Course Title: ENVIRONMENTAL ENGINEERING (Code: CIV-701)	**Syllabus for B.Tech. 7th Semester (Civil Engineering)**	**Total Course Credit: 3**			
Midterm Examination	Class Assessment (Assignments, interaction, tutorials, viva etc.)	Major Examination	L	T	P
30 Marks	10 Marks	60 Marks	2	1	0

Course Outcomes:

CO1: The various aspects related to liquid, solid and gaseous waste
CO2 Quantification and projection of waste produced by communities.
CO3: Segregation and treatment of various types of wastes produced
CO4: Environmental effects of various types of wastes.

S. No.	Course Contents	Contact Hours
01.	**Introduction** Importance of clean Environment, co existence, habitat and eco systems. Sources of pollution to Land, Water and Air. General effects of pollution.	08
02	Pollution by sewage. Nature and types of sewages (domestic, Industrial etc)	06
03	Methods of sewage disposal, effects of disposal on land and in water bodies, Self purification of streams, BOD calculations, Design of sewers, Types of sewers	04
04	Unit operations in Sewage treatment, screening, grit removal, sedimentation, filtration, Activated sludge process. Septic and Imhoff tanks, soakages for isolated systems.	06
05	Solid waste management, Constituents of solid waste, Sanitary land filling, Composting, Incineration	06
06	Air pollution, Air quality standards, measurement of air pollution, factors responsible for pollution, engineering measures to check air pollution.	07

References:

1. Moi P. N.," Waste water Treatment" 2005
2. McGhee, T.J., "Water Supply and Sewerage", McGraw Hill 1991
3. Hammer, M.J. and Hammer M.J., " Water and Waste Water Technology" Prentice Hall of India 2000
4. Nathanson J.A. " Basic Environmental Technology" 5th Ed. 2009
5. Viessman W. and Hammer M.J. " Water Supply and Pollution Control" 6th Ed. Addison Wesley Longman 1999

Course Title: Structural Dynamics (Code: CIV-702)	**Syllabus for B.Tech. 7th Semester (Civil Engineering)**	**Total Course Credit: 3**			
Midterm Examination	Class Assessment (Assignments, interaction, tutorials, viva etc.)	Major Examination	L	T	P
30 Marks	10 Marks	60 Marks	2	1	0

CO1 Get familiarized with basic principles, terminology etc. of structure dynamics and recognize the properties affecting the dynamic behavior of the structure including appropriate idealization for reliable dynamic analysis.

CO2 Understand free vibration of single degree of freedom systems particularly the determination of important dynamic properties (natural frequency and damping) and the forced vibration response of single degree of freedom systems under viscous dynamic excitation like harmonic, periodic, step/pulse and generalized type of loading.

CO3 Learn about some key concepts like natural frequencies, mode shapes and orthogonality relationships of multi degree of freedom systems, understand the free vibration of multi degree of freedom systems and computation of important dynamic properties and understand the forced damped and undamped vibration of multi degree of freedom systems under dynamic excitations using various methods.

CO4 Learn about Indian Standard Codal provisions for earthquake resistant design of buildings using Equivalent Static Method.

S. No.	**Course Contents**	**Contact Hours**
01.	Nature of dynamic loading: Harmonic, earthquake and blast loading,	08
02	Single degree of freedom systems, free vibrations and forced vibrations:	06
03	Harmonic force, Periodic force, Impulse, and General types of loading.	04
04	Multi-degree of freedom systems, numerical techniques for finding natural frequencies and mode shapes, orthogonality relationships of principal modes, Rayleigh's Principal and its application for determination of fundamental frequency. Evaluation of dynamic response by mode superposition method.	06
05	Discussion on Indian standards, codal provisions for earthquake resistant design. Design of buildings (Plane frames only) based on Codal provisions Nature of dynamic loading: Harmonic, earthquake and blast loading, Single degree of freedom systems, free vibrations and forced vibrations: Harmonic force, Periodic force, Impulse, and General type of loading	06

References:

1. Structural Dynamics by Anil.K. Chopra 2005
2. Dynamics of Structures ,Clough and Penzien 5th Edition
3. Dynamics of structures by Vinod Hosur
4. Structural Dynamics Theory and computation by Mario Paz

Subject: Construction Technology & Management (Code: CIV- 703)	**Syllabus for B.Tech.-7th sem (Autumn)**	**Total Course Credit: 3**			
Mid-semester Examination	Continuous Class-Assessment	End-Semester Examination	L	T	P
30 Marks	10 Marks	60 Marks	2	1	0

Course Objective: To impart understanding of various aspects of construction equipment, and management of construction projects

Course Outcomes:

CO1- To understand the various techniques of civil engineering constructions.
CO2- To understand the various aspects of construction equipment's.
CO3- To develop the skill for the management of construction projects.
CO4- To develop the concept of works accounting and leadership organization.

Details of Course:

S. No	Contents	Lecture Hours
01.	Construction Management, its necessity; objectives &Functions	03
02.	Construction methods and plant important equipments only	06
03.	Project scheduling: Various techniques namely Bar chart; CPM and PERT.	07
04.	Engineering economics of projects; Depreciation; Sinking Fund; compound interest factors, Selection of most economical alternative by variable cost method/Cost benefit ratio. Owning and Operating cost.	10
05.	Organization of Leadership: Function of project organization. Principles and advantages of good organization. Leadership and motivation	04
06.	Works accounting. Cashbook, Imprest cash, contractors bills, store accounts. Materials at site account. Indent, invoice, Debit & Credit note, suspense head stock, Engineering Statements, Form of agreement.	06

Books Recommended:

1.Construction Management by Mahesh Verma
2. Construction of Plant and Equipment by Peurifay
3.CPM &PERT by B.C.Punmia
4.Project Management by K.N.JHA

Course Title: Design of Structures III (Code: CIV-704)	**Syllabus for B.Tech. 7th semester (Civil Engineering)**	**Total Course Credit: 4**			
Midterm Examination	Class Assessment (Assignments, interaction, tutorials, viva etc.)	Major Examination	L	T	P
30 Marks	10 Marks	60 Marks	2	2	0

Course Outcomes:

CO1: Design RCC footings (Isolated footings and various types of combined footings) and Design of masonry foundations

CO2: Design cantilever and counter fort type RCC retaining walls. Design masonry retaining walls.

CO3: Design underground, circular and rectangular water tanks with reference to IS: 3370.Design of domes and ring beams.

CO4: Design Rectangular, T and I section beams of pre stressed concrete.

S. No.	**Course Contents**	**Contact Hours**
01.	Foundations: The design of RCC footings, isolated footings and various types of combined footings, design of masonry foundations	06
02.	Retaining walls: Design of cantilever and counter-fort type RCC retaining walls. Design of masonry retaining walls	05
03.	Water tanks: Design of underground, circular and rectangular water tanks with reference to IS:3370.	06
04.	Pre-stressed concrete: Design of Rectangular, T and I section beams of pre stressed concrete.	10
05.	Domes :Design of domes and ring beams.	04
06.	Works accounting. Cashbook, Imprest cash, contractor's bills, store accounts. Materials at site account. Indent, invoice, Debit & Credit note, suspense head stock, Engineering Statements, Form of agreement.	05

References:

1) Construction Management by Mahesh Verma
2) Construction of Plant and Equipment by Peurifay

Course Title: QUANTITY SURVEYING & COST EVALUATION (QSCE) (Code: CIV- 705)	**Syllabus for B.Tech. 5th Semester (Civil Engineering)**	**Total Course Credit: 3**			
Midterm Examination	Class Assessment (Assignments, interaction, tutorials, viva etc.)	End-Term Examination	L	T	P
30 Marks	10 Marks	60 Marks	2	1	0

Course Objective: To impart understanding of various aspects related to Material/ labour analysis and other physical measurements in the field of Civil Engineering.

Course Outcomes:

CO1: Importance of estimation in civil engineering

CO2: Importance of specification in civil engineering

CO3: How we can perform estimate of different civil engineering structures

CO4: Importance and objective of rate analysis

CO5: Importance of road estimate and its cost analysis

S. No.	Course Contents	Contact Hours
01.	**Estimate:** Importance, Items of a work and their units. Types of estimates, viz. preliminary; approximate; Abstract estimate; Plinth area estimate; detailed estimate; revised estimate; supplementary estimate, bill of quantities and abstract of cost.	04
02.	**Analysis of Rates:** Preparing analysis of rates, Labour schedule, material schedule & rate schedule. Analysis of rates- of lime concrete in foundation; Brickwork in foundation in super structure; stone masonry; R.C.C. work; R. B. work; Plastering; pointing; white washing; colour washing; painting; wood work, earth work in foundation; earth work in road; D.P.C.; Steel work for reinforcement; steelwork in trusses; wood work in frames, shutters etc.	08
03.	**Specifications:** General specifications and detailed specifications, Book of specifications, specifications for earth work in foundation; L.C. in foundation; R.C.C. work; Brick work; R. B. work; Wood work in doors, windows etc. D.P.C. centering and shuttering; earthwork in canal and road.	04
04.	**Works Estimate:** Estimates of building; Estimates of walls; methods of building estimate; Longwall-shortwall and centreline methods; Estimate of masonary platform, estimate of a masonary tank, estimate of roof trusses(wooden/steel) Estimate of a single roomed building; estimate of a two roomed building with C.G.I roof over wooden trusses and over steel truss. estimate of a shop; estimate of a R.C.C. beam, R.C.C. Slab	10

05.	**Estimate of Road:** Methods of estimating; materials for different items of work and labour; methods of estimating earth work; estimate of a metaled road.	04
06.	**Valuation & Rent Fixation:** Valuation of building-various methods; Rent fixation, plinth area requirement.	04
07.	**Introduction to Building Codes:** Sanitary fitting; Electrification; in-built furniture, Hazard safety measures in high rise buildings.	02

References:

1. Datta, B. N., Estimating and Costing in Civil Engineering (Theory & Practice), UBS Publishers' Distributors Pvt Ltd; 28th Revised Edition 2016.
2. Khanna, P. N. Indian Practical Civil Engineers Handbook by Published by UBS Publishers' Distributors (P) Ltd in 2012.

Subject: Railway & Airport Engineering (Code: CIV- 711:E2)	**Syllabus for B.Tech.-4th Year (7th Semester)**	**Total Course Credit: 3**			
Mid-Term Examination	Continuous Internal Assessment	End semester examination	L	T	P
30 Marks	10 Marks	60 Marks	3	1	0

Course Outcomes:

CO1: Able to understand the transport system of the country.
CO2: Knowledge about various aspects of railway design
CO3: Able to understand various aspects of airport system and airport pavement design.
CO4: Understanding of Railway planning, design, construction and maintenance and planning and design principles of Airports

S.No	Topic	Lecture Hours
1.	Importance of transportation systems. History of railways and its development, development of Indian Railways. Surveys for Route location.	06
2.	Permanent way and it's component parts, Formation, Ballast, Sleepers, Rails. Gauge problem, Creep and Tilt in Rails. Track resistance and tractive effort, super- elevation near branching of curves; gradients. Track fittings and fastenings. Points and crossings. Station Platforms- Various types of yards and sidings. Signals.	06
3.	Classification of airports; planning, Surveys and site selection of airports. Runway Length, Patterns and orientation-wind rose diagram. Width and grades of runway; Taxiways and aprons. Difference between Highway and airport pavements; Introduction to various design methods. Airport Drainage	08

Books Recommended:

1. Satish Chandra, M. M. Agarwal, "Railway Engineering", Oxford University Press (Latest Edition).
2. S. Ponnuswamy, "Railway Transportation- Engineering, Operation and Management", Narosa Publishing House, New Delhi (Latest Edition).
3. Rangawala, S.C, "Railway Engineering", Charotar Publishers, Anand (Latest Edition).
4. Arora, S.P. and Saxena, "Railway Engineering", Dhanpat Rai Publishers, New Delhi (Latest Edition).
5. Khanna, Arora and Jain, "Airport Planning and Design", Nem Chand and Brothers, Roorkee (Latest Edition).
6. Horren Jeff. "Airport Planning and Design"