

**PROGRAMME REQUIREMENT  
B.TECH (CIVIL)  
Year of Admission 2009**

**OVERALL CREDIT STRUCTURE**

Undergraduate Core (UC)		Undergraduate Elective (UE)	
Category	Credit	Category	Credit
DC	140-152	DE	54-78
BS	32	HM	12
ES	36	OC	12-24
HM	10		
<b>Total</b>	<b>218-230</b>		<b>90-102</b>
<b>Grand Total UC + UE=320</b>			

Course Code	Course	Credit	
<b>Basic Sciences (BS)</b>			
MAL102	Mathematics I	3- 1 - 0	8
MAL103	Mathematics II	3- 1 - 0	8
PHL 101	Physics	3- 0 - 2	8
CHL 101	Chemistry	3- 0 - 2	8
<b>Engineering Arts and Sciences (ES)</b>			
AML101	Engineering Mechanics	3- 0 - 2	8
EEL 101	Electrical Engineering	3- 0 - 2	8
MEL101	Engineering Drawing	3- 0 - 2	8
CSL101	Computer Programming	3- 0 - 2	8
MEP101	Workshop	0- 0 - 4	4
<b>Humanities and Social Sciences (Core) (HM)</b>			
HUL102	Communication Skills	2- 0 - 2	6
HIL103	Social Science	2- 0 - 0	4
<b>Humanities Social Sciences, Management (Elective) (HM)</b>			
<b>DC (Departmental Core)</b>			
CEL2xx	Soil Mechanics	3-0-2	8
CEL2xx	Hydraulic Engineering	3-0-2	8
CEL2xx	Environmental Engineering I	3-0-2	8
CEL2xx	Building Materials & Technology	3-0-2	8
CEL2xx	Building Design and Drawing	2-0-2	6
AML2xx	Strength of Materials	3-0-2	8
CEL2xx	Engineering Geology	3-0-2	8
CEL2xx	Surveying I	3-0-2	8
CEL3xx	Foundation Engineering	3-0-0	6
CEL3xx	Transportation Engineering	3-0-2	8
CEL3xx	Environmental Engineering II	3-0-0	6
AML3xx	Structural Analysis	3-0-2	8
AML3xx	Design of Steel Structures	3-0-0	6
CEL3xx	Concrete Engineering	3-0-2	8
CEL3xx	Design of RCC Structures	3-0-0	6
CEL3xx	Surveying II	3-0-2	8

CEL3xx	Project Planning & Management	3-0-0	6
CEL4xx	Irrigation Engineering	3-1-0	8
CEL4xx	Estimating and Costing	3-0-2	8
CEL401	Project Phase I	2-0-0	4
CEL402	Project Phase II		8
<b>DE (Departmental Electives)</b>			
MAL202	Numerical Analysis	3- 0 - 0	6
CEL2xx	Hydrology	3-0-0	6
CEL2xx	Construction Materials *	3-0-0	6
CEL3xx	Computer Aided Analysis and Design *	3-0-2	8
CEL3xx	Fluid Mechanics	3-0-2	8
CEL3xx	Energy Efficient Buildings *	3-0-0	6
AML3xx	Advanced Structural Analysis	3-1-0	8
CEL3xx	Pavement Design	3-1-0	8
CEL4xx	Rural Water Supply & Sanitation *	3-0-0	6
AML4xx	Advanced Steel Design	3-1-0	8
CEL4xx	Railway, Airports, Ports & Harbor Engineering *	3-0-0	6
CEL4xx	Industrial Waste Water Treatment Recycle & Reuse *	3-0-0	6
CEL4xx	Advanced Concrete Technology	3-0-2	8
CEL4xx	Construction Finance *	3-0-0	6
AML4xx	Advanced RCC	3-1-0	8
AML4xx	Structural Dynamics *	3-0-2	8
CEL4xx	Ground improvement Techniques	3-0-0	6
CEL4xx	Quality and safety in construction *	3-0-0	6
CEL4xx	Traffic Engineering	3-0-0	6
CEL4xx	Geotechnical Engineering	3-0-0	6
CEL4xx	Spatial Analyses for Resources Management *	3-0-2	8
CEL4xx	Pre-stressed Concrete Structures *	3-1-0	8
CEL4xx	Water Distribution Systems	3-1-0	8
CEL4xx	Advanced Structure Design (RCC) *	3-1-0	8
CEL4xx	Remote Sensing & GIS	3-0-0	6
CEL4xx	Hazardous Waste management *	3-0-0	6
CEL4xx	Energy Conversion and Environment *	3-0-0	6
CEL4xx	River Engineering	3-0-0	6
CEL4xx	Earthen Dam *	3-0-0	6
CEL4xx	Hydraulic Structures I *	3-0-0	6
CE	Mini Project	0-0-0	4
CEL4xx	Disaster Management *	3-0-0	6
<b>List of Open Electives:</b>			
CEL4xx	Remote Sensing & GIS	3-0-0	6
CEL4xx	Environmental Studies *	3-0-0	6
CEL4xx	Disaster Management *	3-0-0	6
CEL4xx	Hazardous Waste management *	3-0-0	6
<b>Humanities Social Sciences, Management (Elective) (HM)</b>			
CEL(HM)	Financial and Business management *	3-0-0	6

\* Subject to approval from Senate

**PROGRAMME REQUIREMENT  
B.TECH (CIVIL)  
Year of Admission 2009 (ODD)**

**OVERALL CREDIT STRUCTURE**

Undergraduate Core (UC)		Undergraduate Elective (UE)	
Category	Credit	Category	Credit
DC	140-152	DE	54-78
BS	32	HM	12
ES	36	OC	12-24
HM	10		
<b>Total</b>	<b>218-230</b>		<b>90-102</b>
<b>Grand Total UC + UE=320</b>			

Course Code	Course	Credit	
<b>Basic Sciences (BS)</b>			
MAL102	Mathematics I	3- 1 - 0	8
MAL103	Mathematics II	3- 1 - 0	8
PHL 101	Physics	3- 0 - 2	8
CHL 101	Chemistry	3- 0 - 2	8
<b>Engineering Arts and Sciences (ES)</b>			
AML101	Engineering Mechanics	3- 0 - 2	8
EEL 101	Electrical Engineering	3- 0 - 2	8
MEL101	Engineering Drawing	3- 0 - 2	8
CSL101	Computer Programming	3- 0 - 2	8
MEP101	Workshop	0- 0 - 4	4
<b>Humanities and Social Sciences (Core) (HM)</b>			
HUL102	Communication Skills	2- 0 - 2	6

HIL103	Social Science	2- 0 - 0	4
<b>Humanities Social Sciences, Management (Elective) (HM)</b>			
<b>DC (Departmental Core)</b>			
CEL2xx	Soil Mechanics	3-0-2	8
CEL2xx	Building Materials & Technology	3-0-2	8
CEL2xx	Building Design and Drawing	2-0-2	6
AML2xx	Strength of Materials	3-0-2	8
CEL2xx	Surveying I	3-0-2	8
CEL3xx	Transportation Engineering	3-0-2	8
CEL3xx	Environmental Engineering II	3-0-0	6
AML3xx	Structural Analysis	3-0-2	8
CEL3xx	Concrete Engineering	3-0-2	8
CEL3xx	Project Planning & Management	3-0-0	6
CEL4xx	Estimating and Costing	3-0-2	8
<b>DE (Departmental Electives)</b>			
MAL202	Numerical Analysis	3- 0 - 0	6
CEL3xx	Energy Efficient Buildings *	3-0-0	6
AML3xx	Advanced Structural Analysis	3-1-0	8
CEL3xx	Pavement Design	3-1-0	8
CEL4xx	Advanced Concrete Technology	3-0-2	8
CEL4xx	Construction Finance *	3-0-0	6
AML4xx	Structural Dynamics *	3-0-2	8
CEL4xx	Pre-stressed Concrete Structures *	3-1-0	8
CEL4xx	Remote Sensing & GIS	3-0-0	6
CEL4xx	Energy Conversion and Environment *	3-0-0	6

\* Subject to approval by Senate

**PROGRAMME REQUIREMENT**  
**B.TECH (CIVIL)**  
**Year of Admission 2009 (EVEN)**

**OVERALL CREDIT STRUCTURE**

Undergraduate Core (UC)		Undergraduate Elective (UE)	
Category	Credit	Category	Credit
DC	140-152	DE	54-78
BS	32	HM	12
ES	36	OC	12-24
HM	10		
<b>Total</b>	<b>218-230</b>		<b>90-102</b>
<b>Grand Total UC + UE=320</b>			

Course Code	Course	Credit	
<b>Basic Sciences (BS)</b>			
MAL102	Mathematics I	3- 1 - 0	8
MAL103	Mathematics II	3- 1 - 0	8
PHL 101	Physics	3- 0 - 2	8
CHL 101	Chemistry	3- 0 - 2	8
<b>Engineering Arts and Sciences (ES)</b>			
AML101	Engineering Mechanics	3- 0 - 2	8
EEL 101	Electrical Engineering	3- 0 - 2	8
MEL101	Engineering Drawing	3- 0 - 2	8
CSL101	Computer Programming	3- 0 - 2	8
MEP101	Workshop	0- 0 - 4	4
<b>Humanities and Social Sciences (Core) (HM)</b>			
HUL102	Communication Skills	2- 0 - 2	6
HIL103	Social Science	2- 0 - 0	4
<b>Humanities Social Sciences, Management (Elective) (HM)</b>			

<b>DC (Departmental Core)</b>			
CEL2xx	Hydraulic Engineering	3-0-2	8
CEL2xx	Environmental Engineering I	3-0-2	8
CEL2xx	Engineering Geology	3-0-2	8
CEL3xx	Foundation Engineering	3-0-0	6
AML3xx	Design of Steel Structures	3-0-0	6
CEL3xx	Design of RCC Structures	3-0-0	6
CEL3xx	Surveying II	3-0-2	8
CEL4xx	Irrigation Engineering	3-1-0	8
<b>DE (Departmental Electives)</b>			
CEL2xx	Hydrology	3-0-0	6
CEL2xx	Construction Materials *	3-0-0	6
CEL4xx	Rural Water Supply & Sanitation *	3-0-0	6
AML4xx	Advanced Steel Design	3-1-0	8
CEL4xx	Railway, Airports, Ports & Harbor Engineering *	3-0-0	6
CEL4xx	Industrial Waste Water Treatment Recycle & Reuse	3-0-0	6
AML4xx	Advanced RCC	3-1-0	8
CEL4xx	Traffic Engineering	3-0-0	6
CEL4xx	Spatial Analyses for Resources Management *	3-0-2	8
CEL4xx	Water Distribution Systems	3-1-0	8
CEL4xx	Advanced Structure Design (RCC) *	3-1-0	8
CEL4xx	Hazardous Waste management *	3-0-0	6
	<b>Financial and Business management</b>		
CEL4xx	River Engineering	3-0-0	6
CEL4xx	Earthen Dam *	3-0-0	6
CEL4xx	Hydraulic Structures I *	3-0-0	6
CEL4xx	Disaster Management *	3-0-0	6
<b>Humanities Social Sciences, Management (Elective) (HM)</b>			
CEL(HM)	Financial and Business management	3-0-0	6

\* Subject to approval by Senate





## Course Content Proforma

Course No.	CEL201	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)		
Course Title	<b>Soil Mechanics</b>					
Course Coordinator	D J Katyayan					
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	-	-	-	-		
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	Soil Engineering in Theory & Practice,;				
	Author	Alam Singh				
	Publisher	Asia Publishing House				
	Edition	1975				
	Title	Geotechnical Engineering,				
	Author	S. K. Gulhati & Manoj Dutta:				
	Publisher	Tata McGraw-Hill,				
	Edition	2005.				
	Reference Books	Title	Basic & Applied Soil Mechanics			
		Author	Gopal Ranjan & A.S. RAO			
Publisher		New Age International Ltd,				
Edition		2004.				
Title		Geotechnical Engineering				
Author		C. Venkatramaiah				
Publisher		New Age Ltd.,				
Edition		2006				
Title		Soil Mechanics & Foundation Engg.				
Author		Arora K.R.				
Publisher		Standard Publishers Distributors, Delhi,				
Edition		1989 & later				
Title		Soil Mechanics & Foundation Engg.				
Author		Garg S.K.				
Publisher		Khanna Publishers, Delhi,				
Edition		1998.				
Title	Soil Mechanics & Foundation Engg.					
Author	Punrnia B.C.					
Publisher	Laxmi Publication Pvt. Ltd, New Delhi,					
Edition	2005					
Content	1. Introduction : Formation of soil, residual & transported soils, soil,					

	<p>generally used in practice such as sand, gravel, organic silt, clay, Bentonite, black cotton soil etc.</p> <ol style="list-style-type: none"> <li>2. Phases of Soil: Various soil weight &amp; volume inter-relationship. Density index. methods of determination of in situ density. Physical &amp; Index Properties of soil- concept &amp; methods determination. Water content, specific gravity, sieve analysis, particle size distribution curve, sedimentation analysis, Differential and free-swell value.Consistency of Soil – Atterberg’s limits, determination, Soil structures and clay minerals.</li> <li>3. Classification of Soil: Criteria of classification, particle size classification, Textural classification, Unified &amp; I.S. classification system, Field identification of Expansive soils their identification and related problems.</li> <li>4 Permeability &amp; Seepage: Darcy’s law &amp; its validity, Discharge &amp; seepage velocity, factors affecting permeability, Determination of coefficients of permeability by laboratory and field methods, permeability of stratified soil. Seepage pressure, quick condition, flow-nets, Laplace’s equation, methods to draw flow-nets, their characteristics &amp; uses of flow-nets, Preliminary problems of discharge estimation of homogeneous soils. Effective, Neural and total stresses in Soil mass.</li> <li>5. Stress Distribution: Stress distribution in soil mass, Boussinesque’s, Theory point &amp; uniformly loaded rectangular &amp; circular areas, Newmark’s charts.</li> <li>6. Consolidation: Compression of laterally confined soil, Terzaghie’s 1-D consolidation theory (formation of differential equation only) determination of coefficient of consolidation, degree of consolidation. Determination of pre-consolidation pressure, settlement, rate of settlement.</li> <li>7. Compaction: Mechanics of compaction factors affecting compaction, standard &amp; modified compaction tests, OMC, Field compaction equipment, quality control. P.I. Concept of blending.</li> <li>8. Shear Strength: Introduction, Mohr’s diagram, Mohr-Coloumb’s theory, Measurement of shear strength by direct shear test, tri-axial test, unconfined compression test, vane shear test, sensitivity.</li> <li>9. Shear Strength: Introduction, Mohr’s diagram, Mohr-Coloumb’s theory, Measurement of shear strength by direct shear test, tri-axial test, unconfined compression test, vane shear test, sensitivity.</li> </ol>
Course No.	

Head of the Department of **CIVIL ENGINEERING**

## Course Content Proforma

Department :

Course No.	CEL202	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title	<b>Hydraulic Engineering</b>				
Course Coordinator					
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><b>Practicals :</b></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.	CEL2xx	

Head of the Department of **CIVIL ENGINEERING**

## Course Content Proforma

**Department :**

Course No.	CEL203	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title		<b>Environmental Engineering I</b>			
Course Coordinator		Dr. A. R. Tembhurkar			
Slot in which offered. If not offered write N	Odd		Even		
			A		
Structure	Lecture	Tutorial	Practical	Credits	
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				
	Edition				
Reference Books	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	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.	
Course No.		

Head of the Department of **CIVIL ENGINEERING**

## Course Content Proforma

**Department :**

Course No.	CEL204	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title		<b>Building Materials and Technology</b>			
Course Coordinator		S.R.Dongre			
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					
Overlap course codes As per proposed Course Numbers					
Text Book (Max. 2)		Title	Building Construction & Materials		
		Author	Singh Gurcharan		
		Publisher	Standard Publisher & Distributor, 1978		
		Edition	New		
		Title	Building Construction & Materials		
		Author	Laxmi Publication Pvt. Ltd		
		Publisher	Punmia B.C.		
		Edition	Fifth		
Reference Books		Title	Building Construction & Materials		
		Author	Sushil kumar		
		Publisher	Standard Publisher & Distributor, 2003 reprint		
		Edition			
		Title			
		Author			
		Publisher			
		Edition			
		Title			
		Author			
		Publisher			
		Edition			
		Title			
		Author			
Publisher					
Edition					
Content		1. Foundations: Necessity and types of foundations. Details of shallow foundations. Bearing capacity of soils and its			

		<p>assessment. Presumptive bearing capacity values from codes. Loads on foundations. Causes of failures of foundations and remedial measures. Foundation on black cotton soil. Setting out foundation trenches, excavation, timbering of trenches. Load bearing and frame structures.</p> <ol style="list-style-type: none"> <li>2. Brickwork : Qualities of good bricks, classification of bricks, tests on bricks as per as codes. Specification of Mortar for Brick Masonry. Terms used in brickwork, commonly used types of bonds in brickwork such as header, stretcher, English and Flemish bonds, principles of construction. Reinforced brickwork, brick knogging. Parapets, copings, sills and corbels. Masonry construction using cement concrete blocks (solid &amp; hollow) and clay blocks, Walls - Cavity walls, load bearing and partition walls. Precast construction: Introduction to method and materials. Precast elements like poles, cover, jallies, step corbels, Truss element etc.</li> <li>3. Stone Work: Stones cutting and dressing, selection of stone, types of stone masonry, principles of construction, joints in masonry, Specification of Mortar for stone Masonry, Lifting appliances for heavy stones, and common building stones in India.</li> <li>4. Arches and Lintels &amp; Damp Proofing,: Terminology in construction, types, chajjas and canopies, Precast Lintels &amp; Arches. Causes and effect of dampness. Various methods of damp proofing, damp proofing in Plinth protection, New Techniques of Damp Proofing. Epoxy, resins and other modern materials etc.,</li> <li>5. Floors, Roofs, Stairs and Doors &amp; Windows : General principles, types and method of construction, upper floors, finished quality and testing floor tiles, ceramic tiles, Terracotta, Plaster of Paris. Flat and pitched roofs, roof coverings, types and their constructional features. Thermal Insulation. Types of stairs, functional design of stairs. Purpose materials of construction and types.</li> <li>6. Plastering &amp; Pointing, Temporary Timbering and Painting : Necessity, types and methods Centering and formwork shoring, underpinning and scaffolding. White washing, color washing and distempering new materials &amp; techniques. Principle of Acoustics, and Sound insulation.</li> <li>7. Introduction to Principles of Earthquake Resistant Building Construction &amp; materials</li> </ol>
Course No.		

Head of the Department of **CIVIL ENGINEERING**

Course No.	CEP204	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)
Course Title	<b>Building Materials &amp; Technology Lab</b>			
Course Coordinator	S.R. Dongre			
Slot in which offered. If not offered write N	Odd		Even	
Structure	Lecture	Tutorial	Practical	Credits
	0	0	2	2
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			
	Author			
	Publisher			
	Edition			
	Title			
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	Publisher	
	Edition	
	Title	
	Author	
	Publisher	
	Edition	
Content	<ol style="list-style-type: none"> <li>1.To determine water absorption of burnt clay building bricks.</li> <li>2. To determine crushing/ compressive strength of burnt clay building bricks.</li> <li>3. To determine efflorescence of burnt clay building bricks.</li> <li>4. To determine water absorption of cement concrete flooring tiles.</li> <li>5. To determine flexural /transverse strength of cement concrete flooring titles.</li> <li>6.To determine water absorption of manalore roofing tiles.</li> <li>7. To determine breaking load of mangalore roofing titles.</li> <li>8. To determine moisture content &amp; specific gravity of timber.</li> <li>9. To determine compressive strength of timber parrallel &amp; perpendicular to grain.</li> <li>10. To determine impact strength of white glazed ceramic tiles.</li> </ol>	
Course No.		

Head of the Department of **CIVIL ENGINEERING**

## Course Content Proforma

Department :

Course No.	CEL205	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title	<b>Building Design and Drawing</b>				
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				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
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	Title	
	Author	
	Publisher	
	Edition	
Content		<ol style="list-style-type: none"> <li>1. Importance of Building drawing as Engineer's Language in construction &amp; costing.</li> <li>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. Free hand dimensioned sketches of various building elements. Importance in Civil Engineering.</li> <li>3. Developing working drawings to scale as per I.S. 962 from the given sketch design and general specifications for terraced and pitched roofs. Developing submission drawings to scale with location site and block plan complete.</li> <li>4. Introduction : Site requirements of owner and building bye-laws. Climate and design considerations, orientation, recommendations of CBRI, Roorkee.</li> <li>5. Graph paper drawing (line plans) based on various requirements for Residential, Public, Educational, Industrial Buildings and Interior aspects as well.</li> <li>6. Two point perspective of Residential building neglecting small elements of building such as plinth offset, Chajja projections etc.</li> </ol>
Course No.		

Head of the Department of **CIVIL ENGINEERING**

Course No.	CEP205	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)
Course Title	<b>Building Design and Drawing Lab</b>			
Course Coordinator	S.R. Dongre			
Slot in which offered. If not offered write N	Odd		Even	
Structure	Lecture	Tutorial	Practical	Credits
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			
	Author			
	Publisher			
	Edition			
	Title			
	Author			
	Publisher			
	Edition			
	Title			
	Author			
	Publisher			
	Edition			
	Title			
	Author			
	Publisher			
	Edition			

	Title	
	Author	
	Publisher	
	Edition	
	Title	
	Author	
	Publisher	
	Edition	
Content		<ol style="list-style-type: none"> <li>1. Working drawing of single storied residential building of terrace and pitched roofs with foundation plan of load bearing structure. (Two assignment)</li> <li>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)</li> <li>3. Working drawing of multistoried Public / Educational/ Health / Community / Industrial building including structural details and layout of services. (One assignments)</li> <li>4. Two point perspective of the single storied Residential building neglecting small building elements. (Two assignments – pitched &amp; terrace roof)</li> <li>5. Minimum 30 free hand self-explanatory dimensioned sketches of various building elements in sketch book.</li> <li>6. Line plans if various types of buildings e.g. Public / Educational / Industrial / Hospital / Community on graph papers (06 assignments)</li> <li>7. One compulsory field exercise</li> </ol>
Course No.		

Head of the Department of **CIVIL ENGINEERING**

Course No.	AML2xx	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title	Strength of Materials				
Course Coordinator					
Slot in which offered. If not offered write N	Odd		Even		
	C				
Structure	Lecture	Tutorial	Practical	Credits	
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				
	Author				
	Publisher				
	Title				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
	Publisher				
	Title				
	Author				
Publisher					
	Title				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
Publisher					
Content					
Course No.					

Head of the Department of **CIVIL ENGINEERING**

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

<b>Content</b>	<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 &amp; Scope; Basic concepts; internal and external processes; Geomorphological classification, weathering and erosion</p> <p>Stratigraphy: Definition, scope &amp; 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 &amp; construction of Dams, Bridges, Tunnels, buildings.</p> <p>Engineering Seismology: Causes and effects of earthquakes; Seismic waves, energy release, magnitude, intensity, seismic zoning &amp; seismic Zones of India; Characteristics of strong ground motion, aseismic structures.</p> <p>Geohydrology: Occurrence, availability &amp; movement of Groundwater; Rocks as aquifers, Groundwater investigations, groundwater development and management; Techniques of groundwater recharge.</p> <p>Stability of Slopes &amp; Landslides: Causes and prevention</p> <p>Environmental aspects of Geology.</p>
<b>Practical</b>	<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>
<b>Course No.</b>	

Head of the Department of **CIVIL ENGINEERING**

COURSE CONTENT PROFORMA				
Course No.	CEL207	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)
Course Title	<b>Surveying I</b>			
Course Coordinator	Dr. Rahul V. Ralegaonkar			
Slot in which Offered	Odd		Even	
	A		Nil	
Structure	Lecture	Tutorial	Practical	Credits
	3	0	2	8
Prerequisite Course Codes				
Prerequisite Credits				
Equivalent course Codes				
Overlap Course Codes				
Text Books	Title	Surveying I		
	Author	B. C. Punmia		
	Publisher	Standard Book-House		
	Edition	Latest		
	Title	Surveying Volume I		
	Author	S. K Duggal		
	Publisher	Tata McGraw Hill		
	Edition	Latest		
	Title	Plane Surveying		
	Author	A M Chandra		
Publisher	New Age International Publication			
Edition	Latest			
Reference Books	Title	Surveing & Levelling-Part I		
	Author	T. P. Kanetkar & S. V. Kulkarni		
	Publisher	Pune Vidhyarthi Griha Prakashan, Pune		
	Edition	Latest		
	Title			
	Author			
	Publisher			
	Edition			
	Title			
	Author			
	Publisher			
	Edition			
	Title			
	Author			
Publisher				
Edition				
Content	<b>Theory:</b> 1. <b>Linear Measurements:</b> Methods, Equipments, Ranging, Chain Surveying, Field Work & Plotting, Obstacles in Chaining, area &			



	<p>Volume Computation</p> <ol style="list-style-type: none"> <li>2. <b>Compass Surveying:</b> Instrument, Principles, Bearings</li> <li>3. <b>Plane Table:</b> Equipment, Methods, Errors, Adjustment Survey, Traversing &amp; Plotting</li> <li>4. <b>Levelling:</b> Instruments, Collimation Method, Rise-Fall Method, Curvature &amp; Refraction, Contouring</li> <li>5. <b>Theodolite survey</b> – Study of theodolite – Temporary and permanent adjustments – Measurement of horizontal angles – Methods of repetition and reiteration – Measurement of vertical angles</li> <li>6. <b>Tacheometric Surveying:</b> Theory, Instrument Constants, Methods</li> </ol> <p><b>Practicals:</b></p> <ol style="list-style-type: none"> <li>1. Chain survey Traversing and plotting of details-Area Determination.</li> <li>2. Building Lay- out work</li> <li>3. Plane table survey Method of Radiation/ Intersection</li> <li>4. Plane table survey Solving two/ three point problem</li> <li>5. Plane table survey Traverse</li> <li>6. Instrument Constant-Tachometer</li> <li>7. Leveling Fly leveling – Plane of collimation method</li> <li>8. Leveling Fly leveling – Rise and Fall method</li> <li>9. Theodolite surveying Measurement of horizontal angle</li> <li>10. Theodolite surveying Measurement of vertical angle for determination of height of object</li> </ol>
Course No.	

Head of the Department of **CIVIL ENGINEERING**

Course No.	CEL301	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)
Course Title	<b>Foundation Engineering</b>			
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.	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
	2.	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.
	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, flysh) in stabilization. Basic concepts of reinforced earth, use of geosynthetic materials Salient features, function and applications of various geosynthetic 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.
	6.	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.
	7.	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
	8.	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.

**Department : Civil Engineering**

Course No.	CEL302	Open course(Y/N)	HM Course (Y/N)	Discontinued (Y/N)
Course Title	<b>Transportation Engineering</b>			
Course Coordinator	Dr. Vishrut Landge			
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	Survey			
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	Highway Engineering		
	Author	S.K.Khanna, C.E.G Jesto		
	Publisher	Nemi Chand Brithers Roorkee		
	Edition	latest		
	Title	Traffic Engineering and transportation Planning		
	Author	DR.K.R.Kadiyali		
	Publisher	Khanna Publisher		
	Edition	Seventh edition		
	Title	<b>Bridge Engg</b>		
	Author	Bindra		
	Publisher	Dhanpat Rai		
	Reference Books	Title	Highway Engineering	
Author		Paul H. Wright and Karen Dixon		
Publisher		John Willey & Sons		
Edition				
Title		Transportation Engineering & Planning (3 <sup>rd</sup> Edition)		
Author		C.S Papacostas & P.D. Prevedouros		
Publisher		John Willey & Sons		
Edition		3 <sup>rd</sup>		
Title		Traffic and Highway Engineering		
Author		Garber N.J. & Lester A. Hoel		
Publisher		West Publishing Co. New York		
Edition				
Title		Transport Planning and Traffic Engineering		
Author		O' Flaherty & Coleman.A.		
Publisher	Edward Arnold U.K.			
Edition				
	Title	Principles of Highway Engineering and Traffic Analysis		
	Author	Fred. L. Mannering, Walter P. Kilareski		

	Publisher	John Willey & Sons
	Edition	
	Title	
	Author	
	Publisher	
	Edition	
Content	<p><b>Introduction:</b> Fundamentals of Transportation System, spatial significance of transportation system, impact on life style, components of the system, Transportation Scenario in India, Five year plans, privatisation Efforts, Multilateral funding, Modern Transportation,</p> <p><b>Development &amp; Planning :</b> Road transport Characteristics, Classification of roads, development plans, network patterns, data collection &amp; surveys, principles of alignment, evaluation of plan proposals; Traffic Engineering : 3E's of, traffic characteristics, Surveys, Intersection-types, layouts, design principles, Urban traffic, parking, lighting, Accidents, Traffic control Devices-marking, Signs, Signals, Regulations Motor Vehicle Act &amp; Rules</p> <p>Materials: Subgrade Soil – AASHO Classification, group Index, Subgrade soil Stabilization. CBR, aggregate Physical and Mechanical properties &amp; tests- Bituminous materials classification sources properties and tests. Cutback &amp; Emulsions, modified Bitumen IRC/IS Standards, Introduction to Geotextiles; Construction &amp; Maintenance: IRC, MOST specifications for quality &amp; quantity of materials, techniques, tools and plant, for the Earthwork, sub base, base and wearing / surfacing course of flexible pavements with gravel, W.B.M., WMM, stabilized Bituminous &amp; concrete as Construction material, Drainage, shoulders, maintenance &amp; repairs</p> <p><b>Geometric Design :</b> Road, road user &amp; road vehicle characteristics, Factors affecting design standards. Cross Section elements, stopping &amp; overtaking sight distance overtaking zones. Horizontal alignment-Curves, design of super elevation, widening, 'transition curves, vertical alignments, Design of summit and Valley Curves, I.R.C. standards for Geometric Design, Geometrics of Hill Roads; Pavement Design : Types of pavements &amp; characteristic, Design parameters, Axle &amp; Wheel load, tyre pressure, ESWL for dual Wheels, repetitions, Group Index &amp; CBR method of flexible pavement design. Analysis of load &amp; temperature stresses for rigid pavement, joints.</p> <p><b>Bridges:</b> General : Components, classification and identification, Data Collection site selection, Economic Span; Hydrology: Estimation of flood, discharge, water way, scour depth, depth of foundation, Afflux, clearance and free board. Loads, Forces, Stresses: IRC Specification &amp; code of practices, Critical combinations; Sub-Structure: (A)Types of foundations &amp; their choice, estimation of BC of foundation strata, Open, Raft, Pile and well foundation, pneumatic Caissions, cofferdams. (B) Abutment, Piers &amp; Wingwalls Their types, general design principles (empirical), Choice of Super Structure : Culverts, causeways, minor and major bridges, different structural forms and actions. suitability and choice, precast post tensioned and segmental construction. Launching, operation systems, Bearings, Aesthetics; Rating &amp; Maintenance: Methods &amp; Techniques of rating of existing bridges Inspection, Repairs, maintenance, corrosion-causes and prevention</p>	
Course No.		

Head of The Department of Civil Engineering

Department: Civil Engineering

Course No.:	CEL303	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)

<b>Course Title: Environmental Engineering-II</b>				
<b>Course Coordinator: Dr. Dilip H. Lataye</b>				
<b>Slot in which offered, if not offered write N</b>	<b>Odd</b>		<b>Even</b>	
	<b>A</b>			
<b>Structure</b>	<b>Lecture</b>	<b>Tutorial</b>	<b>Practical</b>	<b>Credits</b>
	<b>3</b>	<b>0</b>	<b>0</b>	<b>6</b>
<b>Prerequisite Course Codes As per proposed Course numbers</b>				
<b>Prerequisite Credits</b>				
<b>Equivalent Course Course Codes. As per proposed Courses &amp; old courses</b>				
<b>Overlap Course Codes As per proposed Course numbers</b>				
<b>Text Book (Max. 2)</b>	<b>Title</b>	<b>Air Pollution</b>		
	Author	M.N. Rao and H.V. N Rao		
	Publisher	Tata Mc-Graw Hill Publsihing Co. New Delhi, 1992		
	Edition	Third		
	<b>Title</b>	<b>Solid Waste Management, Collection, Processing and Disposal</b>		
	Author	A.D. Bhide and B.B. Sundaresan		
	Publisher	Mudra Offset Printers, Bajaj Nagar Nagpur		
	Edition	2001		
<b>Reference Books</b>	<b>Title</b>	<b>Air Pollution Control Engineerg</b>		
	Author	N.D.Nevers		
	Publisher	McGraw Hill International Editions Civil Engineering series		
	Edition	1995		
	<b>Title</b>	<b>Environmental Pollution Control Engg.</b>		
	Author	C.S. Rao		
	Publisher	New Age International Pvt. Ltd. publishers		
	Edition	2002		
	<b>Title</b>	<b>Integrated Solid Waste Management Engineering Principles and Management Issues</b>		
	Author	G. Techobanoglous, H. Theisen , S.A. Vigil		
	Publisher	Tata McGraw Hill International Editions Civil Engg. Series		
	Edition	1993		
	<b>Title</b>	<b>A Textbook of Air Pollution and Control Technologies</b>		
	Author	Y. Anjaneyulu		
	Publisher	Allied Publishers, Nagpur		
	Edition	2002		

<b>Content</b>	<p>Introduction to Environment, atmosphere, Air Pollution: Definition, Classification and sources of air pollutants, Meteorology and Air Pollution: Meteorological parameters affecting air pollution (primary and secondary), Atmospheric stability, inversion types, plume behaviours, Air pollution dispersion models. Effects of air pollutants on man, animals, plants and materials. Air Sampling and Measurement: Ambient air sampling and stack sampling, collection of particulate and gaseous pollutants, methods of estimation. Air pollution control methods and equipments: Principle of control methods for particulate and gaseous pollutants, settling chambers, filters, electrostatic precipitators, cyclones, wet scrubbers. Automobile Exhaust: Pollution due to diesel and petrol engines, exhaust treatment and abatement. Noise pollution, ill effects and control measures. Green house effect, photochemical smog, acid rains.</p> <p>Introduction to solid waste management, Sources, quantity and quality, Sources of solid waste, classification and components, physical and chemical characteristics, per capita contribution, sampling and analysis. Collection and transportation of solid waste, Collection systems, equipments used for collection and transportation, transfer station. Solid Waste Processing, Methods of processing, choice of method, merits and demerits of various methods. Composting of Waste: Principles of composting, factors affecting composting and methods of composting used in India. Sanitary land filling, site requirements, methods, leachate management. Incineration: Principles, types of incinerators, advantages and disadvantages.</p>
<b>Course No.</b>	

Head of The Department of Civil Engineering

Course No.	AML3xx	Open course (Y/N)	HM course (Y/N)	Discontinued (Y/N)	
Course Title		Structural Analysis			
Course Coordinator		MMM			
Slot in which offered. If not offered write N		Odd		Even	
		C			
Structure		Lecture	Tutorial	Practical	Credits
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			
		Author			
		Publisher			
		Edition			
		Title			
		Author			
		Publisher			
		Edition			
		Title			
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		Publisher			
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		Publisher			
		Edition			



	Title	
	Author	
	Publisher	
	Edition	
	Title	
	Author	
	Publisher	
	Edition	
Content		
Course No.		

Head of The Department of Civil Engineering

Course No.	AML3xx	Open course (Y/N)	HM course (Y/N)	Discontinued (Y/N)	
Course Title		Design of Steel Structures			
Course Coordinator		Dr. L.M. Gupta			
Slot in which offered. If not offered write N	Odd		Even		
	A				
Structure	Lecture	Tutorial	Practical	Credits	
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				
	Author				
	Publisher				
	Edition				
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	Publisher	
	Edition	
	Title	
	Author	
	Publisher	
	Edition	
Content		
Course No.		

Head of The Department of Civil Engineering

Course No.	CEL304	Open course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title	<b>Concrete Engineering</b>				
Course Coordinator	Dr. A. D. Pofale / A.G. Tawalare				
Slot in which offered. If not offered write N	Odd		Even		
Structure	Lecture	Tutorial	Practical	Credits	
	<b>3</b>	<b>0</b>	<b>2</b>	<b>8</b>	
Prerequisite Course Codes As per proposed Course Numbers	CEL2*** Strength of Materials				
Prerequisite credits					
Equivalent Course Codes. As per proposed courses and old courses	CEL267 Concrete Engineering				
Overlap course codes As per proposed Course Numbers	CEL267 Concrete Engineering				
Text Book (Max. 2)	Title	Concrete Technology			
	Author	Gambhir M.L			
	Publisher	Tata McGraw Hill			
	Edition	Second, 1995			
	Title	RCC Theory and Design.,			
	Author	Shah M.G. ,Kale.C.M.			
	Publisher	Macmillan India Ltd.			
	Edition	1987			
Reference Books	Title	Prestressed Concrete			
	Author	N. Krishnaraju;			
	Publisher	Tata McGraw Hill			
	Edition	(Third Edition) 1981			
	Title	Concrete Technology			
	Author	M.S.Shetty			
	Publisher	S.Chand & Company New Delhi			
	Edition	2005			
	Title	Concrete Technology -Vol I.			
	Author	Orchard D.F.			
	Publisher	Applied Science Publishers			
	Edition	(Fourth Edition) 1979.			
	Title	Properties of Concrete,			
Author	Neville A.M & J.J.Brook;				
Publisher	Addison Wesley				
Edition	1999				

	Title	Design of prestressed concrete structures.
	Author	Lin T.Y, Burns N.H.;
	Publisher	John Wiley & sons
	Edition	.(Third Edition).1982
	Title	Reinforced Concrete Design
	Author	S. Ramamurtham
	Publisher	Dhanpat Rai Publications
	Edition	2009
Content	<p><b>Concrete Technology</b></p> <ol style="list-style-type: none"> <li>1. Portland cement: Types and properties, Tests on Portland cements, Aggregates: classification function, and types. Properties and Tests on aggregates. Water: its quality and recommendations. Production of concrete: mixing, casting, compacting and curing of Concrete, workability concept, tests, workability factors, Admixtures: Purpose, use and Types</li> <li>2. Hardened concrete: Tests on concrete, properties and factors affecting properties of concrete,, Non destructive tests on concrete, Concrete mix design and methods of mix design Concepts of durability, Types of concrete</li> <li>3. Concepts of Prestressed concrete: Materials, their properties, advantage and disadvantages, methods of prestressing &amp; prestressing systems, Losses in prestress,</li> </ol> <p><b>Design of R. C.C. and Prestressed Concrete (W.S.M)</b></p> <ol style="list-style-type: none"> <li>4. Reinforced concrete: Design concept, I.S.456-2000 for working stress method, Working stress method: Flexural behaviour of beam under load, Analysis and design of singly reinforced, doubly reinforced rectangular beam sections and “T” and “L” beam sections, Shear and bond stress</li> <li>5. Design of simply supported and cantilever beams, Lintels, one-way slab, and cantilever canopy. Design of axially loaded columns and axially loaded isolated footing.</li> <li>6. Prestressed concrete: Analysis by Homogeneous beam concept, load-balancing concept, pressure Line. Design of simple rectangular sections like slab and beam</li> </ol>	
Course No.		

Head of The Department of Civil Engineering

Course No.	CEL305	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)
Course Title	<b><u>RCC Structures</u></b>			
Course Coordinator	Dr. A. D. Pofale / A.G. Tawalare			
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"> <li>1. <b>Limit state Design</b> 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.</li> <li>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.</li> <li>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.</li> <li>4. Analysis and design of portal frames (single bay single storey) hinged or fixed at base. Design of Cantilever &amp; Counterfort Retaining Walls.</li> <li>5. Design of Dog legged and Open Well Staircase.</li> <li>6. Design of Circular and Rectangular water tank with roof slab / dome resting on ground by approximate method. (Using Working Stress Method)</li> </ol>	
Course No.		

Head of The Department of Civil Engineering

COURSE CONTENT PROFORMA				
Course No.	CEL306	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)
Course Title	<b>Surveying-II</b>			
Course Coordinator	Prof Swapnil P. Wanjari			
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		
	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 Vidhyarthi Griha Prakashan, Pune			
Edition	Latest			
Title	Surveying			
Author	Arthur Bannister, Stanley Raymond, Raymond Baker			
Publisher	Person Education			
Edition				
Title				
Author				
Publisher				
Edition				
Content	<b>Theory:</b> <b>1. Curves:</b> Types, Elements, Methods & Setting out curves <b>2. Geodetic Surveying:</b> Triangulation, classifications, reconnaissance,			



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

Head of the Department of **CIVIL ENGINEERING**

Course No.	CEL307	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title	<b>Project Planning and Management</b>				
Course Coordinator	Prof S.P. Wanjari				
Slot in which offered. If not offered write N	Odd		Even		
	F				
Structure	Lecture	Tutorial	Practical	Credits	
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 <sup>th</sup> Edition			
	Title	Quantitatic Techniques in Management			
	Author	N.D. Vorer			
	Publisher	Tata McGraw Hill, New Delhi,			
	Edition	3 <sup>rd</sup> 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 &amp; 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 &amp; maintenance, depreciation &amp; replacement cost, cost of owning. Equipment of major projects : Excavating Machines (Shovels, draglines, Bulldozer, Scrapper), Drilling &amp; blasting, transporting &amp; Handling equipment (Cranes, Hoists, Conveyor belts, Dumpers, Cableways). Shotcreting, Guniting, Concrete equipments : Mixers, vibrators, batch mixing plants.</p>	
Course No.		

Head of the Department of **CIVIL ENGINEERING**

Course No.	CEL401			
Course Title	<b>Irrigation Engineering</b>			
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				
Content	<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 &amp; 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 &amp; Construction aspects.</p> <p>Earthen Dams: Types of Earthen Dams – Factors and general Principles to be considered in the design. 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, Design’s of lined canals,Water Logging &amp; its Prevention: Drainage of land, methods.</p> <p>Types ,description of Canal Structures</p> <p>Cross Drainage Works : Types &amp; general principles</p>
Course No.	CEL401

Head of The Department of Civil Engineering

Course No.	CEL402	Open course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title	<b>ESTIMATING, COSTING &amp; CONTRACTS</b>				
Course Coordinator	A. G. Tawalare				
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				
Content	Title				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
	Publisher				
	Edition				
Content	1. Estimate and Estimating: Purposes of Estimating, Types of Estimates, Methods of Building Estimates, Units of Measurement of Various Items. Methods of Detailed				

	<p>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.</p> <ol style="list-style-type: none"> <li>2. Specifications: Definition, Objectives, Use, Types, Classification, Design of Specifications, Principles of Specification Writing, Sources of Information and Typical Specifications.</li> <li>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.</li> <li>4. Rate Analysis: Purposes of Rate Analysis, Factors affecting, importance, Schedule of Rates, Task works per Day, Rate analysis of typical Items.</li> <li>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.</li> <li>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.</li> </ol>
Course No.	

Head of The Department of Civil Engineering

## Course Content Proforma

**Department** : Civil Engineering

Course No.	CEP402	Open Course (Y/N)	HM Course	Discontinued (Y/N)	
Course Title	<b>ESTIMATING, COSTING &amp; CONTRACTS</b>				
Course Coordinator	A. G. Tawalare				
Slot in which offered. If not offered write N	Odd		Even		
	7 <sup>th</sup>		N		
Structure	Lecture	Tutorial	Practical	Credits	
	0	0	2	2	
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				
Content	<p><b>. Practicals</b></p> <ol style="list-style-type: none"> <li>1. Detailed Estimate of the Following (Any Two): RCC Framed Structure, Hydraulic Structure, Steel Structure Culvert, Road Work.</li> <li>2. A Complete set of Contract document (Including specifications along with a building estimate)</li> <li>3. Rate Analysis of 10 Major Items of Building.</li> <li>4. Earth Work of Road for minimum 1 Km Length.</li> </ol> <p>Practical examination shall consist of viva voce based on the syllabus and a sessional work.</p>				
Course No.					

Head of the Department of **CIVIL ENGINEERING**



Course No.	MAL202	Open Course (Y/N)	HM course (Y/N)	Discontinued (Y/N)	
Course Title		Numerical Analysis			
Course Coordinator					
Slot in which offered. If not offered write N		Odd		Even	
		D			
Structure		Lecture	Tutorial	Practical	Credits
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			
		Author			
		Publisher			
		Edition			
		Title			
		Author			
		Publisher			
		Title			
		Author			
		Publisher			
		Edition			
		Title			
		Author			
		Publisher			

	Title	
	Author	
	Publisher	
	Edition	
	Title	
	Author	
	Publisher	
	Edition	
Content		
Course No.		

Head of the Department of **CIVIL ENGINEERING**

Course No.	CEL208	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)		
Course Title	<b>Hydrology</b>					
Course Coordinator	Prof. A. D. Vasudeo					
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						
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	Elementary Engineering Hydrology				
	Author	M. J. Deodhar				
	Publisher	Pearson Education				
	Edition	2009				
	Title	Hydrology				
	Author	Raghunath H M				
	Publisher	Wylie Publication				
	Edition	1996				
	Reference Books	Title	Applied Hydrology			
		Author	Chow Ven Te, Maidment R David, Mays W Larry			
Publisher		McGraw-Hill New Delhi				
Edition		1998				
Title		Engineering Hydrology				
Author		Subramanya K				
Publisher		Tata McGraw-Hill, New Delhi				
Edition		1996				
Title						
Author						
Publisher						
Edition						
Title						
Author						
Publisher						
Edition						

	Title	
	Author	
	Publisher	
	Edition	
	Title	
	Author	
	Publisher	
	Edition	
Content	<p>Introduction:, Hydrological cycle, Precipitation- forms and types</p> <p>Abstractions :Infiltration, Evaporation, Transpiration, Evapotranspiration, Interception.</p> <p>Runoff: Sources and components of runoff, Classification of streams and measurement of discharge of a stream by Area – Slope and Area – Velocity methods.</p> <p>Hydrograph: Flood hydrographs and its components, S-Curve technique, unit hydrograph, synthetic hydrograph. Statistical Methods, Various methods of averages, probability of an event, Frequency analysis.</p> <p>Floods: Causes and effects, Factors affecting peak flows and its estimation, Flood routing and Flood forecasting.</p> <p>Groundwater: Introduction, Occurrence and distribution of Groundwater, Water table, Darcy's law. Introduction to hydraulics of wells, Open wells - yield test.</p>	
Course No.	CEL208	

Head of The Department of Civil Engineering

Course No.	CEL209	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)
Course Title	<b><u>Construction Materials</u></b>			
Course Coordinator	Dr. A. D. Pofale / A.G. Tawalare			
Slot in which offered. If not offered write N	Odd	Even		
	N	E		
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	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"> <li>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.</li> <li>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.</li> <li>3. Rocks and Stones – Classification, quarrying, dressing, uses, characteristics, selection, types Common building stones, artificial building stones. Uses and applications of stones.</li> <li>4. Wood and wood Products: Classification and growth of trees, Timber: Classification, Structure, Characteristics, Seasoning, defects, Diseases, decay and preservation.</li> <li>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</li> <li>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.</li> <li>7. Ceramic Materials: Classification, Refractories, glass, glass wool, mechanical, thermal and electrical properties Uses and application.</li> <li>8. Polymeric Materials: Polymerisation mechanism and depolymerisation. Rubber and plastics, properties, effect of temperature on mechanical properties. Uses and application.</li> <li>9. 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.</li> <li>10. Lightweight heavy weight materials, natural and artificial, special cements and concrete.</li> </ol>
Course No.	

Head of The Department of Civil Engineering

COURSE CONTENT PROFORMA				
Course No.	CEL308	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)
Course Title	<b>Computer Aided Analysis and Design</b>			
Course Coordinator	Dr. Rahul V. Ralegaonkar			
Slot in which Offered	ODD		Even	
			C	
Structure	Lecture	Tutorial	Practical	Credits
	3	0	2	8
Prerequisite Course Codes				
Prerequisite Credits				
Equivalent course Codes				
Overlap Course Codes				
Text Books	Title	CAAD PRIMER, A GENERAL GUIDE TO COMPUTER AIDED DESIGN AND DRAFTING		
	Author	VIJAY DUGGAL		
	Publisher			
	Edition			
	Title	Mathematical Elements of Computer Graphics		
	Author	D F Rogers & J A Adams		
	Publisher	Tata McGraw-Hill Publishing Company		
	Edition			
Reference Books	Title	Numerical Techniques in 'C'		
	Author	E V Kameshwar		
	Publisher	BPB Publication		
	Edition			
	Title	Database System Concepts		
	Author	Abraham Silberschatz, Henry F. Korth, S. Sudarshan		
	Publisher	MCGraw Hill Companies		
	Edition			
	Title	Introduction to Systems		
	Author	Rajiv Gupta, I J Nagrath		
	Publisher	New Age International		
	Edition			
	Title	Systems Analysis and Design Methods		
Author	<i>Jeffrey L. Whitten, Lonnie D. Bentley</i>			
Publisher	McGraw-Hill Companies			
Edition				
Content	<b>Theory:</b>			
	1. Introduction to CAAD and computer graphics: Overview, programming			

	<p>language, application area, software environment. Data types, graphics devices, representation of images, transformations, computer aided drafting</p> <ol style="list-style-type: none"> <li>2. Programming language and techniques: overview, variables &amp; datatypes, operators, input-output, control structures, functions, arrays, pointers, strings, data-files, trees, recursion.</li> <li>3. Database management system (DMBS): Introduction, Components of DBMS, Data Models, query language, design of database</li> <li>4. Knowledge based expert system: Introduction, Artificial intelligence, components of expert system, knowledge representation, inference mechanism, building expert system</li> <li>5. Simulation: Introduction, Concept of System, models &amp; its purpose, types, approaches</li> <li>6. Analytical Tools: Introduction &amp; application of Finite Element Method, Optimization, Genetic Algorithm, Fuzzy Logic.</li> </ol> <p><b>Practicals:</b> 10 lab experiments will be conducted based on above topics.</p>
Course No.	

Head of the Department of **CIVIL ENGINEERING**



Course No.	CEL309	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)
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	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>Relative equilibrium of fluids, Liquid masses subjected to uniform horizontal and vertical acceleration, Acceleration of fluid mass along a slope, Free and forced vortex, Velocity potential function and stream function, circulation, Kinetic energy correction factor, Momentum correction factor,</p> <p>Boundary Layer Theory, Displacement thickness, Momentum thickness, Laminar boundary layer</p> <p>Forces on immersed bodies, Drag and Lift, Magnus effect</p> <p>Viscous flow, Laminar incompressible flow in a circular pipe, Moody's diagram, two dimensional laminar flow between parallel plates</p> <p>Dimensional Analysis and Model Analysis (undistorted models), Reynold's law and Froudes law of similarity</p> <p>Uniform flow computations in open channels, Critical Flow computations in open channel</p>	
Course No.	CEL309	

Head of The Department of Civil Engineering

COURSE CONTENT PROFORMA					
Course No.	CEL310	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title	<b>Energy Efficient Buildings</b>				
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				
	Title	Solar Energy Fundamentals & Applications			
	Author	H P Garg, J Prakash			
Publisher	Tata MacGraw Hill Publishing				
Edition					
Reference Books	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	<b>Theory:</b>			
		<ol style="list-style-type: none"> <li>1. Conservation &amp; energy efficiency concepts-overview of significance of energy use and energy processes in buildings</li> </ol>			

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

Head of the Department of **CIVIL ENGINEERING**

Course No.	AML3xx	Open course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title	Advance Structural Analysis				
Course Coordinator					
Slot in which offered. If not offered write N	Odd		Even		
	E				
Structure	Lecture	Tutorial	Practical	Credits	
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				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
	Publisher				
	Edition				

	Title	
	Author	
	Publisher	
	Edition	
	Title	
	Author	
	Publisher	
	Edition	
Content		
Course No.		

Head of the Department of **CIVIL ENGINEERING**

Course No.	CEL311	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title	<b>Pavement design</b>				
Course Coordinator	Dr. Vishrut Landge				
Slot in which offered. If not offered write N	Odd		Even		
	C		Even		
Structure	Lecture	Tutorial	Practical	Credits	
	3	1	0	8	
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	Pavement Design and Materials			
	Author	A.T. Papagiannakis & E.A. Masad			
	Publisher	John Willey & Sons			
	Edition				
	Title	<b>Highway Materials, Soils, and Concretes</b>			
	Author	Harold Atkins			
	Publisher	Prentice Hall Company			
	Edition				
Reference Books	Title	Highway Engineering			
	Author	Paul H. Wright and Karen Dixon			
	Publisher	John Willey & Sons			
	Edition				
	Title	<b>Highways: The Location, Design, Construction and Maintenance of Road Pavements</b>			
	Author	O' Flaherty & Coleman.A.			
	Publisher	Edward Arnold U.K.			
	Edition				
	Title	Principles of Pavement Design			
	Author	Yoder C.J. & Witzak M.W.			
	Publisher	John Willey & Sons			
	Edition				
	Title	<b>Pavement Management Systems</b>			
	Author	Ralph C. G. Haas			
Publisher	McGraw Hill Book Co. New York				
Edition					
	Title	Performance and Durability of Bituminous Materials			
	Author	J. G. Cabrera			
	Publisher	John Willey & Sons			
	Edition				
	Title				
Author					

	Publisher	
	Edition	
Content	<p>General : Structural action of flexible and rigid pavements. Characteristics of highway and airfield pavements. Design Parameters: Standard Axie load and wheel assemblies for road vehicles Under carriage system for aircraft, Tyre and contact pressure, contact area imprints, Computations of ESWL for flexible and rigid pavements. Load repetitions and distributions of traffic for highway and airfield pavement, airport traffic areas. Material Characteristics: AASHO subgrade soil classification. Group index, CBR, North Dakota cone bearing value, plate load test for “K”, Marshal’s method of Bituminous mix design. Modulus of rupture and elasticity, poisson’s ratio &amp; coefficient of thermal expansion of concrete. Layer equivalency concepts.</p> <p>Analysis of Flexible and Rigid Pavements: Stress, Strain deformation analysis for single, two three and multi layered flexible pavement systems. Stress and deflections for rigid pavements due to load and temperature, influence Charts, ultimate load analysis, joints in C.C. pavements.</p> <p>3. Highway Pavement Design:</p> <p>(a) Flexible: North Dakota cone, Group index, CBR, IRC-37, Brumister, Triaxial (Kansas), AASHO method of design.</p> <p>(b) RIGID IRC-58, P.C.A., AASHO method of design, Design of joints and reinforcement.</p> <p>Airfield Pavement Design:</p> <p>(a) Flexible: U.S. Corps of Engineering, CBR, FAA, Mcload(Canadian)</p> <p>(b) Rigid: PCA, FAA &amp; LCN, ultimate load Analysis yield lines patterns, methods.</p> <p>4. Pavement Testing and Evaluation: Trial &amp; Inspection Pits, Field Density, CBR, plate load Test, condition surveys and surface evaluation for unevenness, rut depth, profilometers, Bump integrators, Benkalman Beam Deflection Study. Straightening of Pavement: Design of flexible, composite and rigid overlays for flexible and rigid pavements, Repairs, Maintenance and rehabilitation of pavements. Specifications and Cost Estimates: Review of IRC/MORTH/ICAO/NAAI specification and standards for highway and airfield construction. Cost evaluation and comparative study. Pavement Management Systems, case studies of Highway and Airfield pavement projects.</p>	
Course No.		

Head of the Department of **CIVIL ENGINEERING**



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			

<b>Content</b>	<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 &amp;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, Banglore 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>
<b>Course No.</b>	

Head of The Department of Civil Engineering

Course No.	AML4xx	Open course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title		Advanced Steel Design			
Course Coordinator					
Slot in which offered. If not offered write N	Odd		Even		
			C		
Structure	Lecture	Tutorial	Practical	Credits	
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				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
	Publisher				
	Edition				

	Title	
	Author	
	Publisher	
	Edition	
	Title	
	Author	
	Publisher	
	Edition	
Content		
Course No.		

Head of the Department of **CIVIL ENGINEERING**

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	<b>Airport Planning &amp; Design</b>			
	Author	Goyal & Praveen Kumar			
	Publisher	Galgotia Publication			
	Title				
	Author				
	Publisher				
	Title				
	Author				
	Publisher				

	<b>Title</b>	
	<b>Author</b>	
	<b>Publisher</b>	
<b>Content</b>	<p><b>Railways</b></p> <ol style="list-style-type: none"> <li>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.</li> <li>2. Rail types and functions, selection of rails, Test on rails wear &amp; 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.</li> <li>3. Points &amp; crossings : Left and right hand turnout, design calculation for turnout &amp; Crossover, railway track Junctions. Stations and Yards : Types, functions facilities &amp; 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 &amp; modern, techniques of maintenance. RDSO standards. Modern Technology related to track &amp; traction, Rolling Stock, Signaling and Controlling.</li> </ol> <p><b>Airports</b></p> <ol style="list-style-type: none"> <li>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 &amp; Railway.</li> <li>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.</li> </ol> <p><b>Docks and Harbour:</b> Importance, Sea and tides, tidal theories, tide table, wind waves and Cyclones, harbour layout, break waters, jetties and moorings,</p>	
<b>Course No.</b>		

Head of The Department of Civil Engineering

Course No.	CEL 405	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)

Course Title	<b>INDUSTRIAL WASTE WATER TREATMENT, REUSE AND RECYCLING</b>			
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 <sup>nd</sup>		
	Title	Industrial Water Pollution Control		
	Author	W.W.Ecenfelder		
	Publisher	Mc-Graw Hill Book Co.		
	Edition	2 <sup>nd</sup>		
Reference Books	Title	Industrial Pollution Prevention Handbook		
	Author	Freeman H. M.		
	Publisher	McGraw Hill		
	Edition	1 <sup>st</sup>		
	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 <sup>st</sup>		
Content	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.
Course No.	CEL 4xx

Head of The Department of Civil Engineering



Course No.	CEL 406	Open Course (Y/N)	HM course (Y/N)	Discontinued (Y/N)	
Course Title	<b><u>Advanced Concrete Technology</u></b>				
Course Coordinator	Dr. A. D. Pofale / A.G. Tawalare				
Slot in which offered. If not offered write N	Odd		Even		
	H		N		
Structure	Lecture	Tutorial	Practical	Credits	
	0	0	2	2	
Prerequisite Course Codes As per proposed Course Numbers	3CE*** Concrete Engineering				
Prerequisite credits					
Equivalent Course Codes. As per proposed courses and old courses	CEL487 Advanced Concrete Technology				
Overlap course codes As per proposed Course Numbers	CEL487 Advanced Concrete Technology				
Text Book ( Max. 2)	Title	Concrete Technology			
	Author	Gambhir M.L:			
	Publisher	Tata McGraw Hill			
	Edition	(Second Edition) 1995			
	Title	Concrete Technology			
	Author	M.S.Shetty			
	Publisher	S.Chand & Company New Delhi			
	Edition	2005			
Reference Books	Title	Concrete microstructure, properties & materials,			
	Author	P.Kumar Mehata, Paulo & J.M. Monteiro,			
	Publisher	Prentice Hall INC & Mcgraw Hill USA			
	Edition				
	Title	Light Weight Concrete,			
	Author	Short & Kenniburg,			
	Publisher	Asia Publishing House, Bombay			
	Edition	1963			
	Title	Concrete Technology -Vol I. & II			
	Author	Orchard D.F.;			
	Publisher	Applied Science Publishers			
	Edition	(Fourth Edition) 1979			
		Title	Properties of Concrete		
Author		Neville A.M., J.J.Brook			
Publisher		Addison Wesley			
Edition		1999			
Title					
Author					
Publisher					
Edition					
Content	1. Review of properties of cement, their physical and chemical properties,				

	<p>special purpose cements, Classification and properties of aggregates, soundness of aggregates, alkali aggregate reaction, thermal properties of aggregates, Importance of shape and Surface area and grading, gap graded and aggregates. Admixtures &amp; construction chemicals, Use of Fly Ash, Silica Fumes, Metakaolin &amp; GGBS in concrete</p> <ol style="list-style-type: none"> <li>2. Rheological behavior of concrete, requirements of workability of concrete, Effect of environmental conditions, Strength properties of hardened concrete, Impact, Dynamic and fatigue behaviour of concrete, shrinkage and creep of concrete, behaviour of concrete under fire.</li> <li>3. Permeability and Durability of concrete, Parameters of durability of concrete, chemical attack on concrete, Production of concrete; batching mixing, transportation, placing, compaction of concrete. Special methods of concreting and curing of concrete, Hot weather and cold weather concreting, Guniting (Shotcreting)</li> <li>4. Concrete mix design, Basic considerations and choice a mix proportions, various methods of mix designs including IS Code method. Quality control and quality assurance of concrete, Acceptance criteria, Quality management in concrete construction, Inspection and testing of concrete. Non-destructive testing of concrete, core test and load test.</li> <li>5. Special concrete such as high strength, Lightweight, heavy weight, vacuum processed concrete, Mass concrete, high performance concrete, Pumpable concrete, Self Compacting concrete, Air entrained concrete, Ferro cement, fiber reinforced concrete, Polymer impregnated concrete. Jet concrete. Deterioration and repair technology of concrete, Distress and type of repairs, crack sealing techniques</li> </ol>
Course No.	

Head of The Department of Civil Engineering

Course No.	CEP406	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title	<b><u>Advanced Concrete Technology</u></b>				
Course Coordinator	Dr. A. D. Pofale / A.G. Tawalare				
Slot in which offered. If not offered write N	Odd			Even	
	7th			N	
Structure	Lecture	Tutorial	Practical	Credits	
	3	0	2	8	
Prerequisite Course Codes As per proposed Course Numbers	3CE*** Concrete Engineering				
Prerequisite credits					
Equivalent Course Codes. As per proposed courses and old courses	CEL487 Advanced Concrete Technology				
Overlap course codes As per proposed Course Numbers	CEL487 Advanced Concrete Technology				
Content	<ol style="list-style-type: none"> <li>1. Verification of Physical properties of concrete by using chemical admixture</li> <li>2. Design of high strength concrete mixes</li> <li>3. Vee Bee Test on concrete</li> <li>4. Flow Test on concrete</li> <li>5. Design of Concrete Mix by IS code method</li> <li>6..Modulus of Rupture of Concrete</li> <li>7. Determination of Static and Dynamic modulus of elasticity of concrete</li> <li>8. Fatigue properties of concrete study / experiment</li> <li>9. Test on Self Compacting concrete</li> <li>10. Rheological behavior of concrete.</li> </ol>				
Course No.					

Head of The Department of Civil Engineering

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	
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 Plcher			
	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 <sup>th</sup> Edition				

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

Head of The Department of Civil Engineering

Course No.	AML4xx	Open course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title		Advance RCC			
Course Coordinator					
Slot in which offered. If not offered write N	Odd		Even		
			G		
Structure	Lecture	Tutorial	Practical	Credits	
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				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
	Publisher				
	Edition				

	Title	
	Author	
	Publisher	
	Edition	
	Title	
	Author	
	Publisher	
	Edition	
Content		
Course No.		

Head of The Department of Civil Engineering

Course No.	AML4xx	Open course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title	Structural Dynamics				
Course Coordinator					
Slot in which offered. If not offered write N	Odd		Even		
			C		
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				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
	Publisher				
	Edition				
Reference Books	Title				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
	Publisher				
	Edition				



	Title	
	Author	
	Publisher	
	Edition	
	Title	
	Author	
	Publisher	
	Edition	
Content		
Course No.		

Head of The Department of Civil Engineering

Course No.	CEL408	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)
Course Title	<b>Ground Improvement Techniques</b>			
Course Coordinator	D J Katyayan			
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	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	Ground Improvement Techniques		
	Author	Purushothama Raj		
	Publisher	Laxmi Publications,		
	Edition	2005		
	Title	Geotechnical Engineering		
	Author	S. K. Gulhati & Manoj Dutta		
	Publisher	Tata McGraw-Hill		
	Edition	2005		
Reference Books	Title	Soil Mechanics in Theory & Practice		
	Author	Alam Singh		
	Publisher	Asia Publishing House		
	Edition	1975 & later		
	Title	Geotechnical Engineering, Principles and Practice		
	Author	D.P. Coduto;		
	Publisher	Prentice Hall of India Pvt. Ltd,		
	Edition	2002.		
	Title	Engineering Principles of Ground Modification		
	Author	Hausman M. R.		
	Publisher	McGraw Hill Publishing Co.		
	Edition	1990		
	Title	Soil Mechanics & Foundation Engg		
	Author	Punmia B.C.		
Publisher	Laxmi Publication Pvt. Ltd, New Delhi,			
Edition	1994			
Content	<ol style="list-style-type: none"> <li>1. Need for improvement, various examples, Compaction- heavy and light, admixtures - field compaction techniques</li> <li>2. Stabilization, physical and chemical improvement, electro-kinematics, Stabilization, deep mixing with lime, cement</li> <li>3. Vibro-floatation technique for improvement of cohesion less deposits.</li> <li>4. Preloading, dewatering – 3 dimensional consolidation, vertical drains, stone columns, strip, wick and sand drains, Grouting, heat treatment, ground freezing, inclusions.</li> </ol>			

	<ol style="list-style-type: none"><li>5. Anchorage, micro-piles, soil reinforcement, ground anchorage, soil anchors. Basic concepts of reinforced earth, use of Geo-synthetic materials. Salient features, function and application of various geo-synthetic materials.</li><li>6. Rock bolting, soil nailing, emerging trends, Heavy tamping, blasting.</li></ol>
Course No.	CEL408

Head of The Department of Civil Engineering

Course No.	CEL409	Open course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title	Quality & Safety in Construction				
Course Coordinator	Prof S.P.Wanjari				
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					
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 Planning & Management			
	Author	P.S. Gahlot & B.M. Dhir			
	Publisher	New Age International (P) Ltd.			
	Edition				
	Title				
	Author				
	Publisher				
	Edition				
Reference Books	Title	Total Quality in Construction Projects			
	Author	Ron Baden			
	Publisher	Thomas Telford, London			
	Edition				
	Title	Engineered Quality in Construction			
	Author	Michael T. Kubal			
	Publisher	McGraw Hill			
	Edition				
	Title	Safety Health & Welfare Manual			
	Author				
	Publisher				
	Edition				
	Title	Hand book of OSHA Construction Safety & Health			
	Author	Charles D. Reese & James V. Edison			
	Publisher	CRC Press, 1999			
Edition					

	Title	
	Author	
	Publisher	
	Edition	
	Title	
	Author	
	Publisher	
	Edition	
Content	<ol style="list-style-type: none"> <li>1 Total quality Management (TQM) to the construction industry: Evolution, philosophy and principles for building client, the Deming Philip Crosby, J.M. Juran contribution to TQM Quality as a management process, contractual options and integration.</li> <li>2 2. TQM to construction Projects : General application, TQM in precontract, post contract, commissioning and maintenance phase, project quality management .</li> <li>3 Auditing: First party auditing second party auditing, contraction management adjudication.</li> <li>4 Accidents: Types causes, direct and indirect cost of accidents, objective of accident prevention programmes.</li> <li>5 Preventative measures : personal protective equipments, job requirements, tool equipments and fire protection measures. Projection from radioactive /toxic materials, laser and x-ray equipment.</li> <li>6 Safety Organization and Management: Safety policies, safety organization, safety committees, safety representatives, outside agencies – Govt. intervention, international agreements.</li> </ol>	
Course No.		

Head of The Department of Civil Engineering

Course No.	CEL410	Open course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title	Traffic Engineering				
Course Coordinator	Dr. Vishrut Landge				
Slot in which offered. If not offered write N	Odd		Even		
			F		
Structure	Lecture	Tutorial	Practical	Credits	
	3		0	1	
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	Traffic and Highway Engineering			
	Author	Garber N.J. & Lester A. Hoel			
	Publisher	West Publishing Co. New York			
	Edition				
	Title	Traffic Engineering			
	Author	Roger P. Roess, Elena S. Prassas & William R. Mcshane			
	Publisher	John Willey & Sons			
	Edition				
Reference Books	Title	Decision Making on Mega Project: Cost Benefit Analysis, Planning and Innovation (Transport Economics, Management and Policies)			
	Author	Priemm H., Bentt F. & Bert Van Bee			
	Publisher	Edward Elgar Publishing Limited			
	Edition				
	Title	An Introduction to Transportation Engineering			
	Author	William W. Hay			
	Publisher	John Willey & Sons			
	Edition				
	Title	<b>Fundamentals of Transportation Engineering</b>			
	Author	Robert G. Hennes and Martin Eske			
	Publisher	McGraw Hill Book Co. New York			
	Edition				
	Title	Fundamentals of traffic engineering			
	Author	Norman Kennedy			
Publisher	Institute of Transportation and Traffic Engineering, University of California				
Edition					
	Title	Traffic Flow Theory and Control			
	Author	Donald R. Drew			
	Publisher	Institute of Transportation and Traffic Engineering, University of California			
	Edition				

	Title	Urban Transportation Planning
	Author	Michael Meyer & Eric J. Miller
	Publisher	
	Edition	
Content	<p>Traffic Engineering &amp; Studies: Definition, Scope, Various organization working in traffic research, Elements of traffic , characteristics of vehicle, road user and road; traffic studies-speed &amp; delay, traffic volume, O &amp; D, parking and accidents, sample size, study methodology, data collection &amp; presentation,</p> <p>Traffic Control &amp; Safety and Enforcement &amp; Education: Traffic signs, road markings, traffic signals-design of signalized intersections and signaling systems, conflict points, traffic manoeuvres, different intersections, queuing Theory, Traffic control aids, and street furniture. Driver error, vehicle &amp; road surface. Traffic accident scenario in India. Collection and interpretation of accident data and recording in Std. forms skidding, speed and weather effects on accidents, Analysis of Accidents, Pedestration cyclists &amp; auto vehicle drivers safety. Traffic 3R and 5E's of traffic management. Motor Vehicle act and Rules, Education, Need and Methods, Air pollution &amp; Noise Pollution by Traffic, Pollution standards for auto vehicles, PUC</p> <p>Traffic Capacity analysis : Speed, volume, parking &amp; accident data analysis, statistical approach, , , traffic stream characteristics- relationship between speed, flow and density, level of service &amp; capacity analysis, traffic forecasting.</p> <p>Traffic Design: Channelisation of islands for different traffic situations, design of rotaries &amp; at-grade intersections, grade separated intersections, their warrants; facilities for pedestrian &amp; bicycle ways, bus stop location and bus bay design, transport terminals, parking parcels, design of road lighting at different road sections &amp; intersections.</p> <p>Traffic Control Devices: Traffic signs, markings and signals; principles of signal design, Webster's method, signal coordination.</p> <p>Traffic Regulation &amp; Management: Speed, vehicle, parking, enforcement regulations, mixed traffic regulation, management techniques-one-way, tidal flow, turning restrictions etc., road safety measures Traffic Flow theory Introduction</p>	
Course No.		

Head of The Department of Civil Engineering

Course No.	CEL411	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title	<b>Geotechnical Engineering</b>				
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	<ol style="list-style-type: none"> <li>1. Clay mineralogy : Concept of composition classification and nomenclature, structure of clay minerals, Kaolinite Illite, Montmorillonite groups physical properties, clay water relation thixotrophy electrical effects, electrosmosis, streaming potential Zeta potential.</li> <li>2. Drainage and Dewatering : Various systems of and there Graded filters and design Criteria applications of Geomembranes.</li> <li>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.</li> <li>4. Compaction &amp; field compaction and controls : Mechanics, Lab &amp; Fd. Tests, Fd. Compaction equipments &amp; these choice and suitability, quality control, Deep compaction, Vibro floatation.</li> <li>5. Consolidation : Terzaghi's theory for two &amp; three dimensional consolidation field and laboratory tests. Consolidation settlements and drains.</li> <li>6. Soil stabilization, Mechanical and Chemical stabilization, Lab. &amp; Investigations, Field Techniques, Advanced Techniques in Geotextile</li> </ol>			



	applications, Stone columns and Gabions. 7. Case studies of Applications
Course No.	

Head of The Department of Civil Engineering

**Course Content Proforma**

**Department: Civil Engineering**

<b>Course No.:</b>	<b>CEL412</b>	<b>Open Course (Y/N)</b>	<b>HM Course (Y/N)</b>	<b>Discontinued (Y/N)</b>
<b>Course Title: Spatial Analysis for Resource Management</b>				
<b>Course Coordinator: Dr. Y.B.Katpatal</b>				
<b>Slot in which offered, if not offered write N</b>	<b>Odd</b>		<b>Even</b>	
	<b>C</b>			
<b>Structure</b>	<b>Lecture</b>	<b>Tutorial</b>	<b>Practical</b>	<b>Credits</b>
	<b>3</b>	<b>0</b>	<b>2</b>	<b>8</b>
<b>Prerequisite Course Codes As per proposed Course numbers</b>				
<b>Prerequisite Credits</b>				
<b>Equivalent Course Codes. As per proposed Courses &amp; old courses</b>				
<b>Overlap Course Codes As per proposed Course numbers</b>				
<b>Text Book (Max. 2)</b>	<b>Title</b>	<b>Concepts and techniques of Geographic Information Systems</b>		
	<b>Author</b>	C.P LO Albert KW Yeung		
	<b>Publisher</b>	Pritince Hall of India		
	<b>Edition</b>	2002		
	<b>Title</b>	Text Book on Remote Sensing		
	<b>Author</b>	C.S. Agrawal & P K Garg		
	<b>Publisher</b>	Wheeler		
	<b>Edition</b>	First		
<b>Reference Books</b>	<b>Title</b>	Geographic Information Systems and Science		
	<b>Author</b>	Paul A. Longley, M. Goodchild, David Maguire, David Rhind		
	<b>Publisher</b>	Wiley		
	<b>Edition</b>	First		
	<b>Title</b>	Keith C. Clerk, Bradely O Parks, Michel P Crane		
	<b>Author</b>	Geographic Informaiton System and Enviornment Modeling		
	<b>Publisher</b>	Pritince Hall of India		
	<b>Edition</b>	2002		
	<b>Title</b>	Remote Sensing of the Environment ..an Earth Resource Perspective		
	<b>Author</b>	John R Jensen		
	<b>Publisher</b>	Pearson Education		
	<b>Edition</b>	2006		

<b>Content</b>	<p>Fundamentals of Geoinformatics: raster and Vector Data, Resolutions of RS data, Thermal and Radar Sensing, spatial and non spatial information, attribute data collection, data formats, data conversions. RS as a technology for data extraction technique, multithematic data extraction using multispectral sensors, thematic map generation.</p> <p>Overlay analyses, Buffer analyses, Query shell. Spatial analysis, Modeling of spatial data, Network analysis, digital terrain elevation models, Customization and Decision Support Systems.</p> <p>Applications of Geoinformatics for spatial management of resources: Run-off estimations, infiltration characteristics, groundwater potential and recharge characteristics, Watershed management, watershed prioritization, Sediment yield estimation, reservoir capacity studies, Spatial analyses for Environment Impact assessment, Monitoring and feedback, Natural indices, Concept of E-Governance using Geoinformatics. Integrated applications using various technologies within Geoinformatics; methods and approach. Real time and temporal analysis using Geoinformatics.</p> <p>Multidisciplinary applications of Geoinformatics; integration of various segments. Geoinformatics for resources management and utilities management.</p>
<b>Practical</b>	<p>Spatial Digital Data and its Formats  Digital Image analysis and Classification  Vector Data generation, topology building and attribution  Overlay, Buffer and Network analysis  Models for Resource analysis</p>
<b>Course No.</b>	

Head of The Department of Civil Engineering

Course No.	CEL413	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)
Course Title	<b><u>Prestressed Concrete Structures</u></b>			
Course Coordinator	Dr. A. D. Pofale / A.G. Tawalare			
Slot in which offered. If not offered write N	Odd	Even		
Structure	G			
	Lecture	Tutorial	Practical	Credits
	3	1	0	8
Prerequisite Course Codes As per proposed Course Numbers	3CEL-*** RCC Structures			
Prerequisite credits				
Equivalent Course Codes. As per proposed courses and old courses	CEL486 Prestressed Concrete			
Overlap course codes As per proposed Course Numbers	CEL486 Prestressed Concrete			
Text Book ( Max. 2)	Title	Prestressed Concrete		
	Author	N. Krishnaraju		
	Publisher	Tata McGraw Hill		
	Edition	(Third Edition) 1981		
	Title	Prestressed Concrete		
	Author	N. Rajgopalan,		
	Publisher	Narosa Publishing House, Mumbai		
	Edition	Second Reprint 2007.		
Reference Books	Title	Design of Prestressed Concrete Structures.		
	Author	Lin T.Y, Burns N.H.		
	Publisher	John Wiley & sons		
	Edition	(Third Edition).1982		
	Title	Prestressed concrete (First Edition);		
	Author	Pandit G.S. & Gupta S.P.		
	Publisher	CBS Publishers., New Delhi		
	Edition	first reprint, 1995		
	Title	Prestressed Concrete Design & Construction		
	Author	Leonhardt F. , Ernst Wilhelm and Sohen		
	Publisher	Berlin		
	Edition	1964		
	Title	I.S.1343-1980;Code of Practice for Prestressed Concrete,		
	Author			
	Publisher	Bureau of Indian Standards.		
	Edition	1980		
	Title			
	Author			
	Publisher			
	Edition			
Content	1. Design of high strength concrete mixes. Loss of prestress in single span and continuous beams. Use of IS 1343-1980, Analysis Limit State			

	<p>Design of beams for Tension Type II and III problems, Cracking moment, untensioned reinforcement, Partial prestressing, Stress Corrosion.</p> <ol style="list-style-type: none"> <li>2. Transfer of prestress by bond, Transverse tensile stresses, End zone reinforcement. Behaviour of Bonded and unbounded prestress concrete beams.</li> <li>3. Deflection of Prestressed concrete members, short and long term, control of deflections. Crack width considerations. Flexural strength of prestressed concrete sections: Types of flexural failures, Limit state concept.</li> <li>4. Shear resistance of prestressed concrete members: Principal stresses and ultimate shear Resistance, Design of shear reinforcement, prestressed concrete, members in Torsion, Design of reinforcement in torsion shear and bending.</li> <li>5. Stress distribution in end block, Analysis and Anchorage Zone reinforcement. Composite Construction of prestressed precast and cast in situ concrete. Statically Indeterminate structures: Continuous beams, primary and secondary moments, Continuity, concordant cable profile, Analysis and Design of continuous beams.</li> <li>6. Prestressed concrete pipes and poles. Design of Prestressed concrete tanks. Prestressing of dams and bridges: Method of construction. Stage prestressing, Dynamic and Fatigue behaviour of prestressed concrete.</li> </ol>
Course No.	

Head of The Department of Civil Engineering

**Department : Civil Engineering**

Course No.	CEL414	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)
Course Title	Water Distribution Systems			
Course Coordinator	Dr. Rajesh Gupta			
Slot in which offered. If not offered write N	Odd		Even	
Structure	Lecture	Tutorial	Practical	Credits
	03	01	00	08
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	Analysis of water distribution Networks		
	Author	Bhave , P.R. and Gupta R.		
	Publisher	Nawas Publishing Co, New Delhi.		
	Edition			
	Title	Optimal Design of Water Distribution Networks		
	Author	Bhave P.R.		
	Publisher	Nawas Publishing Co, New Delhi.		
	Edition			
Reference Books	Title	Analysis of flow in pipe networks		
	Author	Jeppson R.W.		
	Publisher	Ann Arbon Science Aun Arbox Michigan USA		
	Edition			
	Title	Analysis of water distribution System		
	Author	Walksi T-M		
	Publisher	Van Nostand Reinheld G, New York USA		
	Edition	1984		
	Title	Manual on Water Supply and Treatment		
	Author	CPHEEO		
	Publisher	Ministry of Urban Development G01		
	Edition			
	Title			
	Author			
	Title			
	Author			
	Publisher			
	Edition			
	Title			
	Author			

	Publisher	
	Edition	
Content	<ol style="list-style-type: none"> <li>1. General Hydraulic Principles, Head loss formulae- Darcy-Waisbach formula, Hazen – Williams formula, Modified Hazee- Williams formula, Series and Parallel connection of Pipes, Equivalent Pipes, Analysis of branched Water Distribution Networks.</li> <li>2. Formulation of Equations for looped Water Distribution Networks, Analysis of flow in looped networks using Hardy Cross, Newton-Raphson and Linear Theory method, Introduction of Gradient method and other methods of analysis.</li> <li>3. Reservoirs, Pumps and Valves (check valve, flow control valve and pressure reduces valve) in Water distribution systems. Flow dependent analysis of multi-reservoir systems, Introduction to head-dependent analysis.</li> <li>4. Node flow analysis of water distribution networks:- Node head – discharge relationships, Direct and Indirect methods, Application of NFA technique to serial networks.</li> <li>5. Optimal and Economical diameter of pumping main Design of pumping main considering rising main diameter as continuous as well as discrete variable. Water hammer consideration.</li> <li>6. Design of water distribution networks using Critical path method, Formulation of optimization model, Application of Cost-head loss ratio method and linear programming technique to optimal design of branched networks.</li> <li>7. Determining number of branching configuration for a looped network, Use of path concept and minimum spanning tree concept, Application of critical path method for design of looped networks.</li> </ol>	
Course No.		

Head of The Department of Civil Engineering

Course No.	CEL 415	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)
Course Title	<b><u>Advanced Structural Design (RCC)</u></b>			
Course Coordinator	Dr. A. D. Pofale / A.G. Tawalare			
Slot in which offered. If not offered write N	Odd	Even		
		D		
Structure	Lecture	Tutorial	Practical	Credits
	3	1	0	8
Prerequisite Course Codes As per proposed Course Numbers	3CE*** RCC Structures			
Prerequisite credits				
Equivalent Course Codes. As per proposed courses and old courses	CEL499			
Overlap course codes As per proposed Course Numbers	CEL499			
Text Book ( Max. 2)	Title	Advanced Reinforced Concrete Design		
	Author	Varghese P.C		
	Publisher	Prentice Hall of India		
	Edition	2001		
	Title	Advanced reinforced Concrete		
	Author	N. Krishna Raju		
	Publisher	CBS Publishers & Distributers		
	Edition	2002		
Reference Books	Title	Design of Plates and shells.		
	Author	G.Ramaswamy		
	Publisher			
	Edition			
	Title	Reliability Analysis & Design of Structures.		
	Author	Ranganathan R		
	Publisher	Tata McGrawHill		
	Edition	1990		
	Title	Reinforced Design by,		
	Author	Pillai ,S.U.,D. Menon		
	Publisher	T M H Publication		
	Edition	(Second Edition)2003		
	Title	Design of reinforced Concrete Structures		
	Author	Dayaratnam P		
	Publisher	Oxford& IBH		
	Edition	(Fourth Edition).1984		
	Title			
	Author			
	Publisher			
	Edition			
Content	<b>RCC Structures</b> 1. Design for Structural reliability and study of structural safety. 2. Design of typical staircases,			



	<ol style="list-style-type: none"> <li>3. Design of flat slabs.</li> <li>4. Yield line theory for slabs. &amp; Design of Grid slab by approximate method</li> <li>5. Design of Precast building elements, Design of Plain concrete walls and simple shear walls</li> <li>6 Design of cylindrical and doubly curved shell by approximate method.</li> <li>7 Design of reinforced brick work &amp; Structural design of Brick Masonry &amp; Structures with IS recommendations</li> <li>8 Design of Plates by Beam Method</li> </ol>
Course No.	

Head of The Department of Civil Engineering

## Course Content Proforma

Department: Civil Engineering

<b>Course No.:</b>	CEL416	<b>Open Course (Y/N)</b>	<b>HM Course (Y/N)</b>	<b>Discontinued (Y/N)</b>
<b>Course Title: Remote Sensing &amp; GIS</b>				
<b>Course Coordinator: Dr. Y.B.Katpatal</b>				
<b>Slot in which offered, if not offered write N</b>	<b>Odd</b>		<b>Even</b>	
	A			
<b>Structure</b>	<b>Lecture</b>	<b>Tutorial</b>	<b>Practical</b>	<b>Credits</b>
	3	0	2	8
<b>Prerequisite Course Codes As per proposed Course numbers</b>				
<b>Prerequisite Credits</b>				
<b>Equivalent Course Course Codes. As per proposed Courses &amp; old courses</b>				
<b>Overlap Course Codes As per proposed Course numbers</b>				
<b>Text Book (Max. 2)</b>	<b>Title</b>	<b>Remote Sensing and Geographical Informatiøn Systems</b>		
	Author	M. Anji Reddy		
	Publisher	BS Publications		
	Edition	Third Edition		
	<b>Title</b>	<b>Concepts and techniqa of Geographic Infromation Systems</b>		
	Author	C.P LO Albert KW Yeung		
	Publisher	Pritince Hall of India		
	Edition	2002		
<b>Reference Books</b>	<b>Title</b>	Remote Sensing of the Environment ..an Earth Resource Perspective		
	Author	John R Jensen		
	Publisher	Pearson Education		
	Edition	2006		
	<b>Title</b>	Keith C. Clerk, Bradely O Parks, Michel P Crane		
	Author	Geographic Informaiton System and Enviornment Modeling		
	Publisher	Pritince Hall of India		
	Edition	2002		
	<b>Title</b>	<b>Remote Sensing and GIS</b>		
	Author	B. Bhatta		
	Publisher	Oxford University press		
	Edition	First Edition		

<b>Content</b>	<p>Definition &amp; Scope of Remote Sensing: Electromagnetic energy &amp; spectrum, Remote Sensing Systems, Sensors &amp; Scanners, Resolution of sensors, Multispectral, thermal &amp; Radar data . Radiometers, spectral Signatures.</p> <p>Elements of Remote Sensing Systems: Terrestrial, airborne &amp; space borne platforms, sunsynchronous &amp; Geostationary satellites. Various earthresources satellites, Indian Remote sensing Programs. Remote Sensing Data products &amp; their types: Analogue &amp; Digital data Formats, errors. Interpretation Techniques: Elements &amp; Methods of interpretation, Relief displacement and vertical exaggeration, determination &amp; calculation of elevation from Remote Sensing Data.</p> <p>Digital Image Processing: Image rectification &amp; restoration, image enhancements, image classification; supervised &amp; unsupervised, accuracy assessments.</p> <p>Geographical Information Systems: Raster &amp; Vector Data, Components of GIS, concepts &amp; basic characteristics of Vectorization, topology generation, attribute data attachment, editing and analysis. Global Positioning Systems: Types and method.</p> <p>Applications : Integrated approach of RS &amp; GIS application; Geotechnical investigations (soil studies, dam site studies), water resources management, environmental studies (EIA and Land Use Land cover studies), transportation planning, Urban Planning, E-Governance.</p>
<b>Practical</b>	<ol style="list-style-type: none"> <li>1. RS Data formats &amp; their study; analogue &amp; digital data products</li> <li>2. Image registration</li> <li>3. Digital enhancement</li> <li>4. Image classification</li> <li>5. GIS : Vector data generation, Data attachments and analysis</li> <li>6. Calculation of Elevation from RS data</li> <li>7. Data analysis in GIS</li> <li>8. Case studies: Water resources, environmental applications, geotechnical investigations</li> </ol>
<b>Course No.</b>	

Head of The Department of Civil Engineering

Department: Civil Engineering

Course No.:	CEL417	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
<b>Course Title: Hazardous Waste Management</b>					
<b>Course Coordinator: Dr. Dilip H. Lataye</b>					
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	<b>Hazardous Waste Management,</b>			
	Author	M. D. LaGrega, P.L.Buckingham and J.C.Evans			
	Publisher	McGraw-Hill, Inc., New York			
	Edition	1994			
	Title	<b>International Perspective on Hazardous Waste Management,</b>			
	Author	W.S.Forester and J.H.Skinner			
	Publisher	Mudra Offset Printers, Bajaj Nagar Nagpur			
	Edition	2001			
Reference Books	Title	<b>Hazardous Waste Management,</b>			
	Author	G.W.Dawson and B.W.Mercer,			
	Publisher	Academic Press, Inc., London, England			
	Edition	1987			
	Title	<b>Standard Handbook of Hazardous Waste Treatment and Disposal</b>			
	Author	H.M.Freeman			
	Publisher	McGraw-Hill, Inc., New York			
	Edition	1989			
	Title	<b>Hazardous Waste Management Engineering,</b>			
	Author	E.J.Martin and J.H.Johnson, Jr.,			
	Publisher	Van Nostrand Reinhold Co. Inc. New York.			
	Edition	1987			

<b>Content</b>	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.
<b>Course No.</b>	

Head of The Department of Civil Engineering

Course No.	CEL 418	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title	<b>ENERGY CONVERSION AND ENVIRONMENT</b>				
Course Coordinator	Dr. A. R. Tembhurkar				
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	Energy and the Environment			
	Author	Fowler J. M.			
	Publisher	McGraw Hill New York			
	Edition	2 <sup>nd</sup>			
	Title	Biomass for Energy in the Developing Countries, Current Roles, Potentials, Problems, Prospects			
	Author	D. O. Hall, G. W. Barnard and P. A. Moss			
	Publisher	Pergamon Press Ltd			
	Edition	1 <sup>st</sup>			
Reference Books	Title	Energy Management Handbook			
	Author	W. C. Turner			
	Publisher	Wiley Newyork			
	Edition	1 <sup>st</sup>			
	Title	Energy System Analysis for Developing countries			
	Author	P. Meier			
	Publisher	Sringer Verlag			
	Edition	1 <sup>st</sup>			
	Title	Energy from Bioconversion of Wate materials			
	Author	Dorthy J De Renzo			
	Publisher	Noyes data Corporation USA			
	Edition	1 <sup>st</sup>			
	Title	Energy from Solid Waste – Recent Development			
	Author	Francis A.Domino			
Publisher	Noyes data Corporation USA				
Edition	1 <sup>st</sup>				
	Title	Natural Resource Conservation – Management for Sustainable Future			
	Author	Oliver S. Owen , Daniel D. Chiras			
	Publisher	Prentice Hall Publications			

	Edition	6 <sup>th</sup>
	Title	Integrated Solid Waste Management
	Author	George Tachonobanoglous, Hilary Thesin, Samuel Vigil
	Publisher	McGraw Hill
	Edition	1 <sup>st</sup> International Edn.
Content	<p>Overview of Global and Indian Energy Scenario; Resource Conservation and Environmental Movement; Flow of Energy Through Ecosystem; Renewable and Non- Renewable Energy Sources; Sustainable System of Energy; Energy and Resources Conservation Strategies and Policies; Energy audit; Energy Conversion Methods: Thermal, hydro, nuclear, solar, wind, tidal, Energy Analysis; Energy economics; Future Energy Systems; Introduction to Fuel combustion fundamentals, formation of Pollutants, Measurements and Control; Alternative Energy sources Utilizations; Classification of Waste as Fuel; Waste to Energy options: Combustion, Gasification, anaerobic digestion, fermentation, pyrolysis; Fuels Derived from Waste to Energy Technology; Power Generation using Waste to Energy technology, Gas generations and collection in landfills, Potential for biomass and Biogas Energy system</p>	
Course No.	CEL 4xx	

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				
	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 &amp; 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 &amp; 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	

Head of The Department of Civil Engineering

Course No.	CEL420	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)
Course Title	Earthen Dams			
Course Coordinator	Prof. A. D. Vasudeo			
Slot in which offered. If not offered write N	Odd		Even	
Structure	Lecture	Tutorial	Practical	Credits
Prerequisite Course Codes As per proposed Course Numbers	3	1	0	8
Prerequisite credits	Irrigation Engineering			
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	
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	

Head of The Department of Civil Engineering

Course No.	CEL421	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
Course Title	Hydraulic Structures I				
Course Coordinator	Dr A D Ghare				
Slot in which offered. If not offered write N	Odd		Even		
			F		
Structure	Lecture	Tutorial	Practical	Credits	
	2	1	0	6	
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	Irrigation and Water Power Engineering			
	Author	Punmia B.C. and Pande B.B. Lal			
	Publisher	Laxmi Publications Pvt. Ltd			
	Edition	2003			
	Title	Irrigation Engineering and Hydraulic Structures			
	Author	Garg Santosh Kumar			
	Publisher	Khanna Publishers, New Delhi			
	Edition	2004			
Reference Books	Title	Design of Small Dams			
	Author				
	Publisher	U.S. Bureau Reclamation, Oxford and IBH Publication Co., New Delhi			
	Edition	1960			
	Title				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
	Publisher				
	Edition				
	Title				
	Author				
Publisher					
Edition					

	Title	
	Author	
	Publisher	
	Edition	
	Title	
	Author	
	Publisher	
	Edition	
Content	<p>Spillways : Necessity, components and classification, Estimation of spillway design flood</p> <p>Design considerations of overflow/ ogee spillways: Design as per IS, Effect of submergence by tail water, Effect of silting upstream of spillway, Discharge coefficients versus crest pressures</p> <p>Design considerations of side channel spillways and chute spillways, Effect of contraction</p> <p>Design considerations of shaft spillways</p> <p>Design principles for culverts and small bridges, causeways and box culverts</p> <p>River behaviour, control and training, design of guide banks</p> <p>Design of hydraulic jump type energy dissipator- stilling basin as per IS</p>	
Course No.	CEL4xx	

Head of The Department of Civil Engineering

COURSE CONTENT PROFORMA						
Course No.	CEL4xx	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)		
Course Title		Disaster Management				
Course Coordinator		Dr. Rahul V. Ralegaonkar				
Slot in which Offered		ODD	EVEN			
			A			
Structure		Lecture	Tutorial	Practical	Credits	
		3	0	0	6	
Prerequisite Course Codes						
Prerequisite Credits						
Equivalent course Codes						
Overlap Course Codes						
Text Books		Title	Disaster Management: Text & Case Studies			
		Author	D B N Murthy			
		Publisher	Deep & Deep Pvt. Ltd.			
		Edition				
		Title	Encyclopedia of Disaster Management			
		Author	S L Goel			
		Publisher	Deep & Deep Pvt. Ltd.			
		Edition				
Reference Books		Title	Disaster Management			
		Author	G K Ghosh			
		Publisher	A P H Publishing Corporation			
		Edition				
		Title	Citizen's Guide to Disaster Management			
		Author	Satish Modh			
		Publisher	Macmilan			
		Edition				
		Title				
		Author				
		Publisher				
		Edition				
		Title				
Author						
Publisher						
Edition						
Content		<p><b>Theory:</b></p> <p>1. Introduction to Disasters- Overview, Classifications, causes, loss of resources</p>				

	<ol style="list-style-type: none"> <li>2. Disaster Risk Management- Objectives, Processes, Events, analysis, base-line data, forecasting and warning.</li> <li>3. Emergency operation centre and IT aids- physical environment, IT Aids, Applications.</li> <li>4. Techno-legal &amp; Techno-financial aspects- regulatory mechanism for compliance, administrative structure for legal framework, additional cost on infrastructure, building by-laws.</li> <li>5. Public-private agency co-ordination- federal, state and local disaster response organization and network, citizen and community role in disaster response and recovery.</li> <li>6. Case studies: Natural and man-made disasters, preparedness and planning</li> </ol>
Course No.	

Head of the Department of **CIVIL ENGINEERING**

# List of Open Electives:

## Course Content Proforma

Department: Civil Engineering

Course No.:	CEL423	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)
Course Title: Remote Sensing & GIS				
Course Coordinator: Dr. Y.B.Katpatal				
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 & old courses				
Overlap Course Codes As per proposed Course numbers				
Text Book (Max. 2)	Title	Remote Sensing and Geographical Information Systems		
	Author	M. Anji Reddy		
	Publisher	BS Publications		
	Edition	Third Edition		
	Title	Concepts and techniques of Geographic Information Systems		
	Author	C.P LO Albert KW Yeung		
	Publisher	Pritince Hall of India		
	Edition	2002		
Reference Books	Title	Remote Sensing of the Environment ..an Earth Resource Perspective		
	Author	John R Jensen		
	Publisher	Pearson Education		
	Edition	2006		
	Title	Keith C. Clerk, Bradely O Parks, Michel P Crane		
	Author	Geographic Informaiton System and Enviornment Modeling		
	Publisher	Pritince Hall of India		
	Edition	2002		
	Title	Remote Sensing and GIS		
	Author	B. Bhatta		
	Publisher	Oxford University press		
	Edition	First Edition		



<b>Content</b>	<p>Definition &amp; Scope of Remote Sensing: Electromagnetic energy &amp; spectrum, Remote Sensing Systems, Sensors &amp; Scanners, Resolution of sensors, Multispectral, thermal &amp; Radar data . Radiometers, spectral Signatures.</p> <p>Elements of Remote Sensing Systems: Terrestrial, airborne &amp; space borne platforms, sunsynchronous &amp; Geostationary satellites. Various earthresources satellites, Indian Remote sensing Programs. Remote Sensing Data products &amp; their types: Analogue &amp; Digital data Formats, errors. Interpretation Techniques: Elements &amp; Methods of interpretation, Relief displacement and vertical exaggeration, determination &amp; calculation of elevation from Remote Sensing Data.</p> <p>Digital Image Processing: Image rectification &amp; restoration, image enhancements, image classification; supervised &amp; unsupervised, accuracy assessments.</p> <p>Geographical Information Systems: Raster &amp; Vector Data, Components of GIS, concepts &amp; basic characteristics of Vectorization, topology generation, attribute data attachment, editing and analysis. Global Positioning Systems: Types and method.</p> <p>Applications : Integrated approach of RS &amp; GIS application; Geotechnical investigations (soil studies, dam site studies), water resources management, environmental studies (EIA and Land Use Land cover studies), transportation planning, Urban Planning, E-Governance.</p>
<b>Practical</b>	<ol style="list-style-type: none"> <li>1. RS Data formats &amp; their study; analogue &amp; digital data products</li> <li>2. Image registration</li> <li>3. Digital enhancement</li> <li>4. Image classification</li> <li>5. GIS : Vector data generation, Data attachments and analysis</li> <li>6. Calculation of Elevation from RS data</li> <li>7. Data analysis in GIS</li> <li>8. Case studies: Water resources, environmental applications, geotechnical investigations</li> </ol>
<b>Course No.</b>	

Head of The Department of Civil Engineering

Course No.	CEL424	Open Course (Y/N)	HM Course (Y?N)	Discontinued (Y/N)	
Course Title	Environmental Studies				
Course Coordinator	Dr. Ajay Kalamdhad and Dr. M.V. Latkar				
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 Codes. As per proposed courses and old courses					
Overlap course codes As per proposed Course Numbers					
Text Book ( Max. 2)	Title	Environmental Studies			
	Author	Rajgopalan R.			
	Publisher				
	Edition				
	Title	Environmental Studies			
	Author	Benny Joseph			
	Publisher	McGraw Hill			
	Edition				
	Reference Books	Title	Environmental Studies		
		Author	Erach Barucha		
		Publisher	University press (UGC)		
		Edition			
		Title			
		Author			
Publisher					
Edition					
Title					
Author					
Publisher					
Edition					
Title					
Author					
Publisher					
Edition					

	Title	
	Author	
	Publisher	
	Edition	
	Title	
	Author	
	Publisher	
	Edition	
Content	<p>Natural resources: Forest resources, Water resources, Mineral resources, Food resources, Energy resources, Land resources.</p> <p>Ecosystem: Concept of an ecosystem, Structure and functions of an ecosystem, Procedures, consumers and decomposers, Ecological succession, Food chain, food webs and pyramids.</p> <p>Biodiversity and its conservation: Introduction, definitions: genetics, species and diversity, Value of biodiversity, Biodiversity at global, national and local level, India as a mega-diversity nation, Hot-spot of biodiversity, Threat to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, Conservation of biodiversity: in-situ and ex-situ conservation.</p> <p>Environmental pollution: Definition, Causes, effects and control measures of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solid waste management: Causes, effects and control measures of urban and industrial wastes.</p> <p>Social issues and environment: Sustainable development, Water conservation, Rain water harvesting, Watershed management, Climate change, Global warming, Acid rain, Ozone layer depletion, Nuclear accident, Holocaust, Environmental rules &amp; regulations.</p> <p>Human population and environment: Population growth, Environment and human health, Human rights, Value education, Role of information technology in environment and human health.</p>	
Course No.		

Head of The Department of Civil Engineering

COURSE CONTENT PROFORMA				
Course No.	CEL422	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)
Course Title	Disaster Management			
Course Coordinator	Dr. Rahul V. Ralegaonkar			
Slot in which Offered	ODD		EVEN	
			A	
Structure	Lecture	Tutorial	Practical	Credits
	3	0	0	6
Prerequisite Course Codes				
Prerequisite Credits				
Equivalent course Codes				
Overlap Course Codes				
Text Books	Title	Disaster Management: Text & Case Studies		
	Author	D B N Murthy		
	Publisher	Deep & Deep Pvt. Ltd.		
	Edition			
	Title	Encyclopedia of Disaster Management		
	Author	S L Goel		
	Publisher	Deep & Deep Pvt. Ltd.		
	Edition			
Reference Books	Title	Disaster Management		
	Author	G K Ghosh		
	Publisher	A P H Publishing Corporation		
	Edition			
	Title	Citizen's Guide to Disaster Management		
	Author	Satish Modh		
	Publisher	Macmilan		
	Edition			
	Title			
	Author			
	Publisher			
	Edition			
	Title			
Author				
Publisher				
Edition				
Content	<b>Theory:</b> 7. Introduction to Disasters- Overview, Classifications, causes, loss of resources			

	<p>8. Disaster Risk Management- Objectives, Processes, Events, analysis, base-line data, forecasting and warning.</p> <p>9. Emergency operation centre and IT aids- physical environment, IT Aids, Applications.</p> <p>10. Techno-legal &amp; Techno-financial aspects- regulatory mechanism for compliance, administrative structure for legal framework, additional cost on infrastructure, building by-laws.</p> <p>11. Public-private agency co-ordination- federal, state and local disaster response organization and network, citizen and community role in disaster response and recovery.</p> <p>12. Case studies: Natural and man-made disasters, preparedness and planning</p>
Course No.	

Head of the Department of **CIVIL ENGINEERING**

Department: Civil Engineering

Course No.:	CEL417	Open Course (Y/N)	HM Course (Y/N)	Discontinued (Y/N)	
<b>Course Title: Hazardous Waste Management</b>					
<b>Course Coordinator: Dr. Dilip H. Lataye</b>					
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	<b>Hazardous Waste Management,</b>			
	Author	M. D. LaGrega, P.L.Buckingham and J.C.Evans			
	Publisher	McGraw-Hill, Inc., New York			
	Edition	1994			
	Title	<b>International Perspective on Hazardous Waste Management,</b>			
	Author	W.S.Forester and J.H.Skinner			
	Publisher	Mudra Offset Printers, Bajaj Nagar Nagpur			
	Edition	2001			
Reference Books	Title	<b>Hazardous Waste Management,</b>			
	Author	G.W.Dawson and B.W.Mercer,			
	Publisher	Academic Press, Inc., London, England			
	Edition	1987			
	Title	<b>Standard Handbook of Hazardous Waste Treatment and Disposal</b>			
	Author	H.M.Freeman			
	Publisher	McGraw-Hill, Inc., New York			
	Edition	1989			
	Title	<b>Hazardous Waste Management Engineering,</b>			
	Author	E.J.Martin and J.H.Johnson, Jr.,			
	Publisher	Van Nostrand Reinhold Co. Inc. New York.			
	Edition	1987			

<b>Content</b>	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.
<b>Course No.</b>	

Humanities Social Science Management: (Elective) (HM)

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



	Edition	1996
<b>Content</b>	<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 &amp; Marketing strategies, determinants &amp; Models of consumer behavior, Pricing &amp; promotion strategies, Business forecasting. Modern Control Systems, Total quality Management (TQM), DSS, ERP, Technological innovation &amp; R &amp;D.</p> <p>Financial Management; Meaning and Scope, Economics and Scope, Supply and Demand Mechanism, analysis and forecasting. Balance sheet, profit &amp; 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>	
<b>Course No.</b>		

Head of The Department of Civil Engineering



