SCR, UJT.
iii. Soldering practice-simple circuits using active and passive components.
iv. Study and operation of Ammeters, Voltmeters, Transformers, Analog and Digital Multimeter, Function Generator, Regulated Power Supply and CRO.

Note: The students are required to perform the experiment to obtain the V-I characteristics and to determine the relevant parameters from the obtained graphs.

List of Experiments

Any 10 of the following experiments are to be conducted

1. P.N Junction Diode Characteristics
   Part A: Germanium Diode (Forward bias& Reverse bias)
   Part B: Silicon Diode (Forward Bias only)
2. V-I Characteristics of Zener Diode
3. Zener Diode as Voltage Regulator
4. Half and Full wave Rectifiers (without and with c-filter)
5. BJT Characteristics (CE Configuration)
   Part A: Input Characteristics
   Part B: output Characteristics
6. BJT Characteristics (CB Configuration)
   Part A: Input Characteristics
   Part B: output Characteristics
7. FET Characteristics
   Part A: Drain Characteristics
   Part B: Transfer Characteristics
8. Transistor Biasing
9. BJT-CE Amplifier
10. Emitter Follower –CC Amplifier
11. FET-CS Amplifier
12. Class – A Amplifier

Text Books:

i. Electronic Devices and Circuits- J. Millman, C. Halkias, Tata Mc-Graw Hill, 2nd Edition.
ii. Electronics devices & circuit theory- Robert L.Boylestad and Loui Nashelsky, Pearson/Prentice hall, tenth edition

References Books:

i. Electronic Devices and Circuits- Salivahanan, Kumar, Vallavaraj, Tata Mc-Graw Hill, Second Edition.
ii. Electronic Devices and Circuits – David Bell, Oxford.
iii. Electronic Devices and Circuits – An Introduction by Allen Mottershead, PHI publications.

University College of Engineering Vizianagaram
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA

I Year-I/II Semester		L	T	P	C
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NAME OF THE SUBJECT: ENVIRONMENTAL SCIENCE					

(Common to All branches)

Course Objectives:

The objectives of this course is to acquire knowledge on the

(i)The natural resources and their sustenance of the life and recognize the need to conserve the natural resources.

(ii)The concepts of ecosystem and its functions in the environment. The need for protecting the producers and consumers and their role in the food web.

(iii)The biodiversity of India and the threats to biodiversity, and the conservation practices to protect the biodiversity.

(iv)Various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management.

(v)Social issues both rural and urban environment and the possible means to combat the challenges.

UNIT - I:MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES 7hrs

Definition, Scope and Importance - Need for public Awareness.

Natural Resources : Renewable and non-renewable resources - Natural resources and associated problems - Forest resources - Use and over - exploitation, deforestation,– Timber extraction - Mining, dams and other effects on forest and tribal people - Water resources - Use and over utilization of surface and ground water -dams – benefits and problems - Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modem agriculture, fertilizer-pesticide problems, water logging, salinity.

UNIT - II: ECOSYSTEMS, BIODIVERSITY AND ITS CONSERVATION 7hrs

Ecosystems: Concept of an ecosystem. - Structure and function of an ecosystem - Producers, consumers and decomposers - Energy flow in the ecosystem - Ecological succession - Food chains, food webs and ecological pyramids - Introduction, types, characteristic features, structure and function of the ecosystems.

Biodiversity and its Conservation : Definition: genetic, species and ecosystem diversity – Bio geographical classification of India - Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values - Biodiversity at global, National and local levels - India as a mega-diversity nation - Hot-sports of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts - Endangered and endemic species of India - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT - III Environmental Pollution and solid waste Management 6hrs

Environmental pollution: Definition, Cause, effects and control measures of: Air Pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, nuclear hazards.

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes -Role of an individual in prevention of pollution, Disaster management: floods, earthquake, cyclone and landslides.

UNIT - IV: SOCIAL ISSUES AND THE ENVIRONMBNT 6hrs

Social Issues and the Environment: From Unsustainable to Sustainable development - Urban problems related to energy - Water conservation, rain water harvesting, Resettlement and rehabilitation of people; its problems and concerns. Environmental ethics: Issues and possible solutions - Climate change, global warming, acid rain and ozone layer depletion, Wasteland reclamation – Consumerism and waste products. - Environment Protection Act. - Air (Prevention and Control of Pollution) Act. -Water (prevention and control of Pollution) Act - Wildlife Protection Act - Forest Conservation Act.

UNIT - V: HUMAN POPULATION AND THE ENVIRONMENT 6hrs

Human population and the Environment: Population growth, variation among nations' Population explosion - Family Welfare programme. - Environment and human health - Human Rights - Value Education - HIV/AIDS - Women and Child Welfare - Role of information Technology in Environment and human health.

Field Work: Visit to a local area to document environmental assets River/forest

Grassland/hill/mountain - Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, and birds - river, hill slopes.

Course Outcomes:

The students should be able to:

(i) Gain a higher level of personal involvement and interest in understanding and solving environmental problems.

(ii) Comprehend environmental problems from multiple perspectives with emphasis on human modern lifestyles and developmental activities.

(iii) Demonstrate knowledge relating to the biological systems involved in the major global Environmental problems of the 2lst century.

(iv) Influence their society in proper utilization of goods and services, Recognize the interconnectedness of human dependence on the earth's ecosystems.

(iv) Learn the management of environmental hazards and to mitigate disasters and have a clear understanding of environmental concerns and follow sustainable development practices.

Text Books:

(i)Text book of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, Universities Press.

(ii)Environmental Studies by Palaniswamy - Pearson education.

(iii)Environmental Studies by Dr.S.Azeem Unnisa, Academic Publishing Company.

Reference Books:

(i)Textbook of Environmental Science by Deeksha Dave and E.Sai Baba Reddy, Cengage Publications.

(ii)Text book of Environmental Sciences and Technology by M.Anji Reddy, BS Publication.

(iii)Comprehensive Environmental studies by J.P.Sharma, Laxmi publications.

(iv) Environmental sciences and engineering - J. Glynn Henry and Gary W. Heinke – Prentice hall India Private limited.

(v) A Text Book of Environmental Studies by G.R.Chatwal, Himalaya Publishing House.

(vi) Introduction to Environmental engineering and science by Gilberl M. Masters and Wendell P.Ela - Prentice hall of India Private limited.