Dr. Ambedkar Institute of technology, Bengaluru-56

Department of Civil Engineering

The enclosed documents are verified & approved.

Prof & Head

Dr. S.Vijaya

Department of Civil engineering

Professor and Head
Department of civil Engineering
Dr. Ambedkar Institute of Technology
Bangalore - 560 056

NAAC CO-ORDINATORS:

MARY BHAGYA JYOTHI.T, Asst Professor

Dr K Hemanth Kumar, Asst Professor

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BDA Outer Ring Road, Near Jnana Bharathi Campus, Mallathally, Bangalore - 560 056.

Ref. No. .....

Date : .....

The following subjects are focused on Employability / Entrepreneurship / Skill development for the years 2021-2022.

Name of the Course	Course Code	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development	Year of introduction (during the last five years)
Rural Development Engineering	21CVT109/21CVT209	Employability & Skill development	2021-22
Building Materials & Geology	21CVT303	Employability & Skill development	2021-22
CAED Lab (BPD)	21CVL307	Employability & Skill development	2021-22
Water & Wastewater Engg.	21CVT402	Employability & Skill development	2021-22
Applied Hydraulics	21CVT403	Employability & Skill development	2021-22
Rural Development Engg.	21CVT109	Skill development	2021-22

BOS Chairman

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Ref. No. ..... **Date :** .....

The following subjects are focused on Employability / Entrepreneurship / Skill development for the years 2020-2021.

Name of the Course	Course Code	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development	Year of introduction (during the last five years)
Pre-stressed concrete	18CV641	Employability & Skill development	2020-21
Open Channel Hydraulics	18CV644	Employability & Skill development	2020-21
Earth & Earth retaining structure	18CV645	Employability & Skill development	2020-21
Environmental Impact Assessment	18CV733	Employability & Skill development	2020-21
Reinforced Earth Structures	18CV737	Employability & Skill development	2020-21
Ecology and Environmental Impact Assessment	18CV751	Employability & Skill development	2020-21
Urban Transport Planning	18CV752	Employability & Skill development	2020-21
Photo Geology and Remote Sensing	18CV753	Employability & Skill development	2020-21
Water Resources Engineering	18CV741	Employability & Skill development	2020-21
Advanced Foundation Design	18CV742	Employability & Skill development	2020-21
Pavement Design	18CV743	Employability & Skill development	2020-21
Earthquake Resistant Design of Structures	18CV744	Employability & Skill development	2020-21
Solid Waste Management	18CV745	Employability & Skill development	2020-21
Quality Management System in Civil Engineering	18CV746	Employability & Skill development	2020-21
Hydraulic Structures & Irrigation drawing	18CV747	Employability & Skill development	2020-21

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Ref. No. .....

Date : .....

The following subjects are focused on Employability / Entrepreneurship / Skill development for the years 2019-2020.

Name of the Course	Course Code	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development	Year of introduction (during the last five years)
Pre-stressed concrete	18CV641	Employability & Skill development	2019-20
Open Channel Hydraulics	18CV644	Employability & Skill development	2019-20
Earth & Earth retaining structure	18CV645	Employability & Skill development	2019-20
Environmental Impact Assessment	18CV733	Employability & Skill development	2019-20
Reinforced Earth Structures	18CV737	Employability & Skill development	2019-20
Ecology and Environmental Impact Assessment	18CV751	Employability & Skill development	2019-20
Urban Transport Planning	18CV752	Employability & Skill development	2019-20
Photo Geology and Remote Sensing	18CV753	Employability & Skill development	2019-20
Water Resources Engineering	18CV741	Employability & Skill development	2019-20
Advanced Foundation Design	18CV742	Employability & Skill development	2019-20
Pavement Design	18CV743	Employability & Skill development	2019-20
Earthquake Resistant Design of Structures	18CV744	Employability & Skill development	2019-20
Solid Waste Management	18CV745	Employability & Skill development	2019-20
Quality Management System in Civil Engineering	18CV746	Employability & Skill development	2019-20
Hydraulic Structures & Irrigation drawing	18CV747	Employability & Skill development	2019-20

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Ref. No. .....

Date : .....

The following subjects are focused on Employability / Entrepreneurship / Skill development for the years 2018-2019.

Name of the Course	Course Code	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development	Year of introduction (during the last five years)
Pre-stressed concrete	18CV641	Employability & Skill development	2018-19
Open Channel Hydraulics	18CV644	Employability & Skill development	2018-19
Earth & Earth retaining structure	18CV645	Employability & Skill development	2018-19
Environmental Impact Assessment	18CV733	Employability & Skill development	2018-19
Reinforced Earth Structures	18CV737	Employability & Skill development	2018-19
Ecology and Environmental Impact Assessment	18CV751	Employability & Skill development	2018-19
Urban Transport Planning	18CV752	Employability & Skill development	2018-19
Photo Geology and Remote Sensing	18CV753	Employability & Skill development	2018-19
Water Resources Engineering	18CV741	Employability & Skill development	2018-19
Advanced Foundation Design	18CV742	Employability & Skill development	2018-19
Pavement Design	18CV743	Employability & Skill development	2018-19
Earthquake Resistant Design of Structures	18CV744	Employability & Skill development	2018-19
Solid Waste Management	18CV745	Employability & Skill development	2018-19
Quality Management System in Civil Engineering	18CV746	Employability & Skill development	2018-19
Hydraulic Structures & Irrigation drawing	18CV747	Employability & Skill development	2018-19

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Ref. No. ..... *Date :* .....

The following subjects are focused on Employability / Entrepreneurship / Skill development for the years 2017-2018.

Name of the Course	Course Code	Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development	Year of introduction (during the last five years)
Ground Improvement Techniques	18CV553	Employability & Skill development	2017-18
Advanced Surveying	18CV554	Employability & Skill development	2017-18
Integrated Solid Waste Management	18CV562	Employability & Skill development	2017-18
Earth and Earth Retaining Structures	CV744	Employability & Skill development	2017-18
Open Channel Hydraulics	CV746	Employability & Skill development	2017-18
Construction Project Management	CV758	Employability & Skill development	2017-18
Advanced Pre-stressed Concrete Structures	CV821	Employability & Skill development	2017-18
Quality Management System in Civil Engineering	CV826	Employability & Skill development	2017-18

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Department of Civil Engineering

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Dr. Ambedkar Institute of Technology, Bengaluru-560056

Outcome Based Education(OBE) and Choice Based Credit System (CBCS) (As per NEP2020)

Scheme of Teaching and Examination for I /II Semester B.E., (Common to all B.E. Programmes) Academic Year:2021-22

Chemistry Cycle: I/II Semester

Sl. No.	Course Category	Course Code	Course Title	Teaching Department	Teaching Hrs/ Week					Examination				Credits
					L	T	P	S	Total	Duration (Hrs)	CIE Marks	SEE Marks	Total Marks	
1	BS	21MAT101	Calculus and Linear Algebra	Mathematics	3	2	0	0	5	3	50	50	100	4
		21MAT201	Advanced Calculus and Numerical methods											
2	BS	21CHT102/ 21CHT202	Engineering Chemistry	Chemistry	3	0	0	0	3	3	50	50	100	3
3	ES	21CST103/ 21CST203	Problem solving through Programming	Computer Science	2	2	0	0	4	3	50	50	100	3
4	ES	21ECT104/ 21ECT204	Basic Electronics and Communication Engineering	Electronics	2	2	0	0	4	3	50	50	100	3
5	ES	21MET105/ 21MET205	Elements of Mechanical Engineering	Mechanical	2	2	0	0	4	3	50	50	100	3
6	BS	21CHL106/ 21CHL206	Engineering Chemistry Laboratory	Chemistry	0	0	2	0	2	3	50	50	100	1
7	ES	21CSL107/ 21CSL207	Computer Programming Laboratory	Computer Science	0	0	2	0	2	3	50	50	100	1
8	HS	21HST108	Communicative English	Humanities	1	0	1*	0	2	2	50	50	100	1
		21HST208	Professional writing skills in English											
9	AE	21CVT109	Rural Development	Civil	1	0	1*	0	2	2	50	50	100	1
		21HST209	Health and Wellness	Humanities										
10	MC	21HSN110	Career Development skill-I	Humanities	1	0	1*	0	2	----	50	--	PP/NP	0
		21HSN210	Career Development skill-II											
								Total	30		500	450	900	20

Note: BS: Basic Science Course, ES: Engineering Science Course, HS: Humanities & Social Science Course, AE: Ability Enhancement Course, MC: Mandatory Course, * No practical evaluation,
L: Lecture, T:Titorial, P:Practical/drawing, S:Self study, CIE: Continuous Internal Evaluation, SEE: Semester End Examination

Note –At the end of the second-semester summer internship shall be carried out – based on inter/intra institutional activities credited in the third semester. University /Institutions may swap few courses between a FIRST and SECOND semester to balance the workload teaching and laboratory schedule

Summer Internship - I: All the students admitted shall have to undergo a mandatory summer internship of 03 weeks during the vacation of II semesters. Summer Internship shall include Inter / Intra Institutional activities. Internship A University Viva-voce examination shall be conducted during III semesters and the prescribed credit shall be included in III semesters. The internship shall be considered as a head of passing and shall be considered for the award of degree. Those, who do not take up / complete the internship shall be declared fail and shall have to complete during subsequent University examination after satisfying the internship requirements

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UG - 2021 - 2022

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Outcome Based Education(OBE) and Choice Based Credit System (CBCS) (As per NEP2020)

Scheme of Teaching and Examination for I /II Semester B.E., (Common to all B.E. Programmes) Academic Year:2021-22

Physics Cycle : I/II Semester

Sl. No.	Course Category	Course Code	Course Title	Teaching Department	Teaching Hours/ Week					Examination				Credits
					L	T	P	S	Total	Duration (Hrs)	CIE Marks	SEE Marks	Total Marks	
1	BS	21MAT101	Calculus and Linear Algebra	Mathematics	3	2	0	0	5	3	50	50	100	4
		21MAT201	Advanced Calculus and Numerical methods											
2	BS	21PHT102/ 21PHT202	Engineering Physics	Physics	3	0	0	0	3	3	50	50	100	3
3	ES	21EET103/ 21EET203	Basic Electrical Engineering	Electrical	2	2	0	0	4	3	50	50	100	3
4	ES	21CVT104/ 21CVT204	Elements of Civil Engineering & Mechanics	Civil	3	0	0	0	3	3	50	50	100	3
5	ES	21MED105/ 21MED205	Computer aided Engineering Drawing	Mechanical	2	0	2	0	4	3	50	50	100	3
6	BS	21PHL106/ 21PHL206	Engineering Physics Lab	Physics	0	0	2	0	2	3	50	50	100	1
7	ES	21EEL107/ 21EEL207	Basic Electrical lab	Electrical	0	0	2	0	2	3	50	50	100	1
8	HS	21HST108	Communicative English	Humanities	1	0	1*	0	2	2	50	50	100	1
		21HST208	Professional writing skills in English											
9	AE	21HST109	Health and Wellness	Humanities	1	0	1*	0	2	2	50	50	100	1
		21CVT209	Rural Development	Civil										
10	MC	21HSN110	Career Development skill-I	Humanities	1	0	1*	0	2	--	50	-	PP/NP	0
		21HSN210	Career Development skill-II											
				Total					29		500	450	900	20

Note: BS: Basic Science Course, ES: Engineering Science Course, HS: Humanities & Social Science Course,
AE: Ability Enhancement Course, MC: Mandatory Course, * No practical evaluation,
L: Lecture, T:Titorial, P:Practical/drawing, S:Self study, CIE: Continuous Internal Evaluation, SEE: Semester End Examination

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Outcome Based Education (OBE) and Choice Based Credit System (CBCS) (As per NEP 2020)

Name of the Programme: **B. E. (CIVIL ENGINEERING)**

Scheme of Teaching and Examination Effective from the Academic Year: 2021 – 2022

III Semester

Sl No.	Course Category	Course Code	Course Title	Teaching Department	Teaching Hours / Week					Examinations				Credits
					L	T	P	S	Total	Duration (Hrs)	CIE Marks	SEE Marks	Total Marks	
1	BSC	21MAT301CV	Mathematics - III	Maths	3	0	0	0	3	03	50	50	100	3
2	IPCC	21CVT302	Strength of Materials	Civil	3	0	2	0	5	03	50	50	100	4
3	IPCC	21CVT303	Surveying	Civil	3	0	2	0	5	03	50	50	100	4
4	PCC	21CVT304	Geology and Construction Materials	Civil	3	0	0	0	3	03	50	50	100	3
5	PCC	21CVL305	Construction Materials Lab	Civil	0	0	2	0	2	03	50	50	100	1
6	UHV	21HST306	Social Connect and Responsibility	Civil	0	0	1	0	1	01	50	50	100	1
7	HSSC	21HST3S07 / 21HST3B07	Samskrutika Kannada / Balake Kannada	HSS	1	0	0	1	2	01	50	50	100	1
		OR												
		21HST307	Constitution of India & Professional Ethics (CIP)											
8	AEC	21CVT308X	Ability Enhancement Course – III	Civil	If offered as Theory Course: 1	0	0	0	1	01	50	50	100	1
					If offered as Lab Course: 0	0	2	0	2	02				
9	HSSC	21HSN309	Professional Skills	HSS	1	0	1	0		02	50		PP/NP	0
										Total	**400**	**400**	**800**	**18**

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Outcome Based Education (OBE) and Choice Based Credit System (CBCS) (Asper NEP 2020)

Name of the Programme: **B. E. (CIVIL ENGINEERING)**

Scheme of Teaching and Examination Effective from the Academic Year: 2021 – 2022

IV Semester

Sl No.	Course Category	Course Code	Course Title	Teaching Department	Teaching Hours / Week					Examinations				Credits
					L	T	P	S	Total	Duration (Hrs)	CIE Marks	SEE Marks	Total Marks	
1	BSC	21MAT401CV	Mathematics - IV	Mathematics	3	0	0	0	3	03	50	50	100	3
2	IPCC	21CVT402	Water Supply and Sanitary Engineering	Civil	3	0	2	0	5	03	50	50	100	4
3	IPCC	21CVT403	Fluid Mechanics and Machinery	Civil	3	0	2	0	5	03	50	50	100	4
4	PCC	21CVT404	Structural Analysis	Civil	3	0	0	0	3	03	50	50	100	3
5	PCC	21CVL405	Computer Aided Building Planning and Drawing	Civil	0	0	2	0	2	03	50	50	100	1
6	AEC	21HST406	Biology for Engineers	ML	2	0	0	0	2	02	50	50	100	2
7	HSSC	21HST4S07 / 21HST4B07	Samskrutika Kannada / Balake Kannada	HSS	1	0	0	0	2	01	50	50	100	1
		OR												
		21HST407	Constitution of India & Professional Ethics (CIP)											
8	AEC	21CVT408X	Ability Enhancement Course - IV	Civil	If offered as Theory Course: 1 0 0 0				1	01	50	50	100	1
					If offered as Lab Course: 0 0 2 0				2	02				
9	HSSC	21HSN411	Professional Skills	HSS	1	0	1	0	2	02	50	---	PP/NP	0
10	UHV	21HST409	Universal Human Values	Civil	1	0	0	0	1	01	50	50	100	1
11	INT	21CVI410	Inter / Intra Institutional Internship	Evaluation by the	Completed during the intervening period of II and III semesters by students					03	50		100	2

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Department of Civil Engineering

Course Title	**Rural Development Engineering**						
Course Code	**21CVT109 / 209**						
Category	**Ability Enhancement Course (AEC)**						
Scheme and Credits	No. of Hours/Week					Total Teaching Hours	Credits
	L	T	P	SS	Total		
	1	**0**	**0**	**0**	**1**	**13**	**1**
CIE Marks: 50	**SEE Marks: 50**		**Total Max. Marks: 100**		**Duration of SEE: 02 Hours**		

Course Objectives:	
1	Describe the scope of Rural Development Planning and Concept of Appropriate Technology and implementation of various national policies.
2	Understand the need and concept of low-cost construction materials for individual and group housing;
3	Illustrate the concept of Water Supply and Rural Sanitation.
4	Interpret the concept of rural transport system and issues related to it.
5	Summarize the need of effective Watershed and catchments area development methods and problems relating to watershed management, watershed structures

Unit No.	Syllabus	No. of hours
I	**Rural Development Planning and Concept of Appropriate Technology**: Scope; development plans; various approaches to rural development planning; concept of appropriate technology. Rural development program / projects.	**03**
II	**Rural Housing:** Low-cost construction materials for housing; Composite material - ferro-cement & fly ash, soil-stabilized un-burnt brick; Water-proof and fire-retardant roof treatment for thatch roofs. Pre-cast stone masonry; rat-trap bond for walls; Panels for roof, ferro-cement flooring / roofing units.	**03**
III	**Rural Water Supply and Sanitation:** Sources of water. BIS and WHO water standards. Quality, Storage and distribution for rural water supply works; low-cost water treatment technologies; conservation of water; rainwater harvesting; drainage in rural areas, septic tank; low-cost community & individual Garbage disposal systems	**03**
IV	**Rural Transportation System:** Categories of Pavement Layers, Types of roads, Surface Treatments for roads in rural areas. Soil Stabilization, Lime, Lime Fly ash and Cement Treated Course.	**03**
V	**Irrigation Techniques:** Consideration of low-cost irrigation techniques, drip & sprinkler irrigation systems. Watershed and catchments area development - problems and features of watershed management, watershed structures	**03**

Course Outcomes: The students will be able to	
1	Describe the scope of Rural Development Planning and Concept of Appropriate Technology and implementation of various national policies.
2	Understand the need and concept of low-cost construction materials for individual and group housing.
3	Illustrate the concept of Water Supply and Rural Sanitation.
4	Interpret the concept of rural transport system and issues related to it.
5	Summarize the need of effective Watershed and catchments area development methods and problems relating to watershed management, watershed structures

Suggested Text Book(s):	
1	Rural Development by Katar Singh, SAGE Publication
2	A.G.Madhov Rao, D.S.Ramachandra Murthy, Appropriate Technologies for low cost Housing Oxford and IBH Publishing Co. Pvt .Ltd.

Suggested Reference Book(s):	
1	Rural Infrastructure by P.Nair, SBS Publication
2	Rural Infrastructure by Samalia Bihari Verma, Gyaneshwar Prasad & Sahib Kumari Singh, Sarup & Sons.
3	C. Satyanarayana Murthy, Design of Minor Irrigation and Canal Structures. Wiley Eastern Ltd.,
4	Document on Rural Road Development in India Volume1& 2; Central Road Research Institute, New Delhi.

Other useful e-resources:
https://www.youtube.com/watch?v=8N7ckN-O3yA https://www.youtube.com/watch?v=LXgyAfnBgWo https://www.youtube.com/watch?v=1Q188bq6U8Y https://www.youtube.com/watch?v=Y3giIjR6qTM https://www.youtube.com/watch?v=rfRVX9DdNVA https://www.youtube.com/watch?v=yO-AYyPa_Rk

Practical Based Learning (Suggested Activities in Class)/ Practical Based learning:
https://www.youtube.com/watch?v=IdBemHBN7xQ https://www.youtube.com/watch?v=rsg_GXldFmQ

Theory Question paper pattern:
• The question paper will have ten full questions carrying equal marks. • Each full question will be for 20 marks. • There will be two full questions (with a maximum of four sub - questions) from each unit. • Each full question will have sub - question covering all the topics under a unit. The students will have to answer five full questions, selecting one full question from each unit.

CO & PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓	✓				✓	✓					
CO2							✓					
CO3			✓				✓					✓
CO4							✓					
CO5					✓		✓					✓

Course Title	**GEOLOGY AND CONSTRUCTION MATERIALS**						
Course Code	**21CVT304**						
Category	**Professional Core Course (PCC)**						
Scheme and Credits	No. of Hours/Week						
	L	T	P	SS	Total	Total Teaching Hours	Credits
	3	0	0	0	3	40	3
CIE Marks:50	**SEE Marks:50**		**Total Marks:100**		**Duration of SEE:03 Hours**		

Course Objectives:	
1	Understand the engineering properties of various materials used in civil engineering applications.
2	Learn the techniques involved in designing the components of buildings and method of construction.
3	Acquire knowledge about the different elements of the building and understanding environmentally sustainable building techniques.

Unit No.	Syllabus	No. of Hours
I	**PHYSICAL GEOLOGY:** Geology in civil engineering – branches of geology – structure of earth and its composition – weathering of rocks – scale of weathering – soils – landforms and processes associated with river, wind, groundwater and sea – relevance to civil engineering. Plate tectonics.	**08**
II	**MINEROLOGY AND PETROLOGY:** Physical properties of minerals – Quartz group, Feldspar group, Pyroxene – hypersthene and augite, Amphibole – hornblende, Mica – muscovite and biotite, Calcite, Gypsum and Clay minerals. Classification of rocks, distinction between Igneous, Sedimentary and Metamorphic rocks. Engineering properties of rocks. Description, occurrence, engineering properties, distribution and uses of Granite, Dolerite, Basalt, Sandstone, Limestone, Laterite, Shale, Quartzite, Marble, Slate, Gneiss and Schist.	**08**
III	**INTRODUCTION TO BUILDING MATERIALS:** **STONES & BRICKS:** Quarrying of stones, Tests on stones, properties and uses, Deterioration and preservation of stone work, Ingredients of good brick earth, manufacturing of Bricks, classification and qualities of bricks, Test on Bricks. **CEMENT & CEMENT CONCRETE BLOCKS:** Ingredients, Manufacturing, types. **TIMBER:** Timber, classification, seasoning of timber. Defects in timber, preservation of timber, uses & their properties. Plywood, Block Board, Particle Board, Laminates.	**08**
IV	**FOUNDATION:**	**08**

	Function and requirements of a good foundation, Types of foundations, Preliminary investigation of soil, Safe Bearing Capacity of Soil, Introduction to spread, combined, strap, mat and pile foundations, Deep Foundation **MASONRY:** Classification and Joints in stone masonry, Introduction to load bearing and partition walls. Bonds in Brick work - English Bond, Flemish Bond, and Reinforced Brick Masonry, Characteristics and requirements of good brick masonry. **ARCHES:** Elements of an arch, Classification of arches, Stability of arch	
V	**DOORS, WINDOWS AND ROOFS:** Types of Doors and Windows, Types of Roofs & Roofing materials, Trusses. **STAIRS AND FORM WORK**: Requirements of good stair, Types of Stairs and, Geometrical design of RCC Dog-legged and open well stairs. Introduction to formwork and scaffolding, Formwork details for RCC Column, Beams and Floors, Shoring and under pinning. **GREEN BUILDING:** Green Design, Green Construction Methods, Energy Auditing, Green Products, Life-Cycle Assessment and Precast building, Passive Design Strategy, Carbon Footprint.	**08**

Course Outcomes:	
1	Apply geological knowledge in different civil engineering practice.
2	Acquire knowledge on stones, bricks, timber, cement, types of foundations, classification of Masonry structures, arches and their applications.
3	Understand types of doors, windows and roofs. Explain the construction of Staircase and learn damp proofing, green building concept.

Teaching - Learning Process	Chalk and talk, videos, Power Point Presentation; Group Discussions with assignments; Group Activity

Suggested Text Book(s):	
1	Building Construction, B.C Punmia, India.
2	Building Construction, Rangawala P.C. Charter Publishing House, Anand, India.
3	Building Construction, Sushil Kumar, Standard Publication and Distributors, New Delhi.
4	Chenna Kesavulu N., Textbook of Engineering Geology, Macmillan India Ltd., 2009.
5	Gokhale K.V.G.K, Principles of Engineering Geology, B.S. Publications, Hyderabad 2011.
6	Dr. Adv. Harshul Savla, Green Building: Principles & Practices
7	Parbin Singh. A, Text book of Engineering and General Geology, Katson publishing house, Ludhiana 2009.

Suggested Reference Book(s):	
1	A Text Book Building Materials, by P.G. Varghese, Prentice-Hall of India Pvt. Ltd., Publication.
2	Engineering Materials, Rangawala P.C. Charter Publishing House, Anand, India.

3	Concrete Technology – Theory and Practice, M.S. Shetty, S. Chand and Co, New Delhi, 2002.
4	Blyth F.G.H. and de Freitas M.H., Geology for Engineers, Edward Arnold, London, 2010.
5	Bell F.G., Fundamentals of Engineering Geology, B.S. Publications. Hyderabad 2011.
6	Dobrin M.B, An introduction to geophysical prospecting, Tata McGraw Hill Pvt. Ltd, New Delhi, 1988

Other useful e-resources:	
1	https://www.youtube.com/watch?v=sTYao4RZck&list=PLDF5162B475DD915F&index=3
2	https://www.youtube.com/watch?v=EBiLLJAxBuU&index=2&list=PLDF5162B475DD915F

Process of Assessment (both CIE and SEE):

50% weightage given for each Continuous Internal Evaluation (CIE) and Semester End Examination (SEE). A student shall be considered to have fulfilled the academic requirements and earned the credits allotted to each subject /course by securing not less than 35% (36 Marks out of 100) in the Semester End Examination (SEE), and a minimum of 40% (20 marks out of 50) in the sum total of the Continuous Internal Evaluation (CIE) taken together.

Continuous Internal Evaluation (CIE):

Two Tests each of 20 Marks (duration 01 hour) has been conducted in each semester.

First test at the end of 5th week of the semester and Second test at the end of the 10th week of the semester.

The makeup test at the end of the 15th week of the semester given for the students for whom are not attended the test One and Two due to genuine (medical, participating in academic or extracurricular activities, sports etc.) reason.

Two assignments each of 05 Marks (taken average at the end)

First assignment at the end of 4th week and Second assignment at the end of 9th week of the semester.

Group discussion/Activities / Seminar/Quiz will be planned suitably to attain the Co^{s} and PO^{s} and PS^{o}.

At the end of the 13th week of the semester the sum of two tests, two assignments and Group discussion/Activities /Seminar/Quiz will be Scaled out of 50 marks.

(For each CIE, the portion of the syllabus should not be common/repeated).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination (SEE):

Theory SEE will be conducted by institute as per the scheduled timetable, with common question papers for the subject of duration **03 hours**.

The question paper will have ten questions. Each question is set for 20 marks and there will be 2 questions from each Units/module. Each of the two questions under a Unit/module should have a maximum of 3 sub-questions, should have a mix of topics under the Unit/module. The students have to answer 5 full questions. Selecting one full question from each Unit/module.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓	✓					✓	✓				✓
CO2	✓				✓		✓	✓				✓
CO3	✓				✓	✓	✓	✓				✓

Course Title	**WATER SUPPLY AND SANITARY ENGINEERING**						
Course Code	**21CVT402**						
Category	**Integrated Professional Core Course (IPCC)**						
Scheme and Credits	No. of Hours/Week					Total Teaching Hours	Credits
	L	T	P	SS	Total		
	3	**0**	**2**	**0**	**5**	**50**	**4**
CIE Marks: 50	**SEE Marks: 50**		**Total Max. Marks: 100**		**Duration of SEE: 03 Hours**		

Course Objectives:	
1	Analyze the variations of water demand, sources, collection and conveyance system, and quantify the amount of water requirement for a community.
2	Study the drinking water quality, standards, qualitative analysis and various treatment methods to attain the required water quality standards.
3	Applying the mind to learn and understand the importance of providing the water carriage system of sewerage at all places, quantification and characterization of sewage.
4	Acquiring the knowledge and importance of waste water treatment and disposal with sustainable concept.

Unit No.	Syllabus	No. of Hours
I	**INTRODUCTION:** Water supply engineering, importance and necessity of planned w/s, water treatment, importance and reliability of water works. **WATER DEMANDS:** Various types, total requirement of water for a town or a city, per capita demand, factors affecting percapita demand, variations in demand, factors affecting losses and wastes, effect of variations in demand on the design capacities of water supply components, design periods, population data and population growth, population forecasting methods.	**08**
II	**SOURCES:** Surface and subsurface sources – suitability with regard to quality and quantity. **COLLECTION AND CONVEYANCE OF WATER:** Intakes, types of intakes. Conveyance of water; open channel, aqueducts, tunnels, flumes, pipes of different types, joints. **QUALITY OF WATER:** Wholesome water, impurities in water, physical tests, chemical tests, biological tests, standards of water quality. Maintenance of purity of water – water borne diseases, suitability of water for trade purposes.	**08**
III	**WATER TREATMENT AND DISTRIBUTION:** General introduction, objectives of water treatment, methods of water treatment, screening, aeration, plain sedimentation, sedimentation with coagulation, filtration, types of filters –	**08**

	sand filters, pressurefilter-operational problem in filters. **DISINFECTION OF WATER:** Requirements of disinfectants, methods of disinfection; disinfection, chlorination, chlorine demand, breaking point chlorination, super chlorination, de-chlorination, residual chlorine, miscellaneous treatments. **DISTRIBUTION:** Methods of water distribution- gravity, pumping, combined gravity and pumping system. Dead end, radial, circular system, Hardy cross method, Hazen William formula.	
IV	**SANITARY ENGINEERING:** Introduction, types of sewage and types of sewerage system, components of sewerage system. System of sanitation, methods of collection, conveyance system with its merits and demerits, water carriagesystem with its merits and demerits. Sewerage system, separate, combined and partially separate systems with their merits and demerits, comparison of these studies, patterns of collection system. **QUANTIFICATION OF SEWAGE:** Sources of sewage, factors affecting sewage, determination of rainfall intensity, quality of storm water, the rational method, runoff coefficient, empirical formula for rainfall intensities, time concentration, numerical problems. **CHARACTERISATION OF SEWAGE:** Physical, chemical and biological characteristics, decomposition of sewage, examination and sampling of sewage, solids- total solids, volatile solids, suspended solids, dissolved solids, fixed solids, determination of DO, BOD rates, COD, Chlorides and Sulphides, Nitrogen, P^H, oil and grease, fat.	**08**
V	**TREATMENT AND DISPOSAL OF SEWAGE:** Classification of treatment processes; screening, grit removal, oil and grease removal, sedimentation design, sedimentation aided with coagulation design, treatment through biological filtration, activated sludge process design, TF's, rotatory biological contactors (RBC), oxidation ponds and aerated lagoons, anaerobic treatment; septic tank, Imhoff tanks, sludge treatment, sludge drying. **DISPOSAL OF SEWAGE:** Disposal by dilution, land disposal, sewage farming.	**08**

Expt. No	LABORATORY EXPERIMENTS	No. of Sessions
1	Determination of Acidity and Alkalinity, pH and Turbidity.	**10**
2	Determination of Hardness by EDTA method.	
3	Determination of Chlorides in drinking water sample.	
4	Determination Residual Chlorine and Chlorine demand.	
5	Determination of D.O content.	
6	Determination of Total solids in Municipal sewage.	
7	Determination of BOD of Combined wastewater.	
8	Determination of C O D of Combined waste water.	

9	Determination of Optimum Coagulant dosage (ALUM)	
10	Determination of MPN. (DEMO EXPERIMENT)	

Course Outcomes: At the end of the course the student will be able to	
1	Analyse the various water demand, quantify the requirement, selection of suitable source and plan for suitable intake structures for supply water for a community.
2	Evaluate the water source for physical, chemical and biological characteristics, select and design a suitable treatment processes for the source and also a suitable distribution methods to fulfill the various water demand of a society.
3	Apply the knowledge to manage the sewage and sewerage systems, quantify the sewage generated by various activities and also its characteristics.
4	Plan and design a suitable wastewater treatment process's, disposable methods, and also use various laboratory analytical methods for water and wastewater analysis.

Teaching-Learning Process	Chalk and talk, videos, PowerPoint Presentation, animations, visit to in around water and waste water treatment plants, disposal and reuse Units.

Suggested Text Book(s):	
1	Water Supply and Sewerage, Steel. E. W. & Terence J. M. Ghees, Mc Graw – Hill International Book Co.
2	Water Supply & Sanitary Engineering, G. S. Birdie and J. S. Birdie, Dhanpat Rai Publishing Company (2015, Ninth Edition)
3	Wastewater Engineering – S. K. Garg, Khanna Publishers
4	Environmental Engineering II – B. C. Punmia and Ashok Jain

Suggested Reference Book(s):	
1	Water and waste water Engineering Vol-II- fair, Gayer and Okun, Willey publishers, New York.
2	Wastewater Treatment, Disposal and Reuse, Metcalf and Eddy Inc. Tata Mc Graw Hill Publications (2003 Edition).
3	Water and Wastewater Technology-SI Version, Hammer. M. J. (1986), 2nd Edition, John Wiley and Sons.
4	Environmental Engineering, Peavy, H. S., Rowe, D. R. and Tchobanoglous, G. McGraw Hills, New York 1985.

Practical Based Learning (Suggested Activities in Class)/ Practical Based learning:
http://nptel.ac.in https://swayam.gov.in https://www.vlab.co.in/participating-institute-amrita-vishwa-vidyapeetham

Process of Ascertaining (both CIE and SEE):
50% weightage given for each Continuous Internal Evaluation (CIE) and Semester End Exam (SEE). A student shall be considered to have fulfilled the academic requirements and earned the credits allotted to each subject / course by securing not less than 35% (36 Marks out of 100) in the semester End

examination (SEE), and a minimum of 40% (20 marks out of 50) in the sum total of the Continuous Internal Evaluation (CIE) taken together.

Continuous Internal Evaluation (CIE):

Two Tests each of **20 Marks (duration 01 hour)** has been conducted in each semester.

First test at the end of 5th week of the semester and Second test at the end of the 10th week of the semester.

The Makeup test at the end of the 15th week of the semester given for the students for whom are not attended the test One and Two due to genuine (medical, participating in academic or extracurricular activities, sport etc.) reason.

Two assignments each of **05 Marks (taken average at the end)**

First assignment at the end of 4th week and Second assignment at the end of 9th week of the semester.

Group discussion / Activities / Seminar / Quiz **05 Marks** (**duration 01 hours**)

CIE, Assignments and Group discussion / Activities / Seminar / Quiz will be planned suitably to attain the COs and POs and PSOs.

At the end of the 13th week of the semester, the sum of two tests, two assignments, and Group discussion / Activities / Seminar / Quiz will be **scaled** out of 50 marks.

(For each CIE, the portion of the syllabus should not be common / repeated).

CIE methods / question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination (SEE):

Theory SEE will be conducted by Institute as per the scheduled timetable, with common question papers for the subject of **duration 03 hours**.

The question paper will have ten questions. Each question is set for 20 marks and there will be 2 questions from each Units / module. Each of the two questions under a Unit / module should have a maximum of 3 sub-questions, **should have a mix of topics** under that Unit / module. The students have to answer 5 full questions, selecting one full question from each Unit / module.

CO - PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓	✓		✓		✓	✓		✓			✓
CO2	✓	✓	✓	✓		✓	✓		✓			✓
CO3	✓	✓				✓	✓		✓			✓
CO4	✓	✓	✓		✓	✓	✓		✓	✓		✓

Course Title	**FLUID MECHANICS AND MACHINERY**						
Course Code	**21CVT403**						
Category	**Integrated Professional Core Course (IPCC)**						
Scheme and Credits	No. of Hours/Week					Total Teaching Hours	Credits
	L	T	P	SS	Total		
	3	**0**	**2**	**0**	**5**	**50**	**4**
CIE Marks: 50	**SEE Marks: 50**		**Total Max. Marks: 100**		**Duration of SEE: 03 Hours**		

Course Learning Objectives:	
1	Understand fundamentals of fluid properties, fluid pressure and hydrostatic laws.
2	Gain knowledge on fluid dynamics and basic design of flow through pipes.
3	Able to measure flow of fluid with different devices.
4	Understand the working principles and performance of hydraulic machines.

Unit No.	Syllabus	No. of Hours
I	**BASIC PROPERTIES OF FLUIDS:** Mass density, Specific weight, Specific gravity, Specific volume, Viscosity, Cohesion, Adhesion, Surface tension, Capillarity and vapour pressure, Numericals. **PRESSURE AND ITS MEASUREMENT:** Definition of pressure, Pressure at a point, Pascal's law, Variation of pressure with depth. Types of pressure, Measurement of pressure using simple, differential manometers and mechanical gauges. Numericals.	**08**
II	**DYNAMICS OF FLUID FLOW:** Introduction, Energy possessed by a fluid body. Euler's equation of motion along a streamline and Bernoulli's equation. Practical Applications of Bernouli's equation (Venturimeter, Orificemeter). Problems on applications of Bernoulli's equation. **FLOW THROUGH PIPES:** Losses in pipe flow, Darcy-Weisbach equation for head loss due to friction in a pipe, Minor losses in pipe flow, Numericals.	**08**
III	**DEPTH AND VELOCITY MEASUREMENTS, NOTCHES AND WEIRS:** **Measurement of depth:** Point and hook gauges, self-recording gauges. Staff gauge, Weight gauge, float gauge. **Measurement of velocity:** Pitot tube, Current meter. **Discharge measurements:** Small orifices, mouth pieces, Rectangular notch, Triangular notch, Cipolletti notch, Ogee weir and Broad crested weir, Numericals.	**08**
IV	**UNIFORM FLOW OVER OPEN CHANNELS:**	**08**

	Geometric properties of Rectangular, Trapezoidal. Chezy's equation, Manning's equation-problems. Most economical open channels - Rectangular, Trapezoidal channels, Numericals. **NON-UNIFORM FLOW OVER OPEN CHANNELS:** Specific energy diagram, Conditions for Critical flow. Hydraulic jump in a Horizontal Rectangular Channel, Numericals.	
V	**IMPACT OF JET ON VANES:** Force exerted by the jet on stationary and moving flat and curved vanes, numericals. **TURBINES:** Classification of turbines, working principles of impulse (Pelton) and reaction (Francis and Kaplan) turbines, unit quantities, numericals. **CENTRIFUGAL PUMPS:** Classification, Priming, working Principles, minimum starting speed, multi-stage Centrifugal Pumps (pumps in series and parallel), characteristic curves, numericals.	**08**

Expt. No	LABORATORY EXPERIMENTS	No. of Sessions
1	Verification of Bernoulli's equation.	**10**
2	Determination of Hydraulic coefficients of a vertical orifice.	
3	Calibration of Rectangular and 90^0 V-notch.	
4	Calibration of Broad- crested weir and Ogee weir.	
5	Calibration of Venturimeter and Orificemeter.	
6	Determination of Darcy's friction factor for a straight pipe (PVC and GI).	
7	Determination of vane coefficients for a fixed flat, inclined and semi-circular vane.	
8	Performance characteristics of a Pelton wheel Turbine.	
9	Performance characteristics of a Kaplan turbine and Francis Turbine.	
10	Performance characteristics of a single stage and multi-stage Centrifugal Pump.	

Course Outcomes: At the end of the course the student will be able to	
1	Understand fundamental properties of fluids and solve problems on hydrostatics.
2	Apply principles of Bernoulli's and compute discharge losses in flow through pipes.
3	Compute discharge through orifice, notches and weirs.
4	Design of open channels of various cross sections and operational functions of hydraulic machines.

Suggested Text Book(s):	
1	A Text Book of Fluid mechanics & Hydraulic Machines'- R.K. Rajput, S. Chand & Co, New Delhi, 2006 Edition.
2	'Principles of Fluid Mechanics and Fluid Machines'- N. Narayana Pillai, Universities Press (India), Hyderabad, 2009 Edition.
3	'Text Book Of Fluid Mechanics & Hydraulic Machines'- R.K. Bansal, Laxmi Publications, New Delhi, 2008 Edition.
4	Hydraulics and Hydraulic Machines- Dr. P. N. Modi and Seth, McGraw Hill Publications.

Suggested Reference Book(s):	
1	Fundamentals of Fluid Mechanics – Bruce R. Munson, Donald F. Young, Theodore H. Okiishi, Wiley India, New Delhi, 2009 Edition.
2	'Introduction To Fluid Mechanics' – Edward j. Shaughnessy, Ira m. Katz: James p Schaffer, Oxford University Press, New Delhi, 2005 Edition.
3	Fluid Mechanics' – Streeter, Wylie, Bedford New Delhi, 2008(Ed)
4	Fluid Mechanics and Turbomachines'- Madan Mohan Das, PHI Learning Pvt. Limited, New Delhi. 2009 Edition.
5	Experiments in Hydraulics and Hydraulic Machines: Theory and Procedures, PHI learning Publishers, New Delhi, 2014 Edition.
6	IS: 14750 (2000) calibration of notches and weirs.
7	IS: 4477 - 2 (1975) calibration of venturimeter and orificemeter.
8	IS: 2951 – 1 (1965) Darcy's flow through pipes losses.
9	IS: 1710 (1989) Turbines and Pumps operational characteristics.

Practical Based Learning (Suggested Activities in Class)/ Practical Based learning:
Seminars / Quiz (to assist in GATE preparations). Demonstrations in the lab. Self-Study on simple topics. Virtual lab experiments.

Process of Ascertaining (both CIE and SEE):
50% weightage given for each Continuous Internal Evaluation (CIE) and Semester End Exam (SEE). A student shall be considered to have fulfilled the academic requirements and earned the credits allotted to each subject / course by securing not less than 35% (36 Marks out of 100) in the semester End examination (SEE), and a minimum of 40% (20 marks out of 50) in the sum total of the Continuous Internal Evaluation (CIE) taken together. **Continuous Internal Evaluation (CIE):** Two Tests each of **20 Marks (duration 01 hour**) has been conducted in each semester. First test at the end of 5th week of the semester and Second test at the end of the 10th week of the semester. The Makeup test at the end of the 15th week of the semester given for the students for whom are not attended the test One and Two due to genuine (medical, participating in academic or extracurricular activities, sport etc.) reason. Two assignments each of **05 Marks (taken average at the end)** First assignment at the end of 4th week and Second assignment at the end of 9th week of the semester. Group discussion / Activities / Seminar / Quiz **05 Marks** (**duration 01 hours**) CIE, Assignments and Group discussion / Activities / Seminar / Quiz will be planned suitably to attain the CO^{s} and PO^{s} and PSO^{s}. At the end of the 13th week of the semester, the sum of two tests, two assignments, and Group discussion / Activities / Seminar / Quiz will be **scaled** out of 50 marks.

(For each CIE, the portion of the syllabus should not be common / repeated). **CIE methods / question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.**

Semester End Examination (SEE):

Theory SEE will be conducted by Institute as per the scheduled timetable, with common question papers for the subject of **duration 03 hours**.

The question paper will have ten questions. Each question is set for 20 marks and there will be 2 questions from each Units / module. Each of the two questions under a Unit / module should have a maximum of 3 sub-questions, **should have a mix of topics** under that Unit / module. The students have to answer 5 full questions, selecting one full question from each Unit / module.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓	✓			✓							✓
CO2	✓	✓			✓							✓
CO3	✓		✓				✓			✓		✓
CO4		✓										✓

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SCHEME OF TEACHING AND EXAMINATION from Academic Year 2018-19

B.E (Civil Engineering)

Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

V SEMESTER

Sl. No.	Course and		Course Title	Teaching Department	Teaching Hours /Week			Examination				Credits
					L	T	P	Duration in Hours	CIE Marks	SEE Marks	Total Marks	
1	HS	18HS51/52	M&E / IPR (title as per BOS decision)	Hu	3	--	--	03	50	50	100	3
2	PC	18CV51	Wastewater Treatment and Disposal	CV	3	--	--	03	50	50	100	3
3	PC	18CV52	Design of RCC Structural Elements	CV	4	--	--	03	50	50	100	4
4	PC	18CV53	Analysis of Indeterminate Structures	CV	4	--	--	03	50	50	100	4
5	PC	18CV54	Geotechnical Engineering	CV	2	2	--	03	50	50	100	3
6	PE	18CV55X	Professional Elective - 1	CV	3	--	--	03	50	50	100	3
7	OE	18CV56X	Open Elective - A	CV	3	--	--	03	50	50	100	3
8	PC	18CVL57	Hydraulics and Hydraulic Machinery Laboratory	CV	--	--	2	03	50	50	100	1
9	PC	18CVL58	Computer Aided Design Laboratory	CV	--	--	2	03	50	50	100	1
10	HS	18HS55	Placement Training	Hu	2	--	--	03	50	--	50	PP/NP
			TOTAL		**25**	--	**4**	**30**	**500**	**450**	**950**	**25**

Electives

Course code	Professional Electives - 1
18CV551	Transportation Engineering
18CV552	Theory of Elasticity
18CV553	Ground Improvement Techniques
18CV554	Advanced Surveying
18CV555	Ground Water Hydrology
	OPEN ELECTIVE - A
18CV561	Air Pollution and Control
18CV562	Integrated Solid Waste Management

Students can select any one of the open electives (Please refer to consolidated list of Dr. AIT for open electives) offered by any Department.

Selection of an open elective is not allowed provided:

- The candidate has studied the same course during the previous semesters of the programme.
- The syllabus content of open elective is similar to that of Departmental core courses or professional electives.
- A similar course, under any category, is prescribed in the higher semesters of the programme.

Registration to electives shall be documented under the guidance of Programme Coordinator/ Mentor.

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SCHEME OF TEACHING AND EXAMINATION from Academic Year 2018-19

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VI SEMESTER

Sl. No.	Course and		Course Title	Teaching Department	Teaching Hours /Week			Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P					
1	HS	18HS61/62	M&E/IPR	Hu	3	--	--	03	50	50	100	3
2	PC	18CV61	Design of Steel Structures	CV	3	2	--	03	50	50	100	4
3	PC	18CV62	Railways, Airport, Tunnel and Harbour Engineering	CV	3	--	--	03	50	50	100	3
4	PC	18CV63	Foundation Engineering	CV	2	2	--	03	50	50	100	3
5	PE	18CV64X	Professional Elective - 2	CV	3	--	--	03	50	50	100	3
6	OE	18CV65X	Open Elective – B	CV	3	--	--	03	50	50	100	3
7	PC	18CVL66	Computer Aided Drawing of RC and Steel structures	CV	--	--	2	03	50	50	100	1
8	PC	18CVL67	Geotechnical Engineering Laboratory	CV	--	--	2	03	50	50	100	1
9	M	18CVM68	Mini-Project					03	50	50	100	2
10	PC	18CVL69	Extensive Survey Project	CV	--	--	2	03	50	50	100	1
11	HS	18HS66	Placement Training	Hu	2	--	--	03	50	--	50	PP/NP
			TOTAL		**20**	**2**	**6**	**33**	**550**	**500**	**1050**	**24**

Note: PC: Professional Core, PE: Professional Elective, OE: Open Elective, MP: Mini-Project, INT: Internship.

Internship: All the students admitted to III year of BE have to undergo mandatory internship of 4 weeks during the vacations of VI and VII semesters and /or VII and VIII semesters.

A University examination will be conducted during VIII semester and prescribed credit are added to VIII semester.

Internship is considered as a head of passing and is considered for the award of degree. Those, who do not take-up/complete the internship will be declared as failed and have to complete during subsequent University examination after satisfy the internship requirements.

Electives

Course code	Professional Electives - 2	Open Elective - B
18CV641	Pre-Stressed Concrete	Students can select any one of the open electives (Please refer to consolidated list of Dr. AIT for open electives) offered by any Department. Selection of an open elective is not allowed provided,
18CV642	Alternate Building Materials and Technologies	
18CV643	Traffic Engineering	

18CV644	Open Channel Hydraulics	• The candidate has studied the same course during the previous semesters of the programme. • The syllabus content of open elective is similar to that of Departmental core courses or professional electives. • A similar course, under any category, is prescribed in the higher semesters of the programme. Registration to electives shall be documented under the guidance of Programme Coordinator/ Mentor.
18CV645	Earth and Earth Retaining Structures	
Open Elective - B		
18CV651	Integrated Solid Waste Management	
18CV652	Photogrammetry and Remote Sensing	

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SCHEME OF TEACHING AND EXAMINATION from Academic Year 2018-19
B.E (Civil Engineering)
Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

VII SEMESTER

Sl. No	Course and Course code		Course Title	Teaching Department	Teaching Hours /Week			Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P					
1	MC	18HS71/72	CMEP / OSHA	IM/CV	2	--	--	03	50	50	100	2
2	PC	18CV71	Design of RC & Steel Structures	CV	4	---	---	03	50	50	100	4
3	PC	18CV72	Estimation and Valuation	CV	4	---	---	03	50	50	100	4
4	PE	18CV73X	Professional Elective - 3	CV	3	---	---	03	50	50	100	3
5	PE	18CV74X	Professional Elective - 4	CV	3	--	--	03	50	50	100	3
6	OE	18CV75X	Open Elective - C	CV	3	--	--	03	50	50	100	3
7	PC	18CVL76	Environmental Engg. Laboratory	CV	---	---	2	03	50	50	100	1
8	PC	18CVL77	Advanced Civil Engg. Laboratory	CV	---	---	2	03	50	50	100	1
8	Project	18CVP78	Project Work Phase - I	CV	--	--	2	03	50	50	100	2
9	INT	18CVI79	Internship	(If not completed after VI semester examinations, it has to be carried out during the intervening vacations of VII and VIII semesters)								--
TOTAL					**19**	**--**	**6**	**27**	**450**	**450**	**900**	**23**

Note:
PC: Professional Core, PE: Professional Elective, OE: Open Elective, INT: Internship, MC: Mandatory Course
CMEP: Cost Management of Engineering Projects, OSHA: Occupational Safety and Health Administration

Internship:
All the students admitted to III year of BE have to undergo mandatory internship of 4 weeks during the vacations of VI and VII semesters and /or VII and VIII semesters.
A SEE examination will be conducted during VIII semester and prescribed credits shall be added to VIII semester.
Internship is considered as a head of passing and is considered for the award of degree. Those, who do not take-up/complete the internship will be declared as failed and have to complete during subsequent SEE examination after satisfy the internship requirements.

Electives

Course code	Professional Electives - 3	Open Elective - B
18CV731	Pavement Materials and Construction	

18CV732	Photogrammetry and Remote Sensing	Students can select any one of the open electives (Please refer to consolidated list of Dr. AIT for open electives) offered by any Department. Selection of an open elective is not allowed provided, ✓ The candidate has studied the same course during the previous semesters of the programme. ✓ The syllabus content of open elective is similar to that of Departmental core courses or professional electives. ✓ A similar course, under any category, is prescribed in the higher semesters of the programme. ✓ Registration to electives shall be documented under the guidance of Programme Coordinator/ Mentor.
18CV733	Environmental Impact Assessment	
18CV734	Design of Bridges	
18CV735	Structural Dynamics	
18CV736	Construction Project Management	
18CV737	Reinforced Earth Structures	

Electives : 4

Course code	Professional Elective
18CV741	Water Resources Engineering
18CV742	Advanced Foundation Design
18CV743	Pavement Design
18CV744	Earthquake Resistant Design of Structures
18CV745	Solid Waste Management
18CV746	Quality Management System in Civil Engineering
18CV747	Hydraulic Structures & Irrigation drawing

Electives : B

Course code	Open Elective - C
18CV751	Ecology and Environmental Impact Assessment
18CV752	Urban Transport Planning
18CV753	Photo Geology and Remote Sensing

Professor and Head
Department of Civil Engineering
Dr. Ambedkar Institute of Technology
Bangalore - 560 056.

Syllabus for 2018-19 Batch UG (CV)

Semester: V	
Course Title: Ground Improvement Techniques	
Course Code: **18CV553**	Evaluation Procedure
Credits: **03**	CIE + Assignment + Group Activity + SEE Marks = 40 + 5 + 5 + 50 = 100
Teaching Hours: 39 Hrs (L:T:P:S:3:0:0:0)	SEE Duration: 3 Hrs

Course Learning Objectives:	
1	Understand the various soil stabilization techniques for highly complex soils.
2	Discuss the concepts of ground improvement techniques for various soil conditions.
3	Illustrate the various techniques of soil stabilization and modification.
4	Summarize the methods to improve unstable ground.

UNIT – I	
GROUND IMPROVEMENT: Definition, Objectives of soil improvement. Classification of ground improvement techniques, Factors to be considered in the selection of the best soil improvement technique. **GROUTING:** Introduction, Effects of grouting, Chemicals and materials used, Types of grouting, Grouting procedure, Applications of grouting.	**08 Hrs**
UNIT – II	
MECHANICAL MODIFICATION: Type of mechanical -modification, Aim of modification, compaction, Principle of modification for various types of soils, Effect of grain size distribution on compaction for various soil types like BC soil. Lateritic soil, coarse-grained soil, micaceous soil, Field compaction static, dynamic, impact and vibratory type, Specification of compaction.	**08 Hrs**
UNIT – III	
HYDRAULIC MODIFICATION: Definition, aim, principle, techniques, gravity drain, lowering of water table, multistage well point, vacuum dewatering, discharge equations, design of dewatering system including pipe line effects of dewatering. Drainage of slopes, preloading, vertical drains, sand drains.	**08 Hrs**
UNIT – IV	
CHEMICAL MODIFICATION: Definition, aim, special effects, and methods. Techniques -sandwich technique, admixtures, cement stabilization. Hydration - effect of cement stabilization on permeability, Swelling and shrinkage. Criteria for cement stabilization, Assessment of ground condition for preloading, Electro kinetic dewatering).	**08 Hrs**
UNIT – V (Blended Learning)	
STABILIZATION: Suitability, process, special effects, criteria for lime stabilization, Other chemicals, chlorides, hydroxides, lignin, hydrofluoric acid , Fly ash in cement stabilization, Properties of chemical components, reactions and effects, Bitumen, tar or asphalt in stabilization.	**07 Hrs**

Course Outcomes: The students will be able to	
1	Describe the in-situ methods of soil improvement projects.
2	Explain the ground improvement methods and its application.
3	Analyse the effect of admixtures on soil and the soil stabilization.

Question paper pattern:
• The question paper will have ten full questions carrying equal marks. • Each full question will be for 20 marks. • There will be two full questions (with a maximum of four sub - questions) from each unit. • Each full question will have sub - question covering all the topics under a unit. • The students will have to answer five full questions, selecting one full question from each unit.

Text Books:	
1	Ground Improvement Techniques, Purushothama Raj. P. Firewall Media Publisher, 2004 ISBN8170088372
2	Engineering principles of ground modification, Manfied Hausmann, McGraw Hill Pub. Co., New York., 2008 ISBN0070272794
3	Methods of treatment of unstable ground, Bell, F.G., Butterworths, London. 2007, ISBN0408001666

Reference Books:	
1	Bowles J E , Foundation analysis and design, McGraw- Hill Publications
2	Shashi K. Gulathi & Manoj Datta, Geotechnical Engineering-. , Tata McGraw Hill Publications
3	T.W. Lambe and R.V. Whitman, Soil Mechanics-, John Wiley & Sons.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓	✓										
CO2	✓	✓				✓						
CO3		✓	✓							✓		

Syllabus for 2018-19 batch UG (CV)

Semester: V	
Course Title: Advanced Surveying	
Course Code: **18CV554**	Evaluation Procedure: CIE + Assignment + group activity + SEE Marks = 40 + 5 + 5 + 50 = 100
Credits: **03**	
Teaching Hours: 39 Hrs (L:T:P:S:3:0:0:0)	SEE Duration: 3 Hrs

Course Learning Objectives:	
1	To study Theory of errors, triangulation adjustment.
2	Field Astronomy, Hydrographic surveying and electronic distance measurements.

UNIT – I	
THEORY OF ERRORS AND TRIANGULATION ADJUSTMENT: Errors and Classification of errors Precision and accuracy, Laws of weights and accidental errors. **PROBABILITY:** Probability distribution function and density function-normal distribution. RMS error-measure of precision. Rejection of observations-principles of least squares-Normal equations	**08 Hrs**
UNIT – II	
METHOD OF CORRELATES: Triangulation adjustment. Angle adjustment, station adjustment and figure adjustment.	**08 Hrs**
UNIT – III	
ELECTRONIC DISTANCE MEASUREMENT (EDM): Introduction, Electro Magnetic (EM) Waves. Phase comparison and modulations. Instruments – Geodimeter, Tellurimeter, Distomat – Range finders – Radars. Introduction to GPS Total station.	**08 Hrs**
UNIT – IV (Blended Learning)	
FIELD ASTRONOMY: Earth celestial sphere. Solar system Position by altitude and Azimuth system-spherical triangle and spherical trigonometry. Astronomical triangle. Nepiers rule. **TIME:** Siderial time, day and year-solar time and day-Greenwich mean time-standard time. Meridian and azimuth-their determination-latitude and its determination.	**07 Hrs**
UNIT – V	
HYDROGRAPHIC SURVEYING: Methods of soundings. Instruments. Three point Problem. Tidal and Stream discharge measurement. **SETTING OUT WORKS:** Introduction. Setting out of buildings, culverts, bridge, pipeline and sewers, tunnels.	**08 Hrs**

Course Outcomes: The students will be able to	
1	Explain the probability method for various adjustments related to surveying.
2	Explain the elements of hydrographic surveying and EDM for setting out works.
3	Apply the factual elements of field astronomy and their utilization with respect to latitude and longitude and its determination.

Question paper pattern:
• The question paper will have ten full questions carrying equal marks. • Each full question will be for 20 marks. • There will be two full questions (with a maximum of four sub - questions) from each unit.

- Each full question will have sub - question covering all the topics under a unit.
- The students will have to answer five full questions, selecting one full question from each unit.

Text Books:	
1	Surveying Vol–I and II– B.C. Punmia, Laxmi Publications (2005), New Delhi.
2	Surveying Vol. I and II, S.K. Duggal, Tata McGraw Hill - Publishing Co. Ltd., New Delhi.
3	Surveying Levelling-Part I & II – Kanitkar T.P. & Kulkarni S.V. – Pune Vidhyarthi Gruh Prakashana.

Reference Books:	
1	Introduction to Surveying- James, M. Anderson and Edward, M. Mikhail – Mc Graw Hill Book Co 1985.
2	Analysis and survey measurements- M. Mikhalil and Gracie, G. - Van Nostrand Reinhold Co (NY)-1980.
3	Plane and Geodetic Surveying for Engineers - David Clark -Vol I & II-CBS publishers and distributors, New Delhi.

CO-PO Mapping												
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓	✓										
CO2	✓				✓				✓			
CO3	✓			✓						✓		✓

Syllabus for 2018-19 Batch UG (CV)

Semester: V	
Course Title: SOLID WASTE MANAGEMENT	
Course Code: **18CV562**	Evaluation Procedure: CIE + Assignment + Group Activity + SEE = 40 + 5 + 5 + 50 = 100
Credits: 03	
Teaching Hours: 39 Hrs (L:T:P:S:3:0:0:0)	SEE Duration: 3 Hrs

Course Learning Objectives:	
1	Impart the knowledge of present methods of the municipal waste management system and to analyze the drawbacks.
2	Understand various waste management statutory rules.
3	Identify the adverse effects of improper waste management on the environment.
4	Analyze different elements of solid waste disposal and management, design and develop recycling options

UNIT – I	
INTRODUCTION: Land Pollution – Definition, causes and effects, control of land pollution, scope and importance of solid waste management, properties of solid waste, functional elements of solid waste management, energy content - numericals. **SOURCES:** Classification and characteristics – municipal, commercial & industrial. Methods of quantification.	**07 Hrs**
UNIT – II	
COLLECTION AND TRANSPORTATION: Systems of collection, collection equipment, garbage chutes, transfer stations – bailing and compacting, transfer means and methods, Factors affecting the location of transfer station, route optimization techniques and problems. **TREATMENT / PROCESSING TECHNIQUES:** Components separation, volume reduction, size reduction, chemical reduction and biological and thermal processing problems.	**08 Hrs**
UNIT – III	
INCINERATION: Process – 3 T's, factors affecting incineration process, incinerators – types, prevention of air pollution, pyrolysis, design criteria for incineration. **COMPOSTING:** Aerobic and anaerobic composting, factors affecting composting, Indore and Bangalore processes, mechanical and semi mechanical composting processes. Vermicomposting, Gasification.	**08 Hrs**
UNIT – IV	
SANITARY LANDFILL: Different types, trench area, Ramp and pit method, site selection, basic steps involved, cell design, prevention of site pollution, leachate & gas collection and control methods, requirements of fabrics in sanitary landfills, sanitary land fill lining with design aspects. Different types of Liners, transportation and migration of Leachate.	**08 Hrs**
UNIT – V (Blended Learning)	
DISPOSAL METHODS: Open dumping – selection of site, ocean disposal, feeding to hogs, incineration, pyrolsis, composting, sanitary land filling, merits and demerits, biomedical wastes and disposal. E-	**08 Hrs**

waste and its disposal methods. **RECYCLE AND REUSE:** Material and energy recovery operations, reuse in other industries, plastic wastes, environmental significance and reuse. Energy production, By-Product recovery.	

Course Outcomes: The students will be able to	
1	Understand the existing municipal management system and identify their drawbacks.
2	Identify the adverse effects of improper waste management on the environment
3	Evaluate the flow of Municipal and waste as per the rules laid by Ministry of Environment & Forest
4	Design recycling and disposal options for municipal and plastic waste

Question paper pattern:
• The question paper will have ten full questions carrying equal marks. • Each full question will be for 20 marks. • There will be two full questions (with a maximum of four sub - questions) from each unit. • Each full question will have sub - question covering all the topics under a unit. • The students will have to answer five full questions, selecting one full question from each unit.

Text Books:	
1	Integrated Solid Waste Management: Tchobanoglous: M/c Graw Hill.
2	Solid Waste Management in developing countries. Bhide and Sunderashan.
3	Environmental Engineering – Vol II.: S.K. Garg.

Reference Books:	
1	Environmental Engineering: Peavy and Tchobanoglous.
2	Biomedical waste handling rules – 2000.
3	Solid Waste Engineering by Vesilind.Pa Worrell & Reinhart.D. – 2009, Cengage Learning India Private Limited, New Delhi.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓			✓			✓					
CO2	✓	✓			✓		✓					
CO3		✓			✓	✓	✓					✓
CO4			✓		✓							

Syllabus for 2018-19 Batch UG (CV)

Semester: VI	
Course Title: PRE-STRESSED CONCRETE	
Course Code: **18CV641**	Evaluation Procedure:
Credits: **03**	CIE + Assignment + Group Activity + SEE = 40 + 5 + 5 + 50 = 100
Teaching Hours: 39 Hrs (L:T:P:S:3:0:0:0)	SEE Duration: 3 Hrs

Course Learning Objectives:	
1	To provide methods of design for bending, shear, and torsion of PSC structural elements.
2	To provide general principles of PSC members and design using the latest IS: 1343 code.
3	To give knowledge about the design of PSC members.

UNIT – I	
MATERIALS: High strength concrete and steel, Stress-Strain characteristics and properties. **BASIC PRINCIPLES OF PRESTRESSING:** Fundamentals, Load balancing concept, Stress concept, centre of Thrust. Different types of Prestressing, Methods of Prestressing operations, Prestressing systems, Pre-tensioning and post-tensioning systems, end anchorages. Step by step Procedure of Pre-tensioning and Post-tensioning methods. **ANALYSIS OF SECTIONS FOR FLEXURE:** Stresses in concrete due to prestress and loads, stresses in steel due to loads, Cable profiles. Numerical Problems.	**8 Hrs**
UNIT – II	
LOSSES OF PRE-STRESS: Various losses encountered in pre-tensioning and post tensioning methods, determination of jacking force. Problems on Losses during Prestress. **DEFLECTIONS:** Deflection of a pre-stressed member – Short term and long term deflections, Elastic deflections under transfer loads and due to different cable profiles. Deflection limits as per IS 1343. Effect of creep on deflection, load verses deflection curve, methods of reducing deflection. Problems on Short term and Long term deflections.	**8 Hrs**
UNIT – III	
LIMIT STATE OF COLLAPSE: Flexure - IS Code recommendations – Ultimate flexural strength of sections. Problems on Flexure. Shear - IS Code recommendations, shear resistance of sections, shear reinforcement. Limit state of serviceability – control of deflections and cracking. Problems on Shear.	**8 Hrs**
UNIT – IV (Blended Learning)	
DESIGN OF END BLOCKS: Transmission of prestress in pretension members, transmission length, Anchorage stress in post-tensioned members. Bearing stress and bursting tensile force-stresses in end blocks-Methods, I.S. Code, provision for the design of end block reinforcement. Problems on analysis and design.	**7 Hrs**
UNIT – V	
DESIGN OF BEAMS: Design of pre-tensioned and post-tensioned symmetrical and asymmetrical sections. Permissible stress, design of prestressing force and eccentricity, limiting zone of pre-stressing force cable profile.	**8 Hrs**

Course Outcomes: The students will be able to	
1	Explain the basic concept of pre-stressing, post-tensioning, behavior of PSC members and use of high tensile strength steel.
2	Analyze the pre-stress of bending stresses and its various losses.
3	Calculate deflection in PSC members with respect to short and long time application of forces.
4	Analyze and design of beams for flexure both serviceability and economic point of view.

Text Books:	
1	Pre-stressed Concrete- N. Krishna Raju, Tata McGraw Publishers.
2	Pre-stressed Concrete- P. Dayarathnam, Oxford and IBH Publishing Co.
3	Pre-stressed Concrete- N. Rajgopalan, Alpha Sceince Publishers.
4	Referring Code for Design of Prestressed Concrete structures - IS: 1343.

Reference Books:	
1	Design of pre-stressed concrete structures- T.Y. Lin and Ned H. Burns - John Wiley & Sons, New York.
2	Design of Prestressed Concrete by – Arthus H Nilson. Wiley Publishers.
3	Fundamental of pre-stressed concrete- N.C. Sinha & S.K. Roy, S.Chand Publishers.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓									✓		
CO2		✓										
CO3	✓	✓					✓					
CO4	✓	✓	✓	✓								✓

Syllabus for 2018-19 Batch UG (CV)

Semester: VI	
Course Title: OPEN CHANNEL HYDRAULICS	
Course Code: **18CV644**	Evaluation Procedure: CIE + Assignment + Group Activity + SEE Marks = 40 + 5 + 5 + 50 = 100
Credits: **03**	
Teaching Hours: 39 Hrs (L:T:P:S-3:0:0:0)	SEE Duration: 3 Hrs

Course Learning Objectives:	
1	To study the open channel flow characteristics.
2	To study the Gradually varied flow and its different methods.
3	To understand the hydraulic jump concepts and surges.

UNIT – I	
INTRODUCTION: Difference between pipe flow and open channel flow, classification of flow, energy equation, momentum equation, kinetic energy and momentum factors.	**7 Hrs**
UNIT – II (Blended Learning)	
UNIFORM FLOW: Concepts, uniform flow equations, conveyance and hydraulic exponent for uniform flow, design of channels for uniform flow.	**8 Hrs**
UNIT – III	
CRITICAL FLOW: Concept of specific Energy – Classification of flow. Design of channel, Section Factor, Hydraulic exponent for critical flow critical depth as a flow measurement. **GRADUALLY VARIED FLOW:** Concepts, GVF equation, its different forms, Basic assumptions, Dynamic equation, Characteristics of flow profile and classification.	**8 Hrs**
UNIT – IV	
ANALYSIS OF FLOWS PROFILES: Method of singular point and transitional depth, Methods of computation, Practical problems. **GRADUALLY VARIED FLOW COMPUTATIONS:** Different methods, direct integration method, Bress's Solution, Chow's solution, direct method, standard step method.	**8 Hrs**
UNIT – V	
RAPIDLY VARIED FLOW: Concepts, hydraulic jump in rectangular channels, classification of jumps, characteristics of jump – length location height, application of hydraulic jump stilling basins, shape type-2 and type-4. Hydraulic jump in rectangular channels, Sloping channels, Jump in nonrectangular channels, application of hydraulic jump as energy desipator.	**8 Hrs**

Course Outcomes: The students will be able to	
1	Analyse flow characteristics in open channel.
2	Classify critical flow and gradually varied flow.
3	Design the flow profiles before and after hydraulic jump.

Question paper pattern:
• The question paper will have ten full questions carrying equal marks.
• Each full question will be for 20 marks.
• There will be two full questions (with a maximum of four sub - questions) from each unit.
• Each full question will have sub - question covering all the topics under a unit.

• The students will have to answer five full questions, selecting one full question from each unit.

Text Books:	
1	Open Channel Hydraulics: Subramanya, Tata Mc Graw Hill Publishing Co Ltd, New Delhi
2	Open Channel Flow – Madan Mohan Das, Prentice Hall of India Pvt. Ltd. and New Delhi 2008 Edition.
3	Flow through Open Channels – Rajesh Srivastava, Oxford Press, New Delhi 2008 Edition.

Reference Books:	
1	Open Channel Hydraulics: French, Mc Graw Hill Book Company, New Delhi.
2	Fluid Mechanics: Modi and Seth, Standard Book Home, New Delhi.
3	Open Channel Hydraulics: Henderson, Mr. Millan Publishing Co. Ltd., New York.
4	Open Channel Hydraulics: VenTe Chow,Mc Graw Hill Book Company, New Delhi.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓			✓								✓
CO2	✓		✓			✓						
CO3		✓		✓			✓					✓

Syllabus for 2018-19 Batch UG (CV)

Semester: VI	
Course Title: EARTH AND EARTH RETAINING STRUCTURES	
Course Code: **18CV645**	Evaluation Procedure: CIE + Assignment + Group Activity + SEE = 40 + 5 + 5 + 50 = 100
Credits: **03**	
Teaching Hours: 39 Hrs (L:T:P:S:3:0:0:0)	SEE Duration: 3 Hrs

Course Learning Objectives:	
1	To broadly familiar with the importance of geotechnical engineering problems related field.
2	To understand the types of lateral earth pressure and its use in the design of retaining structures.
3	To check the stability of earthen slopes, retaining walls, sheet piles and braced cuts.
4	To estimation of seepage quantity through earthen dams and sheet piles.

UNIT – I	
STABILITY OF EARTH SLOPES: Types of slopes, causes and type of failure of slopes. Factor of safety, Stability analysis of Infinite slopes by limiting equillbrium condition, Stability analysis of finite slopes by Swedish slip circle method, Method of slices, Fellineous method, Taylor's stability number. Stability of slopes under steady seepage, sudden drawdown and during construction.	**8 Hrs**
UNIT – II (Blended Learning)	
SEEPAGE ANALYSIS: Laplace equation, Flow nets – characteristics and applications, Flow nets for sheet piles and below dam. Phreatic line – A. Casagrande's method – with and without filter, Flow through dams, Design of dam filters.	**7 Hrs**
UNIT – III	
LATERAL EARTH PRESSURE: Types of earth pressure (Active, Passive and at-rest earth pressure). Rankine's and Coulomb's Earth pressure theories – Assumptions and limitations. Rankine's theory of applications (Dry, moist, submerged, partially submerged, uniform surcharge, layered cohesionless, cohesive and cohesive – friction backfill).	**8 Hrs**
UNIT – IV	
RETAINING WALLS: Types of retaining walls, Failure of retaining walls by sliding, overturning and bearing. Stability and principles of the design of retaining walls – Gravity retaining walls, cantilever retaining walls, counterfort retaining walls, modes of failure of retaining walls, drainage of the backfill.	**8 Hrs**
UNIT – V	
BULK HEADS: Cantilever sheet pile walls and Anchored cantilever sheet pile walls in cohesion less soils and in clay. **BRACED CUTS:** Lateral earth pressure on sheeting and Design of various components of bracings.	**8 Hrs**

Course Outcomes: The students will be able to	
1	Determine the factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures.
2	Determine the quantity of seepage through earth retaining structures.
3	Analyse and design the various components and check the safety of retaining wall, sheet pile and braced cut.

Question paper pattern:
• The question paper will have ten full questions carrying equal marks. • Each full question will be for 20 marks. • There will be two full questions (with a maximum of four sub - questions) from each unit. • Each full question will have sub - question covering all the topics under a unit. • The students will have to answer five full questions, selecting one full question from each unit.

Text Books:	
1	Soil Mechanics and Foundation Engineering, Punmia B C, Laxmi Publications Co., New Delhi.
2	Basic and Applied Soil Mechanics - Gopal Ranjan and Rao A.S.R. (2000), New Age International (P) Ltd., New Delhi.
3	Geotechnical Engineering - Braja, M. Das (2002), Fifth Edition, Thomson Business Information India (P) Ltd., India
4	Principles of Soil Mechanics and Foundation Engineering- Murthy V.N.S. (1996), 4th Edition, UBS Publishers and Distributors, New Delhi.

Reference Books:	
1	Bowles J E , Foundation analysis and design, McGraw- Hill Publications
2	Shashi K. Gulathi&ManojDatta, Geotechnical Engineering, Tata McGraw Hill Publications
3	T.W. Lambe and R.V. Whitman, Soil Mechanics, John Wiley & Sons.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓	✓										
CO2	✓	✓				✓						
CO3		✓	✓									

Syllabus for 2017-18 Batch UG (CV)

Semester: VI	
Course Title: PHOTOGRAMMETRY AND REMOTE SENSING	
Course Code: **18CV652**	Evaluation Procedure: CIE + Assignment + Group Activity + SEE = 40 + 5 + 5 + 50 = 100
Credits: **03**	
Teaching Hours: 39 Hrs (L:T:P:S:3:0:0:0)	SEE Duration: 3 Hrs

Course Learning Objectives:	
1	To obtain information about physical objects through process of recording, measuring and interpreting the photographs of the area.
2	To deals with the photo interpretation, recognizing and identifying the objects and judging their significance through careful systematic analysis.
3	To acquire the knowledge of Remote sensing and its applications.

UNIT – I	
PHOTOGRAMMETRY: Introduction, basic definitions, terrestrial photogrammetry, photo theodolite, horizontal and vertical angles from terrestrial photographs, horizontal position of a point from photographic measurements, elevation of points by photographic measurements, determination of focal length.	**7 Hrs**
UNIT – II	
AERIAL PHOTOGRAMMETRY: Advantages, vertical, tilted and oblique photographs, geometry of vertical photographs, scale of vertical photograph over flat and variable terrain, ground coordinates, computation of length of a line, computation of flying height, relief displacement, overlaps, flight planning, computation of required number of photographs for a given area, ground control in photogrammetry. Basics of stereoscopy, stereoscopes, uses, parallax. Basic elements in photographic interpretation. Introduction to digital photogrammetry.	**8 Hrs**
UNIT – III	
REMOTE SENSING: Introduction, Ideal remote sensing system, basic principles of electromagnetic remote sensing, electromagnetic energy, electromagnetic spectrum, interaction with earth's atmosphere, interaction with earth- surface materials, spectral reflectance of earth surface materials. **REMOTE SENSING PLATFORMS AND SENSORS:** Introduction, platforms- IRS, Land sat, SPOT, Cartosat, IKONOS. Sensors-active and passive, MSS, AVHRR, LISS, TM, PAN, WIFS, microwave sensors, sensor resolutions (spatial, spectral, radiometric and temporal).	**8 Hrs**
UNIT – IV	
DATA MODELS: Vector data model: Representation of simple features – Topology and its importance; coverage and its data structure, Shape file; Relational Database, Raster Data Model: Elements of the Raster data model, Types of Raster Data, Raster Data Structure and data conversion.	**8 Hrs**
UNIT – V (Blended Learning)	
APPLICATIONS OF REMOTE SENSING: Applications in land use land cover analysis, change detection, water resources, urban planning, environmental and geological applications.	**8 Hrs**

Course Outcomes: The students will be able to	
1	Explain topographic mapping of large area and also the preparation of special purpose map for various engineering projects such as highways, railway, Dams, Harbors.
2	Apply the Remote sensing technology in various fields of Civil Engineering.
3	Apply the knowledge of remote sensing in design of urban planning and water resource projects.

Question paper pattern:
• The question paper will have ten full questions carrying equal marks. • Each full question will be for 20 marks. • There will be two full questions (with a maximum of four sub - questions) from each unit. • Each full question will have sub - question covering all the topics under a unit. • The students will have to answer five full questions, selecting one full question from each unit.

Text Books:	
1	Principles of GIS - Peter A Burrough Reachael A Mc. Donnel - (Oxford).
2	The GIS Book - George B. Korte, P.E. - 5thEdn, Thomson Learning.
3	Remote sensing and image interpretation - Lillesand - (John Wiley and Sons).

Reference Books:	
1	Geographical Information system: Bemhard Sen-Wiley publications.
2	GIS and Computer cartography - Christopher Jones - (Longman).

CO-PO Mapping												
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓	✓			✓							
CO2	✓					✓						
CO3		✓			✓							

Syllabus for 2018-19 Batch UG (CV)

Semester: VII	
Course Title: PHOTOGRAMMETRY AND REMOTE SENSING	
Course Code: **18CV732**	Evaluation Procedure: CIE + Assignment + Group Activity + SEE Marks = 40 + 5 + 5 + 50 = 100
Credits: **03**	
Teaching Hours: 39 Hrs (L:T:P:S:3:0:0:0)	SEE Duration: 3 Hrs

Course Learning Objectives:	
1	To obtain information about physical objects through process of recording, measuring and interpreting the photographs of the area.
2	To deals with the photo interpretation, recognizing and identifying the objects and judging their significance through careful systematic analysis.
3	To acquire the knowledge of Remote sensing and its applications.

UNIT – I	
PHOTOGRAMMETRY: Introduction, basic definitions, terrestrial photogrammetry, photo theodolite, horizontal and vertical angles from terrestrial photographs, horizontal position of a point from photographic measurements, elevation of points by photographic measurements, determination of focal length	**7 Hrs**
UNIT – II	
AERIAL PHOTOGRAMMETRY: Advantages, vertical, tilted and oblique photographs, geometry of vertical photographs, scale of vertical photograph over flat and variable terrain, ground coordinates, computation of length of a line, computation of flying height, relief displacement, overlaps, flight planning, computation of required number of photographs for a given area, ground control in photogrammetry. Basics of stereoscopy, stereoscopes, uses, parallax. Basic elements in photographic interpretation. Introduction to digital photogrammetry.	**8 Hrs**
UNIT – III	
REMOTE SENSING: Introduction, Ideal remote sensing system, basic principles of electromagnetic remote sensing, electromagnetic energy, electromagnetic spectrum, interaction with earth's atmosphere, interaction with earth- surface materials, spectral reflectance of earth surface materials. **REMOTE SENSING PLATFORMS AND SENSORS:** Introduction, platforms- IRS, Land sat, SPOT, Cartosat, IKONOS, Envisat etc. Sensors-active and passive, MSS, AVHRR, LISS, TM, PAN, WIFS, microwave sensors, sensor resolutions (spatial, spectral, radiometric and temporal).	**8 Hrs**
UNIT – IV	
DATA MODELS: Vector data model: Representation of simple features – Topology and its importance; coverage and its data structure, Shape file; Relational Database, Raster Data Model: Elements of the Raster data model, Types of Raster Data, Raster Data Structure, Data conversion.	**8 Hrs**
UNIT – V (Blended Learning)	
APPLICATIONS OF REMOTE SENSING: applications in land use land cover analysis, change detection, water resources, urban planning, environmental and geological applications	**8 Hrs**

Course Outcomes: The students will be able to	
1	Explain topographic mapping of large area and also the preparation of special purpose map for various engineering projects such as highways, railway, Dams, Harbors.
2	Apply the Remote sensing technology in various fields of Civil Engineering.

3	Apply the knowledge of remote sensing in design of urban planning and water resource projects.

Question paper pattern:
• The question paper will have ten full questions carrying equal marks. • Each full question will be for 20 marks. • There will be two full questions (with a maximum of four sub - questions) from each unit. • Each full question will have sub - question covering all the topics under a unit. • The students will have to answer five full questions, selecting one full question from each unit.

Text Books:	
1	Principles of GIS - Peter A Burrough Reachael A Mc. Donnel - (Oxford).
2	The GIS Book - George B. Korte, P.E. - 5th Edn, Thomson Learning.
3	Remote sensing and image interpretation - Lillesand - (John Wiley and Sons).

Reference Books:	
1	Geographical Information system: Bemhard Sen-Wiley publications.
2	GIS and Computer cartography - Christopher Jones - (Longman).

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓	✓			✓							
CO2	✓					✓						
CO3		✓			✓							

Syllabus for 2018-19 Batch UG (CV)

Semester: VII	
Course Title: ENVIRONMENTAL IMPACT ASSESSMENT	
Course Code: **18CV733**	Evaluation Procedure: CIE + Assignment + Group Activity + SEE Marks = 40 + 5 + 5 + 50 = 100
Credits: **03**	
Teaching Hours: 39 Hrs (L:T:P:S:3:0:0:0)	SEE Duration: 3 Hrs

Course Learning Objectives:	
1	To foresee the potential environmental problems that would arise out of a proposed development.
2	To examine and select the suitable methodology for the various project options and predict significant environmental impact.
3	To identify the appropriate abatement and mitigating measures for the implementation of projects.

Unit-I	
INTRODUCTION TO EIA: Development Activity and Ecological Factors, EIA, Rapid and Comprehensive EIA, EIS, FONSI. Need for EIA Studies, Baseline Information, Step-by-step procedures for conducting EIA, Limitations of EIA.	**08 Hrs**
Unit-II	
METHODOLOGIES OF EIA: Frame work of Impact Assessment. Developmental Projects - Environmental Setting, Objectives and Scope, Contents of EIA, Methodologies, Techniques of EIA.	**07 Hrs**
Unit-III	
ENVIRONMENTAL ATTRIBUTES: Assessment and Prediction of Impacts on Attributes Air, Water, Noise, Land Ecology, Soil, Cultural and Socio-economic Environment. EIA guidelines for Development Projects, Rapid and Comprehensive EIA. (Explanations with flow charts and examples)	**08 Hrs**
Unit-IV (Blended Learning)	
PUBLIC PARTICIPATION PROGRAM: Public Participation in Environmental Decision making. Practical Considerations in preparing Environmental Impact Assessment and Statements. Salient Features of the Project Activity - Environmental Parameter Activity Relationships-Matrices.	**08 Hrs**
Unit-V	
EIA FOR PROJECTS: ✓ EIA for Water resource developmental projects. ✓ Highway projects. ✓ Nuclear-Power plant projects. ✓ Mining project (Coal, Iron ore). ✓ Thermal Power Plant. ✓ Infrastructure Construction Activities.	**08 Hrs**

Text Books:	
1	Methodologies for Environment Impact Assessment - Anjaneyalu. Y, B S publications.
2	Environment Impact Assessment – N.S. Raman, A.R Gajbhiye and S.R. Khandeshwar, dreamtech press.
3	Environment Impact Assessment – R.R. Barthwal, New Age International Publishers.

Reference Books:	
1	Environmental Impact Analysis-Jain R.K.-Van Nostrand Reinhold Co.
2	Guidelines for EIA of developmental Projects Ministry of Environment and Forests, GOI.
3	Environment Impact Assessment - Larry W. Canter - McGraw Hill

Question paper pattern:

- The question paper will have ten full questions carrying equal marks.
- Each full question will be for 20 marks.
- There will be two full questions (with a maximum of four sub - questions) from each unit.
- Each full question will have sub - question covering all the topics under a unit.
- The students will have to answer five full questions, selecting one full question from each unit.

Course Outcomes: The students will be able to	
1	Explain systematic identification and evaluation of the potential impacts of proposed projects on components of the total environment.
2	Apply and identify the measures to be adopted to avoid environmental impact and reinforce a commitment in an organized and systematic approach by involving agencies and public participation.
3	Develop environmental protection mechanism for the proposed projects to protect and restore good environment with sustainable development.

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	✓					✓	✓					
2		✓				✓				✓		
3	✓						✓		✓		✓	

Syllabus for 2018-19 Batch UG (CV)

Semester: VII	
Course Title: CONSTRUCTION PROJECT MANAGEMENT	
Course Code: **18CV736**	Evaluation Procedure: CIE + Assignment + Group Activity + SEE Marks = 40 + 5 + 5 + 50 = 100
Credits: **03**	
Teaching Hours: 39 Hrs (L:T:P:S:3:0:0:0)	SEE Duration: 3 Hrs

Course Learning Objectives:	
1	To study the various management techniques for successful completion of construction projects.
2	To study the effect of management for project organization, design of construction process, labour, material and equipment utilization and cost estimation.
3	To study the cost estimation of a project.

UNIT – I	
THE OWNERS' PERSPECTIVE: Introduction - Project Life Cycle - Types of Construction - Selection of Professional Services - Construction Contractors - Financing of Constructed Facilities - Legal and Regulatory Requirements - Changing Environment of the Construction Industry - Role of Project Managers.	**7 Hrs**
UNIT – II (Blended Learning)	
ORGANIZING FOR PROJECT MANAGEMENT: Project Management – modern trends - Strategic Planning - Effects of Project Risks on Organization - Organization of Project Participants - Traditional Designer-Constructor Sequence - Professional Construction Management - Owner-Builder Operation - Turnkey Operation - Leadership and Motivation for the Project Team.	**8 Hrs**
UNIT – III	
DESIGN AND CONSTRUCTION PROCESS: Design and Construction as an Integrated System - Innovation and Technological Feasibility - Innovation and Economic Feasibility - Design Methodology - Functional Design - Construction Site Environment.	**8 Hrs**
UNIT – IV	
LABOUR, MATERIAL AND EQUIPMENT UTILIZATION: Historical Perspective - Labour Productivity - Factors Affecting Job-Site Productivity - Labour Relations in Construction - Problems in Collective Bargaining - Materials Management - Material Procurement and Delivery - Inventory Control - Tradeoffs of Costs in Materials Management. - Construction Equipment - Choice of Equipment and Standard Production Rates - Construction Processes Queues and Resource Bottlenecks.	**8 Hrs**
UNIT – V	
COST ESTIMATION: Costs Associated with Constructed Facilities - Approaches to Cost Estimation - Type of Construction Cost Estimates - Effects of Scale on Construction Cost - Unit Cost Method of Estimation - Methods for Allocation of Joint Costs - Historical Cost Data - Cost Indices - Applications of Cost Indices to Estimating - Estimate Based on Engineer's List of Quantities - Estimation of Operating Costs.	**8 Hrs**

Course Outcomes: The students will be able to	
1	Develop a project plan based on requirements and prepare schedule of a project by understanding the activities and their sequence.
2	Estimate the quantities and cost of a structure.
3	Explain labour output, equipment efficiency to allocate resources required for an activity / project to achieve desired quality and safety.

4	Establish as an ethical entrepreneur and establish an enterprise utilizing the provisions offered by the federal agencies.

Question paper pattern:
• The question paper will have ten full questions carrying equal marks. • Each full question will be for 20 marks. • There will be two full questions (with a maximum of four sub - questions) from each unit. • Each full question will have sub - question covering all the topics under a unit. • The students will have to answer five full questions, selecting one full question from each unit.

Text Books:	
1	Chitkara, K.K. Construction Project Management: Planning, Scheduling and Control, Tata McGraw-Hill Publishing Company, New Delhi, 1998.
2	Choudhury S, Project Management, McGraw-Hill Publishing Company, New Delhi, 1988.

Reference Books:	
1	Dr. U.K. Shrivastava "Construction Planning and Management", Galgotia publications Pvt. Ltd. New Delhi.
2	P C Tripathi and P N Reddy, "Principles of Management", Tata McGraw-Hill Education

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		✓		✓							✓	
CO2	✓				✓				✓			✓
CO3		✓			✓						✓	✓
CO4	✓							✓		✓		

Syllabus for 2018-19 Batch UG (CV)

Semester: VII	
Course Title: REINFORCED EARTH STRUCTURES	
Course Code: **18CV737**	Evaluation Procedure:
Credits: **03**	CIE + Assignment + Group Activity + SEE Marks = 40 + 5 + 5 + 50 = 100
Teaching Hours: 39 Hrs (L:T:P:S:3:0:0:0)	SEE Duration: 3 Hrs

Course Learning Objectives:	
1	To understand the importance of soil and its properties in Civil Engineering applications.
2	To demonstrate the index properties and engineering properties of different soils and Soil Structure.
3	To interpret the various factors influencing the soil behaviour.
4	To summarize the significance of soils and its behaviour in various applications of Civil engineering.

UNIT – I	
BASICS OF REINFORCED EARTH CONSTRUCTION: Definition, Historical Background, Components, Mechanism and Concept, Advantages and Disadvantage of reinforced earth Construction, Sandwich technique for clayey soil. **GEOSYNTHETICS AND THEIR FUNCTIONS:** Historical developments, Recent developments, manufacturing process-woven & non-woven, Raw materials – polypropylene (polyolefin), Polyethylene (Polyoefin), Polyester, Polyvinyl chloride, Elastomers, Classification based on materials type – Metallic and Non-metallic, Natural and Man-made, Geo-synthetics – Geo-textiles, Geo-grids, Geo-membranes, Geo-composites, Geo-nets, Geo-foam, Geo-mats, Geo-meshes, Geo-webs etc.	**8 Hrs**
UNIT – II	
PROPERTIES AND TESTS ON MATERIALS: Properties – Physical, Chemical, Mechanical, Hydraulic, Endurance and Degradation requirements, Testing & Evaluation of properties. **DESIGN OF REINFORCED EARTH RETAINING WALLS:** Concept of Reinforced earth retaining wall, Internal and external stability, Selection of materials, typical design problems.	**8 Hrs**
UNIT – III	
DESIGN OF REINFORCED EARTH FOUNDATIONS AND EMBANKMENTS: **FOUNDATIONS:** Modes of failure of foundation, Determination of force induced in reinforcement ties – Location of failure surface, tension failure and pull out resistance, length of tie and its curtailment, bearing capacity improvement in soft soils, General guidelines. **EMBANKMENTS:** Concept of Reinforced Embankments, Internal and external stability, Selection of materials, typical design problems.	**8 Hrs**
UNIT – IV	
SOIL NAILING TECHNIQUES: Concept, Advantages & limitations of soil nailing techniques, comparison of soil nailing with reinforced soil, methods of soil nailing, Construction sequence, Components of system, Design aspects and precautions to be taken. **GEO-SYNTHETICS FOR ROADS AND SLOPES:** **ROADS:** Applications to Temporary and Permanent roads, Role of Geo-synthetic in enhancing properties of road, control of mud pumping, Enhancing properties of subgrade, Design requirements. **SLOPES:** Causes for slope failure, Improvement of slope stability with Geo-synthetic, Drainage requirements, Construction technique.	**8 Hrs**

UNIT – V (Blended Learning)	
GEOSYNTHETICS – FILTER, DRAIN AND LANDFILLS: **FILTER AND DRAIN:** Conventional granular filter design criteria, Geo-synthetic filter design requirements, Drain and filter properties, Design criteria – soil retention, Geo-synthetic permeability, anti-clogging, survivability and durability. **LANDFILLS:** Typical design of Landfills – Landfill liner & cover, EPA Guidelines, Barrier walls for existing landfills and abandoned dumps	**7 Hrs**

Course Outcomes: The students will be able to	
1	Interpret the type of soil in the field or in the laboratory
2	Predict the Suitability of soil for a particular project based on its Engineering properties
3	Calculate the rate and amount of settlement of foundation and compaction behaviour of soils
4	Evaluate the index and engineering properties and application to Civil engineering problems

Question paper pattern:
• The question paper will have ten full questions carrying equal marks. • Each full question will be for 20 marks. • There will be two full questions (with a maximum of four sub - questions) from each unit. • Each full question will have sub - question covering all the topics under a unit. • The students will have to answer five full questions, selecting one full question from each unit.

Text Books:	
1	Soil Mechanics and Foundation Engineering, Punmia B C, Laxmi Publications Co., New Delhi.
2	Basic and Applied Soil Mechanics - Gopal Ranjan and Rao A.S.R. (2000), New Age International (P) Ltd., New Delhi.
3	Geotechnical Engineering - Braja, M. Das (2002), Fifth Edition, Thomson Business Information India (P) Ltd., India
4	Principles of Soil Mechanics and Foundation Engineering- Murthy V.N.S. (1996), 4th Edition, UBS Publishers and Distributors, New Delhi.

Reference Books:	
1	Design with Geo-synthetics - Koerner. R.M. – Prince Hall Publication, 2005.
2	An introduction to Soil Reinforcement and Geosynthetics – Shivakumar Babu G. L., Universities Press, Hyderabad, 2006
3	Engineering with Geo-synthetics - Venkattappa Rao, G., & Suryanarayana Raju., G. V.S. – Tata Mc Graw Hill publishing Company Limited., New Delhi.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓	✓										
CO2	✓	✓				✓						
CO3		✓	✓									
CO4		✓	✓									

Syllabus for 2018-19 Batch UG (CV)

Semester: VII	
Course Title: WATER RESOURCES ENGINEERING	
Course Code: **18CV741**	Evaluation Procedure: CIE + Assignment + Group Activity + SEE Marks = 40 + 5 + 5 + 50 = 100
Credits: **03**	
Teaching Hours: 39 Hrs (L:T:P:S-3:0:0:0)	SEE Duration: 3 Hrs

Course Learning Objectives:	
1	To study various aspects of water resources, Surface and groundwater, design of hydraulic structures like dams, spillways and Canal systems.
2	To understand the concept of open wells, tube well and the site suitability for hydraulic structures.
3	To know the water quality aspects, water management and water supply, Surface and ground water flow modelling.

UNIT – I	
INTRODUCTION: Introduction, The world's fresh water resources, water use in the world, water management sectors, the water management community, the future of water resources. **HYDROLOGIC PROCESS:** Introduction to hydrology, hydrologic cycle, atmospheric and ocean circulation. **PRECIPITATION:** Formation and types, rainfall variability, disposal of rainfall on a watershed, design storms.	**7 Hrs**
UNIT – II (Blended Learning)	
SURFACE RUNOFF: Drainage basins, hydrologic losses and rainfall excess, rainfall-runoff analysis using unit hydrograph approach, SCS rainfall-runoff relation. **WATER USE DATA:** Classification of uses, water for energy. Water for agriculture: irrigation trends and needs, irrigation infrastructures, irrigation system selection and performance, water requirement for irrigation, impacts of irrigation Drought management: options, severity, economic aspects of water storage. **ANALYSIS OF SURFACE WATER SUPPLY:** Surface water reservoir systems, Storage-firm yield analysis for water supply reservoir simulation.	**8 Hrs**
UNIT – III	
FLOOD CONTROL: Introduction, flood plain management, flood plain definition, hydrologic and hydraulic analysis of floods, storm water management. **FLOOD CONTROL ALTERNATIVES:** Structural and non-structural measures. Flood damage and net benefit estimation: damage relationships, expected damages, risk based analysis. Operation of reservoir systems for flood control.	**8 Hrs**
UNIT – IV	
STORM WATER CONTROL: Storm water management, storm system: information needs and design criteria. Rational method design. Hydraulic analysis of design, storm sewer appurtenances. Storm detention: effects of urbanization, types of surface detention, subsurface disposal of storm water. **STORM WATER CONTROL STREET AND HIGHWAY DRAINAGE AND CULVERTS:** Drainage of street and highway pavements: design considerations, flow in gutters, pavement	**8 Hrs**

drainage inlets, inlet locations, median, and embankment and bridge culvert design. Hydraulic design of culverts: culvert hydraulics, culver design.	
UNIT – V	
DESIGN OF SPILLWAYS FOR FLOOD CONTROL, STORAGE AND CONVEYANCE SYSTEM: Hydrologic considerations, Dams: types, hazard classification, spillway capacity, criteria, safety of existing dams. **SPILLWAYS:** Functions, overflow and free overfall spillways, ogee spillways, baffled chute spillways, culvert spillways. Gates and valves: spillway crest gates, gates for outlet works, valves for outlet works.	**8 Hrs**

Course Outcomes: The students will be able to	
1	Explain the problems related to water resources engineering.
2	Analyse water supply aspects to rural and urban schemes and in designing of hydraulic structures.
3	Design hydraulic structures to control the flood and storm waters.

Question paper pattern:
• The question paper will have ten full questions carrying equal marks. • Each full question will be for 20 marks. • There will be two full questions (with a maximum of four sub - questions) from each unit. • Each full question will have sub - question covering all the topics under a unit. • The students will have to answer five full questions, selecting one full question from each unit.

Text Books	
1	Water resources engineering: Ralph A Wurbs, Wesley P. James, PHI Learning pvt. Ltd. New Delhi (2009 Ed.)
2	Water resources engineering: Chin D.A., Prentice Hall (2009 Ed.).
3	Water resources engineering: Larry W. Mays, John Wiley & sons (2005).

Reference Books	
1	Water resources engineering, Sathya Narayana Murthy Challa, New Age International Publishers, New Delhi, (2002 Ed.).
2	Elements of water resources engineering, Duggal K.N., Soni J.P., New age international publishers, New Delhi.
3	Water resources engineering, David Chin, Pearson Educaion, NJ, (2006 Ed.).
4	Water resources engineering, lecture notes, IIT Kharagpur.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓	✓	✓									
CO2	✓	✓			✓	✓						
CO3	✓	✓	✓		✓	✓					✓	✓

Syllabus for 2018-19 Batch UG (CV)

Semester: VII	
Course Title: ADVANCED FOUNDATION DESIGN	
Course Code: **18CV742**	Evaluation Procedure
Credits: **03**	CIE + Assignment + Group Activity + SEE Marks = 40 + 5 + 5 + 50 = 100
Hours: 39 Hrs – L:T:P:S:3:0:0:0	SEE Duration: 3 Hrs

Course Learning Objectives:	
1	To gain knowledge on advanced topics of foundation design and analyses.
2	To understand the shallow and deep foundation analyses.
3	To develop the choice of foundation design parameters.
4	To learn the cause and effect of dynamic loads on foundation.

UNIT – I	
PROPORTIONING OF SHALLOW FOUNDATION: Proportion of shallow foundation for equal settlement, Computation of design loads, design of combined footings (rectangular and trapezoidal), strap footings and wall footings, Types of rafts, bearing capacity and settlements of raft foundation, Rigid methods, Flexible methods, coefficient of subgrade reaction, Problems.	**8 Hrs**
UNIT – II	
PILE FOUNDATIONS: Types of piles, Load Transfer mechanism, Static formulae, Dynamic formulae, Pile load Test, SPT and SCPT. Pile groups in clay: Efficiency, Bearing capacity and settlement, Negative skin friction, Problems. Underreamer piles.	**8 Hrs**
UNIT – III (Blended learning)	
FOUNDATIONS ON EXPANSIVE SOILS: Parameters of expansive soils, classification, causes of moisture changes in soils, effect of swelling on buildings, preventive measures for expansive soils, modification of expansive soil, Design of foundation in swelling soils.	**8 Hrs**
UNIT – IV	
DRILLED PIER AND CAISSONS: Construction of drilled pier, Construction of open caisson, Pneumatic caisson and floating caisson, Problems. **WELL FOUNDATIONS:** Different shapes of wells, Grip length, Forces acting on the well foundation, Terzaghi's analysis, Individual components of well, Sinking of wells, Measures for rectification of tilts and shifts, Problems.	**8 Hrs**
UNIT – V	
MACHINE FOUNDATIONS: Introduction, Types of machine foundations, Basic definitions, Degree of freedom of block foundation, General criteria for design of machine foundations, Free vibration, Forced Vibration, Vibration analysis of machine foundation, Determination of natural frequency, Design criteria of foundations of reciprocating machines, Reinforcement and construction details, Weight of foundation, Vibration Isolation and control. Problems.	**7 Hrs**

Question paper pattern:
• The question paper will have ten full questions carrying equal marks. • Each full question will be for 20 marks. • There will be two full questions (with a maximum of four sub - questions) from each unit. • Each full question will have sub - question covering all the topics under a unit.

• The students will have to answer five full questions, selecting one full question from each unit.

Course Outcomes: The students will be able to	
1	Estimate the size of isolated and combined foundations to satisfy bearing capacity and settlement criteria.
2	Design the load carrying capacity and settlement of single and group of piles.
3	Analyse and design of well foundation, drilled piers and caissons.
4	Analyse and design of machine foundations.

Text Books:	
1	Soil Mechanics and Foundation Engineering, Punmia B C (2010), Laxmi Publications Co., New Delhi.
2	Basic and Applied Soil Mechanics - Gopal Ranjan and Rao A.S.R. (2000), New Age International (P) Ltd., New Delhi.
3	Geotechnical Engineering - Braja, M. Das (2002), Fifth Edition, Thomson Business Information India (P) Ltd., India
4	Principles of Soil Mechanics and Foundation Engineering- Murthy V.N.S. (1996), 4th Edition, UBS Publishers and Distributors, New Delhi.

Reference Books:	
1	Bowles J E, Foundation analysis and design, McGraw- Hill Publications.
2	Shashi K. Gulathi & Manoj Datta, Geotechnical Engineering, Tata McGraw Hill Publications.
3	T.W. Lambe and R.V. Whitman, Soil Mechanics, John Wiley & Sons.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓	✓										
CO2	✓	✓				✓						
CO3		✓	✓									
CO4		✓	✓									

Syllabus for 2018-19 Batch UG (CV)

Semester: VII	
Course Title: PAVEMENT DESIGN	
Course Code: **18CV743**	Evaluation Procedure:
Credits: **03**	CIE + Assignment + Group Activity + SEE Marks = 40 + 5 + 5 + 50 = 100
Teaching Hours: 39 Hrs (L:T:P:S:3:0:0:0)	SEE Duration: 3 Hrs

Course Learning Objectives:	
1	To understand the process of collecting data required for pavement design and factors affecting on it and maintenance of the pavement.
2	To illustrate the design concepts of flexible pavement by various methods (CBR, IRC 37-2001, Mc loads, Kansas and also the same of rigid pavement by IRC 58-2002.
3	To understand the various causes leading to failure of pavements and remedies for the same.
4	To develop skills to perform functional and structural evaluation of pavement by suitable methods.

UNIT-I	
INTRODUCTION: Desirable characteristics of pavement, types and components, Difference between Highway pavement and Air field pavement – Design strategies of variables – Functions of sub-grade, sub base – Base course – surface course – comparison between Rigid and flexible pavement. **FUNDAMENTALS OF DESIGN OF PAVEMENTS:** Design life – Traffic factors – climatic factors – Road geometry – Subgrade strength and drainage, Stresses and deflections, Boussinesq's theory – principle, Assumptions – Limitations and problems on above – Bermister's theory – Two layered analysis – Assumptions – problems on above.	**8 Hrs**
UNIT-II (Blended Learning)	
DESIGN FACTORS: Design wheel load – contact pressure – ESWL concept – Determination of ESWL by equivalent deflection criteria – Stress criteria – EWL concept. **FLEXIBLE PAVEMENT DESIGN:** Assumptions – McLeod Method – Kansas method – Tri-axial method – CBR method – IRC Method (old) – CSA Method using IRC 37-2001, problems on above.	**8 Hrs**
UNIT-III	
STRESSES IN RIGID PAVEMENT: Principle – Factors – wheel load and its repetition – properties of sub grade – properties of concrete. External conditions – joints – Reinforcement – Analysis of stresses – Assumptions – Westergaard's Analysis – Modified Westergaard's equations – Critical stresses – Wheel load stresses, Warping stress – Frictional stress – combined stresses (using chart / equations) – problems on above. **DESIGN OF RIGID PAVEMENT:** Design of C.C. Pavement by IRC: 58 – 2002 for dual and Tandem axle load – Reinforcement in slabs – Requirements of joints – Types of joints – Expansion joint – contraction joint – warping joint – construction joint – longitudinal joint, Design of joints, Design of Dowel bars, Design of Tie bars – problems of the above.	**8 Hrs**
UNIT-IV	
FLEXIBLE PAVEMENT FAILURES, MAINTENANCE AND EVALUATION: Types of failures, causes, remedial/maintenance measures in flexible pavements – Functional Evaluation by visual inspection and unevenness measurement by using different technics – Structural Evaluation by Benkelman Beam Deflection Method, Falling weight deflectometer, GPR Method. Design factors for Runway Pavements – Design methods for Airfield pavements and problems on above.	**8 Hrs**

UNIT-V	
RIGID PAVEMENT FAILURES, MAINTENANCE AND EVALUATION: Types of failures, causes, remedial/maintenance measures in rigid pavements – Functional Evaluation by visual inspection and unevenness measurements. Design factors for Runway Pavements – Design methods for Airfield pavements.	**7 Hrs**

Course Outcomes: The students will be able to	
1	Explain the fundamentals and desirable characteristics of flexible pavement design as per standard IRC codes.
2	Illustrate the various stress components & design of rigid pavements as per standard IRC codes.
3	Explain the factual knowledge of failures, its causes and maintenance by structural and functional evaluation of flexible and rigid pavements.

Text Books:	
1	Highway Engineering – S K Khanna and C E G Justo, Nem Chand Bros, 10th edition, Roorkee.
2	Principle and practice of Highway Engineering - L R KADIYALI & N B LAL: Khanna publications, 2017 edition, New Delhi
3	Pavement Analysis & Design - Yang H. Huang- II edition, university of Kentucky, 2004.
4	Relevant IRC codes – IRC – 37 – 2001 & IRC – 58 -2002

Reference Books:	
1	Principles of Pavement Design- Yoder and Witzack - 2nd edition, John Wileys and Sons
2	Pavement Design and Materials by A.T. Papagiannaakis and E. A. Masad, 1st edition, John Wileys and Sons (2007).

Question paper pattern:

- The question paper will have ten full questions carrying equal marks.
- Each full question will be for 20 marks.
- There will be two full questions (with a maximum of four sub - questions) from each unit.
- Each full question will have sub - question covering all the topics under a unit.
- The students will have to answer five full questions, selecting one full question from each unit.

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	✓	✓	✓	✓					✓			
2	✓	✓		✓								
3	✓	✓		✓	✓				✓			

Syllabus for 2018-19 Batch UG (CV)

Semester: VII	
Course Title: EARTHQUAKE RESISTANT DESIGN OF STRUCTURES	
Course Code: **18CV744**	Evaluation Procedure:
Credits: **03**	CIE + Assignment + Group Activity + SEE Marks = 40 + 5 + 5 + 50 = 100
Hours: 39 Hrs (L:T:P:3:0:0)	SEE Duration: 3 Hrs

Course Learning Objectives:	
1	To Study the principle of Engineering Seismology and seismic zoning map of India.
2	To study the behaviour of buildings subjected to earthquake forces and the performance of Structures during past earthquakes.
3	The study of Seismic design philosophy, Determination of design lateral forces.

UNIT-I	
Earthquake ground Motion, Engineering Seismology, Theory of plate tectonics, seismic waves, Magnitude and intensity of earthquakes, local site effects and seismic zoning map of India. Seismic Design Parameters: Types of Earthquakes, earthquake ground motion characteristics, response spectra and design spectrum.	**8 Hrs**
UNIT-II	
Structural modelling, Code based seismic design methods. Response control concepts, seismic evaluation and retrofitting methods. Effect of Structural Irregularities on seismic performance of RC buildings. Vertical irregularity and plan configuration problems, Seismic resistant building architecture – lateral load resistant systems, building characteristics.	**8 Hrs**
UNIT-III (Blended Learning)	
Seismic design philosophy, Determination of design lateral forces - Equivalent lateral force procedure, dynamic analysis procedure.	**8 Hrs**
UNIT-IV	
Step by step procedure for seismic analysis of RC buildings (maximum of 4 storeys, without infills) - Equivalent static lateral force method, response spectrum methods.	**7 Hrs**
UNIT-V	
Earthquake resistant analysis and design of RC buildings – Preliminary data, loading data, load combinations, analysis and design of subframes. (Maximum of 4 storeys, without infills). Earthquake resistant design of masonry buildings - elastic properties of structural masonry, lateral load analysis, Design of two storied masonry buildings.	**8 Hrs**

Course Outcomes: The students will be able to	
1	Explain the dynamic loading system and how it is subjected and distributed for the safe working condition buildings, Bridges, Monumental structures, Assemblies and health centers.
2	Apply the seismic design philosophy and determination of lateral forces.
3	Explain Earthquake resistant analysis and design of RC and masonry buildings.

Text Books:	
1	Earthquake resistant design of structures - Pankaj Agarwal, Manish Shrikande - PHI India.
2	Earthquake Resistant Design of Structures - S.K. Duggal - Oxford University Press, 2007.

Reference Books:	
1	Earthquake Resistant Design- Anil Chopra
2	Earth Quake Engineering Damage Assessment and Structural design- S.F. Borg - (John Wiley and

	Sons. 1983).

Question paper pattern:

- The question paper will have ten full questions carrying equal marks.
- Each full question will be for 20 marks.
- There will be two full questions (with a maximum of four sub - questions) from each unit.
- Each full question will have sub - question covering all the topics under a unit.
- The students will have to answer five full questions, selecting one full question from each unit.

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	✓	✓	✓	✓								
2	✓	✓	✓		✓							
3	✓	✓			✓			✓		✓	✓	

Syllabus for 2018-19 Batch UG (CV)

Semester: VII	
Course Title: SOLID WASTE MANAGEMENT	
Course Code: **18CV745**	Evaluation Procedure:
Credits: 03	CIE + Assignment + Group Activity + SEE = 40 + 5 + 5 + 50 = 100
Teaching Hours: 39 Hrs (L:T:P:S:3:0:0:0)	SEE Duration: 3 Hrs

Course Learning Objectives:	
1	To impart the knowledge of present methods of the municipal waste management system and to analyze the drawbacks.
2	To understand various waste management statutory rules.
3	To identify the adverse effects of improper waste management on the environment.
4	To analyze different elements of solid waste disposal and management, design and develop recycling options.

UNIT – I	
INTRODUCTION: Land Pollution – Definition, causes and effects, control of land pollution, scope and importance of solid waste management, properties of solid waste, functional elements of solid waste management, energy content - numericals. **SOURCES:** Classification and characteristics – municipal, commercial & industrial. Methods of quantification.	**07 Hrs**
UNIT – II	
COLLECTION AND TRANSPORTATION: Systems of collection, collection equipment, garbage chutes, transfer stations – bailing and compacting, transfer means and methods, Factors affecting the location of transfer station, route optimization techniques and problems. **TREATMENT / PROCESSING TECHNIQUES:** Components separation, volume reduction, size reduction, chemical reduction and biological and thermal processing problems.	**08 Hrs**
UNIT – III	
INCINERATION: Process – 3 T's, factors affecting incineration process, incinerators – types, prevention of air pollution, pyrolysis, design criteria for incineration. **COMPOSTING:** Aerobic and anaerobic composting, factors affecting composting, Indore and Bangalore processes, mechanical and semi mechanical composting processes. Vermicomposting, Gasification.	**08 Hrs**
UNIT – IV	
SANITARY LANDFILL: Different types, trench area, Ramp and pit method, site selection, basic steps involved, cell design, prevention of site pollution, leachate & gas collection and control methods, requirements of fabrics in sanitary landfills, sanitary land fill lining with design aspects. Different types of Liners, transportation and migration of Leachate.	**08 Hrs**
UNIT – V (Blended Learning)	
DISPOSAL METHODS: Open dumping – selection of site, ocean disposal, feeding to hogs, incineration, pyrolsis, composting, sanitary land filling, merits and demerits, biomedical wastes and disposal. E-waste and its disposal methods. **RECYCLE AND REUSE:**	**08 Hrs**

Material and energy recovery operations, reuse in other industries, plastic wastes, environmental significance and reuse. Energy production, By-Product recovery.	

Course Outcomes: The students will be able to	
1	Understand the existing municipal management system and identify their drawbacks.
2	Identify the adverse effects of improper waste management on the environment
3	Evaluate the flow of Municipal and waste as per the rules laid by Ministry of Environment & Forest
4	Design recycling and disposal options for municipal and plastic waste

Question paper pattern:
• The question paper will have ten full questions carrying equal marks. • Each full question will be for 20 marks. • There will be two full questions (with a maximum of four sub - questions) from each unit. • Each full question will have sub - question covering all the topics under a unit. • The students will have to answer five full questions, selecting one full question from each unit.

Text Books:	
1	Integrated Solid Waste Management, Tchobanoglous, M/c Graw Hill.
2	Solid Waste Management in developing countries, Bhide and Sunderashan.
3	Environmental Engineering – Vol II.: S.K. Garg.

Reference Books:	
1	Environmental Engineering: Peavy and Tchobanoglous.
2	Biomedical waste handling rules – 2000.
3	Solid Waste Engineering by Vesilind. Pa Worrell & Reinhart. D. – 2009, Cengage Learning India Private Limited, New Delhi.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓			✓			✓					
CO2	✓	✓			✓		✓					
CO3		✓			✓	✓	✓					✓
CO4			✓		✓							

Syllabus for 2018-19 Batch UG (CV)

Semester: VII	
Course Title: QUALITY MANAGEMENT SYSTEM IN CIVIL ENGINEERING	
Course Code: **18CV746**	Evaluation Procedure
Credits: **03**	CIE + Assignment + Group Activity + SEE Marks = 40 + 5 + 5 + 50 = 100
Teaching Hours: 39 Hrs (L:T:P:S:3:0:0:0)	SEE Duration: 3 Hrs

Course Learning Objectives:	
1	To study the various management techniques for successful completion of construction projects.
2	To study the effect of management for project organization, design of construction process, labour, material and equipment utilization, and cost estimation.
3	To study the cost estimation of project.

UNIT – I	
QUALITY MANAGEMENT SYSTEM – QMS: Introduction– Evolution of Quality Management System, Element of Quality, Quality Management System, Concept of Process and Network of Process, ISO 9000-Family, Applying, benefits and Importance, Total Quality Management, Comparison of ISO 9000 **IMPLEMENTING ISO 9001-2000 QUALITY MANAGEMENT SYSTEM:** ISO 9000 – Quality Management Principles, ISO 9000 Documents Content of ISO 9001 : 2000, Quality Management System Requirements, General Requirements, Documentation Requirements, Management Responsibilities, Resource Management, Product Realization, Measurement, analysis and Improvement Monitoring and Measurement, Non-conforming Product.	**8 Hrs**
UNIT – II	
PREPARING A ISO 9001-2000 QUALITY MANAGEMENT SYSTEM FOR CIVIL ENGINEERING: Quality Manual, Introduction, Scope of the Quality Manual, Applicability, Responsibility, Quality Management System, General Requirements, Management Responsibilities, Management Commitment, Planning Responsibility, Authority and Communication, Management Review, Resource Management, Provision of Resources, Human Resources Product Realization, Purchasing, Monitoring and Measurement.	**8 Hrs**
UNIT – III	
QUALITY MANAGEMENT SYSTEM PROCEDURES: Introduction, procedure for management review, Format for writing procedures, procedure for preparing Quality plans/ work instructions, Contract review, Document and data control, Document numbering system, Change request, procedure for purchasing, procedure for control of customer supplied product.	**8 Hrs**
UNIT – IV (Blended Learning)	
WORK INSTRUCTIONS: Introduction – Document and Data Control, Material Procurement, Material Handling, Tendering and Estimating, Planning, Design, Training, Plant and Equipment, Quality Assurance and Control, Patching and Transportation of Concrete. **METHOD STATEMENT:** Introduction, Concrete Works, Earthworks and Compaction, General Soil Investigation works, Survey works, Concrete Repair works, Concrete Demolition works, Road Works, Fencing works etc.	**7 Hrs**
UNIT – V	
JOB DESCRIPTION: Introduction, Job Description of Managing Director, Project Manager, Site Manager, Site	**8 Hrs**

Engineer, QA/QC Engineer, Foreman, Typist/Clerk, Design Engineer, Planning Engineer. **QUALITY CONTROL PLAN/INSPECTION AND TEST PLANS (ITPS):** Introduction-Preparation of Project Quality Plans, Inspection and Test plant. **QUALITY RECORD/FORMATS:** Preparation of Standard Formats: Revision Control form, Document Distribution List, Document Master List, Non-Conformance Report, Store Issue/Receipt Voucher, Local Purchase Order, Material Stock Card, Audit Notification, Quality Audit Report, Corrective Action Report, Calibration Record, Calibration Master Sheet, Work Instruction, Job Description, Contract/Tender Review Form, Accident Report Form, Quality Awareness Training Record.	

Question paper pattern:
• The question paper will have ten full questions carrying equal marks. • Each full question will be for 20 marks. • There will be two full questions (with a maximum of four sub - questions) from each unit. • Each full question will have sub - question covering all the topics under a unit. • The students will have to answer five full questions, selecting one full question from each unit.

Text Books:	
1	Quality Management System in Civil Engineering – D.S. Rajendra Prasad – ISO 9001-2000, Sapna Book House, Bangalore.
2	Productivity and Quality Improvement – John L. Hardesky – McGraw Hill Book Company.
3	Quality Management – Kanishka Bedi – (Oxford university press).
4	Total Quality Management for Engineers – Mohamed Zairi – Aditya Books Private Limited.

Reference Books:	
1	ISO 9000 Concepts, Methods, Implementation- Bagchi – Wheeler Publishing.
2	IS: 456-2000: Indian Standard Specifications for Plain and Reinforced Concrete Code of Practice: 4th Revision, Bureau of Indian Standards.
3	IS: 383-1990: Indian Standard Specifications for Coarse and Fine Aggregates from Natural Sources for Concrete: Bureau of Indian Standards.
4	Data Book for Civil Engineers Field Practice – Elwyn E. Seelye – John Wiley & Sons, Inc.

Course Outcomes: The students will be able to	
1	Explain the quality management, conveyance and treatment.
2	Analyze the concept of Quality control plan / inspection and testing plans for various Civil Engineering works.
3	Apply the basic principles of ISO 9001-2000.

CO-PO Mapping												
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓	✓										
CO2	✓	✓	✓									
CO3	✓	✓						✓			✓	✓

Syllabus for 2018-19 Batch UG (CV)

Semester: VII	
Course Title: HYDRAULICS AND IRRIGATION STRUCTURES	
Course Code: **18CV747**	Evaluation Procedure:
Credits: **03**	CIE + Assignment + Group Activity + SEE Marks = 40 + 5 + 5 + 50 = 100
Hours: 39 Hrs (L:T:P:S:3:0:0:0)	SEE Duration: 3 Hrs

Course Learning Objectives:	
1	To understand the essentiality of water required for various purposes.
2	To plan and design of reservoirs.
3	To plan and construction of various hydraulic structures.

UNIT – I	
RESERVOIR PLANNING: Introduction, classification of Reservoirs, Storage zones of a reservoir, Mass curve, fixing capacity of a reservoir, safe yield, problems, Reservoir sedimentation, life of a reservoir, economic height of a dam, Environmental effects of reservoirs.	**8 Hrs**
UNIT – II	
GRAVITY DAMS: Introduction, forces on a gravity dam, stress analysis in gravity dam, Problems, combination of forces for design. Elementary & practical profiles of a gravity dam, Arch dams, galleries in gravity dams.	**7 Hrs**
UNIT – III (Blended Learning)	
EARTH DAMS: Introduction, types of Earth dams, construction methods, Design criteria for Earth dams, causes of failure of earth dams, section of dam, control of seepage through earth dams, Safety measures.	**7 Hrs**
UNIT – IV	
SPILLWAYS: Introduction, essentials of a spillway, spillway components, factors affecting type & design of spillways. Ogee spillway. Energy dissipation below spillways.	**7 Hrs**
UNIT – V	
DRAWING NOT TO SCALE (To draw only sketch for the given design details without projected views on the working sheet) ✓ Surplus weir with stepped apron. ✓ Tank Plug sluice without tower head. ✓ Tank Plug sluice with tower head. ✓ Canal regulator. ✓ Earthen Bunds.	**10 Hrs**

Course Outcomes: The students will be able to	
1	Understand various aspects of Reservoir planning,
2	Data required for design, procedure of planning, designing the structures and preparing required drawings to execute the work.
3	Understand the design and construction of earthen dams.

Text Books:	
1	Text book of irrigation engineering & Hydraulic Structures- R.K. Sharma, Oxford & IBH publishing Co., New Delhi (2002)
2	Irrigation & Water resources engineering- G.L. Asawa, New Age International Publishers, New

	Delhi (2005)
3	Irrigation, Water Resources & Water power engineering- Modi. P.N., Standard Book House, New Delhi
4	Design of minor irrigation and Canal structures- C. Sathya Narayana Murthy, Wiley eastern limited, New Delhi (1990)

Reference Books:	
1	Irrigation engineering & Hydraulic structures- Garg. S.K., Khanna publishers, New Delhi
2	Hydraulic Structures & Irrigation Design Drawing - Dr. N. Balasubramanya, Tata McGraw-Hill Education Pvt. Ltd., New Delhi
3	Irrigation and Water Power Engineering- Madan Mohan Das & Mimi Das Saikia, PHI Learning Pvt. Ltd., New Delhi (2009)
4	A Text Book of Irrigation Engineering – Raghunath
5	Ground water engineering – Freez and Cherry

Question Paper Pattern:

- ✓ **Four** questions are to be set from Units 1, 2, 3 & 4 of which **Two** full questions are to be answered for 40 marks.
- ✓ **Two** questions are to be set from Unit 5 (excluding Earthen Bunds) of which **One** full question is to be answered for 45 marks (drawings to be drawn for the given Data on the Drawing sheet).
- ✓ **One** Question is to be set from Earthen Bunds which is compulsory for 15 marks (To draw sketches for the given details on the drawing sheet).

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓			✓		✓	✓					✓
CO2		✓					✓					✓
CO3	✓	✓		✓	✓		✓					

Syllabus for 2018-19 Batch UG (CV)

Semester: VII	
Course Title: ECOLOGY AND ENVIRONMENTAL IMPACT ASSESSMENT	
Course Code: **18CV751**	Evaluation Procedure: CIE + Assignment + Group Activity + SEE Marks = 40 + 5 + 5 + 50 = 100
Credits: **03**	
Teaching Hours: 39 Hrs (L:T:P:S:3:0:0:0)	SEE Duration: 3 Hrs

Course Learning Objectives:	
1	To foresee the potential environmental problems that would arise out of a proposed development.
2	To examine and select the suitable methodology for the various project options and predict significant environmental impact.
3	To identify the appropriate abatement and mitigating measures for the implementation of projects.

UNIT – I	
INTRODUCTION TO EIA: Ecological Factors and Development Activity and, EIA, Rapid and Comprehensive EIA, EIS, FONSI. Need for EIA Studies, Baseline Information, Step-by-step procedures for conducting EIA, Limitations of EIA.	**8 Hrs**
UNIT – II	
METHODOLOGIES OF EIA: Frame work of Impact Assessment. Developmental Projects- Environmental Setting, Objectives and Scope, Contents of EIA, Methodologies, Techniques of EIA.	**8 Hrs**
UNIT – III	
ENVIRONMENTAL ATTRIBUTES: Assessment and Prediction of Impacts on Attributes Air, Water, Noise, Land Ecology, Soil, Cultural and Socio-economic Environment. EIA guidelines for Development Projects, Rapid and Comprehensive EIA.	**7 Hrs**
UNIT – IV (Blended Learning)	
PUBLIC PARTICIPATION PROGRAM : Public Participation in Environmental Decision making. Practical Considerations in preparing Environmental Impact Assessment and Statements. Salient Features of the Project Activity-Environmental Parameter Activity Relationships - Matrices.	**8 Hrs**
UNIT – V	
EIA FOR PROJECTS: EIA for Water resource developmental projects, Highway projects: Nuclear-Power plant projects, Mining project (Coal, Iron ore), Thermal Power Plant, Infrastructure Construction Activities.	**8 Hrs**

Course Outcomes: The students will be able to	
1	Explain systematic identification and evaluation of the potential impacts of proposed projects on components of the total environment.
2	Apply and identify the measures to be adopted to avoid environmental impact and reinforce a commitment in an organized and systematic approach by involving agencies and public participation.
3	Develop environmental protection mechanism for the proposed projects to protect and restore good environment with sustainable development.

Question paper pattern:
• The question paper will have ten full questions carrying equal marks. • Each full question will be for 20 marks.

• There will be two full questions (with a maximum of four sub - questions) from each unit. • Each full question will have sub - question covering all the topics under a unit. • The students will have to answer five full questions, selecting one full question from each unit.

Text Books:	
1	Methodologies for Environment Impact Assessment - Anjaneyalu. Y, B S publications.
2	Environment Impact Assessment – N.S. Raman, A.R Gajbhiye and S.R. Khandeshwar, dreamtech press.
3	Environment Impact Assessment – R.R. Barthwal, New Age International Publishers.

Reference Books:	
1	Environmental Impact Analysis-Jain R.K.-Van Nostr and Reinhold Co.
2	Guidelines for EIA of developmental Projects Ministry of Environment and Forests, GOI.
3	Environment Impact Assessment - Larry W. Canter - McGraw Hill

Question paper pattern:
• The question paper will have ten full questions carrying equal marks. • Each full question will be for 20 marks. • There will be two full questions (with a maximum of four sub - questions) from each unit. • Each full question will have sub - question covering all the topics under a unit. • The students will have to answer five full questions, selecting one full question from each unit.

CO-PO Mapping												
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	✓					✓	✓					
2		✓				✓				✓		
3	✓						✓		✓		✓	

Syllabus for 2018-19 Batch UG (CV)

Semester: VII	
Course Title: URBAN TRANSPORT PLANNING	
Course Code: **18CV752**	Evaluation Procedure:
Credits: **03**	CIE + Assignment + Group Activity + SEE Marks = 40 + 5 + 5 + 50 = 100
Hours: 39 Hrs (L:T:P:S:3:0:0:0)	SEE Duration: 3 Hrs

Course Learning Objectives:	
1	To understand and apply basic concepts and methods of urban transportation planning.
2	To explain the various methods of designing, conducting and administering surveys to provide the data required for transportation planning.
3	To understand the process of developing an organized mathematical modelling approach to solve select urban transportation planning problem.
4	To illustrate the various types of models used for travel forecasting, prediction of future travel patterns.

UNIT-I	
INTRODUCTION: Scope of Urban transport planning, Inter dependency of land use and traffic, System Approach to urban planning. **STAGES IN URBAN TRANSPORT PLANNING:** Trip generation, Trip production, Trip distribution, Modal split, Trip assignment.	**8 Hrs**
UNIT-II	
URBAN TRANSPORT SURVEY: Definition of study area, Zoning, Types of Surveys, Inventory of transportation facilities, Expansion of data from sample.	**7 Hrs**
UNIT-III	
TRIP GENERATION: Trip purpose, Factors governing trip generation and attraction, Category analysis, Problems. **TRIP DISTRIBUTION:** Methods, Growth factors methods, Synthetic methods, Fractor and Furness method and problems.	**8 Hrs**
UNIT-IV	
MODAL SPLIT: Factors affecting, characteristics of split, Model split in urban transport planning, problems. **TRIP ASSIGNMENT:** Assignment Techniques, Traffic fore casting, Land use transport models, Lowry Model, Garin Lowry model Applications in India.	**8 Hrs**
UNIT-V (Blended learning)	
URBAN TRANSPORT PLANNING FOR SMALL AND MEDIUM CITIES: Introduction, Difficulties in transport planning, Recent Case Studies.	**8 Hrs**

Course Outcomes: The students will be able to	
1	Explain the importance of urban transport planning and its relation between various surveys involved in urban transport for smooth flow of traffic.
2	Apply the fundamental principles of mathematical models for the trip generation and its assignment techniques for modal split and trip distribution methods.
3	Explain the basic elements and its related case studies with respect to urban transport planning for small and medium cities.

Text Books:	
1	Traffic Engineering and Transport Planning- L.R. Kadiyali - Khanna Publishers, New Delhi.
2	Principles of urban transport system planning - B.G. Hutchinson - Scripta Book Co., Washington D.C. & McGraw Hill Book Co.
3	Introduction to transportation engineering- Jotin Kristey and Kentlal - PHI, New Delhi.

Reference Books:	
1	Urban Transport planning- Black John - Croom Helm ltd, London.
2	Urban and Regional models in geography and planning- Hutchison B G – John Wiley and sons London.
3	Entropy in urban and regional modeling- Wilson A G - Pion ltd, London.

Question paper pattern:

- The question paper will have ten full questions carrying equal marks.
- Each full question will be for 20 marks.
- There will be two full questions (with a maximum of four sub - questions) from each unit.
- Each full question will have sub - question covering all the topics under a unit.
- The students will have to answer five full questions, selecting one full question from each unit.

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	✓	✓				✓						
2	✓	✓		✓								
3	✓					✓						

Syllabus for 2018-19 Batch UG (CV)

Semester: VII	
Course Title: PHOTO GEOLOGY AND REMOTE SENSING	
Course Code: **18CV753**	Evaluation Procedure: CIE + Assignment + Group Activity + SEE Marks = 40 + 5 + 5 + 50 = 100
Credits: **03**	
Teaching Hours: 39 Hrs (L:T:P:S:3:0:0:0)	SEE Duration: 3 Hrs

Course Learning Objectives:	
1	To obtain information about physical objects through process of recording, measuring and interpreting the photographs of the area.
2	To deals with the photo interpretation, recognizing and identifying the objects and judging their significance through careful systematic analysis.
3	To acquire the knowledge of Remote sensing and its applications.

UNIT – I	
PHOTOGRAMMETRY: Introduction, basic definitions, terrestrial photogrammetry, photo theodolite, horizontal and vertical angles from terrestrial photographs, horizontal position of a point from photographic measurements, elevation of points by photographic measurements, determination of focal length	**7 Hrs**
UNIT – II	
AERIAL PHOTOGRAMMETRY: Advantages, vertical, tilted and oblique photographs, geometry of vertical photographs, scale of vertical photograph over flat and variable terrain, ground coordinates, computation of length of a line, computation of flying height, relief displacement, overlaps, flight planning, computation of required number of photographs for a given area, ground control in photogrammetry. Basics of stereoscopy, stereoscopes, uses, parallax. Basic elements in photographic interpretation. Introduction to digital photogrammetry	**8 Hrs**
UNIT – III	
REMOTE SENSING: Introduction, Ideal remote sensing system, basic principles of electromagnetic remote sensing, electromagnetic energy, electromagnetic spectrum, interaction with earth's atmosphere, interaction with earth- surface materials, spectral reflectance of earth surface materials **REMOTE SENSING PLATFORMS AND SENSORS:** Introduction, platforms- IRS, Land sat, SPOT, Cartosat, IKONOS, Envisat etc. Sensors-active and passive, MSS, AVHRR, LISS, TM, PAN, WIFS, microwave sensors, sensor resolutions (spatial, spectral, radiometric and temporal)	**8 Hrs**
UNIT – IV	
DATA MODELS: Vector data model: Representation of simple features – Topology and its importance; coverage and its data structure, Shape file; Relational Database, Raster Data Model: Elements of the Raster data model, Types of Raster Data, Raster Data Structure, Data conversion.	**8 Hrs**
UNIT – V (Blended Learning)	
APPLICATIONS OF REMOTE SENSING: Applications in land use land cover analysis, change detection, water resources, urban planning, environmental and geological applications	**8 Hrs**

Course Outcomes: The students will be able to	
1	Explain topographic mapping of large area and also the preparation of special purpose map for various engineering projects such as highways, railway, Dams, Harbors.
2	Apply the Remote sensing technology in various fields of Civil Engineering.

3	Apply the knowledge of remote sensing in design of urban planning and water resource projects.

Question paper pattern:
• The question paper will have ten full questions carrying equal marks. • Each full question will be for 20 marks. • There will be two full questions (with a maximum of four sub - questions) from each unit. • Each full question will have sub - question covering all the topics under a unit. • The students will have to answer five full questions, selecting one full question from each unit.

Text Books:	
1	Principles of GIS - Peter A Burrough Reachael A Mc. Donnel - (Oxford).
2	The GIS Book - George B. Korte, P.E. - 5th Edn, Thomson Learning.
3	Remote sensing and image interpretation - Lillesand - (John Wiley and Sons).

Reference Books:	
1	Geographical Information system: Bemhard Sen-Wiley publications.
2	GIS and Computer cartography - Christopher Jones - (Longman).

Question paper pattern:
• The question paper will have ten full questions carrying equal marks. • Each full question will be for 20 marks. • There will be two full questions (with a maximum of four sub - questions) from each unit. • Each full question will have sub - question covering all the topics under a unit. • The students will have to answer five full questions, selecting one full question from each unit.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓	✓			✓							
CO2	✓					✓						
CO3		✓			✓							

Syllabus for 2017-18 Batch UG (CV)

Semester: VII	
Course Title: Quality Management System in Civil Engineering	
Course Code: **CV826**	Evaluation Procedure
Credits: **03**	CIE +Assignment +SEE Marks = 45+5 + 50 = 100
Teaching Hours: 39 Hrs (L:T:P:S:3:0:0:0)	SEE Duration: 3 Hrs

Course Learning Objectives:	
1	To study the various management techniques for successful completion of construction projects.
2	To study the effect of management for project organization, design of construction process, labour, material and equipment utilization, and cost estimation.
3	To study the cost estimation of project.

UNIT – I	
QUALITY MANAGEMENT SYSTEM – QMS: Introduction – Evolution of Quality Management System, Element of Quality, Quality Management System, Concept of Process, Network of Process in an organization, ISO 9000 Family, Applying ISO 9000 in practice, Importance of ISO 9000, Benefits of ISO standards of society, Total Quality Management, Comparison of ISO 9000 and TQM – Quality related definitions – Leaders in Quality or Quality Gurus – Customer Orientation – Mahatma Gandhi. **IMPLEMENTING ISO 9001-2000 QUALITY MANAGEMENT SYSTEM:** ISO 9000 – Quality Management Principles, ISO 9000 Documents Content of ISO 9001 : 2000, ISO 9001-2000 Quality Management System Requirements, General Requirements, Documentation Requirements, Management Responsibilities, Resource Management, Product Realization, Measurement, analysis and Improvement Monitoring and Measurement, Non-conforming Product, Analysis of data, Improvement, Implementing ISO 9001-2000 Quality Management System.	**9 Hrs**
UNIT – II	
PREPARING A ISO 9001-200 QUALITY MANAGEMENT SYSTEM FOR CIVIL ENGINEERING: Quality Manual, Introduction, Scope of the Quality Manual, Applicability, Responsibility, Quality Management System, General Requirements, Management Responsibilities, Management Commitment, Customer Focus, Indian Construction Company Quality Policy, Planning Responsibility, Authority and Communication, Management Review, Resource Management, Provision of Resources, Human Resources Product Realization, Planning or Product Realization, Customer Related Processes, Design and Development, Purchasing, Production and Service Provision, Control of Monitoring and Measuring Devices Measurement, analysis and Improvement, Monitoring and Measurement, Non-conforming product, Analysis of data, Improvement.	**6 Hrs**
UNIT – III	
QUALITY MANAGEMENT SYSTEM PROCEDURES: Introduction, procedure for management review, Format for writing procedures, procedure for preparing Quality plans/ work instructions, Contract review, Design control, Document and data control, Document numbering system, Change request, procedure for purchasing, procedure for control of customer supplied product, procedure for product identification and traceability, procedure for process control, procedure for inspection and testing, procedure for control of inspection, measuring and test equipments, procedure for inspection and test status, procedure for the control of non-conforming product, procedure for corrective and preventive action, procedure for handling, storage, packaging and delivery, control of quality records,	**9 Hrs**

procedure for internal quality audits.	
UNIT – IV (Blended Learning)	
WORK INSTRUCTIONS: Introduction – Document and Data Control, Material Procurement, Material Handling, Tendering and Estimating, Planning, Design, Training, Plant and Equipment, Bar Bending Schedule, Concrete Works, Earthworks and Compaction, General Soil Investigation works, Survey works, Concrete Repair Works, Road Works, Painting Works, Water Proofing works, Drainage Works, Quality Assurance and Control, Patching and Transportation of Concrete. **METHOD STATEMENT:** Introduction, Concrete Works, Earthworks and Compaction, General Soil Investigation works, Survey works, Concrete Repair works, Concrete Demolition works, Road Works, Fencing works etc.	**6 Hrs**
UNIT – V	
JOB DESCRIPTION: Introduction, Job Description of Managing Director, Project Manager, Site Manager, Site Engineer, QA/QC Engineer, Foreman, Typist/Clerk, Design Engineer, Planning Engineer. **QUALITY CONTROL PLAN/INSPECTION AND TEST PLANS (ITPS):** Introduction-Preparation of Project Quality Plans, Inspection and Test plant. **QUALITY RECORD/FORMATS:** Preparation of Standard Formats: Revision Control form, Document Distribution List, Document Master List, Non-Conformance Report, Store Issue/Receipt Voucher, Local Purchase Order, Material Stock Card, Audit Notification, Quality Audit Report, Corrective Action Report, Calibration Record, Calibration Master Sheet, Work Instruction, Job Description, Contract/Tender Review Form, Quantity Survey Estimation/Take off sheet, Material/Plant Requisition, Drawing Schedule, Bar-bending Schedule, Design Calculation Sheet, Request for Inspection, Concrete Inspection Request, Inspection Check List – Drainage, Painting, Request for Inspection-Concrete Repair, Accident Report Form, Concrete Production, Concrete Compressive Strength Test Results, Request to Conduct Cube Test, Quality Awareness Training Record.	**9 Hrs**

Question paper pattern:
• The question paper will have ten full questions carrying equal marks. • Each full question will be for 20 marks. • There will be two full questions (with a maximum of four sub - questions) from each unit. • Each full question will have sub - question covering all the topics under a unit. • The students will have to answer five full questions, selecting one full question from each unit.

Text Books:	
1	Quality Management System in Civil Engineering – D.S. Rajendra Prasad – ISO 9001-2000, Sapna Book House, Bangalore.
2	Productivity and Quality Improvement – John L. Hardesky – McGraw Hill Book Company.
3	ISO 9000 Concepts, Methods, Implementation- Bagchi – Wheeler Publishing.
4	Training Manual on ISO 9000-2000 and TQM- Girdhar J. Gyani – Raj Publishing House.
5	Documenting Quality for ISO 9000 and other Industry Standards – Gary E. MacLean – Tata McGraw Hill Publishing Company Limited.
6	Total Quality Management for Engineers – Mohamed Zairi – Aditya Books Private Limited.
7	Data Book for Civil Engineers Field Practice – Elwyn E. Seelye – John Wiley & Sons, Inc.
8	Properties of Concrete – A.M. Neville – ELBS Publications.
9	IS: 456-2000: Indian Standard Specifications for Plain and Reinforced Concrete Code of Practice:

	4th Revision, Bureau of Indian Standards.
10	IS: 383-1990: Indian Standard Specifications for Coarse and Fine Aggregates from Natural Sources for Concrete: Bureau of Indian Standards.
11	Quality Management – KanishkaBedi – (Oxford university press).

Course Outcomes: The students will be able to	
1	Explain the quality management, conveyance and treatment.
2	Analyse the concept of Quality control plan / inspection and testing plans for various Civil Engineering works.
3	Apply the basic principles of ISO 9001-2000.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	√	√										
CO2	√	√	√									
CO3	√	√						√			√	√

Dr. Ambedkar Institute of Technology, Benaluru -

Sub Title : EARTH & EARTH RETAINING STRUCTURES		
Sub Code: CV744	**No of Credits** : 03= 3**:0:0 (L:T:P)**	**No of lecture hours/week : 03**
Exam Duration : 3 hours	CIE + Assignment + SEE = 45 +5 + 50 = 100	**Total Hours : 39**

Objectives:

1. Soil as a backfill is used for many retaining structures like retaining walls, coffer dams and sheet piles.
2. Soil as a construction material is used for earth and rock fill dams.
3. A course on Earth and Earth Retaining Structures will expose students to the importance of the usage of soil as a retaining as well as construction material and as to how it can be strengthened using reinforcement.

Sl. No.	Syllabus Contents	No. Of Hours
1	**UNIT - 1** **EARTH DAMS AND EMBANKMENTS** - Different types of earthen dams with sketches and their suitability. Hydraulic fill and rolled fill methods of construction – Causes of failure of earth dam – Design criteria of earth dams – Stability analysis of earthen dams – Seepage control in earthen dams. Role of Filters in Earth Dam Design. **RETAINING WALLS:** Types of retaining walls, failure of retaining walls by sliding, overturning and bearing. Stability analysis and Principles of the design of retaining walls – Gravity retaining walls, Cantilever retaining walls,	9

	Counterfort retaining walls (no structural design) – Modes of failure of retaining walls – Drainage from the backfill.	
2	**UNIT - 2** **BULK HEADS: Cantilever sheet pile walls** Types of sheet pile walls – Free cantilever sheet pile - cantilever sheet pile in cohesion-less soils – cantilever sheet pile in clay. **BULK HEADS: Anchored Sheet Pile Walls:** Anchored sheet pile with free earth support in cohesion-less and cohesive soil. Bulkheads with fixed earth support method – Types, locations and design of anchors.	**9**
3	**UNIT - 3** **BRACED CUTS:** Introduction, Lateral earth pressure on sheeting, Different types of sheeting and bracing systems – design of various components of bracings. **ROCK FILL DAMS:** Introduction, Origin and usage of rock fill dams, types of rock fill dams, and design of rock fill dams and construction of rock fill dams.	**9**
4	**UNIT- 4** **COFFER DAMS & CELLULAR COFFER DAMS I:** Introduction – types of coffer dams - Design of cellular coffer dams on rock by Tennesse Valley Authority (TVA) method – safety against sliding, slipping, overturning, vertical shear and stability against bursting.	**6**
5	**UNIT- 5** **CELLULAR COFFER DAMS II:** Design of cellular coffer dam on soil - safety against sliding, slipping, overturning, vertical shear and stability against bursting.	**6**

TEXT BOOKS:

1. **Soil Mechanics and Foundation Engineering**: Dr. K.R. Arora: Standard Publishers & Distributors.
2. **Soil Mechanics and Foundation Engineering**: S.K. Garg: Khanna Publishers.

REFERENCE BOOKS / Web links:

1. **Soil Mechanics and Foundation Engineering,**: Dr. B.C. Punmia: axmi Publications Ltd.,
2. **Foundation Engineering.**: Dr. B.J. Kasmalkar
3. **Numericals in Geotechnical Engineering:** A.V. Narasimha Rao & C. Venkataramaiah: Publications: University Press.
4. **Hydraulic Structures**: S.K. Garg: Khanna Publishers.
5. **Soil Mechanics and Foundation Engineering**: Dr. V.N.S. Murthy: Sai Tech. Publications
6. **Geotechnical Engineering:** Dr. C. Venkataramaiah, New age publications.
7. **Geotechnical Engineering**: Purushotam Raj.
8. **Theory and Practice of Soil Engineering**: Alum Singh.
9. **Principles of Geotechnical Engineering, Das, B**. M., Cengage Learning, 2009

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www.nptel.org.in http://books.google.co.in
Note : One Question to be set from each unit and for choice two questions to be set from any two units

Course Outcomes:

CO1. Students are capable of estimating lateral earth pressure on retaining walls and earthen dams.

CO2. Recent technology as made many constructions possible even on weak soils.

CO3 students are capable of designing cantilever and anchored sheet pile walls.

CO4. This course will prepare students to keep abreast with the changing scenario of the usage of soil as fill and construction material.

Cos	Mapping with POs
CO1	PO1, PO2
CO2	PO1, PO2, PO3, PO4, PO5
CO3	PO4, PO5, PO6
CO4	PO1, PO3, PO11, PO12

Sub Title: **HIGHWAY GEOMETRIC DESIGN**		
Sub Code: CV745	**No of Credits** : 03 = 3**:0:0 (L:T:P)**	**No of lecture hours/week : 03**
Exam Duration: 3 hours	CIE + Assignment + SEE = 45 +5 + 50 = 100	**Total Hours : 39**

Objectives:

1. The size and shape of various elements of roads are designed according to standards prescribed by IRC.
2. The horizontal and vertical curves are designed to meet the design speed on the various types of roads.
3. The roads are designed to achieve optimum speed with maximum safety economically.

Sl.	Syllabus Contents	No. Of

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Sub Title: **OPEN CHANNEL HYDRAULICS**		
Sub Code: CV746	**No of Credits** : 03 = 3**:0:0 (L:T:P)**	**No of lecture hours/week : 03**
Exam Duration 3 hours	CIE + Assignment + SEE = 45 +5 + 50 = 100	**Total Hours : 39**

Objectives:

1. Students are introduced to study the open channel flow characteristics including hydraulic jump and surges.
2. Concept of specific energy and energy losses – Classification of flow, design of channel section will be taught.
3. Hydraulic machines viz flow through turbines and pumps including their performance characteristics and design aspects are taught.

Sl. No	Syllabus Contents	No. Of Hours
1	**UNIT – 1** **INTRODUCTION:** Difference between pipe flow and open channel flow, classification of flow, energy equation, momentum equation, kinetic energy and momentum factors	**6**
2	**UNIT – 2** **UNIFORM FLOW:** Concepts, uniform flow equations, conveyance and hydraulic exponent for uniform flow, design of channels for uniform flow.	**6**
3	**UNIT – 3** **CRITICAL FLOW:** Concept of specific Energy – Classification of flow. Design of channel, Section Factor, Hydraulic exponent for critical flow critical depth as a flow measurement. **GRADUALLY VARIED FLOW:** Concepts, GVF equation, its different forms, Basic assumptions, Dynamic equation, Characteristics of flow profile and classification.	**9**
4	**UNIT – 4** Analysis of flows profiles, Method of singular point and transitional depth, Methods of computation, Practical problems. Gradually Varied Flow Computations: Different methods, direct integration method, Bress's Solution, Chow's solution, direct method, standard step method.	**9**
5	**UNIT – 5** Rapidly Varied Flow: Concepts, hydraulic jump in rectangular channels, classification of jumps, characteristics of jump – length location height, application of hydraulic jump stilling basins, shape type-2 and type-4. Hydraulic jump in rectangular channels, Sloping channels, Jump in non rectangular channels, application of hydraulic jump as energy desipator	**9**

TEXTBOOKS:

1. **Open Channel Hydraulics** : Subramanya : Tata Mc Graw Hill Publishing Co Ltd, New Delhi

2. **Open Channel Flow** – Madan Mohan Das, Prentice Hall of India Pvt. Ltd., New Delhi 2008 Edition.
3. **Flow Through Open Channels** – Rajesh Srivastava, Oxford Press, New Delhi 2008 Edition.

REFERENCE BOOKS / Web links:

1. **Open Channel Hydraulics** : French : Mc Graw Hill Book Company, New Delhi.
2. **Fluid Mechanics** : Modi and Seth : Standard Book Home, New Delhi.
3. **Open Channel Hydraulics** : Henderson : Mr. Millan Publishing Co. Ltd., New York.
4. **Open Channel Hydraulic** : Ven Te Chow : Mc Graw Hill Book Company, New Delhi.

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http://books.google.co.in

Note : One Question to be set from each unit and for choice two questions to be set from any two units.

Course Outcomes:

CO1. Students, at the end of the semester will have the abilities to analyze flow characteristics in open channel and design hydraulic machines.
CO2 : Students will acquire the knowledge to calculate critical flow and gradually varied flow.
CO3: Students are able to design the flow profiles.
CO4 : Students will understand the concept of hydraulic jump in rectangular channels.

Cos	Mapping with POs
CO1	PO1, PO2, PO3
CO2	PO, PO, PO, PO, PO, PO. PO, PO,
CO3	PO1, PO3, PO6, PO8
CO4	PO1, PO2, PO3, PO10, PO12

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Sub Title : CONSTRUCTION PROJECT MANAGEMENT		
Sub Code: CV758	**No of Credits** : 03 = 3**:0:0 (L:T:P)**	**No of lecture hours/week : 03**
Exam Duration : 3 hours	CIE + Assignment + SEE = 45 +5 + 50 = 100	**Total Hours : 39**

Objectives:

1. To study the various management techniques for successful completion of construction projects.
2. To study the effect of management for project organization, design of construction process, labour, material and equipment utilization, and cost estimation.
3. To study the cost estimation of project.

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Sl No	Syllabus Contents	No. Of Hours
1	**UNIT 1** **THE OWNERS' PERSPECTIVE** : Introduction - Project Life Cycle - Types of Construction - Selection of Professional Services - Construction Contractors - Financing of Constructed Facilities - Legal and Regulatory Requirements - Changing Environment of the Construction Industry - Role of Project Managers.	**9**
2	**UNIT 2** **ORGANIZING FOR PROJECT MANAGEMENT**: Project Management – modern trends - Strategic Planning - Effects of Project Risks on Organization - Organization of Project Participants -Traditional Designer-Constructor Sequence - Professional Construction Management - Owner-Builder Operation - Turnkey Operation - Leadership and Motivation for the Project Team.	**9**
3	**UNIT 3** **DESIGN AND CONSTRUCTION PROCESS**: Design and Construction as an Integrated System - Innovation and Technological Feasibility - Innovation and Economic Feasibility - Design Methodology - Functional Design - Construction Site Environment.	**9**
4	**UNIT 4** **LABOUR, MATERIAL AND EQUIPMENT UTILIZATION**: Historical Perspective - Labour Productivity - Factors Affecting Job-Site Productivity - Labour Relations in Construction - Problems in Collective Bargaining - Materials Management - Material Procurement and Delivery - Inventory Control - Tradeoffs of Costs in Materials Management. - Construction Equipment - Choice of Equipment and Standard Production Rates - Construction Processes Queues and Resource Bottlenecks.	**6**
5	**UNIT 5** **COST ESTIMATION**: Costs Associated with Constructed Facilities - Approaches to Cost Estimation - Type of Construction Cost Estimates - Effects of Scale on Construction Cost - Unit Cost Method of Estimation - Methods for Allocation of Joint Costs - Historical Cost Data - Cost Indices - Applications of Cost Indices to Estimating - Estimate Based on Engineer's List of Quantities - Estimation of Operating Costs.	**6**

Course Outcomes:

1. On completion of this course the students will be able to know the modern trends in project management viz. design, construction, resource utilization and cost estimation.
2. Students are capable of handling labour, materials and equipments.
3. Students are able to design and construct the different kinds of projects.
4. Students are able to estimate the quantities and cost of a structure.

REFERENCES / Web links:

1. Chitkara, K.K. **Construction Project Management: Planning, Scheduling and Control**, Tata McGraw-Hill Publishing Company, New Delhi, 1998.
2. Choudhury S , **Project Management**, McGraw-Hill Publishing Company, New Delhi, 1988.
3. Chris Hendrickson and Tung Au, Project Management for Construction – Fundamental Concepts for Owners, Engineers, Architects and Builders, Prentice Hall, Pittsburgh, 2000.
4. Frederick E. Gould, **Construction Project Management**, Wentworth Institute of Technology, Vary E. Joyce, Massachusetts Institute of Technology, 2000.
5. George J.Ritz , **Total Construction Project Management** - McGraw-Hill Inc, 1994.

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http://books.google.co.in

Cos	Mapping with POs
CO1	PO1, PO2, PO3
CO2	PO1, PO2, PO4
CO3	PO1, PO2, PO5, PO6, PO8
CO4	PO1, PO3, PO6, PO10, PO11

Sub Title : ENVIRONMENTAL ENGINEERING LABORATORY

Syllabus for 2017-18 Batch UG (CV)

Semester: VIII	
Course Title: Advanced Pre-stressed Concrete Structures	
Course Code: **CV821**	Evaluation Procedure:
Credits: **03**	CIE + Assignment + SEE Marks = 45 + 5 + 50 = 100
Teaching Hours: 39 Hrs (L:T:P:S:3:0:0:0)	SEE Duration: 3 Hrs

Course Learning Objectives:	
1	To understand method of design for Shear, Bending, Torsion and Ultimate flexural strength of Pre-stressed Concrete elements.
2	To expose vividly theory and design of Pre-stressed Concrete in accordance with the latest code of practice IS 1343-2012provisions.
3	To explore knowledge about design of deformation of Pre-stressed Concrete members and Pre-stressed plates.

UNIT – I	
ANCHORAGE ZONE STRESSES IN POST-TENSIONED MEMBERS: Introduction, stress distribution in end block, investigations on Anchorage zone stresses, Magnel and Guyon's Methods, Comparative Analysis, Anchorage zone reinforcement. **SHEAR AND TORSIONAL RESISTANCE:** Shear and principal stresses, ultimate shear resistance, design of shear reinforcement, Torsion, Design of reinforcement for torsion.	**9 Hrs**
UNIT – II (Blended Learning)	
COMPOSITE BEAMS: Introduction, types of composite beams, analysis for stresses, differential shrinkage, serviceability limit state. Design for flexural and shear strength.	**6 Hrs**
UNIT – III	
TENSION MEMBERS: Introduction, Ties, Pressure pipes – fabrication process, analysis, design and specifications. Cylindrical containers- construction techniques, analysis, design and specifications. **STATICALLY INDETERMINATE STRUCTURES:** Introduction, Advantages of continuous members, effect of pre-stressing in indeterminate structures, methods of analysis for secondary moments, concordant cable profile, Guyon's theorem, Ultimate load analysis, Design of continuous beams and portal frames.	**9 Hrs**
UNIT – IV	
COMPRESSION MEMBERS: Introduction, Columns, short columns, long columns, bi-axially loaded columns, Design specifications. **SLAB AND GRID FLOORS:** Types of floor slabs, Design of one way, two way and flat slabs. Distribution of prestressing tendons, Analysis and design of grid floors.	**9 Hrs**
UNIT – V	
PRECAST ELEMENTS: Introduction, Pre-stressed concrete poles- manufacturing techniques, shapes and cross sectional properties, design loads, design principles. Railway sleepers-classification and Manufacturing techniques, design loads, analysis and design principles, Pre-stressed concrete pavements, slab and wall panels	**9 Hrs**

Course Outcomes: The students will be able to	
1	Define and estimate the losses on pre-stressed concrete structures.
2	Analyse and design Tension and Compression members of Pre-stressed Concrete structures.
3	Analyse and design composite Pre-stressed Concrete beams
4	Analyse and design Precast RC elements.

Text Books:	
1	Design of Pre-stressed concrete structures - Lin T.Y. and H. Burns - John Wiley & Sons, 1982.
2	Pre-stressed Concrete - N. Krishna Raju - Tata McGraw Hill, 3rd edition, 1995.
3	Pre-stressed Concrete Structures- P. Dayaratnam - Oxford & IBH, 5th Edition, 1991.
4	IS: 1343-2012.

Reference Book:	
1	G.S. Pandit and S.P. Gupta,Prestressed Concrete - CBS Publishers, 1993.
1	Praveen Nagarjun, Prestressed Concrete Design, Pearson Publishers.
2	Dr.S.N.Sinha&Dr.S.K.Roy, Fundamentals of Prestressed Concrete, S.Chand Publishers.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	√	√										√
CO2	√	√				√						√
CO3		√	√									√
CO4		√	√									√

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Sub: Advanced Pre-stressed concrete Structures		
Sub Code: CV821	**No of Credits** : 03 = 3**:0:0 (L:T:P)**	**No of lecture hours/week : 03**
Exam Duration : 3 hours	CIE + Assignment + SEE = 45 +5 + 50 = 100	**Total Hours : 39**

Objectives:

1. It provides method of design for shear, bending, torsion and ultimate flexural strength of PSC elements.
2. It provides a lucid exposition of theory and design of PSC in accordance with IS 1343-1980 code provisions.
3. It gives knowledge about design of deformation of PSC members and also presrtessed plates.

Sl. No	Syllabus Contents	No. Of Hours
1	**UNIT - 1** **ANCHORAGE ZONE STRESSES IN POST-TENSIONED MEMBERS:** Introduction, stress distribution in end block, investigations on Anchorage zone stresses, Magnel and Guyon's Methods, Comparative Analysis, Anchorage zone reinforcement. **SHEAR AND TORSIONAL RESISTANCE:** Shear and principal stresses, ultimate shear resistance, design of shear reinforcement, Torsion, Design of reinforcement for torsion.	**9**
2	**UNIT - 2** **COMPOSITE BEAMS:** Introduction, types of composite beams, analysis for stresses, differential shrinkage, serviceability limit state. Design for flexural and shear strength.	**6**

3	**UNIT – 3** **TENSION MEMBERS:** Introduction, Ties, Pressure pipes – fabrication process, analysis, design and specifications. Cylindrical containers- construction techniques, analysis, design and specifications. **STATICALLY INDETERMINATE STRUCTURES:** Introduction, Advantages of continuous members, effect of prestressing in indeterminate structures, methods of analysis for secondary moments, concordant cable profile, Guyon's theorem, Ultimate load analysis, Design of continuous beams and portal frames.	9
4	**UNIT – 4** **COMPRESSION MEMBERS:** Introduction, Columns, short columns, long columns, bi-axially loaded columns, Design specifications. **SLAB AND GRID FLOORS:** Types of floor slabs, Design of one way, two way and flat slabs. Distribution of pre-stressing tendons, Analysis and design of grid floors	**9**
5	**UNIT - 5** **PRECAST ELEMENTS:** Introduction, Prestressed concrete poles- manufacturing techniques, shapes and cross sectional properties, design loads, design principles. Railway sleepers-classification and Manufacturing techniques, design loads, analysis and design principles, Pre-stressed concrete pavements, slab and wall panels	**6**

TEXT Books / REFERENCE BOOKS / Web links:

1. **Design of Prestressed concrete structures - Lin T.Y. and H. Burns - John Wiley & Sons, 1982.**
2. **Prestressed Concrete- N. Krishna Raju - Tata McGraw Hill, 3rd edition, 1995.**
3. **Prestressed Concrete Structures- P. Dayaratnam - Oxford & IBH, 5th Edition, 1991.**
4. **Prestressed Concrete- G.S. Pandit and S.P. Gupta - CBS Publishers, 1993.**
5. **IS: 1343 : 1980.**

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Note: One Question to be set from each unit and for choice two questions to be set from any two units.

Course Outcomes:

CO1: The students gain the knowledge to estimate the losses in prestress.
CO2: With its up to date coverage and useful examples and valuable reference has been helping structural engineers.
CO3. Students are able to design of composite PSC beams
CO4. Students are capable of design and handle precast elements.

Cos	Mapping with POs
CO1	PO1, PO2, PO3
CO2	PO1, PO2, PO3, PO5
CO3	PO1, PO2, PO5, PO6, PO11
CO4	PO1, PO2, PO5, PO7, PO11, PO12

Sub Title : ADVANCED FOUNDATION DESIGN		
Sub Code: CV822	**No of Credits** : 03 = 3**:0:0 (L:T:P)**	**No of lecture hours/week : 03**
Exam Duration : 3 hours	CIE + Assignment + SEE = 45 +5 + 50 = 100	**Total Hours : 39**

Objectives:

1. Most civil engineering structures rest either on soil / rock. An analysis depending on type and shape of foundation is a prerequisite for any safe, economical and efficient design a sub structure.
2. The knowledge of the primary criteria to be considered in design and construction of deep foundations will expose the students face the challenges in dealing with the design of different types of foundations.

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Sub Title : QUALITY MANAGEMENT SYSTEM IN CIVIL ENGINEERING		
Sub Code: CV826	**No of Credits** : 03 = 3:0:0 **(L:T:P)**	**No of lecture hours/week : 03**
Exam Duration : 3 hours	CIE + Assignment + SEE = 45 +5 + 50 = 100	**Total Hours : 39**

Objectives:

1. To create the knowledge about the importance of quality management system.
2. To create the importance of ISO 9001 - 2000 quality management system.
3. To study the quality management system procedures.

Sl. No	Syllabus Contents	No. Of Hours
1	**UNIT – 1** **QUALITY MANAGEMENT SYSTEM – QMS:** Introduction – Evolution of Quality Management System, Element of Quality, Quality Management System, Concept of Process, Network of Process in an organization, ISO 9000 Family, Applying ISO 9000 in practice, Importance of ISO 9000, Benefits of ISO standards of society, Total Quality Management, Comparison of ISO 9000 and TQM – Quality related definitions – Leaders in Quality or Quality Gurus – Customer Orientation – Mahatma Gandhi. **IMPLEMENTING ISO 9001-2000 QUALITY MANAGEMENT SYSTEM:** ISO 9000 – Quality Management Principles, ISO 9000 Documents Content of ISO 9001 : 2000, ISO 9001-2000 Quality Management System Requirements, General Requirements, Documentation Requirements, Management Responsibilities, Resource Management, Product Realization, Measurement, analysis and Improvement Monitoring and Measurement, Non-conforming Product, Analysis of data, Improvement, Implementing ISO 9001-2000 Quality Management System.	**9**
2	**UNIT – 2** **PREPARING A ISO 9001-200 QUALITY MANAGEMENT SYSTEM FOR CIVIL ENGINEERING:** Quality Manual, Introduction, Scope of the Quality Manual, Applicability, Responsibility, Quality Management System, General Requirements, Management Responsibilities, Management Commitment, Customer Focus, Indian Construction Company Quality Policy, Planning Responsibility, Authority and Communication, Management Review, Resource Management, Provision of Resources, Human Resources Product Realization, Planning or Product Realization, Customer Related Processes, Design and Development, Purchasing, Production and Service Provision, Control of Monitoring and Measuring Devices Measurement, analysis and Improvement, Monitoring and Measurement, Non-conforming product, Analysis of data, Improvement	**6**
3	**UNIT – 3** **QUALITY MANAGEMENT SYSTEM PROCEDURES:** Introduction, procedure for management review, Format for writing procedures, procedure for preparing Quality plans/ work instructions, Contract review, Design control,	**9**

	Document and data control, Document numbering system, Change request, procedure for purchasing, procedure for control of customer supplied product, procedure for product identification and traceability, procedure for process control, procedure for inspection and testing, procedure for control of inspection, measuring and test equipments, procedure for inspection and test status, procedure for the control of non-conforming product, procedure for corrective and preventive action, procedure for handling, storage, packaging and delivery, control of quality records, procedure for internal quality audits.	
4	**UNIT – 4** **WORK INSTRUCTIONS:** Introduction – Document and Data Control, Material Procurement, Material Handling, Tendering and Estimating, Planning, Design, Training, Plant and Equipment, Bar Bending Schedule, Concrete Works, Earthworks and Compaction, General Soil Investigation works, Survey works, Concrete Repair Works, Road Works, Painting Works, Water Proofing works, Drainage Works, Quality Assurance and Control, Patching and Transportation of Concrete. **METHOD STATEMENT:** Introduction, Concrete Works, Earthworks and Compaction, General Soil Investigation works, Survey works, Concrete Repair works, Concrete Demolition works, Road Works, Fencing works etc.	6
5	**UNIT – 5** 1. **JOB DESCRIPTION:** Introduction, Job Description of : Managing Director, Project Manager, Site Manager, Site Engineer, QA/QC Engineer, Foreman, Typist/Clerk, Design Engineer, Planning Engineer. 2. **QUALITY CONTROL PLAN/INSPECTION AND TEST PLANS (ITPS):** Introduction-Preparation of Project Quality Plans, Inspection and Test plant. **QUALITY RECORD/FORMATS:** Preparation of Standard Formats: Revision Control form, Document Distribution List, Document Master List, Non-Conformance Report, Store Issue/Receipt Voucher, Local Purchase Order, Material Stock Card, Audit Notification, Quality Audit Report, Corrective Action Report, Calibration Record, Calibration Master Sheet, Work Instruction, Job Description, Contract/Tender Review Form, Quantity Survey Estimation/Take off sheet, Material/Plant Requisition, Drawing Schedule, Bar-bending Schedule, Design Calculation Sheet, Request for Inspection, Concrete Inspection Request, Inspection Check List – Drainage, Painting, Request for Inspection-Concrete Repair, Accident Report Form, Concrete Production, Concrete Compressive Strength Test Results, Request to Conduct Cube Test, Quality Awareness Training Record.	9

REFERENCE BOOKS:

1. **Quality Management System in Civil Engineering** – D.S. Rajendra Prasad – ISO 9001-2000, Sapna Book House, Bangalore.
2. **Productivity and Quality Improvement** – John L. Hardesky – McGraw Hill Book Company.
3. **ISO 9000 Concepts, Methods, Implementation**- Bagchi – Wheeler Publishing.
4. **Training Manual on ISO 9000-2000 and TQM**- Girdhar J. Gyani – Raj Publishing House.
5. **Documenting Quality for ISO 9000 and other Industry Standards** – Gary E. MacLean –

Tata McGraw Hill Publishing Company Limited.
6. **Total Quality Management for Engineers** – Mohamed Zairi – Aditya Books Private Limited.
7. **Data Book for Civil Engineers Field Practice** – Elwyn E. Seelye – John Wiley & Sons, Inc.
8. **Properties of Concrete** – A.M. Neville – ELBS Publications.
9. IS : 456-2000 : Indian Standard Specifications for Plain and Reinforced Concrete Code of Practice : 4th Revision, Bureau of Indian Standards.
10. IS : 383-1990 : Indian Standard Specifications for Coarse and Fine Aggregates from Natural Sources for Concrete : Bureau of Indian Standards.
11. **Quality Management –** Kanishka Bedi –(Oxford university press).

/ Web links:

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www.iitg.ernet.in>rkbc>presentation
www.nptel.org.in
http://books.google.co.in

Note : One Question to be set from each unit and for choice two questions to be set from any two units.

Course Outcomes:

CO1: Students will come to know about the importance of quality management, conveyance, treatment.
CO2: The concept of disposal of industrial wastewater, Quality control plan / inspection and test plans can be acquired.
CO3. Students are able to understand the basic principles of ISO 9001-2000.

Cos	Mapping with POs
CO1	PO1, PO2
CO2	PO1, PO2, PO3, ,
CO3	PO1, PO2, PO8, PO11, PO12,

2016-2017

Dr. Ambedkar Institute of Technology
Department of Civil Engineering

Minutes of the 7th BOS meeting held on 18.06.2016

The meeting commenced at 9.00 AM on 18-06-2016 in the M Tech class room of the Silver jubilee building, Dr. AIT under the chairmanship of Dr. B. Shivakumaraswamy, HOD Civil Engineering Department. The Chairman welcomed all the members of BOS to the meeting and presented the scheme and syllabus of BE (Civil) for the approval. The following dignitaries of BOS attended the meeting

1. Dr. B. Shivakumaraswamy, Professor & Head, Dr. AIT. Bangalore
2. Dr. N.S. Kumar, VTU Nominee, Professor of Civil Engg. CED, GCE, Ramanagaram.
3. Dr. Chandrakishen, Professor of Civil Engineering, IISc, Bangalore.
4. Dr. Ganagadhar, S. Professor of Civil Engineering, CED, UVCE, Bangalore.
5. Dr. Udayashankar, Professor of Civil Engineering, CED, RVCE, Bangalore.
6. Dr. Nataraj, Professor of Civil Engineering, CED, SJCE, Mysuru.
7. Dr. K. Shantharaju, Project Head, PSC India Infrastructure Pvt Ltd, Pune Maharastra State
8. Ms. Mamatha ME, (PhD) Asst. Prof. EWIT, Bangalore
9. Dr. M.N. Hegde, Professor, CED, Dr. AIT. Bangalore
10. Dr. K.V.Lokesh, Professor, CED, Dr. AIT. Bangalore
11. Dr. S. Vijaya, Professor, CED, Dr. AIT. Bangalore
12. Dr. S.D. Venkataraj mohan, Professor, CED, Dr. AIT. Bangalore
13. Dr. S.G. Ramachandraiah, Associate Professor, CED, Dr. AIT. Bangalore
14. Dr. K.V. Manjunatha, Associate Professor, CED, Dr. AIT. Bangalore
15. Mr. R. Madhusudhan, Asst. Professor, CED, Dr. AIT. Bangalore
16. Mr. M. R. Suresh, Associate Professor, CED, Dr. AIT. Bangalore
17. Mr. T. Chandrashekariah, Associate Professor, CED, Dr. AIT. Bangalore
18. Mr. H.R.Srinivas, Asst. Prof. CED, Dr. AIT. Bangalore
19. Mr. H. Anantharam, Associate Professor, CED, Dr. AIT. Bangalore
20. Mr. G.P. Manjunath, Associate Professor, CED, Dr. AIT. Bangalore
21. Mr. M. Krishnamurthy, Associate Professor, CED, Dr. AIT. Bangalore
22. Mr. Ankesh, S.B, Asst. Professor, CED, Dr. AIT. Bangalore
23. Mr. Dharshan M.K, Asst. Professor, CED, Dr. AIT. Bangalore
24. Mrs. Poornima Biranagi, Asst. Professor, CED, Dr. AIT. Bangalore
25. Ms. Vaibhavi, Asst. Professor, CED, Dr. AIT. Bangalore
26. Mrs. Kavya,H.K Asst. Professor, CED, Dr. AIT. Bangalore

Agenda

- Review and approval of the proposed Scheme of Study and Syllabus from I Semester to VIII Semester BE Civil Engineering courses to be introduced for the Academic year 2016-17.

- The BOS Chairman presented the proposed Curriculum design, the Scheme and Syllabus of BE Civil Engineering courses to be introduced for the academic year 2016-17 through power point. The hard copies of the proposed Scheme and Syllabus from I Semester to VIII semester BE Civil Engineering courses also distributed to all the members of BOS for a detailed review and sought their opinion with regard to any addition / correction / deletion / modification in the proposed syllabus and accordingly all the members of BOS after a thorough review and discussion made the following suggestions / corrections / modification as detailed below:

1. Dr. Chandrakishen, Professor IISc, Bengaluru, suggested shifting analysis of trusses from unit 2 to unit 1 and deflection of beams (moment area method and conjugate beam method) from unit 1 to unit 2. Also suggested to change the title of the unit 5 as Analysis of indeterminate arches.
2. In addition to the study of kinematics of rectilinear motion, Projectiles and kinetics of rigid bodies, the super elevation and banking portion is introduced in ECE and Engg. Mechanics of I Sem. BE for all branches of Engineering as per the decision taken in the departmental BOS meeting. The Board has accepted to include the suggestions.
3. Dr. Chandrakishen, Professor IISc / BOS has suggested to modify the title of the subject CV31 Building Materials and Construction instead of Building Materials and Construction Technology and the suggestion has been incorporated.
4. Dr. N S Kumar, member of VTU nominee has suggested including derivation of equations for thick and thin cylinders in addition to application in unit 4 in Strength of Materials.
5. Dr. Udayashankar, Prof. of RVCE has suggested to give more credit to Structures subject but the members expressed to give maximum of 4 credits per subject.
6. Dr. Nataraj has suggested to change the title of unit 4 in Fluid Mechanics as flow through pipes and suggested some reference books and the BOS has accepted.
7. Dr. Chandrakishen, Professor IISc / Dr. K. Shantharaju / Dr. Gangadhar have advised to change load for footing as Proportioning of footing for equal settlement and the suggestion has been incorporated.

8. The Chairman proposed to introduce computer Aided RC drawing (Part-A) and Part-B, the design as per IS: 456-2000 in Design and drawing of RC Structures (CV61) as discussed in the department board meeting and the Board has accepted the proposal.
9. Dr. Nataraju. Professor of Civil Engg. SJCE proposed to incorporate Arch dams in Unit 2 of Hydraulic structures & irrigation design – drawing and the board has accepted to incorporate the same.
10. Dr. Nataraju. Professor of Civil Engg. SJCE / Dr. Udayashankar / Mamatha. A, Alumni representative advised to increase the credit for the Extensive Survey Project in VI Sem. BE but the board has not accepted.
11. Mr. T chandrasekaraiah, Associate Professor asked for more credit for Transportation Engineeing-I, but the board suggested to keep the same credit and increase the number of hours of teaching.
12. The members of BOS suggested carrying out New Tank Project and Old Tank Project surveying at SS Ghati using Total Station and the chairman accepted the suggestion and incorporated.
13. Dr. N S Kumar, member of VTU nominee has suggested to remove tubular connection in welded joints in the subject Cv71, Design of Steel Structures and the BOS members agreed for the suggestion.
14. The Chairman proposed to introduce computer Aided steel drawing (Part-A) and Part-B, the design as per IS: 800-2007 in Design and drawing of Steel Structures (CV81) as discussed in the department board meeting and the Board has accepted the proposal.
15. Dr. N S Kumar, member of VTU nominee has suggested. to remove the design of bolted plate girder in the subject design and drawing of Steel Structures of VIII Sem. BE but the board rejected the proposal and to retain the same in the syllabus.
16. Dr. K.V. Lokesh suggested to incorporate Indoor Air Pollution in the subject CV755, Air Pollution and control (Unit 4) and the board has accepted to incorporate.
17. Dr. K. Shantharaju, Industrial Expert advised to include Construction Project Management (CV758) as Core subject instead of Elective but the board has not come to any conclusion because of credit allotment in the core subjects.

18. Dr. Udayashankar B.C. Prof of RVCE, suggested adding code books in the subject CV834, Advanced design of Steel Structures and the same is incorporated.
19. Dr. SDV / HAR / Dr. K.V. Lokesh suggested including environmental impact due to the construction activities in Highway project in the subject CV836, Environmental Impact Assessment as discussed in the department meeting and the board has accepted to incorporate the same in Unit 5.
20. Dr. Chandrakishen, Professor IISc / Dr. K. Shantharaju, Industrial Expert advised to include Repair and Rehabilitation of Structures as Elective and the board has accepted to include the subject in VI Semester electives.
21. The BOS members have suggested including NDT in concrete laboratory syllabus for 7th semester B. E. Since, the equipments required are procured under VTU research grants for the project "Health monitoring, repair and rehabilitation of structures" the suggestion is considered and implemented.
22. As per the suggestions of BOS members, the Advanced concrete Technology subject has been introduced in VI Sem. BE instead of VIII Sem. because to give more time for the students to carry out their main Project.
23. The BOS members suggested to procure latest licensed version soft ware's such as Auto CAD, STAAD Pro, E-Tabs, ANSYS etc for academic purpose.

With the long discussion, all the members are agreed to make changes and modification in the syllabus for the academic year 2016-17. With this, meeting was concluded with vote of thanks to the chair by Dr. K.V. Manjunath.

(Dr. B. Shivakumara swamy)
Chairman, BOS,
Prof.& Head, Dept. of Civil Engineering
Dr. AIT, Bangalore- 56.

W/c to Copy:

1. All the members of BOS for information
2. Principal, Dr. AIT, Bangalore
3. Dean Academic, Dr. AIT, Bangalore
4. Office copy.

2017-2018

Dr. Ambedkar Institute of Technology
Department of Civil Engineering

Minutes of the 7th BOS meeting held on 25.03.2017

The meeting commenced at 10.00AM on 25-03-2017 in the M Tech class room of the Silver jubilee building, Dr. AIT under the chairmanship of Dr. B. Shivakumaraswamy, HOD Civil Engineering Department. The Chairman welcomed all the members of BOS to the meeting and presented the scheme and syllabus of BE (Civil) and M Tech (CSE) for the approval. The following dignitaries of BOS attended the meeting

1. Dr. B. Shivakumaraswamy, Professor & Head, Dr. AIT. Bangalore
2. Dr. Chandrakishen, Professor of Civil Engineering, IISc, Bangalore.
3. Dr. Renukadevi, VTU Nominee, Professor of Civil Engg. CED, RVCE, Bengaluru ~~(23/05/2017)~~.
4. Dr. Ravikumar A. S. Professor of Civil Engineering, CED, UVCE, Bangalore.
5. Dr. Mayanaik, Professor and Head, Civil Engineering, CED, BMSCE, Bangalore.
6. Prof. S. Bhavanishankar Professor of Civil Engineering, CED, UVCE, Bangalore.
7. Sri. Chinnasomaiah, Chief Engineer (Civil), KPC, Bengaluru
8. Mr. Rajagopal R.S, Scientist E, NAL, Bengaluru
9. Mr. Arunkumar ME, (PhD) Asst. Prof. EWIT, Bangalore
10. Dr. S. Vijaya, Professor, CED, Dr. AIT. Bangalore
11. Dr. S.D. Venkataraj mohan, Professor, CED, Dr. AIT. Bangalore
12. Dr. S.G. Ramachandraiah, Associate Professor, CED, Dr. AIT. Bangalore
13. Mr. R. Madhusudhan, Asst. Professor, CED, Dr. AIT. Bangalore
14. Mr. H.R. Srinivas, Associate. Prof. CED, Dr. AIT. Bangalore
15. Mr. M. R. Suresh, Associate Professor, CED, Dr. AIT. Bangalore
16. Dr. Chandraashekar, Associate. Prof. CED, Dr. AIT. Bangalore
17. Mr. T. Chandrashekariah, Associate Professor, CED, Dr. AIT. Bangalore
18. Dr. K.V. Lokesh, Professor, CED, Dr. AIT. Bangalore
19. Dr. K.V. Manjunatha, Associate Professor, CED, Dr. AIT. Bangalore
20. Mr. H. Anantharam, Associate Professor, CED, Dr. AIT. Bangalore
21. Mr. G.P. Manjunath, Associate Professor, CED, Dr. AIT. Bangalore
22. Mr. M. Krishnamurthy, Associate Professor, CED, Dr. AIT. Bangalore
23. Mr. Ankesh, Asst. Professor, CED, Dr. AIT. Bangalore
24. Mr. Darshan M.K, Asst. Professor, CED, Dr. AIT. Bangalore
25. Miss Poornima, Asst. Professor, CED, Dr. AIT. Bangalore
26. Smt. Kavya H.K, Asst. Professor, CED, Dr. AIT. Bangalore
27. Smt. Vaibhavi B.D, Asst. Professor, CED, Dr. AIT. Bangalore
28. Smt. Supritha, Asst. Professor, CED, Dr. AIT. Bangalore

Agenda

- Review and approval of the proposed Scheme of Study and Syllabus from I Semester to VIII Semester BE Civil Engineering courses to be introduced for the Academic year 2017 - 18.

- Review and approval of the proposed Scheme of Study and Syllabus from I Semester to IV Semester M Tech structural Engineering courses to be introduced for the Academic year 2017 - 18.
- The BOS Chairman presented the proposed Curriculum design, the Scheme and Syllabus of BE Civil Engineering courses and also M Tech (Structural Engineering) to be introduced for the academic year 2017-18 through power point. The hard copies of the proposed Scheme and Syllabus from I Semester to VIII semester BE Civil Engineering courses also distributed to all the members of BOS for a detailed review and sought their opinion with regard to any addition / correction / deletion / modification in the proposed syllabus and accordingly all the members of BOS after a thorough review and discussion made the following suggestions / corrections / modification as detailed below:

1. Dr. Chandrakishen, Professor of Civil Engineering, IISc suggested to introduce numerical problems in D'Alembert's Principle in the subject ECE and Engineering. Mechanics of I Sem. BE for all branches of Engineering (common subject for I year). The Board has accepted to include the suggestions.
2. Prof. S. Bhavanishankar suggested to incorporate Cement Concrete blocks, Stabilized mud blocks, Sizes requirement of good blocks, Mortar- types and requirements content in the I unit of Building materials and Construction. Timber chapter is included in unit 3 which consists of doors and windows. The Board has accepted the suggestion.
3. Dr. Ravikumar suggested to include the measurement of fluid flow through Venturi flume in the Fluid mechanics theory and the Board has accepted the suggestion.
4. In the Surveying Practice–II syllabus, the contents such as difference in elevation between two points and gradient, Distance between two inaccessible points using Total Station is introduced as per the suggestion made by Chinnasomaiah, Industrial expert and the Board also accepted the same.
5. Mr. M. R. Suresh expressed to include X-ray diffraction technique of identification of clay minerals, confined and un confined aquifer in unit 3 of Geotechnical engineering –I of V Sem BE, The Board has accepted after discussion.
6. Dr. Ravikumar and Dr. Chandrakishen have suggested to introduce study of performance of Multi-stage cenrifugal pump and Performance characteristics of

Francis Turbine in Fluid mechanics Lab since the equipments are available and the Board has accepted.

7. Description of Mano rail to introduce in transportation engineering –I has been accepted by the board as per the suggestion made by Mr. R. S Rajagopal Scientist E, NAL.
8. Dr. Chandrakishen, Professor IISc advised to include two reference books for Strength of Materials and Structural Analysis by Hibbeler.
9. Pile foundation unit is modified as per the advice of Internal and External BOS members in Geotechnical engineering II subject and the board has accepted the modifications.
10. The relative density for sand and determination of free swell and differential swell for soils, and assessing SBC of soil has been introduced in the subject Geotechnical engineering lab as per the discussion held in the meeting and the board has accepted.
11. The BOS members have suggested to have four CO's in the subject CV62 Transportation Engineering-II and the same is considered.
12. The syllabus content of the mini project has been discussed and accepted by the board.
13. DESIGN AND COMPUTER AIDED DRAWING OF STEEL STRUCTURES for VIII Sem. BE (Civil) has been introduced in place of Design and drawing of steel Structures. Here Part-A, Drawing shall be done using CAD and Practical examination is to be conducted separately for 40 marks. Part-B Design and drawing as per IS:800-2007 and Theory examination shall be conducted separately for 60 marks in 3 hours, the Board has accepted the modification.
14. The syllabus content of main project and seminar has been discussed in detail for VIII Sem. BE and accepted by the board.
15. The subject Advanced concrete Technology is shifted from VIII sem. BE to VII Sem. BE of 2014-15 batch to reduce the number of credits in VIII sem. BE as per the suggestions by the BOS members.
16. Dr. Renukadevi suggested one reference book "Engineering Mechanics by Ferdinand Singer for I semester BE Civil and it is incorporated.
17. Dr. Chandrakishen, suggested to have Advanced Design of Steel Structures as core subject than Design of Plates and shells in M Tech Second semester. The board has accepted the suggestion.

18. The board members discussed the syllabus content of mini project work and also main Project for M Tech (CSE) and accepted the same.
19. Dr. Chandrakishen and Sri. Chinnasomaiah have suggested to include Derivation of fourth order differential equation, relationship between moment and curvature and deflection and Raleigh-Ritz .method in design of Plates and Shells of II Semester M Tech and the board has accepted after thorough discussion.
20. Dr. Renukadevi Opined that Project Management and maintenance subject is essential for M Tech students and is to be incorporated in the syllabus. The BOS members agreed for the suggestion and it will be incorporated in the next academic year.
21. The BOS members suggested to procure latest Licensed version soft ware's such as Auto CAD, STAAD Pro, E-Tabs, Ansys etc for academic purpose. The BOS members expressed their happiness for having Research Methodology and Thesis writing in II Sem. M Tech (CSE).

With the long discussion, all the members are agreed to make changes and modification in the syllabus for the academic year 2017-18. With this, meeting was concluded with vote of thanks to the chair.

(Dr. B. Shivakumara swamy)
Chairman, BOS,
Prof.& Head, Dept. of Civil Engineering
Dr. AIT, Bangalore- 56.

W/c to Copy:

1. All the Members of BOS for information
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3. Dean Academic, Dr. AIT, Bangalore
4. Office copy.

2018-2019

ADr. Ambedkar Institute of Technology
Department of Civil Engineering

Minutes of the 8th BOS meeting held on 25.06.2018

The meeting commenced at 9.30AM on 25-06-2018 in the M Tech class room of the Silver jubilee building, Dr. AIT under the chairmanship of Dr. B. Shivakumaraswamy, HOD Civil Engineering Department. The Chairman welcomed all the members of BOS to the meeting and presented the scheme and syllabus of BE (Civil) and M Tech (CSE) for the approval. The following dignitaries of BOS attended the meeting

1. Dr. B. Shivakumaraswamy, Professor & Head, Dr. AIT. Bangalore
2. Dr. Renukadevi, VTU Nominee, Professor of Civil Engg. CED, RVCE, Bengaluru
3. Dr. Ravikumar A. S. Professor of Civil Engineering, CED, UVCE, Bangalore.
4. Dr. Mayanaik, Professor and Head, Civil Engineering, CED, BMSCE, Bangalore.
5. Prof. S. Bhavanishankar Professor of Civil Engineering, CED, UVCE, Bangalore.
6. Sri. Chinnasomaiah, Chief Engineer (Civil), KPC, Bangalore
7. Sri. Rajagopal R.S, Scientist E, NAL, Bangalore
8. Mr. Arunkumar ME, (PhD) Asst. Prof. EWIT, Bangalore
9. Dr. S. Vijaya, Professor, CED, Dr. AIT. Bangalore
10. Dr. S.D. Venkataraj mohan, Professor, CED, Dr. AIT. Bangalore
11. Dr. S.G. Ramachandraiah, Associate Professor, CED, Dr. AIT. Bangalore
12. Mr. H.R. Srinivas, Associate. Prof. CED, Dr. AIT. Bangalore
13. Mr. M. R. Suresh, Associate Professor, CED, Dr. AIT. Bangalore
14. Mr. T. Chandrashekariah, Associate Professor, CED, Dr. AIT. Bangalore
15. Dr. K.V. Manjunatha, Associate Professor, CED, Dr. AIT. Bangalore

Agenda

- Review and approval of the proposed Scheme of Study and Syllabus from I Semester to VIII Semester BE Civil Engineering courses to be introduced for the Academic year 2018 – 19.
- Review and approval of the proposed Scheme of Study and Syllabus from I Semester to IV Semester M Tech Structural Engineering courses to be introduced for the Academic year 2018 - 19.
- The BOS Chairman presented the proposed Curriculum design, the Scheme and Syllabus of BE Civil Engineering courses and also M Tech (Structural Engineering) to be introduced for the academic year 2018-19 through power point. The hard copies of the proposed Scheme and Syllabus from I Semester to VIII semester BE Civil Engineering courses and M Tech also distributed to all the members of BOS for a detailed review as per AICTE / VTU guide lines and sought their opinion with regard to any addition / correction / deletion / modification in the proposed syllabus and accordingly all the members of BOS after a thorough review and discussion made the following suggestions / corrections / modification as detailed below:

1. The chairman draw the attention of BOS members regarding the limitations of credits and number of subjects as per the AICTE/VTU guide lines and emphasized on change of credits for few subjects in the benefit of students to introduce new syllabus.
2. As per the discussion in the college council meeting to reduce number of credits from 150 to 135 for Civil engineering courses (III Sem. to VIII Sem. BE) and 100 to 88 for M Tech (CSE) from the academic year 2018 – 19 onwards, the chairman presented and sought their approval.
3. The title of the some of the courses from existing scheme was re-named/changed and they are presented in the scheme of study.
4. Some of the existing courses are merged and made it as a single couse / subject as presented in the scheme of study.
5. The scheme and syllabus for first/second semester common to students of all branches, 18CV14 / 24 Civil engineering and mechanics for three credits was discussed and got approval.
6. Dr. Renukadevi suggested to include applications in third unit of 18CV14/24 and it was approved also suggested one reference book "Engineering Mechanics by Ferdinand Singer it is incorporated..
7. In the present curriculum (2018-19) HS01 Environmental studies is introduced in third and fourth semester of BE for all branches.
8. Prof. S. Bhavanishankar suggested incorporating construction chemicals and new materials of construction in the subject 18CV31. Though it is relevant considering the advancement in the technology, but some of the members after going through the syllabus content opined that it is voluminous hence it is not included. He also suggested to include self compacting concrete (SCC) in the subject 18CV41 and the board has accepted.
9. Dr. K V Manjunath suggested shifting unit 1 of 18CV41 to 18CV31 and the board has not accepted.
10. Chinnasomaiah, Industrial expert suggested to change the teaching methodology form conventional to computer aided (Auto CAD) for the course Building planning and drawing and the board has accepted and the subject is renamed as computer Aided Building planning and drawing for the same credit for the students admitted to 2018-19.
11. Concrete and Highway materials lab is allotted to IV Sem. BE civil curriculum as per the suggestion of BOS members.

12. The extensive survey was converted as Advanced survey practice as a non credited course in the VI Sem. BE.
13. The course Hydraulic structures and Irrigation drawing is made it as departmental elective due to shortage of credits. However, Dr. Ravikumar suggested to include Reservoir planning in the core course Hydrology and Irrigation and the board has accepted.
14. The Electives in the various groups are discussed and one of the BOS member Sri Rajagopal R S suggested to keep Advanced Pre-stressed concrete Structure in group 5 and the board has accepted.
15. Prof. S. Bhavanishankar suggested incorporating, the assessment of residual strength of distressed structural elements in the main project of BE and M Tech and the board has accepted.
16. The board members suggested to give seminar / mini project topics from the important units of electives and the board has accepted.
17. Description of Mano rail in the course Railway, Airport and Harbour engineering has been accepted by the board as per the suggestion made by Mr. R. S Rajagopal Scientist E, NAL.
18. The BOS members are suggested to procure equipments for the structural engineering lab,(M Tech) to measure natural period, frequency and mode shapes and the board has accepted. The BOS members expressed their happiness for having Research Methodology and Thesis writing in II Sem. M Tech (CSE).
19. The BOS members expressed their views to modify the syllabus content of newly introduced subject Design of composite Structural Elements as an elective in IV Sem. M Tech. and Dr. Renukadevi suggested to keep Advanced Structural Analysis instead of the above subject.
20. The BOS members suggested to send M Tech students to CPRI Bengaluru or SERC Chennai to do their M Tech projects on transmission towers and advanced research and the board has accepted. Also The BOS members suggested to procure latest Licensed version soft ware's such as STAAD Pro, NASTRON (Analysis software) etc for academic purpose.

With the long discussion, all the members are agreed to make changes and modification in the syllabus for the academic year 2018-19. With this, meeting was concluded with vote of thanks to the chair.

(Dr. B. Shivakumara swamy)
Chairman, BOS,
Prof.& Head, Dept. of Civil Engineering
Dr. AIT, Bangalore- 56.

W/c to Copy:

1. All the Members of BOS for information
2. Principal, Dr. AIT, Bangalore
3. Dean Academic, Dr. AIT, Bangalore
4. Office copy.

2019-2020

Dr. Ambedkar Institute of Technology
Department of Civil Engineering

Minutes of the 8th BOS meeting held on 25.05.2019

The meeting commenced at 9.30AM on 25-05-2019 in the Seminar hall of the Silver jubilee building, Dr. AIT under the chairmanship of Dr. B. Shivakumaraswamy, HOD Civil Engineering Department. The Chairman welcomed all the members of BOS to the meeting and presented the scheme and syllabus of BE (Civil) and M Tech (CSE) for the approval. The following dignitaries of BOS attended the meeting

1. Dr. B. Shivakumaraswamy, Professor & Head, Dr. AIT. Bengaluru
2. Dr. Chandrakishan, Professor, IISc, Bengaluru
3. Dr. Krishnaiah, VTU Nominee, Professor of Civil Engg. CED, MCE, Hassan
4. Dr. Renukadevi, Professor of Civil Engg. CED, RVCE, Bengaluru
5. Dr. Ramaraj, Professor and head of Civil Engineering, CED, DSCE, Bengaluru
6. Dr. M N Hegde, Professor, CED, Dr. AIT. Bengaluru
7. Dr. S. Vijaya, Professor, CED, Dr. AIT. Bengaluru
8. Dr. S.D. Venkataraj mohan, Professor, CED, Dr. AIT. Bengaluru
9. Dr. S.G. Ramachandraiah, Associate Professor, CED, Dr. AIT. Bengaluru
10. Dr. M. R. Suresh, Associate Professor, CED, Dr. AIT. Bengaluru
11. Mr. T. Chandrashekariah, Associate Professor, CED, Dr. AIT. Bengaluru
12. Dr. K.V. Manjunatha, Associate Professor, CED, Dr. AIT. Bengaluru
13. Dr. Chandrrashekar, Associate Professor, CED, Dr. AIT. Bengaluru
14. Dr. Raghunathan, Scientist E, SERC, Tower Testing research Centre
15. Sri. Chinnasomaiah, Chief Engineer (Civil), KPC, Bengaluru
16. Mrs. Nagashree MTech, (PhD), Asst. Prof. MSRIT, Bengaluru

Agenda

- Review and approval of the proposed Scheme of Study and Syllabus from I Semester to VIII Semester BE Civil Engineering courses to be introduced for the Academic year 2019–20
- Review and approval of the proposed Scheme of Study and Syllabus from I Semester to IV Semester M Tech Structural Engineering courses to be introduced for the Academic year 2019-20.
- Review of curriculum as per the guide lines of AICTE/VTU.
- The BOS Chairman presented the proposed Curriculum design, the Scheme and Syllabus of BE Civil Engineering courses and also M Tech (Structural Engineering) to be introduced for the academic year 2019-20 through power point. The hard copies of the proposed Scheme and Syllabus from I Semester to VIII semester BE Civil Engineering courses and M Tech also distributed to all the members of BOS for a detailed review as per AICTE / VTU guide lines and sought their opinion with regard to any addition / correction / deletion / modification in the proposed syllabus and

accordingly all the members of BOS after a thorough review and discussion made the following suggestions / corrections / modification as detailed below:

1. The chairman draw the attention of BOS members regarding the reduction of credits and number of subjects as per the AICTE/VTU guide lines and emphasized on change of credits for few subjects in the benefit of students to introduce new syllabus.
2. The Curriculum design for BE Civil engineering courses (III Sem. to VIII Sem. BE) from 150 to 135 credits and M Tech (CSE) from 100 to 88 from the academic year 2019–20 onwards was presented by the chairman and sought their approval.
3. The syllabus content of few courses are merged and made it as a single course / subject as presented in the scheme of study.
4. The subject title of some of the courses from existing scheme was re-named and they are presented in the scheme of study.
5. The scheme and syllabus for first/second semester common to students of all branches, 18CV14/24 Civil engineering and mechanics for three credits was discussed and got approval.
6. Dr. Chandrakishen, Profesor IISc, Bengaluru has suggested to incorporate video clips during lecture hour in the class related to force system, cetroid, MI and friction in engineering mechanics course.
7. Chinnasomaiah, Industrial expert suggested to incorporate leadership in energy efficient design of components in Building material and construction course.
8. Mrs. Nagashree Alumni of Dr. AIT suggested including contents on re-use of building materials in CV31 course.
9. Dr. Chandrakishen, Profesor IISc, suggested reducing the syllabus in CV32 (SOM) by removing Merchant-Rankine's formula and Mohr's circle of strain.
10. Dr. Ramaraju & Dr. Chandrakishen, Profesor IISc suggested to remove chain / tape surveying, Compass surveying in Survey theory and to include the same in Surveying practice has self study component/demonstration. Also they have suggested to have one unit specially on Total Station.
11. The Internal and External members are agreed to combine Geology theory and Lab in order to reduce the number of credits as per the guide lines.
12. Dr. Chandrrasekar sought to removal of EIA in HS01 subject and the members accepted the same.
13. Dr. Ramaraju suggested to include topic on method of determining the ground water quantity in the course water supply engineering

14. Dr. Renukadevi and Dr. K V Manjunath suggested to modify the contents of Unit 4 &5 of the subject Hydrology and Irrigation and the Board has accepted the same.
15. Dr. Chandrakishen and Dr. Raghunathan suggested including the knowledge curve in determining the strength parameters in Concrete technology.
16. Chinnasomaiah, Dr. Ramaraju suggested to introduce the Advanced Sequential Batch Reactor (ASBR) technology in Wastewater Treatment and Disposal subject.
17. Dr. Chandrakishen, Dr. Raghunathan, Nagashree and Dr. Renukadevi suggested to include plastic analysis instead of Kani's method in the subject Structural Analysis.
18. Dr. Chandrakishen & Chinnasomaiah, has suggested to include Metro rail system in one of the unit in the subject Transportation Engg II.
19. Dr. Ramaraju has suggested to include Radioactive solid waste in SWM & A case study on land fill liners in ISWM subject.
20. Dr. S D Venkataraj mohan & Dr. Raghunathan, suggested to include guide lines of Real Estate Regulation Act (RERA) in Estimating and costing subject
21. Dr. Ramaraju has suggested including experiments using high volume sampler in environmental Engineering Lab.
22. Chinnasomaiah, Dr. Ramaraju & Dr. S D Venkataraj mohan have suggested to include zero level discharge industrial wastewater in Unit IV of IWWT.
23. Dr. Ramaraju & Dr. S D Venkataraj mohan suggested to include ecology contents in CVE03 subject.
24. Dr. Raghunathan, suggested to include skill based design and fabrication in the design of Steel Structure.
25. Dr. Krishnaiah suggested to register Mooc / swayam online courses for final year students and staffs of the department.
26. Dr. Raghunathan has suggested to change the title of the course Structural engg Lab II as Computational Mechanics Lab and the Board has accepted.
27. One of the BOS members suggested to keep only Stiffness matrix method in Computational Structural Mechanics and the board has not accepted.
28. Dr. Chandrakishen, Dr. Raghunathan, has suggested to include design of Strut and Tie members in Advanced design of Steel Structure.
29. Dr. Renukadevi has suggested to change the title of unit V as continuous system in 18CSE13 Mechanics of deformable bodies.
30. Dr. Raghunathan and Chinnasomaiah, has suggested to include Geopolymer concrete in unit I of Special concrete.

31. Nagashree has suggested to incorporate micro structure of concrete using SEM and the board has accepted.
32. Dr. Chandrakishen, Dr. Raghunathan and Nagashree have suggested Design of Precast and composite Structure as one of the elective in any one of the Semester.
33. Dr. Raghunathan has suggested to include prefabrication of Buildings in the elective.
34. Dr. Raghunathan and Chinnasomaiah, has suggested to include Reliability and Risk Analysis in the course Reliability analysis of Structures.
35. Dr. Chandrakishen, has suggested to include concept of Pre-engineered structural components in the subject Advanced design of structures.
36. Dr. Chandrakishen, has suggested inclusion of non-linear analysis of structures in the course Finite element Analysis.
37. Dr. Raghunathan has suggested inclusion of topic Transmission Towers in Design of Tall Structures.
38. Dr. M N Hegde suggested to include MAT Lab, Eigen Value in the Structural Engg Lab –II.
39. Dr. Chandrakishen, has suggested inclusion transver girders in III unit of Design of Tall Structures.
40. Dr. Raghunathan and Nagashree have suggested to introduce Chapters on Patents and Intelectual Property rights in Research methodology course.

With the long discussion, all the members are agreed to make changes and modification in the syllabus for the academic year 2019-20. With this, meeting was concluded with vote of thanks to the chair.

(Dr. B. Shivakumara swamy)
Chairman, BOS,
Prof.& Head, Dept. of Civil Engineering
Dr. AIT, Bangalore- 56.

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2020-2021

Dr. Ambedkar Institute of Technology, Bangalore-56.

DEPARTMENT OF CIVIL ENGINEERING

No. CV/200/BOS/2020-21 Dated: August 14, 2020

FINAL BOARD of STUDIES (BOS) MEETING NOTIFICATION for UG and PG PROGRAMME

Subject: - Revision in the Existing Syllabus of I, II (common subject for both semester) and IV Semester and Syllabus Proposal for the V and VI Semester and also proposal for PG I & II semester (Structural Engineering) Reg.,

The internal Board of Studies (BOS) meetings held on Jul 09, 2020 considered the recommendations of the Department Academic Program Committee (DAPC) for the changes in the existing syllabus of I, II, III and IV Semester and proposal for the V and VI semester syllabus of the upcoming Odd Semester 2020-21.

The internal BOS committee decided as under for **UG Program**:

Sl. No.	Semester	Unit	Existing Portion of the Syllabus	Modified Portion of the Syllabus	Remarks
1	I & II (18CV14 / 24)	I	Force systems in 3-D analysis	Excluded in the upcoming syllabus	It is a common subject for all branches and **it is find to be difficult to complete the syllabus in stipulated time.**
2		III	Screw Jacks and different Screw Jacks analysis in Friction	Excluded in the upcoming syllabus	
3		IV	Mass Moment of Inertia of Circular, Plates, Cylinders, Cone, Sphere and Hook	Excluded in the upcoming syllabus	
4		V	Curvilinear Motion, Super Elevation, D'Alembert's Principle and its application in plane motion and connected bodies	Excluded in the upcoming syllabus	
5	IV (18CVL46)	II	Introduced drawing, editing, modifying and other advanced AutoCAD tools.	Which was not include in the earlier Syllabus	Which is essential to use AutoCAD applications in Civil Engineering works.

ne modifications mentioned in the above table is for your kind review and approval.

The Proposed syllabus for V & VI Semester UG for the academic year 2020-21 is attached with this for your kind reference, review and approval.

The proposed syllabus for I & II semester PG Programme for the academic year 2020-21 is attached with this for your kind reference, review and approval.

Ms. Suma B. P bearing **USN 1DA16CV123** has taken change of college from Govt., Engineering College, Kushalanagara to Dr. AIT in the year 2017-18. She falls 2 credits shortage to complete required 200 credits. Internal BOS committee proposed a project based course (CVPM78 – Minor project) for 2 credits to fulfill this and she completed the course in the academic year 2019-20.

Ms. Veena T A bearing USN **1DA15CV129** has taken change of college from Govt., Engineering College, Raichur to Dr. AIT in the year 2017-18. She falls 0.5 credits shortage to complete required 200 credits. Internal BOS committee proposed a seminar course (subject code yet to finalize) for 0.5 credits to fulfill this.

In this regard the BOS approval is required for the above students. Hence I request you all to go through the matter and give the approval.

Thanking you

Yours sincerely

14/8/2020

Professor and Head
Department of civil Engineering
r. Ambedkar Institute of Technology
Bangalore - 560 056.

2020-2021

Dr. Ambedkar Institute of Technology
Department of Civil Engineering

17/08/2020

Minutes of the Board of Studies (BOS) Meeting.

The online Board of Studies (BOS) meeting was held on 17-08-2020 at 11.00AM through Google Meet platform under the chairmanship of Dr. S Vijaya, Professor and Head of the Department, Department of Civil Engineering, Dr.Ambedkar Institute of Technology, Bengaluru - 56. The Chairman welcomed all committee members to the meeting. As per the meeting agenda the Chairman presented the scheme and syllabus of both UG & PG for the academic year 2020-21 for the approval and approval for the students (taken change from other VTU colleges) facing shortage of credits to fulfill the requirement to award the degree as per Autonomous norms.

The following members were present during the online meeting.

1. Dr. S. Vijaya, Professor & Head, Dr. AIT, Bengaluru
2. Dr. J. M Chandrakishan, Professor, IISc, Bengaluru
3. Dr. Renukadevi, Professor and Dean, RVCE, Bengaluru
4. Dr. Ramaraj, Professor& Head, DSCE, Bengaluru
5. Dr. H C Muddaraju, Asst professor, UVCE, Bengaluru
6. Dr. Raghunathan M. D, Scientist-E, SERC, Tower Testing Research Centre, Chennai
7. Sri. Chinnasomaiah, Chief Engineer (Civil), KPC, Bengaluru
8. Mrs. Nagashree, M.Tech, (Ph.D), Asst Professor, MSRIT, Bengaluru
9. Er. Amit Singh, Invitee Member, Professor & Head, IET, Ayodhya.
10. Dr. S. G. Ramachandraiah, Professor, CED, Dr. AIT, Bengaluru
11. Dr. S. D. Venkataraj Mohan, Professor, CED, Dr. AIT, Bengaluru
12. Dr. Chandrrasekar, Associate Professor, CED, Dr. AIT, Bengaluru
13. Mr. S. B. Ankesh, Asst., Professor, CED, Dr. AIT, Bengaluru
14. Mr. Shreyas K, Asst., Professor, CED, Dr .AIT, Bengaluru
15. Mr. M. Naveen Kumar, Asst., Professor, CED, Dr. AIT, Bengaluru
16. Mr. M. K. Darshan, Asst., Professor, CED, Dr. AIT, Bengaluru
17. Mrs. Kavya H. K, Asst., Professor, CED, Dr. AIT, Bengaluru

The following 2 Members have sent the mail with their feedback and suggestions.

1. Dr. Krishnaiah A. J, VTU Nominee, Professor & Head, MCE, Hassan
2. Dr. L. R. Manjunatha, Chairman, ICI, Bengaluru Centre.

The meeting started with condolence for the misfortune demise of our beloved Professor Dr. B. Shivakumaraswamy, Professor & Dean, Department of Civil Engineering, Dr. AIT.

The chairman presented Power Point Presentation (PPT) with following contents:

1. Scheme and syllabus of UG
2. Scheme and syllabus of PG and
3. Compensating Credit for students taken transfer from other colleges.

1. **Scheme and syllabus of UG**

The meeting started by revised contents in I and II year UG syllabus for the approval and with a detailed discussion the board given approval for the same.

Further, there was a detailed discussion regarding the proposed scheme and syllabus for III year UG (IV and V semester) for the academic year 2020-21, which has been mailed in advance to all members and a detailed review took place in the meeting as follows:

- Sri. Chinnasomaiah, Chief Engineer (Civil), KPC, Bengaluru suggested to conduct the Extensive Survey project (CVP68) **for a minimum period of two weeks** and it was supported by Dr. J M Chandrakishen, Professor, IISc, Bangalore further Chairman conveyed to the committee that with in the college policy limitations it may be considered.
- Dr. J M Chandrakishen, Professor, IISc, Bengaluru discussed about the way of learning of the blended learning portions. Chairman elaborated the way of learning of the said portion to the committee and the members accepted it for implementation.
- Dr. Ramaraju, Professor & Head, DSCE, Bengaluru advised to make paper publication should be compulsory for VIII semester BE students. The Chairman conveyed that it is already in the system and it may be made it compulsory for the coming batches.

2. **Scheme and syllabus of PG**

- Dr. Renukadevi, Professor and Dean, RVCE, Bengaluru and Dr. J M Chandrakishan, Professor, IISc questioned the necessity of Project Phase I, in II semester and the Chairman clarified by giving practical necessity in the system for the PG project evaluation.
- Mrs. Nagashree, M.Tech, (Ph.D), Asst Professor, MSRIT, Bengaluru has suggested to make Design of Plates and Shells as a core subject. The Chairman considered the suggestion for implementation in the future.

3. **Compensating Credit for the students taken transfer from other colleges**

- Sri. Chinnasomaiah, Chief Engineer (Civil), KPC, Bengaluru suggested to manage the credits by NTPL or SWAYAM courses and Dr. J M Chandrakishan, Professor, IISc discussed about the limitations and impact of credits allotment in NTPL or SWAYAM courses. The Chairman conveyed to the committee about the limitations in the Autonomous examination system and the committee accepted for the same.

By the end of the meeting the committee approved the I and II year UG syllabus (with minor modification done) and proposed III year syllabus for the implementation in the academic year 2020-21 and also for the method applied for compensating the credits for the students taken transfer from other college.

The Chairman concluded the meeting by extending the vote of thanks to all committee members with due respect.

(Dr. S. Vijaya)

Chairman, BOS,

Prof. and Head, Dept. of Civil Engineering

Dr.AIT, Bangalore-560056

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Dr. Ambedkar Institute of Technology, Bengaluru - 560056

Department of Civil Engineering,

Minutes of **Board of Studies** meeting (online) held on Friday, 26.11.2021 at 11.00 am to discuss the scheme and syllabus of 1st year UG courses as per NEP 2020 for the academic year 2021-22.

Members Present

Category	Name of Person
Chairman	Dr. S Vijaya, Professor and HOD, CED, Dr. AIT, Bengaluru.
External Subject Experts	1. Dr. J M Chandrakishen, Professor, IISc, Bengaluru. 2. Dr. M C Nataraj, Professor and Head, CED, MSRIT, Bengaluru. 3. Dr. Anjaneyappa, Professor, CED, RVCE, Bengaluru. 4. Dr. Maheshprabhu, Professor, CED, GEC, Ramanagar.
VTU Nominee	Dr. Balakrishna, VTU Nominee, Professor & Head, CED, BIT, Bengaluru.
Industry Representative	1. Sri. Nagesh Puttaswamy, Zonal Head, WT & RMDT, Ultra Tech Cement Ltd. Bengaluru. 2. Dr. M S Sudarshan, Director, Strendant Testing & Proof Checking, Bengaluru. 3. Sri. H R Girish, CEO & MD, Girish Ventures, Strategic Consultants in Construction & Infrastructure Sector – India and Middle East, Bengaluru.
Alumni with P G Degree	Mr. Bhyravraj B, M.Tech, SSS Consultant, Nagarabhavi, Bengaluru.
Internal Faculty Members with various specialization (UG + PG).	Dr. C Nanjundaswamy, Professor, CED, Dr.AIT, Bengaluru Dr. S D Venkataraja Mohan, Professor, CED, Dr.AIT, Bengaluru Dr. S S Honnanagouder, Profesor, CED, Dr.AIT, Bengaluru Dr. Chandrrasekar, Associate Professor, CED, Dr.AIT, Bengaluru. Dr. M N Hegde, Adjunct Faculty, CED, Dr.AIT, Bengaluru (PG) Mr. S B Ankesh, Asst Professor, CED, Dr.AIT, Bengaluru Mr. M K Darshan, Asst. Professor, CED, Dr.AIT, Bengaluru Mrs. Purnima K Biranagi, Asst Professor, CED, Dr.AIT, Bengaluru Mrs. Supritha R M, Asst. Professor, CED, Dr.AIT, Bengaluru Mr. Shreyas K, Asst Professor, CED, Dr.AIT, Bengaluru Mr. M Naveen Kumar, Asst Professor, CED, Dr.AIT, Bengaluru
Department Academic Program committee	Dr. S Vijaya, Professor and Head Dr. C Najundaswamy, Professor Dr. S D Venkataraja Mohan, Professor Dr. Chandrrasekar, Associate Professor Dr. S Honnanagoudar, Professor

	Mr. S B Ankesh, Assistant Professor Mr. M K Darshan, Assistant Professor Mrs. Purnima K Biranagi, Assistant Professor Mrs. Sowmya M, Assistant Professor Mrs. Supritha R M, Assistant Professor Ms. Sphoorthy S M, Assistant Professor Ms. Mary Bhagya Jyothi J, Assistant Professor Mr. Shreyas K, Assistant Professor Mr. Naveen Kumar M, Assistant Professor Mr. Sharath B, Assistant Professor Mr. Ashwin C A, Assistant Professor Dr. Rakesh C, Assistant Professor Ms. Sneha S D, Assistant Professor Mrs. Rajeshwari B, Assistant Professor Mrs. Madhu K S, Assistant Professor Mr. Tilak T N, Assistant Professor Mrs. Tejaswini B R, Assistant Professor Prof. B S Suresh Chandra, Adjunct Faculty Dr. R Madhusudhan, Adjunct Faculty Dr. H R Srinivas, Adjunct Faculty Dr. K V Manjunath, Adjunct Faculty Dr. M N Hegde, Adjunct Faculty Prof. G P Manjunath, Adjunct Faculty

The online meeting was held on 26-11-2021 at 11.00AM through Google Meet platform under the chairmanship of Dr. S Vijaya, Professor and HOD, Department of Civil Engineering, Dr.AIT, Bengaluru - 56.

The Chairman welcomed all the members of BoS and faculty of the department to the meeting and presented the scheme and syllabus of 1st year UG courses as per NEP 2020 for the academic year 2021-22 for approval.

The meeting proceeded with PPT presentation and members have offered suggestions as under.

- **Dr. M C Nataraj**, suggested that assignment has to be given more importance in evaluation procedure and it should be out of text books. And this suggestion has been endorsed by **Dr. Chandrakishen.** Other members suggested to reduce the content of dynamics and asked to justify the title of the Civil Engineering and mechanics subject.
- **Dr. M C Nataraj**, also suggested to check how many CO's can be given. If number of CO's is equal for all the subjects then it would be easy to map. And verify the words of CO's.
- **Dr. M C Nataraj**, suggested to justify the role of the teacher in Unit 5 (Blended learning). He mentioned that tutorials and lecture hours should be clearly mentioned and to relook into it.
- **Dr. Chandrakishen** suggested that, in Unit 4 teaching hours is only of 10hrs but this unit has to be given more importance, hence it is better to reduce the number of teaching hours in Unit 1 and 2 and can increase the number of teaching hours for unit 4.

- **Dr. Anjaneyappa**, suggested to replace the word 'determine' in CO's and asked to modify CO2.
- **Dr. Sudarshan**, suggested that more importance should be given to Elements of Civil Engineering part than mechanics part.
- **Dr. Nataraj**, mentioned that first unit is of basic civil engineering but remaining is all about mechanics. So it has to be verified.
- **Mr. Girish H R**, suggested to give more importance on practical applications of Rural Development course (1st year Ability Enhancement Course). He also suggested that there should be 50 marks guaranteed questions in Rural Development, so that students will learn inevitably. Also suggested to include hygienic and sustainability part.
- **Dr Anjeneyappa**, suggested if possible adding solar panels in energy contents. Remove the word 'technique' and 'modern', in unit 4. Content has to be reduced as the course is for 1 credit. Site visit can be carried out instead of videos and ppts.
- **Dr. Balakrishna**, also suggested to look into the content of Rural Development course, as it seems to be more for one credit.

The HOD has informed the members that, their suggestions will be considered wherever possible and thanked all the external and internal BoS members for their kind suggestions and discussion and the meeting was concluded.

(Dr. S. Vijaya)
Chairman, BOS,
Prof. and Head, Dept. of Civil Engineering
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