



Vision: To be known globally for value-based education, research, creativity and innovation.

Mission:

- To provide students with comprehensive knowledge of engineering and technology with a multi-disciplinary approach that is challenging.
- To create an environment for research and industries and society.
- To involve the students in societal programs to identify concerns and sustainable ethical solution.
- To encourage students for life-long learning and team based problems solving.

Program Educational Objectives:

After Five years after completion of program student will become

1. Successful engineer with vast experience.
2. Have large opportunities and knowledge for growth in carrier.
3. Function successfully in a professional environment by utilizing and enhancing their problem-solving and communication skills.

Program Specific Objectives:

After completing diploma student will have:

PSO1- Skill to perform various tests to select good quality materials by using modern techniques and equipment.

PSO2- Knowledge and ability to Run various computer based programs to solve field problems.

Program Outcomes:

Diploma in Civil engineering students will be able to:

PO1 Basic knowledge: An ability to apply knowledge of basic mathematics, science and engineering to solve the engineering problems.

PO2 Discipline knowledge: An ability to apply discipline - specific knowledge to solve core and/or applied engineering problems.

PO3 Experiments and practice: An ability to plan and perform experiments and practices and to use the results to solve engineering problems.

PO4 Engineering tools: Apply appropriate technologies and tools with an understanding of the limitations.

PO5 The engineer and society: Demonstrate knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering practice.

PO6 Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO7 Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO8 Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO9 Communication: An ability to communicate effectively.

PO10 Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the context of technological changes.

Curriculum

Semester 1									
Sl. No	Course Code	Name of the Course					Assessment Pattern		
			L	T	P	C	IA	CAT	ETE
1	PHYE1001	APPLIED PHYSICS-I	3	2	0	4	20	30	50
2	MATD1002	APPLIED MATHEMATICS-I	4	0	0	4	20	30	50
3	SLPC1003	PROFESSIONAL COMUNICATION-I	2	0	0	2	20	30	50
4	DPCS1004	COMPUTER FUNDAMENTALS	3	0	0	3	20	30	50
5	CHEM1005	BASIC CHEMISTRY	3	2	0	4	20	30	50
6	PHYE1006	APPLIED PHYSICS-I LAB	0	0	2	1	50		50
7	SLPC1007	PROFESSIONAL COMUNICATION-I LAB	0	0	4	2	50		50
8	DPCS1008	COMPUTER FUNDAMENTALS LAB	0	0	2	1	50		50
9	CHEM1009	BASIC CHEMISTRY LAB	0	0	4	2	50		50
		Total	15	4	12	23			
Semester II									
Sl No	Course Code	Name of the Course					Assessment Pattern		
			L	T	P	C	IA	CAT	ETE
1	PHYE1010	APPLIED PHYSICS-II	3	2	0	4	20	30	50
2	MATD1011	APPLIED MATHEMATICS-II	4	2	0	5	20	30	50
3	SLPC1012	PROFESSIONAL COMUNICATION-II	3	0	0	3	20	30	50
4	DPME1014	ENGINEERING GRAPHICS	0	0	6	3	20	30	50
5	DPCE1013	BUILDING MATERIALS	3	0	0	3	20	30	50
6	PHYE1015	APPLIED PHYSICS-II LAB	0	0	2	1	50		50
7	SLPC1016	PROFESSIONAL COMUNICATION-II LAB	0	0	4	2	50		50
8	DPME1017	WORKSHOP PRACTICE	0	0	6	3	50		50
9	DPCE1018	BUILDING MATERIALS LAB	0	0	2	1	50		50
		Total	13	4	20	25			
Semester III									
Sl No	Course Code	Name of the Course					Assessment Pattern		
			L	T	P	C	IA	CAT	ETE
1	DPME2001	APPLIED MECHANICS	3	0	0	3	20	30	50
2	DPCE2002	PUBLIC HEALTH ENGINEERING.	3	0	0	3	20	30	50
3	DPCE2003	SURVEYING I	2	0	0	2	20	30	50
4	DPCE2004	ELEMENTRY ELECTRICAL & MECHANICAL ENGINEERING.	3	0	0	3	20	30	50
5	DPCE2009	BUILDING CONSTRUCTION AND MAINTAINANCE ENGINEERING	3	0	0	3	20	30	50
6	DPCE2015	TRANSPORTATION ENGINEERING-I	3	0	0	3	20	30	50
7	DPME2006	APPLIED MECHANICS LAB	0	0	2	1	50		50
8	DPCE2007	PUBLIC HEALTH ENGINEERING. LAB	0	0	2	1	50		50
9	DPCE2008	SURVEYING-I LAB	0	0	4	2	50		50
10	DPCE2016	TRANSPORTATION ENGINEERING LAB	0	0	2	1	50		50
11	EEDM2001	ENVIRONMENT EDUCATION &	2	0	0	2	20	30	50

		DISASTER MANAGEMENT							
		Total	19	0	10	24			
Semester IV									
Sl No	Course Code	Name of the Course					Assessment Pattern		
			L	T	P	C	IA	CAT	ETE
1	DPCE2023	SOIL MECHANICS AND FOUNDATION ENGINEERING	3	0	0	3	20	30	50
2	DPME2024	HYDRAULICS	3	0	0	3	20	30	50
3	DPCE2006	SURVEYING-II	2	0	0	2	20	30	50
4	DPME2020	STRENGTH OF MATERIAL	3	2	0	4	20	30	50
5	DPCE2017	ESTIMATION AND COSTING	3	0	0	3	20	30	50
6	DPCE2018	TRANSPORTATION ENGINEERING-II	2	0	0	2	20	30	50
7	DPCE2012	SOIL MECHANICS AND FOUNDATION ENGINEERING LAB	0	0	2	1	50		50
8	DPME2021	HYDRAULIC LAB	0	0	2	1	50		50
9	DPCE2013	SURVEYING-II LAB	0	0	4	2	50		50
10	DPME2022	STRENGTH OF MATERIAL LAB	0	0	2	1	50		50
11	DPCE9001	DISRUPTIVE TECHNOLOGY	0	0	2	1	50		50
		Total	16	2	12	23			
Semester V									
Sl No	Course Code	Name of the Course					Assessment Pattern		
			L	T	P	C	IA	CAT	ETE
1	IMED3001	INDUSTRIAL MANAGEMENT AND ENTERPRENURSHIP DEVELOPMENT	3	0	0	3	20	30	50
2	DPCE3002	DESIGN OF REINFORCED CEMENT CONCRETE STRUCTURE	3	2	0	4	20	30	50
3	DPCE3003	CONCRETE TECHNOLOGY	3	0	0	3	20	30	50
4	DPCE3004	IRRIGATION ENGINEERING	3	0	0	3	20	30	50
5	DPCE3006	EARTHQUAKE ENGINEERING	2	0	0	2	20	30	50
6	DPCE3007	DESIGN OF STEEL STRUCTURE	3	0	0	3	20	30	50
7	DPCE3015	CAD LAB	0	0	4	2	50		50
8	PDSS3008	PERSONALITY DEVELOPMENT & SOFT SKILLS	0	0	4	2	50		50
9	DPCE3008	CONCRETE TECHNOLOGY LAB	0	0	2	1	50		50
10	DPCE9998	PROJECT-I	0	0	4	2	50		50
		Total	17	2	14	25			
Semester VI									
Sl No	Course Code	Name of the Course					Assessment Pattern		
			L	T	P	C	IA	MTE	ETE
1	DPCE3009	FIELD VISIT AND PRESENTATION	0	0	4	2	50		50
2	DPCE9999	PROJECT-II	0	0	12	6	50		50
		Total	0	0	16	8			

Detailed Syllabus

Name of The Course	Building Materials			
Course Code	DPCE1013			
Prerequisite	CHEM1005			
Co-requisite	DPCE1018			
Anti-requisite				
	L	T	P	C
	3	0	0	3

Course Objectives

1. To study about the basic building materials, properties and their applications.
2. To know the smart building materials, external paints and their uses.
3. To understand different types of masonries and their applications

Course Outcomes

CO1	Describe the different types of a building material. (k2)
CO2	Analyze the quality of building material. (k4)
CO3	Practice on different testing machine. (k3)
CO4	Compare different types of building Material. (k5)
CO5	Describe the types of insulating materials.(k2)
CO6	Describe new materials and their properties(k2)

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Exam (MTE)	End Term Exam (ETE)	Total Marks
20	30	50	100

Course Content:

Unit I: Building Stones	08 Hours
<p>Classification of rocks: Geological and physical classification; Common rock forming minerals; of stones for specific gravity, water Testing absorption, durability, weathering, hardness by Moh's scale, identification of rocks. Quarrying: Terminology used in quarrying; basic principles involved, methods of quarrying .Blasting: where used, principles of blasting, line of least resistance, drilling of holes(manually and mechanically), charging, tamping, firing ,fuses and detonators safety precautions, common explosives only names, their uses and storage. Wedging: where used, tools required and operation of wedging. Stone crushing: process & equipment used, crushers, grinding mills like hammer mill, ball mill & screens. Availability, characteristics and uses of the following stones: Granite, sandstone, limestone, dolomite, slate, basalt, trap, quartzite and marble. Availability of different stones in state.</p>	
Unit II: Bricks and Clay Products	08 Hours

Raw materials for brick manufacture, properties of good brick making earth, field testing of brick clay. Manufacture of bricks: Preparation of clay-manually/mechanically. Molding: hand molding and machine molding. Drying of bricks. Burning of bricks Clamps. Types of kilns, details of Bull's trench kiln and Hoffman's Kiln, process of burning, size of standard bricks. IS Classification of bricks as per 1077 and, efflorescence test; refractory. Bricks: wall, ceiling, roofing and flooring tiles, their properties, and uses. Other clay products: earthenware and stoneware, their properties and uses.

Unit III: Lime,Cement 10 Hours

Natural sources of lime. Definitions of quick lime, fat lime, hydraulic lime, hydrated lime, lump lime, calcinations, slaking, manufacture of lime. Process of setting and hardening action of lime. Field tests of lime as per IS 1624. Pozzolonic materials. Types, properties and uses. Natural and artificial cement ,raw materials, manufacture of ordinary portland cement , flow diagrams for dry and wet process. setting and hardening of cement, types of cement, properties of cement.

Unit IV: Timber and wood based Products 10 Hours

Classification of trees. Cross-section of an exogenous tree and explanation of terms. Market forms of converted timber as per IS. Seasoning of timber: purpose, types of sea-soning, air seasoning, water seasoning, kiln seasoning, chemical seasoning, Solar seasoning kiln. Defects in timber. Decay in timber. Preservation of timber and methods of treatment. Properties of good timber. Common structural timbers in India, their availability, and uses. Plywood, veneers; manufacture of plywood, uses of plywood. Other wood based product their brief description, manufacture and uses. Laminated boards :block boards, fiber boards, resistant board, hardboard ,plastic coated finishes, water and fire resistant ply wood, PVC boards.

Unit V: Paints ,Insulating Materials 06 Hours

Various types of paints. Constituents of oil paints, their functions and properties. Cement paints, their properties and uses, Varnish and polish: types, properties and uses. Lacquars and enamels: their properties and uses. Trade names of different products Insulating Materials Properties, uses and requirements of heat and sound insulating materials. Properties and uses of :cork, rock wool, glass wool, concrete, aluminium foil, asbestos sheets for ceiling, commercial names of different insulating materials. Glass Types of glasses and their properties: Sheet glass, plate glass ,frosted glass, wired glass, fiber glass bullet resisting glass, colored glass and glass wool glass ,plate Commercial sizes, forms and. their uses.

Unit VI: Plastics, Water proofing materials. 06 Hours

Plastics
Methods of moulding and types, properties and uses of plastics. Important commercial product, uses of plastic in Civil Engineering: plastic pipes, taps, valves, plastic coated paper, polythene sheets thermocole, Bakelite, PVC, rexine and linoleum.
Water proofing materials.
List of water proofing materials, suitable for use in D.P.C., Basement floor and walls, Toilet, Kitchen, Roof Terraces,

Water tanks, etc. Properties & commercial trade names.
Exposure to non conventional & waste by product
Fly ash, Stone Cladding and other finishing materials.

Suggested Reading

- 1. .Duggal, S. K. (2009), Building Materials, New Age International Publications, New Delhi.**
- 2. Mehta, P.K., Mehta, P.K., and Monteiro, P.J.M. (2006), Concrete: Microstructure, Properties, and Materials,**
- 3. Varghese, P.C. (2005), Building Materials, PHI Publications, New Delhi.**
- 4. NIIT, Chandigarh – Civil Engineers Material**
- 5. National Building Code of India, 2006.**

Name of The Course	Building Materials Lab			
Course Code	DPCE1018			
Prerequisite	CHEM1005			
Co-requisite	DPCE1013			
Anti-requisite				
	L	T	P	C
	0	0	2	1

To determine water absorption of bricks
To determine soundness of cement.
To identify hydraulic & fat lime.

Specific Instructional Objectives

1. Describe the different types of a building material.
2. Compare different types of building Material.
3. Describe the different grades of cement.

Course Outcomes

CO1	identify different types of stones and aggregates visually.
CO2	Identify timbers: teak, sal, chir,shisum, siras, deodar, kail and mango visually.
CO3	Determine water absorption of bricks
CO4	Identify hydraulic & fat lime.
CO5	Conduct different field tests on cement.

Continuous Assessment Pattern

Practical Internal Assessment (IA)	Mid Term Exam (MTE)	Practical End Term Exam (ETE)	Total Marks
50	00	50	100

Course Content:

List of Experiments
Identification of different types of stones and aggregates (visual identification).
Identification of timbers: teak, sal, chir,shisum, siras, deodar, kail and mango. (Visual identification)
To conduct field tests of cement.
To determine normal consistency of cement.
To determine setting time (initial and final) of cement.
To determine fineness of given sample of cement.
To determine compressive strength of bricks.

Suggested Reading

1. .Duggal, S. K. (2009), **Building Materials**, New Age International Publications, New Delhi.
2. Mehta, P.K., Mehta, P.K., and Monteiro, P.J.M. (2006), **Concrete: Microstructure, Properties, and Materials**,
3. Varghese, P.C. (2005), **Building Materials**, PHI Publications, New Delhi.
4. NIIT, Chandigarh – **Civil Engineers Material**
5. **National Building Code of India, 2006.**

Name of The Course	Public Health Engg			
Course Code	DPCE2002			
Prerequisite	CHEM1005			
Co-requisite	DPCE2007			
Anti-requisite				
	L	T	P	C
	3	0	0	3

Course Objectives

1. To make the students conversant with sources and its demand of water
2. To understand the basic characteristics of water and its determination
3. To provide adequate knowledge about the water treatment processes and its design

Course Outcomes

CO1	1. Interpret the water supply procedure
CO2	2. Interpret the waste water treatment process.
CO3	3. Categorize different types of joints .
CO4	4. Recognize the sanitation
CO5	5. Relate sanitation with health

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Exam (MTE)	End Term Exam (ETE)	Total Marks
20	30	50	100

Course Content:

Unit I: Water supply Engineering & Sources of water Hours 6	
Introduction-Necessity and brief description of water supply system. Water requirement: Per capita consumption for domestic, industrial, public and firefighting uses as per IS standards. Consumption, demand and its variation ,Surface water sources :Rivers, canal, inponding reservoir and lakes, their quality of water and Suitability.	
Unit II: Water Treatment	8 Hours

Suspended, colloidal and dissolved impurities. Physical, chemical and bacteriological tests and their significance. Minimum standards required for drinking water, Principles of Sedimentation, Coagulation, Flocculation, Filtrations , Disinfection (Chlorination) including Jar Test, Break point chlorination, Residual chlorine. Flow diagram of different treatment units. Function, constructional details, working and operation of (i) Airation fountain (ii) Mixer (iii) Flocculator (iv) Clarifier (v) Slow and rapid sand filter (vii) Chlorination chamber (viii) Water softening (ix) Removal of Iron and Magnese. Chemicals required for water treatment, their uses ,and feeding devices. Simple design of sedimentation tank,

Unit III: Water Distribution Hours 12

(i)Pipes: Different types of Pipes: Cast iron, steel,plastic, (PVC,LDPE,HDPE), asbestos cement, concrete, plastic, GI and lead pipes. Details of their sizes, joints and uses.
(ii) Appurtenances: Sluice (Gate and spindle), air, reflux, scour and safety valves, fire hydrants, their working and Uses .
(iii) Distribution system: Requirements of distribution :Minimum head and rate. Types of lay out-dead end, grid, radial and ring systems. System of water supply- intermittent and continuous. Service reservoirs-types, Waste: Dry, semi liquid, liquid, Necessity of systematic collection and disposal of waste. Brief description of sewage disposal system. Conservancy and water carriage system, their advantages and disadvantages.

Unit IV: Laying of Pipes,Building Water Supply,Maintenance: Hours 14

Setting out alignment of pipe line. Excavation in different types of soils and precautions taken. Precautions taken for traffic control, bedding for pipe line. Handling, lowering, laying and jointing of pipes, testing of pipe lines and back filling. Use of boning rods.
(i) General layout of water supply arrangement for a building (single and multistoried) as per IS Code of practice. Water supply fixtures and their installation. Tapping of water mains.
(ii) Hot and Cold Water supply in buildings. Use of Solar

water heaters. (iii) Rural water supply :Sources, treatment and distribution Leakage detection and prevention. Replacement of damaged pipe. Maintenance of domestic plumbing fixtures..
Unit V: Sewerage Systems,Sewage Treatment Hours 10
<p>i) Types of sewerage systems separate, combined and partially separate.</p> <p>(ii) Sewers : Stone ware, cast iron, concrete and masonry sewers their sizes and joints.</p> <p>(iii) Appurtenances: (Location, function and construction) manholes, drop manhole, lamp hole catch basin, inverted syphon, flushing tanks, ventilating shafts and storm water flows.</p> <p>(iv)Laying of sewers: Setting out alignment of sewer Excavation, checking the gradient with the help of boning rods, preparation of bedding, handling, lowering, laying and jointing, testing and backfilling.</p> <p>(v) Construction of surface drains and different sections required.</p> <p>(i) Meaning and principle of primary and secondary treatment, constructional details of screening chamber, grit chamber, clarifier, trickling filters, secondary clarifiers/airation tank.</p> <p>(ii) Sludge treatment, sludge digestion, sludge drying; sludge disposal.</p> <p>(iii) Oxidation ponds.</p>

Suggested Reading

1. "Punmia B.C, Ashok Jain & Arun Jain, Water Supply Engineering, Laxmi Publications, Pvt. Ltd.,

New Delhi, 2004. "

2.Peavy, Rowe & Tchobanoglous "Environmental Engineering", Mc. Graw Hill, New Delhi.

3.Duggal, K.N. Elements of Environmental Engineering, S.Chand & Co, 2002

Name of The Course	Surveying - I			
Course Code	DPCE2003			
Prerequisite				
Co-requisite	DPCE2008			
Anti-requisite				
	L	T	P	C
	2	0	0	2

Course Objectives

1. To study the basics of linear/angular measurement methods like chain surveying, compass surveying
2. To study the significance of plane table surveying in plan making
3. To know the basics of levelling and theodolite survey in elevation and angular measurements

Course Outcomes

CO1	To identify various surveying instruments.
CO2	To be aware of various survey work.
CO3	To perform leveling of plane
CO4	To perform bearing of different planes
CO5	To run minor instruments

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Exam (MTE)	End Term Exam (ETE)	Total Marks
30	20	50	100

Course Content:

Unit I: Introduction	Hours 5
Concept of surveying, purpose of surveying, Measurements linear and angular, units of measurement, instruments used for taking these measurements. Classification of survey based on instruments. Basic principles of surveying.	
Unit II: Chain Surveying	Hours 8
Purpose of chain surveying, Principles of chain surveying. Equipment used in chain surveying Viz. chains, tapes, ranging rods, arrows, pegs, cross staffs, Indian optical	

square their construction and uses. Different operations in chain surveying: Ranging (direct/indirect), offset (perpendicular/oblique), chaining (flat and sloping ground), conducting chain survey over an area. Recording the field data, plotting the chain survey, conventional sign. Obstacles in chain surveying.

- (a) Errors in chain surveying.
- (b) Correction for erroneous length of chain, simple problems. Testing and adjustment of chain.

Unit III: Compass Surveying **Hours 18**

Purpose of compass surveying. Construction and working of prismatic compass. Use of prismatic Compass, Method of setting and taking observations. Concept of following:

- (a) Meridian - Magnetic, true and arbitrary.
- (b) Bearing- Magnetic, true and arbitrary.
- (c) Whole circle bearing and reduced Bearing,
- (d) Fore and back bearing.
- (e) Magnetic dip and declination

Local attraction-causes, detection, errors and correction. Problems on local attraction, magnetic declination and calculation of included angles in a compass traverse. Concept of a traverse-Open and closed traverse. Traversing with a prismatic compass. Checks for an open and closed traverse. Plotting of a traverse - By included and deflection angles. Concept of closing error. Adjustment of traverse graphically by proportionate method. Errors in compass surveying. Testing and adjustment of a prismatic compass. Use of surveyors compass and its construction details, comparison with prismatic compass.

Unit IV: Leveling **Hours 16**

Purpose of leveling, concept of a level surface, horizontal surface, vertical surface, datum, reduced level and bench marks. Principle and construction of dumpy, I.O.P. (tilting) levels. Concepts of line of collimation, axis of the bubble tube, axis of the telescope and vertical axis. Leveling staff (i) single piece (ii) folding (iii) sop with (iv) invar precision staff. Temporary adjustment: setting up and leveling, adjusting for parallax of Dumpy and I.O.P. level. Differential leveling, concept of back sight, fore sight, intermediate sight, station, change point, height of instrument. Level book and reduction of levels by (a) Height of collimation method and (b) Rise and fall method. Arithmetical checks. Problem on reduction of levels. Fly leveling, check leveling and profile leveling (L-section and X-

section) Errors in leveling, and precautions to minimize them and permissible limits. Reciprocal leveling. Difficulties in leveling. Concept of curvature and refraction. Testing and adjustment of dumpy and IOP level. Numerical problems.

Unit V: Minor Instruments: Hours 5

Principle construction and uses of the following minor instruments:

- (a) Abney's level
- (b) Tangent clinometers
- (c) Ceylone Ghat Tracer
- (d) Pantograph
- (e) Planimeter

Suggested Reading

1. • Duggal, S.K. (2009), Surveying, Vol. 1 and 2, Tata McGraw Hill Education Private Limited, Noida.

2• Punmia, B.C., Jain, A.K., and Jain, A.K. (2005), Surveying and Levelling, Vol. 1 and 2, Standard Publishers, New Delhi.

3• Subramanian, R. (2007), Surveying and Levelling, Oxford University Press, New Delhi.

Name of The Course	ELEMENTRY ELECTRICAL AND MECHANICAL ENGINEERING			
Course Code	DPCE2004			
Prerequisite	PHYE1010			
Co-requisite				
Anti-requisite				
	L	T	P	C
	3	0	0	3

Course Objectives

1. To develop a strong knowledge base of electrical engineering
2. To provide knowledge of basic concepts of mechanical engineering
3. To increase the analytical qualities of student

Course Outcomes

CO1	Describe the elements of Mechanical engineering
CO2	Illustrate different types of gears, lathes, jacks etc.
CO3	Describe the elements of Electrical engineering.
CO4	Illustrate different types of Electrical engineering.

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Exam (MTE)	End Term Exam (ETE)	Total Marks
20	30	50	100

Course Content:

Unit I: Elements of Mechanical Engineering	Hours 20
<ol style="list-style-type: none"> 1. Construction and working of I.C. Engines, their classifications (2 stroke and 4 stroke), details of 4 stroke I.C. Engines. 2. Types of compressors and their uses 3. Different type of gears and their applications. 4. Conveyers, hoists and other material handling equipments- their functioning and uses. 5. Different kinds of lathes, milling machines and drilling machines. 6. Different kinds of Jacks & Hammers and their uses. 	
Unit II: Elements of Electrical Engineering	Hours 20
<ol style="list-style-type: none"> 1. A.C. Machines <ul style="list-style-type: none"> (a) Transformers (b) Alternators (c) Induction Motor - their types, uses and Physical & Electrical specification. 2. General idea of electrical measuring instruments like 	

Ammeter, Voltmeter, Wattmeter and Megger and their uses.

3. Different types of lamps like incandescent lamps, sodium vapour lamps, florescent tube. Halogen lamps - CFL, their merits, demerits and use.
4. Bye laws pertaining to electrical installations, Fans and AC's different types of artificial lighting systems, Lighting systems for residential buildings, public building, schools, colleges, hotels, hospital, exhibition hall,

Suggested Reading

1."D.C. Kulshrestha, "Electrical Enginerring", Tata McGraw Hill.

"

2.Raghuwanshi RS, "Workshop Technology", Dhanpat Rai and Sons, New Delhi.

Name of The Course	Building Construction and Maintenance Engg-I			
Course Code	DPCE2009			
Prerequisite	DPCE1013			
Co-requisite				
Anti-requisite				
	L	T	P	C
	3	0	0	3

Course Objectives

1. To expose students to the various building and general construction products and their associated quality, durability, warranties, and availability
2. To impart knowledge of various types of properties, uses, and variety of materials important in finishing/construction.
3. To understand the effect of environmental condition on construction.

Course Outcomes

CO1	To identify different parts of a building.
CO2	Understand different types of technology used in construction works.
CO3	To illustrate various types of construction machineries, formworks and safety measures involved in construction works.
CO4	To categories different types of doors & windows
CO5	To describe different types of maintenance works and methods to correct them.

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Exam (MTE)	End Term Exam (ETE)	Total Marks
30	20	50	100

Course Content:

Unit I: Building Components and Types of Structure	Hours 3
<ul style="list-style-type: none"> • Definition of a building, classification of buildings based on occupancy. • Building components & their function. Substructure – foundation, plinth. Superstructure – walls, sill, lintel, doors & windows, floor, roof, parapet, beams, columns. Types of structures – load bearing structures, framed structures, composite structures 	

- Orientation of buildings. Site selection.
- Exposure to building bylaws/master plan and building approval Curves necessity, horizontal and vertical curves including transition curves and superelevation, Methods of providing superelevation

Unit II: Construction of Substructure Hours 6

2.1 Job layout

- site clearance, preparing job layout, layout for load bearing structure and framed structure by center line and face line method, precautions while marking layout on ground .

2.2 Earthwork

- excavation for foundation, timbering and strutting earthwork for embankment material for plinth filling. tools and plants used for excavation and earthwork.

2.3 Foundation

- types of foundation – open foundations, shallow foundation, stepped foundation, isolated and combined column footing, raft foundation, deep foundation and pile foundation.
- pumping method of dewatering, cofferdams.
- bearing capacity of foundation soil, under reamed pile foundation.

Unit III: Construction Of Superstructure Hours 20

3.1 Stone masonry

- Terms used in stone masonry – facing, backing, hearting, through stone, corner stone. uncoursed rubble masonry, coursed rubble masonry, point to be observed in construction of stone masonry, mortars for stone masonry, tools and plants used for stone masonry, col-grout masonry.

3.2 Brick masonry

- Common terms used in brick masonry, requirements of good brickwork, bonds in brick masonry: English, Flemish, stretcher and header bonds only.
- brick laying ,line level and plumb of brickwork, striking and raking of joints, lead and lift, precautions in brick masonry, tools and plants used in brick masonry .
- Comparison between brick and stone masonry.
- hollow concrete block masonry, composite masonry
- Cavity wall- purpose and construction.

Unit IV: Doors and windows Hours 10

- Glossary of terms, used in Doors and Windows.
- Doors-Name; uses and sketches of Metal doors; Ledged and Battened Doors; Ledged, battened and braced door; Framed and Panelled doors; glazed and panelled doors; flush doors; collapsible doors; Rolling steel shutters, side sliding doors; Door frames, PVC shutters & metal doors.
- Windows-names, uses and sketches of metal windows, fully

panelled windows, fully glazed Windows, casement windows, fanlight windows and ventilators , sky light window frames, Louvered shutters (emphasis shall be given for using metals and plastics etc. in place of timber	
Unit V: Building Finishes	Hours 6
<p>5.1 floors and roofs floor finishes-</p> <ul style="list-style-type: none"> •shahabad , kota, marble, granite ,kadappa, ceramic tiles ,vitrified , mosaic tiles ,chequerred tiles, glazed tiles ,pavement blocks , concrete floors, tremix floor, skirting and dado. process of laying- process of laying and construction, finishing and polishing of floors. roofing materials – ac sheets ,G.I. sheets, plastic sheets, fibre sheets, mangalore tiles etc.steel trusses. r.c.c. slab <p>5.2 Wall Finishes Plastering –</p> <ul style="list-style-type: none"> • Necessity of plastering, single coat plaster double coat plaster ,neeru finishing and pop, special plasters stucco plaster , plaster board and wall claddings. Precaution to be taken while plastering. defects in plaster. • Pointing – necessity and procedure of pointing. • Painting –necessity, surface preparation, method of application, selecting suitable painting material, white wash and colour wash 	
Unit VI: Building Maintenance	Hours 5
<p>6.1 Cracks</p> <ul style="list-style-type: none"> • Causes and types of cracks, identification and repair of cracks. Guniting and grouting, use of epoxy and crack fills. <p>6.2 Settlement</p> <ul style="list-style-type: none"> • Causes and remedial measures plinth protection – necessity and materials used. <p>6.3 Demolition</p> <ul style="list-style-type: none"> • Necessity, method of demolition-hand demolition, machine demolition, controlled blasting demolition, precautions during demolition. rebaring techniques necessity and equipment for rebaring techniques 	

Suggested Reading

1. Duggal, S. K. (2009), **Building Materials**, New Age International Publications, New Delhi.

2. Punmia, B.C. (2005), “A Text Book of Building Construction”, Publisher: Laxmi Publications, Delhi.

3. Varghese, P.C. (2005), **Building Materials**, PHI Publications, New Delhi.

4. Varghese, P.C. (2007), “Building Construction”,

Name of The Course	Transportation Engineering I			
Course Code	DPCE2015			
Prerequisite	DPCE1013			
Co-requisite	DPCE2016			
Anti-requisite				
	L	T	P	C
	3	0	0	3

Course Objectives

1. "To have an overall knowledge of the traffic components and assess the traffic characteristics and related problems.
- 2."To develop a strong knowledge base of traffic planning and its management in any transportation area. "
- 3."To provide knowledge of traffic control devices and its techniques in transportation interaction"
- 4."To increase the analytical qualities of student."

Course Outcomes

CO1	Describe the functions of transportation and road geometrics
CO2	Illustrate the traffic engineering.
CO3	Illustrate the different types of road materials
CO4	Illustrate the construction procedure of road
CO5	Describe the maintenance process of roads.

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Exam (MTE)	End Term Exam (ETE)	Total Marks
30	20	50	100

Course Content:

Unit I: Introduction , Road geometrics	Hours 7
Importance of Highway transportation., Functions of IRC. IRC classification of roads. , Organization of state highways department , Glossary of terms used in geometrics and their importance; Right of way, formation width, road margin, road shoulder, carriage way, side slopes, kerbs, formation levels, camber and gradient. Design and average running speed, stopping and passing sight distances.	

Curves necessity, horizontal and vertical curves including transition curves and superelevation, Methods of providing superelevation

Unit II: Traffic Engineering Hours 8

- (i) Traffic studies , Methods of collection and presentation of volume count data.
- (ii) Traffic control devices - Signs, markings and signals, their effectiveness and location, installation of signs, IRC standards.
- (iii) Segregation of traffic.
- (iv) Types of intersections and choice of each.
- (v) Accidents: Types, causes and remedies.

Unit III: Road Materials Hours 12

- (i) Different types of road materials in use; soil, aggregates binders.
- (ii) Function of soil as Highway sub grade.
- (iii) C.B.R; Method of finding. CBR value and its significance.
- (iv) Testing aggregates: Abrasion test, impact test, crushing strength test, water absorption test and soundness test.
- (v) Aggregates: Availability of road aggregates in India, requirements of road aggregates as per IS specifications.
- (vi) Binders: Common binders; cement, bitumen and Tar, properties as per IS specifications, penetration and viscosity test , procedures and significance. cut back and emulsion and their uses.

Unit IV: Road Pavements And Their Construction Hours 14

- (i) Road pavement: Flexible and rigid pavement, their merits and demerits, typical cross-sections, functions of various components.
- (ii) Sub-grade preparation - Setting out alignment of road, setting out bench marks, control pegs for embankment and cutting, borrow pits,
- (iii) Flexible pavements: sub base necessity and purpose. Stabilized sub base; purpose of stabilization. Types of Stabilization: (a) Mechanical stabilization. (b) Lime stabilization. (c) Cement stabilization. (d) Fly ash stabilization. (e) Grannular sub base
- (iv) Base course: (a) Brick soling. (b) Stone soling. (c) Metalling: water bound macadam and bituminous macadam. Methods of construction as per Ministry of Shipping and transport (Government of India).
- (v) Surfacing: Types of surfacing; (a) Surface dressing. (b) (i) Premix carpet. (ii) Semi dense carpet (S.D.C) (c) Asphalt concrete. (d) Grouting. Methods of constructions as per Ministry of Surface and Transport, Government of India, specifications

and quality control; equipment used .
 (vi) Rigid pavements Construction of concrete roads as per IRC specifications: Form laying, mixing and placing the concrete, compacting and finishing, curing, joints in concrete pavement, equipment used.

Unit V:Road Maintenance

Hours 10

(i) Common types of road failures-their causes and remedies.
 (ii) Maintenance of bituminous roads such as patch work and resurfacing. Maintenance of concrete roads-filling cracks, repairing joints, maintenance of shoulders (berms),maintenance of traffic control devices.

Suggested Reading

1. "Khanna S.K., Arora M.G., Jain S.S., Airport Planning & Design, Nemchand Bros.,

Roorkee "

2.Saxena S.C., Railway Engineering, Dhanpat Rai & Sons, 1995.

3. "Vukan R. Vuchic, Urban Transit : Operations, Planning & Economics, Wiley Sons

Publishers. "

4.Bindra S.P., Docks & Harbour Engineering, Dhanpat Rai Publications,

Name of The Course	Public Health Engineering Lab			
Course Code	DPCE2007			
Prerequisite	CHEM1009			
Co-requisite	DPCE1018			
Anti-requisite				
	L	T	P	C
	0	0	2	1

Specific Instructional Objectives

1. To discuss the basic characteristics of water and its determination.
2. To describe water treatment process.
3. To make the students conversant with sources and its demand of water

Course Outcomes

CO1	Determine physical and chemical characteristics of water.
CO2	Conduct chlorine demand test
CO3	Determine available chlorine in bleaching powder
CO4	Determine dissolved and suspended solids in water.
CO5	Investigate intermediate pollution in drinking water by OT test.

Continuous Assessment Pattern

Practical Internal Assessment (IA)	Mid Term Exam (MTE)	Practical End Term Exam (ETE)	Total Marks
50	00	50	100

Course Content:

List of Experiments
To determine dissolved and suspended solids in water.
To determine pH value of water sample.
To determine turbidity of water
To calculate: <ol style="list-style-type: none"> Oxygen Demand (OD) Biological Oxygen Demand (BOD) Chemical Oxygen Demand (COD)

To perform Jar Test for Coagulants
To perform chlorine demand test
To determine hardness of water.
To determine available chlorine in bleaching powder
To perform field test for the detection of intermediate pollution in drinking water by OT test.

Suggested Reading

1. "Punmia B.C, Ashok Jain & Arun Jain, Water Supply Engineering, Laxmi Publications, Pvt. Ltd., New Delhi, 2004. "
2. Peavy, Rowe & Tchobanoglous "Environmental Engineering", Mc. Graw Hill, New Delhi.
3. Duggal, K.N. Elements of Environmental Engineering, S.Chand & Co, 2002

Name of The Course	SURVEYING-I Lab			
Course Code	DPCE2008			
Prerequisite				
Co-requisite	DPCE2003			
Anti-requisite				
	L	T	P	C
	0	0	4	2

Specific Instructional Objectives

1. To demonstrate various surveying instruments.
2. To make students understand various survey work.
3. To describe various minor instruments.
4. To define the basics of levelling and theodolite survey in elevation and angular measurements.

Course Outcomes

CO1	To measure using chain and ranging rod
CO2	To practice chain surveying
CO3	To practice traversing
CO4	To use compass
CO5	To compare reduce levels at different points using levelling.

Continuous Assessment Pattern

Practical Internal Assessment (IA)	Mid Term Exam (MTE)	Practical End Term Exam (ETE)	Total Marks
50	00	50	100

Course Content:

List of Experiments
Chain Surveying: (a) Ranging a line. (b) Chaining a line and recording in the field book. (c) Testing and adjustment of chain.
(a) Chaining of a line involving reciprocal ranging. (b) Taking offsets and setting out right angles with cross staff and Indian optical square.
Chain survey of a small area. Plate I
Chaining a line involving obstacles in ranging. Compass Survey

(a) Setting the compass and taking observations. (b) Measuring angles between the lines meeting at a point by prismatic compass.
Traversing with the prismatic compass and chain of a closed traverse. (recording and plotting by included angles) Plate II Setting a regular Pentagon of given side & bearing Plate III
Traversing with the Prismatic compass and chain of a closed and open traverse (Recording and plotting by deflection angles) Plate IV
Determination of local attraction at a station by taking fore and back bearing
To find true bearing of a line at a place.
To find the difference of level between two distant points by taking staff readings on different stations from the single setting.
To find the difference of level between two points by taking at least four change points.
(a) Longitudinal sectioning of a road. (b) Cross-sectioning of a road.
Setting a gradient by IOP level.
Minor instruments a) Setting and checking grades with Abney's level. Setting and checking grades with Ceylone Ghat Tracer b) Finding heights by Indian Pattern Clinometer (Tangent Clinometer) c) Use of planimeter for computing areas.

Suggested Reading

1. • Duggal, S.K. (2009), Surveying, Vol. 1 and 2, Tata McGraw Hill Education Private Limited, Noida.
- 2• Punmia, B.C., Jain, A.K., and Jain, A.K. (2005), Surveying and Levelling, Vol. 1 and 2, Standard Publishers, New Delhi.
- 3• Subramanian, R. (2007), Surveying and Levelling, Oxford University Press, New Delhi.

Name of The Course	Transportation Engineering Lab			
Course Code	DPCE2016			
Prerequisite	CHEM1018			
Co-requisite	DPCE2015			
Anti-requisite				
	L	T	P	C
	0	0	2	1

Specific Instructional Objectives

1. Examine the quality of building stones.
2. Describe the quality of soil.
3. Describe the quality of bitumen

Course Outcomes

CO1	Handle equipment Used for testing of bitumen.
CO2	Handle equipment Used for testing of aggregate.
CO3	Display different tests of transportation material.
CO4	Display different tests of soil .
CO5	Describe the uses of tests

Continuous Assessment Pattern

Practical Internal Assessment (IA)	Mid Term Exam (MTE)	Practical End Term Exam (ETE)	Total Marks
50	00	50	100

Course Content:

List of Experiments
Determination of resistance to abrasion of aggregates by Los Angel's Abrasion Testing Machine.
Determination of Aggregate impact value by aggregate impact tester.
Determination of C.B.R. Value of sub grade soil.
Determination of Aggregate crushing value by aggregate crushing test apparatus.
Determination of Penetration Value of bitumen.
Determination of softening point of bitumen.
Determination of ductility of bitumen.

Determination of flash and fire point of bitumen.

Field Visits of atleast 1 of the following (in different fields):

1. Railway yard and station, points and crossing, rack, communication, control and panel Board
2. Railway Museum for the development of Railways, Rails Mono Rails, Sleepers-- i. R.D.S.O. Lucknow & Rail Bhawan Delhi
3. Bridges under construction.
4. Grade separator.
5. Factory for construction of prestressed sleepers or other fixtures.
6. P.W.D.Research Lab at Lucknow/C.B.R.I. Roorkee.
7. Hume Pipe Factory.

Suggested Reading

1. "Khanna S.K., Arora M.G., Jain S.S., Airport Planning & Design, Nemchand Bros.,

Roorkee "

- 2.Saxena S.C., Railway Engineering, Dhanpat Rai & Sons, 1995.

3. "Vukan R. Vuchic, Urban Transit : Operations, Planning and Economics, Wiley Sons

Publishers. "

- 4.Bindra S.P., Docks & Harbour Engineering, Dhanpat Rai Publications,

Name of The Course	SOIL MECHANICS AND FOUNDATION ENGG			
Course Code	DPCE2023			
Prerequisite	DPCE1013			
Co-requisite	DPCE2012			
Anti-requisite				
	L	T	P	C
	3	0	0	3

Course Objectives

1. To provide a coherent development to the students for the courses in sector of Engineering like Geotechnical Engineering & Soil Improvement Techniques etc.

2. To present the foundations of many basic Engineering tools and concepts related Geotechnical Engineering.

3. To give an experience in the implementation of Engineering concepts which are applied in field of Geotechnical Engineering

4. To involve the application of scientific and technological principles of planning, analysis, design of foundation

Course Outcomes

CO1	Identify and classify soils with reference to their characteristics. (K1)
CO2	Describe the behavior and effect of water in soils.(K2)
CO3	Examine modes of soil behavior. (K4)
CO4	Calculate and plot soil strength parameters
CO5	Describe methods of improving soil stability including reference to compaction plant. (K2)

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Exam (MTE)	End Term Exam (ETE)	Total Marks
30	20	50	100

Course Content:

Unit I: Introduction	Hours 15
<ul style="list-style-type: none"> • Definition of soil Mechanics and foundation engineering. • Soil formation - different kinds of soils and soil structures • Graphical representation of soils as a three phase system. • Definitions of moisture content unit weight of soil mass such as 	

bulk density, saturated density, submerged density and dry density, specific gravity, mass gravity, void ratio, porosity and degree of saturation, percentage air voids and their content, density index

- Relationships between various terms stated above.
- Consistency limits Liquid limit, Plastic limit, Shrinkage limit, Plasticity index, Consistency index. Grain size analysis - Sieve and Hydrometer analysis, C.C. and C.U.
- Textural classification chart, brief description of plasticity chart.
- Particle size classification of soils & I.S. classification of soil.

Unit II: Permeability of Soils

Hours 8

- Definition of permeability.
- Interpretation of Darcy's law, definition of discharge, velocity and seepage velocity and coefficient of percolation.
- Factors affecting permeability.
- Laboratory methods of falling head and constant head, field methods of pumping-out tests and pumping-in tests.

• site clearance, preparing job layout, layout for load bearing structure and framed structure by center line and face line method, precautions while marking layout on ground .

2.2 Earthwork

• excavation for foundation, timbering and strutting earthwork for embankment material for plinth filling. tools and plants used for excavation and earthwork.

2.3 Foundation

- types of foundation – open foundations, shallow foundation, stepped foundation, isolated and combined column footing, raft foundation, deep foundation and pile foundation.
- pumping method of dewatering, cofferdams.
- bearing capacity of foundation soil, under reamed pile foundation.

Unit III: Compaction & Consolidation

Hours 15

- Definition of Compaction.
- Standard & modified Proctor compaction test.
- Different methods of compaction
- Factors affecting compaction.
- Brief description of field compaction methods.
- Compacting equipments and field control.
- Indian Standards.
- Definition of consolidation and its importance on foundation settlement.
- Difference between consolidation and compaction.

Unit IV: Shear Strength	Hours 10
<ul style="list-style-type: none"> • Definition of shear strength. • Definition of Cohesive & non cohesive soil. With reference to c and O (phy) soil. • Coulomb's equation • Coulomb's equation. • Shear box and unconfined compression tests. • Earth pressure: Definition of earth pressure, active and passive earth pressures, terms and symbols relating to a retaining wall, Relation between movement of wall and earth pressure, simple earth pressure calculations without surcharge. 	
Unit V: Site Investigation And Sub Soil Exploration	
Hours	5
<ul style="list-style-type: none"> • Necessity of site investigation & sub-soil exploration. • Types of exploration – general , detailed. • Method of site exploration open excavation & boring • Criteria for deciding the location and number of test pits and bores • Disturbed & undisturbed soil samples for lab testing. • Field identification of soil – dry strength test, dilatancy test & toughness test • Empirical correlation between soil properties and SPT values. 	
Unit VI Shallow and Deep Foundations	Hours 5
<ul style="list-style-type: none"> • Definitions of shallow and deep foundations • Application of Terzaghi's bearing capacity formulae for different types of foundations. • Factors affecting depth of shallow foundations. • Plate load test for shallow foundations 	

Suggested Reading

1.B.C. Punamia; Soil Mechanics & Foundation Engineering; Laxmi Pub. Pvt. Ltd., Delhi.

2Gopal Ranjan, Rao A.S.R.; Basic and applied soil mechanics; New age int. (p) ltd

3 Arora K.R.; Soil Mechanics & Foundation Engineering; Standard Pub., Delhi

Name of The Course	HYDRAULICS			
Course Code	DPME2024			
Prerequisite	DPME2001			
Co-requisite	DPME2021			
Anti-requisite				
	L	T	P	C
	3	0	0	3

Course Objectives

1 To understand the properties of fluids and fluid statics

2 To derive the equation of conservation of mass and its application

3 To solve kinematic problems such as finding particle paths and stream lines

4" To use important concepts of continuity equation, Bernoulli's equation and turbulence, and apply the same to problems

"

Course Outcomes

CO1	To understand fluid mechanics fundamentals, including concepts of mass and momentum conservation. (K2)
CO2	To apply the Bernoulli equation to solve problems in fluid mechanics and use potential flow theory to solve problems in fluid mechanics.(K3)
CO3	To understand working of hydraulic machines. (K2)
CO4	To measure fluid pressure with manometer. (K5)
CO5	

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Exam (MTE)	End Term Exam (ETE)	Total Marks
30	20	50	100

Course Content:

Unit I: Introduction and Properties of fluid
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Hours 8
Fluid : Real fluid, ideal fluid. 1.2 Fluid Mechanics, Hydraulics, Hydrostatics, Hydro kinematics and Hydro dynamics Mass density, specific weight, specific gravity, cohesion, adhesion, viscosity, surface tension, capillarity, vapour pressure and compressibility
Unit II:Hydrostatic Pressure and measurement of pressure
Hours 10
Pressure, intensity of pressure, pressure head, Pascal's law and its applications. Total pressure, resultant pressure, and centre of pressure. Total pressure and centre of pressure on vertical and inclined plane surfaces: Rectangular Triangular Trapezoidal Circular Atmospheric pressure, gauge pressure, vacuum pressure and absolute pressure. Piezometers, simple manometer, differential manometer and mechanical gauges. Measurement of pressure by manometers and pressure gauges.
Unit III:
Fundamental of Fluid Flow and Orifice Hours 10
Types of Flow: Steady and unsteady flow Laminar and turbulent flow Uniform and non-uniform flow. Discharge and continuity equation (flow equation) Types of hydraulic energy. Potential energy Kinetic energy Pressure energy Bernoulli's theorem; statement and description (without proof of theorems). 5.5 Venturimeter (horizontal and inclined) and Orifice Plate meter. Definition of Orifice, and types of Orifices, Hydraulic Coefficients. Large vertical orifices. Free, drowned and partially drowned orifice. Time of emptying a rectangular/circular tanks with flat bottom.
Unit IV:
Flow Measurements Hours 10
Measurement of velocity by (i) Pitot tube (iii) Surface Float (ii) Current-meter (iv) Velocity rods. Measurement of Discharge by a Notch Difference between notches and orifices. Discharge formulae for rectangular notch, triangular Notch, trapezoidal notch, and conditions for their use. (with derivation) Measurement of discharge by weirs. Difference between notch, weir and barrage. Discharge formula for free, drowned, and broad crested weir with and without end contractions ;

velocity of approach and condition of their use. Venturi flumes to measure flow. Measurement of Discharge by velocity area-method

Unit V:

HYDRAULIC MACHINE

Hours 4

Reciprocating pumps Centrifugal pumps Impulse Turbines
Reaction Turbines Sketching and description of principles of
working of above

Suggested Reading

1. HYDRAULICS, FLUID MECHANICS AND HYDRAULICS MACHINES, BY R.S KHURMI, S CHAND PUBLICATION
2. FLUID MECHANICS AND HYDRAULICS, BY R.K BANSAL, LAXMI PUBLICATION
- 3 HYDRAULICS, KARMVEER, KRISHNA PUBLICATION

Name of The Course	Surveying - II			
Course Code	DPCE2006			
Prerequisite	DPCE2003			
Co-requisite	DPCE2013			
Anti-requisite				
	L	T	P	C
	2	0	0	2

Course Objectives

1. Every civil engineering activity takes place on the surface of earth and starts with availing and measuring the land, with the subject surveying students will pursue the engineering approach about surveying.

2. The subject involves surveying activities of taking various measurements on ground that promote habit of working in groups, neatness and care in documentation

Course Outcomes

CO1	Illustrate plane table surveying. (K3)
CO2	Illustrate theodolite surveying. (K3)
CO3	Illustrate the contouring.(K3)
CO4	Identify various types of curve.(K1)
CO5	Interpret the use of total station. (K3)

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Exam (MTE)	End Term Exam (ETE)	Total Marks
30	20	50	100

Course Content:

Unit I: Plane Table surveying	Hours 10
(i) Purpose of plane table surveying. Equipment used in plane table survey (a) Plane table, (b) Alidade (Plain and Telescopic),(c) accessories.	
(ii) Method of plane tabling :(a) centering (b) leveling (c) Orientation.	
(iii) Methods of plane table surveying: (a) Radiation, (b)	

Intersection, (c) Traversing (d) Resection.
 (iv) Two point problem.
 (v) Three point problem by
 (a) Mechanical Method (Tracing paper) (b) Bessel's Graphical Method. (c) Trial and error method.
 Errors in plane table survey and precautions to control them.
 Testing and adjustment of plane table and alidade.

Unit II: Contouring:

Hours 8

Concept of contour: Purpose of contouring;Contour interval and horizontal equivalent;Factors affecting contour interval; characteristics of contour;Methods of contouring direct and indirect, use of stadia measurements in contour survey. Interpolation of contours; Use of contour map; Drawing cross section from a contour map;Marking alignment of a road, railway and a canal on a contour map; Computation of earthwork and reservoir capacity from a contour map.

Unit III: Theodolite Surveying

Hours 12

Working of a transit vernier theodolite, Fundamental axes of a theodolite and their relation;Temporary adjustments of a transit theodolite; least count and concept of transiting, swinging, face left, face right and changing face;Measurement of horizontal and vertical angles. Prolonging a line(forward and backward) Measurement of bearing of a line; Traversing by included angles and deflection angle method;traversing by stadia measurement; Theodolite triangulation and plotting a traverse; concept of coordinate and solution of omitted measurements (one side affected); Errors in theodolite survey and precautions taken to minimize them; Limits of precision in theodolite traversing. Principle and working of a micro-optic theodolite. Brief introduction to tachometry. Principle and working digital theodolite and its practice.

Unit IV: Curves Simple circular curves

Hours 12

(i) Need and definition of a simple circular curve; Elements of simple circular curve, Degree of the curve, radius of the curve, tangent length, point of intersection (Apex point), tangent point, length of curve, long chord,deflection angle, apex distance and mid-ordinate. Setting out of simple circular curve:

(a) By linear measurements only: - Offsets from the tangents. - Successive bisection of arcs. Offsets from the chord produced.
 (b) By Tangential angles using a theodolite.

(ii) Transition Curves: Need (centrifugal force and super elevation) and definition of transition curve;requirements of transition curves;length of transition curves for roads by cubic parabola;calculation of offsets for a transition curve;setting out of a transition curve by tangential offsets only.

(iii) Vertical curves Setting out of a vertical curve.

Unit V: Total Station & Auto Level ,G.P.S. Surveying
Hours 8
Working and application of total station and auto level. Various uses of total station in preparing drawings like drafting of elevation/vertical plane measurement of building. , Brief Introduction of G.P.S. surveying for making drawing of Site Plan, Contoured Plan, Digital Mapping, etc. and its practices

Suggested Reading

1. • Duggal, S.K. (2009), Surveying, Vol. 1 and 2, Tata McGraw Hill Education Private Limited, Noida.

2• Punmia, B.C., Jain, A.K., and Jain, A.K. (2005), Surveying and Levelling, Vol. 1 and 2, Standard Publishers,New Delhi.

3• Subramanian, R. (2007), Surveying and Levelling, Oxford University Press, New Delhi.

Name of The Course	STRENGTH OF MATERIAL			
Course Code	DPME2020			
Prerequisite	DPME2001			
Co-requisite	DPME2022			
Anti-requisite				
	L	T	P	C
	3	2	0	4

Course Objectives

1.To make student to understand basic of material strength concept

2 To make student fesible to calculate the critical conditions

3 increase the choosing capability of student for material

Course Outcomes

CO1	Determine principal stress and principal plane under various loading condition(k4)
CO2	Draw shear force and bending moment diagram(k4)
CO3	Relate different loading conditions with actual cases(k3)
CO4	Calculate slope and deflection of beams(k4)
CO5	Measure buckling and deflection in column and struts(k5)

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Exam (MTE)	End Term Exam (ETE)	Total Marks
30	20	50	100

Course Content:

Unit I: Principal Stress and Principal Plan	Hours 03
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Principal stress and principal plane under direct and shear stress. Graphical determination by Mohr's circle method
Unit II: Bending Moment and Shear Force
6 Hours
Concept of a beam, and supports (Hinged, Roller and Fixed). Types of Beams: Simply supported, cantilever, fixed, overhang and continuous beams. Types of loads (distributed, point and varying). Concept of Bending Moment & Shear Force. Sign conventions. Bending moment and shear force diagrams for cantilever, simply supported and overhanging beams subjected to uniformly distributed, concentrated and uniformly varying loads. Relationship between load, shear force and bending moment. Point of maximum B.M. and contra flexure, concept of fixed and continuous beams. 3. Bending and Shear Stresses Assumption of theory of simple bending. Derivation of the equation. $M/I=F/Y=E/R$. Concept of centroid and second moment of area, Radius of gyration, Theorems of parallel and perpendicular axes, Second Moment of area for sections: rectangle, triangle, circle, trapezium, angle, Tee, I, Channel and compound sections. Moment of resistance, section modulus and permissible bending stresses, Bending stresses in circular, rectangular, I, T and L section. Comparison of strength of the above sections. Concept of shear stresses in beams, Shear stress distribution in rectangular, I and T section.
Unit III: Combined Direct & Bending stresses: Hours 10
Concentric and eccentric loads, eccentricity, effect of eccentric load on the section, middle third rule; stresses due to eccentric loads. Examples in the case of short columns, chimneys and dams.
Unit IV: Slopes and Deflections of Beams Hours 10
Definition of slope and deflection, sign convention. Circular bending. Calculation of maximum slope and deflection for the following standard cases by double integration or moment area method. (1) Cantilever having point load at the free end. Cantilever having point load at any point of the span. Cantilever with uniformly distributed load over the entire span Cantilever having U.D.L. over part of the span from free end Cantilever having U.D.L. over a part of span from fixed end (2) Simply supported beam with point load at centre of the span. Simply supported beam with U.D. load over entire span. NOTE: All examples will be for constant moment of inertia without derivation of formula.

Unit V: Columns & Struts**Hours 6**

Definition of long column, short column and strut, slenderness ratio, equivalent length, critical load, collapse Load, End conditions of column. Application of Euler's and Rankine's formula (no derivation), simple numerical problems based on Euler's and Rankine's formulae.

Suggested Reading

1. "Strength of Materials" by Ramamrutham, S ; Dhanpat Rai and Sons., New Delhi

2. "Applied Mechanics and Strength of Materials" by Ram Chandra; Standard Publishers. Delhi:

3. "Strength of Materials" by Punmia, BC ; Standard Publishers, Delhi,

4. "Strengths of Materials" by Sadhu Singh; Standard Publishers, New Delhi

Name of The Course	Estimation and Costing			
Course Code	DPCE2017			
Prerequisite	DPCE2009			
Co-requisite				
Anti-requisite				
	L	T	P	C
	3	0	0	3

Course Objectives

1. Determination of quantities of items and labour requirement of civil engineering works.
2. Preparation of estimate of the civil engineering works.
3. Preparation of specification of construction items.

Course Outcomes

CO1	Measure the estimate of a building. (K5)
CO2	Name the general items of work. (K1)
CO3	Define analysis of rates, work charged establishment. (K1)
CO4	Explain working of PWD at different levels.(K2)
CO5	Calculate the standard rent for a building. (K4)

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Exam (MTE)	End Term Exam (ETE)	Total Marks
30	20	50	100

Course Content:

Unit I: Estimation:	Hours 12
Importance of Estimation, Different Types of Estimates, Methods of estimation short wall & long wall and center line method ,Specifications General and Detailed.	
Unit II: Methods of Estimation	8 Hours

General Items of Work for Estimates Units and Measurement, Method of Accounting for the Deduction of Openings Etc., Detailed Estimates of A Single Room and A Two Room Residential Building.

Unit III: Analysis of Rates

Hours 10

Definition of Analysis of Rates, Prime Cost, Work Charged Establishment, Quantity of Materials Per Unit of Work for Major Civil Engineering Items, Resource Planning Through Analysis of Rates, Market Rates

Unit IV: Public Work Organization

Hours 10

Public Works Organization: PWD Scheduled and Cost Indices for Building Material and Labour, MES Organization, Indian Railway Organization, Concept of Organizational Set Up for Public Work Execution, Duties, and Responsibilities of the officers.

Unit V: Valuation

Hours 10

1. Purpose of valuation, principles of valuation.
2. Definition of terms such as depreciation, sinking fund, salvages and scraps value.
3. Valuation of a building property by replacement cost method and rental return method.
4. Method of calculation of standard rent-Concept of capitalized value and years purchase

Suggested Reading

1. B. N. Dutta, Estimating and Costing In Civil Engineering, Ubs Publishers Distributors Ltd.
2. Amarjit Aggarwal A.K. Upadhyay, Civil Estimating and Costing, S. K. Kataria & Sons, 2009
3. P.W.D. Hand Book Is Code

Name of The Course	Transportation Engineering II			
Course Code	DPCE2018			
Prerequisite	DPCE2015			
Co-requisite				
Anti-requisite				
	L	T	P	C
	2	0	0	2

Course Objectives

1. To have an overall knowledge of the railway components
2. To have an overall knowledge of the track laying.
3. Preparation of specification of construction items.

Course Outcomes

CO1	Describe the functions of transportation.
CO2	Describe the members of track
CO3	Evaluate track geometry
CO4	Illustrate track laying.
CO5	Describe track geometry.

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Exam (MTE)	End Term Exam (ETE)	Total Marks
30	20	50	100

Course Content:

Unit I: Introduction:	Hours 7
Introduction: Railways - An important system of communication Permanent Ways: Definition of a permanent way; components of a permanent way, subgrade, ballast, sleepers, rails, fixtures and fastenings. Concept of gauge and different gauges prevalent in India. Suitability of these gauges under different conditions.	
Unit II: Track Material	8 Hours
(i) RAILS: Function of rails. Different types of rail sections-double headed, bull headed and flat footed their standard length, weights and comparison. Welded rails-appropriate length of welded rails and advantages of welded rails. Creep: Its definition, causes, effects and prevention. Wear of rails: its causes	

and effects.

- (ii) SLEEPERS: Function of sleepers; Different types of sleepers: wooden, steel, cast iron (pot type), concrete and pre-stressed concrete, their sizes, shapes, characteristics and spacing.
- (iii) BALLAST: Function, materials used for making ballast stone, brick, slag and cinder, their characteristics.
- (iv) FIXTURES AND FASTENINGS: (a) Connections of rail to rail-Fishplate and fish bolts. (b) Connection of Rail to sleepers: Sketches of connection between flat footed rails with various types sleepers with details of fixtures and fasteners used.

Unit III: Geometrics for Broad Gauge Hours 10

Typical Cross-sections of single and double broad gauge railway tracks in cutting and embankment. Permanent and temporary land width. Gradients- ruling, maximum, minimum for drainage. Gradients in station yards. Curves ; Limiting radius of a curve for broad gauge. Transition length to be provided for railway curves as per railway code. Super-elevation-its necessity and limiting value. Definition of equilibrium cant and cant deficiency, widening of gauge on curves

Unit IV: Points and Crossing Hours 10

Points and Crossings: Necessity and details of arrangement; sketch of a turnout definition of stock rail, tongue rail, check rail, lead rail, wing rail, point rail, splice rail, stretcher bar, throw of switch, heel of switch, nose of crossing, angle of crossing, overall length of turnout, facing and trailing points, diamond crossing, cross over, triangle.

Track Laying:
Preparation of subgrade. Collection of materials setting up of material depot and carrying out initial operations such as adzing of sleepers, bending of rails and assembling of crossings. Definitions of base and rail head. Transportation by material trollies, rail carriers and material trains. Method of track laying (parallel, telescopic and American methods). Organisation of layout at rail head. Ballasting of the track.

Unit V: Maintenance of Track, Airpot Hours 10

- (i) Routine maintenance of formation and side slopes, rails, fixtures and drainage.
- (ii) Special maintenance - Replacement of defective sleepers and rails.
- (iii) Tools used for the above operations.
Basic Element, Runway and Taxi Way.

Suggested Reading

1. Kadiyali, L.R., Traffic Engineering and Transport Planning, Khanna publishers
2. IRC-SP41: Guidelines for the Design of At-Grade Intersections in Rural & Urban Areas
3. Saxena S.C., Railway Engineering, Dhanpat Rai & Sons, 1995.

Name of The Course	Hydraulic Lab			
Course Code	DPME2021			
Prerequisite	CHEM1009			
Co-requisite	DPME2024			
Anti-requisite				
	L	T	P	C
	0	0	2	1

Specific Instructional Objectives

1. To study the fluid under static position
2. To study the fluid under flowing condition.
3. To determine the various co-efficient related to it
4. To verify various theorem

Course Outcomes

CO1	Grasp compare the results of analytical models introduced in lecture to the actual behavior of real fluid flows.
CO2	Perform standard measurement techniques of fluid mechanics and their applications.
CO3	Operate different hydraulic machines and measure different parameters.
CO4	Determine Darcy's coefficient of friction for flow through pipes.
CO5	Determine coefficient of discharge of a rectangular notch/triangular notch.

Continuous Assessment Pattern

Practical Internal Assessment (IA)	Mid Term Exam (MTE)	Practical End Term Exam (ETE)	Total Marks
50	00	50	100

Course Content:

List of Experiments
To verify Bernoulli's Theorem.
To find out venturimeter coefficient
To determine Coef. of velocity (Cv), Coef. of discharge (Cd) Coef. of contraction (Cc) and verify the relation between them
To perform Reynold's Experiment.

To determine Darcy's coefficient of friction for flow through pipes.
To verify loss of head due to: (a) Sudden enlargement (b) Sudden Contraction.
TO determine velocity of flow of an open channel by using a current meter.
To determine coefficient of discharge of a rectangular notch/triangular notch.
Study of the following:(i) Reciprocating Pumps or Centrifugal Pumps. (ii) Impulse turbine or Reaction turbine (iii) Pressure Gauge/water meter/mechanical flow meter.

Suggested Reading

1. HYDRAULICS, FLUID MECHANICS AND HYDRAULICS MACHINES, BY R.S KHURMI, S CHAND PUBLICATION
2. FLUID MECHANICS AND HYDRAULICS, BY R.K BANSAL, LAXMI PUBLICATION
- 3 HYDRAULICS, KARMVEER, KRISHNA PUBLICATION

Name of The Course	SOIL MECHANICS AND FOUNDATION ENGG LAB			
Course Code	DPCE2012			
Prerequisite	DPCE1018			
Co-requisite	DPCE2023			
Anti-requisite				
	L	T	P	C
	0	0	2	1

Specific Instructional Objectives

1. To describe the properties of soil and their significance
2. To state the difference in compaction and consolidation of soil.
3. To define shear strength parameters and methods to calculate them.

Course Outcomes

CO1	To determine properties of soil essential for construction purpose like water content, specific gravity, particle size, liquid limit and plastic limit.
CO2	To calculate permeability of soil.
CO3	To perform standard proctor compression test.
CO4	To determine the moisture content of fine aggregates
CO5	To assess the silt content of soil.

Continuous Assessment Pattern

Practical Internal Assessment (IA)	Mid Term Exam (MTE)	Practical End Term Exam (ETE)	Total Marks
50	00	50	100

Course Content:

List of Experiments
Determination of moisture content by oven drying method
Determination of specific gravity of soil particles by specific gravity bottle/pycnometer
Determination of soil particles size distribution by sieving
Determination of liquid limit and plastic limit of soil
Determination of permeability by constant Head Permeameter and falling head permeameter.

Shear strength of sand by Direct Shear test.
Unconfined compression test
Standard Proctor compaction test.
Determination of field density of soil by sand replacement and core cutter methods.
Check the silt content of soil.

Suggested Reading

1. B.C. Punamia; Soil Mechanics & Foundation Engineering; Laxmi Pub. Pvt. Ltd., Delhi.
2. Gopal Ranjan, Rao A.S.R.; Basic and applied soil mechanics; New age int. (p) ltd
3. Arora K.R.; Soil Mechanics & Foundation Engineering; Standard Pub., Delhi

Name of The Course	Strength of material lab			
Course Code	DPME2022			
Prerequisite	DPME2006			
Co-requisite	DPME2020			
Anti-requisite				
	L	T	P	C
	0	0	2	1

Specific Instructional Objectives

1. To discuss the types of loading.
2. To describe the the type of stresses.
3. To explain the properties of metal such as hardness, ductility, flexibility, stiffness etc.
4. To describe the spring action under axial loading.

Course Outcomes

CO1	To analyze shear force at different sections on a simply supported beam under points loads.
CO2	To calculate yield stress, ultimate stress, percentage elongation, plot the stress strain diagram and compute the value of Young's Modulus of mild steel.
CO3	To determine maximum deflection and Young's Modulus of elasticity by deflection apparatus
CO4	To analyze stiffness/deflection of a helical spring
CO5	To calculate hardness of a metal plate

Continuous Assessment Pattern

Practical Internal Assessment (IA)	Mid Term Exam (MTE)	Practical End Term Exam (ETE)	Total Marks
50	00	50	100

Course Content:

List of Experiments
Determination of shear force at different sections on a simply supported beam under points loads.
Determination of bending moment at different sections on a simply supported beam under different types of loading
Determination of yield stress, ultimate stress, percentage elongation, plot the stress strain diagram and compute the value of Young's Modulus of mild steel.
Determination of the maximum deflection and Young's Modulus of elasticity by deflection apparatus

Determination of modulus of rigidity of material by Torsion apparatus
Determination of stiffness/deflection of a helical spring
Determination of hardness of a metal plate by Rock Well Brinell hardness testing machine
To perform impact test on Izod Impact testing machine

Suggested Reading

1. "Strength of Materials" by Ramamrutham, S ; Dhanpat Rai and Sons., New Delhi

2"Applied Mechanics and Strength of Materials" by Ram Chandra; Standard Publishers. Delhi:

3"Strength of Materials" by Punmia, BC ; Standard Publishers, Delhi,

4"Strengths of Materials" by Sadhu Singh; Standard Publishers, New Delhi

Name of The Course	SURVEYING II LAB			
Course Code	DPCE2013			
Prerequisite	DPCE2008			
Co-requisite	DPME2006			
Anti-requisite				
	L	T	P	C
	0	0	4	2

Specific Instructional Objectives

1. To explain working of theodolite.
2. To show the working of all the components of plane table surveying
3. To explain the concept of contours
4. To explain the different types of curves.

Course Outcomes

CO1	Illustrate plane table surveying
CO2	Illustrate theodolite surveying. (K3)
CO3	Illustrate the contouring
CO4	Identify various types of curve.
CO5	Interpret the use of total station

Continuous Assessment Pattern

Practical Internal Assessment (IA)	Mid Term Exam (MTE)	Practical End Term Exam (ETE)	Total Marks
50	00	50	100

Course Content:

List of Experiments
(i) (a) Setting the plane table (b) Marking the North direction. (c) Plotting a few points by radiation method
(a) Orientation by Trough compass, back sighting. (b) Plotting a few points by intersection method.
Traversing an area with a plane table (at least five lines)
(a) Two point problem. (b) Three point problem by Tracing paper method, Bessel's graphical method, Trail and error method.

Preparing a contour plan by radial line method by the use of a Tangent clinometers/Tachometer.
Preparing a contour plan by method of squares.
Drill for taking out the theodolite mounting on the tripod and placing it back in the box.
Reading the vernier and working out the least count, measurement of horizontal angles by repetition and reiteration methods
Traversing an area with a theodolite (at least five lines) and Plotting the traverse by calculating Latitude and Departure
Measurement of vertical angles by the use of theodolite
(a) Measurement of Magnetic bearing of a line. (b) prolonging a line.
Running a closed traverse with a theodolite (at least five sides) and its plotting.
Setting out of a simple circular curve with given data by the following methods: (a) Offsets from main chord. (b) Offsets from the chords produced. (c) One theodolite method. (d) Setting out a circular curve with transition length by linear measurements
Demonstration of Total Station & Auto level

Suggested Reading

1. • Duggal, S.K. (2009), Surveying, Vol. 1 and 2, Tata McGraw Hill Education Private Limited, Noida.
- 2• Punmia, B.C., Jain, A.K., and Jain, A.K. (2005), Surveying and Levelling, Vol. 1 and 2, Standard Publishers, New Delhi.
- 3• Subramanian, R. (2007), Surveying and Levelling, Oxford University Press, New Delhi.

Name of The Course	Design of Reinforced Cement Concrete Structure			
Course Code	DPCE3002			
Prerequisite	DPCE 3003			
Co-requisite				
Anti-requisite				
	L	T	P	C
	3	2	0	4

Course Objectives

1. To provide a coherent development to the students for the courses in sector of Reinforced Concrete Designing

2. To present the foundations of many basic engineering concepts related designing of structures

3. To give an experience in the implementation of designing concepts which are applied in field of structural engineering

4 To involve the application of scientific and technological principles of design of buildings according to limit state method of design

Course Outcomes

CO1	To understand the basic principles of design of R.C.C. sections.
CO2	To analyze the section by LSM
CO3	To design singly reinforced, Doubly reinforced and flanged section of beams
CO4	To design axially loaded columns by LSM.
CO5	To describe the use of pre-stressed concrete.

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Exam (MTE)	End Term Exam (ETE)	Total Marks
30	20	50	100

Course Content:

Unit I: Working Stress Method	Hours 10
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- Introduction to reinforced concrete, R.C. Sections their behavior, grades of concrete steel. Permissible stresses, Assumptions in W.S.M.
- Equivalent bending stress distribution diagram for singly reinforced section,

Unit II: Limit State Method 8 Hours

- Definition, types of limit states, partial safety factors for materials strength, characteristic strength, characteristic load, design load. Loading on structure as per I.S. 875.
- I.S. Specification regarding spacing of reinforcement in slab, cover to reinforcement in slab, beam column & footing, minimum reinforcement in slab, beam & column, lapping, anchoring effective span for beam, & slab.

Unit III: Analysis and Design of Beams (LSM) Hours 10

- 3.1 Analysis and Design of Singly Reinforced beams
- Limit State of collapse (Flexure), Assumptions stress. Strain relationship for concrete and steel neutral axis, Stress block diagram and Strain diagram for singly reinforced section.
 - Concept of under- reinforced, over-reinforced and balanced section, neutral axis co-efficient, limiting value of moment of resistance and limiting percentage of steel required for balanced singly R.C. Section.
 - Simple numerical problems on determining design constants, moment of resistance and area of steel.
- 3.2 Analysis and Design of Doubly Reinforced Sections
- General features, necessity of providing doubly reinforced section reinforcement limitations.
 - Analysis of doubly reinforced section, strain diagram stress diagram, depth of neutral axis, moment of resistance of the section.
 - Simple numerical problems on finding moment of resistance and design of beam sections.
- 3.3 Analysis and Design of T-Beam (LSM)
- General features, advantages, effective width of flange as per IS : 456-2000 code provisions.
 - Analysis of singly reinforced T-Beam, strain diagram & stress diagram, depth of neutral axis, moment of resistance of T-beam Section with neutral axis lying within the flange
 - Design of T-beam for moment and shear for Neutral axis within or up to flange bottom.
 - Simple numerical problems on deciding effective flange width. (Problems only on finding moment of resistance of T-beam section with N. A. lies within or upto the bottom of flange shall be asked in written examination.)

Unit IV: Design of Axially Loaded Column (LSM) Hours 10		
<ul style="list-style-type: none"> • Assumptions in limit state of collapse – compression • Definition and classification of columns, effective length of column. Specification for minimum reinforcement; cover, maximum reinforcement, number of bars in rectangular, square and circular sections, diameter and spacing of lateral ties. • Analysis and design of axially loaded short, square, rectangular and circular columns with lateral ties only; check for short column and check for minimum eccentricity may be applied. 		
Unit V: Pre-Stressed Concrete	Hours	6
<ul style="list-style-type: none"> i. Concept of prestressing. ii. Situations where prestressed concrete is used. iii. Materials used in prestressed concrete and their specifications as per IS. iv. Post-tensioning and pre-tensioning. v. Systems of prestressing 		

Suggested Reading

1. Dr. B.C.Punamia, A.K. Jain; RCC Designs; Laxmi Publication

2. Shah and Kurvey; Limit State theory & Design of Reinforced Concrete

3. IS: 456

4. S.N. Sinha ; Reinforced Concrete Design, Tata McGrawhill

A.K. Jain; Design of Concrete Structures, Nemchand Publication

Name of The Course	Concrete Technology			
Course Code	DPCE3003			
Prerequisite	DPCE1013			
Co-requisite	DPCE3008			
Anti-requisite				
	L	T	P	C
	3	0	0	3

Course Objectives

1. To define and understand concepts related Concrete technology which involves types and property of concrete and different adhesive materials and its vital use for safe, economic development for the buildings.

2 To present the foundations of many basic Engineering tools and concepts related to Concrete technology and Civil Engineering.

3 To give an experience in the implementation of Engineering concepts which are applied in field of Civil Engineering.

4 To understand special concrete and their use

Course Outcomes

CO1	Describe concrete and the materials from which it is made.(K2)
CO2	Describe the materials used to make concrete; including their sources, production and properties.(K2)
CO3	Explain how good concrete is produced.(K2)
CO4	Diagnose the correct procedure quality control.(K2)
CO5	Differentiate between different concrete operations.(K4)

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Exam (MTE)	End Term Exam (ETE)	Total Marks
30	20	50	100

Course Content:

Unit I: Properties of Cement: Hours 10
1.1 Physical properties of Ordinary Portland cement (OPC), determination and test on OPC ,Hydration of cement, physical properties of cement – fineness, standard consistency, initial & final setting times, compressive strength & soundness, different grades of opc 33, 43 , 53 & their specification of physical properties as per relevant I. S. codes. Adulteration of cement (field test), storing cement at site, effect of storage of cement on

properties of cement / concrete.

1.2 Types of Cement

Physical properties, specifications as per relevant IS codes & fieldapplication of the following types of cement

i) Rapid hardening cement

Ii) Low heat cement

Iii) Pozzolana Portland cement

Iv) Sulphate resisting cement

Vi) Blast furnace slag cement

Vii) White cement

Unit II: Properties of Aggregate

10 Hours

2.1 Properties of fine aggregates :

Concept of size, shape, surface texture, strength, specific gravity, bulk density , water absorption, surface moisture, soundness, bulking impurities

2.2 Determination of fineness modulus & grading zone of sand by

sieve analysis, determination of silt content in sand & their specification as per IS 383

2.3 Bulking of sand, phenomenon of bulking, its effect on concrete

mix proportion.

2.4 Properties of coarse aggregates :

Concept of size, shape, surface texture, water absorption, soundness, specific gravity & bulk density

2.5 Determination of fineness modulus of coarse aggregate by sieve

analysis, grading of Coarse Aggregates

2.6 Determination of crushing value, impact value & abrasion value

of coarse aggregate, flakiness index & elongation index of coarse aggregate and their specification.

Unit III: Properties of Concrete:

Hours 6

3.1 Introduction to concrete -

Definition of concrete, necessity of supervision for concreting operation, different grades of concrete (ordinary concrete, standard concrete & high strength concrete as per provisions of IS 456- 2000), minimum grade of concrete for different exposure conditions, minimum grade of concrete for R.C.C., water retaining structure & in sea water construction, durability of concrete.

3.2 Water cement ratio

Definition of w/c ratio, Duff Abraham w/c law, significance of w/c ratio, selection of w/c ratio for different grades of concrete prepared from different grades of OPC as per graphs specified in IS 10262 -1982, maximum w/c ratio for different grades of concrete for different exposure conditions.

3.3 Properties of fresh concrete

Definition of workability, factors affecting workability of

concrete. Determination of workability of concrete by slump cone test, compaction factor test, vee bee consistometer & flow table tests. Range values of workability requirement for different types of concrete works, cohesiveness, segregation, harshness, bleeding.

3.4 Properties of hardened concrete

Definition of compressive strength, durability, impermeability, elastic properties of concrete, modulus of elasticity of concrete. Creep, factors affecting creep, shrinkage, factors affecting shrinkage

Unit IV: Quality Control of Concrete:

Hours 15

4.1 Batching, Different Types of Mixers & Vibrators

Volume & weight batching, volume batching for nominal mixes & weight batching for design mix concrete, types of mixers (tilting & non-tilting type) Different types of vibrators - needle vibrator, surface vibrator, table vibrator, principle & application of each type of vibrator

4.2 Formwork : formwork for concreting, different types of formworks for different works such as beams, slabs, columns, well foundation, materials used for formwork, requirement of good formwork, stripping time for the removal of formwork as per I.S. 456- 2000 provisions for different structural members.

4.3 Transportation, placing, compaction & finishing of concrete:

Modes of transportation of concrete , precautions to be taken during transportation and placing of concrete in formwork compaction of concrete, methods of compaction, care to be taken during compaction, purpose of finishing, types of finishing & methods of application (surface treatment, expose aggregate finish, applied finish, coloured finish), requirement of good finish.

4.4 Curing of concrete : definition of curing, necessity of curing, different methods of curing and their application (spraying

water, membrane curing, steam curing, curing by infra red radiations, curing by wet gunny bags, ponding methods).

4.5 Waterproofing of concrete & joints in concrete construction: Importance & need of waterproofing, methods of waterproofing & materials used for waterproofing, types of joints, joining old & new concrete, methods of joining, materials used for filling joints.

Unit V: Extreme weather concreting & chemical Admixture in concrete :

Hours 10

5.1 Extreme weather concreting

Effect of cold weather on concrete, effect of hot weather on concrete, precautions to be taken while concreting in hot & cold weather condition.

5.2 Chemical admixture in concrete

Properties & application for different types of admixture such as accelerating admixtures, retarding admixtures, water reducing admixture, air entraining admixture & super plasticizers. Properties of Special Concrete: Properties, Advantages & Limitation of the following types of

Special concrete

- i) Ready mix Concrete
- ii) Reinforced Concrete
- iii) Prestressed Concrete
- iv) Fiber Reinforced Concrete
- v) Precast Concrete
- vi) High performance Concrete

Suggested Reading

1. M S Shetty; Concrete Technology , S.Chand Publication New Delhi

**2 P Kumar Mehta, Monteiro; Concrete Technology,
Indian Concrete Institute**

3 IS 456-2000

**4.A R Santhakumar; Concrete Technology , Oxford
University Press**

Name of The Course	Irrigation Engineering			
Course Code	DPCE3004			
Prerequisite	DPME2019			
Co-requisite				
Anti-requisite				
	L	T	P	C
	3	0	0	3

Course Objectives

- 1.To take up the basic concepts of irrigation and construction of various hydraulic structures.**
- 2.To introduce students to basic concepts of water, plants, their interactions, as well as irrigation and drainage systems design, planning and management.**
- 3.The structures involved the elementary hydraulic design of different structures and the concepts of maintenance shall also form part.**
- 4.To develop analytical skills relevant to the areas mentioned above, particularly the design of irrigation and drainage projects.**

Course Outcomes

CO1	Understand water supply system
CO2	Use of water for irrigation
CO3	Calculation of runoff
CO4	Canal work and its importance
CO5	Understand Dams,Water Logging And Drainage,Ground Water Recharge

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Exam (MTE)	End Term Exam (ETE)	Total Marks
20	30	50	100

Course Content:

Unit I: Introduction and . Rain Fall & Run – Off: Hours 8
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1.1 Definition of irrigation. 1.2 Necessity of irrigation 1.3 History of development of irrigation in India 1.4 Types of irrigation 1.5 Sources of irrigation water ,1.6 Definition of rainfall & run-off, catchment area, Dickens's & Ryve's formulae 1.7 Types of rain gauges - Automatic & Non - automatic 1.8 Stream gauging
Unit II: Water Requirement of Crops and Lift Irrigation 10 Hours
2.1 Definition of crop season 2.2 Duty, Delta and Base Period, their relationship 2.3 Gross command area, culturable command area Intensity of Irrigation, Irrigable area 2.4 Water requirement of different crops-Kharif and Rabi. 2.5 Types of Wells - shallow & deep well, aquifer types , ground water flow, construction of open wells and tube wells . 2.6 Yield of an open/tube well and problems 2.7Methods of lifting water - manual and mechanical devices, use of wind mills.
Unit III: Flow Irrigation, 8 Hours
3.1 Irrigation canals 3.2 Perennial Irrigation 3.3 Different Parts of irrigation canals and their functions 3.4 Sketches of different canal cross-sections 3.5 Classification of canals according to their alignment 3.6 Design of irrigation canals - Chezy's formula, Mannings formula, Kennedy's and Lacey's silt theory sand equations, comparison of above two silt theories. Equations, critical velocity ratio. 3.7 Use of Garrets and Lacey's charts 3.8 Various types of canal lining - Advantages & disadvantages.
Unit IV: Canal Head Work,Regulatory Works, Cross Drainage Works Hours 15
4.1Definition, object, general layout, functions of different parts 4.2 Difference between Weir and Barrage 7.1 Functions

and explanation of terms used

Cross and Head regulators

4.3 Falls

4.4 Energy dissipaters

4.5 Outlets-Different types

4.6 Escapes

4.7 Functions and necessity of the following types:-

Aqueduct, Syphon, Super passage , Level crossing, inlet and outlet.

4.8 Constructional details of the above

Unit V: Dams, Water Logging And Drainage, Ground Water Recharge
Hours 10

5.1 Earthen dams-types, causes of failure

5.2 Classification into masonry & concrete dams

5.3 Labeled cross-section of gravity dam.

5.4 Spillways

5.5 Definition, causes and effects , detection, prevention and remedies

5.6 Surface and sub-surface drains and their layout

5.7 Ground Water Recharge:

Aim ,method and advantage

Suggested Reading

1. Garg, S.K., Irrigation Engineering and Hydraulic Structures, Khanna Publishers, New Delhi.

2."Modi, P.N., Irrigation Water Resources and Water Power Engineering, Standard Book House, New Delhi"

3"Punmia, B.C., and B.B. Pande, "Irrigation and Water Power Engineering", Laxmi Publication

Pvt. Ltd., New Delhi"

4."Sharma, R.K., Text book of Irrigation Engineering and Hydraulic Structures, Oxford and

IBK Publishing House, New Delhi. "

Name of The Course	Earthquake Engineering			
Course Code	DPCE3006			
Prerequisite	DPCE2009			
Co-requisite				
Anti-requisite				
	L	T	P	C
	2	0	0	2

Course Objectives

1. To provide a coherent development to the students for the courses in sector of earthquake engineering ,
2. To give an experience in the implementation of engineering concepts which are applied in field of earthquake engineering
3. To present the foundations of many basic engineering concepts related earthquake Engineering

Course Outcomes

CO1	Judge the magnitude and intensity of earthquake
CO2	Compare the performance of structure in past earthquakes
CO3	Explain the effect of soil and liquefaction.
CO4	Practice seismic construction of masonry building
CO5	Apply the code IS:13920 in detailing of RC buildings. Practice disaster management technique

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Exam (MTE)	End Term Exam (ETE)	Total Marks
30	20	50	100

Course Content:

Unit I: Introduction	5 Hours
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intensity and energy release, Basic terminology, Characteristics of earthquakes, Seismic hazard, vulnerability and risk, Seismic Zoning
Unit II: Past Theories: 5 Hours
Earthquakes performance of structures in past earthquakes
Unit III: Earthquake Philosophy Hours 16
Philosophy of earthquake resistant design and concept of ductility, Short and long period structures, Concept of spectrum, Static force Soil : Effect of soils and liquefaction, Remedial measures, Construction of earth structures Architectural Consideration: Building simplicity, symmetry. Irregularities, Continuity and Uniformity
Unit IV: Masonry building Hours 14
Seismic construction of masonry buildings, provisions of IS:4326 R.C. Building : Seismic construction of RC buildings detailing, provisions of IS: 13920. Retrofitting: Retrofitting of masonry and reinforced concrete buildings.
Unit V: Disaster Management Hours 8
DISASTER MANAGEMENT : Definition of disaster - Natural and Manmade, Type of disaster management, How disaster forms, Destructive power, Causes and Hazards, Case study of Tsunami Disaster, National policy- Its objective and main features, National Environment Policy, Need for central intervention, State Disaster Authority- Duties and powers, Case studies of various Disaster in the country, Meaning and benefit of vulnerability reduction, Factor promoting vulnerability reduction and mitigation, Emergency support function plan. Main feature and function of National Disaster Management Frame Work, Disaster mitigation and prevention, Legal Policy Frame Work, Early warning system, Human Resource Development and Function, Information dissemination and communication

Suggested Reading

**1. Earthquake Resistant Design of Structures By Pankaj
Agarwal & Manish Shrikhande, PHI Publications**

**2. Manish Shrikhande & Pankaj Agrawal; Earthquake
Resistant Design of Structures, PHI
Publication, New Delhi**

**3. S. K. Duggal; Earthquake Resistance Design of
Structures; Oxford University Press, New
Delhi**

Name of The Course	Design of Steel Structure			
Course Code	DPCE3007			
Prerequisite	DPME2020			
Co-requisite				
Anti-requisite				
	L	T	P	C
	3	0	0	3

Course Objectives

1 To provide a coherent development to the students for the courses in sector of Designing of the Steel Structures.

2.To present the Engineering concepts related Design of Steel Structures

3.To give an experience in the implementation of Engineering concepts which are applied in field of Steel Structures.

4.To involve the application of scientific and technological principles of planning, analysis, design of buildings.

Course Outcomes

CO1	Understand general Consideration of structural steel and section
CO2	Illustrate Structural Steel Connection.
CO3	Design tension member.
CO4	Design of compression member
CO5	Design beam section
CO6	

Continuous Assessment Pattern

Internal Assessment (IA)	Mid Term Exam (MTE)	End Term Exam (ETE)	Total Marks
30	20	50	100

Course Content:

Unit I: General Considerations Structural Steel and Sections

8 Hours

Introduction, Advantages of Steel as a Structural. Material, Disadvantages of Steel as a Structural
Material, Structural Steel, Stress-Strain Curve for Mild Steel, Rolled Steel Sections, Loads, Dead Load, Live Loads, Environmental Loads, Seismic Forces, Snow and Rain Loads, Erection Loads,
Basis for Design, Design Philosophies
(i) Properties of structural steel as per IS: 226 and IS: 1977.
(ii) Designation of structural steel sections as per IS Handbook and IS: 800.

Unit II: Structural Steel Connections:

10 Hours

(i) Riveted connections - types of rivets, permissible stresses in rivets. Types of riveted joints, Failure of riveted joints, Assumptions made in the design of riveted joints. Specification for riveted joints. Design of riveted joints for axially loaded members.
(ii) Welded Connections Comparison between riveted and welded joints, types of welds, permissible stresses in welds, types of welded connections, strength of welded joint, Design of welded joints for axially loaded members.

Unit III: Tension Members

8 Hours

Tension Members Forms of common sections. Permissible Stresses in tension for steel. Strength of a tension member. Design of tension members (flats, angles & Tee Sections only). Tension splice and their design

Unit IV: Compression Member

10 Hours

Compression Members Design of struts and columns as per IS:800. Effective length, slenderness ratio and permissible stresses, simple and built up sections, concept of lacing in built up columns.

Unit V: Beams: 10 Hours

Beams Design criteria, allowable stresses, Design of laterally restrained beams including simple built-up sections. Checks for web bulking, web crippling and deflection.




Suggested Reading

1 .S.K Duggal ; Steel Structures, TMH

2.B.C.Punamia; Steel Structures, Laxmi Publication

3.K. S. Sai Ram; Design of Steel Structures, Pearson

**4.IS: 800 - 2007, Code of Practice for General Construction
in Steel, BIS, New Delhi.**

Name of The Course	CAD LAB			
Course Code	DPCE3015			
Prerequisite	DPME1014			
Co-requisite				
Anti-requisite				
	L	T	P	C
	0	0	4	2

Specific Instructional Objectives

1. Describe the different techniques of drawing line
2. Describe different symbols
3. Describe the different types of structure

Course Outcomes

CO1	Create drawing of building structure.
CO2	Create drawing of 1 bhk and 2 bhk flat.
CO3	Understand basic commands.
CO4	Draw drawing on software according to details.
CO5	Draw basic symbols

Continuous Assessment Pattern

Practical Internal Assessment (IA)	Mid Term Exam (MTE)	Practical End Term Exam (ETE)	Total Marks
50	00	50	100

Course Content:

List of Experiments
To draw plan, section and elevation of buildings.
To draw line diagram, representation of doors, windows, ventilators and built in features.
To prepare drawing of 1bhk flat.
To prepare drawing of 2bhk flat.
To prepare drawing of plan for multistory building

Name of The Course	Concrete Technology Lab			
Course Code	DPCE3008			
Prerequisite	DPCE1018			
Co-requisite				
Anti-requisite				
	L	T	P	C
	0	0	2	1

Specific Instructional Objectives

1. To develop understanding about concrete
2. To analyze properties of aggregate
3. To analyze quality of concrete
4. To determine quality of concrete

Course Outcomes

CO1	Determine flakiness index and elongation index of coarse aggregates.
CO2	Calculate workability of concrete.
CO3	Analyze fineness modulus of sand.
CO4	Calculate slump of concrete.
CO5	Determine of bulk density and voids of aggregates

Continuous Assessment Pattern

Practical Internal Assessment (IA)	Mid Term Exam (MTE)	Practical End Term Exam (ETE)	Total Marks
50	00	50	100

Course Content:

List of Experiments
To determine flakiness index and elongation index of coarse aggregate (ISI: 2386-pt.1-1963) Field method to determine fine silt in aggregate.
Determination of specific gravity and water absorption of aggregates (IS: 2386 Part-III-1963) (for aggregates 40mm to 10mm)
Determination of bulk density and voids of aggregates (IS: 2386-Part-III-1963)
Determination of surface moisture in fine aggregate by displacement method (IS: 2383-Part-III-1963)

To determine necessary adjustment for bulking of fine aggregate by field method (IS: 2383-Part-III-1983)
Test for workability (slump test); (a) To verify the effect of water, fine aggregate/coarse aggregate ratio and aggregate/cement ratio on slump. (b) To test cube strength of concrete with varying water cement ratio
Compacting factor test for workability (IS:1199-1959)
Workability of concrete by Vee-Bee consistometer.
Fineness modulus of sand.

Suggested Reading

1. M S Shetty; Concrete Technology , S.Chand Publication New Delhi

2 P Kumar Mehta, Monteiro; Concrete Technology, Indian Concrete Institute

3 IS 456-2000

4.A R Santhakumar; Concrete Technology , Oxford University Press

Name of The Course	PROJECT-I			
Course Code	DPCE9998			
Prerequisite				
Co-requisite				
Anti-requisite				
	L	T	P	C
	0	0	4	2

Specific Instructional Objectives

1. Overcome the gap between planning and execution
2. Increase the presentation skill
3. Describe the different types of structure

Course Outcomes

CO1	Create a own data or implementation on previous data project.
CO2	Create model to exhibit project
CO3	Understand basic concept of civil engineering from live project.
CO4	Describe presentation on project.
CO5	Explain their project.

Continuous Assessment Pattern

Practical Internal Assessment (IA)	Mid Term Exam (MTE)	Practical End Term Exam (ETE)	Total Marks
50	00	50	100

Course Content:

List of Experiments
Planning the project
creating the group to work on
Prepare plan of project include repor,drawing,ppt
Creating model of project
Final project report

Name of The Course	Field Visit and Presentation			
Course Code	DPCE3009			
Prerequisite				
Co-requisite				
Anti-requisite				
	L	T	P	C
	0	0	4	2

understanding of drawing
Execution of plan
Report Writing

Specific Instructional Objectives

1. To make student familiar with industry.
2. To develop skills of machine handling.
3. To develop skills of labour handling.

Course Outcomes

CO1	Recognize the process units
CO2	Identify input and output for the process.
CO3	Experience the importance of working safety.
CO4	Understand how to take work from labour.
CO5	Communicate effectively both orally and in writing.

Continuous Assessment Pattern

Practical Internal Assessment (IA)	Mid Term Exam (MTE)	Practical End Term Exam (ETE)	Total Marks
50	00	50	100

Course Content:

List of Experiments
Introduction
About the Project
Safety precautions
Behavior with seniors
Labour handling
Importance of shedule
Application writing

Name of The Course	PROJECT-II			
Course Code	DPCE9999			
Prerequisite				
Co-requisite				
Anti-requisite				
	L	T	P	C
	0	0	12	6

Specific Instructional Objectives

1. Overcome the gap between planning and execution
2. Increase the presentation skill
3. Describe the different types of structure

Course Outcomes

CO1	Create a own data or implementation on previous data project.
CO2	Create model to exhibit project
CO3	Understand basic concept of civil engineering from live project.
CO4	Describe presentation on project.
CO5	Explain their project.

Continuous Assessment Pattern

Practical Internal Assessment (IA)	Mid Term Exam (MTE)	Practical End Term Exam (ETE)	Total Marks
50	00	50	100

Course Content:

List of Experiments
Planning the project
creating the group to work on
Prepare plan of project include repor,drawing,ppt
Creating model of project
Final project report