



### List of New Course(s) Introduced

**Department** : **Civil Engineering**

**Programme Name** : **B.Tech.**

**Academic Year** : **2018-19**

### **List of New Course(s) Introduced**

Sr. No.	Course Code	Name of the Course
01.	CE7TPE4E	DESIGN OF HYDRAULIC STRUCTURE
02.	CE7TPE5A	INDUSTRIAL STRUCTURE
03.	CE7TPE5B	SYSTEM ANALYSIS IN CIVIL ENGINEERING
04.	CE7TPE5D	PAVEMENT CONSTRUCTION AND MAINTENANCE
05.	CE7TOE2B	SUPPLY CHAIN MANAGEMENT - PLANNING
06.	CE7TOE2C	TRAVEL DEMAND ANALYSIS
07.	CE8TPE6A	MACHINE FOUNDATION
08.	CE8TPE6B	EARTHQUAKE GEOTECHNICAL ENGINEERING
09.	CE8TPE6E	CONSTRUCTION EQUIPMENT & TECHNIQUE
10.	CE8TPE7D	FINITE ELEMENT ANALYSIS
11.	CE8TPE7E	HYDROPOWER ENGINEERING
12.	CE8TOE3C	ENGINEERING RISK - BENEFIT ANALYSIS
13.	CE8TOE3D	FLUID DYNAMICS
14.	CE01PES01	PROGRAMMING FOR PROBLEM SOLVING LAB
15.	CE02THS02	ENVIRONMENTAL SCIENCES



**Minutes of Meetings (MoM) of Board of Studies (BoS)**

**Academic Year : 2018-19**

**School : School of Studies of Engineering and Technology**

**Department : Civil Engineering**

**Date and Time : June 06, 2017 11:00 am**

**Venue : Office chamber of the HOD, Civil Engg.**

GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)  
DEPARTMENT OF CIVIL ENGINEERING, INSTITUTE OF TECHNOLOGY

**MINUTES OF MEETING**

Meeting of Board of Studies, (Notified vide letter No 135/BOS/Meeting/Civil Engg./2017, BSP, dtd. 30.05.2017) of the Department of Civil Engg, IT, GGV has been held today on 6<sup>th</sup> June 2017, at 11.00 AM in the office chamber of the HOD, Civil Engg. Following members were present in the meeting.


1. Dr. Shailendra Kumar Professor & Head, CED, ITGGV Chairman, BOS
2. Dr. U.K. Dewangan Professor & Head, CED, NIT, Raipur, External Subject  
Expert-Member
3. Shri R.V. Anand Project Director, IRCON International Ltd., Bilaspur (C.G.),  
Industry Expert - Member
4. Dr. M. Chakradhara Rao Asso. Professor, CED, IT, GGV - Member
5. Mr. N.K. Verma Asst. Professor, CED, IT, GGV - Member

In the meeting, the course scheme and syllabi as per CBCS B. Tech. ordinance (effective from session 2015&16) was discussed. The members discussed the scheme and detailed syllabi, proposed for the B. Tech. 3<sup>rd</sup> and 4<sup>th</sup> year Civil Engg.(V to VIII Semesters), as per choice based credit system(CBCS).

As such, after discussion and deliberation, members recommended and approved the Course scheme and syllabi as attached herewith for B. Tech. 3<sup>rd</sup> and 4<sup>th</sup> year Civil Engg.(V to VIII Semesters) to be effective from session 2017-18 and onwards.

  
Prof. Shailendra Kumar

  
Prof. U. K. Dewangan

  
Shri R.V. Anand

  
Dr. M. Chakradhara Rao

  
Mr. N. K. Verma



The following new courses were introduced in the of B. Tech. 4<sup>th</sup> year (VIII semesters) scheme and syllabi :

- ❖ DESIGN OF HYDRAULIC STRUCTURE (CE7TPE4E)
- ❖ INDUSTRIAL STRUCTURE (CE7TPE5A)
- ❖ SYSTEM ANALYSIS IN CIVIL ENGINEERING (CE7TPE5B)
- ❖ PAVEMENT CONSTRUCTION AND MAINTENANCE (CE7TPE5D)
- ❖ SUPPLY CHAIN MANAGEMENT - PLANNING (CE7TOE2B)
- ❖ TRAVEL DEMAND ANALYSIS (CE7TOE2C)
- ❖ MACHINE FOUNDATION (CE8TPE6A)
- ❖ EARTHQUAKE GEOTECHNICAL ENGINEERING (CE8TPE6B)
- ❖ CONSTRUCTION EQUIPMENT & TECHNIQUE (CE8TPE6E)
- ❖ FINITE ELEMENT ANALYSIS (CE8TPE7D)
- ❖ HYDROPOWER ENGINEERING (CE8TPE7E)
- ❖ ENGINEERING RISK - BENEFIT ANALYSIS (CE8TOE3C)
- ❖ FLUID DYNAMICS (CE8TOE3D)

**विभागाध्यक्ष**  
**HOD**  
**सिविल इंजीनियरी विभाग**  
**Department of Civil Engineering,**  
**प्रौ.स.गु.घा.विश्वविद्यालय, बिलासपुर (छ.ग.)**  
**I.T., G.G.V. Bilaspur (C.G.)**

Signature & Seal of HoD



**Minutes of Meetings (MoM) of Board of Studies (BoS)**

**Academic Year : 2018-19**

**School : School of Studies of Engineering and Technology**

**Department : Civil Engineering**

**Date and Time : September 10, 2018 12:00 noon**

**Venue : Office chamber of the HOD, Civil Engg.**

GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR (C.G.)  
DEPARTMENT OF CIVIL ENGINEERING, SCHOOL OF STUDIES, ENGG. & TECH.

**MINUTES OF MEETING**

A Meeting of Board of Studies, (Notified vide letter No.225/ Civil/ E&T/ GGV/ 2018, Bilaspur Dated-05.09.2018.) of the Department of Civil Engg. SoS Engg. & Tech., GGV has been held today on 10<sup>th</sup> September 2018, at 12.00 noon in the office chamber of the HOD, Civil Engg. Following members were present in the meeting.

- 1 Dr. M. Chakradhara Rao Asso. Professor & Head, CED, SoS E & T, Chairman, BOS
- 2 Dr. Shailendra Kumar Registrar (Acting), Professor, CED, SoS E & T, Member, BOS
- 3 Shri R.V. Anand Project Director, IRCON International Ltd., Bilaspur (C.G).  
Industry Expert - Member, BOS
- 4 Mr. Nikhil Kumar Verma Asst. Professor, CED, SoS E & T, Member, BOS
- 5 Prof. U. K. Dewangan Prof. & Head, CED, NIT, Raipur, Subject Expert - Member, BOS. could not attend the meeting due to his pre-occupied assignment at NIT, Raipur. However, he has sent his remarks through mail. (copy attached)

In meeting the following was discussed:

1. The members discussed the scheme and detailed syllabi, proposed for the B. Tech. I<sup>st</sup> year Civil Engg. (I<sup>st</sup> to II<sup>nd</sup> Semesters), w.e.f. Session 2018-19 as per choice based credit system (CBCS, AICTE).
2. The member also discussed the detailed syllabi of Paper-I and Paper-II proposed for the VRET-2018 for Civil Engg.

After discussion and deliberation, the following was resolved and recommended:-

1. The members recommended and approved the Course scheme and syllabi (Copy attached) for B. Tech. I<sup>st</sup> year Civil Engg. (I<sup>st</sup> to II<sup>nd</sup> Semesters) to be effective from session 2018-19 and onwards.
2. The members also resolved that as the supervisors available in the department are from Structural Engineering specialization, the proposed syllabus of Paper-II which contains mainly the structural Engineering and Mathematics along with Paper-I (Research Methodology) is approved and recommended for VRET-2018 for Civil Engg. However in future if any supervisor who belongs to other than the Structural Engg. specialization are available in the department, then the Paper-II syllabus for VRET (Civil Engg.) will be modified accordingly.

Dr. M. Chakradhara Rao

Prof. Shailendra Kumar

Shri R.V. Anand

Mr. Nikhil Kumar Verma



The following revisions were introduced in the of B. Tech. 1<sup>ST</sup> year Civil Engg. (I to II semesters) scheme and syllabi :

- ❖ MATHEMATICS-II (CE01TBS01)
- ❖ CHEMISTRY (CE01TBS02)
- ❖ PROGRAMMING FOR PROBLEM SOLVING (CE01TES01)
- ❖ ENGINEERING MECHANICS (CE01TES02)
- ❖ PHYSICS (CE02TBS03)
- ❖ BASIC ELECTRICAL ENGINEERING (CE02TES03)
- ❖ MATHEMATICS-I (CE02TBS04)
- ❖ ENGLISH (CE02THS01)
- ❖ ENGINEERING GRAPHICS & DESIGN (CE02PES05)

The following new courses were introduced in the of B. Tech. 1<sup>ST</sup> year Civil Engg. (I to II semesters) scheme and syllabi :

- ❖ PROGRAMMING FOR PROBLEM SOLVING LAB (CE01PES01)
- ❖ ENVIRONMENTAL SCIENCES (CE02THS02)

**विभागाध्यक्ष**  
HOD  
सिविल इंजीनियरी विभाग  
Department of Civil Engineering,  
प्रौ.सं.गु.घा.विश्वविद्यालय, बिलासपुर (छ.ग.)  
I.T., G.G.V. Bilaspur (C.G.)

Signature & Seal of HoD

गुरु घासीदास विश्वविद्यालय  
(केन्द्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केन्द्रीय विश्वविद्यालय)  
कोनी, बिलासपुर - 495009 (छ.ग.)



Guru Ghasidas Vishwavidyalaya  
(A Central University Established by the Central Universities Act 2009 No. 25 of 2009)  
Koni, Bilaspur - 495009 (C.G.)

## Scheme and Syllabus

CBCS SCHEME

For

B.TECH. DEGREE PROGRAMME

In

**Civil Engineering**

(V, VI, VII & VIII Semesters, Effective from 2017-18 onwards)

INSTITUTE OF TECHNOLOGY



GURU GHASIDAS VISHWAVIDYALAYA,

(A CENTRAL UNIVERSITY)

BILASPUR (C.G.) - 495009

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*

*[Signature]*  
06/06/17



VII SEMESTER B.TECH. (CIVIL ENGG.)

Sl No	Subject Code	Subjects	Periods /Week			Evaluation Scheme					Grand Total	Credits
						Internal Assessment				E.S.E		
						L <sup>1</sup>	T <sup>2</sup>	P <sup>3</sup>	C.T. <sup>4</sup>			
1	CE7TPC17	Water Resources Engineering-II	3	0	0	10	20	10	-	60	100	3
2	CE7TPE2X	Professional Elective -2X	3	1	0	10	20	10	-	60	100	4
3	CE7TPE3X	Professional Elective -3X	3	0	0	10	20	10	-	60	100	3
4	CE7TPE4X	Professional Elective -4X	3	0	0	10	20	10	-	60	100	3
5	CE7TPE5X	Professional Elective -5X	3	0	0	10	20	10	-	60	100	3
6	CE7TOE2X	Open Elective -2X	3	0	0	10	20	10	-	60	100	3
Practical												
1	CE7LPS01	Seminar	0	0	3	50			50	-	50	2
2	CE7LPS02	Minor project	0	0	8	60			60	40	100	4
Total Credits											25	

X indicates the serial alphabet of a subject in the subject group

VIII SEMESTER B.TECH.(CIVIL ENGG.)

Sl No	Subject Code	Subjects	Periods /Week			Evaluation Scheme					Grand Total	Credits	
						Internal Assessment				E.S.E			
						L <sup>1</sup>	T <sup>2</sup>	P <sup>3</sup>	C.T. <sup>4</sup>				M.S.E. <sup>5</sup>
1	CE8TPC18	Earthquake Resistant Design of structure	3	1	0	10	20	10	-	40	60	100	4
2	CE8TPE6X	Professional Elective -6X	3	0	0	10	20	10	-	40	60	100	3
3	CE8TPE7X	Professional Elective -7X	3	1	0	10	20	10	-	40	60	100	4
4	CE8TOE3X	Open Elective -3X	3	0	0	10	20	10	-	40	60	100	3
Practical													
1	CE8LPS03	Major Project	0	0	15	120			120	80	200	8	
2	CE8LPC07	Structural Detailing Lab	0	0	3	-	-	-	30	30	20	50	2
Total Credits											24		

X indicates the serial alphabet of a subject in the subject group

<sup>1</sup>-Lecture Hours, <sup>2</sup>-Tutorial Hours, <sup>3</sup>- Practical Hours, <sup>4</sup>- Mid Sem. Exam, <sup>5</sup>-Class Tests/Assignments, <sup>6</sup>-Lab Work Assessment

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17



List of Professional (Core) Electives

Sl. No.	Subject Code	Name of Subject	Credits	SEMESTER
x	CE6TPE1X	Professional Elective-1 (PE Group-1)	4	VI
A	CE6TPE1A	Advanced Concrete Technology		
B	CE6TPE1B	Advanced Surveying		
C	CE6TPE1C	Advanced Concrete Design		
D	CE6TPE1D	Highway Safety		
E	CE6TPE1E	Advanced Fluid Mechanics		
Sl. No.	Subject Code	Name of Subject	Credits	SEMESTER
x	CE7TPE2X	Professional Elective-2 (PE Group-2)	4	VII
A	CE7TPE2A	Design of Prestressed Concrete		
B	CE7TPE2B	Structural Dynamics		
C	CE7TPE2C	Theory of Elasticity & Plasticity		
D	CE7TPE2D	Fracture of Concrete Structures		
E	CE7TPE2E	Advance Structural Analysis		
Sl. No.	Subject Code	Name of Subject	Credits	SEMESTER
x	CE7TPE3X	Professional Elective-3 (PE Group-3)	3	VII
A	CE7TPE3A	Environmental Geotechnical Engineering		
B	CE7TPE3B	Air Pollution Control Engineering		
C	CE7TPE3C	Industrial Waste Water Management		
D	CE7TPE3D	Water Resources Planning & Management		
E	CE7TPE3E	Environmental Impact Assessment		
Sl. No.	Subject Code	Name of Subject	Credits	SEMESTER
x	CE7TPE4X	Professional Elective-4 (PE Group-4)	3	VII
A	CE7TPE4A	Ground Water Hydrology		
B	CE7TPE4B	Ground Improvement Techniques		
C	CE7TPE4C	Geo-informatics & GIS Applications		
D	CE7TPE4D	Rock Mechanics		
E	CE7TPE4E	Design of Hydraulic Structures		
Sl. No.	Subject Code	Name of Subject	Credits	SEMESTER
x	CE7TPE5X	Professional Elective-5 (PE Group-5)	3	VII
A	CE7TPE5A	Industrial Structures		
B	CE7TPE5B	Systems Analysis in Civil Engineering		
C	CE7TPE5C	Railway Engineering		
D	CE7TPE5D	Pavement Construction and Maintenance		
E	CE7TPE5E	Planning & Design of Building Services		
Sl. No.	Subject Code	Name of Subject	Credits	SEMESTER
x	CE8TPE6X	Professional Elective-6 (PE Group-6)	4	VIII
A	CE8TPE6A	Machine Foundation		
B	CE8TPE6B	Earthquake Geotechnical Engineering		
C	CE8TPE6C	Bridge Engineering		
D	CE8TPE6D	Solid and Hazardous Waste Management		
E	CE8TPE6E	Construction Equipment & Techniques		
Sl. No.	Subject Code	Name of Subject	Credits	SEMESTER
x	CE8TPE7X	Professional Elective-7 (PE Group-7)	3	VIII
A	CE8TPE7A	Air and Water Transportation		
B	CE8TPE7B	Theory of Plates & Shells		
C	CE8TPE7C	Repair and Rehabilitation of Structures		
D	CE8TPE7D	Finite Element Analysis		
E	CE8TPE7E	Hydropower Engineering		

Handwritten signatures and dates at the bottom of the page, including dates like 20/06/17, 26/06/17, 06/06/17, and 21/07/17.





**List of Open Electives**

Sl. No.	Subject Code	Name of Subject	Credits	SEMESTER
x	CE6TOE1X	Open Elective-1 (OE Group-1)	3	VI
A	CE6TOE1A	Construction Planning and Management		
B	CE6TOE1B	Rural Technology and Community Development		
C	CE6TOE1C	Engineering System Design Optimization		
D	CE6TOE1D	Engineering System Modelling and Simulation		
Sl. No.	Subject Code	Name of Subject	Credits	SEMESTER
x	CE7TOE2X	Open Elective-2 (OE Group-2)	3	VII
A	CE7TOE2A	Value Engineering		
B	CE7TOE2B	Supply Chain Management-Planning		
C	CE7TOE2C	Travel Demand Analysis		
D	CE7TOE2D	Quality Control Assurance and Safety in Construction		
Sl. No.	Subject Code	Name of Subject	Credits	SEMESTER
x	CE8TOE3X	Open Elective-3 (OE Group-3)	3	VIII
A	CE8TOE3A	Management Information System		
B	CE8TOE3B	Enterprise Resource Planning		
C	CE8TOE3C	Engineering Risk-Benefit Analysis		
D	CE8TOE3D	Fluid Dynamics		

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17



Subject Code:		SYLLABUS						
Subject:		CREDITS: 3			SESSIONAL - TA			
Professional Elective -4X		L	T	P	CT	MSE	TA	TOTAL
Professional Elective-4A or Professional Elective-4B or Professional Elective-4C or Professional Elective-4D or Professional Elective-4E		3	-	-	10	20	10	40
		Any one subject to be Selected from the Professional Electives Group-4 ( i.e. CE7TPE4A or CE7TPE4B or CE7TPE4C or CE7TPE4D or CE7TPE4E )						
Professional Electives Group -4								
CE7TPE4A		Ground Water Hydrology						
CE7TPE4B		Ground Improvement Techniques						
CE7TPE4C		Geo-Informatics & GIS Applications						
CE7TPE4D		Rock Mechanics						
CE7TPE4E		Design of Hydraulic Structures						

*[Signature]*  
26/06/17

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
6/6/17

*[Signature]*  
06/06/17



Subject Code:	CE7TPE4E	SYLLABUS							ESE
		CREDITS:				SESSIONAL - TA			
Subject:	Design of Hydraulic Structures	L	T	P	CT	MSE	TA	TOTAL	60
		3	-	-	10	20	10	40	

**UNIT 1:** Introduction - Classification of dams, Gravity dams, Earth dams, Arch dam, Buttress dam, Steel dams, Timber dams, selection of site for dam, selection of type of dam, Investigations of dam sites, Engineering surveys, Geological investigations, Types of hydropower plants, site selection for power plant, General arrangement of a hydropower project.

**UNIT 2:** Principles of Design of Hydraulic Structures - Hydraulic structures on permeable foundations, Theories of subsurface flow, Khosla's method of independent variables, Exit gradient, Location of Hydraulic jump, water surface profiles, scour due to subsurface flow, Design Principles, Energy dissipation principles.

**UNIT 3:** Gravity Dams - Types of storage head works, Forces acting on gravity dams, Analysis of gravity dams, Profile of a gravity dam, Finite Element Method, Design of gravity dam, joints in gravity dam, Galleries in gravity dam, Adits and shafts, Construction of gravity dam, Foundation Grouting, Instrumentation of gravity dams.

**UNIT 4:** Earth dams - Types of earth dams, Causes of failure of earth dams, Seepage analysis, phreatic line, flow net construction, criteria for safe design of gravity dams, typical cross sections of earth dams, Stability analysis, Seepage control, and design of filters.

**UNIT 5:** Spillways and energy dissipation systems - Essential requirements of spillways, Required spillway capacity, component parts of spillway, Types of spillways, Design of Ogee spillway, Design of shaft spillway, Design of siphon spillway, Design of stilling basins. Hydropower structures - Storage power plant, Runoff River plant, Pumped storage plant, Water conveyance systems, Tunnels and Penstocks, Gates, Surge tanks, Power house layout.

**Reading:**

1. Golze, A. R., Handbook of Dam Engineering, Von Rostrand Reinhold Co., 1977
2. Sharma, H.D., Concrete Dams, CBIP Publication, 1998.
3. Siddiqui, I H, Dams and Reservoirs: Planning, Engineering, Oxford University Press, USA, 2009.
4. Novak, P., Moffat, A. I. B., Nalluri, C and Narayan, R., Hydraulic Structures, Taylor & Francis, 2006.
5. Modi P.M., Irrigation Water Resources and Hydropower Engineering, Standard Publishing Company, New Delhi, 2000.
6. Arora K.L. Irrigation Water Resources Engineering, Standard Book Publishing Co., Delhi, 1996.

Handwritten signatures and dates:

- Signature: 06/06/17
- Signature: 06/06/17
- Signature: 6/6/17
- Signature: 06/06/17



Subject Code: CE7TPE5X		SYLLABUS					
Subject: Professional Elective -5X		CREDITS: 3			SESSIONAL - TA		
L	T	P	CT	MSE	TA	TOTAL	
3	-	-	10	20	10	40	
Professional Elective-5A or Professional Elective-5B or Professional Elective-5C or Professional Elective-5D or Professional Elective-5E		Any one subject to be Selected from the Professional Electives Group-5 ( i.e. CE7TPE5A or CE7TPE5B or CE7TPE5C or CE7TPE5D or CE7TPE5E )					
Professional Electives Group -5							
CE7TPE5A	Industrial Structures						
CE7TPE5B	Systems Analysis in Civil Engineering						
CE7TPE5C	Railway Engineering						
CE7TPE5D	Pavement Construction and Maintenance						
CE7TPE5E	Planning & Design of Building Services						

*[Handwritten signature]*  
06/06/17

*[Handwritten signature]*  
06/06/17

*[Handwritten signature]*  
6/6/17

*[Handwritten signature]*  
06/06/17



Subject Code:	CE7TPESA	SYLLABUS							ESE
		CREDITS: 3			SESSIONAL - TA				
Subject:	Industrial Structures	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	60
<p><b>UNIT 1:</b> Detailed Design of Steel Gantry Girders. Detailed Design of Portal Frames-Single bay two storeys.</p> <p><b>UNIT 2:</b> Detailed Design of Gable Structures. Detailed Design of Knee Brace.</p> <p><b>UNIT 3:</b> Detailed Design of Light weight metal structures. Design of connections-Shear and Flexure Design.</p> <p><b>UNIT 4:</b> Detailed Design of Steel Bunkers. Detailed Design of Silos.</p> <p><b>UNIT 5:</b> Detailed Design of Self Supported Chimneys.</p> <p><b>Reading:</b> 1. Design of Steel Structures, Arya and Azmani, Nem Chand Brothers, Roorkee, 2004 2. Punmia B.C, Ashok Kr. Jain, Arun Kr. Jain, RCC Designs (Reinforced Concrete Design), 10th Edition, Lakshmi Publishers, 2006. 3. Ramachandra, Design of Steel Structures, 12th Edition, Standard Publishers, 2009.</p>									

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
6/6/17

*[Signature]*  
06/06/17



Subject Code: CE7TPE5B		SYLLABUS						ESE
Subject: Systems Analysis in Civil Engineering		CREDITS: 3			SESSIONAL - TA			
L	T	P	CT	MSE	TA	TOTAL	ESE	
3	-	-	10	20	10	40	60	

UNIT 1: Concept of systems approach: system, boundaries of system, goals and objectives, optimality, mathematical models, objective function and constraints, problem solving mechanism, types of problems, modelling / problem formulation, sub-optimization, solution techniques, sensitivity analysis. Basic concepts of probability and probability distributions, regression and curve fitting.

UNIT 2: Decision theory: classification of decision situations, decision tables and decision tree, criteria for decision making under certain, uncertain and risk conditions. Index numbers: basic requirements of index numbers, constructing index numbers: using relatives, using aggregates.

UNIT 3: Linear programming: general nature of problem, graphical method of solution, simplex method, dual, sensitivity analysis.

UNIT 4: Distribution models: transportation and assignment problems and their solutions. Queuing models: various situations, queue discipline and customer behaviour, single server model.

UNIT 5: Simulation: general approach, Monte Carlo simulation, simple problems using hand calculations.

Text/Reference Books:

1. Benjamin J R & Cornell C A, "Probability, Statistics and Decisions for Civil Engineers", McGraw Hill
2. Jewell T K, "A Systems Approach to Civil Engineering Planning and Design", Harper & Row
3. Ossenbruggen P J, "Systems Analysis for Civil Engineers".
4. Shrivastava, Shenoy and Sharma, "Quantitative Techniques for Managerial Decisions", Wiley Eastern.

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
6/6/17

*[Signature]*  
06/06/17



Subject Code:	CE7TPE5D	SYLLABUS						ESE
		CREDITS:			SESSIONAL - TA			
Subject:	Pavement Construction and Maintenance	L	T	P	CT	MSE	TA	TOTAL
		3	-	-	10	20	20	40
								60

**UNIT 1: Pavement Inventories And Evaluation - Factors affecting Pavement Deterioration, Functional Condition Evaluation Techniques: Roughness Measurements, serviceability concepts: Visual & Ride Rating Techniques, structural Condition Evaluation Techniques: NDT Procedures, Rebound Deflection, Measurement and Analysis, Destructive Testing, Remaining Life Concept, AI's Equivalency Factors, Overlay Design methods, IRC, Overlay Design methods, AASHTO methods, Evaluation of Pavement Safety: Skid Resistance, Factors, evaluation, Hydroplaning Reduction with Porous Overlays & Popcorn Friction overlay.**

**UNIT 2: Deterioration Modelling Concepts: Factors Influencing Structural & Functional Condition Deterioration, Examples of Initiation and Progressing Deterioration Models, Use of Deterioration Models by HDM Software.**

**UNIT 3: Pavement Construction - Construction of Subgrade layers, Sub-base and Base Courses, Bituminous Surface Courses, Cement Concrete Surface Courses, MORTH specifications, Quality control.**

**UNIT 4: Pavement Maintenance & Quality Control - Routine, Periodic Maintenance, Special Repairs, Responsive Maintenance Programmes, Rehabilitation and Reconstruction, Components of Pavement Maintenance Management System (PMMS), Stages in Implementing PMMS.**

**UNIT 5: Total Quality Management (TQM): Quality Assurance/Quality Control Concepts, Sampling, Tolerances and Controls Related to Profile & Compaction, Role of ISO 9000 in TQM.**

**Reading:**

1. RCC Haas, W. Ronald Hudson, et al, Modern Pavement Management, Krieger Publishing Company.
2. ISTE Summer School Report on PMSS by Bangalore University. ISTE, New Delhi.
3. Mohammed Y. Shahin, Pavement Management for Airports, Roads & Parking Lots, Chapman & Hall Publishers.
4. Instructor's Guide-Asphalt Institute, Asphalt Technology and Construction Practices, Educational series.
5. A.F. Stocks, Concrete Pavements, Elsevier Applied Science Publishers, New York.
6. Harold N. Atkins, Highway Materials, Soils & Concrete 3rd Edition, Prentice Hall.
7. MORTH, Govt. of India, Specifications for Roads & Bridge Works, New Delhi.
8. Peurifoy, R.L., and Clifford, J.S "Construction Planning Equipment and Method"- McGraw Hill Book Co. Inc.
9. Sharma S.C., "Construction Equipment and its Management"- Khanna Publishers.
10. Freddy L Roberts, Prithvi S Kardhal et al, "Hot Mix Asphalt Materials, mixture design and construction"- (2nd Edition), NAPAR and Education Foundation, Maryland, USA.

*[Handwritten signature]*  
06/06/17

*[Handwritten signature]*  
06/06/17

*[Handwritten signature]*  
06/06/17

*[Handwritten signature]*  
06/06/17

*[Handwritten signature]*  
06/06/17



(SEMESTER-VII)							
CE7TOE2X	CREDITS: 3			SESSIONAL - TA			
Open Elective -2X	L	T	P	CT	MSE	TA	TOTAL
	3	-	-	10	20	10	40
Open Elective-2A or Open Elective-2B or Open Elective-2C or Open Elective-2D	Any one subject to be Selected from the Open Electives Group 2 ( i.e. CE6TOE2A or CE6TOE2B or CE6TOE2C or CE6TOE2D )						
Open Electives Group 2							
CE7TOE2A	Value Engineering						
CE7TOE2B	Supply Chain Management-Planning						
CE7TOE2C	Travel Demand Analysis						
CE7TOE2D	Quality Control Assurance and Safety in Construction						

*[Handwritten Signature]*  
06/06/17

*[Handwritten Signature]*  
06/06/17

*[Handwritten Signature]*  
06/06/2017

*[Handwritten Signature]*  
6/6/17

*[Handwritten Signature]*  
06/06/17





Subject Code:	CE7TOE2B	SYLLABUS							ESE
		CREDITS:			SESSIONAL - TA			TOTAL	
Subject:	Supply Chain Management-Planning	L	T	P	CT	MSE	TA		TOTAL
		3	-	-	10	20	10	40	60
<p>UNIT 1: Introduction to Supply Chain- Supply chain systems, stages and decision phases and Process view of supply chain; supply chain flows; examples of supply chains; competitive supply chain strategies; drivers for supply chain performance.</p> <p>UNIT 2: Designing the Supply Chain Network- Distribution Networking - role, design; Supply Chain Network - SCN- Role, factors; framework for design decisions.</p> <p>UNIT 3: Facility Location and Network Design- Models for facility location and capacity location; Impact of uncertainty on SCN - discounted cash flow analysis; evaluating network design decisions using decision trees; analytical problems.</p> <p>UNIT 4: Planning and Managing Inventories in a Supply Chain- Inventory concepts, trade promotions; managing multi-echelon cycle inventory, safety inventory determination; impact of supply uncertainty aggregation and replenishment.</p> <p>UNIT 5: Sourcing, Transportation and Pricing Products-Role of sourcing, supplier- scoring and assessment, selection and contracts, design collaboration; role of transportation, models of transportation and designing transportation network; revenue management.</p> <p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. Sunil Chopra and Peter M, Supply Chain Management, Pearson publishing, 2001</li> <li>2. Blanchard D., Supply chain management: Best practices. New Jersey: John Wiley &amp; Sons. 2007</li> </ol> <p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Hugos, M., Essentials of supply chain management. (2nd ed.). New Jersey: John Wiley &amp; Sons, 2006</li> <li>2. Kim, B., Supply chain management in the mastering business in As</li> </ol>									

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17



Subject Code: CE7TOE2C		SYLLABUS						ESE	
		CREDITS: 3			SESSIONAL - TA				
Subject:	Travel Demand Analysis	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	
									60

**UNIT 1:** Transportation Issues - Population, Urbanization and Migration, Findings of Commission on Urbanization Introduction to Urban Transportation Urban Issues, Travel Characteristics, Concept of Region, Issues Related to Regional Transportation Planning, Methods of Delineation Regions.

**UNIT 2:** Travel Demand - Trends, Overall Planning process, Long term Vs. Short term planning, Demand Function, Independent Variables, Travel Attributes, Assumptions in Demand Estimation, Sequential, and Simultaneous Approaches, Aggregate and Disaggregate Techniques. Data Collection And Inventories - Collection of data - Organisation of surveys and Analysis, Study Area, Zoning, Screen Lines, Types and Sources of Data - Road Side Interviews - Home Interview Surveys - Commercial Vehicle Surveys, Sampling Techniques, Expansion Factors - Accuracy Checks, Use of Secondary Sources, Economic data - Income - Population - Employment - Vehicle Owner Ship. Four Stage Demand Forecasting - UTPS Approach.

**UNIT 3:** Trip Generation Analysis: Zonal Models, Category Analysis, Household Models, Trip Attraction models, Commercial Trip Rates. Trip Distribution: Growth Factor Methods, Gravity Models, Opportunity Models, Time Function Iteration Models.

**UNIT 4:** Mode Choice Analysis: Mode Choice Behaviour, Competing Modes, Mode Split Curves, Models and Probabilistic Approaches. Traffic Assignment: Basic Elements of Transport Networks, Coding, Route Properties, Path Building Criteria, Skimming Tree, All-or-Nothing Assignment, Capacity Restraint Techniques, Reallocation of Assigned Volumes, Equilibrium Assignment, Diversion Curves.

**UNIT 5:** Regional Travel Demand Estimation - Factors Affecting Goods and Passenger Flows, Use of Mathematical Models to Estimate Freight and Passenger Demand, Abstract Mode Models, Mode Specific Models, Direct Demand Models, IVF Models, IO Model.

**Reading:**

1. Jotin Khisty C, Transportation Engineering - An Introduction, Prentice Hall, Englewood Cliffs, New Jersey, 2004.
2. Kadiyali L.R., Traffic Engineering and Transportation Planning, Khanna Publication, N.D, 2011.
3. Papakostas. C.S., Fundamentals of Transportation Engineering, PHI Pvt. Ltd., New Delhi, 2003.
4. Subhash C. Saxena, A Course in Traffic Planning and Design, Dhanpat Rai and Sons, New Delhi, 1989.

*[Handwritten signature]*  
06/06/17

*[Handwritten signature]*  
06/06/17

*[Handwritten signature]*  
06/06/17

*[Handwritten signature]*  
6/6/17

*[Handwritten signature]*  
06/06/17



SYLLABUS		(SEMESTER-VIII)							ESE
Subject Code:	CE8TPE6X	CREDITS: 3			SESSIONAL - TA				
Subject:	Professional Elective - 6X	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	60
Professional Elective-6A or Professional Elective-6B or Professional Elective-6C or Professional Elective-6D or Professional Elective-6E		Any one subject to be Selected from the Professional Electives Group-6 ( I.e. CE8TPE6A or CE8TPE6B or CE8TPE6C or CE8TPE6D or CE8TPE6E )							
Professional Electives Group -6									
	CE8TPE6A	Machine Foundation							
	CE8TPE6B	Earthquake Geotechnical Engineering							
	CE8TPE6C	Bridge Engineering							
	CE8TPE6D	Solid and Hazardous Waste Management							
	CE8TPE6E	Construction Equipment & Techniques							

*(Signature)*  
06/06/17

*(Signature)*  
06/06/17

*(Signature)*  
06/06/17

*(Signature)*  
06/06/17

*(Signature)*  
06/06/17



SYLLABUS		(SEMESTER-VIII)						ESE
Subject Code:	CEBTPE6A	CREDITS:			SESSIONAL - TA			
Subject:	Machine Foundation	L	T	P	CT	MSE	TA	TOTAL
		3	-	-	10	20	10	40

UNIT 1: General Principles of Machine Foundation Design: Introduction, Types of Machines and Foundations, General requirements, Permissible Amplitude, Allowable soil pressure, Permissible stress of concrete and steel, Permissible stresses of Timber.

UNIT 2: Foundations of Reciprocating Machines: Modes of vibration of a rigid foundation block, methods of analysis, linear elastic weightless spring methods, elastic half space method, effect of footing shape on vibratory response, dynamic response of embedded block foundations, soil mass participating in vibrations, design procedure for a block foundation.

UNIT 3: Foundations of impact machines: Introduction, Dynamic analysis; single degree freedom system, Multi degree freedom system, determination of initial velocity of hammer, stress in the pad, stresses in the soil, Design procedure for a hammer foundation.

UNIT 4: Foundations of Rotary Machines: Introduction, special considerations, design criteria, loads on a turbo generator foundation, methods of analysis and design, resonance method, amplitude method, combined method, three dimensional analysis.

UNIT 5: Vibration isolation and screening: Introduction, force isolation, motion isolation, screening of vibrations by use of open trenches, passive screening by use of pile barriers, problems.

Reading:

1. "Handbook of Machine Foundations" Srinivasulu, P. And Vaidyanathan, C. V., Tata McGraw-Hill, New Delhi, 2001
2. "Foundations for Machines, Analysis and Design" Prakash Shamsher and Puri Vijay K, John Wiley and Sons, USA, 1988.

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17



SYLLABUS		(SEMESTER-VIII)						
Subject Code:	CE8TPE6B	CREDITS:			SESSIONAL - TA			ESE
Subject:	Earthquake Geotechnical Engineering	L	T	P	CT	MSE	TA	TOTAL
		3	-	-	10	20	10	40
								60

**UNIT 1: Seismology and earthquakes:** Basic earthquake principles: Introduction – Internal structure of earth – Plate tectonics faults – seismic waves – Seismograph – Classification of earthquakes – Magnitude and intensity of earthquakes - Seismic zones in India. Common Earthquake effects: Surface rupture – Regional subsidence – liquefaction – slope movement – Tsunami and seiche. Earthquake structural Damage: Earthquake induced settlement – Resonance of structures.

**UNIT 2: Soil dynamics:** Dynamics of discrete system – Soil structure interaction – Vibratory system – free and forced vibration without and with damping – Base shaking – Dynamic soil properties – Geotechnical earthquake engineering analysis: Site investigation: Scope of investigation – quantitative evaluation – subsurface investigation – laboratory testing – peak ground acceleration – report preparation – problems.

**UNIT 3: Liquefaction:** Introduction – mechanism – laboratory liquefaction studies – factors that govern Liquefaction in the field – Liquefaction analysis – cyclic stress ratio from the SPT, DCPT and shear wave velocity- FS against liquefaction – Anti Liquefaction measures – problems. Earth quake induced settlement: Introduction – settlement VS factor of safety against Liquefaction induced ground damage – volumetric compression – settlement due to dynamic loads caused by rocking – problems.

**UNIT 4: Bearing capacity analysis for earthquakes:** Introduction – one third increases in bearing capacity pressure for seismic condition – Bearing capacity analysis for liquefied soil – granular soil with earthquake induced pore water – Bearing capacity analysis for cohesive soil weakened by the earthquake – problems. Slope stability analysis for earthquake: Introduction – inertia slope stability: pseudo static method, new mark method – weakening slope stability: flow slides, liquefaction induced lateral spreading, strain softening soil – restrained retaining walls and temporary retaining walls – problems.

**UNIT 5: Other geotechnical earthquake engineering analysis:** Introduction – pavement design – pipe line design – problems. Site improvement methods to mitigate earthquake effects: Soil improvement Methods: Introduction – Grading, soil replacement, water removal, site strengthening, grouting, thermal, and ground water control methods. Foundation analysis: Introduction – shallow and deep foundations.

**Reading:**

1. Kramer, S. L. (2003): "Geotechnical Earthquake Engineering", Pearson Education.
2. Day, R. W. (2003): "Geotechnical Earthquake Engineering handbook", McGraw Hill.
3. Kamalesh Kumar, (2008): "Basic Geotechnical Earthquake Engineering", New Age.
4. IS-1893(part-1) 2002, "Criteria for Earthquake resistant design of structures" part 1- general provision of buildings.

Handwritten signatures and dates:   
 [Signature] 06/06/17   
 [Signature] 06/06/17   
 [Signature] 06/06/17   
 [Signature] 06/06/17



SYLLABUS		(SEMESTER-VIII)							
Subject Code:	CEBTPE6E	CREDITS:			SESSIONAL - TA			ESE	
Subject:	Construction Equipment and Techniques	L	T	P	CT	MSE	TA		TOTAL
		3	-	-	10	20	10	40	60
<p>UNIT 1: Large and heavy engineering projects- characteristics and complexities, methods statement for major activities like excavation, concreting, steel fabrication and erection for projects like earthen dams, hydropower projects, nuclear power plant, refineries and other industrial projects, Excavation for heavy engineering projects- Excavation in various types of soils, selection of equipment, safety measures in excavation, drainage in excavation.</p> <p>UNIT 2: Concrete construction for heavy engineering projects-Selection of equipment for batching, mixing, transporting, placing and compacting for various types of jobs, safety measures during concreting, Special concretes and mortars-preplaced aggregate concrete, roller compacted concrete, Prefabricated construction- Planning for pre-casting, selection of equipment for fabrication, transport and erection, quality measures, safety measures during erection.</p> <p>UNIT 3: Steel construction-Planning for field operations, selection of equipment and erection tools, tools and methods of welding, tools and methods of cutting and joining, bridge erection, quality measures, safety measures during fabrication and erection.</p> <p>UNIT 4: Specific issues related to planning, site layouts, equipment selection and pre-project activities for large size construction projects like earthen dams, concrete dams, thermal power stations, nuclear power stations, light houses, airports and ports, bridges. Information related to special equipments and their applications to off-shore construction, underground utility construction.</p> <p>UNIT 5: New materials and equipment for construction; Case studies of heavy construction projects.</p> <p>Text/Reference Books:</p> <ol style="list-style-type: none"> <li>1. Thomas baron, Erection of steel structures</li> <li>2. Stubbs, handbook of heavy construction</li> <li>3. Journals of Civil Engineering and Construction Engineering</li> </ol>									

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
6/6/17



SYLLABUS		(SEMESTER-VIII)							
Subject Code:	CE8TPE7X	CREDITS:4			SESSIONAL - TA			ESE	
Subject:	Professional Elective - 7X	L	T	P	CT	MSE	TA		TOTAL
		3	1	-	10	20	10	40	60
Professional Elective-7A or Professional Elective-7B or Professional Elective-7C or Professional Elective-7D or Professional Elective-7E		Any one subject to be Selected from the Professional Electives Group-7 ( i.e. CE8TPE7A or CE8TPE7B or CE8TPE7C or CE8TPE7D or CE8TPE7E )							
Professional Electives Group -7									
CE8TPE7A	Air and Water Transportation								
CE8TPE7B	Theory of Plates & Shells								
CE8TPE7C	Repair and Rehabilitation of Structures								
CE8TPE7D	Finite Element Analysis								
CE8TPE7E	Hydropower Engineering								

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17



SYLLABUS		(SEMESTER-VIII)						ESE	
Subject Code:	CE8TPE7D	CREDITS:		SESSIONAL - TA					
Subject:	Finite Element Analysis	L	T	P	CT	MSE	TA		TOTAL
		3	1	-	10	20	10	40	60
<p>UNIT 1: Matrix Methods of Structural Analysis – Review of concepts – Actions and displacements – compatibility – indeterminacy – Member and joint loads – Flexibility Matrix formulation - Stiffness Matrix</p> <p>UNIT 2: Introduction to Finite Element Method – Background and general description of the method of the analysis procedure.</p> <p>UNIT 3: Theory of Finite element method – Concept of element – various elements shapes – displacement models – shape functions – isoparametric elements – formulation of element stiffness and loads – condensation of internal degrees of freedom.</p> <p>UNIT 4: Overall problem – Assemblage of elements construction of stiffness matrix and loads – boundary conditions and solution of overall problem – Application to continuous beam – spring assemblage – stability of columns – curved beams and vibration problems - torsions of shafts.</p> <p>UNIT 5: Generalization of FEM – Six step finite element procedures in general terms – application to structural engineering problems – analysis of plates, shells and frames.</p> <p>Reading:</p> <ol style="list-style-type: none"> <li>1. Finite element analysis, theory and Programming by CS Krishna Murthy.</li> <li>2. Introduction to Finite element Method by Tirupathi chandra Patla and Belugundu.</li> <li>3. Textbook of Finite Element Analysis, 1st Edition, PHI, 2009.</li> </ol>									

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
6/6/17

*[Signature]*  
06/06/17





SYLLABUS		(SEMESTER-VIII)						ESE
Subject Code:	CEBTPe7E	CREDITS: 4			SESSIONAL - TA			
Subject:	Hydropower Engineering	L	T	P	CT	MSE	TA	
		3	1	-	10	20	10	40
<p>UNIT 1: Stream flow analysis, Hydrograph, Mass curve, Runoff estimation methods, estimation of hydropower potential, flow duration curves, power duration curves, poundage and storage. Electrical load on hydro turbines, load curves, load duration curves, Performance factors.</p> <p>UNIT 2: Types of hydropower plants, Storage power plant, Runoff River plant, Pumped storage hydraulics of turbines, cavitation in turbine, efficiency of pumped storage plants.</p> <p>UNIT 3: Intakes, losses in intakes, air entrainment at intake, inlet aeration, Water conveyance systems, fore bay, canals,</p> <p>UNIT 4: Tunnels and Penstocks, classification of penstocks, design criteria of penstock, economical diameter of penstock, Anchor blocks, Conduit valves, types of valves, bends and manifolds.</p> <p>UNIT 5 : Water hammer, resonance in penstocks, channel surges, Gates, Surge tanks, Power house layout, lighting and ventilation, variations in design of power house, underground power house, structural design of power house.</p> <p>Reading:</p> <ol style="list-style-type: none"> <li>1. Arora, K.R., Irrigation Water Power and Water Resources Engineering, Standard Book Company, Delhi, 2002</li> <li>2. Dandekar, M.M., and Sharma, K.N., Water Power Engineering, Vikas Publishing Company, New Delhi, 2003</li> <li>3. Garg, S.K., Irrigation Engineering and Hydraulic Structures, Khanna Publishers, 2009</li> <li>4. Jog, M.G., Hydroelectric and Pumped Storage Plants, Wiley Eastern Ltd., New York, 1989.</li> </ol>								

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
06/06/17

*[Signature]*  
6/6/17

*[Signature]*  
06/06/17



SYLLABUS		(SEMESTER-VIII)						
Subject Code:	CEBTOE3X	CREDITS: 3			SESSIONAL - TA			
Subject:	Open Elective -3X	L	T	P	CT	MSE	TA	TOTAL
		3	-	-	10	20	10	40
Open Elective-3A or Open Elective-3B or Open Elective-3C or Open Elective-3D		Any one subject to be Selected from the Open Electives Group 3 ( i.e. CE8TOE3A or CEBTOE3B or CE8TOE3C or CEBTOE3D )						
Open Electives Group 3								
CE8TOE3A		Management Information System						
CE8TOE3B		Enterprise Resource Planning						
CE8TOE3C		Engineering Risk-Benefit Analysis						
CE8TOE3D		Fluid Dynamics						

Handwritten signatures and dates:

- Signature: 76/06/12
- Signature: (M.D.) 08/06/12
- Signature: 08/06/12
- Signature: 6/10/12
- Signature: 6/10/12



SYLLABUS		(SEMESTER-VIII)						
Subject Code:	CERTOE3C	CREDITS: 3			SESSIONAL - TA			ISE
Subject:	Engineering Risk-Benefit Analysis	L	T	P	CT	MSE	TA	TOTAL
		3	-	-	10	20	10	40
								60

**UNIT 1: Introduction- Knowledge and Ignorance, Information Uncertainty in Engineering Systems, Introduction and overview of class; definition of Engineering risk; overview of Engineering risk analysis. Risk Methods: Risk Terminology, Risk Assessment, Risk Management and Control, Risk Acceptance, Risk Communication, Identifying and structuring the Engineering risk problem; developing a deterministic or parametric model**

**UNIT 2: System Definition and Structure: System Definition Models, Hierarchical definitions of Systems, System Complexity. Reliability Assessment: Analytical Reliability Assessment, Empirical Reliability Analysis Using Life Data, Reliability Analysis of Systems**

**UNIT 3: Consequence Assessment-Types, Cause-Consequence Diagrams, Microeconomic Modelling, Value of Human Life, Flood Damages, and Consequence Propagation. Engineering Economics: Time Value of Money, Interest Models, Equivalence**

**UNIT 4: Decision Analysis: Risk Aversion, Risk Homeostasis, Influence Diagrams and Decision Trees, Discounting Procedures, Decision Criteria, Tradeoff Analysis, Repair and Maintenance Issues, Maintainability Analysis, Repair Analysis, Warranty Analysis, Insurance Models**

**UNIT 5: Data Needs for Risk Studies: Elicitation Methods of Expert Opinions, Guidance**

**Text Books:**

1. Risk Analysis in Engineering and Economics, B. M. Ayyub, Chapman-Hall/CRC Press, 2003.

**Reference Books:**

1. Probability, Statistics, and Reliability for Engineers and Scientists, Ayyub & McCuen, 2003.
2. Probabilistic Risk Assessment and Management for Engineers and Scientists, by H. Kumamoto and E. J. Henley, Second Edition, IEEE Press, NY, 1996.
3. Bedford, T. and Cooke, R. Probabilistic Risk Analysis: Foundations and Methods. New York: Cambridge University Press, 2001.
4. Normal Accidents, Living with High-Risk Technologies, C. Perrow, Princeton University Press, 1999.
5. Accident Precursor Analysis and Management - Reducing Technological Risk Through Diligence, National Academy of Engineering, the National Academies Press, Washington, DC, 2004.

Handwritten signatures and dates:

- Signature: [Handwritten] 06/06/17
- Signature: [Handwritten] 06/06/17
- Signature: [Handwritten] 06/06/17
- Signature: [Handwritten] 06/06/17



SYLLABUS		(SEMESTER-VIII)							
Subject Code:	CE8TOE3D	CREDITS:			SESSIONAL - TA			ESE	
Subject:	Fluid Dynamics	L	T	P	CT	MSE	TA		TOTAL
		3	-	-	10	20	10	40	60

UNIT I: Introduction & overview of Fluid Dynamics, units and basic flow concepts. Continuum, velocity fields, viscosity, classifications of fluids. Fluid statics, hydrostatic forces on surfaces, rigid body motion, Pressure measurements.

UNIT II: Incompressible potential flow, Bernoulli's equation, Flow metering. Introduction to differential approach to flow analysis, Stream functions, Material Derivative, Reynolds Transport Theorem

UNIT III: Integral approach to flow analysis, control volume concepts, Conservation of mass, momentum and energy, applications. Differential approach to flow analysis, continuity, momentum and energy equations.

UNIT IV: Overview of dimensional analysis, basic equations in non-dimensional form. Introduction to viscous flow in conduits, Moody diagrams, Minor losses, analysis of piping networks, flow metering.

UNIT V: External incompressible viscous flow, boundary layers, Lift and drag forces. Introduction to compressible flow, speed of sound, isentropic stagnation properties, isentropic flows, normal shock waves,

Text Books:  
Fundamental of Fluid Mechanics" by Munson, Young and Okiishi, 5th edition.

Handwritten signatures and dates:

- Signature: [Signature] / 06/06/17
- Signature: [Signature] / 06/06/17
- Signature: [Signature] / 06/06/17
- Signature: [Signature] / 06/06/17
- Signature: [Signature] / 06/06/17



**CIVIL ENGINEERING DEPARTMENT, SOS, ENGINEERING & TECHNOLOGY  
GURU GHASIDAS VISHWAVIDYALAYA (A CENTRAL UNIVERSITY), BILASPUR**

**SCHEME OF B.TECH. I SEMESTER (COURSE-B) CIVIL ENGINEERING  
W.E.F. 2018-19 (ODD SEMESTER)**

S. No	Subject Code	Subjects	Period/Week			Scheme of Evaluation				Grand Total	Credits
						Internal Assessment (IA)			ESE		
						CT-I	CT-II	Total			
		<b>Theory</b>	<b>L</b>	<b>T</b>	<b>P</b>						
1	CE01TBS01	MATHEMATICS-II	3	1	0	15	15	30	70	100	4
2	CE01TBS02	CHEMISTRY	3	1	0	15	15	30	70	100	4
3	CE01TES01	PROGRAMMING FOR PROBLEM SOLVING	3	0	0	15	15	30	70	100	3
4	CE01TES02	ENGINEERING MECHANICS	3	0	0	15	15	30	70	100	3
		<b>Practical</b>									
1	CE01PBS01	CHEMISTRY LAB	0	0	3	-	-	30	20	50	1.5
2	CE01PES01	PROGRAMMING FOR PROBLEM SOLVING LAB	0	0	3	-	-	30	20	50	1.5
3	CE01PES02	WORKSHOP & MANUFACTURING PRACTICES	1	0	3	-	-	30	20	50	2.5
4	CE01PES03	ENGINEERING MECHANICS LAB	0	0	2			30	20	50	1
		INDUCTION TRAINING PROGRAMME*	-	-	-	-	-	-	-	-	-
										<b>Total Credits</b>	20.5

L - Lecture Hours, T-Tutorial Hours, P - Practical Hours, CT - Class Test, ESE – End Semester Exam;  
\* Mandatory Training Programme



**SCHEME OF B.TECH. II SEMESTER (COURSE-A) CIVIL ENGINEERING**  
**W.E.F. 2018-19 (EVEN SEMESTER)**

S. No	Subject Code	Subjects	Period/Week			Scheme of Evaluation				Grand Total	Credits
						Internal Assessment (IA)			ESE		
						CT-I	CT-II	Total			
		<b>Theory</b>	<b>L</b>	<b>T</b>	<b>P</b>						
1	CE02TBS03	PHYSICS	3	1	0	15	15	30	70	100	4
2	CE02TES03	BASIC ELECTRICAL ENGINEERING	3	1	0	15	15	30	70	100	4
3	CE02TBS04	MATHEMATICS-I	3	0	0	15	15	30	70	100	4
4	CE02THS01	ENGLISH	3	0	0	15	15	30	70	100	3
5	CE02THS02	ENVIRONMENTAL SCIENCES	3	0	0	15	15	30	70	100	3
		<b>Practical</b>									
1	CE02PBS02	PHYSICS LAB	0	0	3	-	-	30	20	50	1.5
2	CE02PES04	BASIC ELECTRICAL ENGINEERING LABORATORY	0	0	2	-	-	30	20	50	1
3	CE02PES05	ENGINEERING GRAPHICS & DESIGN	1	0	3	-	-	30	20	50	2.5
										<b>Total Credits</b>	20

L - Lecture Hours, T-Tutorial Hours, P - Practical Hours, CT - Class Test, ESE – End Semester Exam; \* Mandatory Course



DEPARTMENT OF CIVI ENGINEERING B.TECH. SECOND YEAR SYLLABUS W.E.F 2019-20

SYLLAUS	(SEMESTER-1)	CREDITS: 1.5			INTERNAL ASSESSMENT (IA)			ESE
		L	T	P	IA	MSE	TOTAL	
<b>Subject Code:</b>	<b>CE01PES01</b>							
<b>Subject:</b>	<b>PROGRAMMING FOR PROBLEM SOLVING LAB</b>	0	0	3	30	-	30	20

**Course Learning Objectives:**

- To learn the Branching and logical expressions and Loops
- To learn the Arrays and Function
- To understand the Numerical methods and Recursion

**Course Content:**

**The laboratory should be preceded or followed by a tutorial to explain the approach or Algorithm to be implemented for the problem given.]**

**Tutorial 1:** Problem solving using computers:

**Lab1:** Familiarization with programming environment

**Tutorial 2:** Variable types and type conversions:

**Lab 2:** Simple computational problems using arithmetic expressions

**Tutorial 3:** Branching and logical expressions:

**Lab 3:** Problems involving if-then-else structures

**Tutorial 4:** Loops, while and for loops:

**Lab 4:** Iterative problems e.g., sum of series

**Tutorial 5:** 1D Arrays: searching, sorting:

**Lab 5:** 1D Array manipulation

**Tutorial 6:** 2D arrays and Strings

**Lab 6:** Matrix problems, String operations

**Tutorial 7:** Functions, call by value:

**Lab 7:** Simple functions

**Tutorial 8 &9:** Numerical methods (Root finding, numerical differentiation, numerical Integration):

**Lab 8 and 9:** Programming for solving Numerical methods problems

**Tutorial 10:** Recursion, structure of recursive calls

**Lab 10:** Recursive functions

**Tutorial 11:** Pointers, structures and dynamic memory allocation

**Lab 11:** Pointers and structures

**Course Outcomes-** At the end of the course students will be able to

- Utilization of Branching and logical expressions and Loops, Arrays and Function and Numerical methods and Recursion for writing the programmes for various engineering applications



DEPARTMENT OF CIVI ENGINEERING B.TECH. SECOND YEAR SYLLABUS W.E.F 2019-20

SYLLAUS	(SEMESTER-II)	Periods/Week			Internal Assessment ( IA)			ESE	Grand Total	Credits
		L	T	P	CT-I	CT-II	TOTAL			
<b>Subject Code:</b>	<b>CE02TMC01</b>							--	--	00
<b>Subject:</b>	<b>ENVIRONMENTAL SCIENCES</b>	3	0	0	--	--	--			

**Course Learning Objectives:**

- To learn the importance of Ecosystems, Natural Resources and Energy resources
- To learn the importance of Biodiversity and Environmental pollution
- To understand the Environmental ethics

**Course Content:**

Introduction to environmental studies Multidisciplinary nature of environmental studies: scope and importance: Concept of sustainability and sustainable development. Ecosystems: structure and function of ecosystem: Energy flow in an ecosystem: food chains. Food webs and ecological succession a) Forces: ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, Streams lakes, rivers, Oceans, estuaries). Natural Resources Renewable and Non-renewable Resources: Land resources and land use change: Land degradation, soil erosion and desertification. Deforestations: Causes and impacts due to mining, dam building on environment, forests biodiversity and tribal populations. Water: Use and over-exploitation of surface and ground water, floods, droughts. Conflicts over water (international & inter-state) Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies Biodiversity and Conservation: Levels of biological diversity: genetic species and ecosystem diversity. Bio geographic zones of India.

Biodiversity patterns and global biodiversity hot spots India as a mega-biodiversity nation. Endangered and endemic species of India. Threats to biodiversity: Habitat loss poaching of wildlife man wildlife conflicts, biological invasions: Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and informational value. Environmental pollution: Environmental pollution types, causes, effects and controls: Air, Water, soil and noise pollution. Nuclear hazards and human health risks. Solid waste management: Control measures of urban and industrial waste. Pollution case studies. Environmental potencies & practices, Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture. Environment laws Environment protection Act: air (prevention & Control of pollution) Act: water (prevention and control of pollution) Act: wildlife protection Act: Forest Conservation Act, International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD), Nature reserves. tribal populations and rights, human wildlife conflicts in Indian context. Human Communities and the Environment. Human population growth: Impacts on environment. Human health and welfare. Resettlement and rehabilitation of project affected persons: case studies. Disaster management: floods, earthquake, cyclones and landslides. Environmental movements Chipko, silent valley Bishnois of Rajasthan. Environmental ethics: role of Indian and other religions and cultures in environmental conservation. Environmental communication and public awareness, case studies (e. g.CNG vehicles in Delhi). Field work: visit to an area to document environmental assets. River/ forest/flora/fauna, etc. Visit to a local polluted site-urban/rural/Industrial/Agricultural. Study of common plants birds and basic principles of identification Study of simple ecosystems-pond river-etc.

**Suggested Readings:**

1. Gleick P.H.1993 Water in Crisis Pacific Institute for Studies in Dev. Environment & Security Stockholm Env. Institute Oxford Univ.press.





---

DEPARTMENT OF CIVIL ENGINEERING B.TECH. SECOND YEAR SYLLABUS W.E.F 2019-20

---

2. Grumbine.R. Edward and pandit M.K.2013 Threats from India's Himalaya dams Science 339;36—37
3. Sengupta R 2003 Ecology and economics: An approach to sustainable development OUP.
4. sodhi, N.S.Gibson L.& Raven P.H.(eds) 2013 Conservation Biology: Voices from the Tropics john wiley & Sons.

**Outcome:** At the end of the course students will be able to

- To understand the importance of Ecosystems, Natural Resources and Energy resources, learn the importance of Biodiversity and Environmental pollution and understand the Environmental ethics

**गुरु घासीदास विश्वविद्यालय**  
(केन्द्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केन्द्रीय विश्वविद्यालय)  
**कोनी, बिलासपुर - 495009 (छ.ग.)**



**Guru Ghasidas Vishwavidyalaya**  
(A Central University Established by the Central Universities Act 2009 No. 25 of 2009)  
**Koni, Bilaspur - 495009 (C.G.)**