

Department: Civil Engineering
Programme: Certificate in Construction Technology

Trade : a) Surveyor
b) Draftsman

Year I
Semester I

			L	T	P	C
HS	1101	Remedial English I	2	0	2	3
PH	1101	Physics - I	4	0	2	5
CY	1101	Chemistry - I	3	0	2	4
MA	1101	Mathematics - I	3	1	0	4
ES	1151	Engineering Drawing	0	0	6	3
ME	1152	Workshop Practice	0	0	8	4
						23

Semester II

HS	1201	Remedial English II	2	0	2	3
PH	1201	Physics - II	4	0	2	5
CY	1201	Chemistry - II	3	0	2	4
MA	1201	Mathematics - II	3	1	0	4
CE	1201	Construction Materials	3	0	0	3
CE	1251	Civil Engineering Drawing - I	0	0	6	3
ES	1200	Basic Electrical and Electronics Engineering	4	0	2	5
						27

Year II
Semester I

MA	2101	Mathematics - III	3	1	0	4
CE	2101	Construction Technology	3	0	0	3
CE	2102	Building Construction and Maintenance	3	0	2	4
CE	2103	Surveying - I	2	0	2	3
CE	2104	Water Supply and Sanitary Services	2	0	2	3
CE	2105	Estimating and Quantity Surveying	2	1	0	3
CE	2151	Civil Engineering Drawing - II	0	0	4	2
						22

Semester II

HS	2201	Entrepreneurship and Environmental Education	3	0	0	3
CE	2201	Technical Mechanics	3	1	0	4
CE	2250	Civil Engineering Workshop	0	0	4	2
CS	2200	Basics of Computers	2	0	2	3
ED	2200	Extra Curricular Activities and Discipline	0	0	0	2

Surveyor

CE	2202	Survey Trade Theory	4	0	0	4
CE	2251	Survey Practice - I	0	0	6	3
CE	2252	Survey Practice - II	0	0	6	3

Draftsman

CE	2203	Building Planning and Architecture	2	0	4	4
CE	2253	Civil Engineering Drafting - I	0	0	6	3
CE	2254	Civil Engineering Drafting - II	0	0	6	3
						22+2

COURSE CONTENTS

ES 1151 Engineering Drawing: 3 Credits (0-0-6)

Conventional lines & Lettering; Scales; Engineering curves: Conic sections, Cycloid, Involute, Spirals, Helix, etc.; Projection of Points and Straight lines; Projection of Planes; Projection of Solids; Projection on Auxiliary Planes; Section of Solids; Development of surfaces; Isometric Views, Orthographic projections

Books :

1. Elementary Engineering Drawing, N.D. Bhatt and V. M. Panchal, Charotar Publishing House, Anand, India, 2000.
2. Engineering Drawing, Venugopal, Wiley Eastern Ltd, New Delhi, 1998.
3. Engineering Drawing and Graphics Technology, French T.E., Verick C.S. and Forester, R.J., McGraw Hill International, Singapore, 1993.

CE 1201 Construction Materials: 3 Credits (3-0-0)

Unit I	Introduction to Construction Materials, Selection of materials for different Civil Engineering works, Rock: Classification, quarrying and dressing. Bricks: Manufacturing processes, classification and tests. Flooring and roofing tiles.	10 lectures
Unit II	Production, properties and uses of lime; cement and sand-mortar. Concrete: Plain and reinforced.	10 lectures
Unit III	Timber: types and methods of preservation, plywood. Iron and structural steel. Introduction to modern construction materials: laminated timber board, MDF board, ACC blocks, wall fabric materials, etc.	10 lectures
Unit IV	Types and uses of paints; varnishes and distemper. Sound and heat insulating materials; Glasses; plastics and asphaltic materials.	12 lectures

Books:

1. Basic Civil Engineering, Dr. B. C. Punmia & Ashok K. Jain & Arun K. Jain, Laxmi Publication, 2003.
2. Engineering Materials, Rangwala, S.C., Charotar Publishing House, Anand, India, 2016.
3. Elements of Civil Engineering, Dr. Anurag Kandya, Charotar Publishing House, Anand, India, 2015.

CE 1251 Civil Engineering Drawing I : 3 Credits (0-0-6)

Orthographic Views; Oblique Views; Perspective Views; Signs and symbols of building materials; Bond in Brick Masonry (orthographic and isometric); Bonds in Stone Masonry; Sub-structure details; Doors, windows and ventilators; Arches and Lintels; Timber joints and Trusses.

Books :

1. Civil Engineering Drawing, R.S.Malik & G.S. Meo, New Asian Publications, Delhi, 1987.
2. Civil Engineering Drawing, M. Chakraborty, Author, Calcutta, 1996.
3. Principles of Building Drawing, Shah M.G., and Kale C.M., MacMillan India Ltd, New Delhi, 1995.
4. Building Drawings, Shah M.G., Kale C.M. and Patki S. Y., Tata McGraw Hill, New Delhi, 1993.

CE 2101 Construction Technology : 3 Credits (3-0-0)

Unit I	Roads classification, Geometrical features of roads, Construction of WBM, Black top and concrete pavements including grade and base courses. Equipments used for road construction, features of hilly roads.	12 lectures
Unit II	Railways - Components of Railway tracks, Construction and Maintenance of tracks.	10 lectures
Unit III	Bridge and Culverts - Types of bridges/culverts, criteria for selection of sites, Construction and maintenance of bridges/culverts.	10 lectures
Unit IV	Hydraulic Structures - Construction details of dam, construction details of canals/other hydraulic structures.	10 lectures

Books:

1. Highway Engineering, S K Khanna and C E G Justo, Nem Chand and Brothers, Roorkee, India, 1982.
2. A Text Book of Railway Engineering., Arora & Saxena, Dhanpat Rai and Sons, New Delhi, 1981.
3. Elements of Bridge Engineering., J Victor, Oxford and IBH, New Delhi, 1991.
4. Irrigation Engineering & Hydraulic Structures, S.K. Garg, Khanna Publishers, Delhi, 1993.
5. Text Book of Railway Engineering, B.L. Gupta, Standard Publishers, New Delhi, 1997.

CE 2102 Building Construction and Maintenance: 4 Credits (3-0-2)

Unit I	Foundation: Classification and construction, Brick masonry, partition, cavity and curtain walls, scaffolding, underpinning and shoring.	10 lectures
Unit II	Door and windows; Solar passive aspects of windows; Brick and RCC arches and lintels.	8 lectures
Unit III	Roofs: Classification and coverings; Floors: Ground and upper floors,; Cement, concrete, mosaic, stone, tile, laminated timber and other floors; Damp proofing treatment in various components of building.	8 lectures
Unit IV	Stairs; Protective and Decorative finishes, Wall papering, tiling, stone cladding.	8 lectures
Unit V	Maintenance and repairs of foundations, walls, floors, roofs, wooden and metal parts, and Strengthening, retrofitting, rehabilitation of old and damaged structures.	8 lectures

Books:

1. Building Construction, B.C. Punmia, Laxmi Publishers, New Delhi, 1998.
2. Building Construction, Shushil Kumar, Standard Publishers, Delhi, 1999.
3. Building Construction Vol. I to IV, W.B. Mackey, Orient Longman, Mumbai, 1993.
4. Building Construction and Materials, Gurucharan Singh, Standard Book House, New Delhi, 2010.
5. Practical Handbook on Building Construction, M. K. Gupta, Nabhi Publication, New Delhi, 2005.
6. Maintenance of Building, A.C. Panchdhari, New Age International, New Delhi, 1997.
7. Maintenance Manual, CPWD 2012.
8. National Building Code, BIS, New Delhi, 2005.

CE 2103 Surveying-I : 3 Credits (2-0-2)

Unit I	Introduction, classification of survey, chain surveying - principle, instruments used, procedure, Problems and errors in chain survey.	7 lectures
Unit II	Compass surveying: types, description and uses, measurement of bearings in WCB and QB systems, local attraction and related problems.	7 lectures
Unit III	Plane table surveying: methods of plane tabling, two- point and three- point problems and their solutions, errors in plane tabling.	7 lectures
Unit IV	Leveling: leveling principles, booking and reduction of levels, different types of leveling, related problems and practices.	7 lectures

Books:

1. Surveying Vol. I, B.C.Punamia, Laxmi Publications, New Delhi, 2005.
2. Surveying Vol. I, S.K.Duggal, Tata McGraw Hill, New Delhi, 1996.
3. Surveying and Levelling Vol. I, T.P. Kanetkar and S.V. Kulkarni, Pune Vidyarthi Griha Parkashan Pune, 2000
4. Surveying & Levelling, Rangwala, Charotar Publishing House, Anand, India, 2014.
5. Surveying Vol.I, Dr. K.R. Arora, Standard Book House, Delhi, 2013.

CE 2104 Water Supply and Sanitary Services : 3 Credits (2-0-2)

Unit I	Sources of water, wells, tube wells, method of construction, types of pumps, with fittings.	5 lectures
Unit II	Collection of surface water and its conveyance through pipes, pipe laying, lake and corrosion in pipes and their remedial measures.	6 lectures
Unit III	Appurtenances in distribution system, Sanitary systems- Conservancy and water	7 lectures

carriage systems, construction and maintenance of privies, Septic tanks, imhoff tanks.

Unit IV	Construction and maintenance of sewers, sewer appurtenances.	5 lectures
Unit V	Plumbing equipments and operations, Water supply and sanitary fittings, house drainage, concepts of rural water supply and sanitation.	5 lectures

Books:

1. Environmental Engineering Vol. I: Water Supply Engineering, S.K. Garg, Khanna Publishers, Delhi, 1998.
2. Environmental Engineering Vol. II: Sewage Disposal & Air Pollution Engineering, S.K. Garg, Khanna Publishers, Delhi, 1998.
3. Wastewater Engineering: Treatment, Disposal & Reuse, Metcalf & Eddy, Tata McGraw Hill, New Delhi, 1991.
4. Elements of Public Health Engineering, K.N. Duggal, S. Chand & Co, New Delhi, 2000.
5. Water Supply & Sanitary Engineering, S.C. Rangawala, Charotar Publishing House, Anand, India, 2000.
6. Water Supply and Sanitary Installations, A C Panchdhari, New Age International, New Delhi, 1993.

CE 2105 Estimating and Quantity Surveying : 3 Credits (2-1-0)

Unit I	Unit of measurements and payments, Methods of estimates & examples.	4 lectures
Unit II	Preparation of detailed estimates of earthwork, masonry, concreting, flooring.	6 lectures
Unit III	Estimates of plastering,, white washing and painting, wood and steel work, RCC work and sanitary fittings, Estimate preparation for buildings, roads,.	6 lectures
Unit IV	Estimate preparation for culvert, water tank, septic tank and retaining wall.	8 lectures
Unit V	Rate analysis for construction materials and various items of work.	4 lectures

Books:

1. Estimating & Costing in Civil Engineering, B.N. Dutta, UBS Publishers Distributors Ltd., New Delhi, 1998.
2. Estimating, Costing, Specifications & Valuation, M Chakroborty, Author, Calcutta, 1992
3. Estimating & Costing Professional Practice, S.C. Rangwala, Charotar Publishing House, Anand, India, 1995.
4. Quantity Surveying: Estimating and Costing, P L Bhasin, S Chand & Co, Delhi, 1982.

CE 2151 Civil Engineering Drawing II : 2 Credits (0-0-4)

Riveted Bolted and Welded Joined; Steel Truss, Reinforcement details in beams and columns; Stair cases, Single Storeyed Residential Buildings (pitched roof) -Type II, Double Storeyed Residential Building with Flat Roof -Type III, Simple drawings of above topics on computer Graphics.

Books:

1. Civil Engineering Drawing, R.S.Malik & G.S. Meo, New Asian Publishers, Delhi, 1987.
2. Civil Engineering Drawing, M. Chakraborty, Author, Calcutta, 1996.
3. Building Drawings, Shah M.G., Kale C.M. and Patki S. Y., Tata McGraw Hill, New Delhi, 1993.
4. Related Softwares

CE 2201 Technical Mechanics: 4 Credits (3-1-0)

Unit I	Forces in a Plane and Equilibrium of Particles: Vector operations, Multiplication and division of a vector by a scalar, Vector addition, Vector subtraction, Resolution of a vector, Forces on a particle, Resultant of two forces, Addition of a system of coplanar forces, Rectangular component of a force, Unit vectors, Equilibrium of a particle.	8 lectures
Unit II	Equilibrium of Rigid Bodies: External and internal forces, Equivalent forces, Vector product of two vectors, Moment of a force about a point, Varignon's theorem, Rectangular components of the moment of a force, Moment of a force about a given axis, Replacing a force with an equivalent force-moment system at a given point, Replacing a force-moment system (with F perpendicular to M) with a single equivalent force, Free body diagram, Equilibrium of rigid body in two dimensions, Equilibrium of a two-force body, Equilibrium of a three-force body	14 lectures
Unit III	Friction: Laws of dry friction, Coefficient of friction, Angle of friction, Problems	8 lectures

involving dry friction.

Unit IV	Kinematics of Particles: Rectilinear Motion: Position, Displacement, Velocity, and Acceleration, Determination of Rectilinear Motion, Relative Rectilinear Motion, Dependent Rectilinear motions. Curvilinear motion: Position vector, Velocity, and Acceleration, Free flight of a projectile, Tangential and normal components, Radial and transverse components, Cylindrical components.	12 lectures
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Books:

1. Vector Mechanics for Engineers, Statics and Dynamics, Beer and Johnston, Tata McGraw Hill, New Delhi, 1999.
2. Engineering Mechanics, Statics and Dynamics, Hibbeler, Pearson Education Asia Pvt. Ltd., New Delhi, 1997
3. Engineering Mechanics, Statics and Dynamics, Meriam and Kraige, John Wiley & Sons, NY, 1997.
4. Engineering Mechanics, S Timoshenko, D H Young, and J V Rao, Tata McGraw Hill, New Delhi 2007
5. Engineering Mechanics, S S Bhavikatti, K G Rajashekarappa, John Wiley, NY, 1994

CE 2202 Survey Trade Theory : 4 Credits (4-0-0)

Unit I	Introduction to theodolite: components and their functions, temporary adjustment; setting up of theodolite.	12 lectures
Unit II	Measurement of horizontal and vertical angles, direct and deflection angles, field notes, adjustment of errors, setting out straight lines through obstacles like ponds, buildings, hills etc.	16 lectures
Unit III	Permanent adjustment of theodolite, theodolite traversing, Height and Distance problems.	14 lectures
Unit IV	Omitted measurements and calculations, methods of computation of areas and volumes.	14 lectures

Books:

1. Surveying Vol. I & II, B.C.Punamia, Laxmi Publications, New Delhi, 2005.
2. Surveying Vol. I & II, S.K.Duggal, Tata McGraw Hill, New Delhi, 1996.
3. Surveying and Levelling Vol. I & II, T.P. Kanetkar and S.V. Kulkarni, Pune Vidyarthi Griha Parkashan Pune, 2000
4. Surveying & Levelling, Rangwala, Charotar Publishing House, Anand, India, 2014.
5. Surveying Vol.I, Dr. K.R. Arora, Standard Book House, Delhi, 2013.
6. Surveying and Levelling, N.N. Basak, Tata McGraw Hill, New Delhi, 1994.

CE 2203 Building Planning and Architecture: 4 Credits (2-0-4)

Unit I	Types of Building, NBC classification, Site selection, Building Bye-laws and regulation for urban buildings.	8 lectures
Unit II	Orientation and functional requirements of buildings.	6 lectures
Unit III	Elements of aesthetics in architecture, unity, mass, contrast, proportion, scale balance, symmetry etc.	6 lectures
Unit IV	Features of roman/Gothic, Indian, Muslim and modern architecture.	8 lectures

Books:

1. The Great Ages of World Architecture, G.K. Hiraskar, Dhanpat Rai & Sons, New Delhi, 1994.
2. History of Architecture, Fletcher, C.B.S. Publication, New Delhi, 1999.
3. Planning and Designing Building, Y.S. Sane, Engineering Book Publishing Co. Pune, 1959.
4. National Building Code, B.I.S., New Delhi, Latest Publication.

CE 2250 Civil Engineering Workshop: 2 Credits (0-0-4)

Plumbing work : Bending, cutting, threading, Practice in cutting, bending and fixing reinforcement in RCC work; welding of rods, angles with gusset plates; Fabrication of steel frames ; Assembly of frames and shutters of doors and windows and trusses

CE 2251 Survey Practice I : 3 Credits (0-0-6)

Leveling; Type of Instruments, Temporary and Permanent Adjustments, Methods of observations, Booking and Reduction of Levels; Differential and reciprocal leveling, Practice in Differential and Reciprocal Leveling, Establishing Bench Marks, Fly Leveling, Performing permanent Adjustment of a Level, Contours, Laying of Roads and Drains; Setting out of Route Survey, Longitudinal and Cross-section of a Road Project, Plotting and Calculation of Earthwork, Related practice.

Books:

1. Surveying Vol. I, B.C.Punamia, Laxmi Publications, New Delhi, 2005.
2. Surveying and Levelling Vol.I, T.P. Kanetkar and S.V. Kulkarni, Pune Vidyarthi Griha Parkashan Pune, 2000.
3. Surveying & Levelling, Rangwala, Charotar Publishing House, Anand, India, 2014.
4. Surveying Vol. I, S.K.Duggal, Tata McGraw Hill, New Delhi, 1996.
5. Surveying Vol.I, Dr. K.R. Arora, Standard Book House, Delhi, 2013.

CE 2252 Survey Practice II : 3 Credits (0-0-6)

Measurement of area by planimeter; Use of minor instruments like Ghat tracer, Abney level and Box Sextant. Practice of setting theodolite and taking readings; Measurement of horizontal and vertical angles; Setting out given vertical angles and entering in the field books; Setting out straight line through obstacles, extending given lines, establishing lines at given angles with given lines, setting out rectilinear figures; Theodolite traversing and plotting; Preparation of contour maps; Topographical survey with the help of Theodolite Height and distance of accessible and inaccessible objects.

Books:

1. Surveying Vol.-I, B.C.Punamia, Laxmi Publications, New Delhi, 1994.
2. Surveying & Levelling Vol.-I, T.P.Kanetkar & S.V. Kulkarni, Pune Vidyarthi Griha Prakashan, Pune, 1985.

CE 2253 Civil Engineering Drafting I : 3 Credits (0-0-6)

Unit I	Residential Buildings, Industrial building, Public building.	6 turns
Unit II	Bar bending schedule, Structural drawings of RCC elements, foundations for heavy structures (Grillage/Isolated column footing. pile and well foundation).	8 turns
Unit III	Beam column and eccentric connections in steel structures, plate girder.	4 turns
Unit IV	Pipe joints, Septic tanks and soak pits, manholes.	4 turns
Unit V	Simple drawing of above topics in computer graphics.	6 turns

Books:

1. Civil Engineering Drawing, Malik & Meo, New Asian Publications, Delhi, 1987.
2. Civil Engineering Drawing, M. Chakraborty, Author, Clacutta, 1996.
3. Design of Steel Structures, Kazmi & Jindal, Prentice Hall & India, New Delhi, 1987.
4. Civil Engineering Drawing Manual, Thanikachalam & Natarajan, S. Chand & Co., New Delhi, 1984.
5. Building Drawings, Shah M.G, Kale C.M. and Patki S. Y., Tata McGraw Hill, New Delhi, 1993.
5. Related Softwares

CE 2254 Civil Engineering Drafting II : 3 Credits (0-0-6)

Unit I	Culverts, Bridges.	5 turns
Unit II	Dams, Weir and Barrage, and cross Drainage works.	6 turns
Unit III	Hydrographs & Reservoir area capacity curve.	3 turns
Unit IV	Cross sectional details of pavements/road and railway tracks; units of water treatment plant and sewage treatment plant.	6 turns
Unit V	Tracing, Inking, and Reproduction methods.	2 turns

Unit VI Simple drawings of above topics in computer graphics.

6 turns

Books:

1. Civil Engineering Drawing, Malik & Meo, New Asian Publications, Delhi, 1987.
2. Civil Engineering Drawing Manual, Thanikachalam & Natarajan, S. Chand & Co., New Delhi, 1984.
3. Irrigation and Water Power Engineering., B.C. Punmia and B B Lal, Standard Publishers & Distributors, Delhi, 1986.
4. Related softwares