COURSE STRUCTURE AND SYLLABI

(I, II SEMESTERS)

(Choice Based Credit System)

B.TECH.
ELECTRONICS AND COMMUNICATIONS ENGINEERING

2015 – 2016

GAYATRI VIDYA PARISHAD
COLLEGE OF ENGINEERING
(AUTONOMOUS)

Accredited by NAAC with A Grade with a CGPA of 3.47/4.00

Affiliated to JNTUK-Kakinada

MADHURAWADA, VISAKHAPATNAM – 530 048

Vision and Mission of the Institution

Vision

To evolve into and sustain as a Centre of Excellence in Technological Education and Research with a holistic approach.

Mission

To produce high quality engineering graduates with the requisite theoretical and practical knowledge and social awareness to be able to contribute effectively to the progress of the society through their chosen field of endeavor.

To undertake Research & Development, and extension activities in the fields of Science and Engineering in areas of relevance for immediate application as well as for strengthening or establishing fundamental knowledge.

Vision and Mission of the department

Vision

The vision of Electronics and Communication Engineering Department is to be in the lead to create and develop professional and intellectual human capital in electronics and communication engineering and applications in order to foster the technological, economic and social enrichment of the state and the nation and to contribute to global village connectivity

Mission

To play professional role to create, develop, organize and manage complex technologies and products, contribute to the betterment of society and evolve better quality of living in a world increasingly influenced by scientific and technological innovation.

To provide students of E & C Engineering an environment of academic freedom that will ensure the exchange of ideas and the dissemination of knowledge in this discipline.

To Recognize as a place that encourages research excellence and diversity in thought and endeavor in multidisciplinary applications.

COURSE STRUCTURE I&II SEMESTERS

ELECTRONICS AND COMMUNICATIONS ENGINEERING

COURSE STRUCTURE FOR B.TECH., I, II SEMESTERS

I SEMESTER					
Course code	**Course**	**L**	**T**	**P**	**C**
15BM1101	Mathematics-I	3	1	0	4
15BP1101	Physics	3	0	0	3
15CT1102	Computer Programming through C	3	0	0	3
15ME1101	Engineering Mechanics	3	1	0	4
15EE1101	Network Analysis-I	3	0	0	3
15BP1102	Physics Lab	0	0	3	2
15CT1103	Computer Programming Lab	0	0	3	2
15ME1102	Engineering drawing	1	0	3	3
15MT1101	Engineering workshop	0	0	3	2
	Total	**16**	**2**	**12**	**26**

II SEMESTER					
Course code	**Course**	**L**	**T**	**P**	**C**
15HE1101	English	3	0	0	3
15BM1102	Mathematics-II	3	1	0	4
15BC1101	Chemistry	3	0	0	3
15EC1101	Electronic Devices and Circuits	3	1	0	4
	Engineering Science Elective-I	3	0	0	3
15HE1102	English Language Lab	0	0	3	2
15BC1103	Chemistry Lab	0	0	3	2
15EC1102	Electronic Devices and Circuits Lab	0	0	3	2
	Total	**15**	**2**	**9**	**23**

Engineering Science Elective-I:

Basic Electrical Engineering(15EE1142)
Electrical Technology(15EE1144)
Elements of EE &ME(15EM1101)

SYLLABI FOR I-SEMESTER

MATHEMATICS - I

(Common to all Branches)

Course Code: 15BM1101

L	T	P	C
3	1	0	4

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

CO1: Develop the ability to solve linear differential equations of higher order and use the knowledge gain to certain engineering problems

CO2: Appraise the Laplace transform technique and use it to solve various engineering problems.

CO3: Apply the techniques of multivariable differential calculus to determine extrema and series expansions etc. of functions of several variables.

CO4: Extend the concept of integration to two and three dimensions and support it through applications in engineering mechanics.

CO5: Generalize calculus to vector functions and interpret vector integral theorems.

Unit-I (10 Lectures)

Ordinary Differential Equations: Linear differential equations of higher order with constant coefficients, Method of Variation of parameters, Linear differential equations with variable coefficients (Cauchy's homogeneous linear equation only).

Applications of Linear differential equations: Orthogonal trajectories, Models on R-L-C circuits, Newton's law of cooling.

(13.1-13.7, 13.8(1), 13.9(1), 12.3, 12.5, 12.6)

Unit-II (10 Lectures)

Laplace transforms: Laplace transform of elementary functions, properties, Transforms of periodic functions, Transforms of derivatives and integrals, Multiplication by t^n, division by t, evolution of integrals by Laplace transforms.

Inverse transform: Introduction, Finding inverse transforms by the method of partial fractions, other methods of finding Inverse Transform, Convolution theorem, Unit step function, and Unit impulse function.
Application of Laplace transforms: Initial and Boundary Value Problems.
(21.1-21.5, 21.7-21.15, 21.17, 21.18)

Unit-III (10 Lectures)
Partial Differentiation: Total derivative, change of variables, Jacobians, Taylor's theorem for functions of two variables.
Applications of Partial Differentiation: Maxima and Minima of functions of two variables, Lagrange method of undetermined multipliers.
(5.5 –5.7, 5.9, 5.11, 5.12)

Unit -IV (10 Lectures)
Multiple Integrals: Introduction to Non-Cartesian Coordinates, Double integrals, Change of order of integration, Double integral in polar co-ordinates, Triple integrals, Change of variables in double integrals, Change of variables in triple integrals. Simple Applications of Multiple Integrals**:** Area enclosed by plane curves.
(7.1- 7.5, 7.7)

Unit -V (10 Lectures)
Vector Differentiation: Differentiation of vectors, scalar and Vector point functions. Gradient of a scalar field and directional derivatives - Divergence and curl of a Vector field and its physical interpretation.
Vector Integration: Line integral, Circulation, work done, surface and volume integrals, Vector integral theorems: Green's, Stoke's and Gauss Divergence theorems (without proofs) and related problems.
(8.1, 8.4- 8.7, 8.10-8.17)

TEXT BOOK:
1. Dr.B.S.Grewal *"Higher Engineering Mathematics"*, 42nd Edition, Khanna Publishers, 2012.

REFERENCE BOOKS:

1. Kreyszig E, "*Advanced Engineering Mathematics*", 8th Edition, John Wiley, Singapore, 2001.
2. Greenberg M D, "*Advanced Engineering Mathematics*", 2nd Edition, Pearson Education, Singapore, Indian Print, 2003.
3. Peter V. O'Neil, "*Advanced Engineering Mathematics*", 7th Edition, Cengage Learning, 2011.

PHYSICS

Course Code: 15BP1101

L	T	P	C
3	0	0	3

Course Outcomes:

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

CO1: Interpolate the knowledge of elastic and acoustic response of materials for various applications.

CO2: Summarize the basic theories of electrostatics and electromagnetics to solve a variety of problems.

CO3: Convert the knowledge of basic principles of dielectrics magnetism to design electrical and storage devices

CO4: Realize the principles of optics in designing optical devices

CO5: Resolve the discrepancies in classical estimates through quantum principles and classify the solids.

UNIT-I: (9 Lectures)

ELASTIC PROPERTIES OF MATERIALS & ARCHITECTURAL ACOUSTICS

Introduction – classification of stress, strain and Hooke's law – poisson's ratio and relationship between modulus of elasticity – bending of beams – bending moment – Y by cantilever – uniform bending – reverberation and reverberation time – Sabine's law (quantitative treatment) – determination of absorption coefficient by reverberation time method *Factors affecting the acoustics of buildings and their remedies, Method of testing mechanical properties - hardness.*

(Sec: 1.2 to 1.5, 1.9, 1.10, 1.14, 1.15**;** 4.6, 4.61, 4.62, 4.7, 4.8.1, 4.10 of Text book 1).

UNIT –II: (11 Lectures)

ELECTROSTATICS AND ELECTROMAGNETICS

Gradient of a scalar field – divergence & curl of a vector field – *Coulombs law – Electric flux – Gauss law in electrostatics* – differential form of Gauss law, dipole – electric displacement vector, *Magnetic flux*

– *Biot-Savart Law* – Ampere's law, magnetic scalar potential – magnetic vector potential – auxiliary field H **(**Ampere's law in magnetized materials) – Displacement current density – Maxwell's equations in free space – *Significance of Maxwell's equations.*
(Sec: 1.2.2, 1.2.4, 1.2.5**;** 2.1.2, 2.2.1**;** 6.3.1 of Text book 2, 2.20**;** 3.6, 3.7, 3.12, 3.13, 3.14 of Text book 3).

UNIT – III: (9 Lectures)
DIELECTRIC AND MAGNETIC MATERIALS
Dielectric constant and dielectric polarization in materials – dielectric permittivity and susceptibility – types of polarizabilities – electronic polarizability derivation – internal fields (Lorentz fields) in solids, dielectric loss – dielectric strength and *dielectric breakdown*, ferroelectrics, magnetic permeability, and susceptibility, ferrites, *para magnetism – adiabatic demagnetization – dia magnetism, ferro magnetism and hysteresis* – storage devices and memories
(Sec: 20.8, 20.17, 20.18, 20.19, 20.20 of Text book 1, Sec: 33.2, 33.4, 33.6, 33.14, 33.14.1, 33.14.2, 33.18, 33.20, 33.21, 33.24; 34.2, 34.12 of Text book 3).

UNIT –IV: OPTICS & LASERS (11 Lectures)
Introduction to optics – interference phenomenon – interference through thin films in reflected light – Newton's rings – determination of wave length of a source – Michelson interferometer – diffraction due to single slit – intensity pattern discussion – diffraction grating (Qualitative), resolving power of grating – basic principle of a LASER – induced absorption, spontaneous and stimulated emissions – Einstein's coefficients – population inversion – *Ruby laser, He-Ne laser and Semiconductor laser – Laser Applications*.
(Sec: 6.1, 6.2, 6.7, 6.8.1, 6.8.2, 6.11, 6.11.1 to 6.11.7, 6.13, 6.14**;** 7.5, 7.9, 7.10**;** 24.2, 24.3, 24.5, 24.11.1, 24.11.3, 24.11.5, 24.13 of Text book 3).

UNIT – V: (10 Lectures)
WAVE MECHANICS & BAND THEORY OF SOLIDS
Introduction to wave mechanics – wave function characteristics and significance – Schrodinger's time dependent and independent wave

equation – particle in one dimensional rigid box – Bloch theorem (Qualitative), Kronig-Penny model (Qualitative treatment) – concept of effective mass – origin of energy band formation in solids – *Classification of materials in to conductors, semi-conductors and insulators based on band theory.*
(Sec: 20.1, 20.17, 20.18, 20.22**;** 29.3.1, 29.3.2, 29.4, 29.6, 29.7, 29.12 of Text book 3).

Note: Topics in italics are meant for self study

TEXT BOOKS:

1. V. Rajendran, *"Engineering Physics"*, TMH Publishing Company, 6th Reprint 2013.
2. J. Griffiths, *"Introduction to Electrodynamics"*, 3rd Edition, PHI (EEE series), 2009.
3. M.N. Avadhanulu & P.G. Kshirsagar *"A Text book of Engineering Physics"*, 10th Edition, S. Chand & Company Limited, 2013.

REFERENCES:

1. A.J. Dekker, *"Electrical Engineering Materials"*, 1st Edition, Macmillan Publishers, 2007.
2. C. Kittel, *"Introduction to Solid State Physics"*, John Wiley Publishers, 2007.
3. M.N. Sadiku, *"Elements of Electromagnetics"*, 4th Edition, Oxford University Press, 2007.
4. V. Raghavan, *"Materials Science"*, 5th Edition, PHI Publishers, 2007.
5. R.K. Gaur, S.L. Gupta, *"Engineering Physics"*, 8th Edition, Dhanapat Rai Publishers, 2003.
6. P.K. Palanisamy, *"Applied Physics"*, 2nd Edition, Scitech Publishers, 2010.
7. M. R. Srinivasan, *"Engineering Physics"*, New Age Publishers, 2012.
8. S. Ramamrutham, "Strength of Materials" Dhanapat Rai Publishers, 2014.

COMPUTER PROGRAMMING THROUGH C

(Common to all Branches)

Course Code: 15CT1102

L	T	P	C
3	0	0	3

Course Outcomes:

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

CO1: Design Algorithms and draw Flowcharts.

CO2: Develop Programs using functions.
CO3: Develop Programs for Arrays and String manipulations.
CO4: Use pointers in programs.
CO5: Discuss structures, unions, files.

UNIT-I (10 Lectures)

Algorithm/ Pseudo code, Flow chart, Basic structure of C Program, Input and Output statements (printf() & scanf()), A Simple C Program, Identifiers, data types and sizes, Constants, Variables, Operators, Type Conversion, Expression Evaluation, Precedence & Associatively of operators.

CONTROL STATEMENTS: If, switch, for, while and do- while statements, break, continue and go to statements. Sample programs covering all the above topics.

UNIT-II (10 Lectures)

FUNCTIONS: Definition, Advantages, types of functions- user defined and standard library functions, categories of functions, recursion, storage classes. Sample programs covering all the above topics.

UNIT-III (10 Lectures)

ARRAYS: Introduction to arrays, 1 D Arrays, 2 D Arrays: Definition, Declaration, Initialization, Accessing & storing the elements, C Preprocessors.

STRINGS: String- Declaration, Initialization, standard library string functions, Sample programs covering all the above topics.

UNIT-IV (10 Lectures)

POINTERS: Definition, Declaration of Pointer variables, the & and * operators, Pointer arithmetic, Passing addresses to functions, Functions returning pointers, Pointers &Arrays: Passing array elements to functions, pointer to pointer, array of pointers, pointers and strings, Dynamic memory allocation functions, Sample programs covering all the above topics

UNIT-V (10 Lectures)

STRUCTURES & UNIONS: Structures: Definition, Initialization, Accessing structures, nested structures, array of structures, additional features of structures, self-referential structures, unions.

FILES: Concept of a file, Text and Binary files, file I/O operations, Command line arguments. (Let Us C, Yashavant Kanetkar)Sample programs covering all the above topics.

TEXT BOOKS:

1. B.A Forouzan and R.F. Gilberg, *"Computer science, A structured programming approach using C"*, 3rd Edition, Cengage Learning.
2. Yashavant Kanetkar, *"Let Us C"*, 12th Edition, BPB Publications, 2012.
3. Yashavant Kanetkar, *"Understanding pointers in C"*, 4th Edition, BPB Publications, 2009.

REFERENCES:

1. N. B. Venkateswarlu, E.V. Prasad, *"C & Data Structures"*, 1st Edition, S.Chand Publications, 2010.
2. K.R.Venugopal, S.R.Prasad, *"Mastering C"*, 1st Edition, TMH, 2007.

ENGINEERING MECHANICS

(Common to all Branches)

Course Code: 15ME1101

L	T	P	C
3	1	0	4

Course Outcomes:

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

CO1: Convert a given physical problem (by drawing the Free Body Diagrams) into a suitable force system and find i)the resultant force(if any) or, ii) the unknown reactions.

CO2: Solve problems involving static and kinetic friction.

CO3: Locate the centroid of a given plane area and find its area and area moment of inertia.

CO4: Compute the mass moment of inertia of a body, calculate the displacement, velocity and acceleration of a particle subjected to rectilinear or curvilinear translation.

CO5: Compute the motion of and torques on a body subjected to fixed axis rotation; apply work-energy principle to particles and connected systems.

UNIT-I (13 Lectures)

RESULTANT OF FORCE SYSTEMS: Parallelogram law, forces and components, resultant of coplanar concurrent forces, components of forces in space, moment of force, principle of moments, coplanar applications, couples, resultant of any force system (coplanar concurrent cases only).

Equilibrium of force systems: Free body diagram, equations of equilibrium, equilibrium of planar systems.

Analysis of structures- method of joints, method of sections

UNIT-II (7 Lectures)

FRICTION: Theory of friction, angle of friction, laws of friction, static friction, kinetic friction, friction in bodies moving up or down on an inclined plane, wedge friction.

UNIT-III (10 Lectures)

CENTROID AND CENTER OF GRAVITY: Center of gravity of flat plate, centroids of areas and lines, importance of centroids of areas and lines, importance of centroids and moments of area, centroids determined by integration, centroids of composite figures, theorems of Pappus, center of gravity of bodies.

MOMENT OF INERTIA: Definition of moment of inertia, polar moment of inertia, radius of gyration, parallel axis theorem, moments of inertia by integration, moments of inertia for composite areas.

UNIT-IV (10 Lectures)

MASS MOMENT OF INERTIA: Introduction, radius of gyration, parallel axis theorem, mass moments of inertia by integration, moments of inertia of composite bodies.

KINEMATICS AND KINETICS OF A PARTICLE: Motion of a particle, rectilinear motion, rectangular components of curvilinear motion, normal and tangential components of acceleration, radial and transverse components, cylindrical coordinates, translation-analysis as a particle, further discussion of particle kinematics.

UNIT-V (10 Lectures)

KINEMATICS AND KINETICS OF A BODY UNDERGOING FIXED AXIS ROTATION: Types of rigid-body motion, angular motion-fixed axis rotation, application of kinematic equations, kinetics of fixed axis rotation.

WORK-ENERGY METHOD: Work-energy equation for translation, interpretation and computation of work, work-energy applied to particle motion, power, efficiency, applied to fixed-axis rotation, work-energy applied to connected systems, work-energy method

TEXT BOOK:

1. Vijaya Kumar Reddy K and Suresh Kumar J(Adapters), "*Singer`s Engineering Mechanics : Statics and Dynamics*", 3rd Edition (SI Units), BS Publications, Hyderabad, 2011.

REFERENCES :

1. Timoshenko SP and Young DH, Rao and Pytel, "*Engineering Mechanics*", 4th Edition, McGraw Hill International Edition, 2013.
2. Hibbeler RC, "*Engineering Mechanics: Statics*", Low-priced Edition, Pearson Education,2000.
3. Hibbeler RC, "*Engineering Mechanics: Dynamics*", Low-priced Edition, Pearson Education,2000.
4. Tayal AK, "*Engineering Mechanics: Statics and Dynamics*", 13th Edition, Umesh Publications, Delhi, 2005.

NETWORK ANALYSIS - I

Course Code: 15EE1101

L	T	P	C
3	0	0	3

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

CO1: Distinguish between various laws and apply to solve a network.
CO2: Distinguish between various Theorems and apply to solve a network
CO3: Analyze sinusoidal steady state response, power and energy relations with notions of Active and Reactive powers with phasor concepts.
CO4: Make a frequency response analysis (resonance).
CO5: Distinguish between various laws and Theorems and apply to solve an A.C. network.

UNIT-I (10 Lectures)

PRELIMINARIES AND RESISTIVE CIRCUIT ANALYSIS

Network elements, Ohm's law and Kirchhoff's laws, volt-ampere, power and energy relations in R, L and C. Dependent sources, analysis of networks without and with dependent source; Mesh and Nodal analysis, concepts of super mesh and super node, source transformation, Star-Delta Transformation. [Relevant portion from: 1, 2, 3 & 6 Chapters of Text Book 1]

UNIT-II (8 Lectures)

NETWORK THEOREMS (DC CIRCUITS)

Linearity and Superposition, Superposition Theorem, Thevenin and Norton Theorems, Reciprocity Theorem, Maximum Power Transfer Theorem. [Relevant portion from: 4 Chapter of Text Book 1]

UNIT-III (12 Lectures)

SINUSOIDAL STEADY STATE ANALYSIS-1

Sinusoids, effective (rms) and Average values, Form Factor and Peak Factor, V-I-Phasor relations in R, L, and C, Inductive and Capacitive

reactances and susceptances, R-L, R-C and RLC series circuits, Impedance, Admittance, Impedance Angle, Admittance Angle, Average Power and Power factor, series, parallel and series-parallel circuits, Complex Power, Real and Reactive Powers, Power Factor Correction. [Relevant portion from: 9 Chapter of Text Book 1]

UNIT-IV (8 Lectures)

SINUSOIDAL STEADY STATE ANALYSIS – 2

Resonance in RLC Series circuit, Frequency domain, Half Power Frequencies, Band Width & Quality Factor, Parallel Resonance (with constant current & Variable frequency excitation). [Relevant portion from: 14 Chapter of Text Book 1]

UNIT-V (12 Lectures)

GENERAL NETWORK ANALYSIS WITH A. C.

Applicability of Principles of D.C Resistive Network Analysis to A. C Networks. A. C version of Ohm's law, KCL & KVL. Mesh and Nodal Analysis, Network Theorems, Coupled circuits. [Relevant portion from: 10 & 11 Chapter of Text Book 1]

TEXT BOOK:

1. Charles K. Alexander and Mathew N.O.Sadiku, *"Fundamentals of Electric Circuits",* 5th Edition, McGraw Hill Publications, 2012.

REFERENCES

1. M.E.VanValkenberg, *"Network Analysis",* Prentice Hall of India, New Delhi.
2. William H.Hayt, Jr., Jack E.Kemmerly and Steven M.Durbin, *"Engineering Circuit Analysis"*, 7th Edition, McGraw Hill Publications, 2007.

PHYSICS LAB

(Common to all Branches)

Course Code: 15BP1102

L	T	P	C
0	0	3	2

Course Outcomes:

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

CO1: Demonstrate the elastic response of loaded beams; estimate the frequency of a vibrating system using standing wave pattern.

CO2: Familiarize with CRO; assess the resonant frequency and quality factor of electrical oscillations.

CO3: Estimate the strength of the magnetic field due to a current carrying coil.

CO4: Interpolate some of the physical parameters based on optical phenomena.

CO5: Realize explicit knowledge on the working and performance of photocells.

Any TEN of the following 13 experiments shall be completed

ERROR ANALYSIS AND GRAPH DRAWING (LECTURE - DEMO)

1. Bending of beams – Elliptical and Hyperbolic fringes - Determination of 'Y'.
2. Melde's experiment – determination of frequency of electrically maintained tuning fork.
3. Determination of wavelength of laser light using diffraction through a graded scale.
4. Particle size determination using He-Ne laser (Lycopodium powder).
5. ion grating – determination of wavelengths of spectral lines of Mercury spectrum by normal incidence method.
6. Polarization of light – verification of Malu's law and to determine the Brewster's Angle for glass.

7. Determination of Planck's constant.
8. Solar cell characteristics – I-V characteristics, measurement of efficiency and Fill factor.
9. Stewart – Gee apparatus – study of variation of magnetic field along the axis of circular current carrying loop.
10. LCR series and parallel resonance circuit to study the frequency response.
11. Familiarity of CRO – Lissajjou's figures - determination of time period, voltage, frequency and phase of a wave.
12. Newton's Rings- determination of wavelength of the source/ radius of curvature of given convex lens.
13. Optical fibres- determination of Numerical aperture, acceptance angle and bending losses.

Experiments offered beyond the curriculum:

1. Torsional pendulum - comparison of rigidity modulii of various wires.
2. Spectrometer – determination of dispersive power of the material of a prism.

COMPUTER PROGRAMMING LAB

(Common to all Branches)

Course Code: 15CT1103

L	T	P	C
0	0	3	2

Course Outcomes:

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

CO1: Use RAPTOR tool in program development.
CO2: Program mathematical operations using control statements.
CO3: Develop Programs for Arrays and String manipulations.
CO4: Implement Programs using functions, pointers, structures, and unions.
CO5: Implement Programs for File I/O operations

LIST OF PROGRAMS:

1 Demonstration of RAPTOR Tool to generate flowcharts by considering simple algorithms. Generation of flow charts to solve problems such as Temperature Conversion, Swapping of two numbers etc. using RAPTOR Tool.

2 Write C Programs to solve problems such as Student Grading, Income Tax Calculation, and Largest of three Numbers etc., which expose students to various categories of IF Statements. Generate flowcharts using RAPTOR Tool.

3.a) Write a C program to find the roots of a quadratic equation.

b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement.

4.a) The total distance travelled by vehicle in‘t’ seconds is given by distance = $ut+1/2at^2$ where ‘u’ and ‘a’ are the initial velocity (m/sec.) and acceleration (m/sec^2). Write a C program to find the distance travelled at regular intervals of time given the values of ‘u’ and ‘a’. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of ‘u’ and ‘a’.

b) Write a C program to determine whether a given number is an Armstrong or not. (If the sum of the cubes of digits in the number is equal to the original number, then the number is called Armstrong number. Eg: 371 is Armstrong number (33+73+13= 371))

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

b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.

6.a) Write a C program to calculate the following: Sum=1-x2/2! +x4/4!-x6/6! +x8/8! – x10/10!

b) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

7.a) Write a C program to generate Pascal's Triangle.

b) Write a C program to construct a Pyramid of Numbers.

8 Write C programs that use both recursive and non-recursive functions for the following

a) To find the factorial of a given integer.

b) To find the GCD (greatest common divisor) of two given integers.

9.a) Write a C function to read in two numbers, x and n, and then compute the sum of this geometric progression: 1+x1+x2+x3+…+ xn also perform error checking by considering negative values for n and also check for illegal values of x.

b) Write a C function to read in two numbers, x and n (no. of terms), and then compute sin(x) and cos(x).

10.a) Write a C program to find the largest and smallest number in a list of integers.

b) Write a C program to perform Matrix Addition & Matrix Multiplication.

c) Write a C program to compute Transpose of a Matrix.

11.a) Write a C program to exchange value of two integers using call by value and call by reference.
b) Write C programs to demonstrate the use of Pointers.
12 Write user defined string handling functions to implement the following standard library functions: strlen(), strcpy(), strcat(), strrev(), strcmp().
13.a) Write a C program that displays the position/ index in the string S where the string T begins, or-1 if S doesn't contain T.
b) Write a C program to determine whether a given string is Palindrome or not.
14. Write a C program that uses functions to perform the following operations:
a) To insert a sub-string in to given main string from a given position.
b) To delete n Characters from a given position in a given string.
c) To replace a character of string either from beginning or ending or at a specified location.
15.a) Write a C program to find the two's complement of a binary number.
b) Write a C program to convert a Roman numeral to its decimal equivalent.
16. Write a C program that uses functions to perform the following operations using Structures:
a) Reading a complex number.
b) Writing a complex number.
c) Addition of two complex numbers.
d) Multiplication of two complex numbers.
17.a) Write a C program which copies one file to another.
b) Write a C program to count the number of characters, lines, words, tabs and spaces in a given file.

ENGINEERING DRAWING

(Common to all Branches)

Course Code: 15ME1102

L	T	P	C
1	0	3	3

Course Outcomes:

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

CO1: Draw geometrical constructions, conics, and cycloidal curves
CO2: Draw projections of points and lines
CO3: Draw projections of planes
CO4: Draw projection of solids
CO5: Draw isometric views

LIST OF EXERCISES

1. Introduction to engineering drawing & basics of geometrical construction
2. Construction of parabola, ellipse, hyperbola- general method
3. Cycloid, epicycloids, hypocycloid, involutes of circle and square
4. Projections of points
5. Projections of lines inclined to one plane
6. Projections of lines inclined to both the planes
7. Projections of planes inclined to one plane
8. Projections of planes inclined to both the planes
9. Projections of solids in simple positions
10. Projections of solids inclined to both the planes
11. Isometric views

TEXT BOOK:

1. N.D. Bhatt and V.M. Panchal, *"Engineering Drawing"*, 49th Edition, Charotar Publication House, 2008.

ENGINEERING WORKSHOP

(Common to all Branches)

Course Code: 15MT1101

L	T	P	C
0	0	3	2

Course Outcomes:

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

CO1: Prepare the wooden pieces into various joints. Prepare different forms of fit on metal pieces and identify different types of patterns used for mould preparations providing necessary allowances.

CO2: Identify different tin-smithy tools for the preparation of models by sheet form various metals and discuss the types of switching operations used in house wiring application.

CO3: Identify the peripherals of a computer, components in CPU and its functionalities.

CO4: Install windows operating systems, learn MS-DOS commands, and work with MS-Office tools

CO5: Set TCP/IP and LAN Connectivity and work with various search engine techniques

LIST OF EXPERIMENTS

Any six experiments from each module

Module – 1

1. Carpentry: Making a Cross-half lap joint using wooden pieces.
2. Fitting: Preparation of a V-fit between flat mild steel pieces.
3. Foundry: Preparation of a sand mould using a single piece pattern.
4. Tin-Smithy: Preparation of a sheet metal funnel using tin-smithy tools.
5. House Wiring: One lamp controlled by a one-way switch.
6. House Wiring: Two-way switching for stair-case lamp.

Experiments to be demonstrated

1. **Lathe Machine:** Demonstration of turning related activities on Lathe machine.
2. **Drilling Machine:** Demonstration of drilling related activities on Drilling machine.

Module – 2

Exercise - 1

1. **Identify the peripherals of a computer -** Identification of the components in a CPU and its functions - Block diagram of the CPU along with the connectivity of the main components.
2. **Assembling and disassembling the system -** configuration of each peripheral. Disassembly and assembly of a personal computer.

Exercise-2

1. **Install windows XP operating system -** Installation of MS windows XP on the personal computer.
2. **MSDOS commands: -** Basic operations that can be performed through MS DOS commands.

Exercise-3

MS OFFICE TOOLS:

Microsoft Word:-

1. **Creation of project certificate:** Exposure to features like Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and / Word.
2. **Creating project abstract:** Features to be covered are Formatting Styles, Inserting table, Bullets and Numbering. Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.
3. **Creating a Newsletter:** Features to be covered are Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs.

4. **Creating a Feedback form** - Features to be covered are Forms, Text Fields, Inserting objects, Mail Merge in Word.

Exercise-4

Microsoft PowerPoint:-

1. Exposure to basic power point utilities and tools (PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering.
2. Auto Shapes, Lines and Arrows in both LaTeX and Power point, Hyperlinks, inserting Images, Clip Art, Audio, Video, Objects, Tables, Charts) to create basic power point presentation.

Exercise-5

Microsoft Excel:-

1. **Introduction of Excel** as a Spreadsheet tool, Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.
2. **Creating a Scheduler -** Features to be covered are Gridlines, Format Cells, Summation, auto fill, Formatting Text.
3. **Calculating GPA -** Features to be covered are Cell Referencing, Formulae in excel – average, standard deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP.

Exercise-6

1. **Search engines and netiquette** - Basic points of search engines, Search engines working procedure (Web crawling, Indexing, and Searching).
2. **Connectivity -** Connectivity to the Local Area Network and accessibility to the Internet. TCP / IP setting

Experiments to be demonstrated

1. **Install Linux operating system:** Installation of LINUX on the personal computer.

2. **Hardware & Software troubleshooting:**

- Identification of the problem of a PC which does not boot (due to improper assembly or defective peripherals) and fixing it to get the computer back to working condition.
- Identification of the problem of a malfunctioning (due to some system software problems) and fixing it to get the computer back to working condition.

TEXT BOOK:

1. P. Kannaiah and K.L. Narayana, "*Workshop Manual"*, 11th reprint, Scitech publications, October 2010.
2. Vikas Gupta, *"Comdex Information Technology Course tool kit",* 1st Edition, WILEY Dreamtech, 2010.

REFERENCES:

1. Cherly A Schmidt, *"Complete computer upgrade and Rep-air book"*, 3rd edition, Wiley Dreamtech, 2012.
2. ITL Education Solutions limited, *"Introduction to Information Technology"*, 2nd Edition Pearson Education, 2011.
3. Kate J. Chase , *" PC Hardware and A + Handbook"* , 1st Edition, PHI(Microsoft), 2012.
4. Leslie Lamport , " Latex Companion", 1st Edition , PHI/Pearson, 2011.
5. Alexis Leon and Mathews Leon , *"Introduction to Computers with MS-Office 2000",* 1st Edition, Leon Tech world, 2011.

SYLLABI FOR II-SEMESTER

ENGLISH

(Common to all Branches)

Course Code: 15HE1101

L	T	P	C
3	0	0	3

Course Outcomes: The Students will be able to

CO1: Read and answer questions (orally and in writing) based on passages.
CO2: Identify and use selective vocabulary to enrich their writing.
CO3: Discuss and evaluate textual and authentic materials
CO4: Analyse facts, ideas and compose them as instructed.
CO5: Write notes, summaries, and essays in descriptive and narrative modes.

UNIT-I **(10 Lectures)**

1. Story of Insects
2. Bringing up Boys & Girls
3. Polonius' Advice to His son
4. Vocabulary Building: Prefixes, Suffixes, One-Word Substitutes etc.

UNIT-II **(10 Lectures)**

1. Unity of Minds
2. On His Blindness
3. Cultural Variation & Change
4. Grammar: Tenses & Concord

UNIT-III **(10 Lectures)**

1. Three Years She Grew in Sun and Shower
2. Advertising in the Media (Academic Encounters)
3. Grammar: Articles & Prepositions
4. Paragraph Writing; Technical Description-Process, Object

UNIT-IV (10 Lectures)

1. A Special Kind of Blessing
2. Techniques of Solving Crimes
3. La Belle Dame Sans Merci
4. Précis writing &Letter Writing

UNIT-V (10 Lectures)

1. I Have A Dream
2. An Introduction by Kamala Das
3. Writing: Note Taking & Note Making, Essay writing
4. Grammar: Simple, Compound & Complex Sentences

TEXTBOOKS:

1. Kristine Brown & Susan Hood, *"Academic Encounters: Life in Society Reading, Study Skills, Writing, London"*,Cambridge University Press/ Foundation Books, 2006.
2. K Durga Bhavani, G. K. Subbarayuydu, C. Vijayasree, D. Prema Kumari& Y. L. Srinivas, *"English Today: A Course in Reading and Writing"*, Foundation Books, 2005.
3. David Murdoch, The Siren's Song, "*An Anthology of British and American Verse"*, Madras, Orient Longman, 1993.

REFERENCES:

1. Alec Fisher, *"Critical Thinking An Introduction"*, 4th South Asian Edition, New Delhi: CUP, 2011.
2. Bikram K. Das, Kalyani Samantray, RathNayak, SusmitaPani & Saveeta Mohanty, "*An Introduction to Professional English and Soft Skills"*, New Delhi, Foundation Books,2009.
3. *"Regional Institute of English, English for Engineers"*, New Delhi, Foundation Books, 2006.
4. Sharon J.Gerson, Steven M.Gerson, *"Technical Writing"*, New Delhi, Pearson education, 2007.

SUGGESTED READING:

Stories of humor, adventure, mystery and autobiographies of eminent scientists.

MATHEMATICS - II

(Common to all Branches)

Course Code: 15BM1102

L	T	P	C
3	1	0	4

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

CO1: Solve the linear system of equations analytically and compute Eigen values and eigenvectors of a square matrix.

CO2: Numerically solve linear system of equations and compute eigen values and eigenvectors of a square matrix.

CO3: Discuss and demonstrate difference equations to discrete systems.

CO4: Calculate Fourier series and Fourier transforms for certain functions.

CO5: Classify and solve partial differential equations and apply it to heat flow and wave propagation problem

Unit-I (10 Lectures)

Matrices: Rank, Normal form, Echelon form, Consistency and Solution of system of simultaneous linear homogeneous and non-homogeneous equations. Finding Eigen values and eigen vectors, properties, Cayley-Hamilton theorem, computing inverse and powers of a matrix by applying Cayley-Hamilton theorem, Diagonalisation of matrix.
(2.7, 2.10, 2.13 -2.16)

Unit-II (10 Lectures)

Numerical Methods in Linear algebra: Solution of linear simultaneous equations: LU decomposition, Jacobi iteration and Gauss-Seidel methods. Determination of Eigenvalues and eigen vectors by iteration (Rayleigh's Power Method) . (28.5, 28.6(3), 28.7(1)(2), 28.9)

Unit-III (10 Lectures)

Difference equations and Applications: Introduction of Difference operators (forward, backward and shift operators), Introduction to

difference equation, formation of difference equation, Linear difference equations and it's complete solution. Rules for finding the complementary function and complete integral, deflection of a loaded string. (29.1, 29.4, 31.1 - 31.6, 31.8)

Unit-IV (10 Lectures)

Fourier series: Euler's formulae, Dirichlet's Conditions for a Fourier expansion, functions having points of discontinuities, Change of interval, even and odd functions, half range series, wave forms.

Fourier transforms Fourier integral theorem, Fourier transform and inverse Fourier transform, Fourier sine and cosine integrals. – Fourier sine and cosine transforms – properties.(10.1 – 10.8, 22.1 – 22.5)

UNIT-V (10 Lectures)

Partial Differential Equations: Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – solutions of first order linear (Lagrange) equation and nonlinear first order (standard type) equations. Method of separation of variables

Applications of Partial Differential Equations: Classification of second order linear Partial Differential Equations. Solutions of wave equation, one dimensional heat equation, and two-dimensional Laplace's equation under initial and boundary conditions.

(17.1 – 17.3, 17.5, 17.6, 18.1-18.7)

TEXT BOOK:

1. Dr.B.S.Grewal *"Higher Engineering Mathematics"*, 42nd Edition, Khanna Publishers, 2012.

REFERENCE BOOKS:

1. Kreyszig E, *"Advanced Engineering Mathematics"*, 8th Edition, John Wiley, Singapore, 2001.
2. Greenberg M D, *"Advanced Engineering Mathematics*", 2nd Edition, Pearson Education, Singapore, Indian Print, 2003.
3. Peter V. O'Neil, *"Advanced Engineering Mathematics",*7th Edition, Cengage Learning, 2011.

CHEMISTRY

(Common to all Branches)

Course Code: 15BC1101

L	T	P	C
3	0	0	3

Course Outcomes:

At the end of the course, students will be able to:

CO1: Recall the principles; explain the working and design of energy storage devises.

CO2: Extend the principles involved in corrosion to predict and prevent the corrosion in real life system.

CO3: Classify the polymers and can apply to specific purposes.

CO4: Analyze and determine the water quality and prescribe the remedial measures for domestic as well as industrial usage.

CO5: Recite, explain and classify the characteristics of various engineering materials and explain their functioning

UNIT-I: (10 Lectures)

Electrochemical cells

Electrode potential, Nernst equation, EMF of electrochemical cell, Reference electrodes-Standard hydrogen electrode, calomel electrode. Electrochemical series, Concentration cell, Construction of glass electrode, determination of p^H of given solution using glass electrode

Batteries-Primary cell-Dry or Leclanche cell, alkaline battery; secondary cells (storage batteries or accumulators) – Lead-acid Accumulator, Nickel-cadmium battery, Lithium ion battery (LIB) and redox flow battery.

Fuel cells - hydrogen - oxygen fuel cell, phosphoric acid fuel cell, solid oxide fuel cells

UNIT-II: (10 Lectures)

Corrosion and its control

Introduction - Direct chemical corrosion and electrochemical corrosion and its mechanisms, Types of electrochemical corrosion-Differential aeration corrosion, galvanic corrosion, concentration cell corrosion, pitting corrosion and stress corrosion, Galvanic series, passivity, factors influencing corrosion.

Corrosion control-proper designing, cathodic protection-sacrificial anodic protection and impressed current cathodic protection, modifying the environment and use of inhibitors.

Protective coatings- Anodic and cathodic coatings, Hot dipping-Galvanizing and Tinning, Metal cladding, Electroplating, Electroless plating, cementation or diffusion coatings

UNIT-III: (10 Lectures)

Polymer Technology

Polymerization, classification, degree of polymerization, functionality and tacticity of polymer, Types of polymerization addition and condensation polymerization, Mechanism of addition polymerization. Preparation, properties and uses of polythene, PVC, Teflon, nylons-6,6, Bakelite and Silicones.

Plastics- Thermo plastics and thermosetting plastics, compounding of plastics.

Elastomers-Natural and synthetic rubbers, Manufacture, properties and applications of natural rubber-vulcanization, compounding of rubber, Synthetic rubbers-Preparation, properties and applications of Buna-S and Buna-N.

UNIT-IV: (10 Lectures)

Water Technology

Introduction-characteristics imparted by impurities, hardness of water – Temporary and permanent hardness- units, Determination of hardness by EDTA method, Disadvantages of hard water, Boiler troubles - scale and sludge, caustic embrittlement, boiler corrosion, priming and foaming. Municipal water treatment, Desalination of brackish water, Water

softening methods - lime-soda method, zeolite method and ion exchange process.

UNIT-V: (10 Lectures)

Engineering materials

Fuels: classification, characteristics of fuel, calorific value-determination of calorific value by Bomb calorimeter, Analysis of coal - Proximate and ultimate analysis of coal, Petroleum: classification based on sources of petroleum, Refining of petroleum, Knocking, octane value, cetane value, Cracking-thermal cracking and catalytic cracking-fixed bed & moving bed catalytic cracking, reforming.

Cement: Classification of cement, chemical composition functions of ingredients in Portland cement Manufacture of Portland cement- raw materials, setting and hardening of Portland cement.

Lubricants-friction, lubrication, functions of lubrication, mechanism of lubrication-thick film, thin film and extreme pressure lubrication, types of lubricants- solid, semisolid and liquid lubricants- their properties .

TEXT BOOKS:

1. Jain& Jain, *"A text book of Engineering Chemistry",* 15th edition, Dhanapat Roy publishing company, 2010
2. Sasichawla, , *"Engineering chemistry",* 3rd edition, Dhanapat Roy publishing company, 2006

REFERENCE BOOKS:

1. S.S.Dara, *"Engineering Chemistry"*, 11th edition, S.Chand & Co, 2006
2. M.M.Uppal, *"Engineering Chemistry",* 6th edition, Khanna Publishers, 2001

ELECTRONIC DEVICES AND CIRCUITS

Course Code: 15EC1101

L	T	P	C
3	1	0	4

Course Outcomes:

Upon completion of the course, students will able to:

CO1: Identify different materials used for an electronic device & describe the characteristics of various diodes and Design power supplies using Rectifiers and Filters.

CO2: Analyze the characteristics of BJT, JFET, MOSFET, and UJT.

CO3: Illustrate various biasing Techniques for a transistor and perform DC Analysis.

CO4: Perform AC Analysis of a BJT using small signal model.

CO5: Identify the different feedback amplifiers and design various low and high frequency oscillators.

UNIT-I (12 Lectures)

DIODE CHARACTERISTICS:

Introduction to semiconductor materials, V-I Characteristics of Diode, Zener Diode Characteristics, Zener Diode as Voltage Regulator, Tunnel diode, LED.

RECTIFIERS AND FILTERS:

Half wave rectifier, Full wave rectifier, Advantages of full wave rectifier over Half Wave rectifier, C- Filter, Inductor filter, LC- Filter, Pi- filter.

UNIT-II (10 Lectures)

TRANSISTOR CHARACTERISTICS:

Bipolar junction transistors (BJT) - input & output Characteristics of transistor in CB, CE, CC configurations, Relations between current gain parameters (alpha, beta and gamma), Characteristics of JFET, MOSFET (enhancement and depletion), Characteristics of UJT and SCR.

UNIT-III (08 Lectures)

BIASING AND STABILITY:

Need for biasing, criteria for fixing the operating point, thermal run away, thermal stability, stabilization techniques.

UNIT-IV (08 Lectures)

SMALL SIGNAL AMPLIFIERS:

h-parameter representation of a Transistor, Analysis of single stage transistor amplifier using h-parameters, comparison of transistor configurations in terms of A_v , A_i , R_i ,R_o.

UNIT-V (12 Lectures)

FEEDBACK AMPLIFIERS:

Concept of feedback, classification of feedback amplifiers, general characteristics of negative feedback amplifiers, effect of negative feedback on input and output Resistances.

OSCILLATORS:

Condition for oscillations, RC Phase shift oscillator with Transistor, Wein bridge oscillator, Hartley and Colpitts oscillator.

TEXT BOOKS:

1. Millman Jacob Halkias C Christos, *"Electronic Devices and Circuits"*, 2nd Edition, Tata McGraw-Hill Publications, 2007.

REFERENCES:

1. Boylestad. Robert, *"Electronic Devices and Circuits Theory",* 10th Edition, PHI Publications, 2008.
2. B.Visweswara Rao, K.Bhaskarram Murthy, K.Raja Rajeswari, P.Chalam Raju Pantulu. *"Electronic Devices and Circuits"*, 2nd Edition, Pearson Publications, 2009.
3. Raju GSN *"Electronic Devices and Circuits"*, 1st Edition, IK International Publishing House, 2006.
4. Lal Kishore *"Electronic Devices & Circuits"*, 2nd Edition, BSP Publications, 2005.

BASIC ELECTRICAL ENGINEERING

(Engineering Science Elective-I)

Course Code: 15EE1142

L	T	P	C
3	0	0	3

Pre requisites: Physics

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

CO1: Analyze the properties of basic electrical elements and apply network theorems to electrical circuits.
CO2: Analyze magnetic field circuits and solves AC networks.
CO3: Explain the working of DC machines and transformers.
CO4: Explain the working of Alternators and induction motors.
CO5: Understand basic measuring instruments and electrical safety.

UNIT-I: (10 Lectures)

Introduction to Electrical DC Circuits and Theorems:

Introduction, Basic definitions, Circuits elements, Ohm's law, Nodes, Branches & Loops, Kirchoff's laws, series resistors and voltage division, parallel resistors and current division(simple problems). Star-Delta conversion, source transformation, superposition, Thevenin's, Norton's, Maximum Power transfer theorems (simple problems).

UNIT- II: (10 Lectures)

Magnetic Circuits and AC Circuits:

Magnetic field due to Electric current, force on current carrying conductor, comparison of electric and magnetic circuits, Electro Magnetic Induction- Faraday's laws, self and mutual inductance., Inductors in series, sinusoids, Phasors, Voltage current relationship in circuit elements, Impedance and Admittance, Average and RMS values, series ac circuits.

UNIT-III: (10 Lectures)

DC Machines and Transformers

DC Machines: Construction, emf equation, types of dc machine, Torque developed in a motor, motor characteristics, speed control, losses and efficiency (simple problems), (elementary treatment only).

Transformers: Working Principle, construction, ideal transformer, emf equation, phasor diagram on no-load, voltage regulation, efficiency (simple problems), Auto transformer (elementary treatment only).

UNIT-IV: (10 Lectures)

AC Machines

Alternators: Construction induced EMF, voltage regulation by Synchronous Impedance Method (simple problems).

Induction Motor: Construction, principle of operation, slip, rotor frequency, torque equation (simple problems) (Elementary treatment only).

UNIT-V: (10 Lectures)

Electrical Instruments and Electrical Safety

Classification of Instruments, Principles of operation, Essential requirements in indicating instruments, Permanent Magnet Moving Coil (PMMC) instruments, Moving Iron instruments (elementary treatment only). Fuses and circuit breakers, Earthling, Electric shock.

TEXT BOOKS:

1. Dr. K. Uma Rao, *"Basic Electrical Engineering",* 1st edition, Pearson, 2011.

REFERENCES:

1. Charles k Alexander, Mathew N.O. Sadiku, *"Fundamentals of Electric circuits"*, 4th edition McGraw-Hill Companies, 2009.
2. Hughes, I Mckenzie Smith, *"Electrical & Electronic Technology"*, 10th edition, Pearson, 2010.
3. D.P. Kothari & I.J. Nagrath, *"Theory and Problems of basic Electrical Engineering"*, 1st edition, PHI publications, 2010.

ELECTRICAL TECHNOLOGY

(Engineering Science Elective-I)

Course Code: 15EE1144

L	T	P	C
3	0	0	3

Pre requisites: Mathematics and Network Analysis-I.

Course Outcomes:

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

CO1: Describe the operation and constructional features of DC Machines and analyze its characteristics.

CO2: Describe the operation and constructional features of Transformer with phasor diagram.

CO3: Describe the operation and constructional features of Induction motor and stepper Motor.

CO4: Explain the operation of Synchronous Machines and Analyze the Synchronous Impedance method.

CO5: Explain the working principle and operation of various Measuring Instruments.

UNIT-I
DC MACHINES (10 Lectures)

Principle of operation of DC Machines- EMF equation – Types of generators – Magnetization and load characteristics of DC generators. DC Motors – Types of DC Motors – Characteristics of DC motors – 3-point starters for DC shunt motor – Losses and efficiency – Swinburne's test – Speed control of DC shunt motor – Flux and Armature voltage control methods.

UNIT-II (10 Lectures)
TRANSFORMERS

Principle of operation of single phase transformer – Types – Constructional features – Phasor diagram on No Load and Load – Equivalent circuit, Losses and Efficiency of transformer and

Regulation–OC and SC tests – Predetermination of efficiency and regulation (Simple Problems).

UNIT-III (10 Lectures)

INDUCTION MOTORS

3-Phase: Principle of operation of Three-phase Induction motors –Slip ring and Squirrel cage motors – Torque equation-Slip-Torque characteristics – Efficiency calculation – Starting methods. Single Phase: Principle of operation - Shaded pole motors – Capacitor motors, AC servomotor, AC tachometers, Synchros, Stepper Motors – Characteristics.

UNIT-IV (10 Lectures)

SYNCHRONOUS MACHINES

Constructional features – Principle of operation – Types - EMF Equation – Distribution and Coil span factors – Armature parameters-armature resistance-synchronous reactance-phasor diagram-unity power factor-lagging power factor –leading power factor-Predetermination of regulation by Synchronous Impedance Method – OC and SC tests-principle of operation of synchronous motors.

UNIT-V (10 Lectures)

ELECTRICAL INSTRUMENTS

Types of instruments (Indicating, integrating, Recording) - Basic Principles of indicating instruments – Moving Coil and Moving iron Instruments (Ammeters and Voltmeters) wattmeters and energy meters.

Text Books:

1. M.S Naidu and S. Kamakshaiah, *"Introduction to Electrical Engineering"*, 4th Edition, Tata McGraw Hill Publication, 2011.
2. Vincent Del Toro, *"Electrical Engineering Fundamentals",* 5th Edition, PHI Publishers 2009.

Reference Books:

1. V.K Mehta *"Principles of Electrical Engineering"* 5th Edition, Scand Publications, 2005.

2. I.J. Nagrath and D.P Kothari *"Theory and Problems of Basic Electrical Engineering"* 4th Edition, PHI Publications, 2009.

3. David V. Kerns, JR. J. David Irwin, *"Essentials of Electrical and Computer Engineering",* 3rd Edition TMH Education Pvt. Ltd, 2008.

ELEMENTS OF EE & ME

(Engineering Science Elective-I)

Course Code: 15EM1101

L	T	P	C
3	0	0	3

Prerequisites: Physics

Course Outcomes:

After completion of this subject, the students shall have knowledge about electrical circuits and equipments.

CO1: Solve different topologies of networks.

CO2: Analyze the performance characteristics of transformers on different loading conditions.

CO3: Describe and analyze the constructional features of Induction machine, Synchronous machine with their characteristics.

CO4: Identify various machine tools and welding operations.

CO5: Differentiate various I.C. Engines and power transmissions drives.

UNIT-I: (10 Lectures)

FUNDAMENTALS OF ELECTRICAL ENGINEERING

Basic circuit elements - Resistance, Inductance and capacitance - Ohm's law, Kirchhoff's laws - Faraday's law of Electromagnetic Induction. AC fundamentals- Average and effective value-Series RL and RC circuits - Active power, Reactive power, Apparent power, Power Factor - Simple problems.

UNIT-II: (10 Lectures)

TRANSFORMERS

Single phase and Three phase transformers – Operation and construction, EMF equation, losses and efficiency - Simple Problems.

UNIT-III: (10 Lectures)

AC MACHINES

Construction and Principle of operation of three phase and single phase induction motors - Torque slip characteristics - Applications. Principle of operation of Alternators - Types of Alternators

UNIT-IV: (10 Lectures)

MACHINE TOOLS

General purpose machine tools – lathe, drilling machine, shaping machine, planing machine, milling machine.

WELDING

Principles of welding, fundamentals of arc welding and arc cutting, gas welding and gas cutting.

UNIT-V: (10 Lectures)

I.C.ENGINES

Introduction, classification of I.C. engines, I.C. engine-parts and terminology, four stroke cycle engines –petrol and diesel, two stroke cycle engines – petrol and diesel, comparison between four stroke and two stroke cycle engines, comparison between petrol engine and diesel engine.

POWER TRANSMISSION:

Types of drives – belt drives – flat and V belts, Rope and Chain drives.

TEXT BOOKS:

2. V.K.Mehta and Rohit Mehta, *"Principles of Electrical Engineering",* S.Chand Publications, Jan-2008.
3. M.S Naidu and S.Kamakshaiah, *"Electrical Technology"*, TMH Publishers, 2006.
4. K.VenuGopal & V.PrabhuRaja, *"Basic Mechanical Engineering",* 10th Edition, Anuradha Agencies, 2011. (UNIT IV and UNIT V)
5. R.K. Rajput, *"Basic Mechanical Engineering",* 3rd Edition, University Science Press, 2012. (UNIT-IV)

REFERENCES:

1. I.J. Nagrath and D.P Kothari, *"Theory and Problems of Basic Electrical Engineering"*, PHI Publications.
2. David V. Kerns, JR. J. David Irwin, *"Essentials of Electrical and Computer Engineering"*
3. Vincent Del Toro, *"Electrical Engineering Fundamentals"*, 2nd Edition, PHI Publishers

ENGLISH LANGUAGE LAB
(Common to all Branches)

Course Code: 15HE1102

L	T	P	C
0	0	3	2

Course Outcomes:
The Students will be able to:
CO1: Distinguish and use spoken English and respond appropriately.
CO2: Use language in formal and informal contexts.
CO3: Demonstrate oral skills in debates and group discussions.
CO4: Show fluency in speech
CO5: Identify the sounds of English and use stress and intonation in connected speech

SYLLABUS:
The following course content is prescribed for the English Language Laboratory sessions:
1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Listening for Comprehension
4. Situational Dialogues.
5. Oral Presentations- Prepared & Extempore
6. 'Just A Minute' Sessions (JAM)
7. Telephonic communication
8. Group Discussions
9. Debate
10. Presentations- *Pecha Kucha*
11. Reference Skills

REFERENCES:
1. DrSangeeta Sharma &DrBinod Mishra, "*Communication Skills for Engineers and Scientists",* PHI Learning, New Delhi, 2009.

2. Daniel Jones, *"English Pronouncing Dictionary with CD"*,17th Edition, 2006.
3. T. Balasubramanian, *"A Text book of English Phonetics for Indian Students"*, 2nd Edition, Trinity Press/Lakshmi Publications, 2013..
4. Meenakshi Raman &Sangeeta Sharma, *"Technical Communication Principles & Practice"*, 2nd Edition, New Delhi: OUP, 2012.
5. E. Suresh Kumar, P. Sreehari, J. Savithri, *"English for Success",* New Delhi, Foundation Books, 2012.

CHEMISTRY LAB

(Common to all Branches)

Course Code: 15BC1103

L	T	P	C
0	0	3	2

Course Outcomes:

At the end of the course the student shall be able to

CO1: Demonstrate Principles involved in determination of metal ions by titrimetry

CO2: Analyse different water quality parameters

CO3: Explain the properties of liquid lubricants and fuels

CO4: Understand the principles of Potentiometry to determine the metal ion

CO5: Understand the principles of determination of ions by Spectrophotometry

Any **TWELVE** of the following experiments are to be performed during the semester.

Determination of

1. Ferrous iron.
2. Ferric iron.
3. Total hardness of water sample.
4. Carbonate and bicarbonate of water sample.
5. Dissolved oxygen.
6. Available chlorine in bleaching powder.
7. Zinc by potassium ferrocyanide.
8. Copper by EDTA method
9. Calcium by permanganate.
10. Iron-II by potentiometric method.
11. Viscosity of lubricant by viscometer.
12. Flash and fire points of lubricant.
13. Percentage residue of carbon in oils.
14. Calorific value of solid fuels.

15. Fluoride by spectrophotometric method.
16. Iron in cement by spectrophotometric method.

REFERENCE:

1. A.I.Vogel, " *A text book of quantitative chemical analysis*", 6th Edition, Pearson Education, Pvt. Ltd., 2002.

ELECTRONIC DEVICES AND CIRCUITS LAB

Course Code: 15EC1102

L	T	P	C
0	0	3	2

Course Outcomes:

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

CO1: Gain hands on experience in handling electronic components and devices.

CO2: Determine the static and dynamic resistances of various Semiconductor diodes.

CO3: Determine the characteristics of BJT and compute h- parameters.

CO4: Determine the characteristics FETs and compute amplification factor and verify theoretically.

CO5: Design DC power supply.

Note: Any ten of the following experiments are to be performed during the semester

LIST OF EXPERIMENTS

1. PN Junction Diode Characteristics - Cut-in voltage, static resistance, dynamic resistance calculations.
2. Zener Diode Characteristics & Voltage Regulator using Zener Diode - Breakdown voltage, % regulation calculation.
3. Rectifiers without Filters (Full wave & Half wave) - ripple factor, % regulation, load regulation calculation.
4. Rectifiers with Filters (Full wave & Half wave) - ripple factor, % regulation, load regulation calculation.
5. Bipolar Junction Transistor- CB Characteristics - current gain calculation, h- parameter calculation.
6. Bipolar Junction Transistor - CE Characteristics - current gain calculation, h- parameter calculation.
7. Transistor as a switch – Turn ON or OFF a load (LED) placed in Collector branch, identify the saturation region of the BJT characteristic curve.

8. JFET Characteristics – Transfer and Drain characteristics & determine the r_d, g_m, μ, ID_{SS}, V_P.
9. MOSFET Characteristics - Transfer and Drain characteristics & determine trans-conductance parameters.
10. SCR Characteristics - V-I characteristics and find the break over voltage and holding current.
11. CE Amplifier – Bandwidth, input impedance, output impedance calculations
12. CC Amplifier - Bandwidth, input impedance, output impedance calculations
13. FET amplifier (Common Source) – Frequency response, bandwidth and voltage gain calculations.
14. UJT characteristics – Negative resistance curve & determine its intrinsic standoff Ratio.