Deenbandhu Chhotu Ram University of Science & Technology, Murthal (Sonepat)
B.Tech. 1ST YEAR (SEMESTER – I) (Common for all branches)
Choice Based Credit System (Scheme of Studies & Examinations w.e.f. 2018-19)

S. No.	Course Code	Course Title	Teaching Schedule			Marks of Class work	Examination Marks		Total Marks	Credits	Duration of Exam
			L	T	P		Theory	Practical			
1	HUM101C	ENGLISH LANGUAGE SKILLS (Gr.-A)	2	0	0	25	75	0	100	2	3
2		MATHEMATICS-I	3	1		25	75	0	100	4	3
3	CH101C	PHYSICS (Gr.-A) OR CHEMISTRY (Gr.-B)	3	1		25	75	0	100	4	3
4	EE101C EE103C CSE101C	BASIC ELECTRICAL ENGINEERING (Gr.-A) OR ELECTRICAL AND ELECTRONICS ENGG (For CHE only) OR PROGRAMMING FOR PROBLEM SOLVING (Gr.-B)	3 3	1 0		25 25	75 75	0 0	100 100	4 3	3
5	ME101C ME103C	ENGINEERING GRAPHICS & DESIGN (Gr.-A) OR WORKSHOP/ MANUFACTURING PRACTICES (Gr.-B)	1	0	4	25	0	75	100	3	3
6	HUM103C	ENGLISH LANGUAGE LAB (Gr.-A)	0	0	2	25	0	75	100	1	3
7	CH103C	PHYSICS LAB (Gr.-A) OR CHEMISTRY LAB (Gr.-B)	0	0	2	25		75	100	1	3
8	EE105C EE183C CSE103C	BASIC ELECTRICAL ENGINEERING LAB(Gr.-A)/ ELECTRICAL AND ELECTRONICS ENGG .LAB (For CHE only) OR PROGRAMMING FOR PROBLEM SOLVING LAB (Gr.-B)	0 0	0 0	2 4	25 25		75 75	100 100	1 2	3
9	MC101C	INDUCTION PROGRAM*	6	0	0	25	75	00	100	0	1.5
Total		Gr.-A	18	3	10	225	375	300	900	20	
		Gr.-B	16	2	10	175	300	225	700	17	

MATHEMATICS AND PHYSICS COURSES FOR DIFFERENT BRANCHES

COURSE CODE	COURSE TITLE
MATHEMATICS –I	
MATHS101C	MATHEMATICS –I (For computer Science & Engg)
MATHS103C	MATHEMATICS –I (For Bio-technology)
MATHS105C	MATHEMATICS –I (common for all branches except CSE & BT)
PHYSICS and PHYSICS LAB (Any One Combination)	

PHY101C PHY111C	INTRODUCTION TO ELECTROMAGNETIC THEORY IEMT LAB (For ME, AE, Aero & ECE)
PHY103C PHY113C	MECHANICS MECHANICS LAB (For CE)
PHY105C PHY115C	OPTICS, FIBRE OPTICS, MAGNETISM AND QUANTUM MECHANICS OFMQ LAB (For CHE, BT &BME)
PHY107 C PHY117 C	WAVES, OPTICS AND QUANTUM MECHANICS WAVES, OPTICS AND QUANTUM MECHANICS LAB (For EE)

PHY1O9C PHY119C	SEMICONDUCTOR PHYSICS SEMICONDUCTOR PHYSICS LAB (For CSE)

Note:

1 *Effective from the Academic Session 2019-20. Every student has to participate in the MANDATORY INDUCTION PROGRAM OF 07 working day DURATION at the start of regular teaching of first semester. It comprises physical activity, creative Arts, Universal Human Values, Literary, Proficiency Modules, Lectures by Eminent People, Visits to local Areas, Familiarization to Dept/ Branch & Innovations. The remaining equivalent of two weeks (14 days) will be covered during first semester and there will be an examination at semester end.

2 All the branches are to be divided into groups 'A' and 'B' as per the suitability of the institute/college, so that there is an equitable distribution of teaching load in odd and even semesters.

GROUP A: CSE, ECE.AERONAUTICAL
GROUP B: CIVIL, ELECTRICAL,MECHANICAL.

3. Induction Program Chief Coordinator/ coordinators/Mentors shall be assigned a load of 2 hours per week.

4. For student admitted in B. Tech. 1st Semester (C-Scheme) in 2019 and all trailing students, Examinations and evaluation of students shall be conducted as per guidelines AICTE Examinations Reforms covering the entire syllabus. The students shall be made aware about the reforms.

SYLLABUS: B Tech

Department: Common for all branches Subject: Subject
Subject: ENGLISH LANGUAGE SKILLS (Group-A)
Subject Code: HUM101C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
2	-	-	2	25	75	3 hours	100

Course objectives:

1. To equip students with English Language skills needed in academic and professional world
2. To make students technically proficient in handling language skills required for competitive exams.
3. To inculcate human/ethical values in the students to ensure their holistic development
4. To develop ability to critically read the literary texts

Course outcomes:

The students will be able to

1. Acquire basic proficiency in English
2. Develop their verbal ability
3. Enhance their writing, reading and analytical skills
4. Develop proficiency in reading along with sensitivity to the impact literary texts can have on their minds/lives

Course Contents:

Unit I: Basic Writing skills

TOPIC NO 1 Subject Verb Agreement
TOPIC NO 2 Noun Pronoun Agreement
TOPIC NO 3 Governance of Nouns Through Prepositions
TOPIC NO 4 Basic Verb Patterns (V, SV, SVO, SVOO, SVC, SVOC,SVOA)

Unit II: Vocabulary Building

TOPIC NO 5 One word substitution
TOPIC NO 6 Phrasal Verbs
TOPIC NO 7 Commonly used Idioms
TOPIC NO 8 Words/Phrases/Idioms from the texts prescribed in Unit IV-- their meaning and use in sentences

Unit III: Creating Grammatical Cohesion

TOPIC NO 9 Referring Time in Language (Tenses)
TOPIC NO 10 Use of Conditional Sentences
TOPIC NO 11 Use of Active and Passive Voice
TOPIC NO 12 Synthesis of Sentences using Coordinating and Subordinating Conjunctions

Unit IV: Reading and Writing Practices

TOPIC NO 13 Literary Texts:

A "The Secret of Work" by Swami Vivekananda
B " Public Transport in London and Delhi" by Nirad C. Chaudhuri C
"An Outline of Intellectual Rubbish" by Bertrand Russell
D "Mother Teresa" by Khushwant Singh

TOPIC NO 14 Writing official Letters- Issues Concerning Students' academic and social life
TOPIC NO 15 Essay Writing
TOPIC NO 16 Paragraph Writing

Note: Eight hour time on an average to each unit is recommended for class room teaching purposes.
Scheme of End Semester Examination (Major Test):

1. The duration of examination will be three hours.
2. Nine questions of 15 marks each will be set, out of which the examinees will have to attempt five questions.
3. First question of 15 marks will be compulsory. It will cover all the four units of theSyllabus.
4. The question will have sub- parts with marks assigned against each.
   Question No 02 to 09 will be set from the four units of the syllabus --- two from each unit of 15 marks each. The nature of the questions in each unit will depend upon the nature of content therein. Examinees will have to attempt four more questions, selecting one from each unit. The questions may have parts.

Department: Computer Science & Engg.
Subject: MATHEMATICS-I
Subject Code: MATH 101C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	100

Unit-I

TOPIC NO 1 Matrices addition and scalar multiplication, matrix multiplication;
TOPIC NO 2 Linear systems of equations, linear Independence,
TOPIC NO 3 rank of a matrix, determinants,
TOPIC NO 4 Cramer's Rule, inverse of a matrix,
TOPIC NO 5 Gauss elimination and Gauss-Jordan elimination.

Unit-II

TOPIC NO 6 Eigen values, Eigen vectors,
TOPIC NO 7 Cayley Hamiltan Theorem symmetric,
TOPIC NO 8 skew-symmetric, and orthogonal Matrices,
TOPIC NO 9 Eigen space. Diagonalization; Inner product spaces,
TOPIC NO 10 Gram-Schmidt orthogonalization.

Unit-III

TOPIC NO 11 Taylor's and Maclaurin theorems with remainders;
TOPIC NO 12 Maxima and minma of function of single independent variable.
TOPIC NO 13 Curvature & Asymptotes (Cartesian and polar form),
TOPIC NO 14 Evolutes and involutes; Evaluation of definite and improper integrals;
TOPIC NO 15 Beta and Gamma functions and their properties;
TOPIC NO 16 Applications of definite integrals to evaluate surface areas and volumes of revolutions.

Unit-IV

TOPIC NO 17 Vector space, linear dependence and independence of vectors,
TOPIC NO 18 basis, dimension; linear transformations (maps),
TOPIC NO 19 range and kernel of a linear map, rank and nullity,
TOPIC NO 20 Inverse of a linear transformation, rank-nullity theorem,
TOPIC NO 21 composition of linear Maps, Matrix associated with a linear map.

Text Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

Reference Books:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic Geometry, 9th Edition, Pearson Education.
2. D. Poole, Linear Algebra: A Modern Intaiduction, 2nd Edition, Brooks/Cole, 2005.
3. Veerarajan T., Engineering Mathematics for firstyear, Tata McGraw-Hill, New Delhi, 2008.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
5. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East-West press, Reprint 2005.

Course Outcomes:

1. The students will learn to apply differential and integral calculus to notions of curvature and to improper integrals.
2. They will have a basic understanding ofBeta and Gamma functions.
3. They will understand essential tools of matrices and determinant to solve system of algebraic equation.
4. To know the basic concepts of linear algebra i.e., linear transformations, eigen values, diagonalization and orthogonalization to solve engineering problems.
5. Apply Taylor series to approximate functions and estimate the error of approximation

Note:

1. The paper setter will set two questions (with/without parts) from each units, & a ninth compulsory question comprising of 6 to 10 sub-parts, covering the entire syllabus. The examinee will attempt 5 questions in all, along with the compulsory question (with all it sub- parts), selecting one question from each unit.
2. The use of programmable devices such as programmable calculators, etc. is not allowed during the exam.

Department: Common for all Branches except CSE & BT

Subject: MATHEMATICS –I (common for all branches except CSE & BT)

Subject Code: MATH 105C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	100

Unit-I

TOPIC NO 1 Determinants; Inverse and rank of a matrix,
TOPIC NO 2 System of linear equations; Symmetric,
TOPIC NO 3 skew- symmetric and orthogonal matrices;
TOPIC NO 4 Eigenvalues and eigen vectors;
TOPIC NO 5 Diagonalization of matrices;
TOPIC NO 6 Cayley-Hamilton Theorem, Matrix representation,
TOPIC NO 7 Rank-nullity theorem of a Linear Transformation,
TOPIC NO 8 Orthogonal transformation.

Unit –II

TOPIC NO 9 Convergence of sequence and series,
TOPIC NO 10 tests for convergence of sequence and series ;
TOPIC NO 11 Power series, Taylor's and Maclaurin series,
TOPIC NO 12 series for exponential, trigonometric and logarithm functions;
TOPIC NO 13 Fourier series: Half range sine and cosine series,
TOPIC NO 14 Parseval's theorem.

Unit-III

TOPIC NO 15 Taylor's and Maclaurin theorems with remainders; (one variable).
TOPIC NO 16 Asymptotes, Curvature
TOPIC NO 17 Evolutes and involutes,
TOPIC NO 18 Curve Tracing; Evaluation of definite and improper integrals;
TOPIC NO 19 Beta and Gamma functions and their properties;
TOPIC NO 20 Applications of definite integrals to evaluate surface areas and volumes of revolutions.

Unit-IV

TOPIC NO 21 Function of several variables: Limit,
TOPIC NO 22 continuity and partial derivatives,
TOPIC NO 23 Total derivative; Maxima, minima and saddle points;
TOPIC NO 24 Method of Lagrange multipliers; Differentiation under Integral Sign.,
TOPIC NO 25 Vector Calculus: Gradient, Directional derivative, curl and divergence.

Text Books:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

Reference Books:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic Geometry, 9th Edition, Pearson Education.
2. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
3. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
4. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005

Course outcomes:

Note:

1. The students will understand the basic properties of Determinants and matrices & apply these concepts in solving linear simultaneous equations.

2. They will learn the basic concepts regarding convergence of series.
3. The students will learn concepts of vector calculus and apply it in most of the branches of engineering.
4. They will be able to solve Eigen value problems and apply Cayley-Hamilton theorem.

1. The paper setter will set two questions (with/without parts) from each units, & a ninth compulsory question comprising of 6 to 10 sub-parts, covering the entire syllabus. The examinee will attempt 5 questions in all, along with the compulsory question (with all it sub-parts), selecting one question from each unit.
2. The use of programmable devices such as programmable calculators, etc. is not allowed during the exam

B.Tech. Semester-I/II (Common for ECE, ME, AE and AERO)
Subject: INTRODUCTION TO ELECTROMAGNETIC THEORY
Subject Code: PHY101C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	100

UNIT – I: Electrostatics in vacuum and linear dielectric medium

TOPIC NO 1 Calculation of electric field and electrostatic potential for a charge distribution

TOPIC NO 2 Divergence and curl of electrostatic field;

TOPIC NO 3 Laplace's and Poisson's equations for electrostatic potential Boundary conditions of electric field and electrostatic potential;

TOPIC NO 4 energy of a charge distribution and its expression in terms of electric field.

TOPIC NO 5 Electrostatic field and potential of a dipole.

TOPIC NO 6 Bound charges due to electric polarization;

TOPIC NO 7 Electric displacement; boundary conditions on displacement.

UNIT – II: Magneto statics

TOPIC NO 8 Bio-Savart law, Divergence and curl of static magnetic field;

TOPIC NO 9 vector potential and calculating it for a given magnetic field using Stokes' theorem;

TOPIC NO10 the equation for the vector potential and its solution for given current densities.

TOPIC NO 11 Magnetostatics in a linear magnetic medium:

TOPIC NO 12 Magnetization and associated bound currents; auxiliary magnetic field;

TOPIC NO 13 Boundary conditions on B and H.

TOPIC NO 14 Solving for magnetic field due to simple magnets like a bar magnet;

TOPIC NO 15 magnetic susceptibility and feromagnetic,

TOPIC NO 16 paramagnetic and diamagnetic materials.

UNIT – III: Faraday's law and Maxwell's equations

TOPIC NO 17 Faraday's law in terms of EMF produced by changing magnetic flux;

TOPIC NO 18 equivalence of Faraday's law and motional EMF;

TOPIC NO 19 Lenz's law; Electromagnetic breaking and its applications;

TOPIC NO 20 Differential form of Faraday's law; energy stored in a magnetic field.

TOPIC NO 21 Continuity equation for current densities;

TOPIC NO 22 Modified equation for the curl of magnetic field to satisfy continuity equation;

TOPIC NO 23 displacement current and magnetic field arising from time-dependent electric field;

TOPIC NO 24 Maxwell's equation in vacuum and non-conducting medium;

TOPIC NO 25 Energy in an electromagnetic field;

TOPIC NO 26 Flow of energy and Poyntingvector.

UNIT – IV: Electromagnetic waves and Transmission lines

TOPIC NO 27 The wave equation; Plane electromagnetic waves in vacuum,

TOPIC NO 28 their transverse nature and polarization;

TOPIC NO 29 relation between electric and magnetic fields of an electromagnetic wave;

TOPIC NO 30 energy carried by electromagnetic waves and examples.

TOPIC NO 31 Momentum carried by electromagnetic waves and resultant pressure.

TOPIC NO 32Introduction, Basic Principles of Transmission Lines,

TOPIC NO 33 Equivalent Circuit Representation,

TOPIC NO 34 General Transmission Line Equation,

TOPIC NO 35 Wave Characteristics on Finite Transmission Lines,

TOPIC NO 36 Transients on Transmission lines, Primary Constant.

Suggested Reference Books

1. David Griffiths, Introduction to Electrodynamics, Pearson Publisher
2. Resnick and Halliday, Physics, Wiley Publisher
3. W. Saslow, Electricity, magnetism and light, Elsevier Publisher

Department:Civil Engineering
Subject:MECHANICS
Subject Code: PHY103C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	100

UNIT I: Vector Mechanics of Particles

TOPIC NO 1Transformation of scalars and vectors under Rotation transformation;
TOPIC NO 2 Forces in Nature;
TOPIC NO 3 Newton's laws and its completeness in describing particle motion;
TOPIC NO 4 Form invariance of Newton's Second Law;
TOPIC NO 5 Solving Newton's equations of motion in polar coordinates;
TOPIC NO 6 Problems including constraints and friction;
TOPIC NO 7 Extension to cylindrical and spherical coordinates.

UNIT II: Mechanics of Particles in Motion and Harmonic Motion

TOPIC NO 8 Potential energy function; F = - Grad V, equipotential surfaces and meaning of gradient;
TOPIC NO 9 Conservative and non-conservative forces, curl of a force field;
TOPIC NO 10 Central forces; Conservation of Angular Momentum;
TOPIC NO 11 Energy equation and energy diagrams;
TOPIC NO 12 Elliptical, parabolic and hyperbolic orbits;
TOPIC NO 13 Kepler problem; Application:
TOPIC NO 14 Satellite manoeuvres;
TOPIC NO 15 Non-inertial frames of reference;
TOPIC NO 16 Rotating coordinate system: Five-term acceleration formula.
TOPIC NO 17 Centripetal and Coriolis accelerations;
TOPIC NO 18 Applications: Weather systems, Foucault pendulum;
TOPIC NO 19 Harmonic oscillator;
TOPIC NO 20 Damped harmonic motion – over-damped, critically damped and lightly- damped oscillators;
TOPIC NO 21 Forced oscillations and resonance.

UNIT III: Rigid Body Mechanics

TOPIC NO 22 Definition and motion of a rigid body in the plane;
TOPIC NO 23 Rotation in the plane;
TOPIC NO 24 Kinematics in a coordinate system rotating and translating in the plane;
TOPIC NO 25 Angular momentum about a point of a rigid body in planar motion;
TOPIC NO 26 Euler's laws of motion, their independence from Newton's laws,
TOPIC NO 27 their necessity in describing rigid body motion;Examples.
TOPIC NO 28 Introduction to three-dimensional rigid body motion—
TOPIC NO 29 only need to highlight the distinction from two-dimensional motion in terms of

(a) Angular velocity vector, and its rate of change and
(b) Moment of inertia tensor; Three-dimensional motion of a rigid body wherein all Points move in a coplanar manner: e.g. Rod executing conical motion with center of mass fixed — only need to show that this motion looks two dimensional but is three dimensional, and two dimensional formulation fails.

UNIT IV: Statics of Solids

TOPIC NO 30 Free body diagrams with examples on modeling of typical supports and joints;
TOPIC NO 31 Condition for equilibrium in three- and two- dimensions;

TOPIC NO 32 Friction: limiting and non-limiting cases;
TOPIC NO 33 Force displacement relationship;
TOPIC NO 34 Geometric compatibility for small deformations;
TOPIC NO 35 Illustrations through simple problems on axially loaded members liketrusses.

Suggested Reference Books

(i) Engineering Mechanics, 2nd ed. — MK Harbola, Cengage Learning India publisher
(ii) Introduction to Mechanics — MK Verma, CRC Press
(iii) An Introduction to Mechanics — D Kleppner & R Kolenkow, University Printing House, Cambridge
(iv) Principles of Mechanics — JL Synge & BA Griffiths, McGraw-Hill
(v) Mechanics — JP Den Hartog, Dover Publication
(vi) Engineering Mechanics - Dynamics, 7th ed. - JL Meriam, Wiley Publisher
(vii) Mechanical Vibrations — JP Den Hartog, Dover Publication
(viii) Theoryof Vibrations with Applications — WT Thomson, Pearson Publisher

Department: For EE
Subject: WAVESOPTICSANDQUANTUMMECHANICS
Subject Code: PHY107C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	100

UNIT – I: Wave and Light Motion

TOPIC NO 1 Waves: Mechanical and electrical simple harmonic oscillators,
TOPIC NO 2 damped harmonic oscillator,
TOPIC NO 3 forced mechanical and electrical oscillators,
TOPIC NO 4 impedance, steady state motion of forced damped harmonic oscillator
TOPIC NO 5 Non-dispersive transverse and longitudinal waves:
TOPIC NO 6 Transverse wave on a string, the wave equation on a string,
TOPIC NO 7 Harmonic waves, reflection and transmission of waves at a boundary,
TOPIC NO 8 impedance matching, standing waves and their Eigen frequencies,
TOPIC NO 9 longitudinal waves and the wave equation for them, acoustics waves.
TOPIC NO 10 Light and Optics: Light as an electromagnetic wave and Fresnel equations,
TOPIC NO 11 reflectance and transmittance,
TOPIC NO 12 Brewster's angle,
TOPIC NO 13 Total internal reflection and evanescent wave.

UNIT – II: Wave Optics and Lasers

TOPIC NO 14 Wave Optics: Huygens' principle,
TOPIC NO 15 superposition of waves and interference of light by wave-front splitting and amplitude splitting;
TOPIC NO 16 Young's double slit experiment,
TOPIC NO 17 Newton's rings, Michelson interferometer.
TOPIC NO 18 Farunhofer diffraction from a single slit and a circular aperture,
TOPIC NO 19 criterion for limit of resolution and its application to vision;
TOPIC NO 20 Diffraction gratings and their resolving power.
TOPIC NO 21 Lasers: Einstein'stheory of matter radiation interaction and A and B coefficients;
TOPIC NO 22 amplification of light by population inversion,
TOPIC NO 23 different types oflasers: gas lasers (He-Ne, CO), solid-state lasers (ruby, Neodymium), dye lasers;
TOPIC NO 24 Properties of laser beams: mono-chromaticity.

UNIT – III: Introduction to Quantum Mechanics

TOPIC NO 25 Wave nature of Particles,
TOPIC NO 26 Time-dependent and time-independent Schrodinger equation forwave function,
TOPIC NO 27 Born interpretation, probability current,
TOPIC NO 28 Expectation values, Free-particle wave function and wave-packets,
TOPIC NO 29 Uncertainty principle.
TOPIC NO 30 Solution of stationary-state Schrodinger equation for one dimensional problems–particle in a box,
TOPIC NO 31 particle in attractive delta-function potential,

TOPIC NO 32 square-well potential, linear harmonic oscillator.

TOPIC NO 33 Scattering from a potential barrier and tunneling;

TOPIC NO 34 related examples like alpha- decay,

TOPIC NO 35 field- ionization and scanning tunneling microscope,

TOPIC NO 36 tunneling in semiconductor structures.

UNIT – IV: Introduction to Solids and Semiconductors

TOPIC NO 37 Free electron theory of metals,

TOPIC NO 38 Fermi level, density of states in 1, 2 and 3 dimensions,

TOPIC NO 39 Bloch's theorem for particles in a periodic potential,

TOPIC NO 40 Kronig-Penney model and origin of energy bands.

TOPIC NO 41 Types of electronic materials: metals, semiconductors, and insulators.

TOPIC NO 42 Intrinsic and extrinsic semiconductors,

TOPIC NO 43 Dependence of Fermi level on carrier-concentration and temperature

TOPIC NO 44 Carrier generation and recombination,

TOPIC NO 45 Carrier transport: diffusion and drift, p -n junction.

References:

1. I. G. Main, "Vibrations and waves in physics", Cambridge University Press, 1993.
2. H. J. Pain, "The physics of vibrations and waves", Wiley, 2006.
3. E. Hecht, "Optics", Pearson Education, 2008.
4. A. Ghatak, "Optics", McGraw Hill Education, 2012.
5. O. Svelto, "Principles of Lasers", Springer Science & Business Media, 2010.
6. D. J. Griffiths, "Quantum mechanics", Pearson Education, 2014.
7. R. Robinett, "Quantum Mechanics", OUP Oxford, 2006.
8. D. McQuarrie, "Quantum Chemistry", University Science Books, 2007.
9. D. A. Neamen, "Semiconductor Physics and Devices", Times Mirror High Education Group, Chicago, 1997.
10. E.S. Yang, "Microelectronic Devices", McGraw Hill, Singapore, 1988.
11. B.G. Streetman, "Solid State Electronic Devices", Prentice Hall of India, 1995

Department: Computer Science & Engineering
Subject: SEMICONDUCTORPHYSICS
Subject Code: PHY109C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	100

UNIT – I: Electronic Materials

TOPIC NO 1Free electron theory, Density of states and energy band diagrams,
TOPIC NO 2 Kronig-Penny model (to introduce origin of band gap),
TOPIC NO 3 Energy bands in solids, E-k diagram, Direct and indirect bandgaps,
TOPIC NO 4Types of electronic materials: metals,
TOPIC NO 5 semiconductors, and insulators, Density of states,
TOPIC NO 6 Occupation probability, Fermi level
TOPIC NO 7 Effective mass, Phonon

UNIT – II: Semiconductors

TOPIC NO 8 Intrinsic and extrinsic semiconductors
TOPIC NO 9 Dependence of Fermi level on carrier-concentration and temperature
TOPIC NO10 Carrier generation and recombination,
TOPIC NO 11 Carrier transport: diffusion and drift, p-n junction,
TOPIC NO 12 Metal-semiconductor junction (Ohmic and Schottky),
TOPIC NO 13 Semiconductor materials of interest for optoelectronicdevices.

UNIT – III: Light-Semiconductor Interaction

TOPIC NO 14 Optical transitions in bulk semiconductors:
TOPIC NO 15 absorption, spontaneous emission, and stimulated emission;
TOPIC NO 16 Joint density of states, Density of states for photons,
TOPIC NO 17 Transition rates (Fermi's golden rule), Optical loss and gain;
TOPIC NO 18 Photovoltaic effect, Exciton, Drude model.

UNIT – IV: Measurements & Engineered Semiconductor Materials

TOPIC NO 19 Four-point probe and van der Pauw measurements for carrier density,
TOPIC NO 20 resistivity, and hall mobility;
TOPIC NO 21 Hot-point probe measurement, capacitance-voltage measurements,
TOPIC NO 22 parameter extraction from diode I-V characteristics,
TOPIC NO 23 DLTS, band gap by UV-Vis spectroscopy, absorption/transmission.
TOPIC NO 24 Density of states in 2D, 1d and 0D (qualitatively).
TOPIC NO 25 Practical examples of low-dimensional systems such as quantum wells, wires, and dots:
TOPIC NO 26 design, fabrication, and characterization techniques.
TOPIC NO 27 Heterojunctions and associated band-diagrams

References:

1. J. Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw-Hill Inc. (1995).
2. B. E. A. Saleh and M. C. Teich, Fundamentals of Photonics, John Wiley & Sons, Inc., (2007).
3. S. M. Sze, Semiconductor Devices: Physics and Technology, Wiley (2008).
4. A. Yariv and P. Yeh, Photonics: Optical Electronics in Modern Communications, Oxford University Press, New York (2007).
5. P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall of India (1997).
6. Online course: “Semiconductor Optoelectronics” by M R Shenoy on NPTEL
Online course: "Optoelectronic Materials and Devices" by Monica Katiyar and Deepak Gupta on NPTEL

And Technology, Murthal, Sonipat

B. Tech. Semester – I
Subject: CHEMISTRY(Group-B)
Subject Code: CH101C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	100

UNIT-I: Atomic and molecular structure:

TOPIC NO 1 Schrodinger equation.
TOPIC NO 2 Particle in a box solutions and their applications for conjugated molecules and nano particles.
TOPIC NO 3 Forms of the hydrogen atom wave functions and the plots of these functions to explore their spatial variations(derivation excluded).
TOPIC NO 4 Molecular orbitals of diatomic molecules and plots of the multicenter orbitals.
TOPIC NO 5 Molecular orbital energy level diagrams of diatomic.
TOPIC NO 6 Pi-molecular orbitals of butadiene and benzene .
TOPIC NO 7 Crystal field theory and the energy level diagrams for transition metal ions .
TOPIC NO 8 Band structure of solids and the role of doping on band structures.

Periodic properties:

TOPIC NO 9 Effective nuclear charge, penetration of orbitals,
TOPIC NO 10 variations of s, p, d and f orbital energies of atoms in the periodic table,
TOPIC NO 11 electronic configurations, atomic and ionic sizes,
TOPIC NO 12 ionization energies, electron affinity and electronegativity,
TOPIC NO 13 polarizability, oxidation states.

UNIT-II: Stereochemistry:

TOPIC NO 14 Representations of 3 dimensional structures,
TOPIC NO 15 structural isomers and stereoisomers Configurations,
TOPIC NO 16 symmetry chirality, enantiomers, diastereomers.
TOPIC NO 17 Optical activity, absolute configurations and conformational analysis.
TOPIC NO 18 Organic reactions and synthesis of a drug molecule:
TOPIC NO 19 Introduction to reactions involving substitution, addition, elimination,oxidation, reduction,cyclization and ring openings.
TOPIC NO 20 Synthesis of a commonly used drug molecule (Asprin/Paracetamol).

UNIT-II: Intermolecular forces and potential energy surfaces:

TOPIC NO 21 Ionic, dipolar and van der Waals interactions.
TOPIC NO 22 Equations of state of real gases and critical phenomena.
TOPIC NO 23 Potential energy surfaces (with example).

Use of free energy in chemical equilibrium:

TOPIC NO 24 Thermodynamic functions: energy, entropy and free energy.
TOPIC NO 25 Estimations of entropy and free energies.
TOPIC NO 26 Free energy and emf. Cell potentials, the Nernst equation and applications.
TOPIC NO 27 Acid base equilibria, oxidation reduction and solubility equilibria.
TOPIC NO 28 Water chemistry. Corrosion.
TOPIC NO 29 Use of free energy considerations in metallurgy through Ellingham diagrams.

UNIT-IV: Spectroscopic techniques and applications:

TOPIC NO 30 Principles of spectroscopy and selection rules.
TOPIC NO 31 Electronic spectroscopy. Fluorescence and its applications in medicine.
TOPIC NO 32 Vibrational and rotational spectroscopy of diatomic molecules and its applications.
TOPIC NO 33 Nuclear magnetic resonance and magnetic resonance imaging,

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TOPIC NO 34 surface characterisation techniques. Diffraction and scattering.

Suggested Text Books:

(i) University Chemistry by Bruce M. Mahan, 4th Edition, Pearson Education.
(ii) Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane
(iii)Fundamentals of Molecular Spectroscopy, by C. N. Banwel
(iv) Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S. Krishnan
(v) Physical Chemistry, by P. W. Atkins
(vi) Organic Chemistry: Structure and Function by K. P. C. Volhardt and N. E. Schore, 5th Edition.
(vii) Organic chemistry, by R.T Morrison, R.N Boyd, 7th Edition, Pearson Education.

Course Outcomes

1. The concepts developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular level modifications. Students will be able to understand these concepts upto advanced level
2. Quantum theory is more than 100 years old and to understand phenomena at nanometer levels, students will be able to understand the description of all chemical processes at molecular levels.

B. Tech. Semester – I (Common for all Branches)
Subject: BASIC ELECTRICAL ENGINEERING (Group-A)
Subject Code: EE101C

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Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	1	-	4	25	75	3 hours	100

Course Objectives:

1. To analyze dc and ac circuits.
2 To design and analyze RLC networks.
3. To appreciate basic knowledge of electric machines.
4. To assimilate elementary knowledge of electric installations.

UNIT-1: DC Circuits & Theorems:

TOPIC NO 1 Basics of electric circuit elements,
TOPIC NO 2 Kirchhoff's laws & its applications including those based on dependent sources,
TOPIC NO 3 Nodal and Loop methods of Analysis,
TOPIC NO 4 Star-Delta and delta-star transformations.
TOPIC NO 5 Network Theorems: Thevenin's theorem,
TOPIC NO 6 Norton's theorem, Superposition theorem,
TOPIC NO 7 Maximum Power transfer theorem.

UNIT-2: Single A.C. Circuits:

TOPIC NO 8 Sinusoidal signal, instantaneous & peak values, average and RMS values,
TOPIC NO 9 form factor, peak factor.
TOPIC NO 10 Concept of Phasors: Rectangular & Polar, Trigonometric & Exponential forms.
TOPIC NO 11 Behaviour of R, L, C components in ac circuits.
TOPIC NO 12 Time domain analysis of first-order RL and RC circuits.
TOPIC NO 13 Series and parallel circuits: Active and reactive power, power factor,
TOPIC NO 14 Resonance in series and parallel circuits.
TOPIC NO 15 Q-factor, cut off frequencies and bandwidth.
TOPIC NO 16 Three Phase Circuits: Phase and line voltages and currents,
TOPIC NO 17 balanced star and delta circuits.

UNIT-3: Electrical Machines:

TOPIC NO 18 Construction, working principle, type, & equation of Single phase Transformer,
TOPIC NO 19 Ideal Transformer, Phasor diagrams of Single-phase Transformer at no load and on load,
TOPIC NO 20 Equivalent circuit, losses, efficiency.
TOPIC NO 21 Three phase Transformer connections. single phase Autotransformer.
TOPIC NO 22 Rotating Machines: Construction,
TOPIC NO 23 operating principle of d.c. motors and its torque speed characteristics.
TOPIC NO 24 Construction and working principle & type of single phase Induction motor & Three-phase Induction motor,
TOPIC NO 25 concept of slip & torque-speed characteristics,
TOPIC NO 26 construction and working of synchronous generators

UNIT-4: Electrical and electronics components:

TOPIC NO 27 Components of LT Switchgear: Switch Fuse Unit (SFU),
TOPIC NO 28 MCB(Miniature Circuit Breaker),

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TOPIC NO 29 ELCB(Earth Leakage Circuit Breaker),
TOPIC NO 30 MCCB(Moulded Case Circuit Breaker),
TOPIC NO 31 Types of Wires and Cables, Earthing.
TOPIC NO 32 Types of Batteries,
TOPIC NO 33 Important Characteristics of Batteries.
TOPIC NO 34 Elementary calculations for energy consumption.
TOPIC NO 35 Introduction to power factor improvement and battery backup.

Course Outcomes:

1. Students will be able to analyze dc and ac circuits.
2. Students will be able to solve, design and synthesize electrical networks mathematically.
3. Obtain basic knowledge of electric installations.
4. Imbibe elementary knowledge of electric machines.

TEXT BOOKS:

1. Del Toro, “Principles of Electrical Engineering”, 2nd Edition,Pearson Education.
2. D.P.Kothari & I. J. Nagarath, “Basic Electrical Engg”, TMH, New Delhi, 3rd edition.
3. B.L. Theraja & A. K. Theraja, “Electrical Technology”, (Vol-I, Vol-II), S.Chand.
4. Edward Hughes, “Electrical & Electronics Technology”, 10th Edition,Pearson Education.

REFERENCE BOOKS:

1. T.K. Nagsarkar & M.S Sukhija, “Basic Electrical Engineering”, OXFORD Uni. Press.2004.
2. L. S. Bobrow, “Fundamentals of Electrical Engineering”, Oxford University Press.
3. D.C. Kulshreshtha, “Basic Electrical Engineering”, Mc Graw Hill.
4. Hayt & Kemmerly, “Engineering Circuit Analysis”, Mc Graw Hill.
5. “Schaum's Outline of Electric Circuits”, Mc Graw Hill.

A.K.Sawhney. A Course in Electronic Measurements and Instrumentation”, Dhanpat
6 Rai & Co.

7 S.K. Sahdev, “Basic Electrical Engineering” Pearson Education.

Department: Common for all Branches
Subject: PROGRAMMING FOR PROBLEM SOLVING (Group-B)
Subject Code: CSE101C

Study Scheme	Evaluation Scheme		Total Marks
Lectures per week	Internal Assessment	External Assessment (Examination)	

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L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
3	0	-	3	25	75	3 hours	100

Unit I

TOPIC NO 1 Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.),
TOPIC NO 2 Introduction to Programming ,Idea of Algorithm: steps to solve logical and numerical problems.
TOPIC NO 3 Representation of Algorithm: Flowchart/ Pseudocode with examples. ,
TOPIC NO 4 From algorithms to programs; source code,
TOPIC NO 5 variables (with data types) variables and memory locations,
TOPIC NO 6 Syntax and Logical Errors in compilation, object and executable code.

Unit II

TOPIC NO 7 Arithmetic expressions and precedence,
TOPIC NO 8 Conditional Branching and Loops,
TOPIC NO 9 Writing and evaluation of conditionals and consequent branching ,
TOPIC NO 10 Iteration and loops Arrays*:* Arrays (1-D, 2- D),
TOPIC NO 11 Character arrays and Strings, Functions (including using built in libraries),
TOPIC NO 12 Parameter passing in functions, call by value,
TOPIC NO 13 Passing arrays to functions: idea of call by reference

Unit III

TOPIC NO 14 Recursion: Recursion, as a different way of solving problems.
TOPIC NO 15 Example programs, such as Finding Factorial,
TOPIC NO 16 Fibonacci series, Ackerman function etc.
TOPIC NO 17 Structure**:** Defining structures and Array of Structures,
TOPIC NO 18 Pointers: Idea of pointers, Defining pointers,
TOPIC NO 19Use of Pointers in self-referential structures, notion of linked list (no implementation)

Unit IV

TOPIC NO 19 Basic Algorithms**:** Searching (Linear and binary search),
TOPIC NO 20 Basic Sorting Algorithms (Bubble, Insertion, Quick sort),
TOPIC NO 21 Finding roots of equations, notion of order of complexity through example.
TOPIC NO 22 Programs (no formal definition required)File handling (only if time is available,otherwise should be done as part of the lab)

Suggested Text Books:

1. Byron Gottfried, Schaum's Outline of Programming withC, McGraw-Hill
2. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill

Suggested Reference Books :

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, 2nd Edition, Pearson Education.

Department: Common for all Branches
Subject: ENGINEERING GRAPHICS AND DESIGN (Group-A)
Subject Code: ME101C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	

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1	0	4	3	25	75	3 hours	100

Detailed Contents

1 Introduction to Engineering Drawing:
TOPIC NO 1 Principles of Engineering Graphics and their significance,
TOPIC NO 2 usage of Drawing instruments, lettering,
TOPIC NO 3 Conic sections including the Rectangular Hyperbola
TOPIC NO 4 Cycloid, Epicycloid, Hypocycloid and Involute; Vernier Scales.

2 Orthographic Projections:
TOPIC NO 7 Principles of Orthographic Projections-Conventions –
TOPIC NO 8 Projections of Points and lines inclined to both planes;
TOPIC NO 9 Projections of planes inclined Planes - Auxiliary Planes.

3 Projections of Regular Solids:
TOPIC NO 10 those inclined to both the Planes- Auxiliary Views;
TOPIC NO 11 Draw simple annotation, dimensioning and scale.
TOPIC NO 12 Floor plans that include:windows, doors,
TOPIC NO 13 fixtures such as WC, bath, sink, shower, etc.

4 Sections and Sectional Views of Right Angular Solids:

5 TOPIC NO 14 Prism, Cylinder, Pyramid, Cone – Auxiliary Views;

6 TOPIC NO 15 Development of surfaces of Right Regular Solids –

7 TOPIC NO 16 Prism, Pyramid, Cylinder and Cone;
TOPIC NO 17 Draw the sectional orthographic views of geometrical solids
TOPIC NO 18 objects from industry and dwellings (foundation to slab only).

8 Isometric Projections coverin5
TOPIC NO 19 Principles of Isometric projection – Isometric Scale, Isometric Views,
TOPIC NO 20 Conventions; Isometric Views of lines, Planes,
TOPIC NO 21 Simple and compound
TOPIC NO 21 Solids;
TOPIC NO 22 Conversion of Isometric Views to Orthographic Views and Vice-versa

9 Overview of Computer Graphics:
TOPIC NO 23 Listing the computer technologies that impact on graphical communication,
TOPIC NO 24 Demonstrating knowledge of the theory of CAD software
TOPIC NO 25 The Menu System,
TOPTOPIC NO 25 Toolbars (Standard, Object Properties, Draw, Modify),
TOPIC NO 26 Drawing Area (BackgrRound, Crosshairs, Coordinate System),
TOPIC NO 27 Dialog boxes and windows, Shortcut menus (Button Bars),
TOPIC NO 28 The Command Line (where applicable),
TOPIC NO 29 The Status Bar, Different methods of zoom as used in CAD,
TOPIC NO 30 Select and erase objects, Isometric Views of lines,
TOPIC NO 31 Planes, Simple and compound Solids.

10 Customisation & CAD Drawing:
TOPIC NO 32 Consisting of set up of the drawing page and the printer,
TOPIC NO 33 including scale settings, Setting up of units and drawing limits;
TOPIC NO 34 ISO and ANSI standards for coordinate dimensioning and tolerance;
TOPIC NO 35 Orthographic constraints,
TOPIC NO 36 Snap to objects manually and automatically;
TOPIC NO 37 Producing drawings by using various coordinate input entry methods to draw straight lines,
TOPIC NO 38 Applying various ways of drawing circles.

11 Annotations, layering & other functions:
TOPIC NO 39 Applying dimensions to objects, applying annotations to drawings;
TOPIC NO 40 Setting up and use of Layers, layers to create drawings,
TOPIC NO 41 Create, edit and use customized layers;
TOPIC NO 42 Changing line lengths through modifying existing lines
TOPIC NO 43 Printing documents to paper using the print command;
TOPIC NO 44 orthographic projection techniques;

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egular geometric solids and project the true shape of the sectioned surface;D) Software

TOPIC NO 46 Drawing annotation, Computer-aided design

Text Books

S. No.	Title	Author(s)	Publisher
1	Engineering Drawing	Bhatt N.D., Panchal V.M. & Ingle P.R.	Charotar Publishing House
2	Engineering Drawing and Computer Graphics	Shah, M.B. & Rana B.C.	Pearson Education

Department: Common for all Branches
Subject: WORKSHOP/MANUFACTURING PRACTICES (Group-B)
Subject Code: ME103C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
1	0	4	3	25	75	3 hours	100

S. No.	Contents	Contact Hours
1	Lectures & videos: (10 hours)	
i.	Manufacturing Methods- casting, forming, machining, joining, advanced manufacturing methods	3
ii.	CNC machining, Additive manufacturing	2
iii.	Fitting operations & power tools	1
iv.	Carpentry	1
v.	Welding (arc welding & gas welding), brazing	1
vi.	Metal casting	1
vii.	Plastic moulding, glass cutting	1
2	Workshop Practice: (48 hours)	
i.	Machine shop	12
ii.	Fitting shop	6
iii.	Carpentry	6
iv.	Welding shop	6
v.	Casting	6
vi.	Smithy	6
vii.	Plastic moulding & Glass Cutting	6

Text Books

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S. No.	Title	Author(s)	Publisher
1	Elements of Workshop Technology, Vol. I and II	Hajra Choudhury S.K., Hajra Choudhury A.K. and Nirjhar Roy S.K.	Media promoters and publishers (P) limited
2	Manufacturing Engineering and Technology	Kalpakjian S. And Steven S. Schmid	Pearson Education India

Reference Books

S. No.	Title	Author(s)	Publisher
1	Manufacturing Technology– I	Gowri P. Hariharan and A. Suresh Babu	Pearson Education, India
2	Processes and Materials of Manufacture	Roy A. Lindberg	Prentice Hall, India
3	Manufacturing Technology, Vol. I and II	Rao P.N.	Tata McGraw Hill

Course Outcomes

The content delivery through lectures will enable the student to learn:

- The knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.

The laboratory practices will enable the student:

- To decide about the appropriate methods and tool for manufacturing a given product/job which gives the desired dimensional accuracies and dimensional tolerances.
- Fabricate components with their own hands safely while working with different machine tools and hand tools.
- By assembling different components, they will be able to produce small devices of their interest.

B.Tech. Semester I (Common for All Branches)
Subject Code: ENGLISH LANGUAGE LAB (Group-A)
Subject Code: HUM103C

L	T	P	Credits			
0	0	2	1	Class Work	:	25 Marks
				Examination	:	75 Marks
				Total	:	100 Marks
				Duration of Examination	:	3 Hours

Course Objectives:

1. To develop English language skills especially speaking and listening of the students
2. To make the students excel in their professional lives through proficiency in communication
3. To enhance the students linguistic and communicative competence
4. To enable them to face the challenges of professional and social life

Course Outcomes:

The Students will be able to

1. Acquire basic proficiency in Spoken English
2. Enhance their listening skills with listening comprehension exercises
3. Polish their speaking skills in English both at social and professional platforms
4. Present themselves confidently and meaningfully in professional and social circles.

Course Contents:

(i) Listening comprehension
(ii) Recognition of phonemes in International Phonetic Alphabet
(iii) Self introduction and introduction of another person
(iv) Conversation and dialogues in common everyday situations
(iv) Communication at work place (Standard phrases and sentences in various situations)
(vi) Telephonic communication
(vii) Speeches for special occasions (Welcome speeches, Introduction speeches, Felicitation speeches and Farewell speeches)
(viii) Tag Questions
(ix) Formal Presentations on literary texts prescribed in theorypaper

Note: Three hour time to each segment is recommended for instruction and practice.

Approved by Board of UG Studies, Department of Humanities on 19 March 2018

Scheme of End Semester Practical Exam:

1. A small passage may be read out to the examinees and they will have to write the answers to the questions asked at the end of the passage. Questions will be short answer type.
2. Examinees may be asked to identify the sounds of phonemes in given words.
3. Examinees may be asked to introduce themselves or others, participate in role play activities in mock situations, give short responses, engage in hypothetical telephonic conversation or supply the tag questions to statements etc.
4. Examinees may also be asked to deliver speeches on given situations or make presentation on the literary texts prescribed in Unit IV of theorypaper.

Recommended Readings:

1. Bhatnagar, Nitin and Mamta Bhatnagar. *Communicative English for Engineers and Professionals*. Pearson Education, 2013.
2. Swan, Michael. *Practical English Usage*. OUP, 1995.
3. Gangal, J.K. *Practical Course in Spoken English*. New Delhi: PHI Learning, 2015.
4. Konar, Nira. *Communication Skills for Professionals*. New Delhi: PHI Learning Pvt. Ltd., 2009.
5. Bansal, R.K. and J.B. Harrison. *Spoken English*. Orient Longman, 1983.
6. Sharma, Sangeeta and Binod Mishra. *Communication Skills for Engineers and Scientists*. Delhi: PHI Learning Pvt. Ltd., 2015.

Department: For ECE, ME, AE and AERO
Subject: INTRODUCTIONTOELECTROMAGNETICTHEORYLAB.
Subject Code: PHY111C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
0	0	2	1	25	75	3 hours	100

Syllabus:

Note: Students will be required to learn to take readings of vernier calliper, screw gauge, spherometer, spectrometer etc. during their orientation labs at the starting and will have to perform at least ten subject related experiments in a semester

Basic experiments on least count and error estimation (during orientation)

1. To aware about the least count of vernier calliper and screw gauge and to find the thickness of a slide using vernier calliper and diameter of wire using screw gauge.
2. Calculation of radius of curvature of a convex surface using spherometer.
3. Angel measurement using spectrometer.

List of Subject related Experiments:

1. To study Hall effect in semiconductors and measure the Hall coefficient.
2. To find frequency of AC mains using sonometer.
3. To study the magnetic properties of materials using B-Hcurve.
4. To study the Curies temperature of materials using Dielectric set up.
5. To verify the inverse square law with the help of a photovoltaic cell.
6. To determine Planks constant using photocell.
7. To study the characteristics of Solar cell and find out the fill factor.
8. To design and study Active and Passive filters.
9. To find impedance and Q factor using LCR circuit.
10. To study resonance phenomena in LCR circuit.
11. To measure e/m of electron using helical method.
12. To find temperature co-efficient of platinum using Callender Griffith bridge.
13. To study the forward and reverse characteristics of P-N junction diode.
14. To study the reverse characteristics of Zener diode and voltage regulation using Zener Diode

Department: For Civil Engineering Subject:
Subject :MECHANICS LAB.
Subject Code: PHY113C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
0	0	2	1	25	75	3 hours	100

Syllabus:

Note: Students will be required to learn to take readings of vernier calliper, screw gauge, spherometer, spectrometer etc. during their orientation labs at the starting and will have to perform at least ten subject related experiments in a semester.

Basic experiments on least count and error estimation (during orientation)

1. To aware about the least count of vernier calliper and screw gauge and to find the thickness of a slide using vernier calliper and diameter of wire using screwgauge.
2. Calculation of radius of curvature of a convex surface using spherometer.
3. Angel measurement using spectrometer.

List of Subject related Experiments:

1. To find the moment of inertia measurement of a fly wheel.
2. To find acceleration due to gravity using bar pendulum.
3. To study resonance phenomena in mechanical oscillators.
4. To examine the behaviour of coupled pendulum.
5. To examine air track experiment and study Collisions between objects, governed by the laws of momentum and energy.
6. To find the modulus of rigidity of a wire using Maxwell's Needle.
7. To determine the moment of inertia of the given disc using Torsion pendulum.
8. To perform experiment on Rotation and Gyroscopic Precession.
9. To measure spring constant using Hook's Law.
   To measure height of a distant object using sextant.

Department: For EE
Subject: WAVES, OPTICS& QUANTUM MECHANICS LAB
Subject Code: PHY117C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
0	0	2	1	25	75	3 hours	100

Syllabus:

Note: Students will be required to learn to take readings of vernier calliper, screw gauge, spherometer, spectrometer etc. during their orientation labs at the starting and will have to perform at least ten subject related experiments in a semester.

Basic experiments on least count and error estimation (during orientation)

1. To make aware the students about the least count of vernier calliper and screw gauge and to find the thickness of a slide using vernier calliper and diameter of wire using screw gauge.
2. Calculation of radius of curvature of a convex surface using spherometer.
3. Angel measurement using spectrometer.

List of Subject related Experiments:

1. To find out wavelength of monochromatic light using Newton's ring experiment.
2. To findout wavelength of monochromatic light using Diffraction grating.
3. To findout wavelength of monochromatic light using Freshnel's bi-pris
4. To study interference phenomena using Michelson's Interferometer and to find out wavelength of monochromatic light.
5. To find specific rotation of sugar using Polarimeter
6. To find thickness of hair using He-Ne laser.
7. To find Cauchy's constants of a prism byusing spectrometer.
8. To find resolving power of a telescope
9. To determine Planks constant using photocell.
10. To study the characteristics of solar cell and find out the fill factor.
11. To verify the inverse square law with the help of a photovoltaic cell
12. To study Zeeman splitting using EPS/ESR

Department: For Computer Science & Engineering
Subject: SEMI CONDUCTOR PHYSICS LAB
Subject Code: PHY119C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
0	0	2	1	25	75	3 hours	100

Syllabus

Note: Students will be required to learn to take readings of vernier calliper, screw gauge, spherometer, spectrometer etc. during their orientation labs at the starting and will have to perform at least ten subject related experiments in a semester.

Basic experiments on least count and error estimation (during orientation)

1. To aware about the least count of vernier calliper and screw gauge and to find the thickness of a slide using vernier calliper and diameter of wire using screwgauge.
2. Calculation of radius of curvature of a convex surface using spherometer.
3. Angel measurement using spectrometer.

List of Subject related Experiments:

1. To study the forward and reverse characteristics of P-N junctiondiode.
2. To study the characteristics of transistor in common baseconfiguration.
3. To study the characteristics oftransistor in common emitter configuration.
4. To study the characteristics of Junction field effect (JFET) transistor.
5. To study the characteristics of Metal oxide semiconductor field effect (MOSFET) transistor.
6. To study the characteristics of Solar cell and find out the fill factor.
7. To design and study Active and Passive filters.
8. To study the reverse characteristics of Zener diode and voltage regulation using Zener Diode.
9. To determine Planks constant using photocell.
10. To measure e/m of electron using helical method.
11. To find capacitance of condenser using fleshing and quenching experiment.
12. To find temperature co-efficient of platinum using Callender Griffith bridge.
13. To find out low resistance by Carry Foster bridge.
14. To find resistance of galvanometer by post officebox.
15. To compare the capacitance of two capacitors using De'Sauty Bridge.

Department: COMMON FOR ALL BRANCHES
Subject: CHEMISTRY LAB(Group-B)
Subject Code: CH103C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
0	0	2	1	25	75	3 hours	100

LIST OF EXPERIMENTS:

1 .Determination of surface tension of given solvent by stalgmometer.
2. Removal of Ca^{2+} and Mg^{2+} hardness from given water sample using ion exchange coloumn.
3. Calculate the Rf value of given sample using thin layer chromatography.
4. Calculate the strength of strong acid by titrating it with strong base using conductometer.
5. Calculate the e.m.f value of given cell.
6. Prepare the sample ofurea formaldehyde and phenol formaldehyde.
7. Determination of chloride content ingiven water sample.
8. To study the kinetics of ethyl acetate with NaOH.
9. Preparation of asprin.
10. Calculate the specification value of given oil sample.
11. Chemical analysis of two anions and two cations in given sample of salt.
12. Determination of the partition coefficient of a substance between two immiscible Liquids.
13. Determine the alkalinity of given water sample .
14. Study the adsorption phenomena using acetic acid and charcoal.
15. Lattice structures and packing of spheres.
16. Determine the viscosity of given liquid using Ostwald viscometer.

Course Outcomes:

1. The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering.
2. The students will learn to: Estimate rate constants of reactions from concentration of reactants/products as a function of time.
3. Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc. Synthesize a small drug molecule and analyse a salt sample

Note: At least 10-12 experiments are to be performed by the students

1. Each laboratory class/section shall not be more than about 20 students.

2. To allow fair opportunity of practical hands on experience to each student, each experiment may either done by each student individually or in group of not more than 3-4 students. Larger groups be strictly discouraged/disallowed.

3. Pre-experimental &post experimental quiz/questions may be offered for each lab experiment to reinforce &aid comprehension of the experiment.

Suggested Books:

1. A Text book on Experiments and Calculation –Engineering Chemistry by S.S.Dara, S.Chand & Company Ltd.
2. Essential of Experimental Engineering chemistry, Shashi Chawla, Dhanpat Rai Publishing Co.

3 Theory & Practice Applied Chemistry – O.P.Virmani, A.K. Narula (New Age)

Department: COMMON FOR ALL BRANCHES Subject:
BASIC ELECTRICAL ENGINEERING LAB. (Group-A)
Subject Code: EE105C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
0	0	2	1	25	75	3 hours	100

LIST OF EXPERIMENTS

1. To study frequency response of a series R-L-C circuit and determine resonant frequency & Q-factors for various Values of R, L, C.
2. To study frequency response of a parallel R-L-C circuit and determine resonant frequency & Q-Factors for various values of R, L, C.
3. To perform Open circuit & Short circuit Tests on single phase Transformer.
4. To plot torque- speed characteristic of separately excited DC motor.
5. Demonstration of a DC-DC convertor and DC to AC Convertor and also draw PWM waveform.
6. Speed control of induction motor using DC-ACconvertor.
7. Demonstration of Components of LT switch gear like MCB, MCCB, SFU, ELCB and earthing.
8. To obtain torque-slip characteristics of three phase induction motor.
9. To perform voltage control of synchronous generator through field excitation.
10. To study transient and steady state time response of RLC series circuits.

Laboratory Outcomes

1. Get an exposure to common electrical components and the irratings.
2. Understand the usage of common electrical measuring instruments.
3. Student will be able to understand and design resonant circuits.
4. Understand the basic characteristics of transformers and electrical machines.

Department: COMMON FOR ALL BRANCHES
Subject: PROGRAMMINGFORPROBLEMSOLVINGLAB.(Group-B)
Subject Code: CSE103C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
0	0	2	1	25	75	3 hours	100

The laboratory should be preceded or followed by one hour of tutorial to explain the approach or algorithm to be implemented for the problem given.

Tutorial 1: Problem solving using computers:
Lab1: Familiarization with programming environment
Tutorial 2: Variable types and type conversions:
Lab 2: Simple computational problems using arithmetic expressions
Tutorial 3: Branching and logical expressions:
Lab 3: Problems involving if-then-else structures
Tutorial 4: Loops, while and for loops:
Lab 4: Iterative problems e.g., sum of series
Tutorial 5: 1D Arrays: searching, sorting:
Lab 5: 1D Array manipulation
Tutorial 6: 2D arrays and Strings
Lab 6: Matrix problems, String operations
Tutorial 7: Functions, call by value:
Lab 7: Simple functions
Tutorial 8 &9: Numerical methods (Root finding, numerical differentiation, numerical integration):
Lab 8 and 9: Programming for solving Numerical methods problems
Tutorial 10: Recursion, structure of recursive calls
Lab 10: Recursive function
Tutorial 11: Pointers, structures and dynamic memory allocation
Lab 11: Pointers and structures
Tutorial 12: File handling:
Lab 12: File operations

Course Outcomes:

1. To formulate the algorithms for simple problem
2. To translate given algorithms to a working and correct program To be able to correct syntax errors as reported by the compilers
3. To be able to identify and correct logical errors encountered at runtime
4. To be able to write iterative as well as recursive programs
5. To be able to represent data in arrays, strings and structures and manipulate them through a program
6. To be able to declare pointers of different types and use them in defining self-referential structures.
7. To be able to create, read and write to and from simple text files.

Department: COMMON FOR ALL BRANCHES
Subject: INDUCTION PROGRAM
Subject Code: MC101C

Study Scheme				Evaluation Scheme			Total Marks
Lectures per week				Internal Assessment	External Assessment (Examination)		
L	T	P	Credits	Max. Marks	Max. Marks	Exam Duration	
0	0	0	0	25	75	3 hours	100

Course Outcomes:

At the end of this course, students will demonstrate the ability to:

1. Understand self.
2. Inculcate Human Values.
3. Feel inspired for intensive & extensive studies, co-curriculars, career, & life.
4. Nurture a hobby.
5. Dismantle upsets quickly& move forward in life.

Course Curriculum:

1. Each student has to participate in the mandatory Audit (Non-credit) Course INDUCTION PROGRAM of 21 days.
2. Out of these 21 days, initial 07 working days duration shall be dedicated solely to the Induction Program before the start of regular teaching of first semester.
3. The remaining two weeks (14 working days) will be spread over the rest of first semester by allotting 6 periods per week (preferably 2 periods each on Tues., Wed. & Thurs.), however, these periods shall necessarily be in the same slots for all engineering disciplines / branches so that if a common activity is to be planned, the same may be effected / actualized at the Univ. / Institute level.
4. Induction Program comprises of:
   a) Physical Activities,
   b) Creative Arts,
   c) Mentoring And Universal Human Values (UHVs),
   d) Literary Activities,
   e) Proficiency Modules,
   f) Lectures And Workshops by Eminent People,
   g) Visits to local Areas,
   h) Familiarization With Respective Dept./ Branch & Institute,
   i) Co-Curricular Activities in Univ. / College.
5. Each student will maintain a Diary to jot down salient points & scribble associated points lest these may wither & wane away from memory, because each student has to clear an Objective Type Test at the end of this Audit Course.
6. Also, students may keep recording their feedback / rating, on a scale of 1 to 10, of each speaker/ session/ activity in their diary, to reproduce the same in feedback session. The Mentors of resp. groups & Activity In-charges shall from time to time sign on these diaries to monitor progress & attendance.
7. It is expected that students, while coming on to sports arenas, will come in proper sports attire (sports shoes, etc.). They may also carry, in a bag/ carry-bag, their formal dress for subsequent sessions.
8. Each *Universal Human Values (U.H.V.) Discussion Group* shall consist of 20 Students + 2 Senior Student Guides + 1 Faculty Mentor.
9. Venue & Schedule: For cost-effectiveness, the Venue for the Lectures, Proficiency Modules, & common activities, etc. may be kept as Convention Centre/ Auditorium of the Univ./ resp. Institute. The venue for dept.-specific activities may be decided by Chairpersons of resp. Depts. offering these modules.

10. Evaluation Scheme:
    a) The Internal Assessment / Sessional / Class-work Marks shall be awarded for 25 marks by the mentor (for each group of about 20 students of respective branch/ discipline) based on candidate's regularity, attendance, diary work, assignments & enthusiastic participation in various activities of the Induction Program. These marks shall be collected (from each of the mentors of a group of about 20 students of resp. branch) by the senior-most mentor (or by the Class In-charge of 1st Year of the concerned branch/ discipline, as decided by Univ./ concerned Institute) who may upload the Sessional / Internal Assessment / Class-work Marks on the Univ. portal.
    b) There will be an end-semester examination of 75 marks based on selected chapters of the Text Books / References, and the B.Tech. Ordinance of the Univ., and on the life and achievements of State & National Heroes.
    c) Any student failing in the Sessional / Class-work / Internal Assessment and / or in the end-semester examination of Induction Program shall have to reappear and pass as per provisions of the B.Tech. Ordinance.
11. Any student failing of the Induction Program shall have to Preparing for the Conduct of the Program:
    a) Univ. / Each Institute may appoint a Faculty in-charge called Chief Coordinator, Induction Program, who shall prepare the Schedule of 1st Week & shall be responsible, along with his team (which shall necessarily include Faculty Mentors defined in this paragraph, besides other members), for its execution. Further, each Dept. may appoint one Faculty Mentor for each group of 20 first year students of each branch. The senior-most amongst such Faculty Mentors of a Dept. / branch (or the Class In-charge of 1st year of respective branch) shall, in association with other mentor(s), if any, of respective branch shall prepare, within the overall mandate of the Induction Program, the Schedule for the rest of the Semester & shall be responsible for its execution & also for Internal Assessment/ Class- work Marks award and upload. The Chief Coordinator may hold meetings of mentors periodically.
    b) Training program(s) for Chief Coordinator & faculty mentors may be conducted by Univ./ resp. Institute on how to mentor students based on universal human values, & imparting holistic education & larger vision of life.

Text Books / References:

1. Dr. J.S. Saini, "A Pithy Guide for Induction Program", Internal Report, DCRUST, Murthal, Sonipat (Haryana), 2019.
2. Rajeev Sangal, Gautam Biswas, Timothy Gonsalves, Pushpak Bhattacharya, "Motivating UG Students Towards Studies", IIT Director's Secretariat, IIT, Delhi, 2016.
3. "A Guide to Induction Program", Model Curriculum for Undergraduate Degree Courses in Engineering & Technology, vol.-1, Jan. 2018.
4. "A Detailed Guide on Student Induction Program', AICTE, Vasant Kunj, New Delhi, July 30, 2018.
5. R.R. Gaur, R. Sangal, G.P. Bagaria, "A Foundation Course in Human Values & Professional Ethics", Pub.: Excel Books
6. Chapters 1, 2, 3 & 17 of Joseph Murphy, "The Power of Your Sub-Conscious Mind", Samaira Book Publishers, Ghaziabad, U.P. India (also available at www.ichoosetoheal.com).
7. Dr. Spencer Johnson, "Who Moved My Cheese", Vermillion Press.
8. Dr. Birender Hooda, "General Warm Up Exercise Structure And Cardiovascular Fitness Threshold of Training & Target Zones for Aerobic Exercise", Internal Report, DCRUST, Murthal, 2018.
9. Dr. J.S. Saini, "Reading the Mind and Jogging the Brain (A Compilation)", Internal Report, DCR Univ. of Sci. & Tech., 2019.

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