R15 UG Syllabus:

For B. Tech (Electrical & Electronics Engineering and Electronics & Communications Engineering)

First Semester

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1521101	BS	Mathematics-1	3	1	0	30	70	3
1521102	BS	Mathematics-2	3	1	0	30	70	3
1503103	ED	Engineering Graphics	1	0	3	30	70	3
1524104	HS	English-1	4	0	0	30	70	3
1505105	ED	Programming in C	3	1	0	30	70	3
1501106	HS	Environmental Studies	4	0	0	30	70	3
1505107	ED	Programming in C Lab	0	0	3	50	50	2
1599108	ED	Engineering Workshop	0	0	3	50	50	2
		Total	18	3	9	280	520	22

Second Semester

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1522201	BS	Engineering Physics	3	1	0	30	70	3
1521202	BS	Mathematics-3	3	1	0	30	70	3
1523203	BS	Engineering Chemistry	3	1	0	30	70	3
1524204	HS	English-2	4	0	0	30	70	3
1502205	PJ	Electrical Circuits	3	1	3	30	70	3
1525206	HS	Human Values and Professional Ethics	4	0	0	30	70	3
1524207	HS	English Language and Communication Skills Lab	0	0	3	50	50	2
1599208	BS	Physics and Chemistry Lab	0	0	3	50	50	2
		Total	18	3	9	280	520	22

III Semester

S. No.	Subject Code	Subject	SC	L	T	P	IM	EM	CR
1	1521301	Mathematics-4	BS	3	1	0	30	70	3
2	1504302	Electromagnetic fields	PN	3	1	0	30	70	3
3	1504303	Electronic Devices and Circuits	PJ	3	1	0	30	70	3

4	1504304	Signals and Systems	PJ	3	1	0	30	70	3
5	1502305	Network Theory	PN	3	1	0	30	70	3
6	1512306	Electrical Machines	PJ	3	1	0	30	70	3
7	1512307	Electrical Engineering Lab	PN	0	0	3	50	50	2
8	1504308	Electronic Devices & Circuits Lab	PJ	0	0	3	50	50	2
Total:							280	520	22

IV Semester

S. No.	Subject Code	Subject	SC	L	T	P	IM	EM	CR
1	1504401	Analog Communications	PJ	3	1	0	30	70	3
2	1504402	Switching Theory and Logic Design	PJ	3	1	0	30	70	3
3	1504403	Electronic Circuit Analysis	PJ	3	1	0	30	70	3
4	1504404	Pulse and Digital Circuits	PJ	3	1	0	30	70	3
5	1504405	Electromagnetic waves& Transmission Lines	PJ	3	1	0	30	70	3
6	1504406	Probability Theory & Stochastic Processes	PJ	3	1	0	30	70	3
7	1504407	Electronic Circuit Analysis Lab	PJ	0	0	3	50	50	2
8	1504408	Pulse & Digital Circuits Lab	PJ	0	0	3	50	50	2
Total:							280	520	22

V Semester

S. No.	Subject Code	Subject	SC	L	T	P	IM	EM	CR
1	1504501	Microprocessors & Interfacing	PJ	4	0	0	30	70	3
2	1504502	Linear IC Applications	PJ	4	0	0	30	70	3
3	1504503	Digital Communications	PJ	4	0	0	30	70	3
4	1504504	Antenna and Wave Propagation	PJ	4	0	0	30	70	3
5	1515505	Computer Organization	PN	4	0	0	30	70	3
6	1504506	Digital IC Applications	PJ	4	0	0	30	70	3
7	1504507	IC Applications Lab	PJ	0	0	3	50	50	2
8	1504508	Communication Engineering Lab	PJ	4	0	0	50	50	2
Total:							250	520	22

VI Semester

S. No.	Subject Code	Subject	SC	L	T	P	IM	EM	CR
1	1504601	Digital Signal Processing	PJ	4	0	0	30	70	3
2	1525602	Managerial Economics & Financial Analysis	HS	4	0	0	30	70	3
3	1504603	Microwave Engineering	PJ	4	0	0	30	70	3
4	1512604	Control Systems	PN	4	0	0	30	70	3
5	1504605	Microcontrollers and Applications	PJ	4	0	0	30	70	3
6	1515606 1515607 1515608	**Elective-I** 1. Data structures 2. Computer Networks 3. Database Management Systems	PN	4	0	0	30	70	3
7	1504609	Microprocessors & Microcontrollers Lab	PJ	0	0	3	50	50	2
8	1504610	Digital Signal Processing Lab	PJ	0	0	3	50	50	2
Total:							280	520	22

VII Semester

S. No.	Subject Code	Subject	SC	L	T	P	IM	EM	CR
1	1525701	Management Science	HS	4	0	0	30	70	3
2	1504702	**VLSI Design**	PJ	4	0	0	30	70	3
3	1504703	Electronic Measurements and Instrumentation	PJ	4	0	0	30	70	3
4	1504704	Optical communications	PJ	4	0	0	30	70	3
5	 1504705 1504706 1515707	**Elective -II** 1. RADAR Systems 2. Speech Processing 3. OOPS through Java Programming	PJ	4	0	0	30	70	3
6	 1504708 1504709 1504710	**Elective-III** 1. Embedded Real Time Operating Systems 2. Neural networks and Fuzzy Logic 3. Data Communications	PJ	4	0	0	30	70	3
7	1504711	Microwave & Optical Communications Lab	PJ	0	0	3	50	50	2
8	1504712	VLSI Lab	PJ	0	0	3	50	50	2
Total:							280	520	22

VIII Semester

S. No.	Subject Code	Subject	SC	L	T	P	IM	EM	CR
1	1504801	Cellular & Mobile Communications	PJ	4	0	0	30	70	3
2	1504802	Digital Image Processing	PJ	4	0	0	30	70	3
3	1504803	Satellite Communications	PJ	4	0	0	30	70	3
4	 1504804 1404805 1504806	**Elective-IV** 1. Data Acquisition Systems 2. Spread Spectrum Communications 3. Biomedical Instrumentation	PJ	4	0	0	30	70	3
5	1504807	Seminar	PJ	0	0	0	100	0	3
6	1504808	Project	PJ	0	0	0	50	50	10
Total:							270	330	25
I B.Tech.							410	690	45
Grand Total							2080	3620	180

Syllabus

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1521101	BS	Mathematics-1	3	1	0	30	70	3

Objectives:

* To make the students to understand differential equations and to make use these equations not only in mathematics but also in solving engineering problems.

* To make the students to understand the importance of differential calculus double integrals and triple integrals.

Unit I: Differential equations of first order and first degree: Exact, Non exact, Linear and Bernoulli equations. Applications: Orthogonal trajectories, Newton's law of cooling, Law of natural growth and decay.

Unit II: Linear differential equations of second and higher order with constant coefficients and R.H.S term of the type e^{ax}, sin ax, cos ax, polynomials in x , e^{ax} V(x), xV(x) - Method of variation of parameters.

Unit III: Simple examples of Taylor's and Maclaurin's series – Functions of two or more variables Jacobians – Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers.

Unit IV: Curvature: Curvature of a curve – Curvature of a circle – Radius of a curvature – Centre of Curvature – Equation to the circle of curvature. Curve tracing – Cartesian, polar and parametric curves.

Unit V: Multiple Integrals: Evaluation of double integrals in Cartesian coordinates, and polar coordinates - Change of variables in double integrals - Change the order of integration in double integrals - Evaluation of triple integrals in Cartesian and polar coordinates - Change of variables in triple integrals.

Text Books:

1. Higher Engineering Mathematics, Dr. B.S. Grewal, Khanna Publishers-42 edition.
2. Higher Engineering Mathematics, B.V. Ramana, Mc. Graw Hill Education (India) Pvt. Ltd

Reference Books:

1. Advanced Engineering Mathematics, Erwin Kreyszig, Willey Publications, 9th edition- 2013
2. Engineering Mathematics Volume-1, Dr. D.S Chandra Sekharaiah, Prism Books Pvt. Ltd.
3. Advanced Engineering Mathematics by N. Bali, M Goyal, Firewall Media 7th edition.
4. Engineering Mathematics, Volume – I & II, E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher Ist Edition (2010).

Outcomes:

Students are able to understand and apply differential equations in solving hydro dynamics and fluid mechanics problems

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1521102 / 1521201	BS	Mathematics-2	3	1	0	30	70	3

Objectives:

* To make the students to understand Fourier series and apply them in solving problems.

* To inculcate the concept of partial differential equations and its application to solve wave equation and heat equations.

* To make the students to understand Laplace transforms and inverse Laplace transforms.

* The students gain the knowledge about vector differentiation and vector integration.

Unit I: Vector calculus - Vector differentiation: Scalar point function - Vector point function -Vector operator Del – Gradient – Divergence - Curl . Vector integration: Line, Surface and Volume integrals .Green's theorem in a plane, Stoke's theorem and Gauss-divergence theorems (Statements only). Applications of Green's , Stoke's and Gauss divergence theorems.

Unit II: Laplace transforms of standard functions – Properties of Laplace Transforms - Transforms of derivatives and integrals- Evaluation of integrals by Laplace transforms – Unit step function – Second shifting theorem – Dirac's delta function. Laplace transform of periodic functions.

Unit III: Convolution theorem. Inverse Laplace Transforms – Applications of Laplace transforms to ordinary differential equations.

Unit IV: Fourier series: Determination of Fourier coefficients - Fourier series - Even and odd functions - Fourier series in an arbitrary interval - Functions having points of discontinuity- Half range Fourier sine and cosine expansions.

Unit V: Partial Differential Equations: Formation of partial differential equations by eliminating arbitrary constants and arbitrary functions - Method of separation of variables. Solution of one dimensional wave equation - Solution of one dimensional heat equation.

Text Books:

1..Higher Engineering Mathematics, Dr. B.SGrewal, Khanna Publishers-42 edition.

2.Higher Engineering Mathematics, B.V.Ramana, Mc. Graw Hill Education (India) Pvt. Ltd.

Reference Books:

5. Advanced Engineering Mathematics, Erwin Kreyszig, Willey Publications, 9th edition- 2013
6. Engineering Mathematics Volume -1, Dr. D.S Chandra Sekharaiah, Prism Books Pvt. Ltd.
7. Advanced Engineering Mathematics by N. Bali, M Goyal, Firewall Media 7th edition.
8. Engineering Mathematics, Volume – I & II , E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher Ist Edition (2010).
9. Fourier Series and Integral Transforms by Prof. S. Sreenadh, S. Ranganatham,

Dr. M.V.S.S.N. Prasad, Dr. V. Ramesh Babu – S. Chand & Company Pvt. Ltd.

Outcomes:

- Students are able to apply Fourier series in harmonic analysis.
- Students are able to understand wave equation and heat equations and solve them by the method of separation of variables.
- Students are able to understand Laplace transforms and vector calculus concepts and their applications.

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1521202	BS	Mathematics-3	3	1	0	30	70	3

Objectives:

* This course aims at providing the students with the concepts of matrices and basics of linear algebra which will be useful in solving simultaneous linear equations.

* Our emphasis will be more on logical and problem solving development in Numerical methods and their applications in solving Engineering problems when analytical methods fails.

Unit I : Matrices: – Rank – Echelon form – Normal form – Solution of linear system of equations:Consistency and inconsistency - Gauss elimination method – Eigen values, eigen vectors for real matrices – Cayley- Hamilton theorem – Inverse and powers of a matrix. Linear transformations – Orthogonal transformations.

Unit II: Solution of algebraic and transcendental equations – Bisection method - False - position method - Newton - Raphson method. Solution of System of equations: Crout's method- Gauss Seidel iteration method.

Unit III: Interpolation – Finite differences - Forward differences - Backward differences - Newton's forward and backward difference formulae for interpolation - Lagrange's formula for unequal intervals- Inverse interpolation. Curve fitting: Method of least squares- Fitting of a straight line, second degree and exponential curves.

Unit IV: Numerical differentiation: Finding first and second order derivatives using Newton's formulae. Numerical integration: Newton - Cote's quadrature formulae - Trapezoidal rule – Simpson's 1/3 rule – Simpson's 3/8 rule.

Unit V: Numerical solution of ordinary differential equations - Solution by Taylor's series –Picard's method of successive approximations –Euler's modified method - Runge - Kutta methods of second and fourth order – Milne's predictor - corrector method.

Textbooks:

1. Higher Engineering Mathematics, Dr. B.S.Grewal, Khanna Publishers-42 edition.
2. Introductory methods of Numerical Analysis, S.SSastry, 5th edition.

References:

1. Engineering Mathematics – III B, Dr. M.KVenkata Raman, 13th edition.
2. Higher Engineering Mathematics, B.VRamana, Mc. Graw Hill Education(India) Pvt. Limited.
3. Numerical Methods, S. Arumugam, A.Thangapandi Isaac, A. Soma Sundaram, Second edition, Scitech Publications (India) Pvt. Limited.
4. Advanced Engineering Mathematics, Erwin Kreyszig, Willey Publications, 9th edition- 2013.

Outcomes:

- Students are able to understand and Applied Matrix theory in solving Engineering Problems.
- Students are able to understand and applied numerical methods in solving simultaneous equations and transcendental equations

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1522102 / 1522201	BS	Engineering Physics	3	1	0	30	70	3

Course Objective:

- To evoke interest on applications of superposition effects like interference and diffraction, the mechanisms of emission of light, achieving amplification of electromagnetic radiation through stimulated emission, study of propagation of light through transparent dielectric waveguides along with engineering applications.
- To enlighten the periodic arrangement of atoms in crystals, direction of Bragg planes, crystal structure determination by X-rays and also to know the role of ultrasonic's in non-destructive testing..
- To get an insight into the microscopic meaning of conductivity , classical and quantum free electron model, the effect of periodic potential on electron motion, evolution of band theory to distinguish materials and to understand electron transport mechanism in solids.
- To open new avenues of knowledge and understanding on semiconductor based electronic devices, basic concepts and applications of semiconductor and magnetic materials have been introduced which find potential in the emerging micro device applications.
- To give an impetus on the subtle mechanism of superconductors in terms of conduction of electron pairs using BCS theory, different properties exhibited by them and their fascinating applications. Considering the significance of microminiaturization of electronic devices and significance of low dimensional materials, the basic concepts of nanomaterials, their synthesis, properties and applications in modern emerging technologies are elicited.

UNIT – 1: PHYSICAL OPTICS, LASERS AND FIBRE OPTICS

PHYSICAL OPTICS :- Interference, Interference in thin films by reflection – Newton's Rings- Fraunhofer diffraction due to single slit, double slit and diffraction grating.

LASERS:- Introduction –characteristics of laser-Spontaneous and stimulated emission of radiation-Einstein's coefficients-population inversion – Excitation mechanisms and optical resonator-NDYAG laser – He-Ne laser- Application of lasers.

FIBER OPTICS:- Introduction-Construction and working principle of optical fiber-Numerical aperture and acceptance angle- Types of optical fibers- Black diagram of Optical fiber communication system-Applications of optical fibers.

UNIT – 2: CRYSTALLOGRAPHY AND ULTRASONICS

CRYSTALLOGRAPHY:- Introduction –Space lattice –unit Cell lattice parameters- Bravis lattice – Crystal systems- Packing fractions of SC, BCC and FCC – Directions and planes in Crystals – Miller indices – InterPlanar spacing in cubic crystal – X-ray diffraction – Bragg's law powder method.

ULTRASONICS:- introduction- production of ultrasonic's by piezoelectric method- properties and detection- applications in non –destructive testing.

UNIT-3: QUANTUM MECHANICS AND ELECTRON THEORY

QUANTUM MECHANICS: Introduction to matter waves – de'Broglie hypothesis – Schrodinger's time independent wave equation – Physical Significance of wave function – Particle in one dimensional infinite potential well .

ELECTRON THEORY: Classical free electron theory – Sources of electrical resistance – Equation for electrical conductivity – Quantum free electron theory – Fermi-Dirac distribution - Kronig-Penny model (qualitative) – Origin of bands in solids – Classification of solids in to conductors, semiconductors and insulators .

UNIT- 4: ENGINEERING MATERIALS

MAGNETIC MATERIALS:- Introduction and basic definitions- Origin of Magnetic moments- Bohr magneton- Classification of magnetic materials into dia, para, ferro, antiferro and ferri magnetic materials-Hysteresis- Soft and hard magnetic materials and applications of magnetic materials.

SUPERCONDUCTORS: Introduction- effect of magnetic field-Meissner effect- Type I and Type II Superconductors- Flux quantization- London penetration depth- ac and dc Josephson effects- BCS theory(Qualitative)- Applications of superconductors.

UNIT- 5: PHYSICS OF SEMICONDUCTORS AND NANO MATERIALS

SEMICONDUCTOR PHYSICS: Introduction- Intrinsic and extrinsic semiconductors- Drift and diffusion currents and Einstein's equation- Hall effect- Direct and Indirect band gap semiconductors- Formation of P-n junction.

PHYSICS OF NANO-MATERIALS:- Introduction- Significance of Nano-scale and types of nano-materials- physical properties: optical, thermal, mechanical and magnetic properties- Synthesis of nano-materials: ball mill, chemical vapour deposition and sol-gel-Applications of nano-materials.

Text Books:

1. Engineering Physics by K. Thygarajan, Mac Graw – Hill Publishing Co. New Delhi.
2. Engineering Physics by P.K. Palanisamy, Scitech Publications.
3. Engineering Physics by S. Mani Naidu, Pearson edition.

Reference Books:

1. Engineering Physics - Sanjay D. Jain, D. Sahasrambudhe and Girish University Press, I Edition, 2009.
2. Engineering Physics – D K Pandey, S. Chaturvedi, Cengage Learning, I Edition, 2012
3. Engineering physics – M.N. Avadhanulu and P.G. KshirSagar, Chand and Co, Revised Edition, 2013.
4. Solid State Physics – A.J. Dekkar, McMillan Publishers, Latest edition, 2012.
5. Engineering Physics – Gaur and Gupta Dhanapati, Rai Publishers , 7th Edition, 1992.
6. Text book of Nanoscience and Nanotechnology: B S Murthy, P.Shankar, Baldev Raj B B Rath, James Murday, University Press, I Edition, 2012.

Outcome:

- The different realms of physics and their applications in both scientific and technological systems are achieved through the study of physical optics, lasers and fibre optics.
- The important properties of crystals like the presence of long-range order and periodicity, structure determination using X-ray diffraction are focused along with ultrasonic non-destructive technique.
- The discrepancies between the classical estimates and laboratory observations of physical properties exhibited by materials would be lifted through the understanding of quantum picture of subatomic world.
- The electronic and magnetic properties of materials were successfully explained by free electron theory and focused on the basis for the band theory.
- The properties and device applications of semiconducting and magnetic materials are illustrated.
- The importance of superconducting materials and nanomaterials along with their engineering applications are well elucidated.

.Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1523103 / 1523203	BS	Engineering Chemistry	3	1	0	30	70	3

Objectives:

- Knowledge in Chemistry serves as basic nutrient for the understanding and thereby design of materials of importance in life. Thus the advancement in Engineering depend on the outcome of basic sciences.
- The Engineering Chemistry course for undergraduate students is framed to strengthen the fundamentals of chemistry and then build an interface of theoretical concepts with their industrial! Engineering applications.
- The course main aim is to impart in-depth knowledge of the subject and highlight the role of chemistry principles (or) applications in the field of engineering.
- An attempt has been made to logically correlate the topic with its application.

UNIT-I:

Water: Sources of water, types of impurities in water. Hardness of water: Causes, expression of hardness - units - Types of hardness-Temporary & permanent hardness of water. Disadvantages of hard water, Methods of treatment of water for domestic purpose Analysis of water : Hardness of water by EDTA method, Estimation of Dissolved oxygen by Winkler's method Numerical problems.

Boiler troubles - Scale & Sludge formation, caustic embrittlement, Boiler corrosion, priming & foaming.

Softening of water -Internal Treatment: phosphate,colloidal,calgon,carbonate and sodium aluminate treatment, External treatment : Zeolite, Ion exchange process. Reverse osmosis, electro dialysis.

UNIT -II:

Polymers: Introduction, Types of Polymerization, Mechanism (chain growth & Step growth). Plastics: Thermoplastic resins & Thermo set resins. Compounding of plastics, Preparation, properties, engineering applications of polyethylene, Bakelite, Nylon, Teflon. Elastomers-Natural rubber, vulcanization, Compounding of rubber,

Synthetic Rubbers :Buna-S, Butyl rubber and Thiokol Rubbers.

Inorganic Polymers : Basic introduction, Preparation, properties and engineering applications of Silicones, Polyphospazins(-(R)2-P=N-)

UNIT-III:

Electrochemistry: Basic concepts for construction of Electrochemical cells, Types of cells: Concentration cells, Galvanic cells. Electrochemical Series. Batteries- Primary (Laclanche cell) and Secondary Batteries (Lead acid cell) .Fuel cells-H_2-0_2fuel cell and methanol- oxygen fuel cells.

Corrosion- Introduction, Types and Mechanism of Corrosion(Wet and Dry corrosion), factors influence corrosion, Control of Corrosion- Cathodic Protection(Sacrificial anodic protection & impressed current cathodic protection). Basic principles of Electroplating, Electroless plating.

UNIT-IV:

Fuel technology:

Fuels: Classification, Characteristics of good fuel. Solid fuels: Manufacture of Metallurgical coke by Otto Hoffmann's by product oven process. Liquid fuels – petroleum crude - refining of petroleum. Synthetic petrol: Bergius and Fischer Tropsech's process, Calorific value of fuels: HCV, LCV, determination of Calorific value of solid fuels(Bomb calorimetry).

Lubricants: Functions of lubricant, mechanism of lubrication(thick film, thin film& extreme pressure lubrication). Properties of lubricants: Viscosity, Flash & fire point,Cloud and pour point, Aniline point.

UNIT- V:

Advanced Chemistry:

Green Chemistry: Introduction , Significance of green chemistry, 12 principles of Green chemistry. .

Photo Chemistry: Introduction, Fluorescence, Phosphorescence, Luminiscent compounds, Solar cells Catalysis: Introduction, Types of Catalysis(Homogenous& Heterogenous catalysis) Action of catalyst (Catalytic promoters, Catalytic inhibitor and catalytic poisons) and applications of catalyst.

TEXTBOOKS

1 Text Book of Engineering Chemistry, Jain and Jain, DhanapathRai Publishing Company, New Delhi, 15th Edition, 2010.
2 Engineering Chemistry by Jayaveera, G.V. Subba Reddy, Tata McGraHill Publications, Edition 2013.
3 Text Book of Engineering Chemistry, Shashichawla, DhanapathRai Publications, New Delhi, 4th Edition, 2011.
4 Text Book of Engineering Chemistry by S.S. Dara&Mukkati S. Chand & Co Publishers, New Delhi, 2006.

REFERENCES

1. Text Book of Engineering Chemistry - C. Parameswara Murthy, C.V. Agarwal and Andra Naidu, BS Publications, Hyderabad, 3rd Edition, 2008.
2. Engineering Chemistry by K.B. Chandra Sekhar, UN. Das and Sujatha Mishra, SCITECH, Publications India Pvt. Limited, Chennai, 2nd Edition, 2012.
3. Chemistry of Engineering Materials by C.V. Agarwal, A. Naidu, BS publications.

EXPECTED OUTCOMES(EO) : The Student is expected to :

- Differentiate between hard and soft water.Understand the disadvantages of using hard water domestically and industrially. Select and apply suitable treatments domestically and industrially.
- Understand the electrochemical sources of energy
- Understand industrially based polymers,various engineering materials.

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1524104	HS	English-1	4	0	0	30	70	3

Objectives:

- To improve the language, proficiency of the students in English with an emphasis on LSRW Skills.
- To develop an awareness in the students about the significance of silent reading and comprehension.
- To equip the students to study academic subjects with greater facility through theoretical and practical components of the syllabus.
- To develop study skills as well as communication in formal and informal situations.
- To enable students to express themselves fluently and appropriately in social and professional contexts.
- To develop an awareness in the students about writing as an exact and formal skill.

UNIT – I

An Astrologer's day – R.K. Narayan
My struggle for an education – Booker T. Washington
Grammar – Identification and Interchange of parts of speech.

UNIT – II

Building A New State – Dr. A.P.J. Abdul Kalam
The Happy Prince – Oscar Wilde
Grammar – Reading comprehension

UNIT – III

The woodrose – Abburi Chayadevi

Mokshagundam Visveswaraiah – A Biography
Grammar – Vocabulary

UNIT – IV

Homi Jehangir Baba – A Biography
If – Rudyard Kipling
Grammar – Transformation sentences

UNIT – V

Remedial Grammar

Reference Books

1. Glossary of Grammatical Terms – Geogrey Leech
2. Practical English Usage – Michal Swan
3. English Grammar and Composition - Wren and Martin
4. Advanced English Grammar & Composition – M.P. Bhatia
5. English Improvement Course – Dhillon

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1524204	HS	English-2	4	0	0	30	70	3

Objectives:

- To improve the language, proficiency of the students in English with an emphasis on LSRW Skills.
- To develop an awareness in the students about the significance of silent reading and comprehension.
- To equip the students to study academic subjects with greater facility through theoretical and practical components of the syllabus.
- To develop study skills as well as communication in formal and informal situations.
- To enable students to express themselves fluently and appropriately in social and professional contexts.
- To develop an awareness in the students about writing as an exact and formal skill.

UNIT – I

Phonetics & Transcription
Resume & Emails

UNIT – II

Dialogue Writing
Speech Making

UNIT – III

Paragraph Writing
Precis Writing

UNIT – IV

Group Discussion
Interviews

UNIT – V

Letter Writing
Technical Report Writing

Reference Books

1. Effective Technical Communication – M. Ashraf Rizvi, Tata McGraw-Hill
2. Speaking English Effectively – Krishna Mohan & N.P. Sing, Macmillan Publication

3. A Text Book of English Phonetics for Indian Students – T. Bala Subramanian, Trinity Press.
4. Communication with Confidence – Puspalatha, Oxford Publication
5. An approach to Communication Skills – Dhan Rajan
6. Business Correspondence and Report Writing – R.C. Sharma & Krishnamohan

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1503105	ED	Engineering Drawing-1	1	0	3	30	70	3

COURSE OBJECTIVE:

By studying the engineering drawing, a student becomes aware of how industry communicates technical information. Engineering drawing teaches the principles of accuracy and clarity in presenting the information necessary about objects.

- This course develops the engineering imagination i.e., so essential to a successful design. Learning techniques of engineering drawing changes the way one thinks about technical images.
- It is ideal to master the fundamentals of engineering drawing first and to later use these fundamentals for a particular application, such as computer aided drafting. Engineering Drawing is the language of engineers and by studying this course, engineering students will eventually be able to prepare drawings of various objects being used in technology.

UNIT-1:

INTRODUCTION TO ENGINEERING DRAWING

Principles of Engineering Graphics and their significance- Drawing instruments and their use-Conventions in Drawing- Lettering- BIS Conventions.

Curves used in Engineering Practice: (a) Conic sections –General method only, (b) Cycloid, Epicycloids and Hypocycloid, (c) Involutes

UNIT- II:

PROJECTION OF POINTS AND LINES: Principles of orthographic projection- conventions- First and Third angle projections. Projections of points, Lines inclined to one or both planes, Problems on projections, Finding True lengths & traces.

UNIT- III:

PROJECTION OF PLANES: Projections of regular plane surfaces/figures, Projection of planes using auxiliary planes.

UNIT-IV:

PROJECTIONS OF SOLIDS: Projections of regular solids inclined to one or both planes..

UNIT- V

SECTIONS OF SOLIDS: Section planes and sectional views of right regular solids- Prism, Cylinder, Pyramid and Cone. True shape of sections

TEXT BOOKS:

1. Engineering Drawing, N.D.Bhat, Charotar Publishers
2. Engineering Drawing, K.L. Narayana,P.Khanniah, Scitech Pub.
3. Engineering Drawing, Basant Agrawal,C.M.Agrawal, Tata McGraw-Hill

REFERENCES:

1. Engineering Drawing, Shah and Rana, 2/e,Pearson Education
2. Engineering Drawing,B.V.R. Guptha,J.K.Publishers
3. Engineering Drawing and Graphics, Venugopal, New age Publishers
4. Engineering Drawing, Johle, Tata McGraw-Hill

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1503205	ED	Engineering Drawing-2	1	0	3	30	70	3

COURSE OBJECTIVE:

By studying the engineering drawing, a student becomes aware of how industry communicates technical information. Engineering drawing teaches the principles of accuracy and clarity in presenting the information necessary about objects.

- This course develops the engineering imagination i.e., so essential to a successful design. Learning techniques of engineering drawing changes the way one thinks about technical images.

- It is ideal to master the fundamentals of engineering drawing first and to later use these fundamentals for a particular application, such as computer aided drafting. Engineering Drawing is the language of engineers and by studying this course, engineering students will eventually be able to prepare drawings of various objects being used in technology

UNIT- I:

DEVELOPMENT OF SURFACES: Development of surfaces of Right regular solids- Prisms, Cylinder, Pyramid, Cone and their sectional parts.

UNIT- II:

ORTHOGRAPHIC PROJECTIONS: Conversion of isometric projections/views to Orthographic Views-Conventions.

UNIT- III:

ISOMETRIC PROJECTIONS: Principles of isometric projection -isometric views-Conventions- isometric views of Lines, Plane figures, Simple and Compound Solids- Isometric projection of objects having non isometric lines.

UNIT- IV

INTERSECTION OF SURFACES: Intersection of cylinder & cylinder, intersection of cylinder & cone, and intersection of square prism into square prism.

UNIT- V

INTRODUCTION TO AUTOCAD: Co-ordinate systems, Setting of Drawing space, Preparatory commands-limits, Snap, Grid and Ortho, Viewing commands -Zoom, Pan & Osnap; Geometry commands (Only Line, Circle and Arc) and editing commands.

TEXT BOOKS:

1. Engineering Drawing, N.D.Bhat, Charotar Publishers
2. Engineering Drawing, K.L. Narayana,P.Khanniah, Scitech Pub.
3. Engineering Drawing, Basant Agrawal,C.M.Agrawal, Tata McGraw-Hill

REFERENCES:

1. Engineering Drawing, Shah and Rana, 2/e,Pearson Education
2. Engineering Drawing,B.V.R. Guptha,J.K.Publishers
3. Engineering Drawing and Graphics, Venugopal, New age Publishers
4. Engineering Drawing, Johle, Tata McGraw-Hill

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1503103	ED	Engineering Graphics	1	0	3	30	70	3

COURSE OBJECTIVE:

By studying the engineering drawing, a student becomes aware of how industry communicates technical information. Engineering drawing teaches the principles of accuracy and clarity in presenting the information necessary about objects.

- This course develops the engineering imagination i.e., so essential to a successful design. Learning techniques of engineering drawing changes the way one thinks about technical images.
- It is ideal to master the fundamentals of engineering drawing first and to later use these fundamentals for a particular application, such as computer aided drafting. Engineering Drawing is the language of engineers and by studying this course, engineering students will eventually be able to prepare drawings of various objects being used in technology.

UNIT-1:

INTRODUCTION TO ENGINEERING DRAWING

Principles of Engineering Graphics and their significance- Drawing instruments and their use- Conventions in Drawing- Lettering- BIS Conventions.

Curves used in Engineering Practice: (a) Conic sections –General methods only
(b) Cycloid, Epicycloids and Hypocycloid
(c) Involutes

UNIT- II: PROJECTION OF POINTS AND LINES: Principles of orthographic projection-conventions-First and Third angle projections. Projections of points, Lines inclined to one or both planes, Problems on projections, Finding True lengths & traces.

UNIT- III: PROJECTION OF PLANES: Projections of regular plane surfaces/figures, Projection of planes using auxiliary planes.

PROJECTIONS OF SOLIDS: Projections of regular solids inclined to one or both planes..

UNIT- IV SECTIONS OF SOLIDS: Section planes and sectional views of right regular solids- Prism, Cylinder, Pyramid and Cone. True shape of sections

UNIT- V ORTHOGRAPHIC PROJECTIONS: Conversion of isometric projections/views to Orthographic Views- Conventions.

TEXT BOOKS:

1. Engineering Drawing, N.D.Bhat, Charotar Publishers
2. Engineering Drawing, K.L. Narayana,P.Khanniah, Scitech Pub.
3. Engineering Drawing, Basant Agrawal,C.M.Agrawal, Tata McGraw-Hill

REFERENCES:

1. Engineering Drawing, Shah and Rana, 2/e,Pearson Education
2. Engineering Drawing,B.V.R. Guptha,J.K.Publishers
3. Engineering Drawing and Graphics, Venugopal, New age Publishers
4. Engineering Drawing, Johle, Tata McGraw-Hill

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1505105 / 1505203	ED	Programming in C	3	1	0	30	70	3

Course Objectives:

- To understand the syntax and semantics of C programming language and other features of the language
- To learn logical skills for solving problems, implement them using C language

UNIT I

Introduction to Computers: Computer Systems, Computing Environment, Computer Languages, Creating and Running Programs, System Developments, Algorithms, Flowcharts.

Introduction to the C Language: Introduction, C programs, Identifiers, Types, Variables, Constants, Input and Output, Programming Examples.

UNIT II

Structure of C program: Expressions, Precedence and Associativity, Evaluating Expressions, Type Conversion, Statements, Sample Programs.

Selections and Making Decisions: Logical Data and Operators, Two-way Selection, Multiway Selection.

UNIT III

Repetition: Concept of Loop, Pretest and Post-test Loops, Initialization and Updation, Event and Counter Controller Loop, Loops in C, Looping Applications

Functions: Introduction, User Defined Functions, Inter-Function Communication, Standard Functions, Scope, Programming Examples.

UNIT IV

Arrays: Introduction, Two Dimensional Arrays, Multi-Dimensional Arrays, Inter Function Communication, Array Applications, Exchange(Bubble) Sort, Binary Search, Linear Search.

Strings: String Concepts, C Strings, Sting Input/output Functions, Arrays of Strings, String Manipulation Functions, String/Data Conversion.

UNIT V

Enumerated, Structure, and Union Types: The Type Definition, Enumerated Types, Structure, Unions, Programming Applications.

Bitwise Operators: Exact Size Integer Types, Logical Bitwise Operators, Shift Operators, Mask, Introduction to Pointers and File management.

TEXT BOOKS:

1. Computer Science, A Structured Programming Approach Using C, Behrouz A. Forouzan & Richard F. Gilberg, Third Edition, Cengage Learning
2. Programming in ANSI C, E. Balagurusamy, Fifth Edition, McGraw Hill.

REFERENCE BOOKS:

1. How to solve it by Computer by R.G. Dromey, Pearson
2. Computer Fundamentals and C Programming, Second Edition, Dr. P. Chenna Reddy.
3. Programming in C: A Practical Approach, Ajay Mittal, Pearson.

4. The C programming Language, B. W. Kernighan and Dennis M. Ritchi, Pearson Education.
5. Problem Solving and Programming Designs in C, J. R. Hanly and E.B. Koffman.,
6. Programming with C Rema Theraja, Oxford
7. Problem Solving with C, M.T.Somashekara, PHI
8. C Programming with problem solving, J.A. Jones & K. Harrow,Dreamtech Press
9. Programming with C, R.S.Bickar, Universities Press

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1505205	PJ	Introduction to Data Structures	3	1	0	30	70	3

Course Objectives:

- To understand the concept of pointers and files
- To understand dynamic memory allocation concepts
- To implement operations on linked lists
- To understand and implement various sorting and searching methods

UNIT-I

Pointers: Introduction, Understanding pointers, Accessing the address of a variable, Declaring pointer variable, Initialization of pointer variables, Accessing a variable through its pointer, Chain of pointers, Pointer Expressions, Pointers and Arrays, Array of pointers, Pointers to functions.

UNIT-II

File Management in C: Introduction, Defining and opening a file, Closing a file, Input/Output operations on files, Random access to files, Dynamic Memory Allocation: Introduction, Dynamic memory allocation, Memory allocation process, Allocating a block of memory: malloc, Allocating multiple blocks of memory: calloc, Releasing the used space: free, Altering the size of a block: realloc

UNIT-III

Concepts of ADTs: Data structures, Storage structures & File structures, Primitive & Non-primitive data structures, Linear & Non-linear data structures Linear Lists: ADT, Array & Linked representations, simulated pointers

UNIT-IV

Arrays : ADT, Mappings, Representations, Sparse Matrices, Linked Lists: : Single Linked Lists- Insertion, Deletion, Double Linked Lists- Insertion, Deletion, Circular Linked List, Garbage collection.

UNIT-V

Sorting: Selection, Insertion, Bubble, Merge, Quick, Radix Searching: Sequential & Binary Search.

TEXT BOOKS:

1. Programming ANSI C, E. Balaguruswamy, Fifth Edition, McGraw Hill (for Units I & II)
2. Fundamentals of Data Structures, Horowitz and Sahani, Galgotia publication
3. An Introduction to Data Structures with applications, Jean Paul Trembley and Paul G. Sorenson, McGraw Hill.

REFERENCE BOOKS:

1. C Programming & Data Structures, B.A. Fourouzan and R.F. Gilberg, Third Edition, Cengage Learning.

2. Data Structures using C, A.M.Tanenbaum, Y. Langsam and M.J. Augenstein, Pearson Education/PHI, Eigth Edition.
3. Data Structures Through C, G.S. Baluja, Dhanpat Rai & Co.
4. Programming in C and Data Structures, J.R. Hanly, Ashok N. Kamathane and A. Ananda Rao, Pearson Education.
5. Data Structures and Program Design in C, R. Kruse etal, Pearson Education

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
11502205	PJ	Electrical Circuits (Common for EEE & ECE)	3	1	0	30	70	3

Objectives

This course introduces the basic concepts of circuit analysis which is the foundation for all subjects of the Electrical Engineering discipline. The emphasis of this course is laid on the basic analysis of circuits which includes single phase circuits, magnetic circuits, theorems, transient analysis and network topology.

UNIT – I

Introduction to Electrical Circuits: circuit concepts, classification of network elements, voltage & current sources; independent & dependent sources, source transformation techniques, R-L-C Parameters, Voltage - Current relationship for passive elements. Kirchhoff's laws, network reduction techniques – series, parallel, series parallel, Y/ - Transformations, Mesh and Nodal analysis for D.C excitation.

UNIT – II

Single Phase AC Circuits: RMS, Average values, form factor, peak factor for different periodic waveforms, phase, phase difference, phasor notation, J-notation. Concept of Reactance, Impedance, Susceptance, and Admittance, Active & Reactive power, Power factor, power triangle. Response of R, L & C elements for Sinusoidal excitation, steady state analysis of RL, RC and R-L-C (Series, parallel, series parallel) Circuits for sinusoidal excitations, phasor diagram. Steady state analysis of A.C Circuits using mesh and nodal analysis.

UNIT – III

Series and Parallel resonance: Resonant frequency, Half Power frequency, Band width, Q– Factor, Relation between them, problems.

Locus Diagrams: Impedance & admittance locus diagrams of RL & RC Series circuits and two branch parallel circuits.

UNIT – IV

Magnetic Circuits: Concept of self & mutual inductances, Dot Convention, Problems, Coefficient of coupling, Composite Magnetic circuit, analysis of Series and Parallel Magnetic Circuits, Duality and dual Circuits, problems.

Unit – V

Network Topology: Definition – Graph, tree, Co-tree, Incidence Matrix, Tie-Set & Cut – Set Matrices for Planar networks, Formulation of equilibriurn equations based on graph theory, problems.

Text Books

1. Network Analysis – Van Valkenburg - 3rd edition, PHI.
2. Engineering Circuit Analysis – William H. Hayt –Jack E. Kimmerly – TMH
3. Fundamentals of Electric Circuits – Charles's, Alexander & Mathew N.O. Sadiku, TMH 3rd Edition.
4. Electrical Circuits – N. Sreenivasulu – Reem Publications

References

1. Circuits & Networks – A. Sudhakar , Shayammohan.S. Pillai, 4th Edition – TMH.
2. Theory and Problems of Electrical Circuits – Joseph A. Edminister – Schaum Series, 1st Edition – TMH.
3. Network Analysis – N C Jagan & C. Lakshmi Narayana, BSP.

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1525106 / 1525206	HS	Human Values and Professional Ethics	4	0	0	30	70	3

Course Objective:

• This course deals with professional ethics which includes moral issues and virtues, social responsibilities of an engineer, right qualities of moral leadership

UNIT - I : ENGINEERING ETHICS

Senses of Engineering Ethics – Variety of Moral issues – Types of inquiry – Moral Dilemmas – Moral Autonomy – Kohlberg's Theory – Consensus and Controversy – Professions and Professionalism – Professional ideals and virtues

UNIT – II : ENGINEERING AS SOCIAL EXPERIMENTATION

Engineering as experimentation – Engineers as Responsible Experimenters – Research Ethics – Codes of Ethics – Industrial Standards – A Balanced Outlook on Law – The Challenger Case Study

UNIT – III : ENGINEER'S RESPONSIBILITY FOR SAFETY

Safety and Risk – Assessment of Safety and Risk – Risk benefit Analysis – Reducing Risk – The Government Regulator's Approach to Risk – Chernobyl Case and Bhopal Case studies.

UNIT – IV : RESPONSIBILITIES AND RIGHTS

Collegiality and Loyalty – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property (IPR) – Discrimination.

UNIT – V : GLOBAL ISSUES

Multinational Corporations – Business Ethics – Environmental Ethics – Computer Ethics – Role in Technological Development – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Honesty – Leadership – Sample Code of conduct.

TEXT BOOKS :

1. Mike martin and Roland Schinzinger. " Ethics in Engineering '', McGrow Hill, New York 2005
2. Charles E Harris. Michael S Pritchard and Michael J Rabins. " Engineering Ethics – Concepts and Cases ", Thompson Learning 2000.

REFERENCE BOOKS :

1. Charles D Fleddermann, " Engineering Ethics", Prentice Hall, New Mexico, 1999.
2. John R Baatright. "Ethics and the Conduct of Business", Pearson Education 2003.
3. Edmund G Seeabauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University press 2001.
4. Prof. (Col) P S Bajaj and Dr. Raj Agrawal, " Business Ethics – An Indian Perspective", Biztantra, New Delhi, 2004.
5. David Ermann and Michele S Shauf, " Computers, Ethics and Society", Oxford University Press, 2003

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1501106 / 1501206	HS	Environmental Studies	4	0	0	30	70	3

Unit I

Multidisciplinary nature of environmental studies: Definition, scope and importance – Need for public awareness; Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems; (a) Forest resources – Use and over-exploitation, deforestation, case studies – Timber extraction, mining, dams and their effects on forest and tribal people; (b) Water resources – Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems;

(c) Mineral resources – Use and exploitation, environmental effects of extracting and using mineral resources, case studies; (d) Food resources : World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies; (e) Energy resources –Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Case studies; (f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification; Role of an individual in conservation of natural resources; equitable use of resources for sustainable lifestyles

Unit II

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 following ecosystems (a) Forest ecosystem, (b) Grassland ecosystem, (c) Desert ecosystem, (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit III

Biodiversity and its conservation: Introduction – 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 IV

Environmental Pollution: Definition – Cause, effects and control measures of (a) Air pollution, (b) Water pollution, (c) Soil pollution, (d) Marine pollution, (e) Noise pollution, (f) Thermal pollution, (g). Nuclear hazards; Solid waste Management: Causes, effects and control measures of urban and industrial wastes - Role of an individual in prevention of pollution – Pollution case studies; Disaster management: floods, earthquake, cyclone and landslides

Unit V

Social Issues and the Environment: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns; • Environmental ethics : Issues and possible solutions; Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies; 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; Issues involved in enforcement of environmental legislation; Public awareness

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, case studies; 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, birds; Study of simple ecosystems-pond, river, hill slopes, etc.

TEXTBOOKS:

1. Text book of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission, Universities Press.
2. Environmental Studies by Benny Joseph, Mc. Graw Hill Publications.
3. Principles and a basic course of Environmental science for under graduate course by Kousic, KouShic.
4. Text book of Environmental Sciences and Technology by M.AnjiReddy, BS Publication.

REFERENCES:

1. Environmental sciences and engineering – J. Glynn Henry and Gary W. Heinke – Printice hall of India Private limited.
2. Environmental Studies by AninditaBasak – Pearson education
3. Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela - Printice hall of India Private limited

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1599107 / 1599208	BS	Physics and Chemistry Lab	0	0	3	50	50	2

PART A – ENGINEERING PHYSICS LAB

Objectives:-

- To explore the application of interference and diffraction by doing concerned experiments.
- To understand the role of laser in various applications.
- To know the significance of fiber parameters in communication application.
- To understand the concept of energy gap, Hall effect, B-H curve, X-ray diffraction and synthesis of nano material by performing the experiments.

LIST OF EXPERIMENTS

Any 7 of the following experiments has to be performed in a semester:

1. Determination of wavelengths of various colours of mercury spectrum using diffraction grating in normal incidence method.
2. Determination of dispersive power of the prism.
3. Determination of thickness of thin object by wedge method.
4. Determination of radius of curvature of lens by Newton's Rings.
5. Laser : Determination of wavelength using diffraction grating.
6. Determination of Numerical aperture and acceptance angle of an optical fiber.
7. Energy gap of a semiconductor using p-n junction diode.
8. Hall effect: Determination of mobility of charge carriers in semiconductor
9. Hysteresis: B-H curve
10. Magnetic field along the axis of a current carrying coil – Stewart and Gee's method.
11. Determination of crystallite size using X-ray pattern (powder) by using Debye-Scherer method.

12. Synthesis of nanomaterials by any convenient method.

Outcomes:-

- Students can aware of the application of interference, diffraction phenomena along with laser.

The basic concept of fiber parameters, energy gap, Hall effect, B-H curve, X ray diffraction technique, along with synthesis of nano-materils can be elucidated by the students

PART B – ENGINEERING CHEMISTRY LAB

OBJECTIVES

- The objective of the course is that the student will have exposure to various experimental skills which is very essential for an Engineering student.
- The experiments are selected from various areas of Chemistry like Conductometry, Polymers, Energy sources and water.
- Also the student is exposed to various tools like Analytical Balance, pH meter, Viscometer, Bomb calorimeter, etc.

LIST OF EXPERIMENTS

Introduction to Lab - Analytical Balance, Molarity, Normality, Calculations, Glass wares. 1 Determination of total hardness of water by EDTA method.
2 Estimation of Dissolved Oxygen present in given water sample by Winkler's method
3 Determination of viscosity of oils by Redwood viscometer I.
4 Determination of viscosity of oils by Redwood viscometer II.
5 Determination of calorific value of fuel sample using Bomb Calorimetry.
6 Estimation of Iron by Diphenyl amine indicator.
7 Determination of Copper by EDT A method.
8 Conductometric titrations of Strong acid Vs Strong base((NaOH).
9. Colorimetric estimation of Manganese.
10. pHmeter calibration and measurement of pH of water and various other samples.

REFERENCES

1. Vogel's Text book of Quantitative Chemical Analysis, J. Mendham et.al., Pearson Education, Sixth Edition, 2012.
2. Laboratory manual on Engineering Chemistry, Anupama Rajput, Dhanpat Rai& Co Publications.
3. Essentials of Experimental Engineering Chemistry, Shashichawla, DhanpatRai& Co Publications.

OUTCOME
The student is expected to learn from this laboratory course the concept of error and its analysis. It also allows the student to develop experimental skills to design new experiments in Engineering. With the exposure to these experiments the student can compare the theory and correlate with experiment

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1599108 / 1599207	ED	Engineering Workshop	0	0	3	50	50	2

PART A – Engineering Workshop

Objectives: The budding Engineer may turn out to be a technologist, scientist, entrepreneur, practitioner, consultant etc. There is a need to equip the engineer with the knowledge of common and newer engineering materials as well as shop practices to fabricate, manufacture or work with materials. Essentially he should know the labor involved, machinery or equipment necessary, time required to fabricate and also should be able to estimate the cost of the product or job work. Hence engineering work shop practice is included to introduce some common shop practices and on hand experience to appreciate the use of skill, tools, equipment and general practices to all the engineering students.

1. TRADES FOR EXERCISES:

a. Carpentry shop– Two joints (exercises) involving tenon and mortising, groove and tongue: Making middle lap T joint, cross lap joint, mortise and tenon T joint, Bridle T joint from out of 300 x 40 x 25 mm soft wood stock

b. Fitting shop– Two joints (exercises) from: square joint, V joint, half round joint or dove tail joint out of 100 x 50 x 5 mm M.S. stock

c. Sheet metal shop– Two jobs (exercises) from: Tray, cylinder, hopper or funnel from out of 22 or 20 guage G.I. sheet

d. House-wiring– Two jobs (exercises) from: wiring for ceiling rose and two lamps (bulbs) with independent switch controls with or without looping, wiring for stair case lamp, wiring for a water pump with single phase starter.

e. Foundry– Preparation of two moulds (exercises): for a single pattern and a double pattern.

f. Welding – Preparation of two welds (exercises): single V butt joint, lap joint, double V butt joint or T fillet joint

REFERENCE BOOKS:

1. Work shop Manual / P.Kannaiah/ K.L.Narayana/ SciTech Publishers.
2. Engineering Practices Lab Manual, Jeyapoovan, Saravana Pandian, 4/e Vikas
3. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House

PART B – IT Workshop

Course Objectives:

- To provide Technical training to the students on Productivity tools like Word processors, Spreadsheets, Presentations.
- To make the students know about the internal parts of a computer, assembling a computer from the parts, preparing a computer for use by installing the operating system.
- To learn about Networking of computers.

Task 1: Learn about Computer: Identify the internal parts of a computer, and its peripherals.

Represent the same in the form of diagrams including Block diagram of a computer. Write specifications for each part of a computer including peripherals and specification of Desktop computer. Submit it in the form of a report.

Task 2: Assembling a Computer: Disassemble and assemble the PC back to working condition. Students should be able to trouble shoot the computer and identify working and non-working parts. Student should identify the problem correctly by various methods available (eg: beeps). Students should record the process of assembling and trouble shooting a computer.

Task 3: Install Operating System: Student should install Linux on the computer. Student may install another operating system (including proprietary software) and make the system dual boot or multi boot. Students should record the entire installation process. Students should record the various features that are supported by the operating system(s) installed. They have to submit a report on it. Students should be able to access CD/DVD drives, write CD/DVDs, access pen drives, print files, etc. Students should install new application software and record the installation process.

Task 4: Networking: Students should connect two computers directly using a cable or wireless connectivity and share information. Students should connect two or more computers using switch/hub and share information. Crimpling activity, logical configuration etc should be done by the student. The entire process has to be documented.

Task 5: Word Processor: Students should be able to create documents using the word processor tool. Some of the tasks that are to be performed are inserting and deleting the characters, words and lines, Alignment of the lines, Inserting header and Footer, changing the font, changing the color, including images and tables in the word file, making page setup, copy and paste block of text, images, tables, linking the images which are present in other directory, formatting paragraphs, spell checking, etc. Students should be able to prepare project cover pages, content sheet and chapter pages at the end of the task using the features studied. Students should submit a user manual of the word processor considered.

Task 6: Presentations: creating, opening, saving and running the presentations, Selecting the style for slides, formatting the slides with different fonts, colors, creating charts and tables, inserting and deleting text, graphics and animations, bulleting and numbering, hyperlinking, running the slide show, setting the timing for slide show. Students should submit a user manual of the Presentation tool considered.

REFERENCE BOOKS:

1. 1. Introduction to Computers, Peter Norton, Mc Graw Hill.
2. MOS study guide for word, Excel, Powerpoint & Outlook Exams", Joan Lambert, Joyce Cox, PHI.
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. Networking your computers and devices, Rusen, PHI.

Trouble shooting, Maintaining & Repairing PCs", Bigelows, TMH

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1505107 / 1505208	ED	Programming in C Lab	0	0	3	50	50	2

Objectives:

- To make the student lear n C Programming language.
- To make the students sol ve problems, implement them using C language.

The Student is expected to solve at least 12 assignments from different concepts (every year 12 different experiments).

SAMPLE LIST OF EXPERIME NTS:

1. Practice DOS/LINUX co mmands necessary for design of C programs.
2. Write, edit, debug, compile and execute sample C programs to understa nd the programming environment.
3. a) Write a C program to find the sum of the individual digits of a given num ber.

   b) Write a C program to c heck whether a given number is a palindrome or n ot.
4. a) Write a C program to g enerate & print first n terms of the Fibonacci sequence.

   b) Write a C program to find the roots of a quadratic equation.
5. a) Write a C program to c ompute the factorial of a given number.

   b) Write a C program to g enerate all the prime numbers within a given range
6. a) Write a C program to g enerate PASCAL triangle.

   b) Write a C program to find the GCD of two integers.
7. a) Write a C program to e valuate the function Sin(x) as defined by the infinite series expression.

   $$\text{Sin}(x) = \frac{x}{1!} - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \cdots .$$

   b) Write a C program to find the square root of a given number.
8. a) Write a C program to find both smallest and largest number in a list of integers.

   b) Write a C program to erform multiplication of two matrices.
9. Write a C program to read a matrix and perform the following operations.

   i) Print transpose of a matrix.

   ii) Removal of duplicates from an ordered array.
10. a) Write a C program to p erform arithmetic operations using functions.

    b) Write a C program to find the factorial of a given number using recursive function.
11. a) Write a C program to count the number of vowels, constants, blank spac es, digits and special characters in a given string.

    b) Write a C program to c heck whether a given string is palindrome or not.
12. Write a C program to read two strings and perform the following operations without using built-in string library functions.

    i) String length det ermination.

ii) Comparison of two strings.

iii) Concentration of two strings.

iv) String reversing.

12. Write a C program to define a structure with the following members.

    Roll No., Name, marks in Sub1, Sub2, Sub3. Read the n students records and find the total marks of each student and print the result in the following format.

Roll No.	Name	Sub1	Sub2	Sub3	Total Marks	Result
1234	XXX	40	50	90	180	Distinction

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1524108 / 1524207	HS	English Language and Communication Skills Lab	0	0	3	50	50	2

Objectives:

- To improve the language, proficiency of the students in English with an emphasis on LSRW Skills.
- To develop an awareness in the students about the significance of silent reading and comprehension.
- To equip the students to study academic subjects with greater facility through theoretical and practical components of the syllabus.
- To develop study skills as well as communication in formal and informal situations.
- To enable students to express themselves fluently and appropriately in social and professional contexts.
- To develop an awareness in the students about writing as an exact and formal skill.

LANGUAGE LAB

1. Phonetics
2. Situational Dialogues
3. Telephonic Skills
4. Describing Objects / Situation / People and Places
5. Information Transfer
6. Idioms

COMMUNICATION LAB

1. Introducing oneself
2. JAM Session
3. Extempore / Elocution
4. Role-play
5. Debate
6. Group Discussion

Suggested Software: Walden & K-Van Solutions

III Sem. (ECE)

MATHEMATICS-IV

(For EEE and ECE Branches only)

Objectives:

- To train the students in getting a thorough understanding of the fundamentals of special functions.
- To prepare students for lifelong learning and successful careers using analytic function, conformal mapping, complex integration and residues.

UNIT I

Special Functions: Beta function - Gamma function - Relation between Beta and Gamma functions and their properties. – Evaluation of improper integrals – Power series method.

UNIT II

Bessel functions – Solution of Bessel equation - Recurrence formulae for $J_n(x)$ - Generating function for $J_n(x)$ - Jacobi series – Orthogonality of Bessel functions - Legendre polynomials – Solution of Legendre's equation – Legendre Polynomials - Rodrigue's formula -Generating function for $P_n(x)$ - Recurrence formulae for $P_n(x)$ - Orthogonality of Legendre polynomials.

UNIT III

Functions of a complex variable – Limit – Continuity -Differentiability - Analytic function – Properties – Cauchy – Riemann equations in cartesian and polar coordinates - Harmonic and Conjugate harmonic functions. - Construction of analytic function using Milne - Thomson method. Applications to flow problems.

UNIT IV

Conformal Mapping: Some standard transforms – translation, rotation, magnification, inversion and reflection. Bilinear transformation –invariant points. Special conformal transformations $w = e^z$, z^2, sinz and cosz. Complex integration: Line integral - Evaluation along a path and by indefinite integration - Cauchy's theorem - Cauchy's integral formula - Generalized integral formula.

UNIT V

Singular point – Isolated singular point – Simple pole, Pole of order m - Essential singularity.

Residues: Evaluation of residues by formula. Cauchy's residue theorem - Evaluation of the real definite integrals of the type (i) Integration around the unit circle $\int_0^{2\pi} f(\cos\theta, \sin\theta)d\theta$ (ii) integration around a small semi circle $\int_{-\infty}^{\infty} f(x)dx$

Text Books:

1. Higher Engineering Mathematics by Dr. B.S Grewal, Khanna Publishers-43 edition.
2. Advanced Engineering Mathematics by Erwin Kreyszig, Willey Publications, 9th edition.
3. Higher Engineering Mathematics by B.V.Ramana, Mc.Graw Hill Education(India) Private Limited.

Reference Books:

1. Advanced Mathematics for Engineers and Scientists by B. Rama Bhupal Reddy and K.V. Nageswara Reddy, Research India Publications.
2. Advanced Engineering Mathematics by N. Bali, M Goyal, Firewall Media 7th edition.
3. Engineering Mathematics, Volume – III , E. Rukmangadachari & E. Keshava Reddy, Pearson Publisher.

Out comes:

- The students become familiar with the application of special functions and complex variables to engineering and Industrial problems.
- The students will be able to use Complex Analysis to analyze, formulate and solve the problems in engineering applications.

III Sem. (ECE)

ELECTROMAGNETIC FIELDS

Course Objectives:

This course makes students to

- Get foundational education in static electromagnetic fields, and time varying electromagnetic waves.
- Get the knowledge of Maxwell's equations.
- Analyze and solve the problems of electric and magnetic fields that vary with three dimensional spatial co-ordinates as well as with time.

Course Outcomes: This course makes students to

- Get the ability to use vector algebra, and vector calculus.
- Become Proficient in the use of vector identities, and various Coordinate systems & Transformations.
- Possess basic education in static electromagnetic fields.
- Analyze and solve the problems related to electric and magnetic fields.

UNIT-I

Electrostatic Fields: Vector Algebra, Co-ordinate systems, Vector Calculus, Coulomb's law, Electric field intensity, Field due to different charge distributions, Line charge, Surface charge and volume charge distributions. Electric flux and Flux density, Gauss law and its applications.

UNIT-II

Energy and Potential: Divergence theorem. Maxwell's equations for electrostatics in integral and point forms. Energy expended in moving a point charge in an electric field, Line integral, Potential difference and potential, Potential field of a point charge and system of charges, Potential gradient, Dipole, Energy density in the electrostatic field.

UNIT-III

Conductors, Dielectrics and Capacitances: Current and current density, Convection and conduction currents, Continuity of current, metallic conductors, nature of dielectric materials, Capacitance-Parallel plate, Co-axial and Spherical Capacitors, Poisson's and Laplace equations-examples.

UNIT-IV

Magneto static Fields: Biot-savart's law, Ampere's law and applications, Magnetic flux density, Maxwell's two equations for magneto static fields, magnetic scalar and vector potentials, Forces due to Magnetic fields, Ampere's force law, inductances and magnetic energy, illustrative problems.

UNIT-V

Maxwell's Equations: Faraday's law and transformer emf, Inconsistency of ampere's law and displacement current density, Maxwell's equations in different final forms and word statements, conditions at boundary surface-Dielectric-Dielectric and Dielectric-conductor interfaces, illustrative problems.

Text Books:

1. Hayt W.H., Engineering Electromagnetics, 7th Edition, TMH, 2006.
2. Matthew N.O. Sadiku, Elements of Electromagnetics, 4th Edition, Oxford University Press, 2008.
3. Jordan and Balmain, Electromagnetic Waves and Radiating Systems, 2nd Edition, Pearson Ed. 2000.
4. Joseph A. Edminister, "Electromagnetics", Schaum's Outline, McGraw-Hill, 2nd edition, 1994.

Reference Books:

1. G.S.N. Raju, "Electromagnetic Field Theory and Transmission Lines", 1st Edition, Pearson Ed. 2013.
2. John D. Kraus, "Electromagnetics", 3rd Edition, Mc Graw-Hill, 1988.
3. Nanapeneni Narayana Rao, "Elements of Engineering Electromagnetics", 6th Edition, Pearson Ed. 2009.

III Sem. (ECE)

VICES AND CIRCUITS

(Common to EEE & ECE Branches)

Course Objectives:

- To understand electronic devices, including diodes, bipolar junction transistors and FET.
- To understand basic circuits of the electronic devices.

Learning Outcomes:

- Gain practical knowledge of the principles of operation and characteristics of pn Junction diodes, Zener diodes, Photodiode and Phototransistor.
- Able to analyze and design pn Junction diode Rectifier circuits.
- Able to design BJT & FET Amplifiers and analyze their frequency response
- Demonstrate the knowledge in LED, SCR and UJT in future applications

UNIT-I

Semiconductors: Intrinsic and extrinsic semiconductors, mobility and conductivity, Fermi level and carrier concentration of semi conductors, Drift and diffusion currents, continuity equation, Hall effect.

PN junction diode: Construction and operation of PN Junction diode, V-I Characteristics, Temperature Dependence, Static and dynamic resistance, Transition and Diffusion Capacitance, Zener diode and photo diode.

UNIT-II

Rectifiers: Half-wave, Full-wave and Bridge Rectifiers with and without Filters, Ripple Factor and Regulation Characteristics.

UNIT-III

Bipolar Junction Transistors: NPN and PNP junction Transistors, Current components, CB, CE and CC Configurations and their Input and Output Characteristics, Comparison of CE, CC and CB, Saturation, Cutoff and Active Region, α, β and γ Parameters and the relation between them.

UNIT-IV

Field Effect Transistor (FET): JFET and its characteristics, Pinch off Voltage, Drain Saturation Current, MOSFET–Enhancement and Depletion Modes, Small signal models of FET, Biasing of FETs.

UNIT-V

Transistor Biasing Circuits: Various Biasing Circuits, Thermal Runaway, Stabilization and compensation, Thermal Stability, Transistor as an Amplifier.

Special Semiconductor Devices: Tunnel Diode, LED, Schottky Barrier Diode, Varactor Diode, Photo transistor, Uni- Junction transistor (UJT), SCR, LDR, .

Text Books:

1. Jacob Millman and C. Halkias, “Electronic devices and circuits”, McGraw Hill.
2. Jacob Millman and C. Halkias, “Integrated Electronics Analog Digital Circuits”, McGraw Hill.
3. R.L. Boylestad, “Electronic Devices and Circuit Theory”, Prentice Hall Publications.
4. N.Salivahanan, and N.Suresh Kumar, “Electronic Devices and Circuits”, TMH ,3rd Edition, 2012.

Reference Books:

1. David A. Bell, “Electronic Devices and Circuits”, Oxford University press , 5th Edition, 2008.
2. K. Lal Kishore, “Electronic Devices and Circuits”, BSP. 2nd Edition, 2005
3. S. Sedra and K.C. Smith, “Microelectronic Circuits”, Oxford University Press, 5th Edition.

III Sem. (ECE)

SIGNALS AND SYSTEMS

Course Objectives:

- The objective of the course is to analyze the response of linear, time-invariant dynamic systems to standard input signals.
- To Study the different standard signals that can be applied to the various systems for the estimation of their performance.

Learning Outcomes:

- Get acquaintance with Frequency domain representation of different types of signals which is essential to analyze and design advanced communication systems.
- Apply the Laplace transform to analyze and design continuous-time and discrete-time signals and systems.
- Use the knowledge of Discrete Time Signals and Systems in digital signal processing applications
- Develop mathematical skills to solve problems involving convolution, filtering, modulation and sampling**.**

UNIT-I

Introduction: Definition and Classification of Signals, Elementary signals, Basic operations on signals.

Fourier series representation of periodic signals: Analogy between vectors and signals, Orthogonal signal space, Signal approximation using orthogonal functions, Mean square error, Closed or complete set of orthogonal functions, Orthogonality in complex functions. Representation of function by a set of mutually orthogonal functions, Dirichlet's conditions, Trigonometric Fourier series and Exponential Fourier series, Spectrum and its significance, Amplitude and Phase spectra.

UNIT-II

Fourier transforms: Fourier transform(FT), Fourier transform of standard signals, properties of Fourier transforms, Fourier transforms involving impulse function, Fourier transform of periodic signals,

UNIT-III

Discrete Time Signals: Sampling of continuous time signals, Sampling theorem, Reconstruction of signal from its samples, effect of under sampling – Aliasing. Unit impulse, step, ramp, and exponential sequences, Periodicity of Discrete-time signals, Operations on Discrete-time signals.

Signal transmission through LTI systems: Systems, Classification of Systems, Linear time invariant (LTI) system, Transmission of signals through LTI systems, Transfer function of a LTI system. Distortion less transmission through LTI system, Causality & Stability.

UNIT-IV

Discrete Time Systems: Definition, classification, Linear Shift Invariant(LSI) system, Stability , Causality , Linear constant coefficient difference equation , Impulse response , Discrete time Fourier transform , Properties , Transfer function , System analysis using DTFT.

Convolution and correlation of signals and sequences: Graphical method of convolution, auto correlation and Cross correlation of functions, properties of correlation function, Energy density spectrum, Power density spectrum, Relation between convolution and correlation, Applications of convolution and correlation.

UNIT-V

Laplace Transform: Definition , ROC , Properties , Inverse Laplace transform , The S-plane and BIBO stability , Transfer functions , System response to standard signals.

Text Books:

1. Simon Haykin, "Communication Systems", 2nd Edition, Wiley-Eastern, 2003.
2. Oppenheim AV and Willisky, "Signals and Systems", 2nd Edition, Pearson Ed, 1997.
3. B.P. Lathi, "Principles of Linear systems and signals," Oxford Univ. Press, Second Edition International version, 2009.

Reference Books:

1. Simon Haykin, Van Veen, and Wiley, "Signals & Systems", 2nd Edition, 2003.
2. Luis F. Chaparro, "Signals and Systems using MATLAB," Academic Press, 2011.
3. P. Ramesh Babu, R. Ananda Natarajan, "Signals and Systems", 2nd edition, SciTech Publications, 2006.

III Sem. (ECE)

NETWORK THEORY

Course Objectives:

This course introduces the concepts of circuit analysis which includes three phase circuits, transient analysis of D.C. and A.C excitations, various Network functions and synthesis.

Learning Outcomes: On successful completion of this course, the students will be able to

1. Demonstrate knowledge on
   - Star/delta connections with balanced/unbalanced conditions
   - Transient analysis of DC and AC excitations.
   - Two-port network parameters
   - Fourier analysis of AC circuits and Fourier transforms

2. Analyze
   RL, RC and RLC circuits for DC and AC excitations
   Electrical circuits for non-sinusoidal periodic waveforms
3. Design the network elements using two-port parameters.
4. Evaluate
   - Voltage, Current and Power for balanced and unbalanced 3 phase systems
   - Transient behaviour using differential equations and Laplace transforms.
   - Two port parameters namely Z, Y, ABCD, h and g.

UNIT – I

Network Theorems: Superposition Theorem, Thevinin's Theorem, Norton's Theorem, Compensation Theorem, Maximum Power Transfer theorem, Reciprocity theorem, Millmen's theorem, Tellegen's theorems for D.C and Sinusoidal Excitations.

UNIT – II

Three Phase Circuits: Advantages of Three phase system, Phase sequence, balanced and unbalanced systems – magnitude & phasor relationship between line and phase voltages and currents in balanced Y and Δ circuits. Analysis of balanced Three phase circuits with Y and Δ connected loads –Analysis of unbalanced loads- Neutral displacement method, Y-Δ conversion and loop current method.

Measurement of Three phase power by two wattmeter method, Measurement of Three phase reactive power by single wattmeter method.

UNIT – III

DC Transient Analysis: Determination of Initial Conditions – Transient response of R-L, R-C and R-L-C circuits for DC–Solution method using differential equation and Laplace transforms.

UNIT – IV

AC Transient Analysis: Transient response of R-L, R-C and R-L-C series circuits for sinusoidal excitations – Solution method using differential equation and Laplace transforms. Analysis of Electrical Circuits non-sinusoidal periodic waveforms.

UNIT – V

Two Port Parameters: One port and two port networks, driving point and transfer functions of Networks. Open circuit impedance & short circuit admittance parameters, hybrid & inverse hybrid parameters, transmission & inverse transmission parameters, Inter-relationships between parameter sets – Series, parallel & cascade connection of two ports – condition for symmetry & reciprocity of two port Networks in terms of different parameters – Terminated two port Networks.

Text Books:

- Theory and Problems of Electrical Circuits – Joseph A. Edminister – Schaum Series, 1st Edition – TMH.
- Circuit Theory -A.Chakrabarti, DhanapatRai & Co publications.
- Electrical Circuits - N.Sreenivasulu, Reem publications.
- Network Analysis – Van Valkenburg - 3rd edition, PHI.

Reference Books:

- Circuits & Networks – A. Sudhakar, Shayammohan. S. Pillai, 4th Edition – TMH.
- Networks and Systems – D. Roy Chowdari – New Age International
- Network Analysis with applications – Stanely - Pearson education 4th edition.
- Network Analysis by G.K.Mittal, Khanna Publishers.

III Sem. (ECE)

ELECTRICAL MACHINES
(ECE)

UNIT-I

DC Machines: Principle of operation of DC generators-EMF equation –types of generators –magnetisation and load characteristics-applications –DC motor –torque equation –types and characteristics -3 point starter –efficiency calculation-speed control.

UNIT II

Transformers: Single phase transformers-principle of operation –types-constructional features-EMF equation-phasor diagram on no load and load-equivalent circuit –loss and efficiency-regulation –OC and SC tests –predetermination of efficiency and regulation.

UNIT III

Three Phase Induction Motors: Three phase induction motor-constructional features-principle of operation –types-slip-torque characteristics-efficiency calculations-starting methods.

UNIT IV

Synchronous Machines: Synchronous generators-constructional features-types-EMF equation distribution and coil span factor-regulation by synchronous impedance method-principle of operation of synchronous motor-method of starting.

UNIT V

Single Phase Motors: single phase induction motors-constructional features-shaded pole motors-capacitor motor-AC servo motor-AC tachometers-Synchros-stepper motor-characteristics and applications.

Text Books:

1. Electrical Machines-S.K.Battacharya-TMH
2. Electrical Technology-Edward Hughes 7th edition-Pearson Education.
3. A Text Book of Electrical Technology - B. L. Theraja & A. K. Theraja by S. Chand & Company Ltd.
4. Electrical Machines by J. B. Gupta, Kataria Publications
5. Electrical Machines by I.J. Nagarath & D. P. Kothari, TMH, 7th Edition

III Sem (ECE)

ELECTRICAL ENGINEERING LAB

Course Objectives:

1. To give practical knowledge of Network Theorems and Two port Networks
2. To make students perform various tests and learn about DC motors, generators, and single phase transformers.

Part-A:

1. Verification of KVL and KCL.
2. Series and parallel Resonance – Resonant frequency, Bandwidth and Q – factor determination for RLC network.
3. Two port network parameters – Determination of Z and Y parameters and analytical verification.
4. Two port network parameters – Determination of ABCD and h-Parameters and analytical verification.
5. Verification of Superposition and Reciprocity theorems.
6. Verification of maximum power transfer theorem. Verification on DC, verification on AC with Resistive and Reactive loads.
7. Experimental determination of Thevenin's and Norton's equivalent circuits and verification by direct test.

Part-B:

1. Magnetization characteristics of D.C. Shunt generator. Determination of critical field resistance and critical speed.
2. Swinburne's Test on DC shunt machine (Predetermination of efficiency of a given DC machine working as motor and generator)
3. Brake test on DC shunt motor. Determination of performance characteristics.
4. Speed control of DC Shunt Motor
5. OC & SC tests on Single – Phase transformer (Predetermination of efficiency and regulation at given power factors and determination of equivalent circuit).
6. Load test on single phase transformer.
7. Determination of voltage regulation of an alternator by synchronous impedance method.

Note: Any 10 of the above experiment are to be conducted, at least 5 from each part.

III Sem. (ECE)

ELECTRONIC DEVICES & CIRCUITS LAB

(Common to ECE & EEE)

Course Objectives:

- To know the different devices- their characteristics and applications
- To study the design and analysis of amplifier circuits

Learning Outcomes:

- Gain practical knowledge of the principles of operation and characteristics of pn-diodes, Zener diodes, Photodiode and Phototransistor
- Able to analyze and design pn-diode Rectifier circuits
- Able to design BJT & FET Amplifiers and analyze their frequency response
- Demonstrate the knowledge in LED, SCR and UJT in future applications

Electronic Workshop Practice (in 3 lab sessions):

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCB s
2. Identification, Specifications and Testing of Active Devices, Diodes, BJTs, Low power JFETs, MOSFETs, Power Transistors, LEDs, LCDs, SCR, UJT.
3. Study and operation of Millimetres (Analog and Digital), Function Generator, Regulated Power Supplies
4. Study and Operation of CRO

.List of Experiments: (Any ten from the following)

1. Forward and Reverse bias characteristics of PN Junction diode
2. Zener diode characteristics and Zener diode as Voltage Regulator.
3. Input and Output characteristics of Transistor in CB Configuration.
4. Input and Output characteristics of Transistor in CE Configuration.
5. Half Wave Rectifier With and without filter.
6. Full wave Rectifier With and without filter.
7. Bridge rectifier with and without filter.
8. FET characteristics
9. VI characteristics of LED
10. Characteristics of Photo diode
11. Characteristics of Photo transistor
12. SCR Characteristics.
13. UJT Characteristics.
14. LDR Characteristics.

Note: Change at least two experiments every year.

Equipment required for Laboratories:

1. Regulated Power supplies (RPS) - 0-30v.
2. CROs - 0-20M Hz.
3. Function Generators - 0-1 M Hz.
4. Multimeters
5. Decade Resistance Boxes/Rheostats -
6. Decade Capacitance Boxes
7. Micro Ammeters (Analog or Digital)- 0-20 μA, 0-50μA, 0-100μA, 0-200μA.
8. Voltmeters (Analog or Digital) - 0-50V, 0-100V, 0-250V.
9. Electronic Components - Resistors, Capacitors, BJTs, LCDs, SCRs, UJTs, FETs, LEDs, LDRs, MOSFETs, Diodes (Ge & Si type), Germanium and Silicon transistors (NPN & PNP type)

IV Sem. (ECE)

ANALOG COMMUNICATIONS

Course Objectives:

- To analyze various transmitter and receiver functions and circuits
- To analyze different modulation and demodulation techniques

Learning Outcomes:

- Get good knowledge of various Amplitude modulation and demodulation system needed in the development of any Communication System
- Design and apply AM and FM Transmitters, and TDM and FDM systems in analog communication Systems
- Demonstrate the ability to perform power and noise calculations
- Formulate and solve problems in analog communication systems

UNIT-I

Introduction to communication systems: Modulation and its needs and types, Fundamental physical limitations, Electromagnetic Spectrum and Area of Applications.

Amplitude modulation: Hilbert Transform and its properties, Pre-envelope and band pass signals, Full AM, DSBSC and SSB, Generation and detection methods, VSB, frequency translation, FDM, Nonlinear distortion and Inter Modulation.

UNIT-II

Angle modulation: Phase and frequency modulation, NBFM, WBFM, Multi-tone FM, Transmission band width of FM, direct and indirect generations of FM, Demodulation methods, Nonlinear effects, FM versus AM.

UNIT-III

Block diagram study of radio broadcast AM and FM transmitters: Super heterodyne receivers, choice of IF, AGC, Tracking-characteristics of radio receivers, FM stereo.

UNIT—IV

Noise: External and internal sources of noise, Noise calculations, Noise equivalent resistant, Noise figure, Noise temperature, Effect of noise in AM and FM modulation system, FM threshold effect, Pre-emphasis and de-emphasis.

UNIT-V

Sampling: Review of sampling theorem, Practical aspects of sampling; pulses of finite duration, Flat top sampling.

Pulse Analog Modulation: PAM generation and detection, PDM and PPM, Generation and detection, Spectra, Synchronization.

Text books:

1. Simon Haykin, "Communication Systems", Wileyestern, 1978
2. Kennedy and Davis, "Electronic communication systems", 4th Edition, Mc Graw International edition, 1992.
3. A. Bruce Carlson "Communication systems", Mc Graw Hill, ISE, 5th edition.

Reference Books:

1. Dennis Roddy and John Coolen, "Electronic communications" Prentice-Hall of India Private Limited, 1981.
2. B.P. Lathi "Modern Digital and Analog communication system", Oxford University Press, 2nd Edition, 1996.
3. Taub and Schilling, "Principles of communication Systems", Mc Grace Hill, ISE, 1971.

IV Sem. (ECE)

SWITCHING THEORY AND LOGIC DESIGN

(Common to EEE & ECE Branches)

Course Objectives:

- To provide the students with an introduction to the fundamentals of Number systems, logic gates, Combinational and sequential circuits

Learning Outcomes:

- Learn the concepts of number systems, Boolean Algebra and K-Maps that are essential to minimize the logical functions in the design and development of digital systems
- Design and develop various combinational and sequential circuits
- Demonstrate the ability to realize Switching functions using Programmable Logic Devices
- Solve engineering problems pertaining to Digital Electronics and arrive at solutions

UNIT I

Number Systems & Codes: Overview of number systems –complement representation of negative numbers-binary arithmetic, binary codes-error detecting & error correcting codes –Hamming codes.

UNIT II

Boolean Algebra and Minimization of Switching Functions: Fundamental postulates of Boolean Algebra - Basic theorems and properties –Canonical and Standard forms- Minimal SOP and POS forms ,Algebraic simplification digital logic gates –universal gates-Multilevel NAND/NOR realizations. The map method, tabulation method.

UNIT III

Combinational Logic Design: Design using conventional logic gates, Encoder, Decoder, Multiplexer, De-Multiplexer, Realization of switching functions using multiplexer, Parity bit generator, Code-converters, Hazards and hazard free realizations.

UNIT IV

Programmable Logic Devices: Basic PLD's-ROM, PROM, PLA, and PLD, Realization of Switching functions using PLD's.

UNIT V

Sequential Circuits: Synchronous and Asynchronous sequential circuits, Flip-flops-Triggering and excitation tables, Flip flop conversions, shift registers, Design of Synchronous and Asynchronous counters, Ring and Johnson counters. Serial Binary adder, Sequence detector.

Text Books:

1. ZVI Kohavi, Switching & Finite Automata theory –, TMH, 2nd Edition.
2. Morris Mano, "Digital Design", PHI, 3rd Edition, 2006.

3. A. Anand Kumar, “Switching Theory & Logic Design”, 2008, PHI

Reference Books:

1. William I. Fletcher, “An Engineering Approach to Digital Design”, PHI.
2. Charles H. Roth, “Fundamentals of Logic Design”, Thomson Publications, 5th Edition, 2004.
3. John M. Yarbrough, “Digital Logic Applications and Design”, Thomson Publications, 2006.

IV Sem. (ECE)

ELECTRONIC CIRCUIT ANALYSIS

Course Objectives:

- To provide knowledge about single stage amplifiers, multi-stage amplifiers, feedback amplifiers, large signal amplifiers, differential, tuned amplifiers and FET amplifiers and their analysis.
- To provide knowledge about working and design of oscillators.
- Different transistor models at high frequencies.

Learning Outcomes:

- Study various characteristic features of BJT Amplifiers
- Able design various single stage and multi-stage BJT and FET Amplifiers
- Able to design Feedback amplifiers and Oscillators
- Able to perform analysis of various tuned amplifiers and Power Amplifiers

UNIT-I

General Amplifiers: Concept of amplifier, Voltage gain, current gain, input and output resistances, conversion efficiency, frequency response, Bandwidth, Distortion, classification of amplifiers, amplifier circuits using BJT and FET and their biasing schemes.

UNIT-II

BJT Amplifiers: Hybrid model (h- parameters), small signal analysis of a single stage BJT Amplifiers, Comparison of CE, CB and CC amplifiers, Approximate model analysis, Effects of coupling and bypass capacitors on low frequency response, Hybrid-Π model at high frequencies, parameters f_α , f_β and f_T.

UNIT-III

FET Amplifiers: Small signal model, Analysis of CS, CD and CG amplifiers, High frequency response.

Multistage Amplifiers: Types of coupling, choice of amplifier configurations, overall gain and band width of n-stage amplifier, Analysis of two-stage RC coupled amplifier, Darlington and Bootstrap circuits.

UNIT-IV

Feedback Amplifiers: Feedback concept, classification, Effects of negative feedback on gain, stability, noise, distortion, bandwidth, input and output resistances. Different types of feedback circuits.

Sinusoidal oscillators: Barkhausen criterion, RC phase shift, Wein bridge, Hartley, Colpitts and Crystal Oscillators.

UNIT-V

Tuned amplifiers: Introduction, Q-factor, small signal tuned amplifiers, effect of cascading single tuned amplifiers on bandwidth, effect of cascading double tuned amplifiers on bandwidth, stagger tuned amplifier , stability of tuned amplifiers.

Power amplifiers: Classification of power amplifiers, efficiency of class-A, class-B, class-C and class- D power amplifiers, complementary symmetry push pull power amplifier.

Text Books:

1. Jacob Millman, Christos C Halkias, "Integrated Electronics", McGraw Hill.
2. Allen Mottershead, "Electronic Devices and Circuits" Prentice –Hall of India
3. S. Salivahanan – "Electronic Devices and Circuits" – TMH, 3rd Edition, 2012.

Reference Books:

1. Robert L. Boylestad, Louis Nashelsky, "Electronic Devices and Circuit Theory", Pearson Education, 9th Edition, 2008.
2. Donald A Neamen, "Electronic Circuits Analysis and Design", Tata McGraw-Hill, 3rd Edition, 2009.
3. Sedra, Kenneth, Smith, "Microelectric circuits", Oxford University Press, 5th Edition, 2011.

IV Sem. (ECE)

PULSE AND DIGITAL CIRCUITS

Course Objectives:

- To provide the fundamentals of linear and nonlinear wave shaping and multivibrators.

Learning Outcomes:

- Demonstrate knowledge in constructing and analyzing linear and non-linear wave shaping circuits
- Use of Logic gates and Sampling gates to develop digital systems
- Design and Develop Switching Circuits and Multivibrator Circuits
- Apply synchronization and frequency division concepts in advanced applications
- Distinguish among various logic families and Select the appropriate one for an application

UNIT I

Linear Wave shaping: High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square and ramp inputs. High Pass RC network as Differentiator, Low Pass RC network as integrator, attenuators and its applications as a CRO probe, illustrative Problems.

UNIT II

Non-linear Wave shaping: Diode clippers, Transistor clippers, clipping at two independent levels, Comparators, applications of voltage comparators, clamping operation, clamping circuits taking source and Diode resistances into account, Clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage, Synchronized Clamping.

UNIT III

Multivibrators: Transistor as a switch, Transistor-Switching Times, Analysis and Design of Bistable, Monostable, Astable Multivibrators and their triggering circuits. Schmitt trigger circuit using BJT.

UNIT IV

Time Base Generators: General features of a time base signal, methods of generating time base waveform, Miller and Bootstrap time base generators – basic principles, Transistor miller time base generator, Transistor Bootstrap time base generator, Transistor Current time base generators.

Synchronization and Frequency Division: Pulse Synchronization of relaxation Devices, Frequency division in sweep circuit, Stability of relaxation Devices, Astable relaxation circuits, Monostable relaxation circuits, Synchronization of a sweep circuit with symmetrical signals.

UNIT V

Sampling Gates: Basic operating principles of sampling gates, Unidirectional and Bi-directional sampling gates, Four Diode Sampling Gate, Reduction of pedestal in gate circuits, Six Diode Gate, Applications of Sampling Gates.

Digital Logic Circuits: AND, OR, & NOT gates using Diodes, and Transistors, Analysis of DCTL, RTL, DTL, TTL, ECL, IIL, MOS, CMOS Logic Families, and comparison between the logic families.

Text Books:

1. J. Millman, H. Taub and Mothiki S. Prakash Rao, " Pulse, Digital and Switching Waveforms", TMH , 2nd Edition, 2008.
2. Brinton B. Mitchell, "Semiconductor Pulse Circuits with Experiments" Thomson Learning (1 June 1970)
3. David A. Bell, "Solid State Pulse Circuits", PHI, 4th Edition, 2002.
4. Sonde, B. S., "Introduction to system Design using IC's," Wiley, 2/e, 1994.

Reference Books:

1. Millman, J and Grabel A., Microelectronics, 2 nd. Edition, Mc Graw Hill.
2. A. Anand Kumar, "Pulse and Digital Circuits", PHI, 2005.
3. Ronald J. Tocci, "Fundamentals of Pulse and Digital Circuits", 3rd Edition, 2008

IV Sem. (ECE)

ELECTROMAGNETIC WAVES & TRANSMISSION LINES

Course Objectives:

- To give the basic education in time varying electromagnetic waves.
- To develope analytical skills for understanding propagation of electromagnetic waves in different media.
- To understand the concepts of transmission lines & their applications.
- To provide basic knowledge about guided waves and wave guides.
- To know about cavity resonators.

Learning Outcome: After completing the course, it makes the student to

- Become proficient with analytical skills for understanding propagation of electromagnetic waves in different media.
- Understand the concept of transmission lines & their applications.
- Apply Wave Guides and transmission lines in their projects

UNIT-I

Waves in Lossless and Lossy Media: Wave equations for conducting and perfect dielectric media, Uniform plane waves-Definition, All relations between E&H, Sinusoidal variations, Wave propagation in loss less and conducting media, conductors& dielectrics- characterization, wave propagation in good conductors and good dielectrics.

UNIT-II

Polarization, Reflection, and Refraction: Polarization – Linear, Circular, and Elliptical polarizations. Reflection and Refraction of plane waves-Normal and Oblique incidences for both perfect conductors and dielectrics, Brewster angle, Critical angle and total internal reflection, Surface impedance, pointing vector and pointing theorem-applications, power losses in a plane conductor, illustrative problems.

UNIT-III

Transmission Lines: Types, parameters, Transmission line equations, Primary & Secondary constants, Expression for characteristic impedance, Propagation constant, Phase and group velocities, infinite line concepts, Loss less and low loss characterization, Distortion- condition for Distortion less and minimum attenuation, Loading- Types of loading, illustrative problems.

UNIT-IV

Impedance Matching: Input impedance relations, SC and OC lines, Reflection coefficient, VSWR, UHF lines as circuit elements, impedance transformations, and Smith chart, single and double stub matching, illustrative problems.

UNIT-V

Wave Guides: Microwave frequencies advantages and applications, Waves between parallel conducting planes, TE and TM waves, Rectangular wave guides, Excitation of wave guides. Wave equations, rectangular and circular waveguides for TE and TM modes, Cutoff frequency and wave length, Group and phase velocity, Wave impedance, Guide attenuation, Rectangular and cylindrical resonators, Q of the cavity resonators.

Text Books:

1. Jordan and Balmain, “Electromagnetic Waves and Radiating Systems”, 2nd Edition, Pearson Ed.
2. Matthew N.O. Sadiku, “Principles of Electromagnetics”, 4 rd Edition, Oxford University Press.
3. John D. Ryder, “Networks, Lines and Fields”, PHI, 2nd Edition, 1999.

Reference Books:

1. G.S.N. Raju, “Electromagnetic Field Theory and Transmission Lines”, 1st Edition, Pearson Ed
2. Umesh Sinha, “Networks and Transmission Lines”, 8th Edition, Satya Prakashan

IV Sem. (ECE)

PROBABILITY THEORY & STOCHASTIC PROCESSES

Course Objectives:

- The Objective of this course is to provide the students with knowledge about the random variable, random process
- To model the random processes in the communication system such as receiver performance, interference, thermal noise, and multipath phenomenon

Learning Outcomes:

- This course enables students to interpret probability by modeling sample spaces
- They can apply various random processes like Gaussian, Exponential, Uniform and Poisson processes experimentally
- Compute PSD of Random process
- Design solutions for complex engineering problems involving random processes

UNIT-I

Probability: Axioms, Joint and conditional probability, Bayes' theorem, Bernoulli trials.

Random Variable: Concept, Distribution functions, Density functions, Conditional density functions.

UNIT -II

Operations on Single random variables: Expectation, Conditional expected value, Moments, Chebyshev, Markov's and Chernoff's inequalities, Characteristics and moment generating functions, Transformation of continuous, discrete random variable.

UNIT-III

Multiple Random Variables: Vector random variables, Joint distribution / Density functions , Conditional density / Distribution functions, Statistical independence, pdf and cdf for sum of random variables, Central limits theorem, Operations on multiple random variables, Expected value of function of random variables, Joint characteristic function, Joint by Gaussian random variables, Transformations of multiple random variables.

UNIT – IV

Random Processes : Concept, Stationarity, Independence, Time averages, Ergodicity, Correlation functions and its properties, Gaussian, Poisson, and Markov processes, Power spectral density and its properties, Relation between power spectral density and auto-correlation, Cross power spectral density and its properties, Power spectrum for discrete time processes and sequences, Definition of white and colored noise.

UNIT-V

Linear Systems with Random Inputs: Random signal response of linear system, System evaluation using random noise, Spectral characteristics of system response, Noise bandwidth, Band pass, Band limited, and Narrow band processes, Properties of band limited processes.

Text Books:

1. P.Z. Peebles Jr., "Probability Random Variables and Random Signal Principles", Tata McGraw-Hill, 4th Edition, 2001.
2. A. Papoulis and S. Unnikrishna Pillai, "Probability Random Variables and Stochastic Processes", 4th Edition, PHI, 2007
3. J. Launon and V. Chandrasekhar, "Introduction to Probability Random Processes", McGraw-Hill, 1997.
4. Hwei P. Hsu, Ph.D., "Theory and Problems of Probability, Random Variables, and Random Processes", Schaum's Outline Series, McGraw Hill, New York, 1968.

Reference Books:

1. S.P. Eugene Xavier, "Statistical Theory of Communication", New Age Publications, 2003.
2. B.P. Lathi, "Signals, Systems & Communications", B.S. Publications, 2003.
3. G.R. Babu and K. Pushpa, "Probability Theory and Stochastic Processes", Premier Publishing House.
4. D. G. Childer, "Probability and Random Processes", McGraw Hill, 1997.

IV Sem. (ECE)

ELECTRONIC CIRCUIT ANALYSIS LAB

Course Objectives:

- Working of different feedback amplifiers with frequency responses.
- Working of different Oscillators using transistors.

Learning Outcomes:

- Practically verify various Electronic Circuits
- Design and simulate(using advanced tools they will use in research and industrial applications) single stag and multi-stage BJT and FET Amplifiers
- Demonstrate their knowledge of design and simulation related to Feedback amplifiers and Oscillators
- Perform analysis of various tuned amplifiers and Power Amplifiers by design and simulation

Design and Simulation in Simulation Laboratory using any Simulation Software:

I Testing in the Hardware Laboratory (Minimum of 6 Experiments):

1. Common Emitter Amplifier
2. Common Source Amplifier
3. Common collector Amplifier
4. A Two Stage RC Coupled Amplifier.
5. Current shunt and Voltage Series Feedback Amplifier
6. Hartley oscillator
7. Wien Bridge Oscillator using Transistors
8. RC Phase Shift Oscillator using Transistors
9. Class A Power Amplifier (Transformer less)
10. Class B Complementary Symmetry Amplifier
11. High Frequency Common base (BJT) / Common gate (JFET) Amplifier.

II Testing in the Software Laboratory (6 Experiments)

1. Common Emitter Amplifier
2. Common Source Amplifier
3. Common collector Amplifier
4. A Two Stage RC Coupled Amplifier.
5. Current shunt and Voltage Series Feedback Amplifier
6. Hartley oscillator
7. Wien Bridge Oscillator using Transistors
8. RC Phase Shift Oscillator using Transistors
9. Class A Power Amplifier (Transformer less)
10. Class B Complementary Symmetry Amplifier
11. High Frequency Common base (BJT) / Common gate (JFET) Amplifier.

Note: Change at least two experiments every year.

IV Sem. (ECE)

PULSE & DIGITAL CIRCUITS LAB

Course Objectives:

- To know how to design the digital circuits and Multivibrators

Learning Outcomes:

- Design and analyze non-linear wave shaping circuits like clippers and clampers and waveform generators
- Design sequential and combinational circuits using logic gates and flip-flops.
- Understand the switching characteristics of transistor**s** essential in the design of switching circuits
- Design and analyze multivibrators using transistors.
- Design and analyze circuits like Schmitt Trigger, UJT relaxation oscillators, bootstrap sweep circuits and constant current sweep generator (using BJT)

List of Experiments: (Any twelve experiments)

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers.
3. Non Linear wave shaping – Clampers.
4. Transistor as a switch.
5. Study of Logic Gates, Adders & Subtractors.
6. Study of Flip-Flops.
7. Synchronous and Asynchronous Counters.
8. Shift registers.
9. Sampling Gates.
10. Astable Multivibrator.
11. Monostable Multivibrator.
12. Bistable Multivibrator.
13. Schmitt Trigger.
14. UJT Relaxation Oscillator.
15. Bootstrap sweep circuit.
16. Constant Current Sweep Generator using BJT.