



**SAMRAT ASHOK TECHNOLOGICAL INSTITUTE**  
 (Engineering College), VIDISHA M.P.  
 (An Autonomous Institute Affiliated to RGPV Bhopal)  
 -----**CIVIL ENGINEERING**-----

Semester/Year		IV/II	Program		B.Tech				
Subject Category	HSMC	Subject Code:	CE-1841	Subject Name:	Managerial Economics				
Maximum Marks Allotted					Contact Hours			Total Credits	
Theory		Practical		Total Marks	L	T	P		
End Sem	Mid-Sem	Quiz	End Sem					Lab-Work	
70	20	10	-	-	100	3	-	-	3

**Prerequisites:**

The purpose of this course is to provide students with a basic understanding of the economics theory and analytical tools that can be used in decision making problems, identifying problems and formulating them into a managerial model, Price determination in alternative market structures, demand theory, production and cost functions and decision making under uncertainty.

**Course Objective:**

The purpose of this course is to provide students with a basic understanding of the economics theory and analytical tools that can be used in decision making problems, identifying problems and formulating them into a managerial model, Price determination in alternative market structures, demand theory, production and cost functions and decision making under uncertainty.

**Course Outcomes:**

After completion of the course, the student will be able to:

1. To analyse and discuss consumer behaviours and market in general.
2. Analyse business practices with respect to pricing and competition.
3. Definition and application of key-concepts in ecision analysis and profit theory.
4. Demand analysis and estimation, production and cost analysis under different market conditions, forecasting and decision making under uncertainty.

UNITs	Descriptions	Hrs.	CO's
I	Introduction: Meaning, Nature and Scope of Economics, Meaning of Science, Engineering and Technology. Managerial Economics and its scope in engineering perspective. Definitions of basic concepts: Positive and normative approach, Optimization, Marginal analysis, Opportunity Cost, Economic Model, Static and Dynamics.	8	CO1
II	Analysis of Demand - Meaning of demand, Demand Analysis, Law of Demand, Determinates of Demand, Demand function, Indifference curve, Elasticity of Demand, Types of elasticity, Uses of concept of elasticity of demand in managerial decision. Law of supply, Elasticity of supply.	8	CO3
III	Demand forecasting - Meaning, significance, Forecasting of an established product. Forecasting of a new product, production function, Laws of returns to scale & Law of Diminishing returns scale, Theory of cost and break-even analysis, Cost reduction and control.	7	CO4
IV	Market Structure - Pricing under various markets including: Perfect Completion, Imperfect competition, Monopoly, Monopolistic, Oligopoly, duopoly, sorbent features of price determination and Price discrimination.	9	CO4
V	Business Cycle - Concept of National Income and method of measurement, Meaning of Inflation, types, causes & prevention methods, Business Cycles, Phases of business cycle.	8	CO2
Guest Lectures (if any)			
<b>Total Hours</b>		40	
Text Book-			
1. Managerial Economics: R Cauvery, U.K. SudhaNayak			

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2. Managerial Economics for Engineering: Prof D.N. Kakkar	
Reference Books-	
1. Managerial Economics :D.N. Dwivedi, Vikas Publishing House Pvt. Ltd.	
2. Principle of Economics: Robert H. Frank, Ben S. Bernanke Tata McGraw Hill.	
Modes of Evaluation and Rubric	
Quiz, Assignment, Mid term exam and End term exam.	
Rubric: End term exam.	
List/Links of e-learning resource	
<a href="https://nptel.ac.in/courses/110/101/110101005/">https://nptel.ac.in/courses/110/101/110101005/</a>	
<a href="https://nptel.ac.in/courses/110/101/110101005/">https://nptel.ac.in/courses/110/101/110101005/</a>	
Recommendation by Board of studies on	16.12.2022
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Civil Engineering



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 -----**CIVIL ENGINEERING**-----

Semester/Year		IV/II		Program		B.Tech			
Subject Category	DC	Subject Code:	CE-1842	Subject Name:	Quantity Surveying & Costing				
Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		Total Marks	L	T	P	4
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work		3	1	-	
70	20	10	-	-	100				
<b>Prerequisites:</b>									
Building material									
<b>Course Objective:</b>									
Students are expected to learn to know the importance of preparing the types of estimates under different conditions; to know about the rate analysis and bill preparations; to study about the specification writing; to understand the valuation of land and buildings.									
<b>Course Outcomes:</b>									
After completion of the course, the student will be able to:									
<ol style="list-style-type: none"> <li>1. Apply knowledge and techniques to prepare different types of estimates for different types of structures.</li> <li>2. Carry out analysis of rates and bill preparation for various components of construction and utilize for calculating cost of works.</li> <li>3. Apply the concept of valuation for evaluating rent of buildings</li> </ol>									
<b>UNITs</b>	<b>Descriptions</b>					<b>Hrs.</b>	<b>CO's</b>		
I	Introduction: Purpose and importance of estimates, principles of estimating. Methods of taking out quantities of items of work. Mode of measurement, measurement sheet and abstract sheet; bill of quantities.  Types of estimates, plinth area rate, cubical content rate, preliminary, original, revised and supplementary estimates for different projects.					8	CO1		
II	Rate Analysis: Task for average artisan, various factors involved in the rate of an item, material and labour requirement for various trades; preparation for rates of important items of work. Current schedule of rates. (C.S.R.)					8	CO2		
III	Detailed Estimates: Preparing detailed estimates of various types of buildings, R.C.C. works, earth work calculations for roads and estimating of culverts Services for building such as water supply, drainage and electrification.					9	CO1		
IV	Cost of Works: Factors affecting cost of work, overhead charges, Contingencies and work charge establishment, various percentages for different services in building. Preparation of DPR.					8	CO2		
V	Valuation: Purposes, depreciation, sinking fund, scrap value, year's purchase, gross and net income, dual rate interest, methods of valuation, rent fixation of buildings.					7	CO3		
Guest Lectures (if any)									
<b>Total Hours</b>						<b>40</b>			

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<b>Text Book-</b>	
<ol style="list-style-type: none"> <li>Quantity Surveying &amp; Costing – B.N. Datta</li> <li>Estimating &amp; Costing for Civil Engg. – G.S. Birdi</li> </ol>	
<b>Reference Books-</b>	
<ol style="list-style-type: none"> <li>Quantity surveying &amp; costing – Chakraborty</li> <li>Estimating &amp; Costing – S.C. Rangawala</li> </ol>	
<b>Modes of Evaluation and Rubric</b>	
Quiz, Assignment, Mid term exam and End term exam. Rubric: End term exam.	
<b>List/Links of e-learning resource</b>	
<a href="https://nptel.ac.in/courses/105/104/105104161/">https://nptel.ac.in/courses/105/104/105104161/</a>  <a href="https://pdfcoffee.com/estimation-amp-costing-5-pdf-free.html">https://pdfcoffee.com/estimation-amp-costing-5-pdf-free.html</a>	
Recommendation by Board of studies on	16.12.2022
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Subject handled by department	Civil Engineering

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**-----CIVIL ENGINEERING-----**

Semester/Year		IV/II	Program		B.Tech				
Subject Category	DC	Subject Code:	CE-1843	Subject Name:	Geology & Concrete Technology				
Maximum Marks Allotted									
Theory			Practical		Total Marks	Contact Hours			Total Credits
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work		L	T	P	
70	20	10	30	20	150	3	-	2	4

**Prerequisites:**

Building Materials

**Course Objective:**

Students are expected to learn to understand the properties of ingredients of concrete; to study behaviour of concrete in its fresh and hardened state; to study about the concrete design mix; to know about the procedures in concreting.

Students are expected to learn the basic concepts of geology and to think clearly and critically the solution of Civil Engineering problems in with this geological knowledge

**Course Outcomes:**

After completion of the course, the student will be able to:

1. Understand the behaviour of fresh and hardened concrete
2. Design the concrete mix using IS code methods
3. Understand the need for special concretes
4. Acquire the knowledge of the important rocks and minerals.
5. Identify and classify rock using basic geological classification system.

UNITS	Descriptions	Hrs.	CO's
I	Concrete Making Materials: Cement, Fine Aggregate, Coarse aggregate, Water, Chemical & Mineral admixtures. Different test on cement as per Indian standards, Tests on aggregates as per Indian standards, Bulking of sand, Sieve analysis – Grading.  Properties of Fresh and Hardened Concrete: Properties of fresh concrete- Workability – different tests of workability- Factors influencing workability. Tests on hardened concrete as per IS codes – Relationship between different strengths – factors influencing strength.	9	CO1
II	Design of Concrete Mix: Various classical methods of concrete mix design, I.S. code method, basic considerations and factors influencing the choice of mix design, acceptance criteria for concrete.	9	CO2
III	Special Concretes: Light weight concrete, ready mix concrete, Fibre reinforced concrete, underwater concrete, self-compacting concrete, Heat resistant concrete etc.	6	CO3
IV	Introduction and Physical Geology: Introduction and scope of Geology, Internal structure of the earth, Weathering, erosion and denudations process on earth material, Geological work of wind, river underground water and glaciers. Soil formation, geological classification of soil and concept of earthquake Plate- tectonics.  Mineralogy: Fundamentals of mineralogy, study of common rock forming minerals, ores and minerals of economic importance to civil engineering.	9	CO4
V	Petrology: Rocks and their formation, classification of rocks, distinction between Igneous, Sedimentary and Metamorphic rocks. Engineering properties of rocks. Rocks of civil engineering importance.	7	CO5

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	Structural Geology: Structures related to rocks, Dip, Strike and outcrops, Classification and detailed studies of geological structures i.e. folds, Faults, Joints, Unconformity and their importance in Civil Engineering.		
Guest Lectures (if any)			
<b>Total Hours</b>		40	
<b>Suggestive list of experiments:</b>			
<ol style="list-style-type: none"> <li>1. Testing of Cement: Consistency of cement, initial and final setting time, Fineness and Specific Gravity of cement.</li> <li>2. Testing of fine aggregate: Specific Gravity, sieve analysis and zoning, bulking of fine aggregate, bulk density, silt content.</li> <li>3. Testing of coarse aggregate: Specific Gravity, sieve analysis, water absorption &amp; moisture content.</li> <li>4. Concrete Mix design by IS code method (as per IS:10262-2019 &amp; IS:456-2000)</li> <li>5. Tests on Concrete- Workability tests – Slump cone test, compaction factor test, Vee-Bee consist meter test, strength tests- compressive strength, flexural strength, split tensile strength.</li> <li>6. Identification of simple rock forming minerals and important ores.</li> <li>7. Measurement of dip and strike of formation using Brunton compass &amp; Clinometer compass.</li> <li>8. Interpretation of Geological maps and drawings of sections.</li> </ol>			
<b>Text Book-</b>			
<ol style="list-style-type: none"> <li>1. Properties of Concrete – A.M. Nevelli – 5th Ed, Prentice Hall Publishers, 2012.</li> <li>2. Concrete Technology – M. S. Shetty – S Chand Co., Publishers – 2006.</li> <li>3. Concrete Technology – M. L. Gambhir – Tata McGraw Hill Publishers – 2012.</li> <li>4. Prabin Singh – “Engineering and General Geology”</li> <li>5. P.K. Mukerjee – “A text Book of Geology”</li> <li>6. S.K. Garg – “A text Book of Physical and Engineering Geology”</li> </ol>			
<b>Reference Books-</b>			
<ol style="list-style-type: none"> <li>1. Concrete Technology – R.S. Varshney – Oxford&amp; IBH publishing co.</li> <li>2. Hand books on Materials &amp; Technology - Published by BMTPC &amp; HUDCO</li> <li>3. Mohan Rai&amp; M.P. Jai Singh; Advances in Building Materials &amp; Construction</li> <li>4. IS:456 (2000)</li> <li>5. IS:10262 (2019)</li> <li>6. Principles of Engineering Geology - Bangar, K.M. - Standard Publishers Distributors, 1995, New Delhi.</li> <li>7. Structural Geology - Billings, M.P. - Prentice-Hall India, 1974, New Delhi</li> </ol>			
<b>Modes of Evaluation and Rubric</b>			
Quiz, Assignment, Midterm exam, End term exam and Practical Viva. Rubric: End term exam. Practical: 50% Quiz and 50% Viva.			
<b>List/Links of e-learning resource</b>			
<a href="https://nptel.ac.in/courses/105/102/105102012/">https://nptel.ac.in/courses/105/102/105102012/</a> <a href="https://nptel.ac.in/courses/105/104/105104030/">https://nptel.ac.in/courses/105/104/105104030/</a> <a href="https://nptel.ac.in/courses/105/106/105106176/">https://nptel.ac.in/courses/105/106/105106176/</a> <a href="https://nptel.ac.in/courses/105/105/105105106/">https://nptel.ac.in/courses/105/105/105105106/</a> <a href="https://nptel.ac.in/courses/105/105/105105170/#">https://nptel.ac.in/courses/105/105/105105170/#</a>			
Recommendation by Board of studies on		16.12.2022	
Approval by Academic council on			
Compiled and designed by			
Subject handled by department		Civil Engineering	

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# SAMRAT ASHOK TECHNOLOGICAL INSTITUTE

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## -----CIVIL ENGINEERING-----

Semester/Year		IV/II		Program		B.Tech			
Subject Category	DC	Subject Code:	CE-1844	Subject Name:	Fluid Mechanics – I				
Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		Total Marks	L	T	P	
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work					
70	20	10	30	20	150	3	-	2	4

**Prerequisites:**

Physics and Mathematics.

**Course Objective:**

Students are expected to learn basic concepts of fluid flow, fluid properties and relationship between them, fundamental principles of fluid mechanics (principles of continuity, momentum, and energy) as applied to fluid motions.

**Course Outcomes:**

After completion of the course, the student will be able to:

1. Perceive the knowledge of basic properties of fluids, different types of flows and analyse the fluid behaviour under static condition
2. Apply the basic concepts to examine the behaviour of fluid under kinematic and dynamic conditions
3. Perform dimensional analysis and dynamic similitude
4. Evaluate practical flow problems for pipes, open channels
5. Compare the difference between theoretical and practical values of different flow parameters and calibrate the equipment's accordingly (Lab)

UNITS	Descriptions	Hrs.	CO's
I	Review of Fluid Properties: Engineering units of measurement, mass, density, specific weight, specific volume, specific gravity, surface tension, capillarity, viscosity, bulk modulus of elasticity, pressure and vapor pressure. Classification of different Fluids, Rheological Classification of Fluid. Fluid Static's: Pressure at a point, pressure variation in static fluid, Absolute and gauge pressure, manometers, Forces on plane and curved surfaces (Problems on gravity dams and Tainted gates); buoyant force, Stability of floating and submerged bodies, Relative equilibrium.	9	CO1
II	Kinematics of Flow: Path lines, streak lines, streamlines and stream tubes; Types of motion of Fluid Particles, Types of flow-ideal & real , steady & unsteady, uniform & non uniform, flow one, two and three dimensional flow, continuity equation for one and three dimensional flow, rotational & rrotational flow, circulation, stagnation point, separation of flow, sources & sinks, velocity potential, stream function, flow nets- their utility & method of drawing flow nets.	8	CO2
III	Dynamics of Flow: Euler's equation of motion along a streamline and derivation of Bernoulli's equation, application of Bernoulli's equation, energy correction factor, linear momentum equation for steady flow; momentum correction factor. The moment of momentum equation, forces on fixed and moving vanes and other applications. Velocity measurement (Pitot tube, Prandtl tube, current meters etc.); flow measurement (orifices, nozzles, mouth pieces, orifice meter, nozzle meter, venture meter, weirs and notches).	8	CO3
IV	Dimensional Analysis and Dynamic Similitude: Dimensional analysis, dimensional homogeneity, use of Buckingham-pi theorem, calculation of dimensionless numbers, similarity laws, specific model investigations (submerged bodies, partially submerged bodies, weirs, spillways, roto dynamic machines etc.)	8	CO4

V	Laminar Flow: Introduction to laminar & turbulent flow, Reynold's experiment & Reynolds number, relation between shear & pressure gradient, laminar flow through circular pipes, laminar flow between parallel plates, laminar flow through porous media, Stokes law, lubrication principles.	7	CO5
Guest Lectures (if any)			
<b>Total Hours</b>		40	
<b>Suggestive list of experiments:</b>			
<ol style="list-style-type: none"> <li>1. Verification of Energy equation</li> <li>2. Calibration of venturi meter.</li> <li>3. Calibration of orifice meter.</li> <li>4. Calibration of Mouth Piece.</li> <li>5. Calibration of Water meter.</li> <li>6. Calibration Nozzle meter.</li> <li>7. Determination of Cc, Cv, Cd of orifices.</li> <li>8. Reynolds experiment for demonstration of stream lines &amp; turbulent flow.</li> <li>9. Verification of impulse momentum principle.</li> <li>10. Calibration Notches. (Rectangular &amp; V notch)</li> </ol>			
<b>Text Book-</b>			
<ol style="list-style-type: none"> <li>1. Modi &amp; Seth; Fluid Mechanics; Standard Book House, Delhi</li> <li>2. Som and Biswas; Fluid Mechanics and machinery; TMH</li> <li>3. Cengel; Fluid Mechanics; TMH</li> <li>4. White ; Fluid Mechanics ; TMH</li> </ol>			
<b>Reference Books-</b>			
<ol style="list-style-type: none"> <li>1. Essential of Engg Hyd. By JNIK DAKE; Afrikan Network &amp; ScInstt. (ANSTI)</li> <li>2. A Text Book of fluid Mech. for Engg. Student by Franiss JRD</li> <li>3. R Mohanty; Fluid Mechanics By; PHI</li> <li>4. Fluid Mechanics; Gupta Pearson.</li> <li>5. Dr. D.S. Kumar, Fluid Mechanics and Fluid Power Engineering</li> </ol>			
<b>Modes of Evaluation and Rubric</b>			
Quiz, Assignment, Mid-term exam, End term exam and Practical Viva. Rubric: End term exam. Practical: 50% Quiz and 50% Viva.			
<b>List/Links of e-learning resource</b>			
<a href="https://swayam.gov.in/nd1_noc20_ce59/preview">https://swayam.gov.in/nd1_noc20_ce59/preview</a> <a href="https://nptel.ac.in/courses/112105183">https://nptel.ac.in/courses/112105183</a>			
Recommendation by Board of studies on		16.12.2022	
Approval by Academic council on			
Compiled and designed by			
Subject handled by department		Civil Engineering	

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## SAMRAT ASHOK TECHNOLOGICAL INSTITUTE

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### -----CIVIL ENGINEERING-----

Semester/Year		IV/II		Program		B.Tech					
Subject Category	DC	Subject Code:	CE-1845	Subject Name:	Transportation Engg. I						
Maximum Marks Allotted						Contact Hours			Total Credits		
Theory			Practical		Total Marks			L		T	P
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work							
70	20	10	30	20	150			3	-	2	4
<b>Prerequisites:</b>											
<b>Basic knowledge about the railway, bridge and tunnel</b>											
<b>Course Objective:</b>											
<ul style="list-style-type: none"> <li>To know about the basic concepts and design of various components of railway engineering.</li> <li>To know about the types and functions of railway track, junctions, points and railway stations.</li> <li>To know about the airport components and aircraft characteristics and planning.</li> <li>To study about the types and basic components of docks and harbors.</li> <li>To know about various emerging transportation systems and to know Intelligent Transportation Systems.</li> </ul>											
<b>Course Outcomes:</b>											
After completion of the course, the student will be able to:											
<ol style="list-style-type: none"> <li>Distinguish various component of railway transportation system and geometric design of railway elements.</li> <li>Discuss the basic concepts of bridge planning, construction and strengthening of bridges.</li> <li>know about the basic components and methods of tunnel construction to facilitate the transportation system.</li> </ol>											
<b>UNITs</b>	<b>Descriptions</b>						<b>Hrs.</b>	<b>CO's</b>			
I	Introduction: Principles of Transportation, transportation by Roads, Railways, Airways, Waterways, their importance and limitations, Route surveys and alignment, railway track, development and gauges, Hauling capacity and tractive effort. Tractive resistances & Permanent way.  i) Rails: types, welding of rails, wear and tear of rails, rail creep.  ii) Sleepers: types and comparison, requirement of a good sleeper, sleeper density.  iii) Rail fastenings: types, Fish plates, fish bolts, spikes, bearing plates, chain keys, check and guard rails.  iv) Ballast: Requirement of good ballast, various materials used as ballast, quantity of ballast, different methods of plate laying, material trains, calculation of materials required, relaying of track						8	CO1			
II	Geometric design of railway track- speed and cant - Geometric Design; Station & Yards; Points and Crossings & Signaling and interlocking: Formation, cross sections, Super elevation, Equilibrium, Cant and Cant deficiency, various curves, speed on curves. Types, locations, general equipment's, layouts, marshalling yards, Definition, layout details, design of simple turnouts, Types of signals in stations and yards, principles of signaling and inter-locking.						10	CO1			

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III	Bridge Site Investigation and Planning; Loading Standards & Component parts: Selection of site, alignment, collection of bridge design data: essential surveys, hydraulic design, scour, depth of bridge foundation, Economical span, clearance, afflux, type of road & railway bridges. : Design loads and forces, Impact factor, Indian loading standards for Railways Bridges and Highway Bridges, Bridge super structure and sub-structures, abutments, piers, wing walls, return walls, approaches, floors & flooring system, choice of super structure.	7	CO2
IV	Bridge Foundations, Construction, Testing and Strengthening of Bridges: Different types of foundation: piles and wells, sinking of wells, coffer-dams. Choice of bridges and choice of materials, details of construction underwater and above water, sheet piles coffer dams, Erection of bridges, girders, equipment's and plants. inspection and Data collection, strengthening of bridges, Bridge failure.	7	CO2
V	Tunnels: 1. Selection of route, Engineering surveys, alignment, shape and size of tunnel, bridge action, pressure relief phenomenon, Tunnel approaches, Shafts, pilot shafts 2, Construction of tunnels in soft soil, hard soil and rock, Different types of lining, methods of lining, Mucking operation, Drainage and ventilation, Examples of existing important tunnels in India and abroad.	8	CO3
Guest Lectures (if any)			
<b>Total Hours</b>		40	
<b>Suggestive list of experiments:</b>			
<ol style="list-style-type: none"> <li>1. Aggregate Crushing Value Test</li> <li>2. Determination of aggregate impact value</li> <li>3. Determination of Los Angeles Abrasion value</li> <li>4. Determination of penetration value of Bitumen</li> <li>5. Determination of Viscosity of Bituminous Material</li> <li>6. Determination of softening point of bituminous material</li> <li>7. Determination of ductility of the bitumen</li> <li>8. Determination of flash point and fire point of bitumen</li> <li>9. Determination of stripping value of road aggregate</li> <li>10. Determination of shape tests on aggregate</li> </ol>			
<b>Text Book-</b>			
<ol style="list-style-type: none"> <li>1. Chakraborty and Das; Principles of transportation engineering; PHI</li> <li>2. Rangwala SC; Railway Engineering; Charotar Publication House, Anand</li> <li>3. Rangwala SC; Bridge Engineering; Charotar Publication House, Anand</li> <li>4. Ponnuswamy; Bridge Engineering; TMH</li> <li>5. Railway Engineering by Arora &amp; Saxena-Dhanpat Rai &amp; Sons</li> </ol>			
<b>Reference Books-</b>			
<ol style="list-style-type: none"> <li>1. Railway Track by K.F. Antia</li> <li>2. Principles and Practice of Bridge Engineering S.P. Bindra – Dhanpat Rai &amp; Sons</li> <li>3. Bridge Engineering - J.S. Alagia - Charotar Publication House, Anand</li> <li>4. Railway, Bridges &amp; Tunnels by Dr. S.C. Saxena</li> <li>5. Harbour, Docks &amp; Tunnel Engineering - R. Srinivasan</li> <li>6. Essentials of Bridge Engg. By I.J. Victor; Relevant IS &amp; IRC codes</li> </ol>			
<b>Modes of Evaluation and Rubric</b>			
Quiz, Assignment, Mid-term exam, End term exam and Practical Viva. Rubric: End term exam. Practical: 50% Quiz and 50% Viva.			

List/Links of e-learning resource	
<a href="https://nptel.ac.in/courses/105/107/105107123/">https://nptel.ac.in/courses/105/107/105107123/</a> <a href="https://nptel.ac.in/noc/courses/noc17/SEM2/noc17-ce24/">https://nptel.ac.in/noc/courses/noc17/SEM2/noc17-ce24/</a> <a href="https://en.wikipedia.org/wiki/Railway_engineering">https://en.wikipedia.org/wiki/Railway_engineering</a> <a href="https://nptel.ac.in/courses/105/105/105105212/">https://nptel.ac.in/courses/105/105/105105212/</a>	
Recommendation by Board of studies on	16.12.2022
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Civil Engineering

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-----**CIVIL ENGINEERING**-----

Semester/Year		IV/II	Program		B.Tech				
Subject Category	DLC	Subject Code:	CE-1846	Subject Name:	Instrumentation and Sensor Technology for Civil Engg.				
Maximum Marks Allotted						Contact Hours			Total Credits
Theory			Practical		Total Marks	L	T	P	
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work		-	-	2	1
-	-	-	60	40	100	-	-	2	1
<b>Suggestive list of experiments:</b>									
1. Indicating Instrument: Wheat stone bridge									
2. Indicating Instrument: Kelvin's double bridge									
3. Indicating Instrument: Maxwell's Bridge									
4. Indicating Instrument: Hay's bridge									
5. Indicating Instrument: Wein bridge									
6. Acceleration measurement-Velocity, Time and frequency measurement									
7. Hall effect sensor, LDR Sensor, Photo Sensor									
8. Orsat apparatus for environmental pollution (Video explanation)									
9. Ultrasonic liquid level gauge (Video explanation)									
10. Flow measurement by Turbine flow meter (Video explanation)									
Text Book- Hand Book of Instrumentation and Sensor by H.S. Kalksi.									
Reference Books- Instrumentation and Measurement by A.K. Sahwhney Instrumentation and Measurement by Sharma & Sharma									
<b>Modes of Evaluation and Rubric</b>									
Lab work and Practical Viva.									
Rubric: Practical: 50% Quiz and 50% Viva.									
<b>List/Links of e-learning resource</b>									
Recommendation by Board of studies on					16.12.2022				
Approval by Academic council on									
Compiled and designed by									
					Civil Engineering				

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