

# Course Syllabi

## Department of Sciences and Humanities

### SCL101 PREPARATORY MATHEMATICS

(15 Lectures)

**Pre-requisite:** NIL

**Contents:**

**Differential Calculus**

Set theory, concept of functions, types of functions, limit, continuity, differentiability of functions and graphical representation of functions.

**Integral Calculus**

Basic concepts, Integration as a limit of sum, Elementary methods of integration (Integration by parts, by substitution and by partial fraction) Definite Integral basic rules, properties of definite integrals.

**Geometry**

Two dimensional geometry; straight lines, circle, conic sections.

Three dimensional geometry; coordinate system, planes and straight lines.

**Text Books:**

1. Thomas, G.B. and Finney R.L., Calculus and Analytic Geometry, 9<sup>th</sup> ed., Addison-Wesley, 2003.
2. Loney, S.L., The Elements of Coordinate Geometry: Cartesian Coordinates Part-1, AITBS Publishers, India, 2014.

### SCL102 APPLIED MATHEMATICS-I (3-2-0-4)

**Pre-requisite:** NIL

**Contents:**

**Differential Calculus**

Functions of single variable: Limit, continuity and differentiability. Mean value theorems: Rolle's Theorem, Lagrange's theorem, Cauchy's theorem, Taylor's theorem with remainders, indeterminate forms, curvature, curve tracing.

**Integral Calculus**

Fundamental theorem of Integral calculus, mean value theorems, evaluation of definite integrals, Applications in Area, length, volumes and surface of solids of revolutions, Improper integrals: Beta and Gamma functions, differentiation under integral sign.

**Infinte series**

Sequences, Infinite series of real and complex numbers, Cauchy criterion, tests of convergence, absolute and conditional convergence, improper integrals, improper integrals depending on a parameter, uniform convergence, power series, radius of convergence.

**Matrices**

Rank of matrix, consistency of a system of equations, linear dependence and independence, linear and orthogonal transformations, Eigen values and Eigen vectors, Cayley – Hamilton theorem, reduction to diagonal form, Hermitian and skew Hermitian matrices, Quadratic forms.

**Text Books:**

1. Kreyszig, E., Advanced Engineering Mathematics, 9<sup>th</sup> ed., Wiley-India, 2013.
2. Piskunov, N.S., Differential and Integral Calculus (Vol. 1 and Vol. 2), CBS Publishers and Distributors Pvt. Ltd., 2000.

**Additional Books:**

1. Thomas, G.B. and Finney R.L., Calculus and Analytic Geometry, 9<sup>th</sup> ed., Addison-Wesley, 2003.
2. Greenberg, M.D., Advanced Engineering Mathematics, 2<sup>nd</sup> ed., Pearson Education, 2014.
3. Jain, R.K. and Iyengar, S.R.K., Advanced Engineering Mathematics, 4<sup>th</sup> ed., Narosa Publishers, 2014.

### SCL103 APPLIED MATHEMATICS-II (3-2-0-4)

**Pre-requisite:** NIL

**Contents:**

Limit, continuity and differentiability of functions of several variables, partial derivatives and their geometrical interpretation. Euler's theorem on homogeneous functions, Total differentiation, chain rules, Jacobian, Taylor's formula, maxima and minima, Lagrange's method of undetermined multipliers. Multiple Integrals: Double and triple integrals, change of order of integration, change of variables, application to area, volumes and C.G.

**Vector Calculus**

Scalar and vector fields, gradient of scalar point function, directional derivatives, divergence and curl of vector point function, solenoidal and irrotational vector fields.

Vector integration: line, surface and volume integrals, Green's theorem, Stoke's theorem and Gauss divergence theorem (without proof)

**Ordinary Differential Equations**

First order differential equations: Exact equation, Integrating factors, Reducible to exact differential equations, Linear and Bernoulli's form, orthogonal trajectories, First order simultaneous differential equations.

Solutions of second and higher order linear equation with constant coefficients,

Method of variation of parameters, Solution of Cauchy's equation,

Application of first and second order differential equations.

**Fourier Series**

Fourier series for general interval, Fourier series for even and odd functions, half range sine and cosine series expansions, exponential form of Fourier series.

**Text Books:**

1. Kreyszig, E., Advanced Engineering Mathematics, 9<sup>th</sup> ed., Wiley-India, 2013.
2. Boyce, W.E. and DiPrima, R.C. Elementary Differential Equations and Boundary Value Problems, 10<sup>th</sup> ed., John Wiley and Sons, 2013.

**Additional Books:**

1. Thomas, G.B. and Finney R.L., Calculus and Analytic Geometry, 9<sup>th</sup> ed., Addison-Wesley, 2003.
2. Jain, R.K. and Iyengar, S.R.K., Advanced Engineering Mathematics, 4<sup>th</sup> ed., Narosa Publishers, 2014.
3. Greenberg, M.D., Advanced Engineering Mathematics, 2<sup>nd</sup> ed., Pearson Education, 2014.

### SCL104 APPLIED PHYSICS (3-0-2-4)

**Pre-requisite:** NIL

**Contents:**

Mechanics of solids (formulation of particles) and fluid, Quantum mechanics, mechanics wave nature of a particles uncertainty principal.

Postulates of quantum theory, Schrodinger equation and operators, Electromagnetics, interaction with electrons, electrostatic lense, electron gun cyclotron, Waves, Mechanical waves.

Optics: Diffraction, interference, thin films, photonic crystals, transmission through fibers, introduction to Lasers.

Solid state physics, Crystal structures, atomic packaging miller indices, band theory, hall effects, conduction in semiconductors and devices, diodes, drift current and diffusion current.

**Practical:** Practicals as per course contents.

**Text Books:**

1. Dommelen, L.V., Quantum Mechanics for Engineers, Dommelen, 2004.
2. Halliday, D., Resnick R. and Walker, J., Principles of Physics, 9<sup>th</sup> ed., Wiley India, 2013.

**Additional Books:**

1. Beiser, A., Concepts of Modern Physics, 6<sup>th</sup> ed., Tata McGraw Hill, 2009.
2. Jenkins, F.A. and White, H.E., Fundamentals of Optics, 4<sup>th</sup> ed., Tata McGraw Hill, 2001.
3. Pillai, S.O., Solid State Physics, 6<sup>th</sup> ed., New Age International, New Delhi, 2010.
4. Avadhanulu, M.N. and Kshirsagar, P.G., A Textbook of Engineering Physics, 5<sup>th</sup> ed., S. Chand and Company Ltd., 2011.
5. Young, H.D., Sears and Zemansky's University Physics with Modern Physics, 13<sup>th</sup> ed., Pearson Education, 2014.
6. Ghatak, A.K. and Thyagarajan, K., Fiber Optics and Lasers: The Two Revolutions, Macmillan India Ltd., 2006.
7. Ghatak A.K., Optics, 5<sup>th</sup> ed., Tata McGraw Hill Education, New Delhi, 2012.

### SCL105 APPLIED CHEMISTRY (3-0-2-4)

**Pre-requisite:** NIL

**Contents:**

Quantum Chemistry, Schrodinger Equation and its applications, particle in a box, wave function for hydrogen atoms. Atomic orbitals, and molecular orbitals, concept of bonding.

Physical chemistry, Kinetic theory reactions of various orders, Arrhenius equation, chain reaction enzyme kinetics, catalysis

Electrochemistry, Batteries and corrosion,

Inorganic chemistry, Co-ordination chemistry, organometallic compounds, bio-inorganic compounds

Organic chemistry, stereo chemistry, molecular orbital theory.

Synthesis of nano particles and nano molecules and Green chemistry.

**Practical:** Practicals as per course contents.

**Text Books:**

1. Kuriacose J.C. and Rajaram J., Chemistry in Engineering and Technology, (Vol.1 & Vol.2) McGraw Hill.
2. Jain, P.C. and Jain, M., Engineering Chemistry, 15<sup>th</sup> ed., Dhanpat Rai Publishing Company, 2012.

**Additional Books:**

1. Dara, S. S., A Textbook of Engineering Chemistry, S. Chand and Company, New Delhi, 2008.
2. Vermani, O.P. and Narula, A. K., Industrial Chemistry, 1<sup>st</sup> ed., Galgotia Publications Pvt. Ltd., 2008.
3. Vairam, S. and Ramesh, S., Engineering Chemistry, Wiley India, 2013.

### SCL201 APPLIED MATHEMATICS III (3-0-0-3) (ME/EE/CE)

**Pre-requisite:** NIL

**Contents:**

**Integral Transforms**

Laplace Transforms: Definition of Laplace Transforms, Linearity property, condition for existence of Laplace Transform, first and second shifting properties, transforms of derivatives and integrals, evaluation of integrals by Laplace Transform. Inverse Laplace Transform, Convolution Theorem, Laplace Transform of periodic functions, unit step function and Dirac delta function. Applications of Laplace Transform to solve ordinary differential equations.

Fourier Transforms: Fourier integral theorem, Fourier transform, Fourier Sine and Cosine Transforms, Linearity, Scaling, frequency shifting and time shifting properties, Convolution theorem.

Z-transform: Z-transform, Properties of Z-transforms, Convolution of two sequences, inverse Z-transform, Solution of Difference equations.

**Numerical Methods**

Solution of Algebraic and transcendental equations: Regula Falsi method, Newton-Raphson method, Newton Raphson method for system of nonlinear equations, and their convergence.

Solution of linear algebraic system of equations: LU Decomposition, Gauss-Seidal methods; solution of tridiagonal system.

Numerical Solution of first order differential equations and Simultaneous differential equations

Initial value problems: Taylor's, Euler's, Runge-Kutta methods, Finite difference approximations for derivatives, boundary value problems with explicit boundary conditions, implicit boundary conditions, Finite difference methods, Shooting method, Cubic splines and their application for solving two point boundary value problems.

**Complex Analysis**

Functions of a complex variable: continuity, differentiability, analytic functions, complex integration, Cauchy's integral theorem. Cauchy's integral formula, Taylor's theorem, Laurent's theorem, zeros of an analytic function, singularities, residue, Cauchy's residue theorem, contour integration, the fundamental theorem of algebra.

Conformal transformation, Bilinear transformation, Transformation by elementary functions.

**Text Books:**

1. Jain, M.K., Iyengar, S.R.K. and Jain, R.K., Numerical Methods for Scientific and Engineering Computation, 6<sup>th</sup>ed., New Age International, 2012.
2. Kreyszig, E., Advanced Engineering Mathematics, 9<sup>th</sup> ed., Wiley-India, 2013.

**Additional Books:**

1. Gerald, C.F. and Wheatley, P.O., Applied Numerical Analysis, 7<sup>th</sup> ed., Pearson Education, 2009.
2. Atkinson, K.E., An Introduction to Numerical Analysis, 2<sup>nd</sup> ed., John Wiley and Sons, 2004.
3. Spiegel, M.R., Schiller, J.J. and Srinivasan, R.A., Probability and Statistics, 4<sup>th</sup> ed., McGraw Hill, 2013.

**SCL202 ELECTRONIC AND ELECTROMAGNETIC MATERIALS (3-0-0-3)**

**Pre-requisite:** NIL

**Contents:**

Electrical Conduction: high conductivity and resistivity materials, effect of temperature and impurity on conductivity, resistivity of metals, conductivity of pure metals and alloys, temperature coefficient of resistivity, heating element, fuses, contact materials, connectors, switches, solders, fixed and variable resistor. Superconductivity and applications.

Polarization of Dielectrics: Polar and non-polar dielectrics, Basic concept of polarization, Types of polarization, Dielectric constant, Internal field in dielectrics, Ferroelectric, Spontaneous polarization, Curie-Weiss law, Piezoelectric and Pyro electric, Dielectric loss, Breakdown in dielectrics. Ceramic, dielectrics used in cables and transformers, Thin film Processes, Super Capacitors.

Magnetic Properties of Materials: Atomic interpretation of diamagnetic, Paramagnetic, anti-ferromagnetic and ferromagnetic materials, Ferromagnetic domain, permanent magnets and non magnetic steels, nonmetallic magnetic materials, magnetic materials for ferromagnetic tape and memory devices, ferrites.

Industrial lasers: Basic concepts, properties of Lasers, Different types of laser, Industrial application of lasers, drilling, cutting, welding, heat treatment, Optical Fiber Communication.

**Text Books:**

1. Pillai, S.O., Solid State Physics, 6<sup>th</sup> ed., New Age International, New Delhi, 2010
2. Dekker, A.J., Electrical Engineering Materials, Prentice Hall of India, New Delhi, 2013

**Additional Books:**

1. Krane, K.S., Modern Physics, 3<sup>rd</sup> ed., John Wiley, 2012.
2. Omar, M.A., Elementary Solid State Physics: Principles and Applications, 4<sup>th</sup>

ed., Pearson Education, 2008.

3. Kasap, S.O., Principles of Electronic Materials and Devices, 3<sup>rd</sup> ed., Tata McGraw Hill, 2007.
4. Balasubramaniam, R., Callister's Materials Science and Engineering, Wiley India, 2009.
5. Puri, R.K. and Babbar, V.K., Solid State Physics and Electronics, S. Chand Limited, 2008.
6. Kittel, C., Introduction to Solid State Physics, 7<sup>th</sup> ed., Wiley India, 2008.

**SCL203 PROBABILITY AND NUMERICAL METHODS (3-0-0-3) (CS/EC)**

**Pre-requisite:** NIL

**Contents:**

**Random Variable & Probability Distributions**

Random Variables, Density function, distribution function for continuous and discrete R.V. Joint distributions, Distributions of functions of R.V. Mathematical Expectation, The variance and Standard deviation, Moment Generating Function, Characteristic Function. Some special probability distributions like Binomial, Poisson, Geometric, Normal, Uniform, Exponential and Gamma Distributions.

Random processes, continuous and discrete, deterministic, stationary, ergodicity etc. correlation functions, autocorrelation and cross-correlation, properties and applications of correlation functions.

**Numerical Methods**

Numerical Solution of Algebraic and transcendental equations:

Regula Falsi method, Newton-Raphson method, Newton Raphson method for system of nonlinear equations, and their convergence. Solution of linear algebraic system of equations: LU Decomposition, Gauss-Seidal methods; solution of tridiagonal system.

Numerical Solution of first order differential equations and Simultaneous differential equations

Initial value programs: Taylor's, Euler's, Runge-Kutta methods, Finite difference approximations for derivatives, boundary value problems with explicit boundary conditions, implicit boundary conditions, Finite difference methods, Shooting method, Cubic splines and their application for solving two point boundary value problems.

**Text Books:**

1. Papoulis, A., Probability, Random Variables and Stochastic Processes, 4<sup>th</sup> ed., McGraw Hill, 2012.
2. Jain, M.K., Iyengar, S.R.K. and Jain, R.K., Numerical Methods for Scientific and Engineering Computation, 6<sup>th</sup> ed., New Age International, 2012.

**Additional Books:**

1. Spiegel, M.R., Schiller, J.J. and Srinivasan, R.A., Probability and Statistics, 4<sup>th</sup> ed., McGraw Hill, 2013.
2. Gerald, C.F. and Wheatley, P.O., Applied Numerical Analysis, 7<sup>th</sup> ed., Pearson Education, 2009.
3. Atkinson, K.E., an Introduction to Numerical Analysis, 2<sup>nd</sup> ed., John Wiley and Sons, 2004.

**SCL204 DISCRETE MATHEMATICS (3-2-0-4) (CS/EC)**

**Pre-requisite:** NIL

**Contents:**

Set theory, operations on sets-relation and functions, continuity, partial order, equivalence relations, Peano axioms and induction.

Mathematical logic, propositions, predicate logic, formal mathematical systems, algebra, homomorphism automorphism.

Elements of Theory of some algebras, semigroups, monoids, groups.

Rings, fields, lattices, boolean Algebra Graphs, hypergraphs, transitive closure, trees, spanning trees Combinatorics, generating functions, recurrences, Counting theorem and applications.

**Text Books:**

1. Babu Ram, Discrete Mathematics, Pearson Education, 2011.
2. Garnier, R. and Taylor, J., Discrete Mathematics: Proofs, Structures and Applications, 3<sup>rd</sup> ed., Taylor and Francis, 2010.

**Additional Books:**

1. Kolman, B., Discrete Mathematical Structures, 6<sup>th</sup> ed., Pearson Education, 2014.
2. Liu, C.L., Introduction to Combinatorial Mathematics, McGraw Hill, 1986.

**SCL402 LINEAR ALGEBRA (3-0-0-3) (CS/EC)**

**Pre-requisite:** NIL

**Contents:**

Matrices: Review of Matrix Algebra; Rank of matrix, Row reduced Echelon form, Solution of the matrix Equation  $Ax = b$ , Gauss elimination method, Vector Space, Subspaces, Linear Dependence/Independence, Basis, Dimension, Range Space and Rank, Null Space and Nullity; Rank nullity theorem, Linear transformation, Matrix Representation of a linear transformation, Linear Operators on  $R^n$  and their representation as square matrices, Invertible linear operators, Inverse of a non-singular Matrix, Eigenvalues and eigenvectors of a linear operator; properties of eigenvalues and eigenvectors of Hermitian, skew-

Hermitian, Unitary, and Normal matrices (including symmetric, skew-symmetric, and orthogonal matrices), Characteristic Equation, Bounds on eigenvalues, Cayley Hamilton theorem, Diagonalizability of a linear operator.

Inner Product Spaces, Norm, Orthonormal Sets, Gram Schmidt orthogonalisation process; projections and least squares approximation.

Optimization: Modeling and formulation of optimization problems, Linear programming and Simplex Algorithm (Big M and Two Phase Method), Duality and the primal dual method.

#### **Text Books:**

1. Hoffman, K. and Kunze, R.A., Linear Algebra, 2<sup>nd</sup> ed., Pearson Education, 2012.
2. Rao, S.S., Optimization: Theory and Applications, 2<sup>nd</sup> ed., New Age International Ltd., New Delhi, 1995.

#### **Additional Books:**

1. Krishnamurthy, V., Mainra, V.P. and Arora, J.L., An Introduction to Linear Algebra, East-West Press, 1976.
2. Bhattacharya, P.B., Jain, S.K. and Nagpaul, S.R., First Course in Linear Algebra, New Age International Publishers, 2005.
3. Datta, K.B., Matrix and Linear Algebra, Prentice Hall of India, New Delhi, 2006.

### **SCL403 PROBABILITY THEORY AND STATISTICS (3-0-0-3) (Optional)**

**Pre-requisite:** NIL

#### **Contents:**

##### **Random Variable & Probability Distributions**

Random Variables, Density function, distribution function for continuous and discrete R.V. Joint distributions, Distributions of functions of R.V. Mathematical Expectation, The variance and Standard deviation, Moment Generating Function, Characteristic Function. Some special probability distributions like Binomial, Poisson, Geometric, Normal, Uniform, Exponential Gamma Beta, Chi-Square, Students 't', F-distribution and Weibull Distribution.

##### **Statistics**

Sampling Theory: Population Parameter, Sample Statistics, Sampling distributions, Sample mean, Sampling distribution of means, The Sample variance, and the sampling distribution of variance.

Estimation Theory: Point estimate and Interval Estimates, Reliability, Confidence interval estimates of population parameters, confidence intervals for means, proportions and variance.

Tests of Hypothesis and Significance: Statistical decisions, Tests of hypothesis and significance. Type I and Type II errors. Level of significance, one tailed and two tailed tests. Tests involving small samples and large samples. Fitting theoretical distributions to sample frequency distribution. The chi-square test for goodness of fit.

#### **Text Books:**

1. Parzen, E., Modern Probability Theory and Its Applications, John Wiley and Sons, 2013.
2. Miller, I. and Miller, M., John E. Freund's Mathematical Statistics with Applications, 7<sup>th</sup> ed., Pearson Education, 2013.

#### **Additional Book:**

1. Spiegel, M.R., Schiller, J.J. and Srinivasan, R.A., Probability and Statistics, 4<sup>th</sup> ed., McGraw Hill, 2013.

### **SCL411 OPTOELECTRONICS AND MAGNETIC DEVICES (3-0-0-3)**

**Pre-requisite:** NIL

#### **Contents:**

Band theory and semiconductors, HT & ET layer, Thin film, Optics of multilayer thin films, Electron-hole recombination, Optoelectronic materials, Optoelectronic devices LED, OLED, CFL, Solar cells, LCD and OSL, Semiconducting laser, Ruby laser, CO<sub>2</sub> laser and applications.

Production of low magnetic field using Helmholtz coils, solenoid, electromagnets and high magnetic field using superconducting magnets, pulsed and detection using Hall probe, search coils, flux meters and GMR devices. Digital magnetic recording, destructive read out and non-destructive read out methods. Faraday and Kerr effects, Vibrating sample magnetometer, SQUID, MFM devices. Cryotron switch.

#### **Text Books:**

1. Shionoya, Shigeo, William M. Yen and Hajime Yamamoto. *Phosphor Handbook*. 2<sup>nd</sup>-Edition. CRC Press, 2006.
2. Cullity, B. D. *Introduction to Magnetic Materials*. 2<sup>nd</sup>-Edition. California, London: Addison- Wesley Publications, 2008.

#### **Additional Books:**

1. Spaldin, Nicola, *Magnetic Materials Fundamentals And Device Applications*. Cambridge university press, 2003.
2. Rose-Innes, A. C. and E. H. Rhoderick. *Introduction to Superconductivity*. 2<sup>nd</sup>-Edition. Oxford: Pergamon Press, 1978.
3. Weber, Marvin J. *Handbook of Optical Materials*. CRC Press, 2002.

4. Yen, William M., Shigeo Shionoya and Hajime Yamamoto. *Practical Applications of Phosphors*. CRC Press, 2006.

### **SCL412 NUMERICAL METHODS FOR DIFFERENTIAL EQUATIONS (3-0-0-3)**

**Pre-requisite:** NIL

#### **Contents:**

Variational Methods: Variational Principles and Methods, Variational Formulations, Elements of Calculus of Variations, Integral Formulations, Variational Methods (The Ritz Method, Approximation Functions and the Method of Weighted Residuals).

Finite Element Method for Differential Equations in One Dimension: Basic concepts of Second-Order Differential Equations in One Dimension, Basic Steps of Finite Element Analysis (Model Boundary Value Problem, Discretization of the Domain, Derivation of Element Equations, Connectivity of Elements, Imposition of Boundary Conditions, Solution of Equations and Post-computation of the solution, Convergence Criteria, h and p Approximations), Applications of FEM for Solving Second-order Differential Equations in One Dimension.

Finite Difference Method for Solving Partial Differential Equations: Introduction to partial differential equations, Finite Difference Method for Solving One Dimensional Parabolic Differential Equations (explicit, fully implicit, C-N scheme), Discussion of Convergence, Stability and Compatibility, Finite Difference Methods for Elliptic Partial Differential Equations (Standard five point formula and Diagonal five point formula).

#### **Text Books:**

1. Kreyszig, E. *Advanced Engineering Mathematics*. 9<sup>th</sup>-Edition. Wiley India Edition, 2013.
2. Reddy, J.N. *An Introduction to the Finite Element Method*. 18<sup>th</sup> Reprint-2013. Tata McGraw-Hill Publishing Company Limited, 2006.

#### **Additional Books:**

1. Bathe, K. J. *Finite Element Procedures*. 7<sup>th</sup> Indian Reprint. Prentice Hall, 2003.
2. Cook, R. D., M.E. P. Malkus and R.J. Witt. *Concepts and Applications of Finite Element Analysis*. 4<sup>th</sup>-Edition. Reprint-2102. John Wiley and Sons, 2004.
3. Fish, J. and T. Belytschko. *A First Course in Finite Elements*. John Wiley & Sons, 2007.
4. Gerald, C.F. and P.O. Wheatley. *Applied Numerical Analysis*. 6th Edition. Wesley, 2002.
5. Reddy, J.N. *Applied Functional Analysis and Variational Methods in Engineering*. McGraw-Hill, 1986.
6. Smith, G.D. *Numerical Solution of Partial Differential Equations*. 3<sup>rd</sup>-Edition. Oxford University Press, 1985

### **SCL413 INTRODUCTION TO PARTIAL DIFFERENTIAL EQUATIONS (3-0-0-3)**

**Pre-requisite:** NIL

#### **Contents:**

First Order PDEs: Introduction & Formation of PDE's, First order PDE: Classification of first order PDEs; Complete integral, General integral, singular integral; Solutions of linear first order PDEs: Lagrange's Method; First order Non-linear partial differential equation, Method of characteristic Compatible systems; Charpit's method, special types of first order equations, Jacobi's Method for nonlinear first order equations.

Second Order PDEs: Classification of second order PDEs; Canonical forms for Hyperbolic, Parabolic & Elliptic PDEs; Method of characteristics; boundary and initial value problems (Dirichlet and Neumann type) involving wave equation, heat equation, Laplace's equations (solutions by method of separation of variables and Fourier Transform).

#### **Text Books:**

1. Jain, R.K. and S.R.K. Iyengar. *Advanced Engineering Mathematics*. 4<sup>th</sup> – Edition. Narosa Publisher, 2014.
2. Rao, K. S. *Introduction to Partial Differential Equations*. 3<sup>rd</sup> –Edition. PHI Learning Pvt. Ltd., 2011.

#### **Additional Books:**

1. Ross, S.L. *Differential Equations*. 3<sup>rd</sup>-Edition. John Wiley & Sons Publisher, 2007.
2. Kreyszig, E. *Advanced Engineering Mathematics*. 9<sup>th</sup> -Edition. John Wiley & Sons, 2013.
3. Strauss, W.A. *Partial Differential Equations: An Introduction*. 2<sup>nd</sup> –Edition. John Wiley & Sons Publisher, 2008.

### **SCL414 ENGINEERING CHEMISTRY (3-0-0-3)**

**Pre-requisite:** NIL

#### **Contents:**

Polymer Science: Nomenclature, Types of Polymerization, Classification of Polymers, bonding in polymers, Mechanism of Polymerization, stereochemistry of polymers, molecular weight of polymer, methods of polymerization-free radical, anionic, cationic and coordination polymerization, Characterization of

polymers, thermoplastic (low and high density polythenes PMMA) and thermosetting resins (bakelite, epoxy), PVC (Polyvinyl chloride), PVA (polyvinyl acetate), rubbers (natural and synthetic) Inorganic polymers- preparation and uses of silicones.

Water Chemistry: Sources, hard & soft water, Temporary & Permanent hardness, Units of Hardness, Disadvantages of hard water, Scale & Sludge formation in boilers, estimation of hardness by EDTA method, softening of water, zeolite process & demineralization by ion exchangers, specifications for drinking water, treatment of water for domestic use, desalination - Reverse Osmosis & Electrodialysis, industrial waste water treatment.

Lubricants: Lubricants - Definition, theories of lubrication, characteristics of lubricants, viscosity, viscosity index, oiliness, pour point, cloud point, flash point, fire point, additives to lubricants, Solid lubricants.

Dyes: Introduction, Classification, Azo dyes, Triarylmethane dyes, Malachite Green, Rosaniline, Phenolphthalein, Alizarin, Methylene Blue, Other uses of Dyes.

Fuels: Fuels - Classification, examples, relative merits, types of coal, determination of calorific value of solid fuels, Bomb Calorimeter, theoretical oxygen requirement for combustion, Coal, Types of carbonization of coal, proximate & ultimate analysis of coal, manufacture of metallurgical coke, Petroleum, Cracking, Synthetic Petrol, Knocking, LPG, desulphurization of petrol.

#### Text Books:

1. Vermani, O.P. and A.K. Narula, *Applied Chemistry: Theory and Practice*. 2<sup>nd</sup>-Edition. New Age International Publishers, New Delhi, 2008.
2. Morrison, R.T. and R.N. Boyd, *Organic Chemistry*. 7<sup>th</sup>-Edition. Pearson Publisher, 2010.

#### Additional Books:

1. Jain and Jain, *Engineering Chemistry*. 15<sup>th</sup>-Edition. Dhanpat Rai & Sons, New Delhi, 2012.
2. Sharma, Deepa, *Textbook of Engineering Chemistry*. 1<sup>st</sup>-Edition. MedTech, Scientific International Pvt. Ltd., New Delhi, 2015.
3. Bahl, A. and B.S. Bahl, *Advanced Organic Chemistry*. Reprint. S. Chand & Company Ltd., New Delhi, 2012.

### SCL415 CONVEX OPTIMIZATION (3-0-0-3)

Pre-requisite: NIL

#### Contents:

Introduction: Basic definition, problem formulation and illustrative examples. Miscellaneous Application and Model Construction. Convex Analysis: convex sets, closest point theorem, existence of minimum, Weierstrass's Theorem, Separation and Support Sets, Convex Cones, Extreme Points and Extreme Directions, Theorem of alternatives, Farka's lemma, Gordan's theorem, convex functions, minima and maxima of convex functions, generalizations. Necessary conditions for unconstrained nonlinear minimization, Sufficient conditions for unconstrained nonlinear minimization. Linear programming: Motivation, formulation, optimality conditions, simplex method, duality theory: weak and strong duality theorem, dual simplex method. Constrained optimization: role and definition of constraints, Fritz John optimality conditions, KKT optimality conditions. Quadratic Programming; interior-point methods; Case studies: signal processing, statistics and machine learning, control and mechanical engineering, digital and analog circuit design, and finance.

#### Text Books:

1. Bazaraa, M. S., Hanif D. Sherali, and Chitharanjan M. Shetty. *Nonlinear programming: theory and algorithms*, 3<sup>rd</sup>-Edition. John Wiley & Sons, 2013.
2. Rao, Singiresu S., and S. S. Rao. *Engineering optimization: theory and practice*, 4<sup>th</sup>-Edition. John Wiley & Sons, 2009.

#### Additional Books:

1. Fletcher R. *Practical Methods of Optimization*, 2<sup>nd</sup> Edition. John Wiley, 2009.
2. Belegundu, A. D., and Tirupathi R. Chandrupatla. *Optimization concepts and applications in engineering*. 2<sup>nd</sup>-Edition. Cambridge University Press, 2011.
3. Boyd, Stephen, and Lieven Vandenberghe. *Convex optimization*. 1<sup>st</sup>-Edition. Cambridge University Press, 2004.
4. Mohan, C., and K. Deep. *Optimization techniques*. 1<sup>st</sup>-Edition, New Age Science, 2009.

### SCL416 QUANTUM CHEMISTRY (3-0-0-3)

Pre-requisite: NIL

#### Contents:

Mathematical concepts: Vectors, Vector product, linearly dependant and independent vectors, linear vector space (introduction only) and basis set of LVS, Matrix, Types of Matrix (Symmetric, skew-symmetric, Hermitian, skew-Hermitian, unit, diagonal, unitary, etc) and their properties, Matrix equations, concept of eigen value and eigen vectors.

Quantum mechanics: Origin of Quantum mechanics, postulates of Quantum Mechanics, concepts of operators, Schrodinger equation, solution of the Schrodinger equation for simple systems viz. particle in a box, the harmonic oscillator, rigid rotor, the hydrogen atom, Born-Oppenheimer approximation. Variation theorem, linear variation principle. Perturbation theory (first order and non-degenerate). Application of perturbation theory to the Helium atom. Concept

of Angular momentum. Eigen value of angular momentum operator, method of ladder operator, spin. Slater determinant wave functions. Term symbol (R-S and j-j coupling) and spectroscopic states. Molecular orbital theory, LCAO principle, formation of molecular orbitals from atomic orbital, construction of molecular orbitals of  $H_2^+$  by LCAO principle, physical picture of bonding and anti-bonding molecular orbitals, VB and MO theory. Huckel theory of conjugated systems, application to ethylene, butadiene, cyclopropenyl system, cyclobutadiene, etc.

#### Text Books:

1. Levine, I.N., *Quantum Chemistry*, 7<sup>th</sup>-Edition. PHI Learning Pvt. Ltd., 2014.
2. Szabo, A., and Neil S. Ostlund, *Modern Quantum Chemistry: Introduction to the Advanced Electronic Structure Theory*, Revised Edition. Dover Publications, Inc., 1996.

#### Additional Book:

1. McQuarrie, D.A. *Quantum Chemistry*, University Science Books, 2011.

### SCL417 REAGENT CHEMISTRY (3-0-0-3)

Pre-requisite: NIL

#### Contents:

1. Organolithium reagents: Use of lithium in organic synthesis: Lithium diisopropyl amide (LDA)
2. Organocupper regents: Use of Cupper in organic synthesis: Gilman's reagent
3. Organopalladium Chemistry: Use of Palladium in organic synthesis
4. Organosilicon Chemistry: Use of Silicon in organic synthesis: trimethylsilyliodide
5. Organotitanium Chemistry: Use of Titanium in organic synthesis: Tebbe's reagent
6. Organotin Chemistry: Use of Tin in organic synthesis: tri-n-butyl tin hydride
7. Organomagnesium Reagent: Use of Grignard reagents in organic synthesis
8. Oxidation reaction: Use of DDQ, Selenium dioxide, Osmium tetroxide in organic synthesis
9. Reduction Reaction: Use of complex metal hydrides, Wilkinson's catalyst, Lithium aluminium hydride (LAH), Sodium Borohydride, Di iso butyl aluminium hydride (DIBAL-H) etc.
10. Use of Baker's Yeast, Phase transfer catalyst, DCC etc. in organic synthesis.

#### Text Books:

1. Carruthers, W. and I. Coldham, *Modern Methods in Organic Synthesis*, 4<sup>th</sup>-Edition, Cambridge University Press, 2015.
2. March, J., *Advanced Organic Chemistry*, 4<sup>th</sup>-Edition. Wiley, 2007.

#### Additional Books:

1. Smith, M.B. and J. March, *March's Advanced Organic Chemistry: Reactions, Mechanisms and Structures*, Wiley, 2007.
2. Morrison, R.T. & R. N. Boyd, *Organic Chemistry*, 7<sup>th</sup>-Edition. Pearson Publisher, 2010.

### HML101 SOCIAL SCIENCE (2-0-0-2)

Pre-requisite: NIL

#### Contents:

##### Introduction

Social Sciences, Relationship between an individual and society, Utility for Engineers.

Humanities, history of Human civilization & brief history of science in India.

Society: Types & Characteristics.

Culture: Characteristics, Types & issues.

##### Industry and Society

Privatization, Liberalization and Globalization, Impact on Indian Society.

Industrial Fatigue. Reasons & remedial methods.

Job stress

Industrial psychology-Selection, training and motivation of employees.

Organization behavior & Industrial Leadership.

##### Study of political organization

Indian Constitution, Fundamental Rights, directive principals and RTI.

##### Main Social Problems in India

Illiteracy, Over Population, Corruption & Public Perception, Slums, migration, Poverty, Youth movement, Violence, rise of religious fundamentalism and Terrorism.

#### Text Books:

1. Shabbir, S., Sheikh, A.M and Dwadashiwar, J., A New Look into Social Sciences, S. Chand and Company Ltd., 2012.
2. Ahuja, R., Social Problems in India, 2<sup>nd</sup> ed., Rawat Publications, 2013.

#### Reference Books:

1. Bhushan, V. and Sachdeva, D.R., Fundamentals of Sociology, Pearson Education, 2012.
2. Sirohi, A., Fundamentals of Sociology, 1<sup>st</sup> ed., Dominant Publishers, New Delhi, 2012.
3. Chandra, R., Globalisation, Liberalisation, Privatisation and Indian Polity (set of 8 Vols.), Isha Books, Delhi, 2004.

### HML102 PRINCIPLES OF INDUSTRIAL MANAGEMENT AND PSYCHOLOGY (3-0-0-3)

Pre-requisite: NIL

## Contents:

Industrial Management, Scope and relevance, allied disciplines, Psychology, Industrial Sociology and Management, Evolution of Management thought, Principles of Industrial Management, Planning, Co-ordination and Communication, Types of Communication.

Industrial Psychology, Basic concepts Psychology, Learning, Perception and Motivation. Causes of Behavior, Individual differences, Intelligence and Personality, History of Industrial Psychology in India.

Understanding the word of work, Personnel and Human Resource Management, Fundamentals of Marketing Management, Consumer Behavior and advertising, Materials Management, ABC Analysis, ISO 9000 and ISO 14000.

Foundation of Group Behavior, Work Teams, Team Morale, Motivation, Importance and Nature, Theories of Motivation, Maslow, Aldermen, Herzberg and Norms theory of Motivation, Leadership in Industry, Nature and Types, Theories of Leadership.

Conflict and Negotiation, Conflict Management. Fatigue in Industry. Work stress. Nature and sources of stress, Individual difference, coping strategies, Employee counseling. Quality of work life.

## Text Books:

1. Kaila, H.L., Industrial and Organisational Psychology (2 vols.), Kalpaz Publications, Delhi, 2006.
2. Talwar, P., Human Resource Management, Isha Books, Delhi, 2006.

## Additional Books:

1. Mittal, M.L., Essentials of Educational Technology and Management, Pearson Education, 2012.
2. Baron, R.A. and et. al., Fundamentals of Social Psychology, Pearson Education, 2012.
3. Srivastava, S.K. and Kumari, P., Organisational Behaviour: A Comprehensive Study, Global Vision Publishing House, 2009.

## HML103 INDUSTRIAL PSYCHOLOGY AND HUMAN RESOURCE MANGEMENT (3-0-0-3)

**Pre-requisite:** NIL

### Contents:

Industrial Psychology, Basic concepts of Psychology, Learning, Perception and Motivation. Causes of Behavior, Individual differences, Intelligence and Personality, History of Industrial Psychology in India.

Job analysis, Job design and Job appraisals. Selection and recruitment, Selection procedure, Selection Methods, Types of Selection Tests. Intelligence, Personality, Aptitude and Psycho-Motor Tests. Training, Types of Training, Job Satisfaction.

Foundation of Group Behavior, Work Team Morale, Motivation, Importance and Nature, Theories of Motivation, Maslow, Aldeofer, Heazberg and Norms theory of Motivation, Leadership in industry, Nature and Types, Theories of Leadership.

Conflict and Negotiation, Conflict Management. Fatigue in Industry. Work stress. Nature and sources of stress, Individual differences, coping strategies, Employee counseling. Quality of work life.

Human Resource Management. Participation in Decision making. Collective bargaining. Trade Union Movement in India. MBO and Quality Circle Movement, Wage and Salary Administration. H.R.M. in Asia, Europe and U.S.A.

## Text Books:

1. Pandey, A., Psychology and Industrial Efficiency, Global Vision Publishing House, New Delhi, 2006.
2. Baer, R., Stress Management, Global Vision Publishing House, New Delhi, 2010.

## Additional Books:

1. Dunn, W.C., Fundamentals of Industrial Instrumentation and Process Control, Tata McGraw Hill, 2005.
2. Hariharan, M., Padmaja, G. and Padhy, M., Trauma and Pain: Biopsychosocial Perspectives, 1<sup>st</sup> ed., Global Vision Publishing House, 2011.
3. Singh, S., Human Resource and Managerial Development, 1<sup>st</sup> ed., Global Vision Publishing House, 2006.

## HML104 INDUSTRIAL ECONOMICS (3-0-0-3)

**Pre-requisite:** NIL

### Contents:

Industrial Economics its scope and utility Economics systems: Capitalist, Communist and mixed economy. Land system and agriculture, taxes, money and credit, trade and exchange rate. Population, size composition, quality and growth trend, occupational distribution. Division of Economy into private and public sector Role of public sector in Indian economy. Privatization, Urbanization, Westernization, Modernization and Globalization. Scope and significance of productivity, Measurement of productivity, Tools of productivity, Factors influencing on industrial productivity, National productivity council. Globalization India and WTO. Trade policy of government of India, Import and Export Policy, New trade policy IMF, World Bank and associates Economic planning in India, Employment and economics.

## Text Books:

1. Mishra, R.C. and Pandey, R.S., Fundamentals of Financial Management, Global Vision Publishing House, 2010.

2. Chaudhary, M.A., History of International Trade and Monetary Economy, Global Vision Publishing House, 2008.

## Additional Books:

1. Sivayya, K.V. and Das, V.B.M., Indian Industrial Economy, 5<sup>th</sup> rev. ed., S. Chand and Company, 1983.
2. Mishra, S.K. and Puri, V.K., Indian Economy: Its Development Experience, 29<sup>th</sup> rev. ed., Himalaya Publishing House, Mumbai, 2011.
3. Dutta, R. and Sundaram, K.P.S., Indian Economy, S. Chand and Company, New Delhi, 2002.

## HML105 INDUSTRY AND SOCIETY (3-0-0-3)

**Pre-requisite:** NIL

### Contents:

Factory as a social system Formal and inform organization. Impact of social structure on industry. Impact of industry on society. Changing profile of labour. Labour management Relation Participative Management Industrial Dispute and Trade union. Collective bargaining, Industrial health and safety Impact of Industrialization on family, education, and stratification. Class and class conflict in industrial sector obstacles and limitation of industrialization. Migration of rural society to urban society Industrial Policy, Workers welfare legislation in India, Human Relation in Industry. Management and development program and employee training. Politics and society in current scenario

## Text Books:

1. Moore, F., Environment and Society, 1<sup>st</sup> ed., Dominant Publishers and Distributors, New Delhi, 2003.
2. Sen, S., Human Rights in a Developing Society, APH Publishing Corporation, 2011.

## Additional Books:

1. Khanna, O.P., Industrial Engineering and Management, 7<sup>th</sup> ed., Dhanapat Rai and Sons, 1985.
2. Bhagoliwal, T.N., Economics of Labour and Industrial Relations, 5<sup>th</sup> ed., Sahitya Bhawan, 1982.
3. Murthy, C.S.V., Business and Ethics, APH Publishing House, New Delhi, 2003.
4. Bhowmik, S., Industry, Labour and Society, Orient Blackswan, New Delhi, 2012.

## HML106 PERSONNEL MANAGEMENT AND INDUSTRIAL RELATION (3-0-0-3)

**Pre-requisite:** NIL

### Contents:

Human behavior of an individual as a member as a small group and as a member of an organization. Influence of culture organizational on individual. Analysis of dynamic behavior of organization by simulation structure of organization and flow of men, money, material, information capital, equipment and order, system models on the basis of policy of management to evolve effective policies for management.

Scope and objectives of personnel management, personnel planning, labour market, recruitment training and placement.

Job evaluation, merit rating wage incentives, employee health, security and welfare, morale and motivation, industrial disputes, voluntary and compulsory settlement trade unionism.

Labour legislations Performance appraisal and evaluation

## Text Books:

1. Sharma, A., Management and Job Performance, Gyan Publication House, 1986.
2. Mathur, K.M., Managing Human Resource Development: An Indian Perspective, Gyan Publication House, 2001.

## Additional Books:

1. Knouse, S.B., Human Resources Management Perspectives on TQM: Concepts and Practices, ASQC Quality Press, 1996.
2. Schuler, R.S., Managing Human Resources, 6<sup>th</sup> ed., South-Western College Publishing, 1998.
3. Mamoria, C.B., Mamoria, S. and Gankar, S.V., Dynamics of Industrial Relations, Himalaya Publishing House, New Delhi, 2008.

## HML410 CREATIVE WRITING IN ENGLISH (2-2-0-3)

**Pre-requisite:** NIL

### Contents:

What is Creative Writing: Creativity, Imagination and Resistance, Writer and the Text, Processes of Creative Writing and Its Development, Reading and the Individual Writer, Composition of Creative Writing.

Art and Craft: Tropes and Figures, Varieties of English, Playing with Words, Grammar and Word Order, Tense and Time, Textual Reading of L. A. Hill's, "Principles of Good Writing".

Fiction Writing: Writing Literary Fiction, Creative Non Fiction-History and Popular Fiction, Short Story and the Novel, Plot, Character, Modes of Narration, Setting, Literature of Reality \_Writing for Media: Print Media:-Reportage, Feature

Writing, Editorials, Columns, Textual Reading of Popular Columnists including M.J. Akbar, Tavleen Singh.

The Broadcast Media: Radiobroadcast, Screenwriting-Documentary, Television and Film: Words vs Images, Endings and beginnings, Setting up the Story, Plot Points, Scene and Scene Sequence, Building the Story Line, Writing the Screenplay

The New Media: Internet, Advertising: Writing and Sensitivity, Public Taste and Demand, Novelty of Ideas and Expression, Brevity and Focus, Verisimilitude, Studies of Masterpiece Scripts with screening of visual clips

Travel Writing: Reporting the World, Revealing the Self, Representing the Other, Elements of Style, Getting Published, Tools of the Art of Good Travel Writing, Finding and Focusing the Story, Crafting Structure, What it Takes to be a Good Travel Writer

#### Text Books:

1. Dev, Anjana Neira, Anuradha Marwah and Swati Pal. *Creative Writing: A Beginner's Manual*. New Delhi: Pearson & Longman, 2009.
2. Morley, David. *The Cambridge Introduction to Creative Writing*. New York: Cambridge University Press, 2007.

#### Additional Books:

1. Field, Syd. *Screenplay: The Foundations of Screenwriting*. New York: Bentam Dell, 2005.
2. Forster, E.M. *Aspects of the Novel*. New Delhi: Atlantic Publishers, 1995.
3. Kaufman, Scott Berry and James C. Kaufman. *The Psychology of Creative Writing*. New York: Cambridge University Press, 2009.
4. *Lonely Planet's Guide to Travel Writing: Expert Advice from the World Leading Travel Publisher*. 3<sup>rd</sup> ed. Lonely Planet Publications, 2013.
5. Ramet, Adele. *Creative Writing*. 7<sup>th</sup>-Edition. Begbroke, United Kingdom: How to Books, 2007.
6. Snyder, Blake. *Save the Cat!: The Last Book on Screenwriting You'll Ever Need*. Michigan: McNaughton & Gunn Inc., 2005.

**NOTE:** The reference sources would also include study of literary and non-literary creations and scripts written for different genres.

## HML411 CORPORATE COMMUNICATION FOR TECHNOCRATS (2-2-0-3)

**Pre-requisite:** NIL

#### Contents:

Corporate Communication in Theory:

Communication: What is Corporate Communication?: An Overview; Corporate Communication: Discipline or Job Description?; Corporate Communication and Public Affairs; Leadership and Communication; Communication and Public Opinion; Corporate Communication Management; Advancements of Technical Communication in the Software Industry; Changing Business Environments; Communicating Strategically: Corporate Culture/Citizenship/Philanthropy/Social Responsibility.

Corporate Communication in Practice:

Comprehensions: Reading and Listening Comprehension; Précis Writing, Expansion (Paragraph Writing), Note-making, Professional Letter Writing; Research Writing: Articles for publication (Journals), writing abstract, dissertation, qualities of research writing and documentation.

Presentation: PPT Presentation, Group Presentation, Solo Presentation, Poster Presentation: Picture/Placard/Advertisement; Netiquette: Concept, components and evolution, etc. Reading and Analysing Text/s: Chetan Bhagat: *One Night @ Call Centre*. Reading, reviewing, analyzing and summarizing and paraphrasing. VAT: Video Apperception Test, Reviewing Video Clips/Movies, etc.

#### Text Books:

1. Kaul, Asha. *Business Communication*. New Delhi: Prentice Hall, 2000.
2. Mohan, Krishna and Meera Banerji. *Developing Communication Skills*. Delhi: Macmillan, 2000.

#### Additional Books:

1. Adair, J. *Effective Leadership: A Modern Guide to Developing Leadership Skills*. London: Pan Books, 1986.
2. Hartley, Peter & Clive Bruckmann. *Business Communication*. London & New York: Routledge, 2002.
3. Murphy, Herta, Herbert William Hildebrandt. *Effective Business Communication*. New York: McGraw Hill, 1991.
4. Mirel, Barbara. *Reshaping Technical Communication*. London: Lawrence Erlbaum, 2002.
5. Wilkie, Helen. *Writing, Speaking, Listening: The Essentials of Business Communication*. Oxford: How to Books Ltd, 2001.

**NOTE:** Various activities are deemed to be organized during the course- Group Discussion, Colloquium, Photography, Audition, Speeches, - Prepared vs. impromptu, Personality Development, Mock interviews, Conferences, Meetings, Rewriting of News, House Newspapers and Journals, Preparing Interview Schedules, Questionnaire, Sampling, Experimental Survey, etc.

## HML412 LITERATURE, THEATER AND CINEMA: THEORIES OF COMMUNICATION (3-0-0-3)

**Pre-requisite:** NIL

#### Contents:

Introduction: Literature and Communication; Theories of Communication—Soft skills; Interpreting texts, Reading, writing and paraphrasing; Analysing-Prose, Poetry, Drama and Fiction through the lenses of Communication; Texts and its cinematic adaptations. Literary studies in India. Leadership Skills: reading & application: William Shakespeare's *Macbeth*, Chetan Bhagat's *One Night @ Call Centre*.

Introduction: Theatre & personality development; Mime and one act play; Texts and its theatrical adaptations; Creative Writing; Art of dialogue delivery and public speaking; Interaction with public; Role play. Vijay Tendulkar's *Silence! The Court is in Session*, Mahesh Dattani's *Final Solutions*.

Introduction: Cinema and Arts of communication; Non-verbal cues and its application; character analysis; Art & commercial cinema; Youth, cinema and politics of communication; Interpreting commercial advertisements; Juvenile cinema and adolescent communication; significance of audio-visual communication. Film studies in India. Crises Management: *Bheja Fry-2*, *Manjhi: The Mountain Man*.

Practice sessions: PPT presentations; Enactment of plays; Reading novels, short stories; Reciting poems, public interactions.

#### Text Books:

1. Bhagat, Chetan. *One Night @ Call Centre*. New Delhi: Rupa Publications, 2005.
2. Shakesperare, William. *Macbeth*. New Delhi: Rupa, 2003.

#### Additional Books/Articles:

1. Cabrera, Blázquez F. J. "Towards a New Cinema Communication." Web: [www.oficinamediaespana.eu/.../iris%20plus%202014-1%20EN\\_LA-%20](http://www.oficinamediaespana.eu/.../iris%20plus%202014-1%20EN_LA-%20)
2. Levert, Loukie and Opiyo Mumma. *Drama and Theatre: Communication in Development*. Kenya Drama/Theatre and Education Association, 1997.
3. Miller, Katherine. *Communication Theories: Perspectives, Processes and Contexts*. McGraw Hill, 2004.
4. Nellhaus, T. *Theatre, Communication, Critical Realism (What is Theatre?)*. Palgrave Macmillan, 2010.
5. Sharma, Sangeeta and Binod Mishra. *Communication Skills for Engineers and Scientists*. Delhi: PHI Learning Private Limited, 2009.
6. Sell, Roger D. *Literature as Communication: The Foundations of Mediating Criticism*. John Benjamins Publishing, 2000.
7. Sherwin, J. Stephen. *Literature and Communication: A Search for a Unifying Principles*. Web: <http://onlinelibrary.wiley.com/doi/10.1111/j.1460-2466.1957.tb00260.x/abstract>.

**NOTE:** Additional texts and movies and videos of advertising clips will be discussed with students from time to time.

## HML413 SCREENWRITING AND DOCUMENTARY FILMMAKING (3-0-0-3)

**Pre-requisite:** NIL

#### Contents:

Screenwriting: What Is a Screenplay?, Screenplay Structure, Knowing the Subject, Creation of a Character, Building a Character, Story and Character, How to Begin, Know Your Ending, Setting Up the Story, Plot Points, Scene, Sequence, Building the Story Line, Screenplay Form, Screenplay-Terms, Writing the Screenplay, Adaptation and Collaboration, After It is Written, Editing Documentary Film Making: What is a Documentary?, Planning a Documentary, Idea and Script, Documentary Research, Documenting Behaviour, Visual Evidence, Conducting Interviews, Reality and Credibility and Ethics, Directing, Verisimilitude in Documentary, Location, Improvisation in Setting, Closing Thoughts on Cameras, Learning Camera Skills, Shots and Angles, Lighting and Set, Sound Effects and Sound Technicalities, Post Production Jobs, Editing

#### Text Book:

1. Field, Syd. *Screenplay: The Foundations of Screenwriting*. Newly Revised and Updated Edition. New York: Delta Trade, 2005.

#### Additional Books:

1. Hampe, Barry. *Making Documentary Films and Videos: A Practical Guide to Planning, Filming, and Editing Documentaries*. 2<sup>nd</sup>-Edition. New York: Henry Holt and Company, 2007.
2. Holden, Tom. *Get Started in Filmmaking*. Teach Yourself Series. John Murray Learning. 2010.
3. Horton, Andrew and Julian Hoxter, eds. *Screenwriting*. New Brunswick and New Jersey: Rutgers University Press, 2014.
4. Mckee, Robert. *Story: Style, Structure, Substance and the Principles of Screenwriting*. Methuen Publishing Ltd., 1999.

**Note:** The syllabus will also cover the study of popular scripts and screenplays and screening and study of documentary films and videos like "Children of the Pyre", "Gulabi Gang", "Seeds of Plenty Seeds of Sorrow" etc.

## HMP101 PREPARATORY ENGLISH (0-1-0-0.5)

**Pre-requisite:** NIL

#### Contents:

1. Understanding of spoken and written English
2. Writing simple sentence

**Practical Exercises:**

1. Sentence: Structure, Types of Sentences
2. Parts of Speech
3. Tenses & Voice
4. Paragraph Construction
5. Reading and Listening Comprehension

**Text Books:**

1. Wren and Martin. *English Grammar and Composition*. New Delhi: S. Chand & Company Ltd., 2012.
2. W.S. Allen. *Living English Structure*. 5<sup>th</sup>ed. New Delhi: Dorling Kindersley/Pearson Education, 2010.

**Additional Books:**

Raymond Murphy. *Essential Grammar in Use: A Self-Study Reference and Practice Book for Elementary Students of English: With Answers*. 3<sup>rd</sup>ed. New Delhi: Cambridge University Press, 2012.

**HMP102 SPOKEN ENGLISH (1-0-2-2)****Pre-requisite:** NIL**Contents:**

Listening Skills: Kinds of Listening, Hearing and Listening, Barriers in Listening, Enhancing Listening Skills.

Speaking Skills: Art of Speaking, Stages of Speaking, Speech Style and Techniques, Speech Mechanism: Organs of Speech, Sound and Speech, Vowels and Consonants, Diphthongs, Speech Process, Phonetics; Phonology, Phonemes, Stress, Rhythm, Intonation.

Developing Speaking Skills: Instructions, Dictation, Face to Face Communication, Meetings, Public Speaking, Group Discussion, Team Talk, Presentations, Seminars, Conferences, Interviews Techniques, Mock Interviews, Telephonic Skills, Conversation Practice Based on Audio and Visual Aids, Dialogues Delivery, Speech and Debate, Speaking on a given topic, Extempore, Words Exercise and Words Games to enhance Self-Expression, Pronunciation Practices, Communication Games and Activities, Group Project.

Personality Development: Creativity, Mind Mapping, Time Management, Stress Management, Body Language, Attitude and Behaviour, Etiquettes and Manners.

**Practical:** Practicals as per course contents.

**Text Books:**

1. Krishna Mohan and Banerji, M., *Developing Communication Skills*, 2<sup>nd</sup> ed., MacMillan Publishers India Ltd., 2013.
2. Seely, J., *Oxford Guide to Effective Writing and Speaking*, 3<sup>rd</sup> ed., Oxford University Press, 2013.

**Additional Books:**

1. Allen, W.S., *Living English Speech*, Orient Longman, Bombay, 1984.
2. Wallace, H.R. and Masters, L.A., *Personality Development for Work*, 7<sup>th</sup>-Edition, South-Western Educational Publication, 1996.
3. Carnegie, D. and Napoleon Hill, *Public Speaking*, Editorial Benei Noaj, 2006.
4. Aslam, M. and Kak, A.A., *Introduction to English Phonetics and Phonology*, Cambridge University Press India Private Limited, 2007.

**HMP103 WRITTEN ENGLISH (1-2-0-2)****Pre-requisite:** NIL**Contents:**

Grammar: Parts Of Speech, Determiners, Modals, Tenses, Active Passive, Direct Indirect, Transformation of sentences. Sentence Structure, Error Finding,

Vocabulary Building: Synonyms, Antonyms, One word substitutions, Word formation, Idioms and Phrases, Homophones, Prefix, Suffix and Vocabulary Usage, Spelling, Reading Comprehension

Composition: Verbal Input: Descriptive, Argumentative, Visual Input: Essay Writing, Report Writing, Note Making, Diary Entry, Professional Letter Writing, Drafting a job Application Letter, Guidelines for Preparing a C.V.

Communication: Meaning, Definitions, Types of Communication, Process, Levels, Barriers to communication, Communication in Professional Context, and Importance of Effective Communication. Technical Communication, Difference between General Writing and Technical Writing, Features of Technical Writing, Computer-aided Communication, Style in Communication.

**Text Books:**

1. Green, D., *Contemporary English Grammar Structures and Composition*, Macmillan Publishers India Limited, 2013.
2. Sen, L., *Communication Skills*, 2<sup>nd</sup> ed., PHI Learning Private Limited, Delhi, 2013.

**Additional Books:**

1. Murphy, R., *English Grammar in Use: A Self-Study Reference and Practice Book for Intermediate Learners of English: With Answers*, 4<sup>th</sup> ed., Cambridge University Press, 2013.
2. Greenbaum, S. and Nelson, G., *An Introduction to English Grammar*, 3<sup>rd</sup> ed., Pearson/Longman, 2010.
3. Rutherford, A.J., *Basic Communication Skills for Technology*, 2<sup>nd</sup> ed., Pearson Education, 2007.

4. Gerson, S.J. and Gerson, S.M., *Technical Writing: Process and Product*, 5<sup>th</sup> ed., Pearson Education, 2009.

**HMP104 ENGLISH COMMUNICATIONS PROGRAM (0-1-0-0.5)****Pre-requisite:** NIL**Contents:**

- I. Writing and Speaking of Compound and Complex Sentences
- II. Efficiency in Spoken and Written English with Grammatical Accuracy

**Practical Exercises:**

1. Subject-Verb Concord, Moods of Verbs
2. Direct/ Indirect Speech, Using Non-finites, Tag-Questions
3. Clauses and its Types, Compound and Complex Sentences
4. Finding Common Errors and Misappropriations
5. Reading and Listening Comprehension- Advanced Level
6. Spoken Exercises and Activities-Advanced Level
7. Précis Writing, Essay Writing
8. Group Discussion

**Text Book:**

1. Green, David. *Contemporary English Grammar: Structures and Composition*. New Delhi: Macmillan, 2013.

**Additional Books:**

1. Bhatnagar, Nitin and Mamta Bhatnagar. *Communicative English for Engineers and Professionals*. New Delhi: Pearson, 2013.
2. Carnegie, Dale. *The Quick and Easy Way to Effective Speaking*. Simon & Schuster, 1990.
3. Eastwood, John. *Oxford Guide to English Grammar*. Oxford. 2003.
4. Kumar, Sanjay and Pushp Lata. *Communication Skills*. New Delhi: Oxford University Press, 2012.
5. Quirk, Randolph, Sidney Greenbaum et al. *A Comprehensive Grammar of the English Language*. Pearson Education, 2010.
6. Seely, John. *Oxford Guide to Effective Writing and Speaking*. Oxford University Press India, 2013.

**HMP105 URBAN SOCIOLOGY (0-1-0-0.5)****Pre-requisite:** NIL**Contents:**

- I. Introduction to Urban Sociology: Origin, Nature and scope, Relevance of the study of Urban Sociology
- II. Basic concepts: The City, Urbanization, Urbanism, Urbanity, Suburb, Metropolitan
- III. Theories of Urban Sociology:
  - (a) Classical sociological traditions as urban and city dimensions, Emile Durkheim, Karl Marx, Max Weber and Ferdinand Tonnies
  - (b) Urban community and spatial dimensions. Park, McKenzie
  - (c) George Simmel: Metropolis, Louis Wirth: Urbanism as a Way of Life and Redfield: Rural Urban Continuum.
  - (d) Concentric Zone Theory and Sector Theory.
  - (e) Richard Florida-The Creative Class
- IV. Process of Urbanization in India: Growth of Urban Population in India, Emergence of Cities, Causes and Consequences of Urbanization
- V. Urban Social Structure: Urban family, urban social stratification – Caste and Class, Occupational Divisions.
- VI. Urban Slums: Problems and challenges, urban development programmes.
- VII. Urban Planning: Meaning and Principles of Urban Planning, Urban Policy in India.

**Text Book:**

1. Patel, Sujata and Kushal Deb. *Urban Studies*. New Delhi: Oxford University Press, 2006.

**Additional Books:**

1. Sharma, Rajendra. *Urban Sociology*. New Delhi: Atlantic Publishers, 2010.
  2. Ronnan, Paddison. *Handbook of Urban Studies*. New Delhi: Sage, 2000.
- Note: The practical exercise will be conducted based on course content.*