

Syllabus for Even Semester For Session 2010-11

Department :

Course No.	CEL202	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title	Hydraulic Engineering				
Course Coordinator	Dr. P.D.Porey				
Slot in which offered. If not offered write N	Odd		Even		
			B		
Structure	Lecture	Tutorial	Practical	Credits	
	3	0	2	8	
Prerequisite Course Codes As per proposed Course Numbers					
Prerequisite credits					
Equivalent Course Codes. As per proposed courses and old courses	Fluid Mechanics I and Fluid Mechanics II				
Overlap course codes As per proposed Course Numbers					
Text Book (Max. 2)	Title	Engineering Fluid Mechanics			
	Author	Garde R.J. and Mirajgaokar A.G.;			
	Publisher	Scitech Publication			
	Edition	2003			
	Title	Theory and Applications of Fluid Mechanics			
	Author	Subramanya K.			
	Publisher	Tata McGraw Hill Publication			
	Edition	1996			
Reference Books	Title	Fluid Mechanics,;			
	Author	Streeter V.L. and Wyle E.B.;			
	Publisher	International Students Edition			
	Edition	1986			
	Title				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
Publisher					
Edition					

	Title	
	Author	

	Publisher	
	Edition	
	Title	
	Author	
	Publisher	
	Edition	
Content	<p>Fluid Properties and measurement of pressure – manometers and gauges, Hydrostatics- Total pressure and centre of pressure, pressure forces on vertical and inclined laminae, pressure on curved surfaces, Buoyancy and floatation – Centre of buoyancy, body immersed in two different fluids, metacentre, metacentric height, stable, unstable and neutral equilibrium</p> <p>Types of fluid flows and flow lines, Methods of describing fluid motion, Flownet, Fundamental equations of fluid flow, Venturimeter, Orifice and mouthpiece, Notches and weirs</p> <p>Elements of flow through pipes: Darcy Weisbach formula, Hydraulic Gradient Line, Total Energy Line, Minor losses, series and parallel connections</p> <p>Introduction to open channel flow: Manning’s and Chezy’s formula, Most economical section of channel, Uniform flow and Critical flow, Hydraulic jump elements</p> <p>Types of hydraulic turbines, Working principles of Centrifugal and Reciprocating pumps</p> <p>Practicals :</p> <p>Experiments on Ship model, triangular notch, rectangular notch, orifice, mouthpiece, manometers and pressure gauges, pitot tube, friction factor of pipeline, Chezy’s and Manning’s constant for a channel, venturimeter</p>	
Course No.	CEL202	

Head of the Department of **CIVIL ENGINEERING**

Course Content Proforma					
Department: Civil Engineering					
Course No.:	CEL206	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title: Engineering Geology					
Course Coordinator: Dr. Y. B. Katpatal					
Slot in which offered, if not offered write N		Odd		Even	
		D			
Structure		Lecture	Tutorial	Practical	Credits
		3	0	2	8
Prerequisite Course Codes As per proposed Course numbers					
Prerequisite Credits					
Equivalent Course Course Codes. As per proposed Courses & old courses					
Overlap Course Codes As per proposed Course numbers					
Text Book (Max. 2)	Title	Principles of Engineering Geology			
	Author	KVGK Gokhale			
	Publisher	BS Publications			
	Edition				
	Title	Fundamentals of Engineering Geology			
	Author	F.G.Bell			
	Publisher	BS Publications			
	Edition	2005			
Reference Books	Title	Engineering Geology			
	Author	Parbin Singh			
	Publisher	S K Katariya & Sons			
	Edition	Sixth Edition			
	Title	Principles of Physical Geology			
	Author	Homes Arthur and Homles Doris			
	Publisher	EIBS Publications			
	Edition	1987			
	Title	A geology for Engineers			
	Author	F.G. H. Blyth & M.H. de Freitas			

	Publisher	Elsevier
	Edition	Seventh Edition
Content	<p>General Geology : Scope of Engineering Geology, internal structure of the earth. Continental drift and Plate Tectonics; Isostasy and diastrophism.</p> <p>Mineralogy: Definition and classification of Minerals, Structure, Chemical and physical characters of Mineral Groups; Silica, Felspar, Olivine, Pyroxene, Amphibole, Mica and Clay.</p> <p>Petrology: Rock Cycle; Igneous rocks: Genesis of Igneous rocks; Textures, structures and forms of Igneous rocks, Tabular classification. Sedimentary Rocks: Genesis of sedimentary rocks, classification textures and structures of sedimentary deposits. Metamorphic Rocks: Metamorphism, agents and kinds of metamorphism, textures, structure and classification of metamorphic rocks.</p> <p>Structural Geology: Rock Deformation; Attitude of rocks, Mechanism of formation, nomenclature classification and field identification of Folds, Joints, Faults. Problems on Strike, Dip, thickness and depth of strata.</p> <p>Geomorphology: Definition & Scope; Basic concepts; internal and external processes; Geomorphological classification, weathering and erosion</p> <p>Stratigraphy: Definition, scope & principles of Stratigraphy, Unconformities, stratigraphic units; Physiographic and tectonic divisions of India; Review of Indian Stratigraphy.</p> <p>Civil Engineering Applications: Geomechanical properties and Classification of rocks and basement characteristics; construction material, road metal etc.</p> <p>Surface and subsurface geological investigations; Geological, geophysical and remote sensing studies; Site investigations for design & construction of Dams, Bridges, Tunnels, buildings.</p> <p>Engineering Seismology: Causes and effects of earthquakes; Seismic waves, energy release, magnitude, intensity, seismic zoning & seismic Zones of India; Characteristics of strong ground motion, aseismic structures.</p> <p>Geohydrology: Occurrence, availability & movement of Groundwater; Rocks as aquifers, Groundwater investigations, groundwater development and management; Techniques of groundwater recharge.</p> <p>Stability of Slopes & Landslides: Causes and prevention</p> <p>Environmental aspects of Geology.</p>	
Practical	<p>Megascopic study of Minerals and Rocks</p> <p>Geological maps and Profiles</p> <p>Three point and Dip Strike problems</p> <p>Electrical Resistivity Survey</p> <p>Ground Penetration Radar Survey</p>	
Course No.		

Course No.	CEL203	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title	Environmental Engineering I				
Course Coordinator	Dr. A. R. Tembhurkar				
Slot in which offered. If not offered write N	Odd		Even		
			A		
Structure	Lecture	Tutorial	Practical	Credits	
	3	0	2	8	
Prerequisite Course Codes As per proposed Course Numbers					
Prerequisite credits					
Equivalent Course Codes. As per proposed courses and old courses					
Overlap course codes As per proposed Course Numbers					
Text Book (Max. 2)	Title	Water Supply Engineering –			
	Author	B.C. Punmia			
	Publisher				
	Edition				
	Title	Environmental Engineering –			
	Author	S.K. Garg			
	Publisher				
Reference Books	Edition				
	Title	Metcalf, Eddy, “Wastewater Engineering”-			
	Author	McGraw Hill Publication			
	Publisher				
	Edition				
	Title	M.J. Macghee, “Water Supply & Sewage –			
	Author	McGraw Hill Publication			
	Publisher				
	Edition				
	Title				
	Author				
	Publisher				
	Edition				
Title					
Author					

	Publisher	
	Edition	
	Title	
	Author	
	Publisher	
	Edition	
	Title	
	Author	
	Publisher	
	Edition	
Content	<p>Importance and necessity of water supply scheme; planning of WSS; design period; population forecasting; water demand; sources of surface water, ground water, intake structure; conveyance of water, types of pipe joints and fitting; hydraulic design of pipes, rising main; pumps; water quality, standards of drinking water, Theory and application of water treatment unit operation and processes, aeration, coagulation, flocculation, sedimentation, filtration, disinfection; Selection of site and processes of water treatment, treatment flowsheet,; Distribution system, appurtenances, detection and prevention of leakage, storage reservoir for treated water. Introduction to solid waste management.</p>	
Course No.		

Course No.	CEL205	Open Course (N)	HM Course (N)	Discontinued (N)
Course Title	Building Design and Drawing			
Course Coordinator	S.R.Dongre			
Slot in which offered. If not offered write N	Odd		Even	
			F	
Structure	Lecture	Tutorial	Practical	Credits
	2	0	2	6
Prerequisite Course Codes As per proposed Course Numbers				
Prerequisite credits				
Equivalent Course Codes. As per proposed courses and old courses				
Overlap course codes As per proposed Course Numbers				
Text Book (Max. 2)	Title	Building Drawing		
	Author	Shah, Kale & Patki		
	Publisher	TMH publication		
	Edition	Fourth Edition		
	Title	A course in Civil Engineering Drawing		
	Author	Sikka V.B		
	Publisher	S.K. Kataria & Sons publication, 1997		
	Edition			
Reference Books	Title	IS: 1256-1958 (IS Code of building byelaws)		
	Author	Indian Standard		
	Publisher	-		
	Edition	-		
	Title	Time Saver Standard		
	Author	Dodge F. W.		
	Publisher	F. W. Dodge Corp.		
	Edition	3 rd		
	Title			
	Author			
	Publisher			
	Edition			
	Title			
	Author			
	Publisher			
Edition				
Title				
Author				

	Publisher	
	Edition	
	Title	
	Author	
	Publisher	
	Edition	
Content		<p>Theory:</p> <ol style="list-style-type: none"> 1. Importance of Building drawing as Engineer's Language in construction & costing. 2. Selection of scales for various drawings, thickness of lines, dimensioning, Combined First angle and Third angle method of projection, abbreviations and conventional representations as per IS: 962, 1967. Free hand dimensioned sketches of various building elements and its importance in Civil Engineering. 3. Developing working drawing to scale as per I.S. 962, from the given sketch. Design and general specifications for different components of the building including terraced and pitched roofs. Developing submission drawings to scale with location plan, site plan and block plan. 4. Study of building bye-laws and Principals of planning. Planning of residential and public buildings, recommendations of CBRI, Roorkee. 5. Graph paper drawing (line plans) based on various requirements for Residential, Public, Educational, Industrial Buildings and Interior aspects as well. 6. Two point perspective of Residential building neglecting small elements of building such as plinth offset, Chajja projections etc. <p>Practical:</p> <ol style="list-style-type: none"> 1. Working drawing of single storied residential building of terrace and pitched roofs with foundation plan of load bearing structure. (Two assignment) 2. Submission drawing of single storied residential building (framed structure) with access to terrace including all details and statements as per the local bye-laws. (One assignment A1 sheet) 3. Working drawing of multistoried Public / Educational/ Health / Community / Industrial building including structural details and layout of services. (One assignments) 4. Two point perspective of the single storied Residential building neglecting small building elements. (Two assignments – pitched & terrace roof) 5. Minimum 30 free hand self-explanatory dimensioned sketches of various building elements

		<p>in sketch book.</p> <p>6. Line plans of various types of buildings e.g. Public / Educational / Industrial / Hospital / Community on graph papers (04 assignments)</p> <p>7. One compulsory field exercise.</p>

COURSE CONTENT PROFORMA

Course No.	CEL306	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)			
Course Title		Surveying-II					
Course Coordinator		Dr. R.V. Ralegaonkar					
Slot in which Offered		ODD		EVEN			
				G			
Structure		Lecture	Tutorial	Practical	Credits		
		3	0	2	8		
Prerequisite Course Codes							
Prerequisite Credits							
Equivalent course Codes							
Overlap Course Codes							
Text Books		Title	Surveying II				
		Author	B. C. Punmia				
		Publisher	Standard Book-House				
		Edition	Latest				
		Title	Surveying Volume II				
		Author	S. K Duggal				
		Publisher	Tata McGraw Hill				
		Edition	Latest				
		Reference Books		Title	Higher Surveying		
				Author	A M Chandra		
				Publisher	New Age International Publication		
				Edition	Latest		
Title	Surveing & Levelling-Part II						
Author	T. P. Kanetkar & S. V. Kulkarni						
Publisher	Pune Vidhyarathi Griha Prakashan, Pune						
Edition	Latest						
Title	Surveying						
Author	Arthur Bannister, Stanley Raymond, Raymond Baker						
Publisher	Person Education						
Edition							
Title							
Author							
Publisher							
Edition							

Content	<p>Theory:</p> <ol style="list-style-type: none"> 1. Curves: Types, Elements, Methods & Setting out curves 2. Geodetic Surveying: Triangulation, classifications, reconnaissance, base line measurements 3. Triangulation: Laws of weights, errors & adjustments 4. Field Astronomy: Spherical trigonometry, Latitude & Longitude, Astronomy Terms, Co-ordinate System, Corrections. 5. Photographic Surveying: Photo-theodolite, terrestrial photogrammetry, stereo photogrammetry, aerial surveying. 6. Hydrographic Surveying: Shore-line survey, soundings, methods, reductions plots, tides. <p>Practicals:</p> <ol style="list-style-type: none"> 1. Base Line Measurement 2. Study and Application of Auto Level 3. Study and Application of Total Station 4. Setting out of simple curves – linear methods 5. Setting out of simple curves – angular method 6. Setting out of transition curve 7. Computation of geodetic position 8. Correction of geodetic quadrilateral 9. Triangulation Adjustments 10. Determination of Azimuth <p>Field Visit:</p> <p>3 days Survey Camp will be conducted as a part of course curriculum</p>	
Course No.		

Course No.	CEL209	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)
Course Title	<u>Construction Materials</u>			
Course Coordinator	Dr. A. D. Pofale			
Slot in which offered. If not offered write N	Odd N	Even E		
Structure	Lecture 3	Tutorial 0	Practical 0	Credits 6
Prerequisite Course Codes As per proposed Course Numbers				
Prerequisite credits				
Equivalent Course Codes. As per proposed courses and old courses				
Overlap course codes As per proposed Course Numbers				
Text Book (Max. 2)	Title	Engineering Materials,		
	Author	Rangawala S.C.,		
	Publisher	Chortor Publications		
	Edition	1991		
	Title	Building Materials,		
	Author	S.K. Duggal		
	Publisher	New Age International Publications		
	Edition	2006		
Reference Books	Title	Engineering Materials,		
	Author	Rajput R.K		
	Publisher	S Chand & Co. New Delhi		
	Edition	2000		
	Title	Building Materials Technology Structural Performance & Environmental Impact		
	Author	Bruntley L.R		
	Publisher	McGraw Hill Inc		
	Edition	1995		
	Title	Construction Materials their nature & behaviour, E& FN span, -		
	Author	Illston J.M		
	Publisher	Chapman & Hall London		
	Edition	1996.		
	Title	Engineering Materials and applications,		
	Author	Flinn R.A. Trojan		

	Publisher	Jaico Publishing House
	Edition	1993
	Title	
	Author	
	Publisher	
	Edition	
Content	<ol style="list-style-type: none"> 1. Classifications of Construction Materials. Consideration of physical, Mechanical, thermo-physical Properties, characteristics behaviour under stress, selection criteria for construction materials, green building materials, waste products, reuse and recycling. 2. Structural Clay Products- Bricks- Classification, Characteristics, Ingredients, Manufacturing, Forms of Bricks burnt clay, perforated, paving, soling bricks, hallow blocks, Fire clay/refractory bricks, Terracotta, Porcelain, Stoneware, Earthenware, /refractory bricks etc. 3. Rocks and Stones – Classification, quarrying, dressing, uses, characteristics, selection, types Common building stones, artificial building stones. Uses and applications of stones. 4. Wood and wood Products: Classification and growth of trees, Timber: Classification, Structure, Characteristics, Seasoning, defects, Diseases, decay and preservation. 5. Materials for making Mortar and concrete: Lime manufacture, properties, hardening of lime, types of lime, lime concrete uses, cement, aggregates, water, characteristics, properties and uses of Pozzolana materials, Types of mortars, special mortars, properties and applications, admixtures 6 Ferrous metals: Structure, Iron: Pig Iron, Cast Iron, Wrought Iron, Steel, Reinforcing steel Bars, Alloy steel, Non Ferrous metals: Aluminum, Copper, Zinc, Lead tin, Nickel Stainless steel .high tensile steel ,corrosion resistant steel. 2. Ceramic Materials: Classification, Refractories, glass, glass wool, mechanical, thermal and electrical properties Uses and application. 3. Polymeric Materials: Polymerisation mechanism and depolymerisation. Rubber and plastics, properties, effect of temperature on mechanical properties. Uses and application. 4. Paints, Enamels and varnishes, Tar, bitumen and asphalt, Gypsum and gypsum plaster boards, , adhesives and sealants ,waterproofing materials. Heat and sound insulating materials , geosynthetics, Damp prevention materials. 10. Lightweight heavy weight materials, natural and artificial, special cements and concrete. 	
Course No.		

Course No.	CEL301	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)
Course Title	Foundation Engineering			
Course Coordinator	Prof D.J. Katayan			
Slot in which offered. If not offered write N	Odd		Even	
	D			
Structure	Lecture	Tutorial	Practical	Credits
	3	0	0	6
Prerequisite Course Codes As per proposed Course Numbers				
Prerequisite credits				
Equivalent Course Codes. As per proposed courses and old courses				
Overlap course codes As per proposed Course Numbers				
Text Book (Max. 2)	Title	Soil Mechanics in Theory & Practice		
	Author	Alam Singh		
	Publisher	Asia Publishing House,		
	Edition	1975 & later		
	Title	Geotechnical Engineering		
	Author	S. K. Gulhati & Manoj Dutta		
	Publisher	Tata McGraw Hill		
	Edition	2005		
Reference Books	Title	Geotechnical Engineering		
	Author	Purushothama Raj		
	Publisher	Tata McGraw Hill Publishing Co. Ltd		
	Edition	1995		
	Title	Soil Mechanics & Foundation Engg		
	Author	Punmia B.C.		
	Publisher	Laxmi Publication Pvt. Ltd, New Delhi		
	Edition	1994		
	Title	Geotechnical Engineering		
	Author	C. Venkatramaiah		
	Publisher	New Age International Ltd		
	Edition	1995		
	Title	Basic & Applied Soil Mechanics		
	Author	Gopal Ranjan & A. S. RAO;		
	Publisher	New age international Ltd,		
Edition	2004			

	Title	Soil Mechanics & Foundation Engg.
	Author	Arora K.R.
	Publisher	
	Title	
	Author	
	Publisher	
Content	1.	<p>Strength of Cohesionless & Cohesive soils. Shear Strength: General principle of tests, concept of failure strength, Drainage condition, pore pressure and its measurement, pore pressure parameters, Modified failure envelope. Liquefaction and effect of soil shaking. Shear</p> <p>Stability of Slopes: Causes and types of slope failure, stability analysis of infinite slopes and finite slopes, center of critical slip circle, slices method for homogeneous $c-\phi$ soil slopes with pore pressure consideration. Taylor's stability numbers & stability charts, methods of improving stability of slopes, types, method of improving stability of slopes.</p> <p>Lateral Earth Pressure: Earth pressure at rest, active & passive pressure, General & local states of plastic equilibrium in soil. Rankine's and Coulomb's theories for earth pressure. Effects of surcharge, submergence. Rebhann's criteria for active earth pressure. Graphical construction by Poncelet and Culman for simple cases of wall-soil system for active pressure condition.</p> <p>Ground Improvement : Methods of soil stabilization use of admixtures (lime, cement, flysh) in stabilization. Basic concepts of reinforced earth, use of geosynthetic materials Salient features, function and applications of various geosynthetic materials.</p> <p>Bearing capacity of soils: Terzaghi's theory, its validity and limitations, bearing capacity factors, types of shear failure in foundation soil, effect of water table on bearing capacity, correction factors for shape and depth of footings. Bearing capacity estimation from N-value, factors affecting bearing capacity, presumptive bearing capacity.</p> <p>Settlement of shallow foundation: causes of settlement, elastic and consolidation settlement differential settlement, control of excessive settlement. Proportioning the footings for equal settlement. Plate load test: Procedure, interpretation for bearing capacity and settlement prediction.</p> <p>Pile Foundation: Classification of piles, constructional features of cast-in-situ & pre cast concrete piles. Pile driving methods, effect of the driving on ground. Load transfer mechanism of axially loaded piles. Pile capacity by static formula and dynamic formulae, pile load test and interpretation of data, group action in piles, spacing of piles in groups, group efficiency, overlapping of stresses. Settlement of pile group by simple approach, negative skin friction and its effect on pile capacity, general feature of under reamed piles</p> <p>Geotechnical Exploration: Importance and objectives of field exploration, principal methods of subsurface exploration, open pits & shafts, types of boring, number, location and depth of boring for different structures, type of soil samples and samplers. Principles of design of samplers, collection and shipment of samplers, boring and sampling record. Standard penetration test, corrections to N-values & correlation for obtaining design soil parameters.</p>

Head of the Department of **CIVIL ENGINEERING**

Course No.	CEL402	Open course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title	ESTIMATING, COSTING & CONTRACTS				
Course Coordinator	Prof S. R. Dongre				
Slot in which offered. If not offered write N	Odd		Even		
	E				
Structure	Lecture	Tutorial	Practical	Credits	
	3	0	2	8	
Prerequisite Course Codes As per proposed Course Numbers	Building Drawing				
Prerequisite credits					
Equivalent Course Codes. As per proposed courses and old courses	CEL367 ESTIMATING, COSTING & CONTRACTS				
Overlap course codes As per proposed Course Numbers	CEL367 ESTIMATING, COSTING & CONTRACTS				
Text Book (Max. 2)	Title	Estimating ,Costing & Contracts			
	Author	Rangawala S.C.,			
	Publisher	Chortor Publications			
	Edition	2004			
	Title	Estimating and Costing in Civil Engineering			
	Author	Dutta B.N.			
	Publisher	UBS Publication			
	Edition	2004			
Reference Books	Title	Estimating & Costing			
	Author	M.Charborty,			
	Publisher	Authors Publication Kolkatta			
	Edition	1998			
	Title	Red Book of PWD			
	Author				
	Publisher				
	Edition				
	Title				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
	Publisher				

	Edition	
	Title	
	Author	
	Publisher	
	Edition	
Content	<ol style="list-style-type: none"> 1. Estimate and Estimating: Purposes of Estimating, Types of Estimates, Methods of Building Estimates, Units of Measurement of Various Items. Methods of Detailed Estimates, Detailed Estimation of civil Engineering Works: Building (Load Bearing and RCC Framed Structures), Culverts, Hydraulic Structures and Water Supply and Sanitary Works and Road Works. 2. Specifications: Definition, Objectives, Use, Types, Classification, Design of Specifications, Principles of Specification Writing, Sources of Information and Typical Specifications. 3. Contracts: Definition, Essential Requirements, Trade usages, Forms of contract, Termination of Contracts, Labour Contract Negotiated Contracts, Schedule of Prices Contracts, Package Deal Contracts, Demolition Contracts, Responsibilities of the Engineer, Contractor and Owner, Earnest Money and Security Deposits, Mobilization Fund, Tender, Opening of Tenders, Scrutiny of Tenders, Acceptance of Tender, Revocation of Tender, Tender form, Unbalance Tender, Liquidated Damages, Advertisement, contract Documents, Qualification of Contractors, Direct and Indirect Costs, Basic price Contracts. Conditions of Contract: Definition, Object, Importance, Peculiarities, General Provisions, Typical Clauses of the Conditions of Contract, Conditions of Contract in Outlines. 4. Rate Analysis: Purposes of Rate Analysis, Factors affecting, importance, Schedule of Rates, Task works per Day, Rate analysis of typical Items. 5. Valuation: Purposes, Cost, Price and Value, Forms of Value, Classification of Property, Freehold and Leasehold Properties, Sinking Fund, Amortization, Depreciation and Obsolescence, Outgoings, Gross Income and Net Income, Capitalized value, Deferred Land Value, Year's Purchase, Rate of Interest, Mortgage, Legal Mortgage, Accommodation Land and Accommodation Works, Annuity, Land Valuation, Methods of Land Valuation, Rent fixation. 6. P.W.D. Accounts and Procedure for Works: Organization of Engineering Department, Works, Classification of Works, Methods of Carrying out Works, Measurement Book, Stores, Stock, Issue Rates, Tools and Plants, Mode of Payment, Public Works Account, Power of Sanction, Duties of Overseers Travelling Allowances. 	
Course No.		

Course No.	CEL305	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)
Course Title	<u>Design of RCC Structures</u>			
Course Coordinator	Dr. A. D. Pofale			
Slot in which offered. If not offered write N	Odd	Even		
		H		
Structure	Lecture	Tutorial	Practical	Credits
	3	0	0	6
Prerequisite Course Codes As per proposed Course Numbers	AM** Structural Analysis & 3CE***Concrete Engineering			
Prerequisite credits				
Equivalent Course Codes. As per proposed courses and old courses	461 Structural Design II (RCC)			
Overlap course codes As per proposed Course Numbers	461 Structural Design II (RCC)			
Text Book (Max. 2)	Title	Limit state design of Reinforced Concrete Structures		
	Author	Varghese P.C.;		
	Publisher	Prentice Hall of India		
	Edition	1999		
	Title	Limit State Theory and Design of Reinforced Concrete.		
	Author	Karve S.R.& Shah V.L		
	Publisher	Structures Publications, Pune.		
	Edition	2007.		
Reference Books	Title	Reinforced Concrete Design,		
	Author	S.U.Pillai ,D.Menon:		
	Publisher	Tata Mcgraw-Hill Publishing Company New Delhi		
	Edition	2003.		
	Title	Limit state Design		
	Author	Ramchandra.		
	Publisher	Standard Book House		
	Edition	1990		
	Title	I.S.456-2000: Plain and reinforced concrete, Code of Practice,		
	Author			
	Publisher	Bureau of Indian Standards		
	Edition	2000		
	Title	I.S.3370-1967: Part I, II and Part IV, Code of Practice for Concrete structures for storage of liquids.		

	Author	
	Publisher	Bureau of Indian Standards
	Edition	1967
	Title	S.P. (16): Design Aids for Reinforced Concrete. (Interaction Charts Only)
	Author	
	Publisher	Bureau of Indian Standards
	Edition	1980
Content	<ol style="list-style-type: none"> 1. Limit state Design Concept; Partial safety factors, load factors, stress-strain relationship, stress block parameters, failure criteria, Use of I.S. 456-2000, Limit state of collapse in flexure : Design of one way single span and continuous slabs, canopies and two way slabs with various end conditions using IS code coefficients. Analysis and Design of Singly and Doubly reinforced Beams, “T” and “L” beams. 2. Moment redistribution: Analysis and design of fixed beams, propped cantilever, two span symmetric continuous beams. Limit State of collapse in shear, Bond and Torsion, Design for Interaction between Bending moment, Torsional moment and Shear. Limit state of serviceability: Deflection and moment curvature relationship, for beams and one-way slabs. 3. Limit state of collapse under compression: Axially loaded short and long column, column with axial load, uniaxial and biaxial moment, Interaction diagram / Charts. Isolated footing for axially loaded columns, Uniaxial bending, combined footing: Rectangular footing, Strap beam, Trapezoidal, raft etc. 4. Analysis and design of portal frames (single bay single storey) hinged or fixed at base. Design of Cantilever & Counterfort Retaining Walls. 5. Design of Dog legged and Open Well Staircase. 6. Design of Circular and Rectangular water tank with roof slab / dome resting on ground by approximate method. (Using Working Stress Method) 	
Course No.		

Course No.	CEL404	Open course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title	Railways Airport and docks and harbour				
Course Coordinator	Dr. Vishrut Landge				
Slot in which offered. If not offered write N	Odd		Even		
			D		
Structure	Lecture	Tutorial	Practical	Credits	
	3	0	0	6	
Prerequisite Course Codes As per proposed Course Numbers	Transportation Engineering				
Prerequisite credits					
Equivalent Course Codes. As per proposed courses and old courses					
Overlap course codes As per proposed Course Numbers					
Text Book (Max. 2)	Title	Railway Engineering			
	Author	Saxena;			
	Publisher				
	Edition				
	Title	Airport System Planning, Design and Management			
	Author	Richard de Neufville & Amedeo Odoni			
	Publisher	McGraw Hill Book Company			
	Edition				
	Title	Dock and harbour Engineering			
	Author	Oza H.P., Oza G.H.			
	Publisher	Charotar			
	Edition				
Reference Books	Title	Railroad Engineering, 2nd Edition			
	Author	William W. Hay			
	Publisher	John Willey & Sons			
	Edition				
	Title	Docks harbour and tunnels engineering			
	Author	Srivastav R.			
	Publisher	Charoter			
	Title	Airport Planning & Design			
	Author	Goyal & Praveen Kumar			
	Publisher	Galgotia Publication			
	Title				

	Author	
	Publisher	
	Title	
	Author	
	Publisher	
	Title	
	Author	
	Publisher	
Content	<p>Railways</p> <ol style="list-style-type: none"> 1. Railway Transportation and its development, Long term operative plans for Indian Railways. Classification of Railway lines and their track standards, Railway terminology, Railway Administration and Management. Traction and tractive Resistance, Hauling capacity and tractive effort of locomotives, different Types of Tractions. Permanent Way: Alignment Surveys, Requirement, gauges, track section, Coning of wheels, Stresses in railway track, high speed track. 2. Rail types and functions, selection of rails, Test on rails wear & defects, corrugations and creep of rails. Rail joints short and long welded panels. Sleepers – functions, types, merits and demerits, sleeper density. Ballast cushion, Ballast section Rail fixtures and fasteners. Geometric design of railway track, Gauge, Gradient, speed, super elevation, cant deficiency, Negative super elevation, curves, length of transition curves, grade compensations. 3. Points & crossings : Left and right hand turnout, design calculation for turnout & Crossover, railway track Junctions. Stations and Yards : Types, functions facilities & equipment. Railway signaling and interlocking : Objects and principles of signaling classification and types of signals, control and movement of trains, track circuiting. Necessity of interlocking, methods and mechanical devices. Railway track construction, Inspection & modern, techniques of maintenance. RDSO standards. Modern Technology related to track & traction, Rolling Stock, Signaling and Controlling. <p>Airports</p> <ol style="list-style-type: none"> 4. Development of Air Transportation in India : Comparison with other transportation modes. Aircraft components and characteristics, Airport site election. Modern aircraft's. Airport obstructions: Zoning Laws, Imaginary surfaces, Approach and Turning zone, clear zone, vert. Clearance for Highway & Railway. 5. Runway and taxiway design : Windrose, cross wind component, Runway Orientation and configuration. Basic runway length and corrections, runway geometric design standards. Taxiway Layout and geometric design standards. Exit Taxiways. Airport layout Airport classification: Terminal Area, Aircraft parking and parking system. Unit terminal concept, Gates space standards, Aprons, Hangers, International Airports layouts, phase development Helipads, and Heliports. Visual Aids: Airport marking and Lighting for runway, Taxiway and other areas. Air traffic control : Need, Network, control aids, Instrumental landing systems, Advances in Air-traffic control. <p>Docks and Harbour:</p>	

	Importance, Sea and tides, tidal theories, tide table, wind waves and Cyclones, harbour layout, break waters, jetties and moorings,
Course No.	

Department: Civil Engineering

Course No.:	CEL403	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)
Course Title: Rural Water Supply and Sanitation				
Course Coordinator: Dr. Dilip H. Lataye				
Slot in which offered, if not offered write N	Odd		Even	
	G			
Structure	Lecture	Tutorial	Practical	Credits
	3	0	0	6
Prerequisite Course Codes As per proposed Course numbers				
Prerequisite Credits				
Equivalent Course Course Codes. As per proposed Courses & old courses				
Overlap Course Codes As per proposed Course numbers				
Text Book (Max. 2)	Title	Excreta Disposal for Rural Areas and Small Communities		
	Author	E.G. Wagner and J.N. Lanoix		
	Publisher			
	Edition			
	Title	Environmental Engineering – II		
	Author	B.C.Punmia		
	Publisher	Laxmi Publication		
	Edition	2002		
Reference Books	Title	Environmental Engineering – II		
	Author	Garg S.K. ;		
	Publisher	Standard Publication		
	Edition	2002		
	Title			
	Author			
	Publisher			
	Edition			
	Title			
	Author			
	Publisher			
	Edition			

<p>Content</p>	<p>National Water Policy, Status of Rural water supply in India, National and State level programmes of RWS, Planning and implementation of rural water supply, problem village Source development, springs, dug wells, infiltration wells etc. Package water treatment plants, appropriate technology for removal of excess iron and manganese, fluoride, arsenic for drinking water, surface water treatment, slow sand filtration, disinfection in RWS. Guidelines for Design of RWS, Types of RWS systems and their components, types of pipes, pumps used in RWS, Community participation in planning, design, O &M of RWS</p> <p>Low Cost Sanitation Methods, Centralised and Decentralised Methods of Rural Sanitation, Pit Privy, Aqua Privy, Water Seal Latrine, Bore-hole Latrine, bucket Latrine Feuill'ees or Trench Latrine, Overhung Latrine, Compost Privy, Chemical Toilet, Double Pit Latrine, Pour Flush Latrine, Improved Double Pit Pour Flush Latrine, Septic Tank, design of Septic Tank, disposal of Septic tank effluent. Water Carried Methods of Excreta Disposal for Rural Areas, Excreta Disposal Programmes for Rural Areas Composting, Methods of Composting, Indore Method, Bangalore Method, NADEP Method, Vermicomposting Method, biodung Vermicomposting, Gobar Gas Plant, Sulabh Sauchalaya. Role of NGO's and GO's in Rural Sanitation Community Participation in Rural Sanitation.</p>
<p>Course No.</p>	

Course No.	CEL401			
Course Title	Irrigation Engineering			
Course Coordinator	Prof. D. J. Katyayan			
Slot in which offered. If not offered write N	Odd		Even	
			H	
Structure	Lecture	Tutorial	Practical	Credits
	3	0	2	8
Prerequisite Course Codes As per proposed Course Numbers				
Prerequisite credits				
Equivalent Course Codes. As per proposed courses and old courses				
Overlap course codes As per proposed Course Numbers				
Text Book (Max. 2)	Title	Irrigation Engineering		
	Author	Garg Santosh Kumar ;		
	Publisher	Khanna Publishers, New Delhi		
	Edition	2002		
	Title	Irrigation Engineering		
	Author	Aasawa G L		
	Publisher	Wiley Eastern Ltd.		
	Edition	1996		
Reference Books	Title	Engineering for Dams;		
	Author	Creager, Justin, Hinds;		
	Publisher			
	Edition	1995		
	Title	Design of Small Dams		
	Author			
	Publisher	U. S. B. R. Publication		
	Edition	1960		
	Title			
	Author			
	Publisher			
	Edition			
	Title			
	Author			
Publisher				
Edition				

<p>Content</p>	<p>General : Necessity and importance, scope and development of Irrigation in India, Classification of Irrigation, Comparative study of different irrigation systems</p> <p>Quality of irrigation water, salt constituents and their effects, Soil moisture – Consumptive use, water requirements of crops Duty-Delta-Base period-Factors affecting duty – Duty for principal types of crops grown in India, reclamation of saline soil.</p> <p>Reservoir Planning & Management: Investigation-Selection of site – Detail surveys to be conducted and data collection– Determination of field and storage capacity – Determination of L.S.L. and F.R.L. of reservoir sedimentation B-C ratio</p> <p>Dams: Different types and their suitability – Factors governing the selection of type of dam for project.</p> <p>Gravity Dam: Forces acting on a gravity dam (including seismic load) – Stability requirement, Design & Construction aspects.</p> <p>Earthen Dams: Types of Earthen Dams – Factors and general Principles to be considered in the design.</p> <p>Failures of Earthen Dams – Seepage and drainage arrangement</p> <p>Weirs :Different types of weirs – Spillways – General principles of design – types, spillway gates – energy dissipation downstream of spillway.</p> <p>Different types of diversion weirs – Component parts of diversion headworks. Causes of failures of diversion, weirs – Weirs on permeable foundation with design principles. Blighs Creep theory, Khosla's Theory, River Training, Guide banks, Groynes and spurs</p> <p>Irrigation Canals: Types – Design Principles of channels – water losses, sediments and their effects upon stream regime. Reservoir silting silt supporting theory, design of channel in alluvial soils based on silt theories – silt exclusion – silt control. Lining of canals, Water Logging & its Prevention: Drainage of land, methods.</p> <p>Types ,description of Canal Structures</p> <p>Cross Drainage Works : Types & general principles</p>
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Department: Civil Engineering

Course No.:	CEL417	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title: Hazardous Waste Management					
Course Coordinator: Dr. Dilip H. Lataye					
Slot in which offered, if not offered write N		Odd		Even	
				B	
Structure	Lecture	Tutorial	Practical	Credits	
	3	0	0	6	
Prerequisite Course Codes As per proposed Course numbers					
Prerequisite Credits					
Equivalent Course Course Codes. As per proposed Courses & old courses					
Overlap Course Codes As per proposed Course numbers					
Text Book (Max. 2)	Title	Hazardous Waste Management,			
	Author	M. D. LaGrega, P.L.Buckingham and J.C.Evans			
	Publisher	McGraw-Hill, Inc., New York			
	Edition	1994			
	Title	International Perspective on Hazardous Waste Management,			
	Author	W.S.Forester and J.H.Skinner			
	Publisher	Mudra Offset Printers, Bajaj Nagar Nagpur			
Edition	2001				
Reference Books	Title	Hazardous Waste Management,			
	Author	G.W.Dawson and B.W.Mercer,			
	Publisher	Academic Press, Inc., London, England			
	Edition	1987			
	Title	Standard Handbook of Hazardous Waste Treatment and Disposal			
	Author	H.M.Freeman			
	Publisher	McGraw-Hill, Inc., New York			
	Edition	1989			
	Title	Hazardous Waste Management Engineering,			
	Author	E.J.Martin and J.H.Johnson, Jr.,			
	Publisher	Van Nostrand Reinhold Co. Inc. New York.			
Edition	1987				

Content	Generation, storage, transportation, treatment, disposal, exchanges and minimization, legislative and technical aspects, current management practices; Environmental audits, pollution prevention, facility development and operations, treatment and disposal methods; physical, chemical, thermal, biological processes, land disposal with general applications to the industrial and energy-producing sectors, Site remediation. Special wastes, such as, infectious and radioactive waste.
Course No.	

Course Content Proforma				
Department: Civil Engineering				
Course No.:	CEL(HM) 425	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)
Course Title: Finance and Business Management				
Course Coordinator: Prof A.G.Tawalare				
Slot in which offered, if not offered write N	Odd		Even	
			E	
Structure	Lecture	Tutorial	Practical	Credits
	3	0	0	6
Prerequisite Course Codes As per proposed Course numbers				
Prerequisite Credits				
Equivalent Course Course Codes. As per proposed Courses & old courses				
Overlap Course Codes As per proposed Course numbers				
Text Book (Max. 2)	Title	Essentials of Management		
	Author	Harold Koontz, Heinz Wehrich		
	Publisher	Tata McGraw Hill		
	Edition	Sixth Edition		
	Title	Cost Management		
	Author	Hilton, Maher, Selto		
	Publisher	Tata McGraw Hill		
	Edition	Second Edition		
Reference Books	Title	Managerial Economics		
	Author	Yogesh Maheswari		
	Publisher	Prentice Hall India		
	Edition	Second Edition		
	Title	Management		
	Author	James A.F Stoner, R Edward Freeman, Daniel R Gilbert		
	Publisher	Prentice Hall India		
	Edition	Sixth Edition		
	Title	Financial Management		
	Author	Khan, Jain		
	Publisher	Tata McGraw Hill		
	Edition	Fourth Edition		

	<table border="1"> <tr> <td>Title</td> <td>Human Resources and Personnel Management</td> </tr> <tr> <td>Author</td> <td>Werther and Davis</td> </tr> <tr> <td>Publisher</td> <td>Tata McGraw Hill</td> </tr> <tr> <td>Edition</td> <td>1996</td> </tr> </table>	Title	Human Resources and Personnel Management	Author	Werther and Davis	Publisher	Tata McGraw Hill	Edition	1996
Title	Human Resources and Personnel Management								
Author	Werther and Davis								
Publisher	Tata McGraw Hill								
Edition	1996								
Content	<p>Principles of management and Personnel management: Economic environment of business, Introduction to managerial economics; Role of a Manager: Tasks and responsibilities of a professional manager, Human Resource development systems, organization structure, manpower planning, Managerial skills and Management Systems, SWOT Analysis.</p> <p>Business Policy and Strategic Management; Assessment of capital requirement and sources of capital, fixed and current assets, liquid resources, Forecasting of business, cash flow, sources of finance, cost of capital, capital structures.</p> <p>Quality assurance, marketing planning, marketing research & Marketing strategies, determinants & Models of consumer behavior, Pricing & promotion strategies, Business forecasting. Modern Control Systems, Total quality Management (TQM), DSS, ERP, Technological innovation & R &D.</p> <p>Financial Management; Meaning and Scope, Economics and Scope, Supply and Demand Mechanism, analysis and forecasting. Balance sheet, profit & loss account, financial statements; Production and Cost theory, Pricing; Financial analysis, Capital Budgeting, budgetary control, international finance.</p> <p>Accounting information and application, Financial versus economic evaluation, and project appraisal. Taxation and inflation, risk and uncertainty, bidding and awards, cost elements of contracts.</p>								
Course No.									

Head of The Department of Civil Engineering

Course No.	CEL419	Open course (Y/N)	HM course (Y/N)	Discontinued (Y/N)	
Course Title	River Engineering				
Course Coordinator	Dr A D Ghare				
Slot in which offered. If not offered write N	Odd		Even		
			G		
Structure	Lecture	Tutorial	Practical	Credits	
	3	0	0	6	
Prerequisite Course Codes As per proposed Course Numbers	Fluid Mechanics II				
Prerequisite credits					
Equivalent Course Codes. As per proposed courses and old courses					
Overlap course codes As per proposed Course Numbers					
Text Book (Max. 2)	Title	Mechanics of Sediment Transportation and Alluvial Stream Problems			
	Author	Garde R J and Ranga Raju K G			
	Publisher	Wiley Eastern Ltd.			
	Edition	1985			
	Title	Sediment Transport- Theory and Practice			
	Author	Yang C.T.			
	Publisher	The McGraw Hill Companies Inc.			
	Edition	1996			
Reference Books	Title	Fluvial Processes in River Engineering			
	Author	Chang H.H.			
	Publisher	John Wiley			
	Edition	1988			
	Title	Sediment Transport Technology			
	Author	Simons D.B. and Senturk F.			
	Publisher	Water Resources Publications, Fort Collins, Colorado			
	Edition	1977			
	Title				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
Publisher					
Edition					
Title					

	Author	
	Publisher	
	Edition	
	Title	
	Author	
	Publisher	
	Edition	
Content	<p>Origin and properties of sediments : Nature of sediment problems , origin and formation of sediments , properties of sediments , incipient motion of sediment particles , tractive force approach, cohesive materials.</p> <p>Regimes of flow : Description of regimes of flow , ripple , dune , antidune , prediction of regimes of flow.</p> <p>Resistance to flow & velocity distribution in alluvial streams : velocity distribution in turbulent flow over rough boundaries, resistance and velocity distribution in alluvial streams.</p> <p>Bed load transport & saltation : Bed load equations, bed load equations based upon dimensional considerations and semi-theoretical equations, general comments on bed load equations , saltation..</p> <p>Suspended load transport : Mechanism of suspension, equation of diffusion , sediment distribution equation , relations for suspended load, wash load , transport of suspended sediment.</p> <p>Total load transport : sediment samplers design of canals carrying sediment laden water</p> <p>Types of sediment samplers</p> <p>Design of channels carrying sediment laden water</p> <p>Sediment transport through pipes</p>	
Course No.	CEL4xx	

COURSE CONTENT PROFORMA

Course No.	CEL310	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)		
Course Title		Energy Efficient Buildings				
Course Coordinator		Dr. Rahul V. Ralegaonkar				
Slot in which Offered		ODD		EVEN		
		H				
Structure		Lecture	Tutorial	Practical	Credits	
		3	1	0	8	
Prerequisite Course Codes						
Prerequisite Credits						
Equivalent course Codes						
Overlap Course Codes						
Text Books		Title	Energy Efficient Buildings In India			
		Author	Mili Majumdar			
		Publisher	Tata Energy Research Institute			
		Edition				
		Title	Energy-Efficient Building Systems			
		Author	Lal Jayamaha			
		Publisher	McGraw Hill Publication			
		Edition				
Reference Books		Title	Solar Energy Fundamentals & Applications			
		Author	H P Garg, J Prakash			
		Publisher	Tata MacGraw Hill Publishing			
		Edition				
		Title	Solar Energy and thermal processes			
		Author	J A Duffie & W A Beckman			
		Publisher	John Wiley			
		Edition				
		Title	Solar Energy Applications in Buildings			
		Author	A A M Sayigh			
		Publisher	Academic Press			
		Edition				
		Title				
Author						
Publisher						
Edition						

Content	<p>Theory:</p> <ol style="list-style-type: none"> 1. Conservation & energy efficiency concepts-overview of significance of energy use and energy processes in buildings 2. Passive solar energy fundamentals & practices in building design- solar astronomical relations and radiation physics and measurements, human thermal comfort, climatological factors, material specifications and heat transfer principles. 3. Passive solar energy practice in building design- design decisions in building-location, orientation, form, material, Thermal performance evaluation 4. Passive Solar technologies- trombe wall, thermosiphoned mass wall, water wall, sunspaces, roof ponds, glazed windows, cool towers, under slab rock beds 5. Design Guidelines & Economic Optimization- Concept of cost/benefit of energy conservation & passive solar technologies 6. Advances in computational energy conservation- implementation of computer energy simulation programs into solar designs.
Course No.	

Course No.	CEL 405	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)
Course Title	INDUSTRIAL WASTE WATER TREATMENT, RECYCLING AND REUSE			
Course Coordinator	Dr. A. R.Tembhurkar			
Slot in which offered. If not offered write N	Odd		Even	
	-		E	
Structure	Lecture	Tutorial	Practical	Credits
	3	0	0	6
Prerequisite Course Codes As per proposed Course Numbers	Environmental Engg - I			
Prerequisite credits				
Equivalent Course Codes. As per proposed courses and old courses	CEL454			
Overlap course codes As per proposed Course Numbers				
Text Book (Max. 2)	Title	Theories and Practices of Industrial Waste Treatment		
	Author	Nemerow N.L		
	Publisher	Addison Wesley Publishing CO. NY.		
	Edition	2 nd		
	Title	Industrial Water Pollution Control		
	Author	W.W.Ecenfelder		
	Publisher	Mc-Graw Hill Book Co.		
	Edition	2 nd		
Reference Books	Title	Industrial Pollution Prevention Handbook		
	Author	Freeman H. M.		
	Publisher	McGraw Hill		
	Edition	1 st		
	Title	Comprehensive Industry Document Series		
	Author	Central Pollution Control Board, India		
	Publisher			
	Edition			
	Title	The Treatment of Industrial Waste		
	Author	E.B. Besselievre		
	Publisher	Mc-Graw Hill Book Co.		
	Edition	1 st		

Content	<p>Industrial pollution and its measurement; Generation of Industrial wastewater, Disposal standards; Quantification and characterization of wastewater and its variations; Environmental impacts due to discharge of wastewater on streams, land and sewerage system; Industrial waste survey; Stream sanitation, stream sampling, Stream survey; Principles and techniques for Industrial Pollution prevention and control; Waste minimization; recent trends in industrial waste management, Cleaner technologies; Reuse, Recycling and Resource recovery; Volume and strength reduction; Equalization and proportioning; Neutralization; Methods of Disposal and treatment for removal of organic, inorganic, solids, pathogens, heavy metals and other pollutants; Alternatives and Synthesizing industrial waste treatment system; Joint treatment of industrial waste; CETP; Pollution control measures and Treatment of wastes from various industries viz. Pulp and paper, tanning, Sugar, Dairy, Chemical, Cement, Petroleum, Fertilizers, Metal Finishing, Etc.</p>
Course No.	CEL 405

Course No.	CEL420	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title	Earthen Dams				
Course Coordinator	Dr. A. D. Vasudeo				
Slot in which offered. If not offered write N	Odd		Even		
			B		
Structure	Lecture	Tutorial	Practical	Credits	
	3	1	0	8	
Prerequisite Course Codes As per proposed Course Numbers	Irrigation Engineering				
Prerequisite credits					
Equivalent Course Codes. As per proposed courses and old courses					
Overlap course codes As per proposed Course Numbers					
Text Book (Max. 2)	Title	Earth and Rock Fill dams			
	Author	Sower & Sally			
	Publisher	Asia publishing house			
	Edition				
	Title	Engineering for Dams			
	Author	Creager, Justine, Hinds			
	Publisher	John Wiley & Sons			
	Edition				
	Reference Books	Title	U. S. B. R. Design of Small Dams,		
		Author			
Publisher		IBH Publisher			
Edition					
Title					
Author					
Publisher					
Edition					
Title					
Author					
Publisher					
Edition					
Title					
Author					
Publisher					
Edition					

	Title	
	Author	
	Publisher	
	Edition	
	Title	
	Author	
	Publisher	
	Edition	
Content	<p>Introduction, types and advantages of embankment dams</p> <p>Factors affecting the designs of Embankment Dams, Safety criteria.</p> <p>Theoretical Analysis of seepage through embankment and its application. Control of seepage through embankment dams.</p> <p>Stability analysis including seismic stability.</p> <p>Construction aspects.</p> <p>Instrumentation in dams. Typical problems and their solutions in embankment dams. Rockfill dams.</p>	
Course No.	CEL4xx	

Course No.	CEL407	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title	Construction Finance				
Course Coordinator	Prof S.P.Wanjari				
Slot in which offered. If not offered write N	Odd		Even		
	G				
Structure	Lecture	Tutorial	Practical	Credits	
	3	0	0	6	
Prerequisite Course Codes As per proposed Course Numbers					
Prerequisite credits					
Equivalent Course Codes. As per proposed courses and old courses					
Overlap course codes As per proposed Course Numbers					
Text Book (Max. 2)	Title				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
	Publisher				
	Edition				
Reference Books	Title	Modern Construction Management			
	Author	Frunk Harris & Ronald McCaffer			
	Publisher	Blackwell Science			
	Edition				
	Title	Principles of Construction Management			
	Author	Roy Picher			
	Publisher	McGraw Hill Window			
	Edition				
	Title	Guidelines for Project Evaluation			
	Author	United Nation			
	Publisher	Oxford & IBH Publishing			
	Edition	New Delhi			
	Title	Finance & Cost Accounting for Management			
	Author	A.H.Taylor H.Shearing			
	Publisher	Macdonald Evans London			
	Edition	8 th Edition			

	Title	
	Author	
	Publisher	
	Edition	
	Title	
	Author	
	Publisher	
	Edition	
Content	<ol style="list-style-type: none"> 1. Engineering economics - Time value of money, discounted cash flow, decision making among the alternatives, replacement analysis, break even analysis. 2. Project capital: Cash flow of a project, estimation of minimum capital required, internal rate of return (IRR), Multiple IRR, estimation of annualized cost. 3. Depreciation : importance, classification, types – straight line, sum of year method, double rate declining balance method 4. Capital Budgeting: element of budgeting – men, materials, equipments, overhead, profits – preparation of capital budget. 5. Performance statement: capital gearing ratio, shares, debentures, PBT, PAT, PBIT, Earning per share, preparation of company's performance statement, Inflation. 6. Accounting: Basic of site accounting fixed and current assets liquid resources, balance sheet, profit & loss account, fund flow statement, working capital 	
Course No.	CEL407	

Course No.	CEL411	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)		
Course Title	Geotechnical Engineering					
Course Coordinator	D J Katyayan					
Slot in which offered. If not offered write N	Odd		Even			
	N		N			
Structure	Lecture	Tutorial	Practical	Credits		
	3	0	0	6		
Prerequisite Course Codes As per proposed Course Numbers	Soil Mechanics Foundation Engineering					
Prerequisite credits						
Equivalent Course Codes. As per proposed courses and old courses						
Overlap course codes As per proposed Course Numbers	-	-	-	-		
Text Book (Max. 2)	Title	Soil Mechanics in Theory & Practice				
	Author	Alam Singh				
	Publisher	Asia Publishing House				
	Edition	1975 & later				
	Title	Geotechnical Engineering				
	Author	S. K. Gulhati & Manoj Dutta				
	Publisher	Tata McGraw-Hill				
	Edition	2005				
	Reference Books	Title	Geotechnical Engineering			
		Author	Purushothama Raj			
Publisher		Tata McGraw Hill Publishing Co. Ltd.				
Edition		1995				
Title		Soil Mechanics & Foundation Engg				
Author		Punmia B.C.				
Publisher		Laxmi Publication Pvt. Ltd, New Delhi,				
Edition		1994				
Title		Geotechnical Engineering				
Author		C. Venkatramaiah				
Publisher		New Age International Ltd.				
Edition		(Second Edition) 1995				
Title		Basic & Applied Soil Mechanics				
Author		Gopal Ranjan & A.S. RAO,;				
Publisher		New Age International Ltd,				
Edition	2004.					
Content	1. Clay minerology : Concept of composition classification and					

	<p>nomenclature, structure of clay minerals, Kaolinite Illite, Montmorillonite groups physical properties, clay water relation thixotrophy electrical effects, electrosmosis, streaming potential Zeta potential.</p> <ol style="list-style-type: none"> 2. Drainage and Dewatering : Various systems of and there Graded filters and design Criteria applications of Geomembranes. 3. Expansive Soils : Identification and classification Measurement of swelling pressure (vertical) and potential Foundation problems, different types of foundation design principles Latest technique to tackle expansive nature. 4. Compaction & field compaction and controls : Mechanics, Lab & Fd. Tests, Fd. Compaction equipments & these choice and suitability, quality control, Deep compaction, Vibro floatation. 5. Consolidation : Terzaghi's theory for two & three dimensional consolidation field and laboratory tests. Consolidation settlements and drains. 6. Soil stabilization, Mechanical and Chemical stabilization, Lab. & Investigations, Field Techniques, Advanced Techniques in Geotextile applications, Stone columns and Gabions. 7. Case studies of Applications
Course No.	

Course No.	CEL301			
Course Title	FOUNDATION ENGINEERING			
Course Coordinator	D J Katyayan			
Slot in which offered. If not offered write N	Odd		Even	
	N		Y	
Structure	Lecture	Tutorial	Practical	Credits
	3	1	0	8
Prerequisite Course Codes As per proposed Course Numbers	Soil Mechanics			
Prerequisite credits				
Equivalent Course Codes. As per proposed courses and old courses				
Overlap course codes As per proposed Course Numbers	-	-	-	-
Text Book (Max. 2)	Title	Soil Mechanics in Theory & Practice		
	Author	Alam Singh		
	Publisher	Asia Publishing House		
	Edition	1975 & later		
	Title	Geotechnical Engineering		
	Author	S. K. Gulhati & Manoj Dutta		
	Publisher	Tata McGraw-Hill		
	Edition	2005		
Reference Books	Title	Geotechnical Engineering		
	Author	Purushothama Raj		
	Publisher	Tata McGraw Hill Publishing Co. Ltd.		
	Edition	1995		
	Title	Soil Mechanics & Foundation Engg		
	Author	Punmia B.C.		
	Publisher	Laxmi Publication Pvt. Ltd, New Delhi,		
	Edition	1994		
	Title	Geotechnical Engineering		
	Author	C. Venkatramaiah		
	Publisher	New Age International Ltd.		
	Edition	(Second Edition) 1995		
	Title	Basic & Applied Soil Mechanics		
	Author	Gopal Ranjan & A.S. RAO,;		
Publisher	New Age InternationalLtd,			
Edition	2004.			
	Title	Soil Mechanics & Foundation Engg.		
	Author	Arora K.R.		
	Publisher	Standard Publishers Distributors, Delhi,		
	Edition	1989 & later		

Content	<ol style="list-style-type: none"> 1. Shear Strength: General principle of tests, concept of failure strength, Drainage condition, pore pressure and its measurement, pore pressure parameters, Modified failure envelope. Liquefaction and effect of soil shaking. Shear Strength of Cohesionless & cohesive soils. 2. Stability of Slopes: Causes and types of slope failure, stability analysis of infinite slopes and finite slopes, centre of critical slip circle, slices method for homogeneous $c-\phi$ soil, slopes with pore pressure consideration. Taylor's stability numbers & stability charts, methods of improving stability of slopes. 3. Lateral Earth Pressure: Earth pressure at rest, active & passive pressure, General & local states of plastic equilibrium in soil. Rankine's and Coulomb's theories for earth pressure. Effects of surcharge, submergence. Rebhann's criteria for active earth pressure. Graphical construction by Poncelet and Culman for simple cases of wall-soil system for active pressure condition. 4. Ground Improvement: Methods of soil stabilization use of admixtures (lime, cement, fly-ash) in stabilization. Basic concepts of reinforced earth, use of geo-synthetic materials, Salient features, function and applications of various geo-synthetic materials. 5. Bearing capacity of soils: Terzaghi's theory, its validity and limitations, bearing capacity factors, types of shear failure in foundation soil, effect of water table on bearing capacity, correction factors for shape and depth of footings. Bearing capacity estimation from N-value, factors affecting bearing capacity, presumptive bearing capacity. Settlement of shallow foundation: causes of settlement, elastic and consolidation settlement, differential settlement, control of excessive settlement. Proportioning of footings for equal settlement. Plate load test: Procedure, interpretation for bearing capacity and settlement prediction. 6. Pile Foundation: Classification of piles, constructional features of cast-in-situ & pre cast concrete piles. Pile driving methods, effect of the driving on ground. Load transfer mechanism of axially loaded piles. Pile capacity by static formula and dynamic formulae, pile load test and interpretation of data, group action in piles, spacing of piles in groups, group efficiency, overlapping of stresses. Settlement of pile group by simple approach, negative skin friction and its effect on pile capacity, general feature of under reamed piles. 7. Geotechnical Exploration: Importance and objectives of field exploration, principal methods of subsurface exploration, open pits & shafts, types of boring, number, location and depth of boring for different
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	structures, type of soil samples and samplers. Principles of design of samplers, boring and sampling record. Standard penetration test, corrections to N-values & correlation for obtaining design soil parameters.
Course No.	

Course No.	CEL307	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title	Project Planning and Management				
Course Coordinator	Prof S.P. Wanjari				
Slot in which offered. If not offered write N	Odd		Even		
	F				
Structure	Lecture	Tutorial	Practical	Credits	
	3	0	0	6	
Prerequisite Course Codes As per proposed Course Numbers					
Prerequisite credits					
Equivalent Course Codes. As per proposed courses and old courses					
Overlap course codes As per proposed Course Numbers					
Text Book (Max. 2)	Title	Construction Management			
	Author	P G. Gahoit & B.M. Dhis			
	Publisher	New age international (p) Ltd			
	Edition				
	Title	CPM & PERT			
	Author	Srinath L			
	Publisher	East-West Press Pvt. Ltd New Delhi,			
	Edition				
Reference Books	Title	Modern Construction Management			
	Author	Frank Harris & Ronald Mc.Caffer			
	Publisher	Blacknell Suence			
	Edition	4 th Edition			
	Title	Quantitatic Techniques in Management			
	Author	N.D. Vorer			
	Publisher	Tata McGraw Hill, New Delhi,			
	Edition	3 rd Edition			
	Title				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
Publisher					
Edition					

	Title	
	Author	
	Publisher	
	Edition	
	Title	
	Author	
	Publisher	
	Edition	
Content	<p>1.Introduction: Significance of construction management, objectives & function, resources, and stages in construction, construction team.</p> <p>2. Project planning: Bar charts, CPM and PERT analysis, line of balance method. Resources levelling.</p> <p>3. Construction safety: Importance of safety, safety measures, accident cost and its prevention. National safety Council.</p> <p>4. Materials management: Functions and objective, Inventory control, EOQ , ABC analysis .</p> <p>5. Equipment Management : Classification, selection, operation & maintenance, depreciation & replacement cost, cost of owning.</p> <p>Equipment of major projects : Excavating Machines (Shovels, draglines, Bulldozer, Scrapper), Drilling & blasting, transporting & Handling equipment (Cranes, Hoists, Conveyor belts, Dumpers, Cableways). Shotcreting, Guniting, Concrete equipments : Mixers, vibrators, batch mixing plants.</p>	
Course No.		

Course No.	3CEL-305				
Course Title	<u>Design of RCC Structures</u>				
Course Coordinator	Dr. A. D. Pofale				
Slot in which offered. If not offered write N	Odd		Even		
	N		6 th		
Structure	Lecture	Tutorial	Practical	Credits	
	3	0	0	6	
Prerequisite Course Codes As per proposed Course Numbers	AM** Structural Analysis & 3CE***Concrete Engineering				
Prerequisite credits					
Equivalent Course Codes. As per proposed courses and old courses	461 Structural Design II (RCC)				
Overlap course codes As per proposed Course Numbers	461 Structural Design II (RCC)				
Text Book (Max. 2)	Title	Limit state design of Reinforced Concrete Structures			
	Author	Varghese P.C.;			
	Publisher	Prentice Hall of India			
	Edition	1999			
	Title	Limit State Theory and Design of Reinforced Concrete.			
	Author	Karve S.R.& Shah V.L			
	Publisher	Structures Publications, Pune.			
	Edition	2007.			
	Reference Books	Title	Reinforced Concrete Design,		
		Author	S.U.Pillai ,D.Menon:		
Publisher		Tata Mcgraw-Hill Publishing Company New Delhi			
Edition		2003.			
Title		Limit state Design			
Author		Ramchandra.			
Publisher		Standard Book House			
Edition		1990			
Title		I.S.456-2000: Plain and reinforced concrete, Code of Practice,			
Author					
Publisher		Bureau of Indian Standards			
Edition		2000			
		Title	I.S.3370-1967: Part I, II and Part IV, Code of Practice for Concrete structures for storage of liquids.		
	Author				

	Publisher	Bureau of Indian Standards
	Edition	1967
	Title	S.P. (16): Design Aids for Reinforced Concrete. (Interaction Charts Only)
	Author	
	Publisher	Bureau of Indian Standards
	Edition	1980
Content	<ol style="list-style-type: none"> 1. Limit state Design Concept; Partial safety factors, load factors, stress-strain relationship, stress block parameters, failure criteria, Use of I.S. 456-2000, Limit state of collapse in flexure : Design of one way single span and continuous slabs, canopies and two way slabs with various end conditions using IS code coefficients. Analysis and Design of Singly and Doubly reinforced Beams, “T” and “L” beams. 2. Moment redistribution: Analysis and design of fixed beams, propped cantilever, two span symmetric continuous beams. Limit State of collapse in shear, Bond and Torsion, Design for Interaction between Bending moment, Torsional moment and Shear. Limit state of serviceability: Deflection and moment curvature relationship, for beams and one-way slabs. 3. Limit state of collapse under compression: Axially loaded short and long column, column with axial load, uniaxial and biaxial moment, Interaction diagram / Charts. Isolated footing for axially loaded columns, Uniaxial bending, combined footing: Rectangular footing, Strap beam, Trapezoidal, raft etc. 4. Analysis and design of portal frames (single bay single storey) hinged or fixed at base. Design of Cantilever & Counterfort Retaining Walls. 5. Design of Dog legged and Open Well Staircase. 6. Design of Circular and Rectangular water tank with roof slab / dome resting on ground by approximate method. (Using Working Stress Method) 	
Course No.		

Course No.	CEL272			
Course Title	Fluid Mechanics			
Course Coordinator	Dr A D Ghare			
Slot in which offered. If not offered write N	Odd		Even	
	N		N	
Structure	Lecture	Tutorial	Practical	Credits
	3	0	2	8
Prerequisite Course Codes As per proposed Course Numbers	Basic Fluid Mechanics			
Prerequisite credits				
Equivalent Course Codes. As per proposed courses and old courses				
Overlap course codes As per proposed Course Numbers				
Text Book (Max. 2)	Title	Fluid Mechanics		
	Author	Streeter V.L. and Wyle E.B.;		
	Publisher	International Students Edition		
	Edition	1986		
	Title	Theory and Applications of Fluid Mechanics		
	Author	Subramanya K.		
	Publisher	Tata McGraw Hill Publication		
	Edition	1996		
Reference Books	Title	Engineering Fluid Mechanics		
	Author	Garde R.J. and Mirajgaokar A.G.;		
	Publisher	Scitech Publication		
	Edition	2003		
	Title	Fluid Mechanics Through Problems		
	Author	Garde R.J.,		
	Publisher	Wiley Eastern Ltd		
	Edition	1999		
	Title	Fluid Mechanics with Engineering Applications		
	Author	Franzini J.B. and Finnemore E.J.,		
	Publisher	McGraw Hill, International Students Edition,		
	Edition	1996		
	Title			
	Author			
Publisher				
Edition				

	Title	
	Author	
	Publisher	
	Edition	
	Title	
	Author	
	Publisher	
	Edition	
Content	<ol style="list-style-type: none"> 1. Fluids and Their Properties : Definition of fluid, Difference between solids, liquids and gases, fluid properties, Rheological Diagram, Ideal and real fluids, Compressibility and bulk modulus, Surface tension, capillarity, pressure inside a bulb and cylindrical jet, Vapour pressure. 2. Fluid Pressure and its Measurement : Hydrostatic pressure and its variation with depth, Pressure head, Atmospheric pressure and vacuum, Gauge and absolute pressures, Pressure measurement using manometers. Pressures on plane and curved surfaces, Centre of pressure, Fluids in relative equilibrium; fluid masses subjected to horizontal, vertical and inclined acceleration. 3. Buoyancy and Floatation: Buoyant force and centre of buoyancy, Archimedes principle, Metacentre and its determination by analytical and experimental methods, Stability of floating bodies and three states of equilibrium. 4. Kinematics of Flow: Velocity and its variation with space and time. Steady, unsteady, uniform, non-uniform, One, two and three dimensional, rotational, irrotational flow, Stream line, path line, streak line, Lagrangian and Eulerian approaches in fluid flow description, Acceleration of fluid particles, Normal and tangential acceleration. Equation of continuity in Cartesian co-ordinates, stream function, velocity potential and flow net, Circulation, vorticity, source & sink, Free and forced vortices. Newton's law of motion, Euler's, Navier-Stokes and Reynolds Equations, Bernoulli's equation: its assumptions, derivation, limitations and application, kinetic energy correction factor. Momentum equation, Impact of Jets, force on plates, pipe bends and closed conduits and flow nozzles. 5. Fluid Measurements: Velocity measurement : Pitot tube, Pitot-static tube and Prandtl tube. Discharge measurement : Venturimeter, orifice meter and flow nozzles. Orifices and Mouth pieces: Various hydraulic coefficients (C_d, C_v, C_c) and factors affecting them, 	

	<p>Large orifices and submerged orifices. Time for emptying tanks by orifices. Notches & Weirs : Definition, Rectangular, triangular, trapezoidal, Cipolletti, broad-crested and submerged weirs, End contraction, Co-efficient of discharge and its determination, Error in measurement of head. Velocity of approach and its effects.</p> <p>6. Dimensional Analysis: Definition and its use, fundamental and derived dimension, Dimensional analysis by Raleighs and Buckingham Pi methods, Similitude, Geometric, Kinetic and Dynamic similarities, Predominant forces, Force ratio, Dimensionless numbers and their significances.</p>
Course No.	CEL272

Course No.	CEL368			
Course Title	Advanced Hydraulics			
Course Coordinator	Dr A D Ghare			
Slot in which offered. If not offered write N	Odd		Even	
	N		F	
Structure	Lecture	Tutorial	Practical	Credits
	3	1	0	8
Prerequisite Course Codes As per proposed Course Numbers	CEL 202 Hydraulic Engineering			
Prerequisite credits				
Equivalent Course Codes. As per proposed courses and old courses				
Overlap course codes As per proposed Course Numbers				
Text Books (Max. 2)	Title	Flow through Open Channels		
	Author	Ranga Raju		
	Publisher	Tata McGraw Hill Publication		
	Edition	2004		
	Title	Fluid Mechanics		
	Author	Streeter V.L. and Wyle E.B		
	Publisher	Tata McGraw Hill Publication		
	Edition	2005		
Reference Books	Title	Open Channel Hydraulics		
	Author	Ven Te. Chow		
	Publisher	Tata McGraw Hill Publication (International Students Edition)		
	Edition	2003		
	Title	Engineering Fluid Mechanics		
	Author	Narsimhan S.		
	Publisher	Orient Longman Publication		
	Edition	1981		

<p>Contents</p>	<ol style="list-style-type: none"> 1. Equivalent roughness for channel surfaces, Computation of critical flow, Theory of gradually varied flow, Analysis of surface profiles of gradually varied flow, Channel transitions 2. Computation of gradually varied flow, Hydraulic exponents, Direct integration methods, Step methods, Graphical method, Numerical methods 3. Location of hydraulic jump, application of hydraulic jump in design of hydraulic jump type stilling basin with horizontal apron 4. Unsteady flow in a pipe line for incompressible fluid, Time of flow establishment, Rigid water column theory of water hammer and computation of water hammer pressures 5. Water hammer phenomena when compressibility of fluid and elasticity of pipe is considered, computation of water hammer pressure of frictionless flow in horizontal pipe - for sudden and slow closure of valve, Application of Allievi's method of charts for calculation of approximate pressures, Water hammer pressures in pumping systems, Method of characteristics 6. Computation of water hammer pressures in branched pipe system and in surge tank system, Devices used for protection from water hammer pressures, Function of surge tank and different type of surge tanks, Equations governing the flow in the simple surge tank system, Analysis of flow in a simple surge tank system, Computation of maximum surges in a simple surge tank, Case of hydraulic stability in a simple surge tank system
<p>Course No.</p>	<p>CEL368</p>

Course No.				
Course Title	Advanced Traffic Engineering			
Course Coordinator	Dr. V.S.Landge			
Slot in which offered. If not offered write N	Odd		Even	
Structure	Lecture	Tutorial	Practical	Credits
	3	0	2	8
Text Book (max. 2)	Title	Traffic Engineering – Theory & Practice		
	Author	Pignataro, L.J.,		
	Publisher	John Wiley, 1985		
	Edition			
	Title	Traffic Engineering and Transport Planning		
	Author	Kadiyali, L.R.,		
	Publisher	Khanna publishers, New Delhi, 2002		
	Edition			
Reference Books	Title	Highways- Traffic Planning & Engineering		
	Author	O’Flaherty C A		
	Publisher	Edward Arnold, UK		
	Edition	-		
Content	<p>Traffic Engineering & Studies: Scope, traffic elements, characteristics-vehicle, road user and road; traffic studies-volume, O & D, parking, safety , study methodology, data collection & presentation,</p> <p>Traffic Analysis: Speed, volume, parking & accident data analysis, statistical approach, conflict points, traffic stream characteristics- relationship between speed, flow and density, LOS & capacity analysis, traffic forecasting.</p> <p>Traffic Design: Channelisation of islands, design of rotaries, intersections, pedestrian & bicycle ways,</p> <p>Traffic Control Devices: Traffic signs, markings and signals;</p> <p>Traffic Regulation & Management: Speed, vehicle, parking, enforcement regulations, mixed traffic regulation, management various techniques</p> <p>Geometric design provisions for various transportation facilities as per AASHTO, IRC design</p> <p>Practical: Field studies minimum 6 of the following Speed studies , OD studies, Design of traffic signals, Design of intersection, design of rotaries, Road safety studies, traffic volume studies. Perking studies</p>			

Course No.	CEL 554				
Course Title	Project Appraisal & Construction Finance				
Course Coordinator	Prof S. P. Wanjari				
Slot in which offered. If not offered write N	Odd		Even		
Structure	Lecture	Tutorial	Practical	Credits	
	3	0	0	6	
Prerequisite Course Codes As per proposed Course Numbers	-	-	-	-	
Prerequisite credits	-Nil -				
Equivalent Course Codes. As per proposed courses and old courses					
Overlap course codes As per proposed Course Numbers	-	-	-	-	
Text Book (Max. 2)	Title	Modern Construction Management,			
	Author	Frank Harris & Ronald Mc Caffer			
	Publisher	Blackwell science, 4th Edition			
	Edition				
	Title	Principles of Construction Management			
	Author	Roy Pilcher			
	Publisher	Mc Graw Hill Landon			
	Edition				
	Reference Books	Title	Guidelines for project Evaluation		
		Author			
		Publisher	Oxford & IBH Publishing Co.Pvt. Ltd		
		Edition			
		Title			
		Author			
Publisher					
Edition					
Title					
Author					
Publisher					
Edition					
Title					
Author					
Publisher					
Edition					

Content	<p>1. Project Appraisal : Project appraisal, government and private project evaluators, significance of social benefit – cost analysis, commercial profitability, national economic profitability, measurement of direct and indirect benefit and costs. Calculation of benefit cost ratio.</p> <p>2. Engineering economics - Time value of money, discounted cash flow, decision making among the alternatives, replacement analysis, break even analysis.</p> <p>3. Project capital: Cash flow of a project, estimation of minimum capital required, internal rate of return (IRR), Multiple IRR, estimation of annualized cost.</p> <p>4. Depreciation : importance, classification, types – straight line, sum of year method, double rate declining balance method</p> <p>5. Capital Budgeting: element of budgeting – men, materials, equipments, overhead, profits – preparation of capital budget.</p> <p>6. Performance statement: capital gearing ratio, shares, debentures, PBT, PAT, PBIT, Earning per share, preparation of company's performance statement, Inflation.</p>
Course No.	

Engineering Fluid Mechanics. 140 Pages · 2012 · 4.91 MB · 6,980 Downloads · English. Engineering. Student Solutions Manual to accompany Engineering Fluid Mechanics, 7 th Edition Clayton T. Crowe sw Measurement and Instrumentation, Second Edition: Theory and Application. 694 Pages·2015·29.46 MB·22,371 Downloads·New!