

## Syllabus for Even Semester For Session 2010-11

Department :

|  |  |  |                 |                    |  |
|--|--|--|-----------------|--------------------|--|
| Course No.   | CEL202                                   | Open Course (Y/N)                          | HM Course (Y/N) | Discontinued (Y/N) |  |
| Course Title   | <b>Hydraulic Engineering</b>             |  |                 |                    |  |
| Course Coordinator   | Dr. P.D.Porey                            |  |                 |                    |  |
| Slot in which offered. If not offered write N                    | Odd                                      |  | Even            |                    |  |
|  |  |  | B               |                    |  |
| Structure  | Lecture                                  | Tutorial                                   | Practical       | Credits            |  |
|  | 3  | 0  | 2               | 8                  |  |
| Prerequisite Course Codes As per proposed Course Numbers         |  |  |                 |                    |  |
| Prerequisite credits   |  |  |                 |                    |  |
| Equivalent Course Codes. As per proposed courses and old courses | Fluid Mechanics I and Fluid Mechanics II |  |                 |                    |  |
| Overlap course codes As per proposed Course Numbers              |  |  |                 |                    |  |
| Text Book<br>( 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  |  |  |                 |                    |  |

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|  | Title  |  |
|  | Author |  |

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|------------|---|--|
|            | 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. | CEL202  |  |

Head of the Department of **CIVIL ENGINEERING**

| Course Content Proforma  |                        |  |                            |                           |                |
|--|------------------------|--|----------------------------|---------------------------|----------------|
| <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          |                            |                           |                |

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|-------------------|---|-----------------|
|                   | <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> |   |                 |

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| 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            |  |
|  | 3                                  | 0  | 2               | 8                  |  |
| Prerequisite Course Codes As per proposed Course Numbers         |                                    |  |                 |                    |  |
| Prerequisite credits   |                                    |  |                 |                    |  |
| Equivalent Course Codes. As per proposed courses and old courses |                                    |  |                 |                    |  |
| Overlap course codes As per proposed Course Numbers              |                                    |  |                 |                    |  |
| Text Book (Max. 2)   | Title                              | Water Supply Engineering –               |                 |                    |  |
|  | Author                             | B.C. Punmia                              |                 |                    |  |
|  | Publisher                          |  |                 |                    |  |
|  | Edition                            |  |                 |                    |  |
|  | Title                              | Environmental Engineering –              |                 |                    |  |
|  | Author                             | S.K. Garg                                |                 |                    |  |
|  | Publisher                          |  |                 |                    |  |
| Reference Books  | Edition                            |  |                 |                    |  |
|  | Title                              | Metcalf, Eddy, “Wastewater Engineering”- |                 |                    |  |
|  | Author                             | McGraw Hill Publication                  |                 |                    |  |
|  | Publisher                          |  |                 |                    |  |
|  | Edition                            |  |                 |                    |  |
|  | Title                              | M.J. Macghee, “Water Supply & Sewage –   |                 |                    |  |
|  | Author                             | McGraw Hill Publication                  |                 |                    |  |
|  | Publisher                          |  |                 |                    |  |
|  | Edition                            |  |                 |                    |  |
|  | Title                              |  |                 |                    |  |
|  | Author                             |  |                 |                    |  |
|  | Publisher                          |  |                 |                    |  |
|  | Edition                            |  |                 |                    |  |
| Title  |                                    |  |                 |                    |  |
| Author   |                                    |  |                 |                    |  |

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

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| Course No.   | CEL205                             | Open Course (N)                             | HM Course (N) | Discontinued (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<br>As per proposed Course Numbers      |                                    |   |               |                  |
| Prerequisite credits   |                                    |   |               |                  |
| Equivalent Course Codes. As per proposed courses and old courses |                                    |   |               |                  |
| Overlap course codes<br>As per proposed Course Numbers           |                                    |   |               |                  |
| Text Book<br>( Max. 2)   | Title                              | Building Drawing                            |               |                  |
|  | Author                             | Shah, Kale & Patki                          |               |                  |
|  | Publisher                          | TMH publication                             |               |                  |
|  | Edition                            | Fourth Edition                              |               |                  |
|  | Title                              | A course in Civil Engineering Drawing       |               |                  |
|  | Author                             | Sikka V.B                                   |               |                  |
|  | Publisher                          | S.K. Kataria & Sons publication, 1997       |               |                  |
|  | Edition                            |   |               |                  |
| Reference Books  | Title                              | IS: 1256-1958 (IS Code of building byelaws) |               |                  |
|  | Author                             | Indian Standard                             |               |                  |
|  | Publisher                          | -   |               |                  |
|  | Edition                            | -   |               |                  |
|  | Title                              | Time Saver Standard                         |               |                  |
|  | Author                             | Dodge F. W.                                 |               |                  |
|  | Publisher                          | F. W. Dodge Corp.                           |               |                  |
|  | Edition                            | 3 <sup>rd</sup>                             |               |                  |
|  | Title                              |   |               |                  |
|  | Author                             |   |               |                  |
|  | Publisher                          |   |               |                  |
|  | Edition                            |   |               |                  |
|  | Title                              |   |               |                  |
|  | Author                             |   |               |                  |
|  | Publisher                          |   |               |                  |
| Edition  |                                    |   |               |                  |
| Title  |                                    |   |               |                  |
| Author   |                                    |   |               |                  |

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|         | Publisher |  |
|         | Edition   |  |
|         | Title     |  |
|         | Author    |  |
|         | Publisher |  |
|         | Edition   |  |
| Content |           | <p><b>Theory:</b></p> <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, 1967. Free hand dimensioned sketches of various building elements and its importance in Civil Engineering.</li> <li>3. Developing working drawing to scale as per I.S. 962, from the given sketch. Design and general specifications for different components of the building including terraced and pitched roofs. Developing submission drawings to scale with location plan, site plan and block plan.</li> <li>4. Study of building bye-laws and Principals of planning. Planning of residential and public buildings, 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> <p><b>Practical:</b></p> <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</li> </ol> |



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|  |  | in sketch book.<br>6. Line plans of various types of buildings e.g. Public / Educational / Industrial / Hospital / Community on graph papers (04 assignments)<br>7. One compulsory field exercise. |
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### 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        |  | Dr. R.V. Ralegaonkar |                     |                    |                                   |  |  |
| Slot in which Offered     |  | ODD                  |                     | EVEN               |                                   |  |  |
|                           |  |                      |                     | G                  |                                   |  |  |
| Structure                 |  | Lecture              | Tutorial            | Practical          | Credits                           |  |  |
|                           |  | 3                    | 0                   | 2                  | 8                                 |  |  |
| Prerequisite Course Codes |  |                      |                     |                    |                                   |  |  |
| Prerequisite Credits      |  |                      |                     |                    |                                   |  |  |
| Equivalent course Codes   |  |                      |                     |                    |                                   |  |  |
| Overlap Course Codes      |  |                      |                     |                    |                                   |  |  |
| Text Books                |  | Title                | Surveying II        |                    |                                   |  |  |
|                           |  | Author               | B. C. Punmia        |                    |                                   |  |  |
|                           |  | Publisher            | Standard Book-House |                    |                                   |  |  |
|                           |  | Edition              | Latest              |                    |                                   |  |  |
|                           |  |                      |                     |                    |                                   |  |  |
|                           |  | Title                | Surveying Volume II |                    |                                   |  |  |
|                           |  | Author               | S. K Duggal         |                    |                                   |  |  |
|                           |  | Publisher            | Tata McGraw Hill    |                    |                                   |  |  |
|                           |  | Edition              | Latest              |                    |                                   |  |  |
|                           |  |                      |                     |                    |                                   |  |  |
|                           |  | Reference Books      |                     | Title              | Higher Surveying                  |  |  |
|                           |  |                      |                     | Author             | A M Chandra                       |  |  |
|                           |  |                      |                     | Publisher          | New Age International Publication |  |  |
|                           |  |                      |                     | Edition            | Latest                            |  |  |
|                           |  |                      |                     |                    |                                   |  |  |
| Title                     | Surveing & Levelling-Part II                     |                      |                     |                    |                                   |  |  |
| Author                    | T. P. Kanetkar & S. V. Kulkarni                  |                      |                     |                    |                                   |  |  |
| Publisher                 | Pune Vidhyarathi Griha Prakashan, Pune           |                      |                     |                    |                                   |  |  |
| Edition                   | Latest   |                      |                     |                    |                                   |  |  |
|                           |  |                      |                     |                    |                                   |  |  |
| Title                     | Surveying  |                      |                     |                    |                                   |  |  |
| Author                    | Arthur Bannister, Stanley Raymond, Raymond Baker |                      |                     |                    |                                   |  |  |
| Publisher                 | Person Education                                 |                      |                     |                    |                                   |  |  |
| Edition                   |  |                      |                     |                    |                                   |  |  |
|                           |  |                      |                     |                    |                                   |  |  |
| Title                     |  |                      |                     |                    |                                   |  |  |
| Author                    |  |                      |                     |                    |                                   |  |  |
| Publisher                 |  |                      |                     |                    |                                   |  |  |
| Edition                   |  |                      |                     |                    |                                   |  |  |

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| Content    | <p><b>Theory:</b></p> <ol style="list-style-type: none"> <li>1. <b>Curves:</b> Types, Elements, Methods &amp; Setting out curves</li> <li>2. <b>Geodetic Surveying:</b> Triangulation, classifications, reconnaissance, base line measurements</li> <li>3. <b>Triangulation:</b> Laws of weights, errors &amp; adjustments</li> <li>4. <b>Field Astronomy:</b> Spherical trigonometry, Latitude &amp; Longitude, Astronomy Terms, Co-ordinate System, Corrections.</li> <li>5. <b>Photographic Surveying:</b> Photo-theodolite, terrestrial photogrammetry, stereo photogrammetry, aerial surveying.</li> <li>6. <b>Hydrographic Surveying:</b> Shore-line survey, soundings, methods, reductions plots, tides.</li> </ol> <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></p> <p>3 days Survey Camp will be conducted as a part of course curriculum</p> |  |
| Course No. |  |  |

|  |                                      |   |                 |                    |
|--|--------------------------------------|---|-----------------|--------------------|
| Course No.   | CEL209                               | Open Course (Y/N)   | HM Course (Y/N) | Discontinued (Y/N) |
| Course Title   | <b><u>Construction Materials</u></b> |   |                 |                    |
| Course Coordinator   | Dr. A. D. Pofale                     |   |                 |                    |
| Slot in which offered.<br>If not offered write N                 | Odd<br>N                             | Even<br>E   |                 |                    |
| Structure  | Lecture<br>3                         | Tutorial<br>0   | Practical<br>0  | Credits<br>6       |
| Prerequisite Course Codes<br>As per proposed Course Numbers      |                                      |   |                 |                    |
| Prerequisite credits   |                                      |   |                 |                    |
| Equivalent Course Codes. As per proposed courses and old courses |                                      |   |                 |                    |
| Overlap course codes<br>As per proposed Course Numbers           |                                      |   |                 |                    |
| Text Book<br>(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   |                 |                    |

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|------------|--|------------------------|
|            | 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<br/>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>2. Ceramic Materials: Classification, Refractories, glass, glass wool, mechanical, thermal and electrical properties Uses and application.</li> <li>3. Polymeric Materials: Polymerisation mechanism and depolymerisation. Rubber and plastics, properties, effect of temperature on mechanical properties. Uses and application.</li> <li>4. Paints, Enamels and varnishes, Tar, bitumen and asphalt, Gypsum and gypsum plaster boards, , adhesives and sealants ,waterproofing materials. Heat and sound insulating materials , geosynthetics, Damp prevention materials.</li> <li>10. Lightweight heavy weight materials, natural and artificial, special cements and concrete.</li> </ol> |                        |
| Course No. |  |                        |

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

Head of the Department of **CIVIL ENGINEERING**

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



|            |  |  |
|------------|--|--|
|            | Edition  |  |
|            | Title  |  |
|            | Author   |  |
|            | Publisher  |  |
|            | Edition  |  |
| Content    | <ol style="list-style-type: none"> <li>1. Estimate and Estimating: Purposes of Estimating, Types of Estimates, Methods of Building Estimates, Units of Measurement of Various Items. Methods of Detailed Estimates, Detailed Estimation of civil Engineering Works: Building (Load Bearing and RCC Framed Structures), Culverts, Hydraulic Structures and Water Supply and Sanitary Works and Road Works.</li> <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. |  |  |

|  |  |   |                             |                    |  |
|--|--|---|-----------------------------|--------------------|--|
| Course No.   | CEL305   | Open Course (Y/N)   | HM Course (Y/N)             | Discontinued (Y/N) |  |
| Course Title   | <b><u>Design of RCC Structures</u></b>                   |   |                             |                    |  |
| Course Coordinator   | Dr. A. D. Pofale   |   |                             |                    |  |
| Slot in which offered. If not offered write N                    | Odd  |   | Even                        |                    |  |
|  |  |   | H                           |                    |  |
| Structure  | Lecture  | Tutorial  | Practical                   | Credits            |  |
|  | 3  | 0   | 0                           | 6                  |  |
| Prerequisite Course Codes<br>As per proposed Course Numbers      | AM** Structural Analysis &<br>3CE***Concrete Engineering |   |                             |                    |  |
| Prerequisite credits   |  |   |                             |                    |  |
| Equivalent Course Codes. As per proposed courses and old courses | 461<br>Structural Design II (RCC)                        |   |                             |                    |  |
| Overlap course codes<br>As per proposed Course Numbers           | 461<br>Structural Design II (RCC)                        |   |                             |                    |  |
| Text Book<br>( 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.<br>(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. |  |  |

|  |  |  |                 |                    |  |
|--|--|--|-----------------|--------------------|--|
| 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.   | Odd                                    |  | Even            |                    |  |
| If not offered write N   |  |  | D               |                    |  |
| Structure  | Lecture                                | Tutorial                                       | Practical       | Credits            |  |
|  | 3                                      | 0  | 0               | 6                  |  |
| Prerequisite Course Codes<br>As per proposed Course Numbers      | Transportation Engineering             |  |                 |                    |  |
| Prerequisite credits   |  |  |                 |                    |  |
| Equivalent Course Codes. As per proposed courses and old courses |  |  |                 |                    |  |
| Overlap course codes<br>As per proposed Course Numbers           |  |  |                 |                    |  |
| Text Book<br>( 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   |  |
|         | Title   |  |
|         | Author  |  |
|         | Publisher   |  |
| Content | <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></p> |  |

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

Department: Civil Engineering

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

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|-------------------|---|
| <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, Bangalore Method, NADEP Method, Vermicomposting Method, biodung Vermicomposting, Gobar Gas Plant, Sulabh Sauchalaya. Role of NGO's and GO's in Rural Sanitation Community Participation in Rural Sanitation.</p> |
| <b>Course No.</b> |   |



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

|                |   |
|----------------|---|
| <p>Content</p> | <p>General : Necessity and importance, scope and development of Irrigation in India, Classification of Irrigation, Comparative study of different irrigation systems</p> <p>Quality of irrigation water, salt constituents and their effects, Soil moisture – Consumptive use, water requirements of crops Duty-Delta-Base period-Factors affecting duty – Duty for principal types of crops grown in India, reclamation of saline soil.</p> <p>Reservoir Planning &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.</p> <p>Failures of Earthen Dams – Seepage and drainage arrangement</p> <p>Weirs :Different types of weirs – Spillways – General principles of design – types, spillway gates – energy dissipation downstream of spillway.</p> <p>Different types of diversion weirs – Component parts of diversion headworks. Causes of failures of diversion, weirs – Weirs on permeable foundation with design principles. Blighs Creep theory, Khosla’s Theory, River Training, Guide banks, Groynes and spurs</p> <p>Irrigation Canals: Types – Design Principles of channels – water losses, sediments and their effects upon stream regime. Reservoir silting silt supporting theory, design of channel in alluvial soils based on silt theories – silt exclusion – silt control. Lining of canals, Water Logging &amp; its Prevention: Drainage of land, methods.</p> <p>Types ,description of Canal Structures</p> <p>Cross Drainage Works : Types &amp; general principles</p> |
|----------------|---|

Department: Civil Engineering

|   |  |  |                    |                    |  |
|---|--|--|--------------------|--------------------|--|
| Course No.:   | CEL417                                   | Open Course<br>(Y/N)   | HM Course<br>(Y/N) | Discontinued (Y/N) |  |
|   |  |  |                    |                    |  |
| Course Title: Hazardous Waste Management                              |  |  |                    |                    |  |
| Course Coordinator: Dr. Dilip H. Lataye                               |  |  |                    |                    |  |
| Slot in which offered, if not offered write N                         |  | Odd  |                    | Even               |  |
|   |  |  |                    | B                  |  |
| Structure   | Lecture                                  | Tutorial   | Practical          | Credits            |  |
|   | 3  | 0  | 0                  | 6                  |  |
| Prerequisite Course Codes As per proposed Course numbers              |  |  |                    |                    |  |
| Prerequisite Credits  |  |  |                    |                    |  |
| Equivalent Course Course Codes. As per proposed Courses & old courses |  |  |                    |                    |  |
| Overlap Course Codes As per proposed Course numbers                   |  |  |                    |                    |  |
| Text Book<br>(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> |   |

| <b>Course Content Proforma</b>   |                        |  |                        |                               |
|--|------------------------|--|------------------------|-------------------------------|
| <b>Department: Civil Engineering</b>   |                        |  |                        |                               |
| <b>Course No.:</b>   | <b>CEL(HM)<br/>425</b> | <b>Open Course<br/>(Y/N)</b>                         | <b>HM Course (Y/N)</b> | <b>Discontinued<br/>(Y/N)</b> |
| <b>Course Title: Finance and Business Management</b>                             |                        |  |                        |                               |
| <b>Course Coordinator: Prof A.G.Tawalare</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<br/>(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                                       |                        |                               |

|                   |  |              |   |        |                   |           |                  |         |      |
|-------------------|--|--------------|---|--------|-------------------|-----------|------------------|---------|------|
|                   |  |              |   |        |                   |           |                  |         |      |
|                   | <table border="1"> <tr> <td><b>Title</b></td> <td><b>Human Resources and Personnel Management</b></td> </tr> <tr> <td>Author</td> <td>Werther and Davis</td> </tr> <tr> <td>Publisher</td> <td>Tata McGraw Hill</td> </tr> <tr> <td>Edition</td> <td>1996</td> </tr> </table>  | <b>Title</b> | <b>Human Resources and Personnel Management</b> | Author | Werther and Davis | Publisher | Tata McGraw Hill | Edition | 1996 |
| <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

|  |                    |   |                    |                    |  |
|--|--------------------|---|--------------------|--------------------|--|
| Course No.   | CEL419             | Open course<br>(Y/N)  | HM course<br>(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<br>As per proposed Course Numbers      | Fluid Mechanics II |   |                    |                    |  |
| Prerequisite credits   |                    |   |                    |                    |  |
| Equivalent Course Codes. As per proposed courses and old courses |                    |   |                    |                    |  |
| Overlap course codes<br>As per proposed Course Numbers           |                    |   |                    |                    |  |
| Text Book<br>( Max. 2)   | Title              | Mechanics of Sediment Transportation and Alluvial Stream Problems |                    |                    |  |
|  | Author             | Garde R J and Ranga Raju K G                                      |                    |                    |  |
|  | Publisher          | Wiley Eastern Ltd.  |                    |                    |  |
|  | Edition            | 1985  |                    |                    |  |
|  | Title              | Sediment Transport- Theory and Practice                           |                    |                    |  |
|  | Author             | Yang C.T.   |                    |                    |  |
|  | Publisher          | The McGraw Hill Companies Inc.                                    |                    |                    |  |
|  | Edition            | 1996  |                    |                    |  |
| Reference Books  | Title              | Fluvial Processes in River Engineering                            |                    |                    |  |
|  | Author             | Chang H.H.  |                    |                    |  |
|  | Publisher          | John Wiley  |                    |                    |  |
|  | Edition            | 1988  |                    |                    |  |
|  | Title              | Sediment Transport Technology                                     |                    |                    |  |
|  | Author             | Simons D.B. and Senturk F.  |                    |                    |  |
|  | Publisher          | Water Resources Publications, Fort Collins, Colorado              |                    |                    |  |
|  | Edition            | 1977  |                    |                    |  |
|  | Title              |   |                    |                    |  |
|  | Author             |   |                    |                    |  |
|  | Publisher          |   |                    |                    |  |
|  | Edition            |   |                    |                    |  |
|  | Title              |   |                    |                    |  |
|  | Author             |   |                    |                    |  |
| Publisher  |                    |   |                    |                    |  |
| Edition  |                    |   |                    |                    |  |
| Title  |                    |   |                    |                    |  |

|            |  |  |
|------------|--|--|
|            | Author   |  |
|            | Publisher  |  |
|            | Edition  |  |
|            | Title  |  |
|            | Author   |  |
|            | Publisher  |  |
|            | Edition  |  |
| Content    | <p>Origin and properties of sediments : Nature of sediment problems , origin and formation of sediments , properties of sediments , incipient motion of sediment particles , tractive force approach, cohesive materials.</p> <p>Regimes of flow : Description of regimes of flow , ripple , dune , antidune , prediction of regimes of flow.</p> <p>Resistance to flow &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   |  |



### COURSE CONTENT PROFORMA

|                           |        |                                   |  |                    |         |  |
|---------------------------|--------|-----------------------------------|--|--------------------|---------|--|
| Course No.                | CEL310 | Open Course<br>(Y/N)              | HM Course<br>(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                           |  |                    |         |  |
|                           |        |                                   |  |                    |         |  |
| Reference Books           |        | Title                             | Solar Energy Fundamentals & Applications |                    |         |  |
|                           |        | Author                            | H P Garg, J Prakash                      |                    |         |  |
|                           |        | Publisher                         | Tata MacGraw Hill Publishing             |                    |         |  |
|                           |        | Edition                           |  |                    |         |  |
|                           |        |                                   |  |                    |         |  |
|                           |        | Title                             | Solar Energy and thermal processes       |                    |         |  |
|                           |        | Author                            | J A Duffie & W A Beckman                 |                    |         |  |
|                           |        | Publisher                         | John Wiley                               |                    |         |  |
|                           |        | Edition                           |  |                    |         |  |
|                           |        |                                   |  |                    |         |  |
|                           |        | Title                             | Solar Energy Applications in Buildings   |                    |         |  |
|                           |        | Author                            | A A M Sayigh                             |                    |         |  |
|                           |        | Publisher                         | Academic Press                           |                    |         |  |
|                           |        | Edition                           |  |                    |         |  |
|                           |        |                                   |  |                    |         |  |
|                           |        | Title                             |  |                    |         |  |
| Author                    |        |                                   |  |                    |         |  |
| Publisher                 |        |                                   |  |                    |         |  |
| Edition                   |        |                                   |  |                    |         |  |

|            |  |
|------------|--|
|            |  |
| Content    | <p><b>Theory:</b></p> <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> <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. |  |

|  |  |   |                 |                       |
|--|--|---|-----------------|-----------------------|
| Course No.   | CEL<br>405   | Open Course<br>(Y/N)                                    | HM Course (Y/N) | Discontinued<br>(Y/N) |
| Course Title   | <b>INDUSTRIAL WASTE WATER TREATMENT,<br/>RECYCLING AND REUSE</b> |   |                 |                       |
| Course Coordinator   | Dr. A. R.Tembhurkar  |   |                 |                       |
| Slot in which offered. If not<br>offered write N                       | Odd  |   | Even            |                       |
|  | -  |   | E               |                       |
| Structure  | Lecture  | Tutorial  | Practical       | Credits               |
|  | 3  | 0   | 0               | 6                     |
| Prerequisite Course Codes<br>As per proposed Course<br>Numbers         | Environmental Engg - I   |   |                 |                       |
| Prerequisite credits   |  |   |                 |                       |
| Equivalent Course Codes.<br>As per proposed courses and<br>old courses | CEL454   |   |                 |                       |
| Overlap course codes<br>As per proposed Course<br>Numbers              |  |   |                 |                       |
| Text Book<br>( Max. 2)   | Title  | Theories and Practices of Industrial<br>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<br>Handbook             |                 |                       |
|  | Author   | Freeman H. M.   |                 |                       |
|  | Publisher  | McGraw Hill   |                 |                       |
|  | Edition  | 1 <sup>st</sup>   |                 |                       |
|  | Title  | Comprehensive Industry Document<br>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    | <p>Industrial pollution and its measurement; Generation of Industrial wastewater, Disposal standards; Quantification and characterization of wastewater and its variations; Environmental impacts due to discharge of wastewater on streams, land and sewerage system; Industrial waste survey; Stream sanitation, stream sampling, Stream survey; Principles and techniques for Industrial Pollution prevention and control; Waste minimization; recent trends in industrial waste management, Cleaner technologies; Reuse, Recycling and Resource recovery; Volume and strength reduction; Equalization and proportioning; Neutralization; Methods of Disposal and treatment for removal of organic, inorganic, solids, pathogens, heavy metals and other pollutants; Alternatives and Synthesizing industrial waste treatment system; Joint treatment of industrial waste; CETP; Pollution control measures and Treatment of wastes from various industries viz. Pulp and paper, tanning, Sugar, Dairy, Chemical, Cement, Petroleum, Fertilizers, Metal Finishing, Etc.</p> |
| Course No. | CEL 405  |

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

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

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



|  |  |  |                 |                    |  |
|--|--|--|-----------------|--------------------|--|
| 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.<br>If not offered write N                 | Odd  |  | Even            |                    |  |
|  | N  |  | N               |                    |  |
| Structure  | Lecture  | Tutorial                               | Practical       | Credits            |  |
|  | 3  | 0                                      | 0               | 6                  |  |
| Prerequisite Course Codes<br>As per proposed Course Numbers      | Soil Mechanics<br>Foundation Engineering                       |  |                 |                    |  |
| Prerequisite credits   |  |  |                 |                    |  |
| Equivalent Course Codes. As per proposed courses and old courses |  |  |                 |                    |  |
| Overlap course codes<br>As per proposed Course Numbers           | -  | -                                      | -               | -                  |  |
| Text Book<br>(Max. 2)  | Title  | Soil Mechanics in Theory & Practice    |                 |                    |  |
|  | Author   | Alam Singh                             |                 |                    |  |
|  | Publisher  | Asia Publishing House                  |                 |                    |  |
|  | Edition  | 1975 & later                           |                 |                    |  |
|  | Title  | Geotechnical Engineering               |                 |                    |  |
|  | Author   | S. K. Gulhati & Manoj Dutta            |                 |                    |  |
|  | Publisher  | Tata McGraw-Hill                       |                 |                    |  |
|  | Edition  | 2005                                   |                 |                    |  |
| Reference Books  | Title  | Geotechnical Engineering               |                 |                    |  |
|  | Author   | Purushothama Raj                       |                 |                    |  |
|  | Publisher  | Tata McGraw Hill Publishing Co. Ltd.   |                 |                    |  |
|  | Edition  | 1995                                   |                 |                    |  |
|  | Title  | Soil Mechanics & Foundation Engg       |                 |                    |  |
|  | Author   | Punmia B.C.                            |                 |                    |  |
|  | Publisher  | Laxmi Publication Pvt. Ltd, New Delhi, |                 |                    |  |
|  | Edition  | 1994                                   |                 |                    |  |
|  | Title  | Geotechnical Engineering               |                 |                    |  |
|  | Author   | C. Venkatramaiah                       |                 |                    |  |
|  | Publisher  | New Age International Ltd.             |                 |                    |  |
|  | Edition  | (Second Edition) 1995                  |                 |                    |  |
|  | Title  | Basic & Applied Soil Mechanics         |                 |                    |  |
|  | Author   | Gopal Ranjan & A.S. RAO,;              |                 |                    |  |
|  | Publisher  | New Age International Ltd,             |                 |                    |  |
| Edition  | 2004.  |  |                 |                    |  |
| Content  | 1. Clay minerology : Concept of composition classification and |  |                 |                    |  |

|            |   |
|------------|---|
|            | <p>nomenclature, structure of clay minerals, Kaolinite Illite, Montmorillonite groups physical properties, clay water relation thixotrophy electrical effects, electrosmosis, streaming potential Zeta potential.</p> <ol style="list-style-type: none"> <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 applications, Stone columns and Gabions.</li> <li>7. Case studies of Applications</li> </ol> |
| Course No. |   |

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

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|---------|---|
| Content | <ol style="list-style-type: none"> <li>1. Shear Strength: General principle of tests, concept of failure strength, Drainage condition, pore pressure and its measurement, pore pressure parameters, Modified failure envelope. Liquefaction and effect of soil shaking. Shear Strength of Cohesionless &amp; cohesive soils.</li> <li>2. Stability of Slopes: Causes and types of slope failure, stability analysis of infinite slopes and finite slopes, centre of critical slip circle, slices method for homogeneous <math>c-\phi</math> soil, slopes with pore pressure consideration. Taylor's stability numbers &amp; stability charts, methods of improving stability of slopes.</li> <li>3. Lateral Earth Pressure: Earth pressure at rest, active &amp; passive pressure, General &amp; 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.</li> <li>4. Ground Improvement: Methods of soil stabilization use of admixtures (lime, cement, fly-ash) in stabilization. Basic concepts of reinforced earth, use of geo-synthetic materials, Salient features, function and applications of various geo-synthetic materials.</li> <li>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.<br/><br/>Settlement of shallow foundation: causes of settlement, elastic and consolidation settlement, differential settlement, control of excessive settlement. Proportioning of footings for equal settlement. Plate load test: Procedure, interpretation for bearing capacity and settlement prediction.</li> <li>6. Pile Foundation: Classification of piles, constructional features of cast-in-situ &amp; 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.</li> <li>7. Geotechnical Exploration: Importance and objectives of field exploration, principal methods of subsurface exploration, open pits &amp; shafts, types of boring, number, location and depth of boring for different</li> </ol> |
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|            | structures, type of soil samples and samplers. Principles of design of samplers, boring and sampling record. Standard penetration test, corrections to N-values & correlation for obtaining design soil parameters. |
| Course No. |   |

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|--|--|--------------------------------------|-----------------|--------------------|--|
| 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            |  |
|  | 3                                      | 0                                    | 0               | 6                  |  |
| Prerequisite Course Codes<br>As per proposed Course Numbers      |  |                                      |                 |                    |  |
| Prerequisite credits   |  |                                      |                 |                    |  |
| Equivalent Course Codes. As per proposed courses and old courses |  |                                      |                 |                    |  |
| Overlap course codes<br>As per proposed Course Numbers           |  |                                      |                 |                    |  |
| Text Book<br>( 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  |  |                                      |                 |                    |  |

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|            | 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.</p> <p>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. |  |  |

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|--|--|--|---|---------|--|
| Course No.   | 3CEL-305   |  |   |         |  |
| Course Title   | <b><u>Design of RCC Structures</u></b>                   |  |   |         |  |
| Course Coordinator   | Dr. A. D. Pofale   |  |   |         |  |
| Slot in which offered. If not offered write N                    | Odd  |  | Even  |         |  |
|  | N  |  | 6 <sup>th</sup>   |         |  |
| Structure  | Lecture  | Tutorial   | Practical   | Credits |  |
|  | 3  | 0  | 0   | 6       |  |
| Prerequisite Course Codes<br>As per proposed Course Numbers      | AM** Structural Analysis &<br>3CE***Concrete Engineering |  |   |         |  |
| Prerequisite credits   |  |  |   |         |  |
| Equivalent Course Codes. As per proposed courses and old courses | 461<br>Structural Design II (RCC)                        |  |   |         |  |
| Overlap course codes<br>As per proposed Course Numbers           | 461<br>Structural Design II (RCC)                        |  |   |         |  |
| Text Book<br>( 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   |  |   |         |  |



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|------------|--|---|
|            | 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. |  |   |

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

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

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

|  |                               |  |           |         |
|--|-------------------------------|--|-----------|---------|
| Course No.   | CEL368                        |  |           |         |
| Course Title   | Advanced Hydraulics           |  |           |         |
| Course Coordinator   | Dr A D Ghare                  |  |           |         |
| Slot in which offered. If not offered write N                    | Odd                           |  | Even      |         |
|  | N                             |  | F         |         |
| Structure  | Lecture                       | Tutorial   | Practical | Credits |
|  | 3                             | 1  | 0         | 8       |
| Prerequisite Course Codes As per proposed Course Numbers         | CEL 202 Hydraulic Engineering |  |           |         |
| Prerequisite credits   |                               |  |           |         |
| Equivalent Course Codes. As per proposed courses and old courses |                               |  |           |         |
| Overlap course codes As per proposed Course Numbers              |                               |  |           |         |
| Text Books<br>( Max. 2)  | Title                         | Flow through Open Channels                                       |           |         |
|  | Author                        | Ranga Raju   |           |         |
|  | Publisher                     | Tata McGraw Hill Publication                                     |           |         |
|  | Edition                       | 2004   |           |         |
|  | Title                         | Fluid Mechanics  |           |         |
|  | Author                        | Streeter V.L. and Wyle E.B                                       |           |         |
|  | Publisher                     | Tata McGraw Hill Publication                                     |           |         |
|  | Edition                       | 2005   |           |         |
| Reference Books  | Title                         | Open Channel Hydraulics  |           |         |
|  | Author                        | Ven Te. Chow   |           |         |
|  | Publisher                     | Tata McGraw Hill Publication<br>(International Students Edition) |           |         |
|  | Edition                       | 2003   |           |         |
|  | Title                         | Engineering Fluid Mechanics                                      |           |         |
|  | Author                        | Narsimhan S.   |           |         |
|  | Publisher                     | Orient Longman Publication                                       |           |         |
|  | Edition                       | 1981   |           |         |
|  |                               |  |           |         |
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|-------------------|---|
| <p>Contents</p>   | <ol style="list-style-type: none"> <li>1. Equivalent roughness for channel surfaces, Computation of critical flow, Theory of gradually varied flow, Analysis of surface profiles of gradually varied flow, Channel transitions</li> <li>2. Computation of gradually varied flow, Hydraulic exponents, Direct integration methods, Step methods, Graphical method, Numerical methods</li> <li>3. Location of hydraulic jump, application of hydraulic jump in design of hydraulic jump type stilling basin with horizontal apron</li> <li>4. Unsteady flow in a pipe line for incompressible fluid, Time of flow establishment, Rigid water column theory of water hammer and computation of water hammer pressures</li> <li>5. Water hammer phenomena when compressibility of fluid and elasticity of pipe is considered, computation of water hammer pressure of frictionless flow in horizontal pipe - for sudden and slow closure of valve, Application of Allievi's method of charts for calculation of approximate pressures, Water hammer pressures in pumping systems, Method of characteristics</li> <li>6. Computation of water hammer pressures in branched pipe system and in surge tank system, Devices used for protection from water hammer pressures, Function of surge tank and different type of surge tanks, Equations governing the flow in the simple surge tank system, Analysis of flow in a simple surge tank system, Computation of maximum surges in a simple surge tank, Case of hydraulic stability in a simple surge tank system</li> </ol> |
| <p>Course No.</p> | <p>CEL368</p>   |

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

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



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