


## Honours Programs in Civil Engineering

### Honours in Civil Engineering (HA)

<i>S. No.</i>	<i>Course Code</i>	<i>Course Name</i>	<i>Semester</i>	<i>Credits</i>	<i>Course Type</i>	<i>Recommended Class Strength</i>
1		Solid Waste Management (3 0 0)	V	3	Core	10 to 30
2		Dynamics of Structures (2 1 0)	V	3	Core	10 to 30
3		Advanced Foundation Design (2 1 0)	VI	3	Core	10 to 30
4		Ground Improvement Techniques (2 1 0)	VI	3	Core	10 to 30
5		Design of Hydraulic Structures (2 1 0)	VII	3	Core	10 to 30
6		Concrete Technology (3 0 0)	VIII	3	Core	10 to 30

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## Syllabi of Honours and Minor Courses offered by Civil Engineering:

UG/PG: UG	Department: Civil Engineering
Course Code:	Course Name: Solid Waste Management
Credit: 3	L-T-P: 3-0-0
Course Type: HA	
Pre-requisite Course:	
<b>Syllabus</b> Problems associated with solid waste disposal; generation of solid wastes; Classification of solid; characteristics of solid waste; analysis of solid waste; Onsite handling, storage and processing of solid waste; Solid waste collection systems; options for transfer and transport systems; processing and disposal methods; Recovery of resources, conversion products and energy generation from solid waste, Biomedical waste definition; Biomedical Handling Rules; Waste Category; waste minimization; Handling and Disposal; Biomedical waste treatment; Electronic waste and its management.	
<b>Text Books</b> 1. Integrated Solid Waste Management: Tchobanoglous, Theisen and Vigil 2. Hazardous Waste Management: Wentz 3. Environmental Engineering, Howard Peavy, D. Rowe.	

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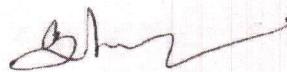
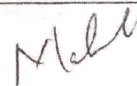
<b>UG/PG:</b> UG	<b>Department:</b> Civil Engineering
<b>Course Code:</b>	<b>Course Name:</b> Dynamics of Structures
<b>Credit:</b> 3	<b>L-T-P:</b> 3-0-0
<b>Course Type:</b> HA + HB + MC	
<b>Pre-requisite Course:</b> Structural Analysis	
<p><b>Syllabus</b></p> <p>Fundamental theory of vibration, Degree of freedom (DOF); Single degree of freedom (SDOF) system- Free and Forced vibrations of Undamped and Damped systems subjected to Harmonic loading, periodic loading, impulsive loading and Machine Vibration. Vibration Isolation; Concepts of elastic response spectra, Introduction to dynamics of Multi-degree of freedom (MDOF) systems; Two degree of freedom (TDOF) system- Free and Forced vibrations of Undamped and Damped systems subjected to Harmonic loading; MDOF systems- Natural frequencies and mode shapes, Orthogonal relationship; Dynamic response by mode superposition method; Approximate Methods for Vibration Analysis - Rayleigh quotient, Rayleigh-Ritz method, Holzer Method. Introduction to dynamics of continuous systems.</p> <p><b>Text Books</b></p> <ol style="list-style-type: none"> <li>1. Jain, A.K., "Dynamics of Structures With MATLAB® Applications", Pearson</li> <li>2. Chopra, A.K., "Dynamics of Structures, (5/e)", Pearson</li> <li>3. Humar, J.L., "Dynamics of Structures, (3/e)", CRC Press</li> <li>4. Paz, M. and Kim, Y.H., "Structural Dynamics, (6/e)", Springer</li> <li>5. Shabana, A.A., "Theory of Vibration: An Introduction, (3/e)", Springer</li> <li>6. Clough, R.W. and Penzien, J., "Dynamics of Structures, (3/e)", Computers and Structures, Inc.</li> </ol>	

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<b>UG/PG:</b> UG	<b>Department:</b> Civil Engineering
<b>Course Code:</b>	<b>Course Name:</b> Advanced Foundation Design
<b>Credit:</b> 3	<b>L-T-P:</b> 2-1-0
<b>Course Type:</b> HB + HC + MC	
<b>Pre-requisite Course:</b> Geotechnical Engineering – II	
<p><b>Syllabus</b></p> <p>Introduction, Foundation Choice, Definitions, Requirements, Types of foundations, Shallow foundations, Types of failures, bearing capacity, Settlement analysis, Contact stress beneath foundations, Beams on elastic foundations, Modulus of subgrade reaction, Special foundations, Foundations in expansive soils (CNS concept), Underreamed pile foundations, Remedial measures for cracked buildings. Foundation of transmission line towers, Underpinning of foundations, Importance and situations for underpinning, methodology, Typical examples of underpinning, Pile Foundation, Bridge substructures, Maximum depth of scour, Depth of foundation, Allowable bearing pressure, loads to be considered, Well Foundation, Lateral stability of well foundation, Design of pier cap, Design of pier, Sinking stresses in wells, Design of well components, Reinforced earth.</p> <p><b>Text Books</b></p> <ol style="list-style-type: none"> <li>1. A.P.S. Selvadurai, "Elastic Analysis of Soil-Foundation Interaction", Elsevier Scientific Publishing Company</li> <li>2. B. M. Das, "Principles of Foundation Engineering", PWS Publishing Company</li> <li>3. Joseph Bowles, "Foundation Analysis and Design", McGraw-Hill.</li> <li>4. V.N.S. Murthy, "Advanced Foundation Engineering", CBS Publishers and Distributors, New Delhi.</li> <li>5. Tomlinson, M.J. " Foundation Design and Construction", English Language Book Society, Longman.</li> <li>6. Swami Saran, "Analysis and Design of Substructures", Oxford and IBH Publishing Co. Pvt. Ltd, New Delhi.</li> </ol>	



<b>UG/PG:</b> UG	<b>Department:</b> Civil Engineering
<b>Course Code:</b>	<b>Course Name:</b> Ground Improvement Techniques
<b>Credit:</b> 3	<b>L-T-P:</b> 2-1-0
<b>Course Type:</b> HA + HC	
<b>Pre-requisite Course:</b> Geotechnical Engineering - II	
<p><b>Syllabus</b></p> <p>Need for Ground Improvement, Different types of problematic soils, Emerging trends in ground Improvement, Shallow and deep compaction requirements, Principles and methods of soil compaction. Shallow compaction and methods, properties of compacted soil and compaction control, deep compaction and vibratory methods, dynamic compaction. Ground Improvement by drainage, Dewatering methods, Design of dewatering systems, Preloading, Vertical drains, vacuum consolidation, Electro-kinetic dewatering, design and construction methods. Cement stabilization and cement columns, Lime stabilization and lime columns, Stabilization using bitumen and emulsions, Stabilization using industrial wastes. Construction techniques and applications, Permeation grouting, compaction grouting, jet grouting, different varieties of grout materials, grouting under difficult conditions, Soil nailing, rock anchoring, micro-piles, design methods, construction techniques, Case studies of ground improvement projects. Soil Reinforcement and Geosynthetics, design principles and influencing factors, Use of geosynthetics for filtration, drainage, roads, and landfills.</p> <p><b>Text Books</b></p> <ol style="list-style-type: none"> <li>1. Ground Improvement Techniques by Dr. P. Purushottam, Laxmi Publications, New Delhi</li> <li>2. Construction and Geotechnical methods in foundation engineering, by Koerner, MGH</li> <li>3. Engineering with Geo-synthetics, by GV Rao &amp; GVSS Raju, Tata McGraw Hill, New Delhi.</li> <li>4. G. Venkatappa Rao, "Geosynthetics an Introduction", Sai Master Geoenvironmental Pvt Ltd.</li> <li>5. Nainan P. Kurian, "An Introduction to Modern Techniques in Geotechnical and Foundation Engineering", Narosa Publishing House, New Delhi.</li> <li>6. G.L. Sivakumar Babu, "An Introduction to Soil Reinforcement and Geosynthetics", Universities Press (India) Pvt Ltd, Hyderabad, A.P, India.</li> </ol>	

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<b>UG/PG:</b> UG	<b>Department:</b> Civil Engineering
<b>Course Code:</b>	<b>Course Name:</b> Design of Hydraulic Structures
<b>Credit:</b> 3	<b>L-T-P:</b> 2-1-0
<b>Course Type:</b> HA	
<b>Pre-requisite Course:</b> Water Resources Engineering, Hydrology	
<p><b>Syllabus</b></p> <p>Introduction; type of hydraulic structures and their function; consideration for their selection. Dams; Design principles of gravity and earth dams; spillway; types of spillway: Ogee, chute, shaft, side channel and siphon spillway; spillway aerators; spillways; Design of ogee spillway. Diversion headworks; Components of diversion head work and their design. Channel transitions; Design of channel transitions for sub critical and super critical flows; cross and distributory head regulators; energy dissipation downstream of falls; Cross drainage structures: Super passage, aqueducts, design of cross drainage structures, Design of outlets.</p> <p><b>Text Books</b></p> <ol style="list-style-type: none"> <li>1. Water Resources Engineering by Linsley &amp; Franzini</li> <li>2. Irrigation Engineering by G.L. Asawa</li> <li>3. Water Resources &amp; Water Power Engg. By P.N. Modi.</li> </ol>	

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<b>UG/PG:</b> UG	<b>Department:</b> Civil Engineering
<b>Course Code:</b>	<b>Course Name:</b> Concrete Technology
<b>Credit:</b> 3	<b>L-T-P:</b> 2-1-0
<b>Course Type:</b> HA	
<b>Pre-requisite Course:</b> Building Technology	
<b>Syllabus</b> Review of constituent materials and mix design, admixtures, Properties of concrete in fresh and hardened state, Special concretes, Durability of concrete subjected to extreme environment, Deterioration mechanisms, assessment and control of corrosion in concrete structures, In-situ assessment of concrete structures, Various NDT techniques and their applications, Repair of concrete structures.	
<b>Text Books</b> 1. Concrete technology by A. M. Neville, Pearson education India. 2. Concrete Technology by Krishnaraju 3. Concrete Technology by Gambhir	

