




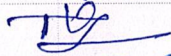


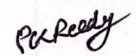
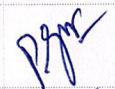
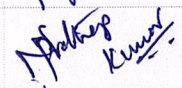

BOARD OF STUDIES MEETING – 2020-21
K.S.R.M COLLEGE OF ENGINEERING
AUTONOMOUS

Minutes of the Meeting

Date	19.09.2020	Day	Saturday
Time	3:00PM	Venue	Virtual meeting: meet.google.com/zom-fvte-oxr
Dept./SS	CE	Convener	Dr. G. Sreenivasa Reddy

Members Present: 10

Members Absent: 00

S.No	Name	Designation	Signature	S.No	Name	Designation
1.	Prof. H. Sudarshana Rao	Prof., JNTU, Anantapur				
2.	Sri. M. Konda Reddy	Executive Engineer, WRE Dept., Kadapa				
3.	Prof. G. Sreenivasa Reddy	Prof., KSRMCE				
4.	Prof. T. Kiran Kumar	Prof., KSRMCE				
5.	Prof. V. Giridhar	Prof., KSRMCE				
6.	Dr. V. Ramesh Babu	Assistant Prof., KSRMCE				
7.	Dr. P. Kishore Kumar Reddy	Assistant Prof., KSRMCE				
8.	Sri. P. Suresh Praveen Kumar	Assistant Prof., KSRMCE				
9.	Sri. N. Prathap Kumar	Assistant Prof., KSRMCE				
10.	Sri. P. Rajendra Kumar	Assistant Prof., KSRMCE				

Dr. G. Sreenivasa Reddy, welcomed all the members to the meeting and presented the agenda of the meeting.

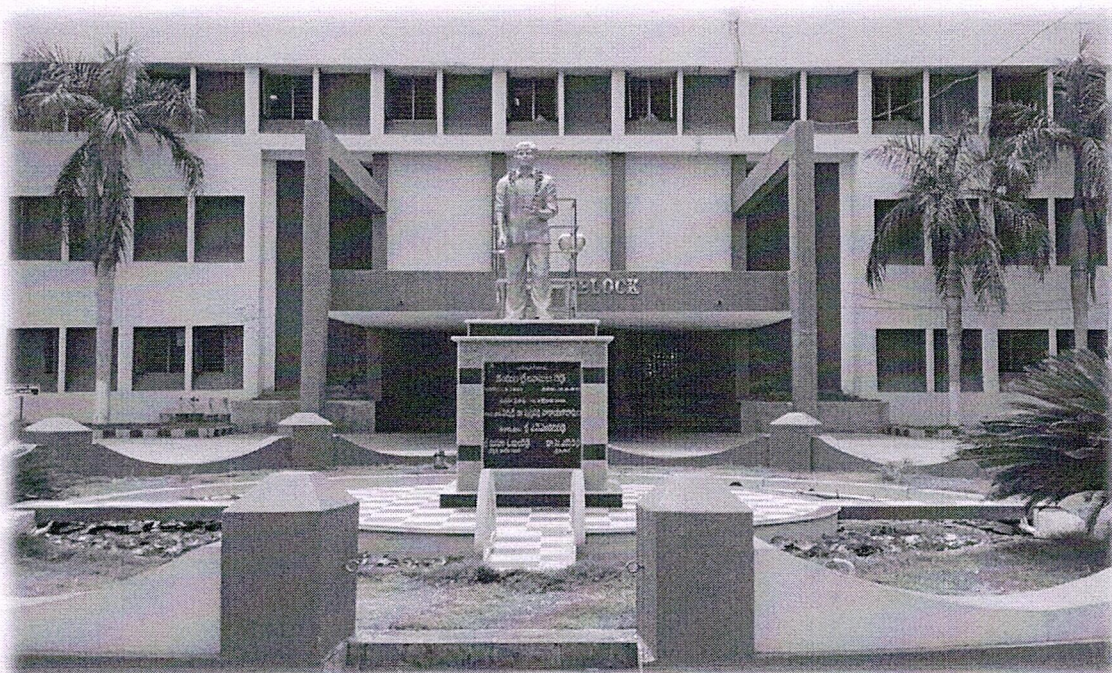
The resolutions are:

	To do item	Discussion	Resolution	Coordinator/in-charge
1	Honors and Minors courses finalization	The Head of the Department has presented the syllabus designed by the faculty of CE by considering the stakeholders feedback & action taken report and by comparing with premier institutes curriculum.	The committee suggested to offer the courses for Honors and Minors degree from the existing Professional Elective Courses in the R18 curriculum which have not offered as PEC in that respective semester (5 th , 6 th 7 th & 8 th sem).	Dr. G. Sreenivasa Reddy
2	The syllabus of Honors and Minors courses.	The Head of the Department has presented the syllabus designed by the faculty of CE by considering the stakeholders feedback & action taken report and by comparing with premier institutes curriculum.	The committee suggested to offer the following courses also for Honors and Minors degree: <ul style="list-style-type: none"> • Urban Transportation planning • Construction Project Planning and Systems 	Prof. V. Giridhar
3	To finalize and approve the syllabus for Value Added Courses/Certificate Courses/Skill Courses.	The Head of the Department has presented the syllabus designed by the faculty of CE by considering the stakeholders feedback & action taken report and by comparing with premier institutes curriculum.	The committee approved the content for offering New Courses/Certificate Courses/Skill Courses to implement in 2020-21.	Prof. T. Kiran Kumar

The Head of the Department have proposed the Vote of thanks and Concluded the meeting.

Regulations for UG Program in Engineering (R18 UG)
(Effective from 2018-19 for regular students and 2019-20
for lateral entry students)

B. Tech (R18) Syllabus
Civil Engineering



Kandula Srinivasa Reddy Memorial College of
Engineering (Autonomous)

Kadapa-516005. AP

(Approved by AICTE, Affiliated to JNTUA, Ananthapuramu, Accredited by NAAC)
(An ISO 9001-2008 Certified Institution)

UG Programs in Civil Engineering (R18 UG)

Curriculum

1st Semester

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1821101	BSC	Mathematics – 1	3	1	0	30	70	4
1823102	BSC	Engineering Chemistry	3	1	0	30	70	4
1824103	HSMC	English	2	0	0	30	70	2
1805104	ESC	Programming for Problem Solving	3	0	0	30	70	3
1823107	BSC	Chemistry Lab	0	0	3	50	50	1.5
1805108	ESC	Programming for Problem Solving Lab	0	0	4	50	50	2
1824109	HSMC	English Lab	0	0	2	50	50	1
Total			11	2	9	270	430	17.5

2nd Semester

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1821201	BSC	Mathematics – 2	3	1	0	30	70	4
1822204	BSC	Engineering Physics	3	1	0	30	70	4
1802205	ESC	Basic Electrical Engineering	3	1	0	30	70	4
1803207	ESC	Engineering Graphics and Design	1	0	4	50	50	3
1822208	BSC	Engineering Physics Lab	0	0	3	50	50	1.5
1802209	ESC	Basic Electrical Engineering Lab	0	0	2	50	50	1
1803211	ESC	Workshop and Manufacturing Practice	1	0	4	50	50	3
Total			11	3	13	290	410	20.5

3rd Semester

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1823301	BSC	Biology for Engineers	2	0	0	30	70	2
1821302	BSC	Numerical Methods, Probability & Statistics	2	1	0	30	70	3
1803303	ESC	Basic Mechanical Engineering	2	1	0	30	70	3
1801304	PCC	Engineering Mechanics	3	1	0	30	70	4
1801305	PCC	Surveying and Geomatics	2	1	0	30	70	3
1801306	PCC	Building Materials and Construction	2	1	0	30	70	3
1801307	PCC	Computer Aided Civil Engineering Drawing Lab	0	0	4	50	50	2
1801308	PCC	Surveying and Geomatics Lab	0	0	2	50	50	1
1801309	PCC	Civil Engineering Workshop	0	0	2	50	50	1
Total			13	5	8	330	570	22

4th Semester

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1825401	OEC 1	Managerial Economics & Financial Analysis	3	0	0	30	70	3
1824402	HSMC	Effective Technical Communication	2	1	0	30	70	3
1801403	PCC	Engineering Geology	2	0	0	30	70	2

1801404	PCC	Fluid Mechanics	3	1	0	30	70	4
1801405	PCC	Solid Mechanics – 1	3	1	0	30	70	4
1801406	PCC	Disaster Preparedness & Planning Management	2	0	0	30	70	2
18994M1	MC 1	Environmental Studies	2	0	0	30	0	0
1801407	PCC	Engineering Geology Lab	0	0	2	50	50	1
1801408	PCC	Fluid Mechanics Lab	0	0	3	50	50	1.5
1801409	PCC	Solid Mechanics Lab	0	0	3	50	50	1.5
Total			17	3	8	360	570	22

5th Semester

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
18995M1	MC 2	Human Values and Professional Ethics	2	0	0	30	0	0
1801501	PCC	Solid Mechanics – 2	2	1	0	30	70	3
1801502	PCC	Hydraulic Machinery	2	0	0	30	70	2
1801503	PCC	Structural Analysis – 1	2	1	0	30	70	3
1801504	PCC	Geotechnical Engineering	2	1	0	30	70	3
1801505	PCC	Environmental Engineering	2	0	0	30	70	2
1801506	PCC	Transportation Engineering	2	0	0	30	70	2
PEC 1	PEC 1	RS & GIS	2	0	0	30	70	2
1801514	PCC	Geotechnical Engineering Lab	0	0	2	50	50	1
1801515	PCC	Transportation Engineering Lab	0	0	2	50	50	1
1801516	PCC	Environmental Engineering Lab	0	0	2	50	50	1
1801517	PROJ	Socially Relevant Project	0	0	3	100	0	2
Total			16	3	9	490	640	22

6th Semester

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1814601	ESC	Basic Electronics and Sensor Technology	2	0	0	30	70	2
1801602	PCC	Concrete Technology	2	0	0	30	70	2
1801603	PCC	Structural Analysis – 2	2	1	0	30	70	3
1801604	PCC	Design of Reinforced Concrete Structures – 1	2	1	0	30	70	3
1801605	PCC	Foundation Engineering	2	0	0	30	70	2
1801606	PCC	Water Resources Engineering – 1	2	1	0	30	70	3
PEC 2	PEC 2	Port and Harbour Engineering	2	0	0	30	70	2
1814613	ESC	Basic Electronics and Sensor Technology Lab	0	0	2	50	50	1
1801614	PCC	Concrete Technology Lab	0	0	2	50	50	1
1801615	PCC	Foundation Engineering Lab	0	0	2	50	50	1
1801616	PROJ	Internship	0	0	3	100	0	2
Total			14	3	9	460	640	22

7th Semester

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1801701	PCC	Engineering Economics, Estimation & Costing	2	0	0	30	70	2

1801702	PCC	Design of Reinforced Concrete Structures – 2	2	1	0	30	70	3
1801703	PCC	Design of Steel Structures	2	0	0	30	70	2
1801704	PCC	Water Resources Engineering – 2	2	0	0	30	70	2
1801705	PCC	Sanitary Engineering & Solid Waste Management	2	0	0	30	70	2
PEC 3	PEC 3		2	0	0	30	70	2
OEC 2	OEC 2		3	0	0	30	70	3
OEC 3	OEC 3		3	0	0	30	70	3
1801715	PROJ	Project – 1 (Project work, seminar and internship in industry or at appropriate work place)	0	0	12	100	0	3
Total			18	1	12	340	560	22

8th Semester

Subject Code	Subject Category	Subject Title	L	T	P	IM	EM	CR
1899801	MC 3	Organisational Behaviour	2	0	0	30	0	0
1801802	PCC	Repairs & Rehabilitation of Structures	2	0	0	30	70	2
PEC 4	PEC 4		2	0	0	30	70	2
OEC 4	OEC 4		3	0	0	30	70	3
1801809	PROJ	Project – 2 (Continued from 7 th Semester, Project work, seminar and internship in industry or at appropriate work place)	0	0	12	50	50	5
Total			9	0	12	170	260	12

Professional Elective Courses

Subject	PEC 1	PEC 2	PEC 3	PEC 4
Structural Engineering	1. Pre-stressed Concrete	1. Advanced Concrete Structures 2. Design of Structural Systems (Tall Buildings)	1. Advanced Structural Analysis by Matrix Methods	1. Bridge Engineering 2. Finite Element Methods
Geotechnical Engineering	1. Ground Improvement Techniques 2. RS & GIS		1. Advanced Foundation Engineering 2. Soil Dynamics & Machine Foundation	1. Environmental Geo-Technology
Transportation Engineering	1. Highway Construction and Management 2. Railway Engineering	1. Airport Planning and Design 2. Port and Harbour Engineering	1. Intelligent Transportation Systems	1. Urban Transportation Planning.
Construction			1. Construction	

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Engineering & Management			Project Planning & Systems	
Environmental Engineering		1. Environmental Laws and Policy	1. Environmental Impact Assessment	
Hydraulics, Hydrology & Water Resources Engineering	1. Surface Hydrology	1. Urban Hydrology and Hydraulics	1. Integrated Watershed Management	1. Design and Drawing of Irrigation Structures

List of Professional Elective Subjects for R18 Curriculum

1801508 - Prestressed Concrete
 1801509 - Ground Improvement Techniques
 1801510 - RS & GIS
 1801511 - Highway Construction and Management
 1801512 - Railway Engineering
 1801513 - Surface Hydrology
 1801607 - Advanced Concrete Structures
 1801608 - Design of Structural Systems (Tall Buildings)
 1801609 - Airport Planning and Design
 1801610 - Port and Harbour Engineering
 1801611 - Environmental Laws and Policy
 1801612 - Urban Hydrology and Hydraulics
 1801706 - Advanced Structural Analysis by Matrix Methods
 1801707 - Advanced Foundation Engineering
 1801708 - Soil Dynamics & Machine Foundation
 1801709 - Intelligent Transportation Systems
 1801710 - Construction Project Planning & Systems
 1801711 - Environmental Impact Assessment
 1801712 - Integrated Watershed Management
 1801803 - Bridge Engineering
 1801804 - Finite Element Methods
 1801805 - Environmental Geo-Technology
 1801806 - Urban Transportation Planning
 1801807 - Design and Drawing of Irrigation Structures


List of Open Elective Subjects for R18 Curriculum

18OE101 - Engineering Mechanics
 18OE102 - Surveying
 18OE103 - Building Technology
 18OE104 - Estimating and Costing
 18OE105 - Water Supply Engineering
 18OE106 - Construction Practice and Management
 18OE107 - Disaster Preparedness
 18OE108 - Rehabilitation of Structures


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List of Honours Subjects for R18 Curriculum

- 1892101 - Highway Construction and Management
- 1892102 - Railway Engineering
- 1892103 - Ground Improvement Techniques
- 1892104 - Airport Planning and Design
- 1892105 - Advanced Foundation Engineering
- 1892106 - Soil Dynamics & Machine Foundation
- 1892107 - Construction Project Planning & Systems
- 1892108 - Environmental Geo-Technology Construction Practice and Management


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B. Tech., V Semester

Course Title	Advanced Structural Analysis by Matrix Methods					B. Tech. V Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1801507	Professional Elective (PEC 1)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		
Course Objectives: <ul style="list-style-type: none">• To introduce the matrix transformation methods, flexibility method and Stiffness method• To apply matrix method for analysis of fixed and continuous beams• To analyse trusses using flexibility method and stiffness method• To analyse 2D frames using flexibility method• To analyse 2D frames using stiffness method								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Understand matrix transformation methods, flexibility method and Stiffness method							
CO 2	Analyze statically indeterminate beams, rigid jointed using flexibility method, Stiffness method							
CO 3	Analyze 2-D trusses by flexibility method and stiffness method							
CO 4	Analyze 2-D frames and trusses using Flexibility matrix methods							
CO 5	Analyze 2-D frames and trusses using Stiffness matrix methods							

UNIT – I

Introduction to Matrix methods: Introduction, coordinate systems, displacement and force transformation matrices, element and structure stiffness matrices, Element and structure flexibility matrices, equivalent joint loads, stiffness and flexibility approaches.

UNIT – II

Matrix methods for beams: Analysis of beams, fixed and continuous beams by flexibility method. Analysis of beams, fixed and continuous beams by stiffness method.

UNIT – III


Matrix methods for Plane truss problems: Analysis of 2-D trusses by flexibility method, Analysis of 2-D trusses by stiffness method

UNIT – IV

Matrix methods for Plane Frames: Analysis of 2-D frames by Flexibility matrix methods.

UNIT – V

Matrix methods for Plane Frames: Analysis of 2-D frames by Stiffness matrix methods.

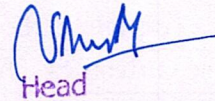

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Text Books:

1. G. S. Pandit and S. P. Gupta, "Matrix Methods of Structural Analysis", Tata McGraw-Hill Companies, Inc. New York.
2. M W Weaver and Gere, "Matrix Analysis of framed Structures", Van Nostrand Reinhold.
3. Concepts and applications of Finite Element Analysis, Robert D. Cook, Michael E Plesha, John Wiley & sons Publication
4. Introduction to Finite Elements in Engineering, Tirupati R. Chandrupatla, Ashok D. Belgundu, PHI publications

Reference Books:

1. Devdas Menon, "C.K Wang Advanced Structural Analysis", Narosa Publishing House.
2. Asslam Kassimali, "Matrix Analysis of Structures", Brooks/Cole Publishing Co., USA.
3. C.K Wang, "Analysis of Indeterminate Structures", Tata McGraw-Hill Companies, Inc. New York.
4. A first course in Finite Element Method by Daryl L. Logan, 5th Edition, Cengage Learning India Pvt. Ltd.



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B. Tech., V Semester

Course Title	Pre-Stressed Concrete					B. Tech. V Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1801508	Professional Elective (PEC 1)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		
Course Objectives: <ul style="list-style-type: none">To give idea on methods available on pre-stressed concrete and analysis of pre-stressed members and design of members.								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Calculate the effect of prestressing on statically determinate structures and statically indeterminate structures							
CO 2	Design, analysis, detailing and construction of prestressed concrete structures							
CO 3	Distinguish between pre-tensioning and post-tensioning technology							
CO 4	List the differences between pre-tensining and post-tensioned systems for structures							
CO 5	Design and analyze prestressed concrete and concrete composite structures							

UNIT – I

Introduction: General Principles of Pre-Stressed Concrete Members – Advantages and Limitations of Pre-Stressed Concrete – Comparison of Pre-Stressed Concrete Beams with Reinforced Concrete Beams.

Systems of Pre-Stressing: Classification of Pre-Stressed Concrete Members, System of Pre-Stressing, Pre-Tensioned System, Stability of the System. Hoyer System, Magnel Blaton System, Freyssinet System, Gifford Udall System, P.S.C Mono Wire System, C.C.L Standard System, LEE-MCCALL System.

UNIT – II

Losses of Pre-Stresses: Loss of Pre-Stress in Pre-Tensioned and Post-Tensioned Due to Various Causes Like Elastic Shortening of Concrete, Shrinkage of Concrete, Creep of Concrete, Relaxation of Stress in Steel, Slip in Anchorage Bending of Member and Wobble Frictional Losses.

UNIT – III

Analysis and design of sections for flexure: Assumptions, Analysis by Stress Concept – Elastic Analysis of Concrete Beams Pre-Stressed with Straight, Concentric, Eccentric, Bent and Parabolic Tendons – Design of Pre-Stressed Concrete Beams – I.S Recommendations as per IS 1343 Code Book – Design of Rectangular and an I-Section of a Beam – Lever Arm Concept – Kern Distance.

UNIT – IV

Shear Design of PSC Beam: Design of Shear based on IS 1343 Code Book – Design of Beam.

UNIT – V


Deflections of Pre-Stressed Concrete Beams: Importance of Control of Deflections – Factors Influencing Deflections – Short Term Deflections of Uncracked Members Prediction of Long Term Deflections.

Text Books:

1. S Ramamrutham “Pre-Stressed Concrete”, Dhanpat Rai Publishing Company (P) Limited, New Delhi.
2. N Krishna Raju “Pre-Stressed Concrete”, Tata McGraw-Hill Companies, Inc. New York.
3. N Rajagopalan “Pre-Stressed Concrete”, Narosa Publishing House, New Delhi.
4. Prestressed Concrete Structures by M.K.Hurst, Tata Mc.Graw Hill Publications, 2nd Edition, 2009

Reference Books / IS Codes:

1. IS 1343-2012 “Indian Standard Code of Practice for Prestressed Concrete”, Bureau of Indian Standards, New Delhi.
2. Prestressed Concrete Structures by P.Dayaratnam, Oxford & IBH Publishers, Fourth Edition.
3. Prestressed Concrete by K. U. Muthu, Agmil Ibrahim, Maganti Janardhana, M. Vijayanand, PHI Publishers, 2016
4. Design of Prestressed Concrete Structures by T.Y. Lin & N.H.Burns, John Wiley & Sons, 3rd Edition, 2005.


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B. Tech., V Semester

Course Title	Ground Improvement Techniques					B. Tech. V Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1801509	Professional Elective (PEC 1)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		
Course Objectives: <ul style="list-style-type: none">To learn and understand various ground improvement technique.To learn various method of compaction for ground improvement in its strength.To learn various physical and chemical modification for ground improvementTo learn the method to choose the foundation and or treatment method based on the site condition								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Select the ground improvement technique which is suitable and economical for soil strengthening.							
CO 2	Select different techniques based on the various types of soils in-situ							
CO 3	Design reinforced earth structures							
CO 4	Exposed to the knowledge on use of geosynthetic material							

UNIT – I

In-situ densification methods in granular soils, Vibration at the ground surface, Impact at the Ground surface, Vibration at depth, Impact at depth. In-situ densification methods in cohesive soils, Preloading, Dewatering, Drain wells, Sand drains, Sandwich geodrains, Stone columns, Lime columns, Thermal methods.

UNIT – II

Reinforced earth principles, Components of reinforced earth walls, Factors governing design of reinforced earth walls, Design principles of reinforced earth walls.

UNIT – III

Geotextiles: Introduction, Type of geotextiles, Function and their application, tests for geotextile materials, Geogrids, Functions of geogrids. Expansive soils, Problems in Expansive soils, Mechanism of swelling, swell pressure, swell potential, Heave, Tests for identification, I. S. Test Methods of determination of swell pressure, Foundation techniques in Expansive soils.

UNIT – IV

Mechanical stabilization: Soil aggregate mixtures, Properties and proportioning techniques, soft aggregate stabilization, compaction, Field compaction control. Cement stabilization: Mechanism-Factors affecting and properties, Uses of additives, Design of soil-cement mixtures, Construction techniques.

UNIT – V

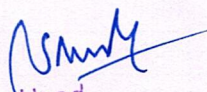
Lime and Bituminous stabilization: Types of admixtures, Mechanism, Factors affecting, Design of mixtures, Construction methods.

Text Books:

1. Dr. P. Purushothama Raj., “Ground Improvement Techniques”, Lakshmi Publications Pvt. Ltd.
2. Jones, J.E.P., Earth Reinforcement and Soil Structure, Butterworths, 1985.
3. Koerner, R.M. and Welsh, J.P., Construction and Geotechnical Engineering using Synthetic Fabrics, John Wiley, 1990.
4. Koerner, R.M., Designing with Geosynthetics (Third Edition), Prentice Hall, 1997.

Reference Books:

1. Moseley, M.D., Ground Treatment, Blackie Academic and Professional, 1998.
2. Hehn, R.W., Practical Guide to Grouting of Underground Structures, ASCE, 1996.
3. Das, B.M., Principles of Foundation Engineering, (Fourth Edition). PWS Publishing, 1999
4. Foundation Analysis and Design by Joseph E. Bowles; McGraw – Hill International Book Company 2


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B. Tech., V Semester

Course Title	Remote Sensing and GIS					B. Tech. V Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1801510	Professional Elective (PEC 1)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		
Course Objectives: The purpose of this course is to provide an understanding of physical concepts and underlying various engineering and technological applications in remote sensing. In addition, the course is expected to understand the basic principles of remote sensing and its applications.								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Perceive the basics of remote sensing							
CO 2	Pick out the characteristics of the instruments used for remote sensing							
CO 3	Analyze the need and standard techniques used for image processing							
CO 4	Perceive the basics of GIS							
CO 5	Study the areas of application using Remote Sensing and GIS							

UNIT – I

Remote Sensing – 1: Introduction to Basic Concepts: Definition – Physics of Remote Sensing – Electro Magnetic Radiation (EMR) – Interaction of EMR with atmosphere, Earth surface features – Vegetation, soils, water – Spectral reflectance curves – Atmospheric windows

UNIT – II

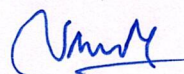
Remote Sensing – 2: Remote Sensing Systems: Platforms: Introduction – Types – Satellites and orbits, - Spectral, radiometric and spatial resolutions, temporal resolution of satellites - Some remote sensing satellites and their features.

UNIT – III

Image Processing Techniques: Digital Image Processing: Image enhancement – Contrast stretch, Spatial filtering and edge enhancement; Classification – Supervised unsupervised classification – Visual image interpretation techniques.

UNIT – IV

G I S: Geographical Information Systems: Basic Principles – Definition – Components – Data Structures – Raster and Vector formats – Functioning of GIS – Data Input – Data Manipulation – Data Retrieval – Spatial Data Analysis – Computational Analysis Methods (CAM) – Visual Analysis Methods (VAM) - Data Display – Data Base Management Systems.


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UNIT – V

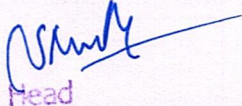
Remote Sensing Applications: Remote Sensing Applications: Water shed management - Irrigation Management - Drought Assessment - Environmental Monitoring - other applications.

Text Books:

1. Thomas Lillesand, Ralph W Kiefer and Jonathan Chipman “Remote Sensing and Image Interpretation”, John Wiley & Sons, India.
2. M Anji Reddy “Remote Sensing & GIS”, B.S Publications, Hyderabad.
3. C P Lo and Albert K W Yeung “Concepts and Techniques in Geographical Information Systems”, Prentice Hall of India, New Delhi.
4. Geographic Information systems – An Introduction by Tor Bernhardsen, Wiley India Publication, 3rd Edition, 2010.

Reference Books:

1. Floyd F Sabins Jr. “Remote Sensing Principles and Interpretation”, Freeman and Co., San Francisco.
2. J R Jensen “Remote Sensing of the Environment: An Earth Resource Perspective”, Prentice Hall of India, New Delhi.
3. Fundamentals of Geographic Information systems by Michael N. Demers, 4th Edition, Wiley Publishers, 2012.
4. Remote Sensing and GIS by Basudeb Bhatta, Oxford University Press, 2nd Revised Edition, 2011.


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B. Tech., V Semester

Course Title	Highway Construction and Management					B. Tech. V Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1801511	Professional Elective (PEC 1)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		
Course Objectives: The purpose of this course is to provide an understanding highway construction methods and its maintainace. In addition, the course is expected to understand the basic highway economics and its policies.								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Explain the specifications and steps for construction of Embankment, subgrade, sub base, granular, Bituminous and concrete layers							
CO 2	Select the specifications for construction and maintenance of pavement layers							
CO 3	Examine the quality of pavement layers during construction and maintenance							
CO 4	Construct and maintain the pavements.							
CO 5	Perceive the highway Benefit cost Ratio and its distribution							

UNIT – I

Highway Construction: General Features of highway construction- Embankment and subgrade construction- construction of Gravel Base - Cement stabilized sub base - WBM bases - Wet mix constructions- Shoulder Constructions.

UNIT – II

Bituminous pavement construction and cement concrete pavement construction: Preparation and laying of tack coat - Bituminous macadam - Penetration macadam- Built up spray Grout - Open Graded Premix- Mix seal - Bituminous concrete - Interface Treatments and overlay construction - IRC Specifications - Introducing mechanical mixers - Pavers- Finishers - Construction of Cement Roads - Manual and Mechanical methods - Joints in concrete and Reinforced concrete pavement and overlay construction - Related equipment.

UNIT – III

Highway Drainage: Objects of Highway drainage system - Requirements and Importance of Highway Drainage- Surface drainage system for Roads - Hydrologic Analysis- Hydraulic Design- Subsurface Drainage - Drainage and Slopes and erosion control - Road construction in water logged areas.

UNIT – IV

Highway Maintenance: Importance of Highway Maintenance works - Deterioration and damages in Road infrastructure - Maintenance requirement in different road components - Distresses in Flexible pavements and Maintenance measures - Structural Evaluation of Flexible

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pavements and Strengthening by overlay - Benkelman Beam Method.

UNIT – V


Highway Economics and Finance: Introduction - Highway User benefits - General benefits - Quantifiable Benefits - Non Quantifiable Benefits -Highway Costs - Motor Vehicle operation cost - Annual Highway cost- Economic Analysis -Basis of analysis - Method of economic analysis - Annual cost method- Rate of Return Method - Benefit cost Ratio method - Highway Finance - Distribution of Highway cost- Sources of Revenue for the government - Highway Financing in India - Central Road fund.

Text Books:

1. S K Khanna, C E G Justo and A Veeraragavan “Highway Engineering”, Nemchand Publications, New Delhi.
2. Principles of Pavement Design” by Yoder and Witczak, John Wiley and sons, New York, USA, 1975.
3. Design of functional Pavements by YC Yang, Mc Graw Hill Book Company, New York, USA, 1972.
4. Croney, D. and P. Croney The design and performance of road pavements, McGraw-Hill Book Company, London, UK, 1991

Reference Books:

1. L R Kadiyali “Principles and Practice of Highway Engineering”, Khanna Publishers, NewDelhi.
2. ParthaChakroborthy, Animesh Das, “Principles of Transportation Engineering”, Prentice Hall of India, New Delhi.
3. S P Bindra “Highway Engineering”, DhanpathRai& Sons, NewDelhi.
4. Huang, Y.H. Pavement Analysis and Design, Second Edition, Dorling Kindersley (India) Pvt. Ltd., New Delhi, India, 2008.


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B. Tech., V Semester

Course Title	Railway Engineering					B. Tech. V Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1801512	Professional Elective (PEC 1)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		
Course Objectives: This course is taught to introduce the concepts of railway engineering regarding the components, track geometry and the maintenance.								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Demonstrate the components of railway track, different railway gauges							
CO 2	Design track gradients as per given requirements							
CO 3	Identify purposes and facilities at railway stations							
CO 4	Explain interlocking and modern signal system							
CO 5	Describe safety devices of railway track and design of high speed tracks							

UNIT – I

Introduction to Railway Engineering: Permanent Way Components – Cross Section of Permanent Way – Functions of Various Components Like Rails, Sleepers and Ballast – Rail Fastenings – Creep of Rails – Theories Related to Creep – Adzing of Sleepers–Sleeper Density.

UNIT – II

Geometric Design of Railway Track: Necessity of Geometric design of railway track– Gradients – Grade Compensation – Cant and Negative Super Elevation – Cant Deficiency – Degree of Curve–Speed of Train–radius of Curvature–curves.

UNIT – III

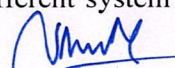
Points and crossings: Devices and layouts - Most commonly employed layouts – Special fittings and safety devices – Station and yard – Different types and their typical layouts – General equipments – Track junction – Movable diamond crossing.

UNIT – IV

Station and Yards: Introduction – Purposes of Rail Way Stations – Selection of a Site for a Railway Station – Types of Railway Stations – Definition of a Yard – Types of Yards – Tunnelling Definition – Types of Tunnelling – Drainage in Tunnels –Ventilation of Tunnels – Lining of Tunnels – Underground Railways – Tube Railways – Maintenance of Railway Tunnels.

UNIT – V

Signals and Interlocking Signals: Different types and their working – Location of signals – Principles and mechanism of interlocking – Safety devices – Different system of control on


Head


movement of trains Introduction to modern trends in Indian railways in the design of high speed tracks – MRTS and suburban railways – Electric traction – BOT and BOLT (basic concepts)

Text Books:

1. S C Saxena and S P Arora “A Text Book of Railway Engineering”, Dhanpat Rai Publishing Company (P) Limited, New Delhi.
2. Air Transportation Planning and Design by Virendhra Kumar & Satish Chandra; Gal Gotia Publications Pvt. Ltd., New Delhi, India, 1999.
3. Railway Engineering by Bindra, S.P. Dhanpat Rai and Sons, New Delhi, India, 1997.
4. Dock and Harbour Engineering by Seetharaman, S., Umesh Publications, New Delhi, India, 1999.

Reference Books:

1. Satish Chandra and M M Agarwal “Railway Engineering”, Oxford & IBH Publishing Company (P) Limited, New Delhi.
2. Airport planning and Design by S.K. Khanna & M.G Arora; Nemchand & Bros, Roorkee, India, 2012.
3. A Course in Docks and Harbour Engineering by Bindra, S.P.; Dhanpat Rai and Sons, New Delhi, India, 1992.
4. R. Srinivasa Kumar, Transportation Engineering, Railways, Airports, Docks and Harbors Universities Press Pvt Ltd, Hyderabad. 2014


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B. Tech., V Semester

Course Title	Surface Hydrology					B. Tech. V Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1801513	Professional Elective (PEC 1)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		
Course Objectives: <ul style="list-style-type: none">• The students acquire knowledge about hydrologic cycle, precipitation its measurement.• To understand the precipitation forms, evaporation, types measurements and analysis along with its abstractions.• To study the Infiltration losses, surface runoff and its importance and effects.• To understand the concept of hydrograph types of hydrographs and its behavior.• To study the importance of flood to understand the methods to estimate the floods.								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Have a thorough understanding of the theories and principles governing the hydrologic processes and its components							
CO 2	To evaluate the average precipitation ,evaporation and its importance.							
CO 3	To know the losses and its estimation impacts.importance of infiltration and runoff							
CO 4	Devolop unit hydrograph and Base flow Subsurface flow and its role							
CO 5	Design storms and carry out frequency analysis. To know estimation of flood routing methods.							

UNIT – I

Introduction: Scope and definition of hydrology – Hydrologic cycle.


Precipitation: Types and forms of precipitation, Measurement – Recording and non-recording type of rain gauges – Rain Gauge Net Work, Adequacy of Rainguage stations, Estimation of Missing Rainfall Data, Mass curve of rain fall – Hyetograph – Intensity – Duration analysis – Average depth of precipitation – Depth–Area–Duration analysis, Double mass curve.

UNIT – II

Abstractions from Precipitation:

Mean Precipitation Over an Area by Arithmetic Mean, Thiessen Polygon and Isohyetal Methods.

Evaporation, Transpiration Evapotranspiration – Factors affecting – Estimation and Measurement – Methods to Reduce evaporation.


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UNIT – III

Infiltration: Factors affecting Infiltration, Measurement of Infiltration, Infiltration Curve and Infiltration Indices.

Runoff: Components – Factors affecting – Rain fall – Runoff relationships – Flow Duration curve.

UNIT – IV

Hydrographs:

Features of hydrograph – Separation of base flow – Direct runoff hydrograph, Unit hydrograph (UH theory – Derivation – UH from complex storms – UH for various durations), S–Curve hydrograph – limitations of unit hydrograph, Synthetic and Instantaneous Unit Hydrographs.

UNIT – V

Floods:

Flood Estimation: Introduction– Methods–Rational Method & Empirical formulae.

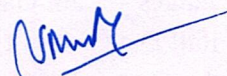
Flood Routing: Introduction – Reservoir routing– Channel routing-Methods of Routing-Muskingum method and Frequency of Rainfall & Probability.

Text Books:

1. Larry W.Mays., “Water Resources Engineering”, *John Wiley, 2010.*
2. P. Jayarami Reddy., “A Text Book on Hydrology”, Lakshmi Publications, New Delhi.
3. H.M.Raghunadh., “A Text Book on Hydrology”, New Age International (P) Limited, Publishers, New Delhi.
4. Engineering Hydrology by C.S.P. Ojha, P. Bhunya, R. Berndtsson, Oxford Higher Education, 2008

Reference Books:

1. U.Aswathanarayana., “Water and Environment”, A.A. Balkema Publishers, 2001.
2. K.C.Parti., “Hydrology and Water Resources Engineering”, Narosa Publishing House, New Delhi.
3. A.K.Biswas., “Water Resources-Environment Planning & Development”, Tata McGraw-Hill Companies, Inc. New York.
4. Wani & Elenin., “Hydrology Quantity & Quality”, *John Wiley, 2010.*
5. Ven Te Chow, Maidment & Mays., “Applied Hydrology”, Tata McGraw-Hill Companies, Inc. New York.


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B. Tech., VI Semester

Course Title	Advanced Concrete Structures					B. Tech. VI Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1801607	Professional Elective (PEC 2)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		
Course Objectives: <ul style="list-style-type: none">• The aim of this course is to keep students up to date with various advanced design.• Students will be familiar with Shell type structures• Students will be familiar with Chimneys, Bunker and silos								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	To understand and design of torsion and calculation of deflection and crack widths							
CO 2	Design special Reinforced Concrete Shells and their classifications							
CO 3	To known the design factors and design of chimneys.							
CO 4	To understand and design of RCC pipes.							
CO 5	Design the RC structures like bunkers and silos.							

UNIT – I

Design of Philosophies:

Introduction to design methods – Calculation of deflection – Calculation of crack width – Design of torsion.

UNIT – II

Design of Shells:

Introduction – Types of shells – classification of shells – Specifications of shells – Design of shell

UNIT – III

Design of Chimneys:

Introduction- Parts of chimney – Design Factors – Design of Chimney.

UNIT – IV

Design of RCC Pipes:

Introduction – Classification of RCC pipes – Tests on pipes – Design principles – Reinforcements in pipes – Design of Pressure RCC pipes

UNIT – V

Design of Bunker and Silos:

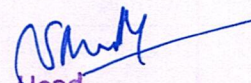
Introduction -Difference between bunker and silos – Design of Rectangular Bunker – Design of silos.

Text Books:

1. Varghese. P.C., "Advanced Reinforced Concrete Design", Prentice Hall of India, 2008.
2. Krishna Raju. N., "Advanced Reinforced Concrete Design", CBS Publishers and distributors, 2007
3. Unnikrishna Pillai and Devdas Menon ,Reinforced Concrete Design, Tata McGraw Hill Publishers Company Ltd., New Delhi, 2006.
4. Punmia B.C, Ashok Kr. Jain, Arun Kr. Jain, RCC Designs (Reinforced Concrete Design) , 10th Edition, Lakshmi Publishers, 2006.

Reference Books:

1. Park & Paulay , "Reinforced Concrete", Robert Publisher, 1975.
2. Ashok.K. Jain, Nem Chand & Bors. "Reinforced Concrete", Tata McGraw-Hill Publishing Company Limited, New. Delhi, 2003..
3. Sinha. N. C. and Roy S. K., "Fundamentals of Reinforced Concrete", S. Chand and company Limited, New Delhi, 2003.
4. Bungey, Millard, Grantham, "Testing of Concrete in Structures", Taylor and Francis, United Kingdom.


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B. Tech., VI Semester

Course Title	Design of Structural Systems (Tall Buildings)					B. Tech. VI Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1801608	Professional Elective (PEC 2)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		
Course Objectives: <ul style="list-style-type: none">• Plan tall buildings considering structural systems, fire rating, local considerations etc.• Evaluate loading for tall structures• Analyze and design of tall structural systems including structural connections								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Know design principles and different types of loading							
CO 2	Describe the various structural systems used in the construction of Tall structures							

UNIT – I

Design Criteria: Design Philosophy - History-advantages and disadvantages - Vertical city concepts - essential amenities - Fire safety - water supply - drainage and garbage disposal - service systems - structural and foundation systems. Factors affecting height, growth and form - Human comfort criteria

UNIT – II

Loading: Gravity Loading-Dead and live load-calculation-Impact and construction loads. Wind loading-static and dynamic approach-Analytical and wind tunnel experimental method.

UNIT – III

Materials: Earthquake Loading - Equivalent lateral force, Modal analysis combination of loading in various design philosophies. Materials for tall buildings - High strength concrete - Lightweight Concrete - Fiber reinforced concrete Composite materials.

UNIT – IV

Behavior of Structural Systems: Behavior of High - rise Structures - Different system for load distribution in steel and concrete -Vertical and horizontal load resistant systems - Rigid frames braced frames - in filled frames-shear walls - Wall frames - tubular systems - outrigger braced systems - Mega systems.

UNIT – V

Analysis and Design: Analysis and Design principles of various horizontal load transfer systems - approximate methods - Modeling for accurate analysis - 3D analysis - Member forces - displacements. Analysis for various secondary effects - Creep, shrinkage and temperature



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Text Books:

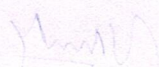
1. Bryan Stafford Smith and Alex Coull, "Tall Building Structures - Analysis and Design", John Wiley and Sons, Inc., United States.
2. Taranath B.S, "Structural Analysis and Design of Tall Buildings", McGraw-Hill, New York
3. COULL, A. and SMITH, STAFFORD, B. " Tall Buildings ", Pergamon Press, London, 1997.
4. Design of Tall Buildings by Taranath B., McGraw Hill.

Reference Books:

1. Lin T. Y. and Burry D. Stotes, "Structural Concepts and Systems for Architects and Engineers", John Wiley and Sons, Inc., United States.
2. WOLFGANG SCHUELLER " High - rise building Structures", John Wiley and Sons.
3. Lynn S. Beedle, "Advances in Tall Buildings", CBS Publishers and Distributors, New Delhi.
4. Reinforced Concrete Design of Tall Buildings by Bungales. Taranath, CRC Press.


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B. Tech., VI Semester

Course Title	Airport Planning and Design					B. Tech. VI Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1801609	Professional Elective (PEC 2)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		
Course Objectives:								
• To expose the students to planning, design, construction and maintenance of airport								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Understand the importance of airport infrastructure planning and design							
CO 2	Identify the factors governing design of airport infrastructure							
CO 3	Designing of taxi way							

UNIT – I

Airport planning: Objectives - Components, - Airport Classifications – Air transport Characteristics - various surfaces of airport - selection of site – Factors affecting the size of airport - Elements of Runway - Length of Run way, Case studies, Parking and Circulation Area.

UNIT – II

Airport Design: Airport layout - Wind rose diagram - Runway design - Geometric design of runways - Elements of Taxiway design - Airport Zones

UNIT – III

Taxiway Design: Taxiway Marking - Apron, Terminal Building - Passenger facilities, Air traffic control -primary functions of Air Traffic Control, Runway safety - Accidents due to wet runways.

UNIT – IV

Visual Aids: General - Airport lightening system, Airport marking, Instrumental landing system, blast considerations, Temperature.

UNIT – V

Airport Grading and Drainage: General – computation of Earth Work - Airport Drainage - Special characteristics and requirements of Airport Drainage

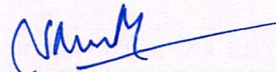
Text Books:

1. S K Khanna, M G Arora and S S Jain, “Airport Planning and Design”, Nem Chand and Bros, Roorkee.
2. Airport Engineering Planning & Design, Subhash C. Saxena, 2016, CBS Publishers, New Delhi.
3. Highway, Railway, Airport and Harbor Engineering, Subramanian K. P, Scitech Publications (India) Pvt Limited, Chennai.

4. Airport Engineering, Virendra Kumar, Dhanpat Rai Publishers, New Delhi.

Reference Books:

1. Rangwala, "Airport Engineering", Charotar Publishing House, Pvt. Ltd., Gujarat.
2. Airport Engineering, Khanna & Arora - Nemchand Bros, New Delhi.
3. Transportation Engineering, Railways, Airports, Docks & Harbours, Srinivasa Kumar R, University Press, Hyderabad
4. Transportation Engineering Planning Design, Wright P. H. & Ashfort N. J., John Wiley & Sons


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B. Tech., VI Semester

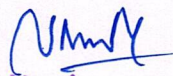
Course Title	Port and Harbour Engineering					B. Tech. VI Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1801610	Professional Elective (PEC 2)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		
Course Objectives: <ul style="list-style-type: none">• To expose the students to plan, Design, construction and Maintenance of Harbour.• To make the student able to describe the function of different components of port and harbours.• To make the student able to perform the theoretical aspects of port and harbour engineering along with the design and management applications.• To make student to explain the significance of ports and harbours as a mode of transport• To make student to develop diverse knowledge of port and harbour engineering practices applied to real life problems.								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Understand the various features in Harbours and ports, their Construction, Costal protection works and Costal Regulations to be adopted.							
CO 2	Classify harbour and Plan a new harbour layout of particular class or upgrade existing harbour							
CO 3	Design harbour terminal facilities according to the requirements.							
CO 4	Adopt different coastal protection techniques and suitable dredgers to dispose dredged material							
CO 5	Perform port operations considering environmental concerns and type of coastal structures.							

UNIT – I

Definition of Basic Terms: Harbour, port, satellite port, Docks, Wharves and Tides-Coastal Structures: Piers, Break Waters, Wharves, Jetties, Quays, Spring Fenders, Dolphins and Floating landing stage-Inland Water Transport

UNIT – II

Harbour Planning: Classification of Harbour, Natural Harbours, Artificial Harbours, Size of Harbours-Selection of Site and Planning of Harbour, Components, Ship Characteristics, Characteristics of good Harbour, Principles of Harbour planning, layouts of Harbour, Site Selection.


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UNIT – III

Design of Harbour: Requirements, Classification, Location and Design, Principles, and Terminal facilities,

UNIT – IV

Harbour Maintenance: Coastal protection -Coastal Regulation Zone 2011, Purpose, Methods, Wave action on Coastal Structures, Types, Suitability. Dredgers- Disposal of dredged materials, Mechanical and Hydraulic dredges.

UNIT – V

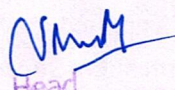
Coast Structures: Piers, Break waters, warehouses, spring fenders, Dolphins and floating landing Stage, wave action on coastal structure-Environment concern of port operations

Text Books:

1. Bindra S P, “Railway Engineering – A Course in Docks and Harbour Engineering”, Dhanpath Rai and Sons, New Delhi.
2. V.N. Vazirani and S P. Chandola, “Docks and Harbour Engineering - Text book of Transport Engineering”, Khanna Publishers, New Delhi.

Reference Books:

1. Hasmukh P. Oza and Gautam H. Oza, “Dock and Harbour Engineering”, Charotar Publishing House Pvt. Ltd., Gujarat.


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B. Tech., VI Semester

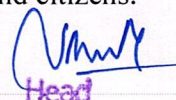
Course Title	Environmental Laws and Policy					B. Tech. VI Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1801611	Professional Elective (PEC 2)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		
Course Objectives: <ul style="list-style-type: none">• To explain the role of law, policy and institutions in the conservation and management of natural resources as well as pollution control.• To introduce the laws and policies both at the national and international level relating to environment• To equip the students with the skills needed for interpreting laws, policies and judicial decisions Course content.								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Constitutional provisions for the protection of environment							
CO 2	Environment (protection) Act, powers of central government and state government to make laws and Environment Tribunals							
CO 3	Be familiar with the laws, policies and institutions in the field of environment acquire the skills needed for interpreting laws, policies and judicial decisions in a holistic perspective							
CO 4	Acquire the ability to evaluate the role of law and policy in conservation and management of natural resources and prevention of pollution							

UNIT – I

Basic Concepts in Environmental Law: An introduction to the legal system – Constitution - Acts-Rules – Regulations - Indian Judiciary - Doctrine of precedents - judicial review - Writ petitions - PIL – liberalization of the rule of locus standi - Judicial activism. Introduction to environmental laws in India - Constitutional provisions - Stockholm conference - Bhopal gas tragedy - Rio conference. General principles in Environmental law: Precautionary principle - Polluter pays principle- Sustainable development - Public trust doctrine

UNIT – II

Environmental Regulations and Policies: Environmental protection laws and acts-Models of environmental management- Incentives- Context- Theories of corporate strategy and environmental policy- Environmental guidelines and charters; Auditing-Monitoring-Reporting-economics and accounting- Local economic development and environmental management- Role of government- Law and policies beyond environmentalism- Sustainability issues- Role of government and non-government organizations and citizens.



UNIT – III

Concept of Law and Policy:

Concept of Law: Law as Commands -Law as Rules - Law as Principles - Law as Ethics or Morality - Law as Social Norm and Customs - Law as Written Documents - Law Distinguished from Policy. Procedural environmental rights- Judicial remedies in environmental cases- Responsibility and Liability for environmental harm- Regulation of Mining sector in India.- Duty of the State (Part IV) - Fundamental Duties of the Citizens (Part IV A) -Fundamental Rights (PART III)- Right to livelihood vis-à-vis Environment - Right to equality Freedom of Trade- Role of Panchayat and Municipalities - Writ Jurisdiction and Public Interest Litigations.

UNIT – IV

Law of Crimes and Environment: Related Legislations (select provisions) - Indian Penal Code, 1860-Section 277,278,425 - The Indian Criminal Procedure Code of 1973 (CrPC) – Section 133 3.1 Introduction 3.2 Indian Penal Code-1860 3.3The Indian Criminal Procedure Code of 1973 (CrPC) 3.4Different Types of Environmental Crimes 3.5Punishment— Land Acquisition Act, 1894-- Tenure & Property Rights and Community Rights— Introduction to Environmental Public Hearing (EPH) & Processes.

UNIT – V

Environmental Justice, Equity and Governance: Introduction - Environmental Law and the Indian Constitution - Stages in Environmental Protection - National Environment Appellate Authority - Powers of Central Government to take measures to Protect and Improve the Environment - Powers of the Court - Penalties.

Text Books:

1. Divan S. and Rosencranz A. (2005) “Environmental Law and Policy in India”, 2nd Ed., Oxford, New Delhi.
2. Leela Krishnan P. (2008) “Environmental Law in India”, 3rd Ed., Lexis Nexis, India.

Reference Books:

1. Desai A. (2002) “Environmental Jurisprudence”, 2nd Ed., Modern Law House, Allahabad.
2. Sands P. (2002) “Principles of International Environmental Law”, 2nd Ed, Cambridge.
3. Upadhyay S. and Upadhyay V. (2002) “Hand Book on Environmental Law - Forest Laws, Wildlife Laws and the Environment”, Lexis Nexis- Butterworths - India, New Delhi.



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B. Tech., VI Semester

Course Title	Urban Hydrology and Hydraulics					B. Tech. VI Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1801612	Professional Elective (PEC 2)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs					End Exam Duration: 3 Hrs			
Course Objectives: <ul style="list-style-type: none">To understand urban hydrological cycle, impact of urbanization on quality of water and erosion due to urban runoff.To identify the concepts about probabilistic and statistical approaches, data collection of storm water.To analyse the urban drainage systems and design considerations for sewers.To justify the storm water management and mitigation of urban storm runoff.To formulate the maintenance of urban drainage systems and regulations.								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	To understand the impact of urbanization on water sub systems and urban hydrologic cycle.							
CO 2	To interpret the storm water modelling and data collection by statistical approaches							
CO 3	To analyse the urban drainage systems and control measures							
CO 4	To mitigate storm water management and damaging effects on urban runoff							
CO 5	To criticize the maintenance of urban drainage subsystems and regulations							

UNIT – I

Urban Hydrologic Process: Process of urbanization, Water in Urban ecosystem, Urban water subsystems, Urban hydrologic cycle, Impact of urbanization on urban runoff and stream flow quantity, Impact of urbanization on quality of runoff and stream flow, Erosion due to urban runoff.

UNIT – II


Storm water Modeling: Analysis of hydrologic changes due to urbanization, Approaches to study, Data collection and analysis, Probabilistic and statistical approaches, Principles of storm water modeling.

UNIT – III

Urban Drainage Systems: Sanitary and combined sewer systems, components, Design considerations for fixing sewer capacity, Infiltration into and ex-filtration from sewers, causes, Infiltration inflow analysis, Field investigations, Control measures.

UNIT – IV

Storm Water Management: Urban storm runoff quantity and quality management, Mitigation of damaging effects of urban storm runoff


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UNIT – V

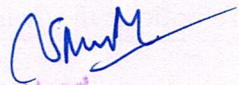
Urban Drainage Systems Maintenance: Maintenance management of UDS and its subsystems, Drainage system, Storm drain conveyance system, Pump stations, Open channel illicit connections and discharges, Spill response, Other considerations, limitations and regulations.

Text Books:

1. Stephenson. D, “Storm Water Hydrology and Drainage”, Elsevier Publications, 2nd Edition, 1981.
2. Hall.J.M, “Urban Hydrology”, Elsevier Applied Science Publishing Company, 1st Edition, 1984.
3. Urban Hydrology, Hydraulics and Stormwater Quality: Engineering Applications and Computer Modelling, Akan A.O and R.L. Houghtalen (2006), Wiley International.
4. Hydrology – Quantity and Quality Analysis, Wanielista M P and Eaglin (1997), Wiley and Sons

Reference Books:

1. Overtens D.E., and Medows M.E., “Storm water Modelling” Academic Press, United States.
2. Grigg, N.S, “Urban Water Infrastructure Planning, Management, and Operations”, John Wiley & Sons, United States.
3. Viessman W.I., Knapp J.W., Lewis G.L., and Henbrough, T.E., “Introduction to Hydrology”, Harper Publishers, New York.
4. Frontiers in Urban Water Management – Deadlock or Hope, by Maksimovic C and J A Tejada-Guibert (2001), IWA Publishing


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B. Tech., VII Semester

Course Title	Advanced Structural Analysis by Matrix Methods					B. Tech. VII Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1801706	Professional Elective (PEC 3)	L	T	P	C			
		2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs					End Exam Duration: 3 Hrs			
Course Objectives: The course is designed to students, <ul style="list-style-type: none">To introduce stiffness method and flexibility method for analysis of statically indeterminate structures.To understand the basics of finite element method and application to structural analysis.Use and/or develop structural analysis software to analyze complicated structural systems.Interpret the output from computer-based analyses for the purpose of structural design								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Identify static and dynamic indeterminacy of structure and can apply matrix methods to analyse the structures.							
CO 2	Analyse the continuous beams using stiffness and flexibility methods.							
CO 3	Analyse two dimensional portable frames using stiffness and flexibility methods.							
CO 4	Analyse two-dimensional pin-jointed trusses using stiffness and flexibility methods.							
CO 5	Transform local coordinate system to global coordinate system in matrix methods.							

UNIT – I

Introduction to Matrix methods: Introduction, coordinate systems, displacement and force transformation matrices, element and structure stiffness matrices, Element and structure flexibility matrices, equivalent joint loads, stiffness, and flexibility approaches.

UNIT – II

Matrix methods for beams: Analysis of fixed and continuous beams by flexibility method. Analysis of fixed and continuous beams by stiffness method.

UNIT – III

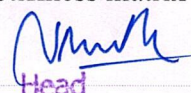
Matrix methods for Plane truss problems: Analysis of 2-D trusses by flexibility method, Analysis of 2-D trusses by stiffness method.

UNIT – IV

Matrix methods for Plane Frames: Analysis of 2-D frames by Flexibility matrix methods.

UNIT – V

Matrix methods for Plane Frames: Analysis of 2-D frames by Stiffness matrix methods.

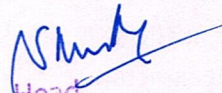

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Text Books:

1. G. S. Pandit and S. P. Gupta, "Matrix Methods of Structural Analysis", Tata McGraw-Hill Companies, Inc. New York.
2. M W Weaver and Gere, "Matrix Analysis of framed Structures", Van Nostrand Reinhold.
3. Structural Analysis (Matrix Approach) by Pandit and Gupta –Tata Mc Graw Hill Publishers
4. Theory of structures by Ramamrutam Jain book depot, New Delhi

Reference Books:

1. Devdas Menon, "C.K Wang Advanced Structural Analysis", Narosa Publishing House.
2. Asslam Kassimali, "Matrix Analysis of Structures", Brooks/Cole Publishing Co., USA.
3. C.K Wang, "Analysis of Indeterminate Structures", Tata McGraw-Hill Companies, Inc. New York.
4. Matrix structural analysis by T.N.Gayl, Tata Mc Graw Hill Company


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B. Tech., VII Semester

Course Title	Advanced Foundation Engineering					B. Tech. VII Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1801707	Professional Elective (PEC 3)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs					End Exam Duration: 3Hrs			
Course Objectives: <ul style="list-style-type: none">• To explain how the earth pressure acting on sheet pile• To explain the concepts of braced cuts and how to calculate the lateral pressure at different locations• To explain the concepts of Terzaghi and IRC Methods and individual components• To explain the concepts of collapsible and expansive soils and design of foundations• To explain different methods of ground improvement techniques								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Analyse and design the depth of embedment for sheet pile and forces in the anchor.							
CO 2	Determine the loads / forces on the struts and bending moment in Wells, sheet piles and design of coffer dam							
CO 3	Analyze and design well foundation including complete stability analysis							
CO 4	Determine the swell, uplift capacity, and factor of safety							
CO 5	Importance and difficulties in stabilization							

UNIT – I

Bulkheads: Types of Sheet Pile Walls – Free Cantilever Sheet Pile – Cantilever Sheet Pile in Cohesionless and Cohesive Soils – Anchored Sheet Pile with Free Earth Support – Rowe's Moment Reduction Curves – Anchored Sheet Pile with Fixed Earth Support – Design of Anchors

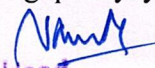
UNIT – II

Braced Cuts and Cofferdams: **Braced Cuts** – Introduction – Lateral Earth Pressure on Sheet Piles – Different Types of Sheet Piles and Bracing Systems – Design of Various Components of Bracings.

Cofferdams – Types of Cofferdams – Design of Circular Cofferdams on Rock – Design of Cellular Cofferdams on Soil.

UNIT – III

Well Foundations: Introduction – Different Shapes of Wells – Grip Length – Forces Acting on the Well Foundation – Terzaghi's Analysis – Banerjee and Gangopadhyay's Analysis –


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Simplified Analysis for Heavy Wells – IRC Method – Individual Components of the Well – Sinking of Wells – Measures for rectification of Tilts and Shifts.

UNIT – IV

Foundations on Collapsible and Expansive Soils: Collapsible Soils – General

Considerations and observations – Computation of Collapse Potential and Settlement – Foundation Design – Treatment Methods.

Expansive Soils – Distribution of Expansive Soils – General Characteristics – Clay Mineralogy and Mechanism of Swelling – Definition of Some Parameters – Evaluation of Swelling Potential of Expansive Soils – Classification of Swelling Soils by Indirect Measurement – Swelling Pressure by Direct Measurements – Effect of Initial Moisture Content and initial Dry Density on Swelling Pressure – Estimating the Magnitude of Swelling – Design of Foundations in Swelling Soils – Elimination of Swelling.

UNIT – V

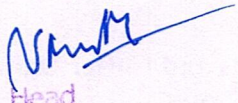
Soil Stabilization: Introduction – Mechanical Stabilization – Cement Stabilization – Lime Stabilization – Bituminous Stabilization – Chemical Stabilization – Thermal Stabilization – Electrical Stabilization, Stabilization by Grouting – Stabilization by Geo-Textile and Fabrics – Reinforced Earth.

Text Books:

1. Dr. K R Arora “Soil Mechanics & Foundation Engineering”, Standard Publishers Distributors, New Delhi.
2. V N S Murthy “Advanced Foundation Engineering”, C B S Publishers & Distributors, New Delhi.
3. Geotechnical Engineering by C. Venkataramiah, New age International Pvt . Ltd, (2002).
4. Soil Mechanics and Foundation by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

Reference Books:

1. Joseph E. Bowles “Foundation analysis & Design”, Tata McGraw-Hill Companies, Inc. New York.
2. Braja M Das “Principles of Foundation Engineering”, Thomson Publishers, United States.
3. Dr. P Purushothama Raj “Ground Improvement Techniques”, Lakshmi Publications, New Delhi.
4. Geotechnical Engineering by Iqbal H.Khan, PHI publishers.


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B. Tech., VII Semester

Course Title	Soil Dynamics & Machine Foundation					B. Tech. VII Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1801708	Professional Elective (PEC 3)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs					End Exam Duration: 3 Hrs			
Course Objectives: <ul style="list-style-type: none">• To explain the significance of dynamic load in machine foundation analysis• To explain theory of vibration for different field conditions• To explain the principles of machine foundation design for reciprocating and impact machines• To explain the concept and method of foundation isolation								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Analyse and design the depth of embedment for sheet pile and forces in the anchor.							
CO 2	Determine the loads / forces on the struts and bending moment in sheet piles and design of coffer dam							
CO 3	Analyse and design well foundation including complete stability analysis							
CO 4	Determine the swell, uplift capacity, and factor of safety							
CO 5	Importance and difficulties in stabilization							

UNIT - I

Introduction: - nature of dynamic loads - stress conditions on soil elements under earthquake loading - dynamic loads imposed by simple crank mechanism - type of machine foundations - special considerations for design of machine foundations.

UNIT - II

Theory of vibration: general definitions - properties of harmonic motion - free vibrations of a mass- spring system - free vibrations with viscous damping - forced vibrations with viscous damping - frequency dependent exciting force - systems under transient forces - Raleigh's method - logarithmic decrement - determination of viscous damping - principle of vibration measuring instruments - systems with two degrees of freedom.

UNIT - III

Criteria for a satisfactory machine foundation - permissible amplitude of vibration for different type of machines - methods of analysis of machine foundations - methods based on linear elastic weightless springs - methods based on linear theory of elasticity (elastic half space theory) - methods based on semi graphical approach - degrees of freedom of a block foundation - definition of soil spring constants - nature of damping - geometric and internal damping - determination of soil constants – methods of determination of soil constants in laboratory and field based on IS code provisions.

UNIT – IV

Vertical, sliding, rocking, and yawing vibrations of a block foundation - simultaneous rocking, sliding and vertical vibrations of a block foundation - foundation of reciprocating machines - design criteria - calculation of induced forces and moments - multi-cylinder engines - numerical example (IS code method).

UNIT – V

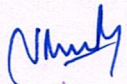
Foundations subjected to impact loads - design criteria - analysis of vertical vibrations - computation of dynamic forces - design of hammer foundations (IS code method) - vibration isolation - active and passive isolation - transmissibility - methods of isolation in machine foundations.

Text books:

1. Shamsheer Prakash, Soil Dynamics, McGraw-Hill, 1981.
2. Principles of soil dynamics, Braja M. Das, G.V. Ramana, Cengage Learning, 2010.
3. Soil Dynamics and Machine Foundations, Swami Saran, Galgotia Publications Pvt Ltd, 1999.
4. S.Prakesh & V.K Puri, Foundation for machines, McGraw-Hill 1993

Reference Books:

1. Alexander Major, Dynamics in Soil Engineering, A Kademai, 1980.
2. Sreenivasulu and Varadarajan, Handbook of Machine Foundations, Tata McGraw-Hill, 2007.
3. IS 2974 - Part I and II, Design Considerations for Machine Foundations
4. Srinivasulu, P & Vaidyanathan, Hand book of Machine Foundations, McGraw-Hill, 1996


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B. Tech., VII Semester

Course Title	Intelligent Transportation Systems					B. Tech. VII Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1801709	Professional Elective (PEC 3)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		
Course Objectives: <ul style="list-style-type: none">To gain knowledge on intelligent transportation systems (ITS) and its objectives and benefitsTo ascertain different data collection techniques on ITSTo know the different telecommunication systems in ITSTo understand the impact of technology on different modes and movementTo study the automated highway systems across the globe								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Understand the historical background, objectives, and benefits of ITS							
CO 2	Develop an understanding on ITS data collection techniques							
CO 3	Describe various telecommunication systems in ITS							
CO 4	Understand various user needs and services in ITS							
CO 5	Understand different ITS programs, ITS implementations in developed and developing countries							

UNIT – I

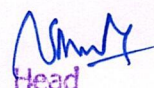
Intelligent Transportation Systems: Introduction to Intelligent Transportation Systems (ITS) – Definition of ITS and Identification of ITS Objectives, Historical Background, Benefits of ITS.

UNIT – II

ITS Data collection techniques: Detectors, Automatic Vehicle Location (AVL), Automatic Vehicle Identification (AVI), Geographic Information Systems (GIS), video data collection.

UNIT – III

Telecommunications in ITS: Importance of telecommunications in the ITS system, Information Management, Traffic Management Centers (TMC). Vehicle – Roadside communication – Vehicle Positioning System; ITS functional areas – Advanced Traffic Management Systems (ATMS), Advanced Traveler Information Systems (ATIS), Commercial Vehicle Operations (CVO), Advanced Vehicle Control Systems (AVCS), Advanced Public Transportation Systems (APTS), Advanced Rural Transportation Systems (ARTS).


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UNIT – IV

ITS User Needs and Services: Travel and Traffic management, Public Transportation Management, Electronic Payment, Commercial Vehicle Operations, Emergency Management, Advanced Vehicle safety systems, Information Management.

UNIT – V

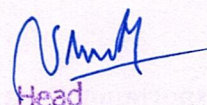
Automated Highway Systems: Vehicles in Platoons – Integration of Automated Highway Systems. ITS Programs in the World – Overview of ITS implementations in developed countries, ITS in developing countries.

Text Books:

1. Intelligent Transport System by Pradip Kumar Sarkar and Amit Kumar Jain, PHI Learning Pvt Ltd., New Delhi.
2. Ghosh, S., Lee, T.S. Intelligent Transportation Systems: New Principles and Architectures, CRC Press, 2000
3. R.P Roess, E.S. Prassas, W.R. McShane. Traffic Engineering, Pearson Educational International, Third Edition, 2004.
4. Mashrur A. Chowdhury, and Adel Sadek, Fundamentals of Intelligent Transportation Systems Planning, Artech House, Inc., 2003.

Reference Books:

1. Fundamentals of Intelligent Transportation Systems Planning by M.A Chowdary and A. Sadek, Artech House, London-2003.
2. Synthesis Report on ITS Including Issues and Challenges in India by, Centre of Excellence In Urban Transport, IIT, Chennai.
3. Sussman, J.M. Perspectives on Intelligent Transportation Systems, Springer, Berlin, 2010.
4. Fundamentals of intelligent transportation systems planning By Mashrur A. Chowdhury, Adel Wadid Sadek



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B. Tech., VII Semester

Course Title	Construction Project Planning and Systems					B. Tech. VII Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1801710	Professional Elective (PEC 3)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		
Course Objectives: <ul style="list-style-type: none">• Understand the importance of construction management, resources and stages of Planning• To know how to prepare scheduling in construction activity. significance of PERT and CPM and make use of these two techniques how to develop a network diagram for construction• To know various types of equipment in construction and applications mechanisation in construction• Understand importance of inspection and how to maintain quality in different stages. Recognize the Importance of safety measures in construction• To know the importance of contractual system and carefulness in legal issues during and after the construction.								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Broad View on construction before and after execution							
CO 2	Expertize on scheduling of construction with latest techniques							
CO 3	Understand the benefit and productivity of mechanization in construction							
CO 4	Know the value of quality and safety in construction							
CO 5	Aware of contractual system and enlarged view on legal problems in construction							

UNIT – I

Introduction: History of Construction Management, Functions and Responsibilities of Construction Manager, Resources and Advances in Construction Management. Stages and Major problems in Construction Industry.

UNIT – II

New Techniques in construction Management: Work Breakdown of structures, Development of Bar charts, Shortcomings, Remedial measures, Milestone charts. PERT-Elements of Networks, Development of PERT network, Numbering, Fulkerson's rule, Slack, Identification of Critical Path, Probability of Completion of projects. CPM – Construction of network, Start and Finish times of activities, Floats, Identification of Critical Path using floats.

UNIT – III

Construction Equipment and Management: Equipment Requirements in Construction Industry, Heavy Earth Moving Equipment – Bulldozers, Scrapers, Loaders Shovels and Cranes – Compaction Equipment, Grading Equipment, Aggregate Production Equipment, Hauling Equipment, Concrete Mixing Equipment, Pneumatic Equipment, Bridge Construction Equipment, Drilling and Blasting Equipment, Pumping and Dewatering Equipment.

UNIT – IV

Inspection and Quality Control and safety management: Inspection and Quality Control: Need for Inspection and Quality Control Principles of Inspection – Enforcement of Specifications – Stages of Inspection and Quality Control. Safety Management: Safety importance in construction industry, hazards in construction projects, causes of accidents, cost of an accidents.

UNIT – V


Contracts and Legal issues: Contracts: Execution of Works, Direct execution by Department, Execution through contractor – Definitions – Types of contracts. Legal Issues: Earnest money deposit and Security deposit, Termination of contract. Disputes, Settlement through arbitration, Indian Arbitration Act 1940, Clauses and advantages of arbitration, Contract Labor Act 1970, Minimum Wages Act 1948, Workmen Compensation Act 1923

Text Books:

1. P S Gahlot and B M Dhir “Engineering Construction Planning and Management”, New Age International (P) Limited, Publishers, New Delhi.
2. S C Sharma “Construction Equipment and Its Management”, Khanna Publishers, New Delhi.
3. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Building Construction, 10th Edition, Laxmi Publications (P) Ltd., New Delhi, 2010
4. Jha, Construction Project Management, 1st Edition, Pearson Publications, New Delhi, 2011

Reference Books:

1. M Govindarajan, S Natarajan and V S Senthilkumar “Engineering Ethics”, Prentice-Hall of India (P) Limited, New Delhi.
2. Dr. S Seetharaman “Construction Engineering and Management”, Umesh Publications, New Delhi.
3. P.K. Joy, Total Project Management: The Indian Context, 1st Edition, Mac Millan Publishers India Limited, 1993.
4. Horpal Singh “Construction Management and Accounts”, Tata McGraw-Hill Companies, Inc. New York.


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B. Tech., VII Semester

Course Title	Environmental Impact Assessment					B. Tech. VII Semester		
Course Code	Category	L	T	P	Credits	Maximum Marks		
						Continuous Internal Assessment	End Exam	Total
1801711	Professional Elective (PEC 3)	2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		
Course Objectives:								
<ul style="list-style-type: none">Deals with the various impacts of infrastructure projects on the components of environment and method of assessing the impact and mitigating the same.The student can know about the various impacts of development projects on environment and the mitigating measures.								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Perform a critical quality review of an EIA and EIS.							
CO 2	Structure the EIA working process considering the need for interdisciplinary.							
CO 3	Perform the screening and scoping of an EIA, based on existing requirements, evaluate the impacts and draw meaningful conclusions from the results of the EIA.							
CO 4	Clarify the concept of EIA and its application in an international context to those involved in or affected by the EIA process.							
CO 5	Interpretation an EIA, present its conclusions and translate its conclusions into actions.							

UNIT – I


Basic Concepts of EIA: Initial Environmental Examination – Elements of EIA – Factors Affecting E-I-A – Impact Evaluation and Analysis – Preparation of Environmental Base Map – Classification of Environmental Parameters.

UNIT – II

EIA Methodologies: Introduction – Criteria for the Selection of EIA Methodology – E I A Methods – Ad-Hoc Methods – Matrix Methods – Network Method – Environmental Media Quality Index Method – Overlay Methods and Cost/Benefit Analysis

UNIT – III

Impact of Developmental Activities and Land Use: Introduction and Methodology for the Assessment of Soil and Ground Water – Delineation of Study Area – Identification of Actives – Procurement of Relevant Soil Quality – Impact Prediction – Assessment of Impact Significance – Identification and Incorporation of Mitigation Measures – E I A in Surface Water – Air and Biological Environment – Methodology for the Assessment of Impacts on


Head

Surface Water Environment – Air Pollution Sources – Generalized Approach for Assessment of Air Pollution Impact.

UNIT – IV

Assessment of Impact on Vegetation and Wildlife: Introduction – Assessment of Impact of Development Activities on Vegetation and Wildlife – Environmental Impact of Deforestation – Causes and Effects of Deforestation.

Environmental Audit: Introduction - Environmental Audit & Environmental Legislation – Objectives of Environmental Audit – Types of Environmental Audit – Audit Protocol – Stages of Environmental Audit – Onsite Activities – Evaluation of Audit Data and Preparation of Audit Report.

UNIT – V

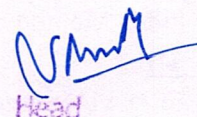
Environmental Acts (Protection and Prevention): Post Audit Activities – The environmental Protection Act – The Water Prevention Act – The Air (Prevention and Control of Pollution Act) – Wildlife and Preparation of Environmental Impact Assessment Statement for Various Industries.

Text Books:

1. Y Anjaneyulu and Valli Manickam “Environmental Impact Assessment Methodologies”, B S Publications, Sultan Bazar, Hyderabad.
2. J Glynn Henry and Gary W Heinke “Environmental Science and Engineering”, Prentice-Hall of India (P) Limited, New Delhi.
3. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke – Prentice Hall Publishers
4. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B.S. Publication, Sultan Bazar, KAKINADA

Reference Books:

1. Dr. Suresh K Dhameja “Environmental Science and Engineering”, S K Kataria & Sons Publishers, New Delhi.
2. H S Bhatia “Textbook on Environmental Pollution and Control”, Galgotia Publications Pvt. Limited, New Delhi.
3. Rau and Wooten “Environmental Impact Analysis Handbook”, Tata McGraw-Hill Companies, Inc. New York.
4. Environmental Science and Engineering, by Suresh K. Dhaneja – S.K.,Katania& Sons Publication., New Delhi.



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B. Tech., VII Semester

Course Title	Integrated Watershed Management					B. Tech. VII Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1801712	Professional Elective (PEC 3)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		
Course Outcomes: <ul style="list-style-type: none">• Student understands the processes leading to degradation of soil and water resources and implementation of conservation measures.• Water shed development programme is proper use of all available resources of a watershed for optimum production with minimum hazards to natural resources• To know deferent water and soil conservation structures to improve the ground water table• To understand basin characteristics and to know the ridge to valley concept to save downstream people.• To impart the principles of managing water form watershed to river basin scale.								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Develop technical and socio-economic knowledge available for implementing Watershed successfully.							
CO 2	Identifying Causes of soil erosion.							
CO 3	Plan and design soil conservation measures in a watershed							
CO 4	Plan and design water harvesting and groundwater recharge structures							
CO 5	Plan measures for reclamation of saline soils							

UNIT – I

Introduction to Watershed: Watershed delineation - Watershed development - Definition and concepts - objectives and need - Integrated and multidisciplinary approach for watershed management - Characteristics of watershed - Size, shape, physiography, slope, climate, drainage, land use, vegetation, geology and soils - Hydrology and hydrogeology - Socio-economic characteristics.

UNIT – II

Watershed Management: Definition of watershed management – Factors affecting watershed management - Preparation of land drainage schemes - Types and design of surface drainage - Controlling of soil erosion and soil salinity - Estimation of soil loss due to erosion - Universal soil loss equation.

UNIT – III

Water Conservation and Harvesting: Types and design of water conservation and water harvesting structures for different types of catchments - Rainwater harvesting - Catchment and

roof top harvesting - Harvesting structures - Soil moisture conservation - Check dams - Artificial recharge - Farm ponds - Percolation tanks

UNIT – IV

Introduction to River Basins: River systems - Water and river basin management in India - Upstream-downstream demands -Quality problems downstream - Environmental flows - Shared rivers - Water conflict resolution - Requirements for integrated river basin management.

UNIT – V

River Basin Management: River basin management - Principles of planning processes – Water availability assessment – Surface water and groundwater - Water demand assessment - Municipal, industrial, agricultural and environmental - Water allocation - Principles and policies - Case studies - Impacts of anthropogenic activities and climate change on water resources.

Text Books:

1. J V S Murthy, “Watershed Management”, New Age International Publishers, New Delhi.
2. Gurmel Singh et al. 2004. Manual of soil and water conservation practices. Oxford & IBH publishing Co. New Delhi.
3. G J Young, J C I Dooge and J C Rodda, “Global Water Resources Issues”, Cambridge University Press, Cambridge, UK.
4. Murthy, V.V.N. 2005, Land and water management, Kalyani publishing, New Delhi.

Reference Books:

1. Ghanshyam Das “Hydrology and Soil Conservation Engineering”, Prentice-Hall of India Pvt. Ltd., New Delhi.
2. Suresh R “Soil and Water Conservation Engineering”, Standard Publishing Distributors, New Delhi.
3. E M Tideman “Watershed Management”, Omega Scientific Publishers, New Delhi.
4. M Newson, “Land, Water and Development: River Basin Systems and Their Sustainable Management”, Routledge, London.



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B. Tech., VII Semester

Course Title	Building Technology					B. Tech. VII Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
18OE103	Open Elective (OEC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hrs					End Exam Duration: 3 Hrs			
Course Objectives: <ul style="list-style-type: none">Understand the importance of construction management, resources and stages of PlanningTo know how to prepare scheduling in construction activity. significance of PERT and CPM and make use of these two techniques how to develop a network diagram for constructionTo know various types of equipment in construction and applications mechanisation in construction								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Investigate the various construction materials used the field/industry							
CO 2	Describe different types of concrete mixes along with admixtures							
CO 3	Understand various foundations, floorings, masonry works used in the construction field							
CO 4	Understand concepts on lintels, arches, sunshades and types of roofs and form works							
CO 5	Understand various plastering and painting works, water supply and sanitary arrangements in the building							

UNIT – I

Building Materials-I: Bricks, Stones, Aggregate, Sand, Ordinary and Special Cements, Tiles, Wood, Paints, varnishes.

UNIT – II

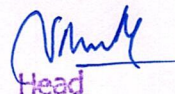
Building Materials-II: Reinforced Cement Concrete, Ready Mixed Concrete, High Performance Concrete, Concrete and Mortar Admixtures, I.S.I. Standards and Laboratory Testing of Building Materials.

UNIT – III

Building Structures-I: Types of foundation, Stone masonry, brick masonry. Damp proof course, plinth beam, types of flooring.

UNIT – IV

Building Structures-II: Framed Structures, lintels, arches, sunshades, Types of roofs and roof coverings. Staircases, Form works, door, windows.


Head

UNIT – V

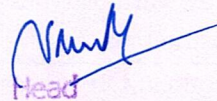
Building Finishes: Plastering, Colour Washing, Distempers, Painting and Varnishing. Water Supply and Sanitary arrangements, Electrification and Weatherproof Courses.

Text Books:

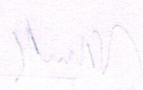
1. Rangwala, “Engineering Materials”, Charotar Publishing House, Anand, Gujrat.
2. M S Shetty “Concrete Technology”, S. Chand Publishers, New Delhi.
3. Building Construction by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi
4. Building material by S K Duggal – New Age International Publishers; Second Edition.

Reference Books:

1. S P Arora & S P Bindra, “Building Construction”, Dhanpath Rai and Sons, New Delhi.
2. Sushil Kumar, “Building Construction”, Standard Publishers Distributers, New Delhi.
3. Building materials by P.C. Varghese, Prentice-Hall of India private Ltd, New Delhi.
4. Building materials by R.S.Rangwala, Charotar publications.



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B. Tech., VII Semester

Course Title	Estimating & Costing					B. Tech. VII Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
18OE104	Open Elective (OEC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		
Course Objectives: <ul style="list-style-type: none">• To know the importance of preparing the types of estimates under different conditions.• To know about the rate analysis and bill preparations• To emphasizes on preparation quantities of item of works with different methods and how to prepare bar bending schedule for structural elements• To study about the specification writing• To equip the student with the ability to do rate analysis, valuation of properties.								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Apply different types of estimates in different situations							
CO 2	Carry out analysis of rates and bill preparation at different locations.							
CO 3	Expertise the different methods of estimation of various item of work and expertise to prepare bar bending schedule.							
CO 4	Demonstrate the concepts of specification writing							
CO 5	Discuss agreements, contracts, tenders for building construction and carry out valuation of assets							

UNIT - I

Introduction to the Estimation of Structures: Introduction, Different Item of Works – Units of Item of Works – Types of Estimates – Methods of Estimates

UNIT – II

Rate Analysis: Rate Analysis of Different Item of Works: Earthwork Excavation – Mortars of Various Proportions (Cement and Lime) – Concrete with Various Proportions (Lime and Cement) – Brick Masonry – Stone Masonry – Pointing – Painting – Plastering – Aluminum Partitions – Wooden Partitions – Cement Concrete Flooring With 1:2:4 Mix – Ceramic and Vitrified Tile Flooring and Mosaic Flooring.

UNIT – III

Quantity Estimation of Buildings: Estimation of Quantities in Buildings: Load Bearing Wall Structure of Single Room, Double Room and Multi Room.

UNIT – IV

Specifications: Specification of Different Items of Works: Types - Standard Specifications for Different Items of Building Construction – Earth Work for Foundations, Mortars, Foundation Concrete, Reinforced Concrete, Brick Work, Stone Masonry, Mosaic Flooring, Terrazzo

Flooring, RCC Roof and AC Roof and GI Sheets, Plastering, Painting, Pointing and Wood Works.

UNIT – V

Contracts and Valuation:

Contracts: Types of Contracts, Contract Document, Conditions of Contracts, Contract Procedure, Termination of Contracts, Specifications, Important Conditions of Contract, Arbitration and Tenders.

Valuation: Introduction, Technique of Valuation, Elements of Valuation and Factors Affecting

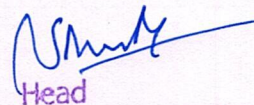
Valuation, Methods of Valuation to the Land Property and Building Property, Mortgage.

Text Books:

1. B N Dutta “Estimating and Costing in Civil Engineering”, U B S Publishers Distributors. Pvt. Limited, Noida.
2. “Standard Data Book – Vol.2”, Andhra Pradesh Department of Standard Specifications, Amaravathi.
3. Contracts and estimations by B.S.Patil, Universities.Press, Hyderabad
4. G.S. Birdie, Estimating and Costing , Danpatrai Publications, New Delhi, 2009

Reference Books:

1. Dr. Roshan H Namavati “Professional Practice”, The Lakhani Book Depot, Mumbai.
2. S C Rangwala “Estimating Costing and Valuation”, Charotar Publishing House Pvt. Limited, Anand.
3. M. Chakraborti. M, Estimating, Costing, Specification & Valuation in Civil Engineering, UBS Publishers, and distributors, 2006.
4. IS 1200 (Parts I to XXV–1974/ Method of Measurement of Building and Civil Engineering Works – B.I.S.)



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B. Tech., VII Semester

Course Title	Water Supply Engineering					B. Tech. VII Semester		
Course Code	Category	L	T	P	Credits	Maximum Marks		
						Continuous Internal Assessment	End Exam	Total
18OE105	Open Elective (OEC)	3	0	0	3	30	70	100
Mid Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		
Course Objectives: <ul style="list-style-type: none">To impart knowledge in water quantity and quality parameters and future demand and forecasts on waterTo study the sources, quality, and standards of waterTo understand various water treatments methodsTo understand the water distribution system from source to destination								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	To understand the impact of development of water supply and estimation and design of public water supply.							
CO 2	To interpret the sources, Quality and Standards of drinking water quality standards.							
CO 3	To interpret water treating procedures and design of water treatment methods.							
CO 4	To evaluate the advanced water treatment in removal of harmful constituents and water management.							
CO 5	To evaluate the water distribution techniques and water distribution system, its working and plumbing.							

UNIT – I

Introduction to Water Supply: Environmental Engineering - Role of Environmental Engineer - Water supply - Development of public water supply - Need for protected water supplies - Objectives of water supply systems - Water supply scheme - Quantity of water - Estimating requirements - Design period – Per Capita Consumption - Fluctuations in demand pattern -population forecast – Arithmetic, Incremental, Geometric methods.

UNIT – II

Sources, Quality and Standards of Water: Sources of water - Surface and ground water sources – Quality of water - Physical, chemical, and biological aspects - Analysis of water - Water quality standards - Impurities in water - Water borne diseases - Drinking water quality standards.

UNIT – III

Treatment of Water: Flowchart of water treatment plant - Treatment methods (Theory and Design) – Sedimentation - Coagulation - Sedimentation with Coagulation – Filtration -

Chlorination and other Disinfection methods - Softening of Water – Defluorination - Removal of Odours.

UNIT – IV

Advanced Water Treatments and Management: Principles and functions of Aeration - Iron and manganese removal, Defluorination and demineralization - Water softening - Desalination - Membrane Systems - Recent advances. Sustainable Development - Rainwater harvesting methods - Water Pollution - Causes and effects

UNIT – V

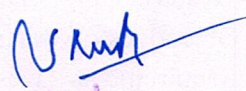
Water Distributions and Plumbing: Distribution systems – Requirements, Layout of Water distribution systems - Design procedures- Hardy Cross and equivalent pipe methods service reservoirs – Joints, valves such as sluice valves, air valves, scour valves and check valves water meters – Laying and testing of pipelines – Pump house, waste detection and prevention, Principles of design of water supply in buildings - House service connection. Water supply – pipes and fittings; House drainage - Sanitary fittings, Traps, Plumbing system of drainage

Text Books:

1. S K Garg, “Environmental Engineering”, Vol.1 Khanna Publishers, New Delhi.
2. B C Punmia, Ashok Kumar Jain & Arun Kumar Jain “Water Supply Engineering”, Lakshmi Publications, New Delhi.
3. Water supply and sanitary Engineering by G.S. Birdi, Dhanpat Rai & Sons Publishers
4. Water Supply Engineering, Vol. 1, waste water Engineering, Vol. II, B.C.Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt.Ltd, New Delhi

Reference Books:

1. H S Peavy, D R Rowe and G Tehobanoglous “Environmental Engineering” Tata McGraw-Hill Companies, Inc. New York.
2. S K Hussain “Water Supply and Sanitary Engineering”, Oxford & IBH, New Delhi.
3. K.N. Duggal, Elements of Environmental Engineering, 1st Edition, S.Chand Publishers, New Delhi, 2010.
4. G.S. Birdie and J. S. Birdie, Water Supply and Sanitary Engineering, 8th Edition, Dhanpat Rai and Sons Publishers, New Delhi, 2010.


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B. Tech., VII Semester

Course Title	Construction Practice and Management					B. Tech. VII Semester		
Course Code	Category	L	T	P	Credits	Maximum Marks		
						Continuous Internal Assessment	End Exam	Total
18OE106	Open Elective (OEC)	3	0	0	3	30	70	100
Mid Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		
Course Objectives: <ul style="list-style-type: none">Understand the importance of construction management, resource management and what the stages of construction activity are?To know how to prepare scheduling in construction activity. significance of pert and CPM and make use of these two techniques how to develop a network diagram for constructionTo know various types of equipment in construction and their usage in varied works usage of mechanization and its effect on productivity. Applications of machinery in different types of constructions are?Understand importance of inspection and how to maintain quality in different stages. Recognize the standards of materials and effective utilization of skilled persons in construction. Effect of ethical procedures in construction.To know the importance of safety measures in construction activity, effect of safety benefits to construction workers. Understand the importance of organization and know how to maintain communications in construction.								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	List the various stages and implementation of management skills in construction.							
CO 2	Possibility usage of sophisticated equipment in construction.							
CO 3	The basic in quality maintains in various stages.							
CO 4	The importance of organization and how correspondence carried out in construing industry.							
CO 5	Know the value of quality and safety in construction.							

UNIT – I

Introduction: Significance of Construction Management – Objectives and Functions of Construction Management – Types of Construction – Resources for Construction Industry – Stages of Construction – Construction Team and Engineering Drawings.

UNIT – II

Construction Planning and New Techniques in Construction Management: Stages of Planning – Scheduling, Preparation of Material – Equipment – Labour and Finance Schedules

– Bar Charts and Milestone Charts. Programme Evaluation Review Technique (PERT) and Critical Path Method (CPM) – Break Down of Structures – Classification of Activities – Rules for Developing Networks – Network Development and Analysis – Critical Activities – Critical Path and Cost Optimization.

UNIT – III

Construction Equipment and Management: Equipment Requirements in Construction Industry, Heavy Earth Moving Equipment – Bulldozers, Scrapers, Loaders Shovels and Cranes – Compaction Equipment, Grading Equipment, Aggregate Production Equipment, Asphalt Mixing Plant and Asphalt Laying Plant, Hauling Equipment, Concrete Mixing Equipment, Material Handling Devices, Pneumatic Equipment, Bridge Construction Equipment, Drilling and Blasting Equipment, Pumping and Dewatering Equipment.

UNIT – IV

Inspection and Quality Control, Ethical Audit: Need for Inspection and Quality Control Principles of Inspection – Enforcement of Specifications – Stages of Inspection and Quality Control. Introduction – Aspects of Project Realization – Ethical Audit Procedures – The Decision Makers – Variety of Interest – Formulation of Briefs – The Audit Statement and Reviews.

UNIT – V


Safety and Risk, Organization of Construction: Introduction on Safety and Risk – Concept and Importance of Safety – Types of Risks – Safety and Engineers – Safety Measures in Construction Work – Design for Safety – Risk Benefit Analysis – Accidents. Principles of Organization – Communication – Leadership and Human Relations – Types of Organizations – Organization for Construction – Temporary Services and Job Layout.

Text Books:

1. P S Gahlot and B M Dhir “Engineering Construction Planning and Management”, New Age International (P) Limited, Publishers, New Delhi.
2. S C Sharma “Construction Equipment and Its Management”, Khanna Publishers, New Delhi.
3. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Building Construction, 10th Edition, Laxmi Publications (P) Ltd., New Delhi, 2010
4. Jha, Construction Project Management, 1st Edition, Pearson Publications, New Delhi, 2011

Reference Books:

1. M Govindarajan, S Natarajan and V S Senthilkumar “Engineering Ethics”, Prentice-Hall of India (P) Limited, New Delhi.
2. Dr. S Seetharaman “Construction Engineering and Management”, Umesh Publications, New Delhi.
3. Horpal Singh “Construction Management and Accounts”, Tata McGraw-Hill Companies, Inc. New York.
4. P.K. Joy, Total Project Management: The Indian Context, 1st Edition, Mac Millan Publishers India Limited, 1993.


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B. Tech., VIII Semester

Course Title	Bridge Engineering					B. Tech. VIII Semester		
Course Code	Category	L	T	P	Credits	Maximum Marks		
						Continuous Internal Assessment	End Exam	Total
1801803	Professional Elective (PEC 4)	2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		
Course Objectives: <ul style="list-style-type: none">• Bridges and its components- different types of loadings and IRC classification of loadings and its importance• Bridges and box culverts and its design procedure.• Bridge bearings and its importance and plate girder bridges and its design procedure.								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Students are effectively learned the bridges; its components and various loads are acting on the bridge structure.							
CO 2	Students understand the analysis & Design of square box culvert easily							
CO 3	Student effectively analyze and design the deck slab bridge according to IRC codes							
CO 4	Students known about analysis & design of T-beam bridge and subjected to loading of class ‘AA’ tracked vehicles							
CO 5	Students develop the knowledge about piers and abutment of bridges, various forces acting on it and different types of bridge foundations. Also known about the design principles of bridge bearings							

UNIT - I

Introduction: Importance of Site Investigation in Bridge Design – Highway Bridge Loading Standards – Impact Factor – Railway Bridge Loading Standards (B.G & M G Bridges) – Various Loads in Bridges.

UNIT – II

Box Culvert: General Aspects – Design Loads – Design of Box Culvert Subjected to R C Class AA Tracked Vehicles only.

UNIT - III

Design of Deck Slab Bridge: General Features – Effective Width Method of Analysis Design of Deck Slab Bridge (Simply Supported) subjected to Class AA Tracked Vehicles only.

UNIT - IV

Design of T-Beam Bridge: General Features – Design of Interior Panel of Slab – Pigeaud's Method – Design of a T- Beam Bridge Subjected to Class AA Tracked Vehicles only.

UNIT – V

Piers, Abutments and Bridge Bearings: General Features – Bed Block – Material Piers & Abutments – Types of Piers – Forces Acting on the Piers – Stability Analysis of Piers – General Features of Abutments – Forces Acting on Abutments – Stability Analysis of Abutments – Types of Wing Walls – Approaches – Types of Bridge Foundations (Excluding Design)

Bridge Bearings: General Features – Types of Bearings – Design Principles of Rocker & Roller Bearings – Design of Steel Rocker Bearings – Design of Elastomeric Pad Bearings

Text Books:

1. S Ponnuswamy “Bridge Engineering”, Tata McGraw-Hill Companies, Inc. New York.
2. N Krishna Raju “Design of Bridges”, Oxford & IBH Publishing Company (P) Limited, New Delhi.
3. D Johnson Victor “Essentials of Bridge Engineering”, Oxford & IBH Publishing Company (P) Limited, New Delhi.
4. Design of Steel structures, by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi Publications, New Delhi.

Reference books / IS Codes / IRC Codes:

1. IS 800-2007 “Indian Standard Code of Practice for General Construction in Steel”, Bureau of Indian Standards, New Delhi.
2. IS 456-2000 “Indian Standard Plain and Reinforced Concrete – Code of Practice”, Bureau of Indian Standards, New Delhi.
3. IRC 6-2000 “Standard Specifications and Code of Practice for Different Types of Loadings Acting on the Bridge Structure”, The Indian Roads Congress, New Delhi.
4. IRC 22-2000 “Standard Specifications and Code of Practice for Road Bridges and Different Materials used in Bridge Structures and Reinforcement Details”, The Indian Road Congress, New Delhi.
5. IRC 24-2000 “Standard Specifications and Code of Practice for Permissible Bending Stresses in Steel and its Properties”, The Indian Road Congress, New Delhi.
6. IRC 83-2000 “Standard Specifications and Code of Practice for Different Types of Bridge Bearings used in the Bridges and its Detailed Specifications”, The Indian Road Congress, New Delhi.



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B. Tech., VIII Semester

Course Title	Finite Element Method					B. Tech. VIII Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1801804	Professional Elective (PEC 4)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		
Course Objectives: To understand the concepts of Finite element methods to analyze critical stress conditions in structures.								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Understanding of the fundamental theory of the FEM							
CO 2	Demonstrate the differential equilibrium equations and their relationship							
CO 3	Demonstrate the displacement models and load vectors							
CO 4	Understand the use of the basic finite elements for structural applications using truss, beam, frame, and plate elements.							
CO 5	compute the stiffness matrix for isoperimetric elements and develop suitable software tools for analysis purpose							

UNIT - I

Introduction to Finite Element Method: Introduction - Finite Difference Method - Advantages and Disadvantages - Basic Steps – Limitations - Finite Element Modelling and Discretization - Types of Elements - Nodes and Degrees of Freedom - Interpolation and Shape Functions

UNIT- II

One Dimensional & Two-Dimensional Elements: Stiffness matrix for bar element – shape functions for one dimensional element – one dimensional problem. Two Dimensional Elements - Different types of elements for plane stress and plane strain analysis – Displacement models – generalized coordinates – shape functions – convergent and compatibility requirements – Geometric invariance – Natural coordinate system – area and volume coordinates

UNIT - III

Trusses: Plane Trusses - Local and Global Coordinate Systems - Direction Cosines - Element Stiffness Matrix - Assembly of Global Stiffness Matrix - Stress Calculation.

UNIT - IV

Beams: Introduction Beam Stiffness - Assembly of Beam Stiffness Matrix – Loading - Boundary Conditions - Plane Stress - Plane Strain Analysis



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UNIT - V

Iso-parametric Elements and Finite Element Modelling: Mesh Requirements - Material Properties - Loads and Reactions - Boundary Conditions - Checking the Model - Analysis and Design Software (For Practice Purpose Only)

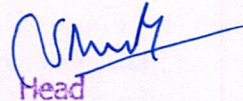
Solution Techniques: Numerical Integration, Static condensation, assembly of elements and solution techniques for static loads.

Text Books:

1. Daryl L Logan "A First Course in the Finite Element Method", Cengage Learning India Private Limited, New Delhi.
2. S S Bhavikatti "Finite Element Analysis", New Age International (P) Limited, Publishers, New Delhi.
3. Finite Element analysis – Theory & Programming by C.S.Krishna Murthy- Tata Mc.Graw Hill Publishers
4. Finite element analysis by S.S. Bhavakatti-New age international publishers

Reference books:

1. Robert D Cook, David S Malkus and Michael E Plesha "Concepts and Applications of Finite Element Analysis", Wiley India Pvt. Limited, New Delhi.
2. George R Buchanan "Theory and Problems of Finite Element Analysis", Tata McGraw-Hill Companies, Inc. New York.
3. Finite element analysis and procedures in engineering by H.V.Lakshminarayana, 3rd edition, universities press, Hyderabad.
4. Finite Element Analysis for Engineering and Technology, Tirupathi R Chandraputla, Universities Press Pvt Ltd, Hyderabad. 2003.



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B. Tech., VIII Semester

Course Title	Environmental Geotechnology					B. Tech. VIII Semester		
Course Code	Category	L	T	P	Credits	Maximum Marks		
						Continuous Internal Assessment	End Exam	Total
1801805	Professional Elective (PEC 4)	2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		
Course Objectives: <ul style="list-style-type: none">• To make the students to learn the concepts of geoenvironmental engineering, planning and design of waste in landfills, ash ponds and tailing ponds.• To make the students to understand the effects of pollutants on soil properties• To give awareness about the adverse effects of soil and ground water contaminants• To analyze and apply various techniques for remediation of the contaminants• To make the student to understand the reuse of waste materials in geotechnical constructions.								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Understand the different types of contaminants and their effects on subsurface soils							
CO 2	Understand the waste contaminants and design the landfill							
CO 3	Understand the environmental impacts due to the contaminants of slurry waste							
CO 4	Adopt the type of barriers to protect the earth from different contaminants							
CO 5	Understand the engineering properties of the waste material and reuse in the construction							

UNIT – I

Introduction: Industrialization and Urbanization, Pollution, Control, and remediation.


Contamination: Surface contamination, Contamination transport, Soil-a Geotechnical trap, Effect of subsurface contamination, Detection of polluted zone, Monitoring and Effectiveness of designed facilities.

UNIT – II

Contaminants of Solid Waste in Landfills: Waste contaminants, landfills, types, shape, and size of landfills. Liner and liner system, Cover and cover system, Stability of landfills. Landfill construction & operation, sustainable waste management.

UNIT – III

Contaminants of Slurry wastes: Slurry transported wastes, slurry ponds, operation, Embankment construction and raising, Design aspects, Environmental Impact, and control.


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UNIT – IV

Vertical Barriers for Contaminant: Contaminated sites, Types of barriers, Soil-Bentonite slurry trench walls, Cement-Bentonite slurry trench walls, construction, material, and design aspects.

UNIT – V

Geotechnical Reuse of Waste materials: Waste reduction, use in geotechnical construction, waste characteristics, transportation consideration, engineering properties of Wastes, Waste material in Embankment and Fills.

Text Books:

1. Lakshmi N. Reddi and Hilary I. Inyang, “Geoenvironmental Engineering: Principles and Applications”, CRC Press, United States.
2. Hari D. Sharma and Krishna R. Reddy, “Geoenvironmental Engineering: Site Remediation, Waste Containment, and Emerging Waste Management Technologies”, John Wiley and Sons, Inc., United States.
3. G.S. Birdie and J. S. Birdie, Water Supply and Sanitary Engineering, 8th Edition, Dhanpat Rai and Sons Publishers, New Delhi, 2010
4. H.S. Peavy and D.R. Rowe, Environmental Engineering, 1st Edition, McGrawHill Publishing Company, New York, 1984.

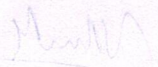
Reference Books:

1. David E. Daniel, “Geotechnical Practice for Waste Disposal”, Chapman & Hall, Springer Publishers, Germany.
2. Rowe R. Kerry, “Geotechnical and Geoenvironmental Engineering Handbook”, Springer Publishers, Germany.
3. Proceedings of the International symposium of Environmental Geotechnology (Vol. I and II), Environmental Publishing Company, 1986 and 1989.
4. ASTM Special Technical Publication 874, Hydraulic Barrier in Soil and Rock, 1985.



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B. Tech., VIII Semester

Course Title	Urban Transportation Planning					B. Tech. VIII Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1801806	Professional Elective (PEC 4)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		
Course Objectives: <ul style="list-style-type: none">• To study the need of urban transportation planning system.• To understand different types of transportation surveys.• To study the process of trip generation and distribution.• To understand model split and factors affecting it.• To study the transportation plan preparation for different transit systems								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Justify the need for urban transportation system planning.							
CO 2	Undertake transport surveys followed by a report.							
CO 3	Plan the process of trip generation and distribution.							
CO 4	Justify the need of a modal split.							
CO 5	Prepare the transportation plans for urban mass rapid transit systems.							

UNIT – I

Urban Transportation System Planning: Role of transportation in urban development - Transportation problems in urban areas - Purpose of transportation planning - Transportation planning process and factors affecting it - Travel demand and actors affecting it - Urban transport forecasting

UNIT – II

Transportation Surveys: Study area and zoning - Survey Types: Home interview surveys - Commercial vehicle surveys - Taxi surveys - Road side interview surveys - Post card questionnaire surveys - Registration number surveys - Tag surveys - Public transport surveys - Telephone surveys - Inventory of existing transport facilities.

UNIT – III

Trip Generation and Distribution: Trip generation: Trip purpose, Problems of trip generation - Factors governing trip generation and attraction rates - Trip distribution 3.4 Methods of trip distribution: Uniform factor - Average factor – Detroit – Fratar - Furness and Time factor method - Problems based on trip distribution

UNIT – IV

Modal Split: Modal split in the transport process planning problem and factors affecting modal split - Trip Characteristics in urban areas: Household characteristics, Zonal characteristics, Network characteristics


Head

UNIT – V


Transportation Plan Preparation: Definitions: corridor, corridor traffic forecasting, corridor traffic study, count, segment, point, segment capacity, screen line - Corridor identification - Mass transit system - Urban mass rapid transit system - Rail based transit – Metro, Light rail transit system (LRT), Monorail, Sky rail - Road based transit – Bus rapid transit system (BRTS), Electric trolley bus, commuter Bus / City Bus.

Text Books:

1. Kadiyali. L. R. “Traffic Engineering and Transportation Planning”, Khanna Publishers, New Delhi.
2. Hutchinson, B. G “Introduction to Urban System Planning”, McGraw Hill.
3. Papa Costas C.S.; Fundamentals of Transportation Engineering, Prentice Hall, India
4. L.R.Kadiyalli; Traffic Engineering and Transportation Planning Khanna Publishers, Delhi

Reference Books:

1. John W. Dickey, Metropolitan Transportation Planning, Tata McGraw Hill Pub. Co
2. Vukan R. Vuchic, Urban Public Transportation System & Technology, Prentice Hall, Inc.
3. Jotin Khisty, C. and Kent Lall, B., Transportation Engineering – An Introduction, Prentice-Hall
4. Salter, R J., Highway Traffic Analysis and Design, ELBS.


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Department of Civil Engineering
K.S.R.M. College of Engineering
(Autonomous)
KADAPA - 516 003. (A.P.)

B. Tech., VIII Semester

Course Title	Design and Drawing of Irrigation Structures					B. Tech. VIII Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1801807	Professional Elective (PEC 4)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		2	0	0	2	30	70	100
Mid Exam Duration: 2 Hrs					End Exam Duration: 3 Hrs			
Course Objectives: <ul style="list-style-type: none">• To study the preliminary and secondary investigations required for hydraulic structures.• To study the different methods for estimating of peak flow.• To study in detail design procedures and their site-specific criteria.• To study the different safety measures required for during operations of irrigation structures.								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Gain knowledge and use or apply theory / design principles of surplus weir works.							
CO 2	Understand the importance and easily recognize the structure in broadest context of canal drop works.							
CO 3	Apply engineering fundamentals in stability and analysis of tower head design.							
CO 4	Compute the stresses and stability analysis of canal regulation arrangements.							
CO 5	Design of outlet structures and drop structures based on different field conditions.							

UNIT-I

Design of surplus Weir: Introduction – Estimation of Flood Discharge – Selection of type of Work – Length of Surplus Weir – Crest Width Base Width – Abutments – Wings Returns – Aprons.

UNIT – II

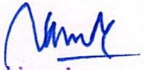
Canal Drop (Notch Type): Trapezoidal Notch Length of Drop Wall Between Abutments – Profile of Drop Wall – Notch Pier – Protective Works.

UNIT – III

Tank Sluice with Tower Head: Vent Way Design – Sluice Barrel Tower Head – R.C Slab – Earth Pressure – Stability Analysis – Tower Head Design – Cistern.

UNIT – IV

Canal Regulator cum Road Bridge: Vent Way Design – Drowning Ratio Method – Roadway – Piers Shutters, Abutments – Wing Walls – Return Walls – Return Walls – Solid Apron for Regulator – Revetments – Energy Dissipation.


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UNIT – V

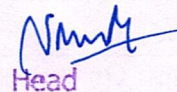
Under Tunnel: Design of Barrel Roof – Abutments Pressure Under Pier – Fixing Maximum Flood Levels Rail Channel – Afflux over Drop Wall – Loss of Head Calculation – Depth of Foundation Return Walls – Wing Walls and Return – Uplift – Creep Loss in Percolation.

Text Books:

1. C Satyanarayana Murty “Water Resources Engineering – Principles and Practice”, New Age International (P) Limited, Publishers, New Delhi.
2. Irrigation engineering and Hydraulic structures by S.K.Garg, Standard Book House.

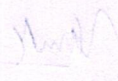
Reference Books:

1. Santosh Kumar Garg “Irrigation Engineering and Hydraulic Structures”, Khanna Publishers, New Delhi.
2. N Balasubramanya “Hydraulic Structures and Irrigation Design Drawing”, Sapna Book House and Publishers, Bangalore.



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B. Tech., VIII Semester

Course Title	Disaster Preparedness					B. Tech. VIII Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
18OE107	Open Elective (OEC 4)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hrs						End Exam Duration: 3 Hrs		
Course Objectives: <ul style="list-style-type: none">• To Understand basic concepts in Disaster Management• To Understand Definitions and Terminologies used in Disaster Management• To Understand Types and Categories of Disasters• To Understand the Challenges posed by Disasters• To understand Impacts of Disasters Key Skills								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Know the fragile ecosystem and the types of the disasters							
CO 2	Acquire the preparedness and the responsibilities of different agencies on Disaster.							
CO 3	Understand the rescue, rehabilitation, and reconstruction process of disaster management							
CO 4	Understand the disaster response and relief measures							
CO 5	Understand the concepts of vulnerability reduction							

UNIT - I

Introduction: Concepts and definitions: disaster, hazard, vulnerability, risks severity, frequency and details, capacity, impact, prevention, mitigation.

UNIT - II

Disasters: Disasters' classification; natural disasters (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.); manmade disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills, transportation accidents, terrorist strikes, etc.); hazard and vulnerability profile of India, mountain and coastal areas, ecological fragility.

UNIT - III

Disaster Impacts: Disaster impacts (environmental, physical, social, ecological, economic, political, etc.); health, psycho-social issues; demographic aspects (gender, age, special needs); hazard locations; global and national disaster trends; climate change and urban disasters.

UNIT - IV

Disaster Risk Reduction (DRR): Disaster management cycle – its phases; prevention, mitigation, preparedness, relief, and recovery; structural and non-structural measures; risk analysis, vulnerability and capacity assessment; early warning systems, post-disaster environmental response (water, sanitation, food safety, waste management, disease control,

security, communications); sustainable and environmentally friendly recovery; reconstruction and development methods.

UNIT - V

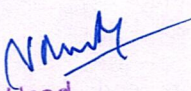
Environment and Development: Roles and responsibilities of government, community, local institutions, NGOs, and other stakeholders; Policies and legislation for disaster risk reduction, DRR programmes in India and the activities of National Disaster Management Authority.

Text Books:

1. Pradeep Sahni and Madhavi Ariyabandu, “Disaster Risk Reduction in South Asia”, PHI Learning Pvt. Ltd., Delhi.
2. B. K. Singh, “Handbook of Disaster Management: Techniques and Guidelines”, Rajat Publications, Delhi.
3. Inter-Agency Standing Committee (IASC) (Feb. 2007). IASC Guidelines on Mental Health and Psychosocial Support in Emergency Settings. Geneva: IASC
4. Disaster Management Guidelines, GOI-UND Disaster Risk Program (2009-2012)

Reference Books:

1. G. K. Ghosh, “Disaster Management”, APH Publishing Corporation, New Delhi.
2. <http://ndma.gov.in/> (Home page of National Disaster Management Authority).
3. <http://www.ndmindia.nic.in/> (National Disaster management in India, Ministry of Home Affairs).
4. Disaster Medical Systems Guidelines. Emergency Medical Services Authority, State of California, EMSA no.214, June 2003.
5. Inter-Agency Standing Committee (IASC) (Feb. 2007). IASC Guidelines on Mental Health and Psychosocial Support in Emergency Settings. Geneva: IASC.


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B. Tech., VIII Semester

Course Title	Rehabilitation of Structures					B. Tech. VIII Semester		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
18OE108	Open Elective (OEC 4)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hrs					End Exam Duration: 3 Hrs			
Course Objectives:								
<ul style="list-style-type: none">• To impart knowledge on the distress in structures.• Understand the basic concepts of deterioration of structures.• Understand the serviceability and durability aspect of structures.• Learning the materials used for retrofitting technique.								
Course Outcomes: On successful completion of this course, the students will be able to								
CO 1	Understand the cause of deterioration of concrete structures.							
CO 2	Able to assess the damage for different type of structures.							
CO 3	Summarize the principles of repair and rehabilitation of structures.							
CO 4	Recognize ideal material for different repair and retrofitting technique.							
CO 5	Know the artificial polymers and rust eliminators used for retrofitting works.							

UNIT – I

General: Introduction and Definition for Repair, Retrofitting, Strengthening and rehabilitation. Physical and Chemical Causes of deterioration of concrete structures, Evaluation of structural damages to the concrete structural elements due to earthquake.

UNIT – II


Damage Assessment: Purpose of assessment, Rapid assessment, Investigation of damage, Evaluation of surface and structural cracks, Damage assessment procedure, destructive, non-destructive, and semi destructive testing systems.

UNIT – III

Influence on Serviceability and Durability: Effects due to climate, temperature, chemicals, wear and erosion, Design and construction errors, corrosion mechanism, Effects of cover thickness and cracking, methods of corrosion protection, corrosion inhibitors, corrosion resistant steels, coatings, and cathodic protection.

UNIT – IV

Maintenance and Retrofitting Techniques: Definitions: Maintenance, Facts of Maintenance, and importance of Maintenance Need for retrofitting, retrofitting of structural members i.e., column and beams by Jacketing technique, externally bonding (ERB) technique, near surface mounted (NSM) technique, External post-tensioning, Section enlargement and guidelines for seismic rehabilitation of existing building.


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UNIT – V


Materials for Repair and Retrofitting: Artificial fibre reinforced polymer like CFRP, GFRP, AFRP and natural fibre like Sisal and Jute. Adhesive like, Epoxy Resin, Special concretes and mortars, concrete chemicals, special elements for accelerated strength gain, Techniques for Repair: Rust eliminators and polymers coating for rebar during repair foamed concrete, mortar and dry pack, vacuum concrete, Guniting and Shot Crete Epoxy injection, Mortar repair for cracks, shoring and underpinning.

Text Books:

1. Sidney, M. Johnson, “Deterioration, Maintenance and Repair of Structures”
2. Denison Campbell, Allen & Harold Roper, “Concrete Structures – Materials, Maintenance and Repair”- Longman Scientific and Technical.
3. Repair and protection of concrete structures by Noel P. Mailvaganam, CRC Press, 1991
4. Concrete repair and maintenance Illustrated by Peter H. Emmons, Galgotia publications Pvt. Ltd., 2001.

Reference Books:

1. R. T. Allen and S.C. Edwards, “Repair of Concrete Structures”-Blakie and Sons Raiker R.N., “Learning for failure from Deficiencies in Design, Construction and Service”- R&D Center (SDCPL).
2. M. S. Shetty, Concrete Technology – Theory and Practice, S. Chand & Co. Ltd., New Delhi.
3. Failures and repair of concrete structures by S. Champion, John Wiley and Sons, 1961
4. Handbook on seismic retrofit of buildings, A. Chakrabarti et.al., Narosa Publishing House, 2010.


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Department of Civil Engineering

The list of the value added/certificate courses conducted in the Civil Engineering Department during the AY 2020-21.

S. No.	Semester	Value Added Course
1	VIII	Instruments used in environmental pollutant quantification
2	VI	Design of Slopes using GeoStudio
3	IV	Liquefaction analysis of soil using FEA Media & IS1893-2015
4	VIII	Design of multi-storeyed building using STAAD Pro
5	VI	Course on advanced surveying equipment and its applications
6	IV	Design of compression members Using Microsoft Excel
7	VII	Computing software for water resources engineering and management
8	V	Design of various structural elements of RCC buildings
9	III	Beam design formulae with shear force and bending moment diagrams
10	VII	Requirements and estimation of framed building structures
11	V	Design of continuous beams using Microsoft Excel spread sheets
12	III	Introduction to Microsoft Office


Convener/HOD

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Syllabus of Certification Course

Course Name: Introduction to Microsoft Office

Duration: 30 Hours

Table of Contents

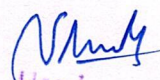
1. Launch Word
2. Window and Ribbon Features
3. File Tab
4. Templates
5. Window Options
6. Customize Your Ribbon
7. Quick Access Toolbar
8. Non-Printing Characters
9. Practice Document
10. Save a Document
11. Select Text
12. Margins
13. Line Spacing
14. Format a Document
15. Additional Font Options
16. Text Alignment
17. View Modes
18. Spelling and Grammar Checks
19. Page Breaks and Section Breaks
20. Tables
21. Edit a Table
22. Format a Table
23. Print a Document
24. Illustrations Demonstration
25. Illustrations Quick Reference
26. Track Changes Quick Reference
27. Additional Quick References

Textbooks:

1. ML Humphrey "Word for Beginners", ML Humphrey Publishers, New York.
2. Joan Lambert "Microsoft Word 2019 Step by Step", Microsoft, USA.
3. Guy Hart-Davis "Teach Yourself VISUALLY Word 2019", John Wiley & Sons, INC., Indianapolis, IN.

Reference Books:

1. Peter Schiessl "Microsoft Word 2019 - FIRST VOLUME - Training Book with many Exercises", by Lindemann Group Publishers.
2. Dan Gookin "Microsoft Word 2019 For Dummies"
3. Linda Foulkes "Learn Microsoft Office 2019", Packet publishing Limited, Mumbai, India.


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Syllabus of Certification Course

Course Name: Design of continuous beams using Microsoft Excel spread sheets

Duration: 30 Hours

MODULE I:

Flexibility Method of Analysis- Continuous beams with both ends fixed, one end fixed, both ends hinged, one side over hanging, both ends over hanging and with settlements at supports.

MODULE II:

Stiffness of Analysis- Continuous beams with both ends fixed, one end fixed, both ends hinged, one side over hanging, both ends over hanging and with settlements at supports.

MODULE III:


Introduction of MS Office Excel, creating spreadsheets for various continuous beam problems using flexibility method and stiffness method.

Textbooks:

1. D. Menon , Advanced Structural Analysis, Narosa Publication, 2020.
2. Das, Structural Analysis, Prentice Hall India Learning Private Limited; 1St Edition, 2011.

Reference Books:

1. Bittu Kumar, Mastering MS Office, V&S Publishers, 2017.


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Syllabus of Certification Course

Course Name: Requirements and estimation of framed building structures

Duration: 30 Hours

Module I:

Specification of different items of works for framed structures: Earth work for foundations, mortars, foundation concrete, Reinforced concrete, Brick work, Stone masonry, Mosaic Flooring, Terrazo Flooring, RCC roof and AC roof and GI sheets, plastering, Painting, pointing and wood works.

Module II:

Vastu and its importance, planning of building according to vastu shastra. Different item of works- units of item of works, Types of Estimates-Methods of estimates.

Module III:

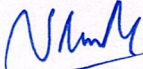
Rate Analysis (Using Excel): Earthwork Excavation – Mortars of various proportions (cement and lime) – Concrete with various proportions (lime and Cement) – Brick Masonry – Stone Masonry – Pointing – Painting – Plastering – aluminum partitions – Wooden partitions – cement concrete flooring with 1:2:4 mix

Module IV

Quantities Estimation of Buildings and Bar Bending Schedule (Using Excel) – Estimation of concrete in beams, columns, footings, Estimation of Bar Bending Schedule: Beams - Slabs – Staircases – Sun shade – Lintels – Portico

Text Books:

1. B. N. Dutta, Estimating and Costing in Civil Engineering: Theory and Practice Including Specifications and Valuation, UBS Publishers' Distributors Ltd, 25th edition,
2. Hodgson Fred T, Estimating Frame and Brick Houses, BiblioLife.


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Syllabus of Certification Course

Course Name: Design of Compression members using Microsoft Excel.

Duration: 30 Hours

Module I:

Simply Supported beam point load, uniformly distributed load and uniformly varying load

Module II:

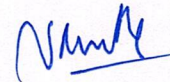
Cantilever beam subjected to point load and uniformly distributed load

Module III:

Over hanging beam (one side and both sides) subjected to point load and uniformly distributed load

Text Books:

1. R K Rajput, Strength of Materials, S. Chand Publications, 2016
2. S. Ramamrutham & R. narayanan, Strength of Materials, Dhanpat Rai Publishing Company, 2020



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Syllabus of Certification Course

Course Name: Design of various structural elements of RCC Buildings

Duration: 30 Hours

Module I:

Moment resistance and Design of singly, doubly and T-beams, Design for shear and torsion

Module II:

Design of One-way slab, Continuous one-way slab and two-way slab

Module III:

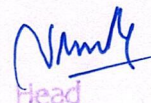
Design of axially loaded column with lateral ties and circular columns with helical ties, Analysis and Design of uniaxial moment

Module IV:

Design of Isolated square and rectangular footings, Deflection calculations and design of dog-legged staircase.

Text Books:

1. N. Subramanian, Design of Reinforced Concrete Structures; Oxford University Press, 2014
2. S Unnikrishna Pillai & Devdas Menon, Reinforced Concrete Design, McGraw Hill, 2021



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Syllabus of Certification Course

Course Name: Computing softwares for Water Resources Engineering and Management

Duration: 30 Hours

Module 1: Role of water Resources Department in the best utilization of water Resources of A.P

Module 2: Creating Irrigation potential through lift Irrigation Scheme

Module 3: Rational Design of Hydraulic structures in Water sheds

Module 4: An overview Application on water Resource Software

Module 5: EPANET software

TextBooks :

1. Basak P. 1997, "*Surangams – A traditional water harvesting system in North Malabar*". In: Dying Wisdom, Anil Agarwal and Sunita Narain (Eds.). Centre for science and Environment, Thomson Press Limited, Faridabad (India, pp.222-223.
2. Das, D.C 1988, "*Water harvesting for water conservation in catchment and command area*", Proc. Nat. Semi. Water conserve. In drought, II/WCM/1-32.

References :

1. Harris, D.G. 1923, "*Irrigation in India*", Oxford Univ. Press, London, U.K.
2. Jha, Pt. Achyntan (Ed.) 1988. "*Vrhat Sanhita (550 A.D.) by Varahmihira*", Chow Khamba Vidyabhawan, Varanasi -221 001.
3. Madhawan Nair, E.P. 1978, Bhagirath, 25.



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Syllabus of Certification Course

Course Name: Design of Compression members using Microsoft Excel.

Duration: 30 Hours

Start Date: 22nd March 2021

Module I:

Review of Limit State Method- Limit state of Collapse, Limit State of Flexure, Limit State of Serviceability

Module II:

Design of Axially loaded short columns

Module III:

Analysis and Design of short columns with Uniaxial Bending

Module IV:

Analysis and Design of short columns with Biaxial Bending

Text Books:

1. N. Subramanian, Design of Reinforced Concrete Structures; Oxford University Press, 2014
2. S Unnikrishna Pillai & Devdas Menon, Reinforced Concrete Design, McGraw Hill, 2021



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Syllabus of Certification Course

Course Name: Advanced surveying equipments and its applications

Duration: 30 Hours

Module – I

Introduction about Advanced Surveying Equipments, its applications, Digital levels, Salient features of digital levels, components of digital levels

Module – II

Electronic Distance Measuring Instruments Introduction, Principle of EDM, Classification of EDM, Operations of EDM, Error Sources in EDM

Module – III


Electronic Theodolite, Total Station, Salient features of Modern Total Station, Parts of Total Station, Field Techniques with Total Station

Module –IV

Usage of Total Station, Advantages of Total station, Applications – Working Procedure of Total Station by using Sokkia – Setting up the total station- Collecting Data- Data Transfer From sokkia to PC- Creating a .DXF file from SDR

Text Books:

- 1) Gopi Satheesh, R.Sathikumar, N. Madhu, Advanced Surveying: Total Station, GPS, GIS & Remote Sensing, Second Edition, Pearson Education.
- 2) Gopi Satheesh and R Sathikumar, Advanced Surveying Total Station Gps Gis And Remote Sensing by Gopi Satheesh and R Sathikumar, Pearson India,


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Syllabus of Certification Course

Course Name: Design of Multi-Storeyed Building using STAAD Pro.

Duration: 30 Hours

Module I:

Installation of STAAD Pro. in windows computer system, Creating Models, Structures, Graphical Interface, Specify Member Properties, Specify Material Constants, Specify Supports, Specify Loads, Specify Analysis Type, Annotating the Displacements, Creating Models of a Reinforced, Concrete Framed Structure.

Module II:

Creating simple beams with different support conditions, Applying point load, Uniformly Distribute Loads, Uniformly Varying loads on beam member, shear force & bending moment diagrams, Report preparation.

Module III:

Modeling Truss members using GUI of STAAD Pro., applying loads on truss members, finding member forces and joint reactions using STAAD Pro., Report preparation.

Module IV

Interactive Design Information, Creating Multy-Storeyed Models Using Graphical Interface, Performing Analysis and Designing, Viewing Results Using the Output File, Viewing Post Post –Processing, Producing on Onscreen Report

Text Books:

1. T.S. Sarma, Staad Pro V8i for Beginners: With Indian Examples, Notion Press; 1st edition (1 January 2014).
2. Sham Tickoo, Learning Bentley Staad.Pro V8I for Structural Analysis, Dreamtech Press (10 June 2015).

References:

1. Learn Yourself Staad.Pro V8i , LAP Lambert Academic Publishing
2. <https://www.bentley.com/en/products/product-line/structural-analysis-software/staadpro>


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Syllabus of Certification Course

Course Name: Liquefaction analysis of soil using FEA Media & IS1893-2015

Duration: 30 Hours

Module I:

Introduction to liquefaction, Propagation of harmonic motion of shear waves in one dimensional system, Description of the program shake.

Module II:

Soil Stratum, Input Motion, Soil Properties, Element Input, Predefined Materials, User-Defined Materials.

Module III:

Additional Viscous Damping, Step-By-Step Time Integration

Module IV

Running The Analysis, Response At A Location, Response Profile, Report Generator

Text Books:

- I. M. Idriss & R. W. Boulanger, Soil Liquefaction During Earthquakes, Earthquake Engineering Research Institute, 2 edition, 2008.
- II. Hughes, The Finite Element Method: Linear Static and Dynamic Finite Element Analysis, Dover Publications Inc.; Illustrated edition, 2003



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Syllabus of Certification Course

Course Name: Design of Slopes using GeoStudio

Duration: 30 Hours

Module I:

Fundamentals on slopes, Types of slopes, Methods of analysis -Limit Equilibrium, Numerical Methods like Finite Element Methods, Finite Difference Methods, boundary Element methods, Universal Distinct Element Methods, Langranian Methods. Causes of Failures

Module II:

Different Limit equilibrium methods and its application to slopes, Introdcution about Geo Studio, Fundamentals on LE

Module III:

Different Shapes of Slip surfaces, Geometry of slope, various functions in Geo Studio, Material strength of different soils and evaluation of properties in lab and field

Module IV

Examples on various site conditions – slope, Embankment, Layered Soil

Text Books:

1. Slope Stability Modeling with Geo Studio by Geo Slope International, Ltd.
2. Slope Stability and Stabilization Methods Glenn M. Boyce, Thoms S.Lee, Sunil Sharma, Lee W. Abramson, John Wiley & Sons Publishers

References:

1. <https://www.seequent.com/products-solutions/geostudio/slope/>



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Syllabus of Certification Course

Course Name: Instruments used in environmental pollutant quantification

Duration: 30 Hours

Module 1:

Introduction, Sampling, Storage, Importance of instruments in Environmental Planning and management.

Module 2:


Separation Methods: Chromatography, Principle and Chromatogram; Types of Chromatography: Gas Chromatography, High-performance liquid chromatography, Ion chromatography

Module 3:

Spectrophotometric Methods: Ultraviolet and visible absorption spectroscopy; Double-beam scanning spectrometer; Infrared spectroscopy; Fourier transform infrared spectrometer (FTIR); Attenuated total reflection (ATR); Atomic absorption and flame emission spectroscopy; Measurements by AAS or by FES Measurements by FES; Hollow cathode lamps; Flame photometers.

Textbooks:

1. Francis Rouessac, Annick Rouessac - Chemical Analysis. Modern Instrumentation Methods and Techniques-Wiley (2007)
2. Alfred R. Conklin, Introduction to soil chemistry: analysis and instrumentation – Wiley (2005)


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