

**BE CIVIL ENGINEERING**  
**SEMESTER - VII**  
**19C710 DESIGN AND DETAILING OF STRUCTURES**

**0 0 4 2**

**REINFORCED CONCRETE AND BRICK MASONRY :**

1. Design and detailing of one way continuous slab , Tee beam and L beam , dog legged stairs and stair case with stringer beams.
  2. Design of masonry walls and piers - types of bonds
- (30)

**STEEL ROOF TRUSS:**

1. Design of metal roof sheets - design of roof and cladding purlins - loads and load combinations - double plane trusses - design of strut and tie members - bracing design - design of connections - base connection-detailing
  2. Weld symbols
- (30)

**Total P: 60**

**TEXT BOOKS:**

1. Krishna Raju. N , "Structural Design and Drawing (Reinforced Concrete and Steel)", III, University Press, Hyderabad, 2006.
2. Krishna Raju N , "Design of Reinforced Concrete Structures", CBS Publishers & Distributors, New Delhi, 2003.

**REFERENCES:**

1. IS 1905:1987 , "Code of Practice for Structural Use of Unreinforced Masonry", Bureau of Indian Standards, New Delhi, 1987.
2. SP 34:1987 , "Handbook on Concrete Reinforcement and Detailing", Bureau of Indian Standards, New Delhi, 1987.
3. IS 456:2000 , "Indian Standard Code of Practice for Plain and Reinforced Concrete", Bureau of Indian Standards, New Delhi, 2000.
4. IS 800:2007 , "Indian Standard Code of Practice for General Construction in Steel", Bureau of Indian Standards, New Delhi, 2007.

**19C711 COMPUTER ANALYSIS AND DESIGN LABORATORY**

**0 0 4 2**

**ANALYSIS USING SPREADSHEET :**

1. Basic principles, behavior and design of reinforced concrete slabs, beams, columns, footings, grids, frames as per IS codes using computer programs and softwares.
  2. Basic principles, behavior and design of steel trusses, beams, columns and frames as per IS codes using computer programs and software
- (12)

**ANALYSIS AND BEHAVIOURAL STUDY OF RC AND STEEL STRUCTURES :**

1. Structural analysis of beams and frames -modeling — boundary conditions — loads – loading conditions - load combinations
  2. Calculation of deflections, stress resultants - shear force diagrams and bending moment diagrams for beams and frames, axial force diagrams
- (48)

**Total P: 60**

**REFERENCES:**

1. Department of Civil Engineering, "Computer Laboratory manual", PSG College of Technology, Coimbatore, 2019.

**19C720 PROJECT WORK I**

**0 0 4 2**

- Identification of thrust areas
- Developing a mathematical model for solving the above problem
- Finalization of system requirements and specification
- Proposing different solutions for the problem based on literature survey
- Future trends in providing alternate solutions
- Consolidated report preparation of the above

**Total P: 60**

## SEMESTER - VIII

### 19C820 PROJECT WORK II

0 0 8 4

The project work involves the following:

- Preparing a project – brief proposal including Problem Identification
- Methodology specifying the process/specifications/ parameters - List of alternate methodology if available Justification for the methodology adopted - Time line of activities
- Carrying out experimental/ theoretical work as per the specified time line of activities
- A presentation including all the above along with final results and conclusions.
- Consolidated report preparation.

Total P: 120

## PROFESSIONAL ELECTIVES

### 19C001 ADVANCED REINFORCED CONCRETE DESIGN

3 0 0 3

**SPECIAL STRUCTURAL MEMBERS AND DUCTILE DETAILING** : Flat slabs direct design method and detailing - ribbed hollow block slabs - waffle slabs - deep beams and walls - design of corbels - concepts of ductility, factors influencing ductility, design principles and Codal provisions. (11)

**YIELD LINE THEORY** : Yield line theory for slabs of square - rectangular and circular shapes with different boundary conditions subjected to UDL by virtual work method - concept of segmental equilibrium method - corner lever effects - lower bound solution-introduction to Hiller Borg's strip method. (9)

**RETAINING STRUCTURES AND SHEAR WALLS** : Design and detailing of cantilever and counterfort retaining walls - design and detailing of tanks resting on the ground, underground and elevated water tanks with staging as per IS 3370. - classification and loads in shear walls - moment of resistance of rectangular walls - ductile design of shear walls (9)

**BUNKERS AND SILOS** : Design of a square bunker as per IS 4995 - design of a circular silo - Janssen's theory - principle of Airy's theory (no derivation or problems). (9)

**CHIMNEYS** : Design of RC chimneys as per IS 4998 for combined effect of self load - wind load and temperature (7)

Total L: 45

#### TEXT BOOKS:

1. Varghese P.C, " Advanced Reinforced Concrete Design", Prentice Hall of India , New Delhi, 2005.
2. Krishna Raju N , "Advanced Reinforced Concrete Design", CBS Publishers, New Delhi, 2010

#### REFERENCES:

1. Punmia B.C Ashok Kumar Jain and Arun Kumar Jain , " Comprehensive RCC Designs," , Lakshmi Publications (P) Ltd, New Delhi, 2005.
2. Winter, Nilson A H , "Design of Concrete Structures", Tata McGraw Hill Publishing Company Ltd, New Delhi, 2005.
3. Unnikrishnan Pillai S and Devdas Menon , "Reinforced Concrete Design", 3<sup>rd</sup> Edition, Tata McGraw Hill Publishing Co, Ltd, NewDelhi, 2010.
4. N Subramanian, "Design of Reinforced Concrete Structures", 1<sup>st</sup> Edition, Oxford University Press, 2014.

### 19C002 ADVANCED STEEL DESIGN

3 0 0 3

**DESIGN OF COMPOSITE BEAMS** : Design for composite construction - encased beam - types of shear connectors - degree of shear connection - partial and complete shear connection. (6)

**DESIGN OF COMPOSITE COLUMNS AND BEAM-COLUMNS** : Design for composite construction of columns and beam columns - design of in-filled and encased columns - square, circular and rectangular cross sections. (9)

**DESIGN OF COMPOSITE SLABS** : Design of slabs using decking profile - resistance to longitudinal shear - resistance to vertical shear - bending resistance of composite slab - profile sheeting - parallel and perpendicular to beams. (6)

**LIGHT GAUGE SECTIONS** : Light gauge sections - types of sections, material - local buckling of thin elements - stiffened, unstiffened and multiple stiffened elements - compression members - laterally supported and unsupported flexural members - connections - design of cold formed steel purlins. (9)

**INDUSTRIAL BUILDINGS** : Design of simple and rigid frames — gable frames — knee bents - long span roofs - pre-engineered buildings. (15)

**Total L: 45**

**TEXT BOOKS:**

1. Ramchandra and Vivendra Gehlot , "Design of Steel Structures", 10<sup>th</sup> Edition, Scientific Publishers (India), Jodhpur, 2007.
2. Subramanian N , "Design of Steel Structures-Limit States Method", 2<sup>nd</sup> Edition, Oxford University Press, NewDelhi, 2017.

**REFERENCES:**

1. Johnson R.P , "Composite Structures of Steel and Concrete", Wiley India Pvt. Ltd, India, 2013.
2. Jayagopal L S, Tensing D , "Design of Steel Structures", Vikas Publishing House Pvt Ltd, NewDelhi, 2016.
3. Charles G Salmon & John E Johnson , "Steel Structures — Design & Behaviour", 3<sup>rd</sup> Edition, Harper Collins Publishers, 1990.
4. Robert Englekirk , "Steel Structures, Controlling Behaviour through Design", John Wiley & Sons Inc, 2003.

### **19C003 BASICS OF STRUCTURAL DYNAMICS AND EARTHQUAKE RESISTANT DESIGN**

**3 0 0 3**

**BASIC CONCEPTS IN STRUCTURAL DYNAMICS** : Single and Two degrees of freedom system - linear systems - equation of motion - components of vibration system - natural frequency - viscous damping - response to undamped & damped free and forced vibration - response to support motion - principle of accelerometers and displacement meters. (15)

**STRUCTURES MODELED AS SHEAR BUILDINGS** : Free vibration of a shear building - forced vibration of a shear building - reduction of dynamic matrices. (6)

**ELEMENTS OF EARTHQUAKE ENGINEERING** : Elements of Engineering Seismology - Indian Seismicity - faults - seismic waves - earthquake intensity and magnitude - earthquake ground motion - behaviour of structures in the past earthquakes - basic terminology. (5)

**EARTHQUAKE RESPONSE** : Linear systems: Earthquake ground motion - response spectrum - response history analysis - IS codal provisions for the determination of lateral loads - modal analysis. (9)

**DESIGN CONCEPTS** : Seismic Design Concepts - design spectrum - Earthquake Resistant Design of simple framed structures - IS 1893 codal provisions - ductile detailing of Reinforced Concrete frames as per IS 13920. (10)

**Total L: 45**

**TEXT BOOKS:**

1. Anil K Chopra , "Dynamics of Structures - Theory and Applications to Earthquake Engineering", Prentice Hall of India (P) Ltd, NewDelhi, 2004.
2. Pankaj Agarwal & Manish Shrikhande , "Earthquake Resistant Design and Structures", Prentice Hall of India, NewDelhi, 2006.

**REFERENCES:**

1. Clough R W and Penzein , "Dynamics of Structures", McGraw Hill Book Co Ltd, NewDelhi, 1993.
2. Paz Mario, William Leigh , "Structural Dynamics - Theory and Computation", 5<sup>th</sup> Edition, Springer, NewDelhi, 2004.
3. Craig, R.R, and Andrew J.K , "Structural Dynamics - An Introduction to computer Methods", JohnWiley & Sons, 2006.
4. Manickaselvam, V.K , "Elementary Structural Dynamics", Dhanpat Rai & Sons, 2001.

### **19C004 BRIDGE ENGINEERING**

**3 0 0 3**

**INVESTIGATIONS AND PLANNING** : Need for investigation- selection of bridge site - preliminary data collection and preliminary drawings - determination of design discharge - linear water way - economic span - afflux-scour depth - choice of bridge type - importance of investigation. Standard specifications for road bridges and railway bridges - general design considerations. (9)

**SUBSTRUCTURES AND BEARINGS** : Piers and abutments - function - aesthetics - materials; wing walls construction aspects - Bearings - types - design of rocker and roller bearings. (9)

**REINFORCED CONCRETE BRIDGES** : Design of T beam and Slab Bridge - design principles of RC balanced cantilever bridge and - Super structure - types - choice of materials - design principles, considerations and criteria of pipe culverts, slab culvert, box culvert, and causeways. (9)

**DESIGN PRINCIPLES OF RC AND STEEL BRIDGE :** Design of T beam and Slab Bridge - design principles of RC balanced cantilever bridge and articulation - Design concepts of rigid frame bridges ,Suspension bridges - cable stayed bridges and their components. (9)

**ELEMENTS OF PRESTRESSED CONCRETE BRIDGE DESIGN, CONSTRUCTION AND MAINTENANCE :** Size, prestressing force, eccentricity, design of cables, end blocks - Bridge superstructure construction - supports and centering for RC bridges - erection of precast RC girders and steel girder bridges - maintenance of bridges, strengthening of bridges. (9)

**Total L: 45**

**TEXT BOOKS:**

1. D.Johnson victor , "Essentials of Bridge Engineering", 6<sup>th</sup> Edition, Oxford and IBH Publishing Co., New Delhi, 2007.
2. Krishna Raju N , "Design of bridges", 5<sup>th</sup> Edition, Oxford and IBH Publishing Co., New Delhi, 2017.

**REFERENCES:**

1. Bakhi B , Jaeger L.G , " Bridge deck analysis simplified", McGraw Hill book company, 1987.
2. Jagadeesh T.R , Jayaram M.A, "Design of bridge structures", PHI Learning Private limited, 2010.
3. Ponnuswamy S , "Bridge Engineering", third, Tata McGraw Hill Publishing Co., New Delhi, 2017.

## **19C005 DESIGN OF ENERGY EFFICIENT BUILDINGS**

**3 0 0 3**

**THE CLIMATE :** Factors that determine climate - components of climate - characteristics of climatic types: Design for various climatic zones: Passive and active energy control. Body heat balance - the sensation of heat comfort zone - exercise on the establishment of effective temperature and comfort zone. (6)

**SOLAR CONTROL AND HEAT FLOW THROUGH MATERIALS :** Movement of the sun-charts - calculation of Altitude and azimuth - solar charts - shadow angle - solar shading - design of shading devices. (5)

**THERMAL COMFORT AND NATURAL VENTILATION :** Thermal comfort factors - Principles of heat gain and losses through building and calculation of heat gain and losses - passive means of thermal comfort design of buildings. Calculation of U values. Concept of green buildings. - Natural Ventilation-The wind-elements of air and their effect on human beings: Air movement through buildings-thermally induced air flow pattern in buildings: ventilation requirements for health - Mechanisms and estimation of natural ventilation. (12)

**DAYLIGHTING AND ARTIFICIAL LIGHTING :** Day Lighting-Principles of day lighting analysis and design - design of fenestration in buildings various types - quality of day lighting - illumination design - luminaries and their characteristics - code requirements - Artificial Lighting-Types and luminaries design interiors determination the illumination level -Lumen method - artificial lighting to supplement day lighting. Modern theory of light and colour. (11)

**ACOUSTICS, SOUND INSULATION AND NOISE CONTROL :** Introduction - scope of study. Absorption co-efficient and their measurement Absorption materials used and their choice-Resonance - reverberation and echo-actual and optimum RT - RT for various uses and calculations. Acoustics of buildings: Characteristics of audible sound - behavior of sound and its effect - acoustical defects - acoustical defects - acoustics of buildings - sound absorbents and acoustical materials. Sound insulation of buildings: Introduction to effects and types of noise - transmission of noise - sound insulation vs sound absorption - transmission loss - maximum acceptable noise levels - means of noise control and sound insulation. - Design of acoustical buildings. - Noise Control- Characteristics and effect of noise - source and control of noise in buildings of various types -planning and design against outdoor and indoor noise. Noise contour. (11)

**Total L: 45**

**TEXT BOOKS:**

1. Koenigsberger O.H, Ingersoll T.G , "Manual of Tropical housing and Building -Climatic design", University Press, Hyderabad, Reprint 2011.
2. Dr. B.C.Punmia, Er.Ashok k jain. , "Building Construction Engineering", 11<sup>th</sup> Edition, Lakshmi Publications (P)Ltd, New Delhi, 2016.

**REFERENCES:**

1. Ishwar Ch, Bhargava P K , "The Climate Hand Book", Tata McGraw Hill, New Delhi, 1999.
2. Majumdar M, "Energy Efficient Buildings in India", TERI, 2000.
3. SP:41 (1987) , "Hand book on Functional Requirements of Buildings (other than Industrial Buildings)".

## **19C006 DISASTER MANAGEMENT AND MITIGATION**

**3 0 0 3**

**NATURAL DISASTERS :** Cyclones - Floods - Drought and Desertification - Earthquake - Tsunami - Volcanoes - Landslides and Avalanche (9)

**MAN MADE DISASTERS** : Chemical industrial hazards - Major power breakdowns - Traffic accidents - Fire, Forest Fire, Oil fire - War - Atom bombs - Nuclear disaster - Accident in Mines (9)

**GEOSPATIAL TECHNOLOGY** : Remote sensing - GIS and GPS applications in real time disaster monitoring, prevention and rehabilitation - Disaster mapping (9)

**RISK ASSESSMENT AND MITIGATION** : Hazards, Risks and Vulnerabilities - Disasters in India - Assessment of Disaster Vulnerability of a location and vulnerable groups - Preparedness and Mitigation measures for various Disasters - Mitigation through capacity building - Preparation of Disaster Management Plans (9)

**DISASTER MANAGEMENT** : Legislative responsibilities of disaster management - Disaster management act 2005 – Post disaster recovery and rehabilitation, Relief & Logistics Management - Disaster related infrastructure development - Post Disaster, Emergency Support Functions and their coordination mechanism (9)

**Total L: 45**

**TEXT BOOKS:**

1. Ramana Murthy, "Disaster Management", Dominant, New Delhi, 2004.
2. Rajdeep Dasgupta, "Disaster Management and Rehabilitation", Mittal Publishers, New Delhi, 2007.

**REFERENCES:**

1. Murthy D B N, "Disaster Management: Text and Case Studies", Deep and Deep Publications (P) Ltd., 2007.
2. Sundar I, Sezhiyan T, "Disaster Management", Sarup and Sons, 2007.
3. Khanna B K, "All You Wanted To Know About Disasters", New India Publishing Agency, 2005.
4. A status report, "Disaster Management in India", National Disaster Management Institute, Ministry of Home Affairs, Govt. of India, 2004.

## **19C007 REPAIR AND REHABILITATION OF STRUCTURES**

**3 0 0 3**

**BUILDING MAINTENANCE, CRACKS & DAMPNES** : maintenance classification — structural appraisal — building maintenance - Building cracks - Principal sources of crack formation — diagnosis of cracks - Sources of dampness — moisture movement from ground — reasons for ineffective DPC - leakage in slab — ferrocement overlay technique (13)

**REPAIR MATERIAL** : Epoxy — polymer & latex — acrylic polymers — polyester resins - application of repair chemicals - concrete repair chemicals - examples of concrete chemicals for repair (6)

**CONCRETE STRUCTURE** : Types and causes of deterioration — diagnosis of deterioration - Corrosion of steel in reinforced concrete - Treatment against carbonation induced and chloride induced corrosion-cracks in RCC structural elements and their prevention (8)

**MASONRY STRUCTURE** : Causes and treatment of cracks — cracks in load bearing walls - masonry partition walls - Remedial measures — cracks in plastering and rendering — surface cracks — corner cracks — cracks in building due to swelling of soil (9)

**STRENGTHENING OF EXISTING STRUCTURES** : General principles — relieving loads — strengthening super structure — plating — conversion to composite construction - post stressing — jacketing — bonded overlays — section enlargement and addition of reinforcement - strengthening of substructure (9)

**Total L: 45**

**TEXT BOOKS:**

1. P C Varghese, "Maintenance, Repair and Rehabilitation and Minor works of Buildings", PHI Pvt Ltd, 2014.
2. B L Gupta & Amit Gupta, "Maintenance and Repair of Civil Structures", Standard publishers distributors, 2007.

**REFERENCES:**

1. Macdonald S, "Concrete — Building Pathology", Blackwell Science limited, 2003.
2. Strecker P P, "Corrosion Damaged Concrete — Assessment and Repair", Butterworths, 1987.
3. Denison Campbell, Allen, Harold Roper, "Concrete structures, Materials, Maintenance and Repair", Longman scientific and technical, 1991.
4. Raina VK, "Concrete for Construction — Facts and Practice", Tata Mac Graw Hill, 1999.

## **19C008 INDUSTRIAL STRUCTURES**

**3 0 0 3**

**PLANNING AND FUNCTIONAL REQUIREMENTS**: Planning and layout of low-rise buildings for different functions - Lighting and Ventilation - Fire Safety - Protection against noise and vibration - Guidelines from factories act. (9)

**DESIGN OF FRAMES** : Design of simple and rigid frames as per IS 800 - Gable frames - Knee bents - Pre

Engineered Buildings. (9)

**DESIGN OF CHIMNEYS AND TOWERS** : Self-supporting Chimneys - IS 6533 provisions - Guyed Chimneys – Design of towers - Design of Masts. (9)

**INDUSTRIAL ROOFING STRUCTURES** : Planning and Design of industrial sheds and Trusses - Bracing of roofs and Vertical bracing of buildings - Design of purlins - Design of gantry girder and gantry columns. (9)

**BUNKERS AND SILOS** : Pressure on side walls of bunkers and silos - Janssen's and Airy's theories - Design of rectangular and square bunkers Bunkers with sloping bottom and design of staging - Design of Silos including their supporting structures and foundation. (9)

**Total L: 45**

**TEXT BOOKS:**

1. Subramanian.N , " Design of Steel Structures", 2<sup>nd</sup> Edition, Oxford University Press, NewDelhi,2017.
2. Dunham C W , "Planning Industrial Structures", McGraw Hill Book Company, Inc., 1980.

**REFERENCES:**

1. Jayagopal L S & Tensing D , "Design of Steel Structures", Vikas Publishing House Pvt Ltd., 2016.
2. Charles G Salmon & John E Johnson, "Steel Structures — Design & Behaviour", Harper Collins Publishers, 1990.
3. Robert Englekirk , "Steel Structures, Controlling Behaviour through Design", John Wiley & Sons, 2003.
4. Ram Chandra , "Design of Steel Structures - 2", 13<sup>th</sup> Edition, Scientific Publishers (India), Jodhpur, 2008

## 19C009 PRESTRESSED CONCRETE STRUCTURES

**3 0 0 3**

**PRINCIPLES, ANALYSIS AND LOSSES** : Principles - types of prestressing - materials definition of Type I, Type II and Type III structures - requirements - behaviour of PSC elements - force transmitted by pretensioned and post tensioned systems- analysis - service loads - ultimate strength. - losses due to deformation and slip of anchorage units - elastic shortening, frictional losses - shrinkage and creep of concrete, relaxation of steel - as per IS 1343 : 2012. (13)

**DESIGN FOR FLEXURE** : Philosophy - limit states - concepts - collapse and serviceability - - service load – basic requirements - stress range approach - Lin's approach - Magnel's approach - cable layouts (7)

**DESIGN FOR SHEAR AND TORSION** : Shear and principal stresses - limit state shearing resistance of cracked and uncracked sections - - design of shear reinforcement by limit state approach. - Behaviour under torsion - modes of failure - design for combined torsion - shear and bending as per IS 1343 : 2012. (7)

**DEFLECTION AND TRANSFER OF PRESTRESS** : Transmission of prestressing force by bond in pretensioned members - Transmission length - Factors affecting transmission length - check for transmission length - transverse tensile stresses - end zone reinforcement. - Anchorage zone stresses in post-tensioned members - Magnel's method - Calculation of bearing stress and bursting tensile forces - code provisions - Reinforcement in anchorage zone. - Deflection - short and long term deflection of uncracked and cracked members as per IS 1343: 2012. (7)

**TANKS AND PIPES** : Circular prestressing in liquid retaining tanks - analysis for stresses - design of tank wall. PSC pipes - types - design of non cylinder pipes. (5)

**STATICALLY INDETERMINATE STRUCTURES** : Methods of achieving continuity - assumptions in elastic analysis - pressure line - linear transformation - concordant cables - Guyon's theorem - analysis and design of continuous beams. (6)

**Total L: 45**

**TEXT BOOKS:**

1. Rajagopalan N , "Prestressed Concrete", 2<sup>nd</sup> Edition, Narosa Publishing House, New delhi, 2005.
2. Krishna raj , "Prestressed Concrete", 5<sup>th</sup> Edition, Tata McGrawhill publishers, Newdelhi, 2012.

**REFERENCES:**

1. Praveen Nagarajan , " Prestressed Concrete Design", Pearson, 2013.
2. Sinha N C, Roy S K , " fundamentals of Prestressed concrete", S Chand & Co, 1985.

## 19C010 FINITE ELEMENT ANALYSIS

**3 0 0 3**

**DIRECT STIFFNESS FOR PIN JOINTED FRAMES** : Structural Mechanics Concept , Matrix Displacement Method of Analysis - Stiffness matrix, Principle of superposition - Basic Theory of Finite Element Method, Application of Finite Element Method - Advantages and Disadvantages - Concept of direct stiffness, Element Stiffness - Element Assembly to Global Stiffness Matrix, Boundary Condition - Plane truss - displacement of joints, forces in members - Space truss, numerical examples -

(9)

**DIRECT STIFFNESS METHOD FOR BEAMS AND PLANE RIGID FRAMES** : Direct Stiffness for Beams and Frames - stiffness matrix for beam element, principle of superposition - Continuous beams, assembly of element stiffness matrices - application of boundary conditions, consistent load vector - evaluation of displacements at nodes, element end forces - shear force and bending moment diagrams - plane rigid frame element, global and local coordinate systems - transformation matrix, element assembly, stiffness matrix - analysis of plane rigid frames, axial force, shear force and bending moment diagrams (9)

**CONCEPTS OF ELASTICITY AND TWO DIMENSIONAL STRESS ANALYSIS** : Introduction to Elasticity theory, Basic concepts - Constitutive law, plane stress, plane strain problems - Equilibrium equations, compatibility equations, transformation - Saint Venant's Principle - Idealisation, Triangular Element - Constant Strain Triangle, strain displacement matrix - Element Stiffness, Assembly of Element Stiffness - Application to simple problems - Introduction to Isoparametric elements, basic concepts only. (9)

**METHOD OF WEIGHTED RESIDUAL AND VARIATIONAL FORMULATION** : trial function, residue, weight concepts - methods of weighted residual and applications - collocation method and over determined collocation method - subdomain method, galerkin's method - method of least squares - calculus of variations, euler lagrange equation functional, rayleigh ritz method concept - application to deflection of beams - application to buckling load of columns (9)

**SOLUTION TECHNIQUES FOR STATIC AND DYNAMIC ANALYSIS** : Linear system of equations, storage schemes, band form of storage - gaussian elimination method - cholesky decomposition method - application to static analysis, evaluation of displacements - eigen value problems, stress analysis, stability problems - mass matrix, lumped mass, consistent mass - jacobi method for eigen value problems - evaluation of maximum eigen value by forward iteration - evaluation of minimum eigen value by inverse iteration (9)

**Total L: 45**

#### **TEXT BOOKS:**

1. Rajasekaran S and Sankarasubramanian G , "Computational Structural Mechanics", 1<sup>st</sup> Edition, Prentice Hall of India Pvt. Ltd., new delhi, 2001.
2. Rajasekaran S , "Finite Element Analysis in Engineering Design", 1<sup>st</sup> Edition, S Chand & Co, New Delhi, 2003.

#### **REFERENCES:**

1. C S Krishnamoorthy , "finite element analysis - Theory and programming", 1<sup>st</sup> Edition, Tata McGraw Hill Publishing Co, New Delhi, 1994.
2. Cook R D, Malkus D S, et al , "Concepts and Applications of Finite Element analysis", 4<sup>th</sup> Edition, John Wiley & Sons, New York, 2003.
3. Chandrapatla and Belegundu , "Introduction to Finite Elements in Engineering", 1<sup>st</sup> Edition, Prentice Hall of India, New Delhi, 2002.

## **19C011 PREFABRICATED STRUCTURES**

**3 0 0 3**

**DESIGN PRINCIPLES** : Need for industrialized methods in building construction - Historical perspective of precast construction in India - Specific requirements for planning and layout of prefabrication plant - Modular Coordination - Standardization - Mechanization - Disuniting of Prefabricates - Types of prefabrication - Prefabrication systems - Material Properties - Moulds - Manufacture of prefabricated components - Transport and Erection of structural components - Finishing and Fitting up operations - Dimensional deviation and Tolerance - Principles of structural design of prefabricated components - IS Code Specifications (10)

**FLOORS AND ROOFS** : Types of floor slabs - Flooring arrangements - Behaviour - Analysis and design of voided slab floor elements and composite plank floor - Design of Horizontal Floor diaphragms - Types of Roof Slab and its behaviour - Design considerations of shell roofs for industrial sheds - Cylindrical, Folded plate and hyper-prefabricated shells - Erection and jointing techniques (9)

**WALLS** : Types of wall panels - Blocks and large panels, Sandwich wall Panels, Curtain, Partition and load bearing walls - behaviour - Load transfer path - Stability of wall panels - Location of shear wall in buildings - Design of shear walls - Leak prevention, joint sealants and Expansion joints (8)

**PRECAST RC FRAME COMPONENTS** : Precast Frame Analysis - Analysis and Design of Beams, Columns and corbel - Structural integrity - Design for Progressive collapse (9)

**JOINTS AND CONNECTIONS** : Basic force transfer mechanisms - Design Philosophy - Types of joints - Compression, Tension, shear, Flexural and Torsional joints - Structural Connections - Connection Materials - Methods of Connection analysis - Connection between various structural precast elements (9)

**Total L: 45**

#### **REFERENCES:**

1. Handbook on Precast Concrete buildings , 1<sup>st</sup> Edition, Indian Concrete Institute, Chennai, 2016.

- Kim S.Elliot , "Precast concrete structures", 2<sup>nd</sup> Edition, CRC Press (Taylor and Francis Group), London, 2016.
- Kim S.Elliot, Collin K.Jolly , "Multi storey Precast concrete framed structures", 2<sup>nd</sup> Edition, Wiley Blackwell, Hoboken, United States, 2013.
- fib 43 , "Structural connections for Precast concrete buildings", 1<sup>st</sup> Edition, International federation for structural concrete (fib), Switzerland, 200.

## 19C015 GROUNDWATER ENGINEERING

3 0 0 3

**FUNDAMENTALS OF GROUNDWATER** : Introduction - Occurrence of groundwater - movement of groundwater - classification of aquifers - distribution of water - groundwater column - Permeability - Darcy's Law - laboratory permeability test - types of aquifers - hydrogeological cycle - water level fluctuations. (9)

**HYDRAULICS OF FLOW** : Storage coefficient - specific yield - heterogeneity and anisotropy -transmissivity - governing equations of groundwater flow - steady state flow - Dupuit Forchheimer assumptions - Velocity potential - Flow nets. (9)

**ESTIMATION OF PARAMETERS** : Transmissivity and Storativity - Pumping test - unsteady state flow – Thiess method - Jacob method - Image well theory - effect of partial penetrations of wells. (9)

**GROUNDWATER DEVELOPMENT, SURFACE INVESTIGATION OF GROUNDWATER** : Infiltration gallery - collector wells - conjunctive use - artificial recharge -safe yield -yield test - Selection of pumps - Geophysical methods of groundwater, electrical resistivity method, seismic refraction method, gravity and magnetic method, remote sensing techniques. (9)

**WATER QUALITY** : Groundwater chemistry - Origin, movement and quality - water quality standards - saltwater intrusion - Environmental concern. Control of groundwater contamination - Groundwater Modeling. (9)

**Total L: 45**

### TEXT BOOKS:

- Raghunath H M, "Ground Water", Third edition, New Age International Publisher, 2007.
- David K. Todd & Larry W. Mays, "Groundwater Hydrology", Wiley student edition, 2014.

### REFERENCES:

- Franklin W. Schwartz & Hubao Zhang , "Fundamentals of Groundwater", student edition, Wiley, 2003.
- Ramakrishnan S , "Ground Water", Second edition, Scitech publications India Pvt LTD, 2011.
- Jacob Bear , "Hydraulics of Groundwater", McGraw Hill Education, 2013.

## 19C016 IRRIGATION ENGINEERING

3 0 0 3

**NEED FOR IRRIGATION** : Advantages and disadvantages - Types of irrigation - soil formation - functions and properties of soils - types of soil moisture - suitability of soil for crops - suitability of water for irrigation – standards for irrigation water (7)

**REQUIREMENTS OF WATER** : Duty and delta of a crop - factors affecting duty - crop seasons - Techniques of water distribution - optimum utilization - irrigation efficiency - consumptive use and its estimation (7)

**IRRIGATION CANAL AND SEDIMENT TRANSPORT** : Alluvial and non alluvial canals - Alignment of canals - Distribution system - command area - intensity of irrigation - Channel losses - Estimation of required canal capacity - Design of stable channels - Kennedy's and Lacey's theories - cross section of irrigation channels in cutting and embankment - problems and maintenance of irrigation channels (11)

**LINING OF CANALS AND WATER LOGGING** : Need and justification for lining of canals - Design of lined canals - cross-section - types of lining — drainage - Causes of water logging - methods of reclaiming a water logged area (10)

**RIVER TRAINING AND TANK IRRIGATION** : Behaviour of rivers - need for controlling their behaviors - River training works - Tanks in isolation and series - capacity of water spread - estimation of inflow - principal elements of an irrigation tank (10)

**Total L: 45**

### TEXT BOOKS:

- Santhosh Kumar Garg , "Irrigation and Hydraulic Structures", 16<sup>th</sup> Edition, Khanna Publishers, New Delhi, 2014.
- Punmia BC, Pande B B Lal, Ashok Kumar Jain, Arun Kumar Jain , "Irrigation and Water Power Engineering", 12<sup>th</sup> Edition, Laxmi Publications (P) Ltd., New Delhi, 2014.



**REFERENCES:**

1. Sahasra Budhe S R , "Irrigation and Hydraulic Structures", Katson Publishing House, Ludhiana, 2012.
2. Asawa G L , "Irrigation and Water Resources Engineering", 1<sup>st</sup> Edition, New Age International Publishers, New Delhi, 2014.
3. Sharma R K, Sharma T K , "Irrigation Engineering", 3<sup>rd</sup> Edition, S Chand and Company Ltd., New Delhi, 2012.

**19C021 ENVIRONMENTAL IMPACT ASSESSMENT****3 0 0 3**

**ELEMENTS OF ENVIRONMENT IMPACT ASSESSMENT (EIA) :** Elements of Environment Impact Assessment (EIA) Objectives - Environmental Impact statement (EIS) - EIA capability and limitations - Legal provisions on EIA - Impact of development projects under Civil Engineering on environment (6)

**METHODOLOGIES AND PREDICTION AND ASSESSMENT :** Methods of EIA - Checklists - Matrices - Networks - Cost-benefit analysis - Analysis of alternatives - case studies - Impact prediction, assessment and monitoring on Socio-economic, - Soil, Water and Air quality, Noise, Transport, Ecology - Mathematical models - public participation - Rapid EIA (14)

**ENVIRONMENTAL MANAGEMENT PLAN :** Plan for mitigation of adverse impact on environment - options for mitigation of impact on water - air and land - flora and fauna; addressing the issues related to the project affected people- Remote sensing and GIS in EIA - ISO 14000. (8)

**EIA IN INDIA :** Procedure for environmental clearance - Flow chart - Environmental guidance for Thermal power plants - Mining projects - River valley development projects - Legislation and Institutional support - International co-operation - Guidance for industrial licensing. (8)

**CASE STUDIES :** EIA for infrastructure projects - Bridges - Stadium - Highways - Dams - Multi-storey Buildings - water supply and drainage projects. (9)

**Total L: 45****TEXT BOOKS:**

1. Larry Canter , "Environmental Impact assessment", McGraw Hill Inc, 2014.
2. Anji Reddy , "Environmental Impact Assessment: Theory and Practice", BS Publications, 2014.

**REFERENCES:**

1. Peter Morris , Riki Therivel , "Methods of Environmental Impact assessment", Span Press, 2001.
2. John G Rau , David C Hooten (Ed) , " Environmental Impact Analysis Handbook", McGraw Hill Book Company, 1990.
3. Judith Petts , " Handbook of Environmental impact Assessment Vol. I & II", Blackwell Science, 1999.

**19C022 INDUSTRIAL WASTE MANAGEMENT****3 0 0 3**

**INDUSTRIAL POLLUTION :** Types of industries and industrial pollution - characteristics of industrial wastes - Population equivalent - Bioassay studies - effects of industrial effluents on streams - sewer - land - sewage treatment plants and human health - Environmental legislation related to prevention and control of industrial effluents and hazardous wastes - Common effluent treatment plants. (9)

**WASTE MANAGEMENT :** Waste management Approach - Environmental Auditing - ISO 14000 - Basics and Approaches - Volume and strength reduction - Material and process modifications - Waste minimization - Recycle - reuse and byproduct recovery - Applications. (9)

**TREATMENT TECHNOLOGIES :** Equalization - Neutralization - removal of suspended and dissolved organic solids - Chemical oxidation - Adsorption - Removal of dissolved inorganic solids - Combined treatment of industrial and municipal wastes - Common Effluent Treatment methods - Residue management - Dewatering- Disposal. (10)

**POLLUTION CONTROL FROM AGRO BASED INDUSTRIES :** Sources - characteristics - waste treatment flow sheets for selected industries such as Textiles - Tanneries - dairy - Sugar - Paper - Distilleries (9)

**POLLUTION CONTROL FROM OTHER MAJOR INDUSTRIES :** Sources - characteristics - waste treatment flow sheets for Pharmaceuticals - Electroplating industries - Steel plants - Refineries - Fertilizer - Thermal power plants - Wastewater reclamation concepts. (8)

**Total L: 45****TEXT BOOKS:**

1. Rao MN , Dutta AK , "Wastewater Treatment", Fourth, Oxford — IBH Publication, New Delhi, 2007.
2. Eckenfelder W W Jr. , "Industrial Water Pollution Control", McGraw Hill Book Company, 2000.

**REFERENCES:**

1. Nemerrow N L , "Industrial waste treatment", Butterworth-Heinemann, 2007.
2. Shen T T , "Industrial Pollution Prevention", Springer, 1999.
3. Freeman H M , "Industrial Pollution Prevention Hand Book", McGraw Hill Inc., 1995.
4. Bishop, P.L. , "Pollution Prevention: Fundamental & Practice", McGraw Hill, 2000.

**19C023 SOLID WASTE MANAGEMENT****3 0 0 3**

**SOURCES AND TYPES :** Sources and types of solid wastes - Quantity - factors affecting generation of solid wastes; characteristics - methods of sampling and characterization; Effects of improper disposal of solid wastes - public health effects. Principle of solid waste management - social & economic aspects; Public awareness; Role of NGOs; Legislation. (10)

**ON-SITE STORAGE & PROCESSING :** On-site storage methods - materials used for containers - on-site segregation of solid wastes - public health & economic aspects of storage - options under Indian conditions - Critical Evaluation of Options. (8)

**COLLECTION AND TRANSFER :** Methods of collection - types of vehicles - Manpower requirement – collection routes - transfer stations - selection of location - operation & maintenance; options under Indian conditions. (8)

**TREATMENT AND DISPOSAL :** Processing techniques and Equipment; Resource recovery from solid wastes - composting - incineration - pyrolysis - options under Indian conditions - Dumping of solid waste; sanitary land fills site selection design and operation of sanitary landfills - Leachate collection and treatment. (11)

**HAZARDOUS WASTE MANAGEMENT :** Hazardous - radioactive and biomedical wastes - Physico Chemical treatment - solidification - incineration - secured landfills. (8)

**Total L: 45****TEXT BOOKS:**

1. George Tchobanoglous, Hilary Theisen, Samuel Vigil , "Integrated Solid Waste Management", McGraw Hill Publishers, 2004.
2. Bilitewski, Bernd, Härdtle, Georg, Marek, Klaus , "Waste Management", Springer, 2004.

**REFERENCES:**

1. CPHEEO , "Manual on Municipal Solid Waste Management", CPHEEO, Ministry of Urban Development, New Delhi, 2000.
2. Landreth R.E., , Rebers P. A, "Municipal Solid Wastes — Problems and Solutions", Lewis Publishers, 1997.
3. Bhide A.D. and Sundaresan, B.B. , "Solid Waste Management in Developing Countries", INSDOC, 1993.
4. Bhide A.D. and Sundaresan, B.B. , "Solid Waste Collection, Processing and Disposal", First, Authors, Nagpur, 2001.

**19C026 GEOSYNTHETICS IN CIVIL ENGINEERING****3 0 0 3**

**OVERVIEW OF GEOSYNTHETICS AND DESIGN PRINCIPLES :** Overview of Geotextiles, geogrids, geonets, geomembranes, geosynthetic clay liners, geopipes and geocomposites - their current applications for various functions, Mechanism of reinforced soil - Factors influencing behaviour and performance, Soil-reinforcement interaction. (9)

**USE OF GEOSYNTHETICS IN ROADS :** Applications, Role of subgrade conditions - Design - The Giroud and Noiray approach - Geotextile serviceability, Application in pavement overlays. (8)

**DESIGN OF REINFORCED SOIL RETAINING WALLS :** Components of reinforced soil walls - Principles of design — Internal and external stability - Design examples. (9)

**IMPROVEMENT OF BEARING CAPACITY :** Modes of failure in reinforced earth, Determination of force induced in reinforcement - Guidelines on the use of geogrids, Bearing capacity improvement in soft soils. (8)

**EMBANKMENTS IN SOFT SOILS, USE OF GEOSYNTHETICS FOR FILTRATION AND DRAINAGE:** Analysis, Influence of reinforcement extensibility, deformation in foundation - Overall stability with respect to bearing. - Applications, Geotextile filter requirements, boundary conditions - drain and filter properties, design criteria. (11)

**Total L: 45****TEXT BOOKS:**

1. Sivakumar Babu G L , "Introduction to Soil Reinforcement and Geosynthetics", Universities Press, Hyderabad, 2009.
2. Robert M Koerner , "Designing with Geosynthetics", 5<sup>th</sup> Edition, Prentice Hall, New Jersey, 2005.

**REFERENCES:**

1. Mandal J N , "Geosynthetics World", 1<sup>st</sup> Edition, New Age International (P) Ltd., New Delhi, 2007.
2. Braja M Das , "Shallow Foundations: Bearing Capacity and Settlement", CRC Press, New York, 1999.
3. Jones C J F P , "Earth Reinforcement and Soil Structures", Thomas Telford Publishing, 1996.

**19C027 GROUND IMPROVEMENT TECHNIQUES****3 0 0 3**

**INTRODUCTION :** Role of ground improvement in foundation engineering - Methods of ground improvement - Geotechnical problems in alluvial and black cotton soils - Selection of suitable ground improvement techniques based on soil condition. (9)

**DRAINAGE AND DEWATERING :** Drainage techniques-well points - vacuum and electroosmotic methods - Seepage analysis for two dimensional flow - Fully and partially penetrating slots in homogeneous deposits (Simple cases only). (9)

**INSITU TREATMENT OF COHESIONLESS AND COHESIVE SOILS :** Insitu densification of cohesionless and consolidation of cohesive soils-Dynamic compaction and consolidation - vibrofloatation - Sand compaction pile - Preloading with sand drains and fabric drains - Stone columns - Lime piles-Installation techniques only - Relative merits of various methods and their limitations. (9)

**EARTH REINFORCEMENT :** Concept of reinforcement - Types of reinforcement material - Applications of reinforced earth - Use of Geotextiles for filtration - drainage and separation in road and other works. (9)

**GROUT TECHNIQUES :** Types of grouts - Grouting equipment and machinery - Injection methods - Grout monitoring - Stabilisation with cement - lime and chemicals - Stabilisation of expansive soils. (9)

**Total L: 45****TEXT BOOKS:**

1. Purushothama Raj , "Ground Improvement Techniques", Tata McGraw Hill Publishing Company, New Delhi, 2016.
2. Robert M Koerner , "Design with Geosynthetics", Prentice Hall, New Jersey, 2005.
3. Satyendra Mittal , "An Introduction to Ground Improvement Engineering", Scientific International Private Limited, New Delhi, 2013.

**REFERENCES:**

1. Joseph E Bowles , "Foundation Analysis and Design", McGraw Hill Companies. Inc., New York, 2011.
2. Braja M Das , "Principles of Foundation Engineering", Thomson Publishing company, Brooks/Cole Division, 2004.
3. Shashi K Gulhati , Manoj Datta , "Geotechnical Engineering", Tata McGraw Hill Education (P) Ltd., New Delhi, 2010.
4. Kenneth D Weaver , Donald A Bruce , "Dam Foundation Grouting", ASCE Press, Virginia, 2007.

**19C028 PAVEMENT ENGINEERING****3 0 0 3**

**PRINCIPLES OF PAVEMENT DESIGN :** Types of pavement-flexible and rigid- Components of pavement and their functions - Provisions of IRC Guidelines for each component - Comparison between highway and airport pavements - Factors influencing pavement stability: Vehicle and traffic factors-ESWL and Wheel Load Factor- Moisture and climate - soil-CBR - Hveem stabilometer method - Plate Bearing method for finding modulus of subgrade reaction and North Dakota Cone method- and stress distribution factor-Boussinesq and Burmister theories. (9)

**DESIGN OF FLEXIBLE PAVEMENT :** Empirical method based on arbitrary strength-CBR method-Provisions of IRC 37- Plate Bearing method (US Navy method for airfields) - Theoretical and semi-theoretical methods-Kansas and Texas triaxial methods - IRC guidelines for design of flexible rural roads. Federal Aviation Administration (FAA) method (Recommended by International Civil Aviation Organization) (9)

**STRESSES IN RIGID PAVEMENT :** Stresses in rigid pavement due to wheel load-Westergaard - Older - Bradbury and Kelly theories- Stresses due to change in temperature-warping stress-theory by Bradbury- Stress due to subgrade restraint - Critical combination of stresses. (5)

**DESIGN OF RIGID PAVEMENT :** Modulus of Rupture of concrete - Design of airport pavement- Federal Aviation Administration (FAA) method (Recommended by International Civil Aviation Organization) - Design of rigid highway pavement- IRC 58 method - IRC guidelines for design of rigid rural roads - Types of joints - Types of rigid pavement based on reinforcement - Design of reinforcement in longitudinal and transverse direction - tie bars and dowel bars. (10)

**PAVEMENT DISTRESS, EVALUATION AND REHABILITATION INCLUDING STABILIZATION :** Distresses in flexible and rigid pavements - condition surveys - Types of roughness - present serviceability index - skid resistance - structural evaluation - Benkelman deflection method - Design of overlays both for highway and airport pavements - flexible overlay over flexible pavement - rigid overlay over rigid pavement - flexible overlay over rigid pavements - Methods suggested by IRC - FAA and Asphalt Institute - Stabilisation with special reference to highway pavements Chemical and mechanical stabilisation - Use of Geosynthetics (geotextiles and geogrids) in roads. (12)

Total L: 45

**TEXT BOOKS:**

1. Kadiyali, Lal , "Principles and Practice of Highway Engineering", Khanna Tech Publications, New Delhi, 2010.
2. Yoder E J, Witczak MW , "Principles of Pavement Design", John Wiley and Sons Inc, New York, 2011.

**REFERENCES:**

1. IRC: 37-2001 , "Guidelines for the Design of Flexible pavements", Indian Road Congress, New Delhi, 2001.
2. IRC: 58-2002 , "Guidelines for the Design of Rigid Pavements for Highways", Indian Road Congress, New Delhi, 2002.
3. IRC:SP:20-2002 , "Rural Roads Manual", Indian Road Congress, New Delhi, 2002.
4. IRC: 81-1997 , "Guidelines for Strengthening of Flexible Road Pavements Using Benkelman Beam Deflection Technique", Indian Road Congress, New Delhi, 1997.

## 19C031 AIRPORT DOCKS AND HARBOUR ENGINEERING

3 0 0 3

**INTRODUCTION:** Air transportation in India - Component parts of aero plane - Aircraft characteristics comprehensive view of Metro Airports in India - Key developers in India. (3)

**AIRPORT PLANNING AND DESIGN :** Objects and Types of surveys - Airport zoning - Clearance over highways and railways - Airport layouts - Apron - Hangars - Terminal buildings - Airports buildings - Passenger flow Passenger facilities. (8)

**RUNWAY AND TAXI WAY DESIGN AND AIR TRAFFIC CONTROL :** Basic runway length - Balanced field concept- Comparison of runway patterns - Orientation of Runway- Taxiway design - Separation distances — Design speed - Corrections to basic runway length- - Drainage - Visual aids — Runway and taxiway markings - Runway and Taxiway lightings - Wind direction indicators - Air traffic control network - Helipads — Service equipments. (14)

**DOCKS AND HARBOURS :** Definition of terms — Classification of Harbours - Ports, Docks — Tides — Waves and waves dynamics - Littoral drift — Hydrographic survey and Topographic Survey - Sounding line, satellite ports - Classification of harbors — Site selection and investigation - Harbour layout - Dry and wet docks, Locks - Navigational aids- Light houses — Mooring accessories - Dredging-classification and type- Current Scenario. (10)

**COASTAL STRUCTURES :** Piers - Slipways - Breakwaters - Wharves - Jetties - Dolphins, Quays , Spring fenders - Coastal shipping - Inland water transport - Container transportation - Pipe ways - Rope ways - Major port profiles- Visakhapatnam, Chennai, Mumbai, Cochin - inter port comparison. (10)

Total L: 45

**TEXT BOOKS:**

1. Rangwala , "Airport Engineering", 13<sup>th</sup> Edition, Charotar Publishing House Pvt. Ltd, Anand Gujarat, 2012.
2. Hasmukh P. Oza and Gutam H. Oza , "Docks and Harbour Engineering", 7<sup>th</sup> Edition, Charotar Publishing House Pvt. Ltd, Anand, Gujarat, 2013.

**REFERENCES:**

1. S.K. Khanna, M.G. Arora, S.S. Jain , "Airport Planning & Design", 6<sup>th</sup> Edition, Nem Chand & Brothers, Roorkee, 2012.
2. Bindra.S.P , "Docks and Harbour Engineering", Dhanpat Rai&Sons, New Delhi, 2012.
3. Hamukh P.Oza, Gautam H.Oza , "Dock and harbour Engineering", 7<sup>th</sup> Edition, Charotar, Gujarat, 2013.

## 19C032 HOUSING PLANNING AND MANAGEMENT

3 0 0 3

**INTRODUCTION TO HOUSING AND HOUSING ISSUES – INDIA CONTEXT :** Definition of Basic Terms — House, Home, Household, Apartments, Multi storeyed Buildings, Special Buildings, Objectives and Strategies of National Housing Policies, Principle of Sustainable Housing, Housing Laws at State level, Bye-laws at Urban and Rural Local Bodies — levels - Development Control Regulations, Institutions for Housing at National, State and Local levels. Housing and its importance in neighborhood and city planning. Housing demand and supply — National Housing Policy — Housing agencies and their role in housing development — impact of traditional life style — Rural Housing, Public, private sector housing (10)

**SOCIO- ECONOMIC ASPECTS AND LOW-INCOME HOUSING AND HOUSING :** Economics of housing; housing demand and supply; quantifying and estimating housing need; housing process and housing adjustment; formal and informal sector provision of housing; legislation for housing development, slum housing and re-development, sites and services, low-cost housing- case studies in India and developing countries. Housing affordability- Cost effective materials and technologies for housing. (10)

**HOUSING STANDARDS :** URP — guidelines, CCA, EIA, stipulated by NIUA, model inclusive zoning, DCR, CRZ rules for Indian cities, housing density, street classification and standards; housing standards for EWS, LIG, MIG and HIG and

facilities programming for housing and housing development. FINANCE AND PROJECT APPRAISAL: Appraisal of Housing Projects — Housing Finance, Cost Recovery — Cash Flow Analysis, Subsidy and Cross Subsidy, Pricing of Housing Units, Rents, Recovery Pattern (Problems) (9)

**SITE PLANNING AND HOUSING DESIGN** : Site Planning and green building practices: Selection of site for housing, consideration of physical characteristics of site, location factors, orientation, climate, topography — Landscaping- Housing design — Traditional housing, row housing, cluster housing –apartments and high-rise housing relating to Indian situations — case studies in India –integration all types of services, parking, concepts relating to housing and housing developments and incorporation of green building and sustainable practices in Indian and International context –prefabrication in housing (8)

**COMMUNITY ARCHITECTURE AND DISASTER RESISTANT HOUSING** : Community architecture movement and housing developments, community participation and housing management — Environmental aspects and natural calamities; planning and design for cyclone, landslide, earthquake and disaster mitigation (8)

**Total L: 45**

**TEXT BOOKS:**

1. Chandra Sekar.K, Karthikeyan.N , "Housing Planning & Management Revised", 2<sup>nd</sup> Edition, CGS Publishers & Distributors, Tamil Nadu, 2016.
2. Meera Mehta and Dinesh Mehta , "Metropolitan Housing Markets", Sage Publications Pvt. Ltd, 2010.

**REFERENCES:**

1. Richard Kintermann and Robert , "Small Site Planning for Cluster Housing", Van Nostrand Reinhold company, Jondon/New York, 1977.
2. HUDCO Publications , "Housing for Low Income, Sector Model", Energy Research Institute, 2016.

## **19C033 TRAFFIC ENGINEERING, SAFETY AND MANAGEMENT**

**3 0 0 3**

**INTRODUCTION** : Significance and scope - Characteristics of Vehicles and Road Users - Skid Resistance and Braking Efficiency (Problems) - Components of Traffic Engineering- Road - Traffic and Land Use Characteristics. (9)

**TRAFFIC SURVEYS AND ANALYSIS** : Surveys and Analysis - Volume - Capacity - Speed and Delays - Origin and Destination - Parking - Pedestrian Studies - Accident Studies and Safety Level of Services- Problems. (9)

**TRAFFIC CONTROL** : Traffic signs - Road markings - Design of Traffic signals and Signal co-ordination (Problems) – Traffic control aids and Street furniture - Street Lighting - Computer applications in Signal design. (8)

**GEOMETRIC DESIGN OF INTERSECTIONS** : Conflicts at Intersections - Classification of Intersections at Grade - Chanellised and Unchanellised Intersection - Grade Separators (Concepts only) - Principles of Intersection Design - Elements of Intersection Design - Chanellisation and Rotary design (Problems) - Grade Separators (10)

**TRAFFIC MANAGEMENT** : Traffic Management- Traffic System Management (TSM) and Travel Demand Management (TDM) - Traffic Forecasting techniques - Restrictions on turning movements - One-way Streets - Traffic Segregation - Traffic Calming - Tidal flow operations - Exclusive Bus Lanes - Introduction to Intelligence Transport System (ITS). (9)

**Total L: 45**

**TEXT BOOKS:**

1. Khanna.K, Justo C.E.G , "Highway Engineering", Khanna Publishers, 2001.
2. Kadiyali.L.R , "Traffic Engineering and Transport Planning", Khanna Book Publishing Co Ltd, 2003.

**REFERENCES:**

1. Papacostas. C.S, Prevendouros.P.D , "Transportation Engineering and Planning", Prentice Hall, New Delhi, 2002.
2. O'Flaherty.C.A , "Transportation Planning and Traffic Engineering", 1<sup>st</sup> Edition, Butterworth-Elsevier, Oxford, 2006 Reprint.
3. Wolfgang.s, Homburger, Louis E Keefer, William.R.Mcrath , "Transportation and Traffic Engineering Hand Book", 2<sup>nd</sup> Edition, Prentice Hall, New Jersey, 1982.

## **19C036 CARTOGRAPHY**

**3 0 0 3**

**INTRODUCTION** : Cartography today - Nature of Cartography - History of Cartography - Graticules - Cartometry-Map Scales and Contents. (9)

**EARTH** : Earth-Map Relations - Basic Geodesy -- Map Projections - Reference and Coordinate system -

Transformation - Basic Transformation - Affine Transformation. (9)

**SOURCES OF DATA:** Ground Survey and Positioning -Remote Sensing data collection - Census and sampling - data - Models for digital cartographic information - Map digitizing. (9)

**PERCEPTION AND DESIGN :** Cartographic design - Color theory and models - Color and pattern creation and specification, Color and pattern - Typography and lettering the map - Map compilation. (9)

**CARTOGRAPHY ABSTRACTION :** Selection and Generalisation Principles ,Symbolisation, Topographic and thematic maps - Map production and Reproduction - Map series. (9)

**Total L: 45**

**TEXT BOOKS:**

1. Arthur, H. Robinson , "Elements of Cartography", Seventh, John Wiley and Sons, 2004.
2. John Campbell , "Introductory Cartography", Third, WMC Brown Publishers, 2004.

**REFERENCES:**

1. Anson R.W. and Ormeling F.J , "Anson R.W. and Ormeling F.J", Third, Elsevier Applied Science Publishers,, 2004.
2. Robert G Cromley , "Digital Cartography", Prentice Hall, 1992.

## **19C037 GEOGRAPHIC INFORMATION SYSTEMS**

**3 0 0 3**

**GIS TECHNIQUE AND DATA INPUT :** Map — Types of Maps — Map projections, Development of GIS — Components of GIS — Hardware, software, organisation — Types of data -Spatial and non-spatial data —Sources of data - Point, Line and Polygon — Vector and Raster data — Database structures — Vector and Raster data structures- Important GIS softwares and their relevance. (9)

**DATA ANALYSIS AND MODELLING :** Data Retrieval — Query — Simple Analysis — Spatial Analysis — Overlay — Vector Data Analysis — Raster Data Analysis — Modelling using GIS — Digital Elevation Model — Cost and path analysis—ExpertSystems—ArtificialIntelligence—IntegrationwithGIS. (9)

**DATA OUTPUT AND ERROR ANALYSIS :** Data Output — Types — Devices used — Raster and Vector Display Devices - Printers – Plotters – Devices – Sources of Errors –Types of Errors–Elimination–Accuracies-GIS Standards-Open Source GIS, Internet GIS (9)

**GIS APPLICATIONS IN RESOURCE MANAGEMENT :** Fields of Applications — Natural Resources — Agriculture — Soil - Water Resources — Site Selection for civil Engineering Projects, Wasteland Management - Social Resources - Cadastral Records—LIS (9)

**ADVANCED GIS APPLICATION :** AM/FM — Utility Network Management — Integration with Remote Sensing — Knowledge based techniques – Multicriteria Techniques – Introduction to Object Oriented Data base Models (9)

**Total L: 45**

**TEXT BOOKS:**

1. Burrough P A , "Principles of GIS for Land Resources Assessment", Oxford Publication, 2000.
2. Elangovan K , "GIS: Fundamentals, Applications and Implementations", First, New India Publishing Agency, New Delhi, 2006.

**REFERENCES:**

1. Kang-Tsung Chang , "Introduction to Geographic Information Systems", TMH, 2002.
2. Chrisman N R , "Exploring Geographic Information Systems", Second, John Wiley & Sons, New York, 2002.
3. Michael N Demers , "Fundamentals of Geographical Information Systems", Second, John Wiley Publications, 2002.
4. Clarke K C , "Getting started with Geographic Information Systems", Third, Prentice Hall, 2001.

## **19C038 REMOTE SENSING TECHNIQUES AND APPLICATIONS**

**3 0 0 3**

**PRINCIPLES AND CONCEPTS :** Definition - Historical Background - Components of Remote Sensing- Electromagnetic spectrum - Visible - Infra Rd - NIR - Thermal IR - Microwave - Radiation Principle and Energy equations- - Active and Passive Remote Sensing- - platforms-Aerial and Space Platforms-Baloons-Helicopters - Aircrafts and satellites - Significance of Remote Sensing - Limitations (9)

**ENERGY INTERACTION WITH ATMOSPHERE AND EARTH SURFACE MATERIALS :** Atmospheric Characteristics - Atmospheric interference- Scattering of EMR-Rayleigh - Mie and Non Selective Scattering-Absorption-Atmospheric Windows- Spectral Signature- interaction of EMR with atmosphere - earth surface - soils - water and vegetation. (9)

**REMOTE SENSING SATELLITES AND DATA INTERPRETATION :** Satellites-Types-Based on Orbits and Purpose- Sun

Synchronous and Geostationary Satellites- Characteristics of Satellites-Landsat - SPOT - IRS - IKONOS - Quickbird - MODIS - SeaWifs and other currently available Satellites- visual image interpretations and digital image interpretations (9)

**WATER RESOURCES AND LAND USE STUDIES :** Aerial assessment of surface water bodies - Capacity survey of water bodies - mapping of snow-covered areas - flood risk zone mapping - identification of groundwater potential zones - recharge areas - droughts - definition - drought assessment and management.-Definition of landuse - landuse / landcover classification - schemes and levels of classification systems with RS data - landuse mapping - change detection - urban landuse planning - site suitability analysis - transportation planning. (9)

**AGRICULTURE, SOIL, FORESTRY AND EARTH SCIENCE :** Crop inventory mapping - production estimation - command area monitoring - soil mapping - crop stress detection - estimation of soil erosion - forest types and density mapping - forest fire risk zone mapping- Lithology - lithological mapping - structural mapping - Geomorphology - nature and type of landforms - identification - use of remote sensing data for landslides - targeting mineral resources - Engineering geology and Environmental geology. (9)

**Total L: 45**

**TEXT BOOKS:**

1. Floyd F Sabins , "Remote Sensing: Principles and interpretation", W H Freeman and Company.,2000.
2. Jensen J R , "Remote sensing of the environment", First, Pearson Education, New Delhi, 2009.

**REFERENCES:**

1. Chen C H , "Image Processing for Remote Sensing", CRC Press, 2008.
2. George Joseph , "Fundamentals of Remote Sensing", University Press, 2004.

## **ONE-CREDIT COURSES**

### **19CF01 SAFETY IN CONSTRUCTION**

**1 0 0 1**

**BASIC CONCEPTS :** Problems impeding safety in construction industry causes of fatal accidents, types and causes of accidents related to various construction activities, human factors associated with these accident construction regulations - contractual clauses Pre contract activities, preconstruction meeting. (3)

**SUBSTRUCTURE ACTIVITIES :** Excavations, trenches , shafts tunneling blasting - preblast and postblast inspection, confined spaces, working on contaminated sites, work over water (3)

**HEIGHT WORKS :** Safe access and egress safe use of ladders Scaffoldings , requirement for safe work platforms, stairways, gangways and ramps - fall prevention and fall protection , safety belts, safety nets, fall arrestors, controlled access zones, working on fragile roofs, work permit systems erection of structural frame work, road works, safety in high-rise construction (3)

**CONSTRUCTION EQUIPMENTS :** Selection, operation, inspection and testing of cranes, (mobile cranes, tower cranes), crane inspection checklist builder's hoist, winches, chain pulley blocks use of concrete mixers, concrete vibrators - safety in earth moving equipment, excavators, dozers, loaders, dumpers, graders, concrete pumps, welding machines, use of portable electrical tools, drills, grinding tools. (3)

**DEMOLITION :** Safety in demolition work, manual, mechanical, using explosives keys to safe demolition, pre survey inspection, method statement - site supervision, safe clearance zone, fire hazards and preventing methods, implosion (3)

**Total L: 15**

**TEXT BOOKS:**

1. Hudson R , "Construction Hazard and Safety Hand Book", Butter Worth's, 1985.
2. Jonathan D Sime , "Safety in the Built Environment", , London, 1988.

**REFERENCES:**

1. Davies VJ, Tomasin K , "Construction Safety Hand Book", Thomas Telford Ltd, London, 1990.
2. Charles D, Reese, James V , "Handbook of OSHA Construction Safety and Health", 2006.
3. Accident Prevention Manual for Industrial Operations , NSC,, Chicago, 1988.
4. Fulman J B , "Construction Safety, Security and Loss prevention", John Wiley and Sons, 1984.

### **19CF02 CONCEPTS OF SMART CITY**

**1 0 0 1**

**URBAN LOCAL GOVERNANCE :** Urban Local Governance in India - Administrative setup: Different Departments and their functions - Various Civic Services - Challenges of urban local governance in India - 74th Constitutional amendment (5)

**SMART CITY** : Aims and Objectives of Smart City - Salient features of smart city - Special Purpose Vehicle (SPV) - Selection Process - Area Development - Challenges in the city and solutions - Implementation of strategies and Funding patterns (5)

**CASE STUDY AND FIELD VISIT** : Case study based on visit to Coimbatore Smart City Limited (5)

**Total L: 15**

**REFERENCES:**

1. Sameer Sharma , "Smart Cities - Unbundled", 1<sup>st</sup> Edition, Bloomsbury Publishing India Pvt Ltd, New Delhi, 2018.
2. Mani N , "Smart Cities and Urban Development in India", 1<sup>st</sup> Edition, New Centruy Publications, New Delhi, 2016.

## ENGLISH

### 19GF01 INTERPERSONAL AND ORGANIZATIONAL COMMUNICATION

**1 0 0 1**

**INTRA ORGANIZATIONAL COMMUNICATION** : Communication Networks in an Organization; Intra- organizational communication (2)

**INTER ORGANIZATIONAL COMMUNICATION** : Flow Nomenclature; Workplace diversity and intercultural aspects of communication (2)

**COMMUNICATION FUNCTIONS IN ORGANIZATIONS** : Teamwork and team dynamics; Conflict resolution strategies and styles; Leading and influencing others-facilitation skills (3)

**WRITTEN COMMUNICATION** : Email Writing, Professional Reports, and Memos (4)

**INTERPERSONAL SKILLS** : Nature and Dimensions of Interpersonal Communication; Personality and Communication styles; Active listening and intentional responding; Working with emotional intelligence (4)

**Total L: 15**

**REFERENCES:**

1. Bagchi Subroto , "The Professional", Penguin Publications, UK, 2011.
2. PMBOK guide , "A Guide to the Project Management Body of Knowledge", Project Management Institute Inc, USA, 2013.

### 19GF02 HUMAN VALUES THROUGH LITERATURE

**1 0 0 1**

**PROSE** : Kalam's vision of college education in Wings of fire - Emerson's advocacy of independence of Human will in Self-reliance - Harmony in Education-views of Betrand Russel (4)

**POETRY** : Maintaining Human relations in Robert Frost's Mending Wall - Quest for identity and freedom in Kamala Das's An Introduction (2)

**DRAMA** : Statesmanship and friendship in Girish Karnad's Tughlaq (3)

**ONE-ACT PLAY** : The theme of love in Chekhov's The Bear (3)

**SHORT STORY** : Empathy in Somerset maugham's Mr. Know-all - Family bond in Anita Desai's Devoted son (3)

**Total L: 15**

**TEXT BOOKS:**

1. Faculty - Department of English , "Course materials", PSG College of Technology, Coimbatore, 2019.

**REFERENCES:**

1. Abrams M .H, Harpham , "A Glossary of Literary Terms", Cengage, Boston, 2015.
2. Scholes R, et.al. , "Elements of Literature", IV, Indian Rpt. OUP, New Delhi, 2013.



## HUMANITIES

### 19OFA1 EXPORT – IMPORT PRACTICES

1 0 0 1

- INTRODUCTION** : Export – Import Business – Preliminaries for starting Export – Import Business Registration. (3)
- EXPORT PROCEDURES** : Obtaining an Export License – Export Credit Insurance – Procedures and Documentation (4)
- FOREIGN EXCHANGE** : Finance for Exports – Pricing - Understanding Foreign Exchange Rates. (3)
- IMPORT PROCEDURES** : Import Policy – License - Procedure and Documentation. (3)
- EXPORT INCENTIVES** : Incentives - Institutional support (2)

**Total L: 15**

#### REFERENCES:

1. Ramagopal C , "Export Import Procedures - Documentation and Logistics", New Age International, 2014.
2. Cherian and Parab , "Export Marketing", Himalaya Publishing House, New Delhi, 2008.
3. Parul Gupta , "Export Import Management", MC-Graw Hill, 2017.
4. Justin Paul, Rajiv Aserkar , "Export Import Management", Oxford, 2013.

### 19OFA2 INSURANCE - CONCEPTS AND PRACTICES

1 0 0 1

- INTRODUCTION TO INSURANCE AND RISK MANAGEMENT** : Origin, History, Nature and Scope of insurance – Meaning, types and significance of risk. (3)
- INSURANCE LAWS AND REGULATIONS** : Insurance Act, IRDA Act, Consumer Protection Act, Ombudsman Scheme. (2)
- INSURANCE UNDERWRITING AND RISK MANAGEMENT** : Meaning of underwriting and underwriter, guidelines and steps in the process of underwriting – characteristics, significance and principles of risk management. (4)
- FINANCIAL ASPECTS OF INSURANCE MANAGEMENT** : Role and functions of financial institutions, determination of premium for various insurance products. (3)
- SETTLEMENT OF INSURANCE CLAIMS** : Documents needed during various claims, Factors affecting insurance claims (3)

**Total L: 15**

#### REFERENCES:

1. Scott Harrington, Gregory Niehaus , "Risk Management and Insurance", McGraw Hill Education, 2017.
2. George E Rejda , "Principles of Risk Management & Insurance", Pearson Education, 2017.
3. John Hull , "Risk Management & Financial Institution", John Wiley and Sons, 2018.
4. Arjun Mittal, D D Chaturvedi , "Insurance and Risk Management", Scholar Tech Press, 2017.

### 19OFA3 PUBLIC FINANCE

1 0 0 1

- INTRODUCTION**: Nature and Scope of public finance – Principles of taxation. (2)
- PUBLIC REVENUE AND TAXATION**: Sources of Revenue – Tax and non-tax revenue – Classification of Taxes, GST. (4)
- PUBLIC EXPENDITURE**: Importance – Types – Causes of increase in public expenditure – Effects of public expenditure in India. (3)
- DEFICIT FINANCING AND BUDGET**: Sources of public debt – Debt redemption – Budget – Types – Preparation of Budget in India. (3)
- FEDERAL FINANCE**: Centre-State financial relations – Finance commissions. (3)

**TOTAL: 15**

#### REFERENCE BOOKS:

1. Richard A Musgrave and Peggy B Musgrave, "Public Finance in Theory and Practice" – Tata McGraw Hill Education, New Delhi, 2004.
2. Bhatia H.L, "Public Finance" – Vikas Publishing House, 29th Edition, New Delhi, 2012.
3. David N Hyman, "Public Finance: A contemporary application of theory and policy", Cengage Publication, 11th Edition,

- Noida, 2014.
4. Santhosh Dalvi and Krishnan Venkatasubramanian, "An introduction to Goods and Service Tax: The biggest tax reform in India", CCH Publisher, New Delhi, 2015.

## 19OFA4 SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT

**1 0 0 1**

<b>INVESTMENT ENVIRONMENT</b> : Financial Markets - Classification - Financial Instruments – Security Trading.	(2)
<b>TYPES OF SECURITIES</b> : Trading – Orders, Margin Trading – Clearing and Settlement Procedures.	(5)
<b>SECURITY ANALYSIS I</b> : Industry Analysis –Estimation of Rates of Return.	(2)
<b>SECURITY ANALYSIS II</b> : Company Analysis — Estimation of Rates of Return.	(2)
<b>PORTFOLIO MANAGEMENT</b> : Measuring Risk and Returns and Treatment in Portfolio Management.	(4)

**Total L: 15**

**REFERENCES:**

1. William F Sharpe, Gordon J. Alexander, Jeffery V Bailey , "Investments", Prentice Hall, 2012.
2. Prasanna Chandra , "Investment Analysis and Portfolio Management", TATA McGraw Hill Publishing, 2011.
3. Ranganathan , "Investment Analysis and Portfolio Management", Pearson, 2004.
4. Bhalla V K , "Investment Management", TATA McGraw Hill Publishing, 2011

## LANGUAGE ELECTIVES

### 19G001 COMMUNICATION SKILLS FOR ENGINEERS

**0 0 4 2**

**COMMUNICATION CONCEPTS:**

Process of Communication Inter and Intrapersonal Communication Inter and Intrapersonal Communication Activities	(9)
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**FOCUS ON SOFT SKILLS :**

Etiquette — Work Place etiquette — Telephone etiquette Body Language Persuasive Communication Public Speaking Critical Reasoning and Conflict Management based on Case Studies Group Communication Meetings Interview Techniques	(14)
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**TECHNICAL WRITING:**

Technical Writing Principles Style and Mechanics Technical Definitions – Physical, Functional and Process Descriptions Technical Report Writing Preparing Instructions and Manuals Interpretation of Technical Data	(15)
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**BUSINESS CORRESPONDENCE :**

Writing Emails Preparing Resumes Memos Technical and Business Proposals	(7)
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**TECHNICAL COMMUNICATION :**

Seminars Process Description and Group Discussions Use of Visual Aids	(15)
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**Total P: 60**

**TEXT BOOKS:**

1. Faculty Incharge "Course Material on "Communication Skills for Engineers"", PSG College of Technology., Coimbatore, 2019

**REFERENCES:**

1. Jeff Butterfield "Soft Skills for Everyone", Cengage Learning., New Delhi, 2013
2. Jean Naterop B and Rod Revell "Telephoning in English", Cambridge University Press., Cambridge, 2011
3. David A Mc Murrey and Joanne Buckley "Handbook for Technical Writing", Cengage Learning., New Delhi, 2011
4. Simon Sweeney "English for Business Communication", Cambridge University Press., New Delhi, 2012

**19G002 GERMAN- LEVEL A1.1****0 0 4 2****GUTEN TAG! :**

1. To greet, learn numbers till 20, practice telephone numbers & e mail address, learn alphabet, speak about countries & languages
2. Vocabulary: related to the topic
3. Grammar: W — Questions, Verbs & Personal pronouns I. (10)

**FREUNDE, KOLLEGEN UND ICH :**

1. To speak about hobbies, jobs, learn numbers from 20; build dialogues and frame simple questions & answers
2. Vocabulary: related to the topic
3. Grammar: Articles, Verbs & Personal pronouns II, sein & haben verbs, ja/nein Frage, singular/plural (10)

**IN DER STADT :**

1. To know places, buildings, question, know transport systems, understand international words; build dialogues and write short sentences
2. Vocabulary: related to the topic
3. Grammar: Definite & indefinite articles, Negotiation, Imperative with Sien verbs (12)

**GUTEN APPETIT! :**

1. To speak about food, shop, converse; Vocabulary: related to the topic; build dialogues and write short sentences
2. Grammar: Sentence position, Accusative, Accusative with verbs, personal pronouns & prepositions, Past tense of haben & sein verbs (13)

**TAG FÜR TAG/ZEIT MIT FREUNDEN :**

1. To learn time related expressions, speak about family, about birthdays, understand & write invitations, converse in the restaurant; ask excuse, fix appointments onphone
2. Vocabulary: related to the topic
3. Grammar: Time related prepositions, Possessive articles, Modalverbs (15)

**Total P: 60****TEXT BOOKS:**

1. Dengler Stefanie "Netzwerk A1.1", Klett-Langenscheidt Gmbh., München, 2013
2. Sandra Evans, Angela Pude "Menschen A1", Hueber Verlag., Germany, 2012

**REFERENCES:**

1. Stefanie Dengler "Netzwerk A1", Klett-Langenscheidt Gmbh., München, 2013
2. Hermann Funk, Christina Kuhn "Studio d A1", Goyal Publishers & Distributors Pvt. Ltd., New Delhi, 2009
3. Rosa-Maria Dallapiazza "Tangram Aktuell 1 (Deutsch als Fremdsprache)", Max Hueber Verlag., Munchen, 2004
4. Christiane Lemcke und Lutz Rohrmann "Grammatik Intensivtrainer A 1", Goyal Publishers & Distributors Pvt. Ltd., New Delhi, 2012

**19G003 FRENCH LANGUAGE LEVEL 1****0 0 4 2****PARTS OF SPEECH :**

1. inviter et répondre à une invitation, Pronoms sujets
2. L'article définis, l'article indéfinis
3. Conjugation : présent, adjectifs possessifs
4. interrogation, décrire les personnes
5. La vie de quatre parisiens de professions différentes (12)

**ELEMENTS OF GRAMMAR :**

1. Exprimer l'ordre et l'obligation demander et commander
2. l'adjectif possessifs, l'article partitif, l'article démonstratif, négation ne
3. pas, l'article contracté
4. verbe pronominaux
5. prepositions (12)

**SENTENCE STRUCTURE :**

1. Raconter et reporter-donner son avis
2. Futur simple, pronom complètement d'objet direct, passé composé

3. plusieurs région de France, imparfait, pronom y/en, imparfait (12)

**TENSES AND NUMBERS :**

1. Demander l'autorisation-passé récent, futur proche  
2. La vie administrative et régionale, Pluriel des noms, moyens de transport (12)

**DISCOURSE :**

1. le discours rapporté, décrire un lieu, exprimer ses préférences  
2. décrire la carrière, discuter d'un système éducation de France  
3. parler de la technologie de l'information (12)

**Total P: 60**

**TEXT BOOKS:**

1. Christine Andant étal "À propos (livre de l'élève", LANGER., NEW DELHI, 2012  
2. Myrna Bell Rochester "Easy French Step By Step", McGrawhill Companies., USA, 2008

**REFERENCES:**

1. Michael D. Oates "Entre Amis: An Interactive Approach", Houghton Mifflin., 2005 , 5th  
2. Bette Hirsch, Chantal Thompson "Moments Literaries : An Anthology for intermediate French", ..  
3. Simone Renaud, Dominique van Hooff "En bonne forme", ..

**19G004 BASIC JAPANESE**

**0 0 4 2**

**JAPANESE PEOPLE AND CULTURE :**

1. Basic greetings and responses  
2. Basic script—Method of writing hiragana and katakana — Combination sounds and simple words  
3. Selfintroductions: "Hajimemashite"—Demonstratives "Kore", "Sore", "Are"—Demonstrative "Kono", "Sono", "Ano"  
4. Possessive noun particle "no"— Japanese apartments: Greeting your neighbor (12)

**PARTICLE "NI (AT)" FOR TIME :**

1. kara (from) ~ made(until) — Particle "to (and)"  
2. Time periods: Days of the week, months, time of day —Verbs (Present / future and pasttense)  
3. Telephone enquiry: Asking for a phone no. And business hours- Destination particle "e". (12)

**LIKES AND DISLIKES :**

1. Potential verbs (wakarimasu and dekimasu) — "Kara (~ because)"  
2. Adverbs — Asking some one out over the phone-Verbs denoting presence  
3. Introduction to Adjectives (na and ii type) -Verb groups — I, II and III — Exercises to group verbs- Please do (te kudasai)  
4. Present continuous tenses (te imasu) — Shall I? (~ mashou ka) — Describing a natural phenomenon (It is raining) (12)

**DIFFERENT USAGES OF ADJECTIVES :**

1. Comparison — Likes and dislikes — Going to a trip- Need and desire (ga hoshii) — Wanting to ... (Tabeti desu)-  
Going for a certain purpose (mi -ni ikimasu)  
2. Choosing from a menu-Adjectives ("i" and "na" type) — Adjectives (Positive and negative useage) (12)

**ROLE PLAYS IN JAPANESE :**

1. Framing simple questions & answers  
2. Writing Short paragraphs & Dialogues  
3. A demonstration on usage of chopsticks and Japanese tea party (12)

**Total P: 60**

**TEXT BOOKS:**

1. Minna no Nihongo, Honsatsu Roma "ji ban (Main Textbook Romanized Version)", . International publisher — 3A Corporation., Tokyo, 2012

**REFERENCES:**

1. Eri Banno et.al "Genki I: An Integrated Course in Elementary Japanese I -Workbook", .. 1999  
2. Tae Kim "A Guide to Japanese Grammar: A Japanese Approach to Learning Japanese Grammar", 2014  
3. Minna No Nihongo "Translation & Grammatical Notes In English Elementary",