

DEPARTMENT OF TECHNOLOGY FINAL YEAR B.TECH

Scheme of Teaching and Examination Semester – VII (Civil Engineering)

		Teaching Scheme											
			(How	rs / We	eek)		Exan	nination Sc	nation Scheme (Marks)				
Subject	Subject					Theory Practical							
Code		L	Т	Р	Credits	-	Max.	Min.		Max.	Min.		
						Scheme	marks	Passing	Scheme	marks	Passing		
								#			_		
*CE 411	Design of RCC					CIE	50	20					
·CE 411	Structures -I	03	01	-	04	SEE	50	20					
CE 412	Structural Dynamics and					CIE	50	20					
CE 412	Earthquake Engineering	03	-	-	03	SEE	50	20					
CE 412	Estimating and Costing					CIE	50	20					
CE 415	Estimating and Costing	03	-	-	03	SEE	50	20					
Water Resources						CIE	50	20					
CE 414	Engineering - II	03	-	-	03	SEE	50	20					
		0.4			0.1	CIE	50	20					
CE	Elective-I	04	-	-	04	SEE	50	20					
CEL 415	Major Project Phase-I \$	-	-	02	03				IOE	50	20		
CEL 416	Lab-I Structural Design and Drawing - II	-	-	02	01				EOE	50	20		
	Lab-II Structural										20		
CEL 417	Dynamics and	-	-	02	01				EOE	50	20		
	Earthquake Engineering												
CEL 418	Lab-III Estimating and	-	-	02	01				EOE	50	20		
	Costing												
CEL	Lab IV Elective-I	-	-	02	01				IOE	50	20		
CEL 419	Internship III	-	-	-	01				IOE	50	20		
	Total	16	01	10	25		500			300			
	·				Audit Co	ourse	•	•					
	Introduction to					Institute/	100	40					
AC 416	Introduction to	2	-	-	-	Departme							
	Constitution of India					ntal Level							

Total Credits: 25

Total Contact Hours/Week: 29 hrs

Note:

#: Minimum 40% marks required in CIE to become eligible for SEE.

• Tutorials and practical shall be conducted in batches with batch strength not exceeding 18 students.

•Contact hours of 2 with Guide for Project Phase I for a group of students(AICTE guidelines)

* Theory paper will be of 4 hours.

CIE - Continuous Internal Evaluation, SEE - Semester End Examination,

IPE – Internal Practical Evaluation, EPE–External Practical Examination,

IOE– Internal Oral Evaluation, EOE–External Oral Examination

Note: After semester VI, during vacation period, students will undergo Internship III for minimum 4 weeks in a reputed industry from standpoint Civil Engineering principles. The students will submit a report of the training. This particular activity is equivalent to one credit and it carries 50 marks as an Internal Oral Evaluation (IOE) which is included in Semester VII. For submission of the activity report, all the students will follow one specific format recommended by the Program Advisory Board.



DEPARTMENT OF TECHNOLOGY FINAL YEAR B. TECH

Scheme of Teaching and Examination Semester – VIII (Civil Engineering)

		1	Feach	ing S	cheme						
		(Hou	rs / V	Veek)	Examination Scheme (Marks)						
Subject	Subject	_				Т	Practical				
Code		L	Т	P	Credits		Max.	Min.	Scheme	Max.	Min.
						Scheme	marks	Passing		marks	Passing
								#			U
*CE 421	Design of RCC Structures-					CIE	50	20			
*CE 421	II	04	01	-	05	SEE	50	20			
CE 422	Construction Practices					CIE	50	20			
		03	-	-	03	SEE	50	20			
CE 423	Town and Country					CIE	50	20			
	Planning		-	-	03	SEE	50	20			
CE	Elective-II					CIE	50	20			
		04	-	-	04	SEE	50	20			
CE	Elective-III	03			03	CIE	50	20			
		05	_	-		SEE	50	20			
CEL 424		-	-	02	0.4				IOE	50	20
	Major Project Phase - II			\$	04				EOE	100	20
CEL 425	Lab-I Structural Design and Drawing - III	-	-	02	01				EOE	50	20
CEL	Lab-II Elective-II	-	-	02	01						
									EOE	50	20
CEL	Lab-III Elective-III	-	-	02	01				IOE	50	20
	Total	17	01	08	25		500			300	
	1				Audit C	Course		1	1		1
AC 427	Professional Ethics	02	-	-	02	Institute/ Departmental Level	100	20			

Total Credits: 25

Total Contact Hours/Week: 27 hrs

Note:

#: Minimum 40% marks required in CIE to become eligible for SEE.

• Tutorials and practical shall be conducted in batches with batch strength not exceeding 18 students.

\$ Students are expected to do self study for two hours as per the guidance given by the project guide hence contact hours to be taken as two for the calculation of contact hours.

* Theory paper will be of 4 hours.

CIE – Continuous Internal Evaluation,	SEE – Semester End Examination,
IPE – Internal Practical Evaluation,	EPE-External Practical Examination,
IOE- Internal Oral Evaluation,	EOE-External Oral Examination

Elective-I

CE 428:Advanced analysis of structure

CE 429: Energy Efficient and Cost-Efficient Building Technology

CE 430: Human Resource Management in construction

CE 431: Transportation in Infrastructure planning and Demand Estimation

CE 432: Watershed Management

Lab IV Elective-I

CEL433 Advanced analysis of structure

CEL434 Energy Efficient and Cost-Efficient Building Technology

CEL435 Human Resource Management in construction

CEL436 Hydrology and Watershed Management

CEL437 Transportation in Infrastructure planning and Demand Estimation

Elective-II

CE438 Advanced Design of Structures

CE439 Advanced Geotechnical Engineering

CE440 Development Engineering

CE441 Design of Concrete Bridges

CE442 Structural Dynamics

Lab II Elective-II

CEL 443 Advanced Design of Structures CEL 444 Advanced Geotechnical Engineering CEL 445 Development Engineering CEL 446 Design of Concrete Bridges CEL 447 Structural Dynamics

Elective-III (Open Elective)

CE 448 Engineering Optimization

CE 449 Engineering Economics and Valuation

CE 450 Finite Element Method

CE 451 Numerical Methods

CE 452 Remote Sensing and GIS application

Lab III Elective-III (Open Elective)

CEL 453 Engineering Optimization

CEL 454 Engineering Economics and Valuation

CEL 455 Finite Element Method

- CEL 456 Numerical Methods
- CEL 457 Remote Sensing and GIS application

Detailed Evaluation and Examination Scheme

- 1. Out of total 100 theory marks, 50 marks are assigned for Continuous Internal Evaluation (CIE). In CIE, obtaining minimum 20 marks is essential. It is similar to term work, the completion of which is mandatory to become eligible to appear for the Semester End Examination (SEE). Failing to complete the term in a particular course i.e. not obtaining 20 marks in CIE out of 50 shall be treated as term not granted in that course and it is on the part of the course teacher to officially inform the particular case through the respective Program Coordinator and the Director to the University Examination Section. The section will take a kind note of the same and it will not issue the hall ticket of the particular students for the SEE in the particular course/s.
- 2. CIE (50 marks) includes:
 - Internal Test I, of 20 marks in 5th week on 1st and 2nd unit
 - Internal Test II, of 20 marks in 10th week on 3rd and 4th unit
 - Activities for the students: 10 marks. It is at the course teachers' discretion to get the assignments
 of varied nature completed by the students. However, the course teacher will plan to cover those
 course objectives that suit course learning outcomes and program outcomes that may not be
 covered in the internal tests.
- 3. For the Semester End Examination (SEE), 100 marks (3 hours) paper will be set and finally it will be converted to 50 marks. The students must secure minimum 40 % i.e. 20 marks in SEE as theUniversity examination passing head.
- 4. Final theory marks (out of 100) will be the addition of CIE (out of 50 marks) and SEE (out of 50 marks).
- 5. Internal Practical/Oral Evaluation (IPE/IOE) will be on the basis of Internal Oral/ Practical/Tutorials/Seminar in which students must secure minimum 40% i.e. 20 marks. It is similar to the term work, the completion of which is mandatory to be eligible to appear for the Semester End Examination (SEE).
- 6. External Practical/Oral Examination (EPE/EOE) will be conducted under the supervision by some external course expert. The minimum score 40% i.e. 20 marks is required to be secured as the University's passinghead in EPE/EOE.
- 7. *Semester End Examination duration will be 4 hr.
- 8. Equivalence for the Course: As elaborated at the end of this whole curriculum document.

Academic Autonomy:

- **1.** Flexibility in deciding Structure and Contents of Curriculum with reasonable frequency for changes in the same.
- **2.** Continuous Assessment of Students performance with newly adopted Credit System based on award of grade.
- **3.** Credits are simply a means of attaching relative values to courses of different components. These are a currency of learning and in general regarded as a measure of the time typically required to achieve a given curricular outcome.
- 4. All courses (Courses) under each Program/Discipline are unitized.

Credit system:

Education at the Institute is organized around the semester-based credit system of study. The prominent features of the credit system are a process of continuous evaluation of a student's performance/progress and flexibility to allow him/her to progress at an optimum pace suited to his/her ability or convenience.Each course by every student need to fulfillminimum requirements of credits for continuation.

A student's performance/progress is measured by the number of credits that he/she has earned, i.e. completed satisfactorily. Based on the course credits and grades obtained by the student, grade point average is calculated. A minimum grade point average is required to be maintained for satisfactory progress and continuation in the Program. Also, a minimum number of earned credits and a minimum grade point average should be acquired in order to qualify for the degree. All Programs are defined by the total credit requirement and a pattern of credit distribution over courses of different categories.

Course credits assignment:

Each course, except a few special courses, has a certain number of credits assigned to it depending upon its lecture, tutorial and laboratory contact hours in a week. This weightage is also indicative of the academic expectation that includes in-class contact and self-study outside of class hours.

Lectures and Tutorials: One lecture or tutorial hour per week per semester is assigned one credit.

Practical/Laboratory: One laboratory hour per week per semester is assigned half a credit.

Example: Course:Chemical Reaction Engineering -I:5 credits (3-1-2)

The credits indicated for this course are computed as follows:

3 hours/week lectures = 3 credits

- 1 hours/week tutorial = 1 credit
- 2 hours/week practical = $2 \times 0.5 = 1$ credit

The contact hours in this case of 5credits course is 6 hours per week. (3h Lectures + 1h Tutorial + 2 h Practical=6 hours per week.)

For each lecture or tutorial and practical credit, the self-study component is 1 hour/week per credit. In the above example, the student is expected to devote 3 + 1+1 = 5 hours per week on self-study for this course, in addition to class contact of 6 hours per week.

Earning credits:

At the end of every course, a letter grade is awarded in each course for which a student had registered. On obtaining a pass grade, the student accumulates the course credits as earned credits. A student's performance is measured by the number of credits that he/she has earned and by the weighted grade point average.

The credit system enables continuous evaluation of a student's performance and allows the students to progress at an optimum pace suited to individual ability and convenience.

Features of Credit System at Shivaji University, Kolhapur:

Every course is allotted credits based on its academic importance/weightage.

- 1. All Courses may not have same credits.
- 2. There will be 23 to 28 Credits / Semester.
- 3. Absolute Grading System with 7 Passing Grades viz. AA, AB, BB, BC, CC, CD, DD and FF for failure.
- 4. Getting FF grade in 4 heads in one academic year, he/she is considered as failed.
- **5.** Continuous Evaluation: Internal Test I i.e. T_1 [20 marks], and Internal Test II i.e. T_2 [20 marks]. Activities will be for 10 marks and the course owner/in charge will have discretion to decide the nature of activities.
- **6.** Standardization of courses: Each course is unitized in 6 numbers. Internal Test I on units I and II while Internal Test II on units III and IV, SEE will be based on all the units of the course curriculum.
- 7. Internal Test I and Internal Test II will be supervised and evaluated by internal course teachers while SEE will be evaluated mostly by external and internal teachers as joint examiner ships.
- 8. Any request for re-test will not be entertained after internal test.
- 9. For both the semesters' failure courses, re-examination will be only after the even Semester End Examination. No re-examination will be conducted for odd semester courses in even semester or vice-versa.

Attendance rule:

All students must attend every lecture, tutorial and practical class. However, to account for late registration, sickness or other such conditions, the attendance requirement will be a minimum of 75 % of the classes actually held. A student with less than 75 % attendance in a course during the semester, in lectures,

tutorials and practical taken together (as applicable), will be awarded the 'F' grade in that course irrespective of his/her performance in the tests.

Taking into account the consolidated attendance record for the whole semester, the course in charge in consultation with the Program Coordinator will award 'XX' grade to the student who is deficient in attendance. For the purpose of attendance calculation, every scheduled practical class will be counted as one unit irrespective of the number of contact hours.

Attendance record will be maintained based upon roll calls (or any equivalent operation) in every scheduled lecture, tutorial and practical class. The course owner will maintain and consolidate attendance record for the course (lectures, tutorials and practical together, as applicable).

Evaluation system:

1. Semester Grade Point Average (SGPA) =

 \sum (course credits in passed courses X earned grade points)

 Σ (Course credits in registered courses)

2. Cumulative Grade Point Average (CGPA) =

 \sum (course credits in passed courses X earned grade points) of all Semesters

 \sum (Course credits in registered courses) of all Semesters

3. At the end of B. Tech Program, student will be placed in any one of the divisions as detailed below:

 I^{st} Division with distinction: CGPA \geq 8.25 and above I^{st} Division: CGPA \geq 6.75 and <8.25</td> II^{nd} Division: CGPA \geq 6.25 and < 6.75</td>

As per AICTE Handbook (2011-12), gradation is as follows:

Grade Points	Equivalent Percentage Range
6.25	55
6.75	60
7.25	65
7.75	70
8.25	75

Conversion of CGPA to corresponding equivalent percentage marks for CGPA>5.0 may be obtained using the following equation:

Equivalent Percentage marks = (Respective CGPA x 10) – 7.5

A specimen example of these calculations is given below:

Typical academic performance calculations - I semester

Course no.	Course	Grade	Earned	Grade	Points
	credits	awarded	credits	points	Secured
Col 1	Col 2	Col 3	Col 4	Col 5	Col 6
					(Col 4* Col 5)
MALXXX	5	CC	5	6	30
CSLXXX	4	CD	4	5	20
PHLXXX	4	AA	4	10	40
PHPXXX	2	BB	2	8	16
MELXXX	4	FF	0	0	0
TTNXXX	2	AB	2	9	18
Total	21		17	38	124

1. Semester Grade Point Average (SGPA) =

(124) = 5.90(21)

2. Cumulative Grade Point Average (CGPA) =

Cumulative points earned in all passed courses = 124 (past semesters) + 124 (this sem.) = 248 Cumulative earned credits = 23 (past semesters) + 21 (this sem.) = 44 $\sum (124 + 124)$

----- = 5.63

 $\sum (23 + 21)$

Marks Range	Grade Points	Grade	Description of Performance
91-100	10	AA	Outstanding
86-90	09	AB	Excellent
76-85	08	BB	Very Good
66-75	07	BC	Good
56-65	06	CC	Fair
46-55	05	CD	Average
40-45	04	DD	Poor
Below 40	00	FF	Fail
		\$	Passed in first attempt
		PP	Passed (Audit Course)
		NP	Not Passed (Audit Course)
		** 2 nd *** 3 rd **** 4 th	One grade punishment for 2 nd , 3 rd , 4 th ,attempt,

Chart for marks range and its corresponding grade and grade points

Audit Courses:

Additional courses shall be included as audit courses from the third semester onwards. While the performance of the student in audited courses shall be included in the Grade Card, these grades do not contribute to SGPA or CGPA of the concerned student.

Award of Degree:

Following rules prevail for the award of degree:

1. A Student has registered and passed all the prescribed courses under the general institutional and departmental requirements.

- 2. A student has obtained CGPA \geq 4.5.
- 3.A student has paid all the institute dues and satisfied all the requirements prescribed.
- 4. A student has no case of indiscipline pending against him/her.

5. Institute authorities shall recommend the award of B. Tech degree to a student who is declared to be eligible and qualified for above norms.

CGPA Improvement Policy for award of degree:

An opportunity shall be given to a student who has earned all the credits required by the respective program with CGPA greater than or equal to 4.00 but less than 4.50, to improve his/her grade by allowing him/her to appear for 100% examinations of maximum two theory courses of seventh and eighth semester. However, CGPA shall be limited to 4.5 even though the performance of a student as calculated through modified CGPA becomes greater than 4.5.

Class and Semester	:	Final. Y. B. Tech (Civil Engineering) Part IV, Sem VII					
Course Title	:	DESIGN OF RCC STRUCTURES-I	Course Code:	:	CE 411		
Teaching Scheme (Hours)	:	3 hours/weeks = 3x 13 weeks = 39 hrs minimum Tutorial= 01hr/week Practical= 02hrs/week	Total Credits	:	03+01+01 =05		
Evaluation Scheme (Marks)	:	$\begin{array}{cccc} CIE & = & & \\ (20+20+10) & & IOE & \\ SEE & = 50 & & EPE/EOE & \\ \end{array} \begin{array}{c} : \\ EPE/EOE & \\ : \\ +50 & = 150 \end{array}$	Duration of SEE	:	4 hrs		
Revision:	:	Second	Month	:	June 2019		

:						
The prerequisite for this course is to possess the fundamental knowledge of material properties, calculation of						
shear force and bending moment.						
:	Theory					
:	Core					
:	Cognitive, Affective domain, Psychomotor					
	e is to ent.					

Course Assessment Methods:

Student is evaluated during Continuous Internal Evaluation (Internal Test I and Internal Test II) and Semester End Examination.

Course Objectives:

- 1. To understand behavior of structural members under various loadings
- 2. To understand concept of RCC structural design
- 3. To conceive elementary, deign of different structural elements

Course Outcomes:

At the end of this course, students will be able to

- 1. analyse behaviour of structural members under various loadings
- 2. implement concepts of structural design by Limit- state method
- 3. analyze and design the individual members and hence building as a whole

Curriculum Content	Hours				
UNIT 1					
Design philosophies of R.C structures (WSM, LSM), Structural elements, loads on structures, and	7				
structural properties of concrete, Role of structural engineer.					
R.C. sections in flexure: theory and design, singly, doubly reinforced rectangular and flanged					
sections.					
UNIT 2					
One-way slab - simply supported, cantilever and continuous. Design of staircase: Dog legged and	7				
open well.					
UNIT 3					
Two-way slab- simply supported, continuous and restrained	6				
	Ŭ				
UNIT4					
Design of beams for flexure, shear, bond and torsion: Simply supported, continuous, cantilever					
	7				
UNIT 5					
Re-distribution of moments in beams. Column, axially loaded, short and long, uni-axial and					
biaxial moments.					
UNIT 6					
Isolated column footing, axial load, uni-axial and biaxial moments. Eccentric footing, Footing in	5				
difficult soil conditions.					
Text Books :					
1. N.C. Sinha and S.K. Roy, "Fundamentals of Reinforced Concrete", S.Chand publications, 4th	h edition,				
2013					
2. B. C. Punmia, A.K. Jain and A.K. Jain, "Comprehensive Design of R.C. Structures", Laxmi					
Publications, 10th edition, 2015					
3. V. L. Shah and S.R. Karve, "Limit State Theory and Design", Structures publications,8 thedition, 2014.					
4. A. K. Jain, "Reinforced Concrete: Limit State Design", 7th edition, 2012.					

Reference Books	:						
1. P.C. Varghese, "Limit State Design of reinforced concrete", Prentice-hall of India Pvt.Ltd , 2ndEdition, 2004.							
2. M. L. Gambhir and Mo	2. M. L. Gambhir and McMillan, "Reinforced Concrete Design", PHI learning Pvt. ltd 4thEdition,2006						
Reference Codes	:						
1. IS 456-2000: code of p	ractice	for Plain and reinforced concrete, Bureau of Indian Standard, New Delhi.					
2. IS 875 (part 1): code of	2. IS 875 (part 1): code of practice for design loads (other than earthquake) for buildings and structures. part						
1: dead loads-unit weights of building materials and stored materials (second revision)							
3. IS 875 (part 2): code of	practic	ce for design loads (other than earthquake) for buildings and structures. part					
2: imposed loads (seco	nd revis	sion)					

Class and Semester	:	Final. Y. B.Tech (Civil Engineering) Part IV, Sem VII						
Course Title	:	STRUCTURAL I EARTHQUAKE	STRUCTURAL DYNAMICS AND EARTHQUAKE ENGINEERING					CE 412
Teaching Scheme (Hours)	:	3 hours/weeks = 32 Tutorial=00hr/wee Practical= 02/week	Total Credits	:	03+ 00 +01 =04			
Evaluation Scheme (Marks)	:	CIE = (20+20+10) SEE = 50	IPE IOE EPE/EOE	: : :	+50 = 150	Duration of SEE	:	3 hrs
Revision:	:	Second				Month	:	June 2019

Pre-requisites	:					
The prerequisite for this course is to possess the fundamental knowledge of material properties, calculation of						
shear force and bending mome	shear force and bending moment.					
Type of Course	:	Theory				
Course Domain	:	Core				
Skills Imbibed	••	Cognitive, Affective domain, Psychomotor				

Course Assessment Methods:

Student is evaluated during Continuous Internal Evaluation (Internal Test I and Internal Test II) and Semester End Examination.

Course Objectives:

- 1. To understand behavior of earth surface during earthquake.
- 2. To understand the dynamic behavior of structures.
- 3. To understand ductile detailing of structures.
- 4. To understand various seismic devices techniques.

Course Outcomes:

Students will able to

- 1. understand the structure and behavior of earth during earthquake.
- 2. design earthquake resistant structures.
- 3. know and understand the concept of vibration isolation and techniques.

Curriculum Content	Hours				
UNIT 1	4				
Seismology					
Seismic activities of a region-India, local geology and soil condition, quantification, magnitude,					
energy and intensity of earthquake. Analysis of earthquake data, seismic zoning, cause of earthquake					
damage, history of past earthquake.					
UNIT 2	7				
Vibration Theory	,				
Free and forced vibration of single degree, two degree, damping, response spectra.					
UNIT 3					
Structural Form and Response to Earthquakes					
Form of super structure, regular, irregular form of structures, Response of load bearing masonry					
building and RC building with brick infill	6				
Lateral load resisting system, guidelines for efficient seismic designs.					
UNIT 4					
Concept of Seismic Design	10				
Evaluation of seismic force as per Indian code, modal analysis techniques, lateral load analysis of					
building, Torsion					
UNIT 5					
Codal Provisions for Ductile Detailing of RC Structures subjected to Seismic Forces	6				
Design of Flexural members, Design of columns and frame members subjected to Bending and axial					
load, Design of joints of frame.					
UNIT 6	6				
New Techniques in Aseismic Design					
Base Isolation technique, Seismic dampers					
Text Books :					
1. Hosur V.I., "Earthquake Resistant Design of RCC structures", Willey Publication					
Reference Books:					
1. Arya A.S., "Earthquake Resistant, Design of Masonry and Timber Structures",					
2. Chopra Anil.K., "Dynamics of Structures", Prentice Hall of India Pvt. Ltd.2006					

3.	Clough R. W. and Penzien Joseph, "Dynamics of Structures". McGraw Hill Co.							
4	Dowrick D. J. "Earthquake Resistant Designs" John Wiley and Sons							
5	Gosh S. K. "Farthquake Resistant Design of R. C. C. Structures"							
5.	Gosh S. K., Earthquake Resistant Design of R. C. C. Structures							
0.	Giover G. K., Miechanical Violations, Koorkee Oniversity, Koorkee.							
7.	Krishna Jai, "Elements of Earthquake Engineering", South Asian Pub. New Delhi							
8.	Pankaj Agarwal and Shrikhande Manish, "Earthquake Resistant Design of Structures", Prentice Hall							
	of India, New Delhi, 2006							
9.	Paz Mario, "Structural Dynamics", CBS Publishers and Distributers, 2004							
10.	Rochter, "Elements Seismology",							
11.	Earthquake Resistant Design Philosophy, MCE and DBE planning aspects, symmetry,							
	simplicity, regularity							
12.	Government of Maharashtra Earthquake resistant Design of house guiding lines and assessment of							
	damages							
13.	Manual of Earthquake Resistant Non engineering Construction, University, Roorkee							
Referenc	e Codes :							
1	IC 1992/2016) In dian Catania East East and Decision of Constants (Dect D. Constants)							
1.	IS:1893(2016), Indian Standard Criteria For Earthquake Resistance of Structures (Part I): General							
	Provisions and Building (Fifth Revision), Bureauof Indian Standards, New Delhi							
2.	IS:4326Criteria for Earthquake Resistant Design and Construction of Buildings – Code of Practice,							
	Bureau of Indian Standards, New Delhi							
3.	IS:13827							
4.	IS:13828							
5.	IS:13920(1993), Ductile Detailing of Reinforced Concrete Structures Subjected to Seismic Force –							
	Code of Practice, Bureau of Indian Standards, New Delhi							
6.	IS 456 (2000), Plain and Reinforced Concrete - Code of Practice, Bureau ofIndian Standards, New							
	Delhi							
	Delhi							

Class and Semester	:	Final. Y. B.	Fech (Civil]	Eng	gineering)	Part IV, Ser	n V	II
		1					—	1
Course Title	:	ESTIMATING AND COSTING Course : CE 413						CE 413
Teaching Scheme (Hours)	:	3 hours/week minimum Tutorial= 00 Practical= 02	$\frac{3 \text{ hours/weeks} = 3x13 \text{ weeks} = 39 \text{ hrs}}{\frac{1}{\text{Futorial}} = 00 \text{hr/week}} $ $\frac{1}{\text{Credits}} = \frac{100 \text{ hr/week}}{100 \text{ hr/week}} $					
Evaluation Scheme (Marks)	:	CIE = (20+20+10) SEE = 50	IPE IOE EPE/EOE	:	+50 = 150	Duration of SEE	:	3 hrs
Revision:	:	Second				Month	:	June 2019
Pre-requisites	:	The prerequise building mate	site for this c erial specific	oui atic	rse is to po ons, buildir	ssess the fund g/structural o	lam lrav	ental knowledge of vings.
Type of Course	•	Theory						
Course Domain	•	Core						
Skills Imbibed	:	Cognitive. A	ffective dom	ain	. Psychom	otor		
Course Assessment Methods:		008			, 1 8 j • 110 111			
Student is evaluated du	iring	g Continuous II	nternal Evalu	ati	on (Interna	l Test I and I	nte	rnal Test II) and
Semester End Examination.								,
 Course Objectives: 1. To provide students necessary knowledge and skills in estimation of civil works 2. To carry out rate analysis of various items 3. To understand procedure of tenders and contracts 4. To corry out unhabition of civil engineering structures 								
Course Outcomes:		U	0					
At the end of this course, stude 1. take out of quantities for 2. prepare estimates for v 3. draft specifications and 4. prepare valuation report	ent v or vario l ten rt fo	will be able to arious construct us civil engine ider notice r civil engineer	ction projects ering works ring structure	and	l calculate	rates for vario	ous	items of construction
		Curric	ulum Conte	nt				Hours
UNIT 1 Introduction: Purpose of quantity estimates, Types of estimates, Various items to be included in estimates, Modes of measurement and units of measurement as per codal provision IS1200, Administrative approval and Technical sanction to estimates, Introduction to DSR (District Schedule Rate) and CSR(Common Schedule of Rates) Specifications: Purpose, basic principles, general and detailed specifications for various items related to building								7 included in ion IS1200, ict Schedule ms related to
UNIT 2 Measurement of Quantities: Long wall- Short wall method and Center line method, measurement sheet and abstract sheet. Analysis of rates, Factors affecting cost of an item work, materials, sundries, labour, tools and plant, overheads and profit. Task work- Definition and factors affecting task work. Analysis of rates of items related to building. Prime cost, Provisional sum and provisional quantities							7 neasurement ls and plant, ates of items	

· · · · · · · · · · · · · · · · · · ·					
UNIT 3 Detailed Estimation : R.C.C works, Culverts, earthwork for canals. Roads including hill roads and other civil engineering works.	7				
Approximate estimates, purpose, Various methods used for buildings and other civil engineering works. Preparation of schedule for steel reinforcement.					
UNIT 4 Tenders(Bids): Meaning, Categories, Tender notice, Notification in press and media, e-procurement, ,National Building Code (NBC) Corrigendum, Preparation and Submission of tenders, Tenders form and information, EMD and SD, revocation of tenders, opening of tenders, qualification of contractors, Scrutiny of tenders, unbalanced tenders, acceptance of tenders,running bills and final bills, settlement of disputes, Arbitration					
UNIT 5 Contracts: General idea, Types of contracts viz: lump-sum, item rate, percentage rate, cost plus, Engineering Procurement Construction (EPC). Conditions of contracts, Law of contract. Definition, objective and essentials of valid contract, Termination and breach of contracts, Negotiated contracts, Demolition contracts, Non-conventional contract: PPP, PWDandWRD organization.	6				
	(
Valuation : Purpose, Value and Cost, Price, Market value, Potential value, Sentimental value, Scrap value etc. Real estate, rent fixation, Tenure of land, Free hold and lease hold property, Sinking fund, Depreciation, Capitalized value and Annualized value of an old building.	0				
Text Books :					
1. S. C. Rangwala, "Elements of Estimating and Costing", Charotar Publishing house, 4 th edition,2014.					
2. B.N. Dutta, "Estimating and costing", DhanpatRai and sons, 28th edition, 2016.					
4 B S Patil "Civil Engineering Contracts and Estimates" Universities Press Private Ltd 4th edition 2015					
 5. G.S. Birdie, "Estimating and Costing", DhanpatRaiand Sons, 6th edition, 2005. 					
Reference : Books					
1. Standard specifications volumes I and II (PWD Maharashtra) Govt. of Maharashtra					
2. CPWD Specifications					
3. CPWD Schedules of Kates 4. PWD Hand Book and Ped Book					
 F WD Hallu DOOK allu Keu DOOK PWD Schedule of Rates – Latest 					
6. National Building Code of India – Guidelines for regulating the building construction activities					

Class and Semester	:	F. Y. B. Tech (Civil Engineering) Part IV, Sem VII					
Course Title	:	WATER RESOURCES ENGINEERING-II	Course Code:	:	CE 414		
Teaching Scheme (Hours)	:	3 hours/weeks = 3 x 13 weeks= 39 hrs minimum Tutorial= 00hr/week Practical= 00hr/week	Total Credits	:	03+00+00=03		
Evaluation Scheme (Marks)	:	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Duration of SEE	:	3 hrs		
Revision:	:	Second	Month	:	June 2019		

Pre-requisites	•	This course requires the student to know about the basic concepts regarding various dams, their site selection and design of various dams, spillways, river training works and hydro-electric power generation.

Type of Course	•	Theory
Course Domain	:	Core
Skills Imbibed	:	Cognitive, Affective domain, Psychomotor

Course Assessment Methods:

Student is evaluated during Continuous Internal Evaluation (Internal Test I and Internal Test II) and Semester End Examination.

Course Objectives:

- 1. Introduce students to the structure of the dams, earth dam, canals, spillways and cross drainage works.
- 2. Learn to estimate the capacity of reservoir using mass curve.
- 3. Necessity and importance of diversion, storage head works, weir and barrages.
- 4. Determine the uplift pressure, impervious floors using the theory.

Course Outcomes:

1. Explain the basics regarding site selection criteria for reservoir as well as dams. Design earth dam by slip circle method, to study various failures and seepage control of earth dam.

2. Demonstrate the various forces acting on gravity dam with magnitude and direction, stability calculations regarding gravity dam.

- 3. Discuss various types of spillways and spillway gates, methods of dissipation of energy.
- 4. Study of typical canal sections, Discuss Kennedy and Lacey's silt theories, and various cross drainage

works and diversion headwork and Bligh's and Khosla's seepage theories.	
5. Show meandering phenomenon, types of river training work and its design. Describe Hydro por	wer
generation process and layout of it with its components	
Curriculum Content	Hours
UNIT 1	06
Introduction	
Types of Dam, Choice of dam, height, various components of dam	
Gravity Dam	
Forces acting and design of Gravity Dams, low and high dams, construction of Gravity Dam.	
UNIT 2	
Earth Dam	07
Elements of Earth Dam, basic design consideration, design of section, design of filters, rock toe,	
pitching, causes of failures, piping and its prevention, rolled filled construction.	
UNIT 3	06
Spillway and Gates	
Spillway capacity, flood absorption and disposal, different types of Spillway, their principles of	
design and construction, energy dissipation below Spillway. Types and uses.	
UNIT 4	07
Diversion Head Works	
Selection of sites, layout of the work types of weirs and barrages, design of subsurface flow,	
safety against piping and uplift, Bligh, Lane, and Khosala's Theories, design of weirs on	
permeable foundations.	
Canal Irrigation	
Types of canal, canal alignment, losses in irrigation channels. Design of lined channels, various	
types of canal lining, economics of lining.	
UNIT 5	06
Preliminary Sediment Transport Theory	
Critical Tractive Force, regimes of flow, resistance of bed forms, suspended and bed load, its	

effect on channel design. Design of stable channels in alluvium, the	regime method, Semi
theoretical approached, cross-section of irrigation channels.	
Canal Masonry Works	
Cross drainage works, necessity types and selection, comparative	merits and demerits,
principles of design of various types of cross drainage work, falls, types	and design, regulation,
distributary head regulating works.	
UNIT 6	07
River Training Works	
Hydraulics of alluvial rivers, meandering, aggradations and degra	dation, river training,
necessity, river training works and bank protection, various measures	s and their design and
construction principles.	
Hydro Power	
General features of Hydro-power, types of development, general layo	outs of different types,
Assessment of power potential, main components of Hydro-power schen	nes.
Types and selection of turbines, setting of turbines, cavitation.	
Text Books :	
1. Garg. S. K., "Irrigation Engineering and Hydraulic Structures". Khann	a Publishers Delhi.
2007.	
2. Modi P.N., Irrigation, "Water Resource and Water Power Engineering" 2008.	, Standard Book House, Delhi,
Reference Books:	
1. Goldin A. L. and Rasskazor, L. N., "Design of Earth Dams,	
2. River Behaviour, Management and Training, CBIP Vol-I, 1989	
3. Subramanya K., "Engineering Hydrology", Tata McGraw Hill., 2008	
4. Varshney R. S., "Concrete Dams", Oxford and IBH Publishing Co.	
5. B.C. Punmia, Jain., "Irrigation and water resource Engineering", Laxn	ni Publications
6. K. R. Arora., "Irrigation and water resource Engineering", Standard pu	iblications

Elective I

Class and Semester	:	Final. Y. B. Tech (Civil Engineering) Part IV, Sem VII						
Course Title	:	ADVANCED ANALYSIS OF STRUCTURE	Course Code:	:	CE 428			
Teaching Scheme (Hours)	:	4 hours/weeks = 4 x 13 weeks = 52 hrs minimum Tutorial=hr/week Practical= 02/week	Total Credits	:	04+00+01 =05			
Evaluation Scheme (Marks)	:	CIE = (20+20+10) IOE : +50 = SEE = 50 : 150	Duration of SEE	:	3 hrs			
Revision:	:	Second	Month	:	June 2019			

Pre-requisites	:						
The prerequisite for this course is to possess the fundamental knowledge of Human Resourcing along							
with basic processes involved in HRM.							
Type of Course	:	Theory					
Course Domain	:	Elective					
Skills Imbibed	:	Cognitive, Affective domain, Psychomotor					
Course Assessment	Methods:						
Student is evaluated dur	ring Contin	uous Internal Evaluation (Internal Test I and Internal Test II) and					
Semester End Examinat	ion.						
Course Objectives:							
1. Student should learn analysis of curved members							
2. Student s	should unde	erstand approximate methods of analysis					
<i>3</i> . Student s	should stud	y Unsymmetrical Bending and Shear Center,					
analysis of space trusses							
4. Student should understand basics of theory of elasticity							
Course Outcomes:							
At the end of this course	At the end of this course, students will be able to						

At the end of this course, students will be able to

1. perform analysis of curved members

2. do	multistory frames using approximate methods						
3. analyze members subjected to unsymmetrical bending, locate shear center and a							
spa	ce trusses						
4. und	lerstand basics of theory of elasticity						
	Curriculum Content	Hours					
UNIT 1		8					
Influence line dia	grams for indeterminate structure: Muller Breslau principle, I.L.D. for						
propped cantilever	r, two span continuous beam						
UNIT 2		8					
Fixed arches: and	alysis of fixed arches by elastic center method beams curved in plan:						
determinate and ir	determinate beams curved in plan.						
UNIT 3		2					
Approximate meth	nod of analysis of multi-storey frames: analysis of portal frames subjected	9					
to lateral loads – p	ortal method, cantilever method						
UNIT 4		9					
Asymmetrical Be	nding: shear canter for thin walled beam section symmetrical about one	-					
axis							
UNIT 5		9					
Analysis of space	trusses by tension coefficient method analysis of secondary stresses in						
plane frames		0					
UNIT 6		9					
Introduction to th	eory of elasticity- (Treatment in Cartesian coordinates), state of stress at						
point, stress equi	librium equations, strain components, stress-strain relation, generalized						
Hooke's law, plan	e stress and plane strain conditions, stress and strain compatibility for 2 D						
Text Books	:						
1. C.S.Red	dy, "Basic structural Analysis", Tata McGraw Hill, Delhi, 2nd edition						
2. S. B. J	unnarkarand H.J. Shah "Mechanics of Structures" Vol. II and III, Charotar Pu	blishing					
House, A	Anand						
Reference Book	ks :						
1. Norris and	1. Norris and Wilbur, "Elementary Structural Analysis", McGraw Hill Inc., 4th Edition 2 Negi and						
Jangid, "S	tructural Analysis", Tata McGraw Hill Pub. Co. Ltd. 3 Timoshenko, "Str	rength of					
Materials	Materials VolII", East-West Press ltd. Delhi 4 Vazirani and Ratwani, "Analysis of Structures						

Vol.-II", Khanna Publishers, Delhi 5 B.C. Punmia and A.K. Jain, "Design of Steel Structures", Laxmi Publication Ltd. Delhi 6 S.P. Timoshenko and J.N. Goodier, "Theory of Elasticity", Tata McGraw-Hill Publishing Co. Ltd., 3rd edition

Useful Links:

- 1. http://nptel.ac.in/courses/105105109/pdf/m6l36.pdf
- 2. https://www.youtube.com/watch?v=7ZR1p2K-gdI

Class and Semester	:	Final. Y. B. Tech	(Civil Engine	ering) Part	IV, Sem V	Π		
Course Title	:	ENERGY EFFICIENT AND COST- EFFECTIVE BUILDING TECHNOLOGYCourse Code:CE 4						
Teaching Scheme (Hours)	:	4 hours/weeks = 4 minimum Tutorial = 00hr/we Practical= 02/wee	x 13 weeks = eek k	Total Credits	:	04+ 0 = 05	00 +01	
Evaluation Scheme (Marks)	:	CIE = (20+20+10) SEE = 50	Duration of SEE	÷	3 hrs	3 hrs		
Revision:	:	Second			Month	:	June 2	2019
Pre-requisites	:	The prerequisite for of Green Building	or this course i gs	s to possess	the fundam	ent	al knov	wledge
Tune of Course		Theory						
Course Domain	•	Flective						
Skills Imbibad	•	Cognitive Affecti	ve domain Ps	vehomotor				
Course Assessment Meth	i odai	Cognitive, Affecti	ve uomani, rs	ychomotor				
Course Assessment Mein	oas:	uina Continuous In	annal Essalssati	on (Intonnol	Test I and I			(11)
Student is evaluate		iring Continuous In	ternal Evaluati	on (Internal	Test I and I	nte	rnal Te	est II)
and Semester End Examin	atio	n.						
Course Objectives:								
1. To study of Buildi	ngs a	and Environment						
2. To study Ferro-con	ncret	e						
3. To study Building	bloc	ks and Mortars for	Masonry					
Course Outcomes:								
At the end of this course,	stude	ent will be able to						
1. Understand Altern	ative	e Roofing Systems						
2. Understand Conce	pts c	of Green Building						
	_	Curriculum	Content					Hours
UNIT 1: Buildings and H	Envi	ronment						8
Energy concepts in building materials and buildings, Global warming and environmental issues related to building materials, Passive and active energy systems, Buildings and climate, Cost effective vs. Energy efficiency in buildings.								
UNIT 2 Ferrocement, Fe Introduction, Materials, C Applications, Design exar Fiber reinforced cement co behavior, Applications Fil Processes and Application	e rro- onstr nple ompo oer ro	concrete and Fibra ruction methods, Du s, Ferro-concrete, A osites: Materials, M einforced polymer c	e reinforced c arability, Mech pplications, D echanical prop composites: Ma	omposites aanical prope esign examp perties of FR aterials, man	erties, bles C, Analysis bufacturing	an	d	9
UNIT 3: Building blocks Introduction, Stone and La Terracotta blocks, Stabiliz Lime, Lime pozzolona and Properties and Uses, Pract	and aterit ed N d con tical	I Mortars for Mase te blocks, Burnt clay Aud blocks, Stone n nbination mortars for aspect	onry y bricks, Solid nasonry blocks or masonry, Ra	and Hollow , Selection of aw materials	concrete bl of building b , Process,		cs, eks.	9

UNIT 4 Introduction to design of load bearing structures	8					
Stresses in masonry under compression, Factors influencing compressive strength of masonry,						
Strength of masonry under compression, Bond strength in masonry, Elastic properties, Design						
of masonry under vertical gravity loads						
UNIT 5: Alternative Roofing Systems	9					
beam papel roofs / floors, bollow bourdi/concrete block roofs / floors						
Masonry Domes and Vaults: Historical notes, Relevance of vaults and domes, Analysis and design of brick masonry domes, construction of masonry domes, design of brick masonry vaults, Construction of vaults, Problems of lateral thrust, Vaults and domes.						
UNIT 6 Concepts of Green Buildings	9					
Sustainability concepts, Forms of energy, Embodied and Life cycle energy, Energy Efficiency						
in Building materials. Building Materials from Agro and Industrial waste, Biomass resources,						
treated thatch, Industrial wastes, use of industrial wastes, Active and Passive energy systems,						
Rain water harvesting, Cladding materials.						
Reference Books :						
1. Balaguru P.N. and Shah S.P., "Fibre reinforced Cement Composites", McGraw Hill, Inc.						
2. Hannant D. J., "Fibre cements and Fibre Concretes", John Wiley and Sons.						
3. Jagadish K.S., Reddy B.V.V., Nanjuda Rao K.S., "Alternative Building Materials and						
Technologies", New Age International Publishers						
4. Neville A.M., "Properties of Concrete", ELBS, Longman.						

Class and Semester	:	Final. Y. B.Tech (Civil Engineering) Part IV, Sem VII										
Course Title	:	HUMAN RESOURCE MANAGEMENT IN CONSTRUCTION	Course Code:	:	CE 430							
Teaching Scheme (Hours)	:	4 hours/weeks = 4 x 13 weeks= 52 hrs minimum Tutorial=hr/week Practical= 02/week	Total Credits	:	04+00+01 = 05							
Evaluation Scheme (Marks)	:	CIE = $(20+20+10)$ IOE: :+50 = 150SEE = 50::	Duration of SEE : 3 hrs		3 hrs							
Revision:	:	Second	Month	:	June 2019							

Pre-requisites	:								
The prerequisite for this co	The prerequisite for this course is to possess the fundamental knowledge of Human Resourcing								
along with basic processes	invo	olved in HRM.							
Type of Course	:	Theory							
Course Domain	:	Elective							
Skills Imbibed	:	Cognitive, Affective domain, Psychomotor							

Course Assessment Methods:

Student is evaluated during Continuous Internal Evaluation (Internal Test I and Internal Test II) and Semester End Examination.

Course Objectives:

- 1. To understand concept of Human Resource Management.
- 2. To understand the various means of employee handling.
- 3. To understand the legal concepts relating to HRM.

Course Outcomes:

- 1. Students will be able to determine the practical application of Human resource Management.
- 2. Students will be able to determine requirement of human resource, training pattern for employees.
- 3. Students will be able to understand different performance appraisals techniques and various acts used in India for Human welfare.

Curriculum Content	Hours
UNIT 1	07
Introduction, Nature and scope of HRM, HRM: functions and objectives of HRM,	
HRM model, evaluation of HRM, need of HRD in the context of globalization.	
UNIT 2	09
Human Resource Planning: Nature and importance of HRP, Factors affecting HRP,	
Planning process.	
Manpower calculations: techniques of manpower planning for company project,	
Various HRD parameters, functional skills, supervisory skills, entrepreneurship skills.	
UNIT 3	09
Personnel Management: Concept of Personnel Management, Role and function of	
personnel Manager, Necessity of Personnel Management, Role of Personnel Manager.	
	10
UNIT 4	10
Recruiting Human resources: Nature, purpose and importance of recruitment, Factors	
governing recruitment, Recruitment process.	
Selecting Human Resources: Organization for selection, selection process, barriers to	
effective selection, selection in India.	
Inducting and Placing: Evaluation of orientation program, Problems of orientation,	
typical orientation program.	
UNIT 5	09
Training: Nature of training and development, Inputs in training and development,	
gaps in training, the training process in various construction companies.	
Remuneration: Remuneration of personnel, Factors Influencing employee's	
remuneration, various method of deciding the remuneration wage policy in India Job	
evaluation, Performance appraisal, Merit rating.	
UNIT 6	08
Motivation Perspective: Motivation, importance of motivation, theories of motivation	
comparison of domestic HRM and IHRM, Managing international HR activities.	
Labor laws, Labor legislation.	

Text Books	
1. Aswathappa K, "H	nan Resource Management", Tata McGraw Hill, V Edition, 2008.
2. DeNisi A.S., Griffi	R.W., "Human Resource Management", Biztantra Publishers, II
Edition, 2009.	
Reference Books	
1. Loosemore M., Da	ty A., Lingard H., "Human Resource Management in Construction
Projects", Spon Pre	s, 2003.
2. Monappa A, "Perso	nel Management", Tata McGraw Hill, New Delhi, 1997.
3. Rao T, "HRD in the	New Economic Environment", Tata McGraw Hill.
4. William J Bruns Jr.	Performance Measurement, Evaluation and Incentives", Tata McGraw
Hill.	
5. NICMAR Publicat	n on - HRD in the Construction Industry - papers and proceedings of th
5 th National HRD r	and table in the Construction Industry, Pune - March - 2000.

Class and Semester	:	F. Y. B. Tech (Civil Engineering) Part IV, Sem VII											
Course Title	:	TRANSPORTATION INFI PLANNING AND DEMAN	RASTRU D ESTIM	CT [A]	URE FION	Course Code:	:	CE 431					
Teaching Scheme		$3 \text{ hours/weeks} = 3 \times 13 \text{ week}$	Total Credits	:	02.00								
	:	Tutorial= 00hr/week			03+00 $\pm 01-04$								
(1104/3)		Practical= 02hr/week			101 - 04								
Evaluation Scheme (Marks)	:	CIE = (25+25) SEE = 50	Duration of SEE	:	3 hrs								
Revision:	:	Second				Month	:	June 2019					

Pre-requisites	:	Transportation Engineering
The prerequisite for this course is to poss Engineering and Highway Engineering	ess t	the fundamental knowledge of Traffic and Transportation
Type of Course	:	Theory
Course Domain	:	Elective
Skills Imbibed	:	Cognitive, Affective domain, Psychomotor
Course Assessment Methods:		

Student is evaluated during Continuous Internal Evaluation (Internal Test I and Internal Test II) and Semester End Examination.

Course Objectives:

- 1. To introduce the students with the principles and practice of transportation engineering this focuses on Traffic and Transportation Engineering and Highway Engineering.
- 2.To introduce the recent advancements in the field of Sustainable Urban Development, Traffic Engineering and Management, Systems Dynamics Approach to Transport Planning, Highway Design and Construction, Economic and Environment Evaluation of Transport Projects.
- 3. To strength the student's knowledge and technical knowhow to be efficient Transport Engineers.

Course Outcomes:

- The students after completion of this course will have an in-depth knowledge in Traffic Engineering, Transport Planning, Highway Design and Construction, Sustainable Urban and Transport Development and will be efficient enough to take up projects in the field.
- 2. As the students have a hands-on experience in working with the Software, live projects, field visits to

various organizations and training sessions during the course of study, they will be fully fledg	ed
Transport and Highway Planner.	
Curriculum Content	Hours
Unit 1	06
Introduction: Infrastructure and its role in developing society; Transport sector in India -	
policy framework; Development plans –Airports, Highways – National Highway	
Development Program (NHDP); JNNURM, Project Development Process.	
Infrastructure Planning: Systems Engineering Approach to Transportation Planning; Inter	
dependence of Land Use and Transportation; Urban vs. Rural Transportation Needs;	
Transportation System Evaluation Process (Demand and Supply equilibrium); Deficiency	
Analysis; Stages of Project Planning and Stakeholders – Feasibility Studies, Detailed Studies	
(Detailed Project Reports).	
	06
Unit 2	UU
Traffic Characteristics: Traffic characteristics – Road user characteristics, General human	
characteristics, physical characteristics. Vision eye - movement peripheral vision, Visual	
attention, visual sensitivity to light and colour, glare vision and recovery perception of space.	
Hearing, Stability sensation, Time factor in response, Theory of PIEV modifying factors,	
conditional responses; Vehicular Characteristics -types, dimensions, resistance, power	
requirement for different resistance, change in direction - minimum turning radius, off	
tracking, slip angle.	
Unit 3	06
Traffic and Transportation Surveys: Project data needs assessment: Identification of Project	00
Influence Area: Zoning Principles: Primary and Secondary data: Data Collection and	
Sampling Techniques: Traffic Surveys – Planning and Ouestionnaire Design: Inventory of	
Transport Facility: Sources of Secondary Data.	
Unit 4	05
Traffic Parameter Studies and Analysis: Objectives and Method of Studies, Traffic Studies	
- Volume, Speed, Travel Time, Capacity and Intersection survey and analysis, Parking and	
Accident studies.	

Unit 5

Travel Demand Estimation and Forecasting: Characteristics of Highway Travel Demand, Urban (Public and Private Transport) Travel Demand; Principles of Travel Demand Estimation and Forecasting; 4-stage Travel Demand Modelling; Category analysis; Applications.

Traffic Management: Elements of Traffic Management Plan; Urban Traffic Management, Arterial Road Traffic Management Measures; Traffic Signal Designs; Design of Intersections and Rotary; Traffic Management at Construction Site.

Unit 6

06

10

Intelligent Transport System: Technology oriented systems area –Advanced traffic management system, traveller information system and vehicle control system; Application oriented systems area –

Advanced public transport system, commercial vehicle operation and rural transport system, benefits of ITS. Case Studies on Urban Transportation Plans for medium sized cities; Traffic Forecasting for Highways; Public Transit Demand Forecasting

Text Books

1. Kadiyali L.R. and N.B. Lal, "Principles and Practice of Highway Engineering (Including

:

Expressways and Airport Engineering)", Khanna Publishers, New Delhi. (2004)

2. Pignataro L.J., "Traffic Engineering: Theory and Practice", Prentice-Hall Inc., New Jersey. (1973)

Reference Books

1. Black John, "Urban Transportation Planning", Croom Helm Ltd. London. (1981)

:

2. BPR Urban Transportation Planning: General Information and Introduction to System, Bureau ofPublic Roads, Washington D.C. (1970)

3. Bruton M.J., "Introduction to Transportation Planning. II", Edn. Hutchinson, London(1975)

4. Drew D.R., "Traffic Flow Theory and Control", McGraw-Hill, New York. (1968)

5. Hutchinson B.G., "Principles of Urban Transport Systems Planning", McGraw-Hill Book Co., NewYork. (1974)

6. Kadiyali L.R., "Traffic Engineering and Transport Planning", Khanna Publishers, New Delhi. (1994)

7. McShane W.R. and Roess R.P., "Traffic Engineering", Prentice-Hall Inc., New Jersey(1990)

8. Partha Chakroborty and Animesh Das, "Principles of Transportation Engineering, Prentice-HallIndia, New

Delhi. (2003)								
9. Putman S.H., "Integrated Urban Mode	9. Putman S.H., "Integrated Urban Models", Pion Ltd., London. (1983)							
10. Wilson A.G., "Entropy in Urban and	l Reg	ional Modelling", Pion Ltd., London(1970):						
11. Wells G.R., "Traffic Engineering – A	An In	troduction", Griffins, London. (1970):						
12. Wohl M. and Martin B.V., "Traffic S	Syste	m Analysis of Engineers and Planners", McGraw-HillBook Co.,						
New York.								
13. www.nhai.org								
8								
Reference Codes	:							
1 IRC: 76-1979 – Tentative Guide	lines	for Structural Strength Evaluation of Rigid Airfield Pavement -						
Indian Roads Congress -IRC. Ne	ew De	elhi.						
2. IRC: 85-1983 – Code of Practice	e for	Accelerated Strength Testing and Evaluation of Concrete Road						
2. IRC: 85-1983 – Code of Practice and Air field Constructions- Indi	e for an Ro	Accelerated Strength Testing and Evaluation of Concrete Road oads Congress -IRC, New Delhi.						
2. IRC: 85-1983 – Code of Practice and Air field Constructions- Indi	e for an Ro	Accelerated Strength Testing and Evaluation of Concrete Road oads Congress -IRC, New Delhi.						
 IRC: 85-1983 – Code of Practice and Air field Constructions- Indi IRC: 58-2002 (Second Revision) 	e for an Ro) – Gi	Accelerated Strength Testing and Evaluation of Concrete Road oads Congress -IRC, New Delhi. uidelines for the Design of Rigid Pavements for Highways						

5. IRC: 37-2001 – Guidelines for the Design of Flexible Pavements for Highways-Indian Roads Congress-IRC, New Delhi.

Class and Semester	:	Final. Y. B. Tech (Civil Engineering) Part IV, Sem VII							
Course Title	:	WATERSHI	ED MANA	GE	MENT	Course Code	:	CE 432	
Teaching Scheme (Hours)	:	4 hours/week hrs minimum Tutorial= 00 Practical= 02	eek	cs = 52	Total Credits	:	04+00+01 = 05		
Evaluation Scheme (Marks)	:	CIE = (20+20+10) SEE = 50	IPE IOE EPE/EOE	:	Duration of SEE	:	3 hrs		
Revision:	:	Second				Month	:	June 2019	
Pre-requisites	:	The prerequis hydrology, so	site for this c oil and water	cc	rse is to p onservatio	oossess the function in the function of the fu	ind	amental knowledge of	
Type of Course	•	Theory							
Course Domain	•	Elective							
Stills Imbibad	•	Cognitive Af	fective dom	air	Pevehor	notor			
Skills Indidea	·	Cognitive, Al	licenve dom	alf	i, r sychol	10101			
Student is evaluated du Semester End Examination. Course Objectives: 1. To study sustainable at 2. To study watershed me 3. To study flood, drough	nd nd nt a	ng Continuous I integrated wate ling and use of nd water qualit	Internal Eva ershed mana f modern tec y manageme	lua gei hni	ntion (Inte ment and a iques in w	rnal Test I a its social asp vatershed ma	nd bect	Internal Test II) and s. gement.	
Course Outcomes:									
At the end of this course, stud 1. Understand sustainable 2. Understand watershed 3. Understand study floor	ent e ai mo d, c	will be able to ad integrated w odeling and use brought and wa	vatershed ma of modern ter quality n	na tec nan	gement ar hniques in agement.	nd its social and watershed	asp ma	ects. nagement.	
		Curricul	um Conten	t				Hours	
UNIT 1 Introduction and Basic Cone Concept of watershed, introd relative importance, watershed Sustainable Watershed App Sustainable integrated water practices, integrated farming, arid and semiarid regions, case UNIT 2 Integrated Watershed Mana Introduction to integrated appr water resources, rainwater har Social Aspects of Watershed Community participation, Priv Integrated development, Water developed water shed	cep luct d m roa so e st so e st nge roa ves l m vate er le	ts: ion to watersh anagement pol ach and Water ed management il erosion and udies, short ter ment: ch, integrated v ating; roof catch anagement: e sector particip egislation and in	ned managen licies and de shed Mana nt, natural conservation rm and long- water resour hment system pation, Institi mplementation	me cis gen re n; v ter cess n. utie	nt, differe ion makin ment Pra sources watershed m strateg managen onal issue s, Case st	ent stakeholo ng. ctices: management management ic planning. nent, conjun es, Socio-eccudies and Vi	der , a nt p ctiv	7 s and their agricultural practices in 7 ve use of my, to	

UNIT 3	7					
Watershed Modeling:						
Standard modeling approaches and classifications, system concept for watershed modeling,						
overall description of different hydrologic processes, modeling of rainfall-runoff process,						
subsurface flows and groundwater flow.						
UNIT 4	7					
Management of Water Quality:						
Water quality and pollution, types and Sources of pollution, water quality modeling,						
environmental guidelines for water quality.						
Water Conservation and Recycling:						
Perspective on recycle and reuse, Waste water reclamation						
	6					
UNIT 5						
Storm Water and Flood Management:						
Storm water management, design of drainage system, flood routing through channels and						
reservoir, flood control and reservoir operation, case studies on flood damage.						
Drought Management:						
Drought assessment and classification, drought analysis techniques, drought mitigation planning.						
	6					
UNIT 6						
Use of Modern Techniques in Watershed Management:						
Applications of Geographical Information System and Remote Sensing in Watershed						
Management, Role of Decision Support System in Watershed Management.						
Text Books :						
Murthy, J.V.S., "Watershed Management", New Age Intl., New Delhi 1998.						
Murthy, J.V.S., Watershed Management in India, Wiley Eastern, New Delhi, 1994						
Vir Singh Raj, "Watershed Planning and Management", Yash Publishing House, Bikaner, 2000						
Reference Books :						
Allam, Gamal Ibrahim Y., "Decision Support System for Integrated Watershed Management", Color	ado State					
University, 1994.						
American Soc. of Civil Engr., "Watershed Management", American Soc. of Civil Engineers, New Yo	ork,					
1975.	,					
Black Peter E., "Watershed Hydrology", Prentice Hall, London, 1991.						
Michael A.M., "Irrigation Engineering", Vikas Publishing House, 1992						
Purandare A.P., Jaiswal A.K., "Watershed Development in India", NIRD,						

Class and Semester	:	Final Year B. Tech (Civil Engineering), Part IV, Sem VII			
Course Title	:	MAJOR PROJECT PHASE-I	Course Code:	: CEL 415	
Pre-requisites	:	The prerequisite for this course is to possess the fundamental knowledge of Civil Engineering			
Type of Course	:	Practical			
Course Domain	:	core			
Skills Imbibed	:	Cognitive, Affective domain, Psychomotor			
Course Assessment Methods:					
Student is evaluated during External Oral Examination					

Course Objectives:

- 1. To carry out extensive literature survey on the research topic
- 2. To identify the problem statement for the research work.
- 3. To decide methodology for the research work.
- 4. To carry out initial mathematical modeling or experimental set up.

Course Outcomes:

At the end of this course, student will be able to

:

- 1. perform extensive literature survey and identify research topic of work
- 2. identify the problem statement for the research work
- 3. decide methodology for the research work.
- 4. carry out mathematical modeling or experimental program for the proposed work

Practical covered

Project Topics

Project topics should preferably be design, development, design aid type and interdisciplinary. The projects should aim at training the students in going through all important phases of project studies starting from establishing the need through collection of data, analysis, design, development, drawing, cost estimates and project reports, where appropriate some alternatives which meet the same needs should also be considered and evaluated using appropriate evaluation criteria.

Methodology for Project Evaluation

Project group consists of a minimum THREE and maximum FIVE students. The group is required to do literature survey, formulate the problem and form a methodology of arriving at the solution of the problem. During the First Stage of the Project Students would identify a project in area related with engineering and carryout the necessary literature review. Based on the literature review during first stage of the project student would write a report which would give a review of literature, problem formulation and methodology to be adopted. The report would be presented through a seminar which would be evaluated at the end of the term by the panel of internal and external examiners.

The Work may consist of the following points:

1. Problem Formulation
2. Survey of Literature

3. Experimental investigation/ Data collection

- **4.** Design and Fabrication of Model
- 5. Industrial Assignment

Note:

The assessment of the project will be done at the end of the semester by a committee consisting of three faculty members from the department along with Project Guide. The students will present their project work before the committee. A minimum ten-page typed report excluding photographs based on the work done will have to be submitted in prescribed format to the assessing committee. The project guide will award the marks to the individual students depending on the group average awarded by the committee. One Project Guide shall be allotted maximum TWO groups for guidance. For work load calculation minimum load is 2hr/week, for one group of FOUR to FIVE students. (As per AICTE Guide Lines).

Class and Semester	:	Final Year B. Tech (Civil Engineering), Part IV, Sem VII									
Course Title	:	LAB-II STRUCTURAL DESIGN AND DRAWING-II	Course Code:	:	CEL 416						
Pre-requisites	:	The prerequisite for this course is to possess the fundamental knowledge of material properties, calculation of shear force and bending moment.									
Type of Course	:	Practical									
Course Domain	:	core									
Skills Imbibed	:	Cognitive, Affective domain, Psychomotor									

Student is evaluated during External Oral Examination

Course Objectives:

- 1. To prepare detailing of reinforcement of members under various loading conditions
- 2. To prepare schedule of the reinforcement

Course Outcomes:

Students will able to

- 1. implement the concepts of structural design procedure
- 2. design the individual members and hence building as a whole.
- 3. To practice the elementary design of different structural elements

Practical covered

The laboratory work should include the following:

:

I) List of experiments: (Any 8)

Design Assignments Shall Consist of Following:

- 1. Design of RC building for gravity loads only, covering all types of structural elements of building, including estimation of steel and concrete quantities. (Maximum two students in a group).
- 2. The drawings would be drafted using Drafting Package/ Auto CAD. Four full size drawing sheets would be drawn using drafting software/ Auto CAD.
- **3.** Bar bending schedule and detailing of reinforcements as per standard professional practice and relevant IS codes.
- **4.** Emphasis would be given on structural detailing of reinforcement taking in to account earthquake effects.
- 5. Design of multistoried RC buildings using software such as STAAD .Pro, STRUD, ETABS, etc.
- 6. For the architectural layouts necessary for the RCC design assignments, buildings designed for the

Laboratory work on Building Design and Drawing and Building Planning would be taken as basis.

7. Report of a site visit related to building structure under construction.

Design Assignments Shall Consist of Following:

- 1. Design of RC building for gravity loads only, covering all types of structural elements of building, including estimation of steel and concrete quantities. (Maximum two students in a group).
- 2. The drawings would be drafted using Drafting Package/ Auto CAD. Four full size drawing sheets would be drawn using drafting software/ Auto CAD.
- **3.** Bar bending schedule and detailing of reinforcements as per standard professional practice and relevant IS codes.
- **4.** Emphasis would be given on structural detailing of reinforcement taking in to account earthquake effects.
- 5. Design of multistoried RC buildings using software's such as STAAD.Pro, STRUD, ETABS, etc.
- **6.** For the architectural layouts necessary for the RCC design assignments, buildings designed for the Laboratory work on Building Design and Drawing and Building Planning would be taken as basis.
- 7. Report of a site visit related to building structure under construction.

Design Assignments Shall Consist of Following:

- 1. Design of RC building for gravity loads only, covering all types of structural elements of building, including estimation of steel and concrete quantities. (Maximum two students in a group).
- 2. The drawings would be drafted using Drafting Package/ Auto CAD. Four full size drawing sheets would be drawn using drafting software/ Auto CAD.
- **3.** Bar bending schedule and detailing of reinforcements as per standard professional practice and relevant IS codes.
- **4.** Emphasis would be given on structural detailing of reinforcement taking in to account earthquake effects.
- 5. Design of multistoried RC buildings using software's such as STAAD.Pro, STRUD, ETABS, etc.
- **6.** For the architectural layouts necessary for the RCC design assignments, buildings designed for the Laboratory work on Building Design and Drawing and Building Planning would be taken as basis.
- 7. Report of a site visit related to building structure under construction

Class and Semester	:	Final Year B. Tech (Civil Engineerin	ng), Part I	V, 9	Sem VII
Course Title	:	LAB-II STRUCTURAL DYNAMICS AND EARTHQUAKE ENGINEERING	Course Code:	:	CEL 417
Pre-requisites	:	The prerequisite for this course is to possess to for material properties, calculation of shear for	he fundament	ntal ling	knowledge moment.
Type of Course	:	Practical			
Course Domain	:	core			
Skills Imbibed	:	Cognitive, Affective domain, Psychomotor			
Course Assessment	Metho	ds:			
Student is evaluated dur	ring Exte	ernal Oral Examination			
Course Objectives:					
5. To understand the	concept	of vibration response to SDOF			
6. To understand the	concept	of vibration response to MDOF			
7. To understand ear	thquake	effects on water tanks			
Course Outcomes:					
Students will able to					
1. understand the c	oncept o	of vibration response to SDOF			
2. understand the c	oncept o	of vibration response to MDOF			
<i>3.</i> understand earth	quake e	ffects on water tanks			
Practical covered	:				
The laboratory wor I) List of experiments: 1. Vibration tra 2. Free vibratio 3 Harmonic for	rk shou (Any 8) insducer on chara	Id include the following: Id include the following: s and elementary data processing. cteristic of structural systems-natural frequency ration response of structural models and frequency	y and dampin	ng r	atio.
4. Dynamic vib	pration a	bsorber.	ney respons	c iu	netions.

- 5. Prototype testing and system identification.
- 6. Vibration isolation of a secondary system.
- 7. Dynamics of a four storied building frame with and without an open ground floor
- 8. Dynamics of one-span and two-span beams.
- 9. Earthquake induced waves in rectangular water tanks
- **10.** Dynamics of free-standing rigid bodies under base motions
- 11. Seismic wave amplification, liquefaction and soil-structure interactions.

Class and Semester		Final Year B. Tech (Civil Engineering	g), Part IV, S	em VII
Course Title	<u> </u>	I AD III ESTIMATING AND COSTING	Course	· CEI 419
Course Tille	•	LAD-III ESTIMATING AND COSTING	Code	. CEL418
Pre-requisites	:			
Type of Course	:	Practical		
Course Domain	:	core		
Skills Imbibed	:	Cognitive, Affective domain, Psychomotor		
Course Objectives	iuring : dents r	necessary knowledge and skills in estimation of civi	il works	
2. To make stude	nts aw	are of professional practices.		
Course Outcomes.	:			
Student will be able to		· · · · · ·		
1. take out quanti	ties for	r various items of construction		
2. uran specificat	tes for	various civil engineering works		
4 carry out the y	aluatio	n of immovable properties using appropriate metho	nds	
Practical covered	aruutio	• • • • • • • • • • • • • • • • • • •		
The laboratory v	vork s	hould include the following:		
I) List of experime	its:	noura meruae me rono (mg.		
1 Writing detaile	ed snec	ifications for items of work from various civil engi	neering works (each from
Building, Road	ls. Irrig	ation works. Water supply and sanitation and seve	er from buildings	
2. Detailed rate a	nalysis	for items of work from various civil engineering w	vorks. (at least 10) items)
3. Schedule of rea	inforce	ement for the following:	× ×	,
Beams, Slab, S	staircas	se, Column and Footing		
4. Preparing deta	iled est	timate for $G + 1$ building with framed structure		
5. Preparing deta	iled est	timate for civil structures other than building such a	as Culvert, road,	embankment,
drainage system	n (any	one)		
6. Preparing tend	er noti	ce and schedule 'B' (BOQ) for $G + 1$ building for v	which the detailed	d estimate is
prepared,			· , · · ·	
prepared, 7. Preparing tend	er docu	ament for $G + 1$ building for which the detailed esti-	mate is prepared	
prepared, 7. Preparing tend 8. Preparing deta	er docu iled va	ument for $G + 1$ building for which the detailed esti- luation report for residential/commercial/ industrial	l building using s	tandard form

Lab IV Elective II

Class c	ind		:	Final Year B. Tech (Civil Engineering), Part IV, Sem VI	Ι							
Semest	er											
					Car			CEI				
Course	e Title		:	LAB-IV ADVANCED ANALYSIS OF STRUCTURES	Col	urse de	:	433				
Pre-ree	quisites		:									
Type o	f Cours	e i	:	Practical								
Course Skills I	Imbibed • Cognitive Affective domain Psychomotor											
Course	Assess	men	• nt N	Tethods:								
Studen	t is eval	uate	ed d	luring Internal Oral Examination								
Cours	e Obje	ctiv	es.	:								
	1.	Stu	den	t should learn analysis of curved members								
	2.	Stu	den	t should understand approximate methods of analysis								
	З.	Stu	den	t should study Unsymmetrical Bending and Shear Center,								
		ana	lysi	is of space trusses								
	4.	Stu	den	t should understand basics of theory of elasticity								
Cours	e Outo	com	es.									
At the	end of the	his c	cou	rse, students will be able to								
1.	perform	n an	aly	sis of curved members								
2.	do mul	tisto	ry	frames using approximate methods								
3.	analyze	e me	mb	ers subjected to unsymmetrical bending, locate shear center a	and ana	alyze	spa	.ce				
	trusses											
4.	underst	and	bas	sics of theory of elasticity								
Practic	cal cover	red			:							
The la	borator	y w	orł	s should include the assignments based on following:								
1.	Influen	ce li	ine	diagrams for indeterminate structure								
2.	Fixed a	irche	es									
3.	Approx	kima	te	method of analysis of multi-storey frames: analysis of porta	al fram	ies su	bje	cted to				
	lateral	load	s –	portal method, cantilever method								
4.	Asymm	netri	cal	Bending: shear center for thin walled beam section symmetry	ical ab	out o	ne a	ıxis				
5.	Analys	is of	f sp	pace trusses by tension coefficient method analysis of secon	dary st	tresse	s in	ı plane				
	frames											
6.	Theory	ofe	elas	ticity								

Class and	•	Final Year B. Tech (Civil Engineering).	Part IV. Se	m \	VII								
Semester		i mui i cui Di i cen (ci vi Engineering),	1 ui (1 (,))										
Course Title	:	LAB-IV ENERGY EFFICIENT AND COST-EFFICIENT BUILDING TECHNOLOGY	CEL 434										
Pre-requisites	:												
Type of	:	Practical											
Course													
Course	:	Elective											
Domain													
Skills Imbibed	<i>d</i> : Cognitive, Affective domain, Psychomotor												
Course Assess	Course Assessment Methods:												
Student is evalu	lated	during External Oral Examination											
Course Objecti	ves:												
1. To l	know	about green building rating system											
2. To a	under	stand Embodied and Life cycle energy.											
3. To a	apply	the knowledge of Building blocks and Morta	urs for Masc	onry	in specific site.								
Course Outcom	nes:												
Students shall a	able t	0											
1. To und	lersta	and rainwater harvesting methodologies.											
2. Under	stand	Active and Passive solar energy systems											
3. Apply	theor	ry knowledge in practical demonstration.											
Practical	:												
covered													
The laborator	y wo	rk should include the following:											
A) Assignment	based	l on All topics in Theory.											
B) Introduction	to gi	een building rating system.											
C) Visit to Gree	C) Visit to Green Building Site/solar power/rainwater harvesting site.												

Class and Semester	:	Final Year B.Tech (Civil Engineering), Part IV, Sem VII								
Course Title	:	Lab-IV HUMAN RESOURCE MANAGEMENT IN CONSTRUCTION	•••	CEL 435						
Pre-requisites	••	The prerequisite for this course is to possess the fundamental knowledge of Human Resourcing along with basic processes involved in HRM.								
Type of Course	:	Practical								
Course Domain	:	Elective								
Skills Imbibed	:	Cognitive, Affective domain, Psychomotor								

Student is evaluated during External Oral Examination

Course Objectives:

- 1. To understand concept of Human Resource Management.
- 2. To understand the various means of employee handling.
- 3. To understand the legal concepts relating to HRM.

Course Outcomes:

- 1. Students will be able to determine the practical application of Human resource Management.
- 2. Students will be able to determine requirement of human resource, training pattern for employees.
- 3. Students will be able to understand different performance appraisals techniques and variousacts used in India for Human welfare.

Practical covered

The laboratory work should include the following:

:

I) List of Assignments: (Any 8)

- 1. Introduction to Human Resource Management in Global Perspective.
- 2. Skills and parameters in analysis of Human Resource Management.
- 3. Personnel Management and its perspective in Construction Engineering.
- 4. Process of Recruitment in Construction sector based on various factors.
- 5. Importance of Induction and its processes.
- 6. Importance of Training and its relevance in Construction sector.
- 7. Remuneration defining and role of appraisal in one's career growth.
- 8. Understanding International Human Resource Management.
- 9. Legal concepts relating to Human Resource Management.
- 10. Industrial visit to understand proceedings in HRM.

Class and Semester	:	Final Year B.Tech (Civil Engine	ering), Part IV, Sem VII								
		· · · · · · · · · · · · · · · · · · ·									
Course Title	:	LAB-IV WATERSHED MANAGEMENT	Course Code : CEL 436								
Pre-requisites	:										
Type of Course	:	Practical									
Course Domain	:	Elective									
Skills Imbibed	:	Cognitive, Affective domain, Psy	chomotor								
Course Assessment Meth	Course Assessment Methods:										
Student is evaluated during	ng E	xternal Oral Examination									
Course Objectives:											
To study various Watersh	ned l	Management Practices on site									
To carry out watershed m	node	ling of selected site									
To study how to manage	floo	d and drought condition at site									
Course Outcomes:											
Student will be able to											
1. study various Wa	tersł	ed Management Practices on site									
2. carry out watershe	ed n	odeling of selected site									
3. manage flood and	dro	ught condition at site									
Practical covered		•									
The laboratory work sh	oul	l include the following:									
A) At least one Assig	nme	nt based on each unit									
B) Site Visit containing	ng s	udy of following points:									
1. Implementation	n o	f Watershed Management Practices	in selected site region								
2. Watershed mo	odeli	ng of selected site									
3. Use of moder	n teo	hniques in watershed management	at selected site								
4. Flood Manage	eme	nt or drought management in selecte	ed area								
5. Water quality	mai	agement in selected site area									

	1		<u> </u>	<u> </u>									
Class and Semester	:	Final Year B. Tech (Civil Engineering)	ng), Part IV,	Sei	m VII								
			~	—	1								
Course Title	:	INTERNSHIP III	Course Code	:	CEL 419								
Pre-requisites													
Type of Course	: Practical												
Course Domain	: core												
Skills Imbibed	: Cognitive, Affective domain, Psychomotor												
Course Assessment Methods:													
Student is evaluated during Inte	erna	al Oral Examination											
Course Objectives:													
1. To expose the students	to a	ctual working environment.											
2. To enhance their knowl	edg	e and skill from what they have learned	in the acader	nic									
3. To instill the good quali	ities	s of integrity, responsibility and self-cor	nfidence.										
Course Outcomes:													
Student will be able to													
1. Relate engineering l	cno	wledge and understand field practices in	ncivil enginee	erin	g.								
2. Correlate theoretical	l co	ncepts with practical implementation.											
3 Acquire report prep	arat	ion skill and work as an individual and	team										
s. riequite report prop	ui ui	ion skin und work us un marviduar and	touin.										
Practical covered		:											
ASSESSMENT ON VACAT	'IO	N FIELD TRAINING (4 WEEKS)											
The students are required to u	ind	ergo rigorous field training for summer	vacation for	mi	nimum of 4								
weeks in any of the Civil eng	gine	ering firms to have an exposure to pra	actical aspects	3. S	tudent shall								
submit a report on field training	ig a	nd give presentation based on training.											
The Report Should Consist:	-												
1. Introduction and Brief Histo	ory	of the Organization											
2. Technical and Practical info	orm	ation gained during the summer training	g period										
3. Daily Material Consumption	n R	eport	-										
4. Daily Work Progress Repor	t	•											
5. Daily Muster of Labors on S	Site												
6. Safety Measures													
7. Site Layout													
8. Site Details (Includes Plan)													
9. Bar Chart of Work													
10. Necessary certificate from	the	e organization where such training is und	dertaken										
11. Conclusion and Recomme	nda	tions, Photo gallery, References, Apper	ndices.										
Note: The faculty in charge s	sha	Il personally visit the site at least once	e during the t	raiı	ning period.								

Evaluation of Report by External should be done at the end of 7th semester.

Class and Semester	:	Final Year B. Tech (Civil Engineering), Part IV, Semester VII									
Course Title	:	INTRODUCT CONSTITUTI	IOI ON	N TO V		Course Code:	:	AC416			
Teaching Scheme (Hours)	:	Lectures= 2 hr	Lectures= 2 hr /Week= 2 x14= 28 hours							Nil	
Evaluation Scheme (Marks)	:	Assignments Viva voce	:	50 25	Written Test Grand Total	:	25 100	Duration of Exam	:	Not Applica ble	
Revision	:	Second		•		•		Month	:	June 2019	

Pre-requisites	:	It has no any pre-requisites. Every citizen of the country ought to study the course content.
Type of Course	••	Audit Course at institute level
Course Domain	:	Humanities and Social Science
Skills Imbibed	:	Cognitive: Understand, Predicting Situation, Comprehend, Affective: Receive, Listen, Respond, showing self-reliance, Organize Psychomotor: Imitation, adaptation, articulation, origination

The students will be given five assignments each for 10 marks. At the end of the course, there will be a written test of 25 marks and a viva voce of 25 marks. There will be assessment for a total of 100 marks. Based on the marks obtained, they will be awarded with a grade similar to other credit courses. Though it is an audit course, obtaining passing grade is essential.

Course Objectives:

- 1. To get familiarity with preamble
- 2. To understand the fundamental rights and duties of citizens
- 3. To know about the union and state executives
- 4. To interpret and recognize the constitutional provisions
- 5. To understand and follow the electoral process

- 1. Associate with constitution of India
- 2. State fundamental duties.
- 3. Describe union and state executives.
- 4. Discuss constitutional provisions
- 5. Illustrate electoral process
- 6. Report the role of democracy in welfare of society

Curriculum Content								
Unit I: Introduction to Preamble: Preamble to the constitution of India. Fundamental rights	04							
under Part – III – details of Exercise of rights, Limitations and Important cases.								
Unit II: Relevance of Directive principles of State Policy under Part – IV. Fundamental duties								
and their significance.								
Unit III: Union Executive – President, Prime Minister, Parliament and the Supreme Court of	04							
India.								
Unit IV: State executive – Governors, Chief Minister, State Legislator and High Courts.	05							
Unit V: Constitutional Provisions: Provisions for Scheduled Castes and Tribes, Women and	05							
Children and Backward classes. Emergency Provisions.	05							
Constitutional amondments	05							
Text Book:								
1. Durga Das Basu: "Introduction to the Constitution of India" (Students Edn.) Prentice - Hall EEE,								
19th/20th Edn., 2001.								
2. R.C. Agarwal, "Indian Political System", (1997) S.Chand and Company, New	w Delhi.							
Maciver and Page, "Society: An Introduction Analysis", Mac Milan India Ltd., New Delhi.								
3. K.L. Sharma, "Social Stratification in India: Issues and Themes". (1997). Jawaharlal Nehru U	Iniversity.							
New Delhi								
Reference Book:								
1. An Introduction to Constitution of India" by M.V.Pylee, Vikas Publishing	g, 2002.							
Sharma, Brij Kishore, "Introduction to the Constitution of India:, Prentice Hall of India, New	⁷ Delhi.							
2. U.R. Gahai, "(1998) Indian Political System ", New Academic Publishing House, Jalaendhar	2. U.R. Gahai, "(1998) Indian Political System ", New Academic Publishing House, Jalaendhar.							
3. R.N. Sharma, "Indian Social Problems", Media Promoters and Publishers Pvt. Ltd.								
4. Yogendra Singh, "(1997) Social Stratification and Charge in India ", Manohar, New Delhi.								

Class and Semester	:	Final. Y. B. Tech (Civil Engineering) Part IV, Sem VIII									
Course Title	:	DESIGN OF RCC	STRUCT	Course Code:	:	CE 421					
Teaching Scheme (Hours)	:	4 hours/weeks = 4x minimum Tutorial= 01hr/wee Practical= 02/week	Total Credits	:	04+ 01 +01 =05						
Evaluation Scheme (Marks)	:	CIE = (20+20+10) SEE = 50	IPE IOE EPE/EOE	:	+50 = 150	Duration of SEE	÷	3 hrs			
Revision:	:	Second		Month	:	June 2019					

Pre-requisites	•	
The prerequisite for this course is to po	sses	s the fundamental knowledge of material properties and
construction activities and Design of R	CC	structure-I.
Type of Course	••	Theory
Course Domain	:	Core
Skills Imbibed	:	Cognitive, Affective domain, Psychomotor

Student is evaluated during Continuous Internal Evaluation (Internal Test I and Internal Test II) and

Semester End Examination.

Course Objectives:

- 1. To study concept of pre-stressed concrete, methods of pre-stressing along with its advantages
- 2. To study concept of analysis and design of Pre-stressed concrete sections.
- 3. To Study concept of combined footing and retaining wall
- 4. To understand working stress philosophy and design of water tanks

- 1. Understand pre-stressed concrete and method of pre-stressing along with its advantages
- 2. Analyze and design Pre-stressed concrete sections
- 3. Analyze and design water tanks resting on ground
- 4. Analyze and design combined footing and retaining wall

Cur	ricı	ılum Content	Hours					
UNIT 1			8					
Basic concepts, materials, various pre-tensioning and post tensioning systems, concept of								
losses.								
UNIT 2			9					
Concept of cable profile, Analysis of	con	tinuous beams of two spans, Multistoried frames						
analysis using substructure frame me	thod	, Analysis for lateral loads using cantilever and						
portal method,			0					
UNIT 3			8					
Design of multistoried building using	des	ign aids, computer codes for all loads including						
wind and earthquake loads.								
UNIT 4			9					
Design of cantilever and counter fort	retai	ning wall for all loads including surcharge etc. T						
and L shapes.			0					
UNIT 5			9					
Design of combined footings, Rectang	gular	footing and Trapezoidal footing both slab and L						
beam type for two columns only.								
UNIT6								
Design of Ground Water Tanks and Overhead Tanks, roof, base and supporting structure,								
Circular tanks with flexible joints	at t	base, Circular tanks with rigid joints at base,						
Rectangular water tanks, Design shall	be	based on approximate method and IS Code 3370						
(Revised)								
Text Books	:							
1. Krishnaraju N., "Advanced De	sign	of Structures",						
2. Lin T. Y., "Design of Prestress	ed C	oncrete Structures",						
3. Roy and Sinha, "Design of R.	C. St	ructures",						
4. Shah V.L. and Karve S.R., "Design of Multistoried Buildings (G+3)",								
Reference Books/Codes:								
1.IS 456 (2000), Plain and Reinforced Concrete - Code of Practice, Bureau of Indian Standards, New								
Delhi								
2.IS:1893 (2002), Indian Standard	Crite	eria For Earthquake Resistance of Structures (Part I): General					
Provisions and Building (Fifth Rev	visio	n), Bureau of Indian Standards, New Delhi						
3.I.S. 875 and IS 3370								

Class and Semester	:	Final. Y. B. Tech (Civil Engineering) Part IV, Sem VIII						
Course Title	:	CONSTRUCTION PRA	CTICES			Course Code:	:	CE422
	:	3 hours/weeks = 3x 13 we	Total Credits	:	02.00			
(Hours)		Tutorial=hr/week				+00 -03		
(110013)		Practical=/week						100 -05
Evaluation Scheme (Marks)	:	CIE = (20+20+10) SEE = 50	IPE IOE EPE/EO E	:	=100	Duration of SEE	:	3 hrs
Revision:	:	Second				Month	:	June 2019

Pre-requisites	:	
The prerequisite for this construction activities.	cou	rse is to possess the fundamental knowledge of material properties and
Type of Course	:	Theory
Course Domain	:	Core
Skills Imbibed	:	Cognitive, Affective domain, Psychomotor

Student is evaluated during Continuous Internal Evaluation (Internal Test I and Internal Test II) and

Semester End Examination.

Course Objectives:

- 1. To build knowledge among students about advanced construction techniques
- 2. To aware paradigm shift in construction techniques
- 3. To expose students to developments taking place in construction practices

- 1. knowledge about advanced construction techniques
- 2. aware paradigm shift in construction techniques
- 3. exposed to developments taking place in construction practices

Curriculum Content	Hours
UNIT 1	4
Introduction -Conceptual planning of new project, site access and services, Mechanical v/s	
Manual construction.	
UNIT 2	8
Excavation in Earth: Earth moving equipment's - Tractors, Bulldozers, Scrappers, Power	0
shovel, Hoes, simple numerical problems based on cycle time and production rates.	
Drag line, Clamshell, Trenchers, Compactors- types and performance, operating efficiencies,	
lifting capacities.	
UNIT 3	7
Excavation in hard rock: Rippers, jack hammers, drills, compressors and pneumatic equipment's	
Blasting explosives, detonators, fuses, Drainage in excavation – necessity and methods of	
dewatering.	
UNIT 4	6
RMC plant, layout and production capacity. Grouting, Shotcreting, under water concreting.	
Slip formwork	
UNIT 5	8
Prefabricated construction: Relative economy,	
Steel construction: Planning and field operations, Erection equipments, Composite Steel-	
Concrete Construction	
Floating and dredging equipments.	
Asphalt mixing and batching plant (Hot mix plant), Sensor Paver for rigid roads, Crushingplants	
Belt conveyers, cableways - Need and Construction methods	
UNIT 6	6
a) Diaphragm Walls – Purpose and Construction Methods	
b) Safety measures in construction, prevention of accidents	
c) Introduction to Disaster management	
d) Rehabilitation and Strengthening of Structures	
Text Books :	
1. Stubbs, "Hand Book of Heavy Construction", McGraw Hill Inc, 1971	
2. Wedel, "Concrete Construction Hand Book", McGraw Hill Higher Education; 2nd edition ,197	74
3. Singh Jagman, "Heavy Construction – Planning, Equipment and methods", Oxford and IBH pu	ublishers,
New Delhi 9.	

Department of Technology (Civil Engineering) Program – Syllabus w. e. f. 2019-20

Refer	ence Books	:	
1.	Peurifoy R. L .,	Con	struction, Planning, Equipment and methods", McGraw hill book co New
	Delhi.		
2.	Prof. Ataev S. S	., "C	onstruction Technology", Mir Publishers, Mascow.
3.	Baron Thomas,	"Ere	ction of Steel Structures".
4.	Day, "Construct	ion I	Equipment Guide".
5.	Boyes R.G.H., "	Stru	ctural and cut off Diaphragm walls", Applied Science Publishers Ltd., London.
6.	Varma Mahesh,	"Co	nstruction Equipment", Metropolitan book Co, New york
7.	Hajnal I, I Marto	on, F	. RegeleA. Wiley, "Construction of Diaphragm Walls", Inter-science
	Publication, John	n Wi	ley and Sons.
8.	Quin, "Planning	and	Construction of Docks and Harbors"

Class and Semester	:	Final. Y. B. Tech (Civil Engineering) Part IV, Sem VIII							
Course Title	:	TOWN AND COUNTRY	PLANNI	١G		Course Code:	:	CE 423	
T 1: C 1		3 hours/weeks = 3x 13 weeks= 39 hrs minimum				Total Credits	:	02 1 00	
(Hours)	:	Tutorial= 00hr/week	+00 = 03						
(110005)		Practical=/week			100 -00				
Evaluation Scheme (Marks)	:	CIE = (20+20+10) SEE = 50	IPE IOE EPE/EO E	::	= 100	Duration of SEE	÷	3 hrs	
Revision:	:	Second				Month	:	June 2019	

Pre-requisites	:				
The prerequisite for this course is to possess the fundamental knowledge of planning, development of town					

and country.

Type of Course	:	Theory
Course Domain	:	Core
Skills Imbibed	:	Cognitive, Affective domain, Psychomotor

Course Assessment Methods:

Student is evaluated during Continuous Internal Evaluation (Internal Test I and Internal Test II) and

Semester End Examination.

Course Objectives:

- 1. To understand the students with applications of principle of Town and country planning.
- 2. To make students understand various terminologies involved in Town and country Planning.
- 3. To make students learn the planning and designing aspect of Town Planning
- 4. To provide students the knowledge of town and country Planning

- 1. Students will be aware about the applications of principle of Town and country Planning
- 2. Students will be able to understand various terminologies involved in Town Planning
- 3. Students will be able to understand various concepts of Town Planning
- 4. Students will learn the planning and designing aspect of Town Planning

Curriculum Content	Hours
UNIT 1	6
1.1 Town planning principles	
General-evolution of planning-objects of town planning-Economic justification for town planning	
principles of Town Planning-Necessity of town planning-origin of towns-growth of towns-stages in	
town	
development-personality of town-Distribution of land uses-Forms of planning-site for an ideal	
Town-	
Requirements of new Towns-Planning of the modern Town-Powers required for enforce T.P.	
schemes-cost of Town planning-present position of Town Planning in India.	
1.2 Surveys:	
General-Necessity-collection of Data-Types of surveys-Uses of surveys	
1.3 Zoning:	
Meaning of the term-Uses of land-objects-principles of Zoning-Advantages of Zoning-Importance	
of	
Zoning-Aspects of Zoning-Transition Zone-Economy of Zoning-Zoning powers-Maps for Zoning.	
UNIT 2	7
2.1 Housing	
General-Importance of housing-Demand for houses-Building site-Requirements of residential	
buildings-	
Classification of residential buildings-Design of residential areas-Rural Housing-Agencies for	
housing-	
Investment in housing- HUDCO- CIDCO- Housing problem in India.	
2.2 Slums:	
General-Causes of slums-Characteristics of slums-Effects of slums-Slum clearance-Works of	
improvement-	
Open plot scheme-Slum clearance and rehousing-Prevention of slum formation-Resources for slum	
clearance programmes-The Indian slum.	
UNIT 3	6
3.1 Public buildings:	
General - Location of Public Buildings - Classification of public Buildings - Principles of design of	
public	
buildings - Town centres - Grouping of public buildings - Civic aesthetics.	
3.2 Parks and play grounds:	

General-Types of recreation-Location of urban green spaces-classification of parks-park systemspark

design-Finance of parks-parkways-playgrounds-space standards-Landscape architecture.

3.3 Master plan:

General-Objects-Necessity-Data to be collected-Drawings to be prepared-Features of master plan-Planning

standards-Report-stages of preparation-Method of Execution-conclusion.

3.4 Re-planning existing towns:

General-Objects of re-planning-Defects of existing towns-Data to be collected-Urban renewal projects-

Decentralization-Garden city-Surface Drains-Refuse of Town.

UNIT 4

4.1 Urban roads:

General-Objects- Requirements of good city road-Factors to be considered-Classification of urban roads-

Types of street systems-Through and By-pass Roads-Outer and inner ring roads-Expressways-Freeways-

Precincts-Road aesthetics.

4.2 Traffic management:

General-Object-Traffic survey-Traffic congestion-Traffic control-Road junction-Parking-Traffic capacity of road-Road traffic problems –Road accident-Traffic signal –Road sign –Road marking-Street lighting in a town –Traffic pr4oblem of existing towns –Peculiarities of traffic.

UNIT 5

5.1 Building bye-laws:

General- Objects of bye-laws-importance of bye-laws-Function of local authority-Responsibility of owner-

Applicability of bye-laws-set-back-Light Plane-Floor space index-Off-street parking-Fire protection-

Minimum plot sizes-Some other terms-Principles underlying building bye-laws-Building bye-laws for

residential area of a typical town planning scheme-Building bye-laws-Development control rules-General

rules of metropolitan Area-CMDA rules.

5.2 Miscellaneous topics:

6

7

Department of Technology (Civil Engineering) Program – Syllabus w. e. f. 2019-20

Airports-Location-size-N	Noise Control-Parts of an airports-Betterment and compensation-city blocks			
conurbations-				
Cul-de-sac streets-Focal	Point-Green Belt-Public utility services-Rapid transit –Remote			
sensing applicationurb	ban planning using remote sensing-site suitability analysis-Transportation			
planning.				
UNIT 6		7		
Different town plannin	ng works with reference to M.R.T.P. Act. (Brief idea about various			
provisions)				
Land acquisition act – ne	ecessity and procedure of acquisition.			
village planning- Plannin	ng process, Multilevel planning, Decentralization concepts, Rural			
developments- planning	methodology, Growth centre approach, Area Development approach,			
Integrated rural developm	ment approach			
Text Books				
1. Modak N.V. ar	nd V.N. Ambdekar, "Town and Country Planning and			
Housing", Orie	ent Longman Ltd., New Delhi.			
2. Hiraskar G.K.	"Fundamentals of Town Planning", Dhanpat Raiand			
Sons, Delhi.				
Reference Books				
1. D. Van M/s, "The urba	ban pattern city planning and design",			
2. Harvey M. Rubenstair	n, "A Guide to site and Environmental planning", Newyork.			
3. John Rate life, "An In	troduction to town and country planning", London			
4. Michael Hord, "Remo	ote sensing methods and application", John Wiley and Sons, New York,			
1986.				
5. Rangwala K. S. and R	Rangwala P. S., "Town Planning", Charotar Publishing House,15th			
Edition,1999.				
6. Ramegowda K A., "U	Jrban and regional planning", University of Mysore			
7. National Building Cod	de of India- Part-III.			
8. Municipal and Pancha	ayat bye-laws, CMDA Rules and Corporation bye-laws.			
9. Time saver standards	for site planning, Mc Graw Hill Book company			
10. The art of home land	dscaping, Mc Graw Hill Book company			

Elective II

Class and : Final. Y. B. Tech (Civil Engineering) Part IV, Sem VIII Semester : Final. Y. B. Tech (Civil Engineering) Part IV, Sem VIII								
Course Title	:	ADVANCED DESIGN OF STRUCTURES	Course Code	:	CE 438			
Teaching Scheme (Hours)	:	4 hours/weeks = 4x 13 weeks = 52 hrs minimum Tutorial= 00hr/week Practical= 02/week	Total Credits	:	04+ 00 +01 = 05			
Evaluation Scheme (Marks)	:	CIE = $(20+20+10)$ IPE:SEE = 50IOE:EPE/EOE:	Duration of SEE	÷	3 hrs			
Revision:	:	Second	Month	:	June 2019			
Pre-requisites	:	The prerequisite for this course is to possess the mechanics, determination of engineering and ind	fundamental kno ex properties.	wlec	lge of soil			
Type of Course	:	Theory						
Course Domain	:	Elective						
Skills Imbibed	:	Cognitive, Affective domain, Psychomotor						
Course Assessment Student is e and Semester End I	t Ma valu Exai	ethods: aated during Continuous Internal Evaluation (Inter mination.	nal Test I and Int	terna	nl Test II)			
1 To understand b 2 To study analys	ehav is an	viour of special RC structures under various loadings d design special RC structures						
Course Outcomes.	ann	g of remorement in special Ke surdenes						
At the end of this control of the end of the	ours iviou ign s f rei	e, or of special RC structures under various loadings special RC structures nforcement in special RC structures as per IS provision	15					
		Curriculum Content			Hours			
UNIT 1 Design of Flat Slab provisions	s: ai	nalysis and design of flat slab, detailing of reinforcer	nent as per Codal		9			
UNIT 2 Analysis of Deep B provisions	UNIT 2 Analysis of Deep Beams: design of simply supported and continuous deep beam as per Codal provisions							
UNIT 39Design of Chimney: analysis of stresses in concrete chimneys- uncracked and cracked sections, Codal provisions, design of chimney9Design of bunkers and silos								
UNIT 4 Design of overhead water tank: Rectangular and circular water tank with flat bottom, rectangular and circular base slab, flat and dome tank roof, design based on IS 3370 Design of GSR								

UNIT 5	9				
Design of retaining walls: analysis and design of cantilever					
and counter fort retaining walls with horizontal and inclined surcharge					
Design of shear walls					
	9				
UNIT 6					
Yield line analysis of slabs: virtual work and equilibrium method of analysis, design of a	simply				
supported rectangular slabs					
Text Books :					
1. V. L. Shah and S.R. Karve, "Limit State Theory and Design", Structures publications, 8th	edition, 2014				
2. N Krishna Raju, "Advanced Reinforced Concrete Design", CBS publishers and distribut	ors,				
2ndedition,2010					
3. Ramamrutham, "Design of Reinforced Concrete Structures", Dhanpatraiand son's					
publication,9 th edition,1981					
Reference Books :					
1. P Purushothaman, "Reinforced Concrete Structural Elements", Mc-Grawhill					
publishing co.,3 ¹⁴ edition, 2004					
2. G.S. Ramaswamy, "Design and Construction of Concrete Shell Roofs", McGraw-Hill publication,					
New York, 1968	-				
3. K. Jain, "Reinforced Concrete: Limit State Design", Nem Chand and bros.					
publications, 7 th edition, 2012					
4. Jain and Jai Krishna, "Plain and Reinforced Concrete-Vol. I and II", Nem Chand Bro	os. Publication,				
Roorkee.					
5. Taylor C Pere, "Reinforced Concrete Chimneys", Laxmipublications, 7 th edition,					
New Delhi					
6. Jones LL and Thomas and Hudson, "Yield Line Analysis of Slabs", Chatto and wind	lus Publisher,				
London, 1967					
7. Design of deep girders, Concrete Association of India					
8. Mallick and Gupta, "Reinforced Concrete", Oxford and IBH publishing co. Pvt.					
Ltd.6 th edition,1996					
9. Codes of Practice IS 456-2000, plain and reinforced concrete					
10. IS 3370: code of practice concrete structures for the storage of liquids					

	1								
Class and	:	Final. Y. B. Tech (Civil	Engineering)	Part IV,	Sem VIII				
Semester									
		A DVANCED CEOTE			C	1			
Course Title	:	ADVANCED GEOTEG ENGINEERING	CNGINEERING Code : CE 4						
Teaching Scheme		4 hours/weeks = $4x 13$ w	Total		04+00+01				
(Hours)	:	Tutorial= 00hr/week			Credits	:	= 05		
		Practical= 02/week							
Evaluation		CIE = (20+20+10)	IPE :		Duration		2 has		
Scheme (Marks)	:	SEE = 50	IOE : EDE/EOE :	50-150	of SEE	:	5 mrs		
Revision:	:	Second	LFE/LOL .	+30-130	Month	:	June 2019		
Pre-requisites	:	The prerequisite for this	course is to pos	ssess the fu	ndamental k	nov	wledge of		
		soil mechanics, determin	nation of engine	ering and i	ndex proper	ties			
		Γ							
Type of Course	:	Theory							
Course Domain	:	Elective							
Skills Imbibed	:	Cognitive, Affective dor	nain, Psychomo	otor					
Course Assessment	Mei	thods:	tamal Esselvatio		Test I and I	[and Test II)		
Student is ev	aiua	ated during Continuous In	ternal Evaluatio	on (Internal	Test I and	inte	ernal Test II)		
Course Objectives:	'Xall	iiiiatioii.							
1. To study fou	ında	tion and bearing capacity	aspects						
2. To study gro	ound	improvement techniques.							
3. To study fou	inda	tions on expansive soils.							
4. To study me	thoc	ls of ground improvement	-						
Course Outcomes:									
At the end of this co	ourse	2,							
1. Students will be a	ible	to plan and execute soil e	xploration activ	ity.					
2. Student will be at	ble t	o decide soil parameters f	or foundation d	esign.					
3. Student will be at	ole t	o design foundation for ex	xpansive soil.						
4. Student will be at	bie t	Curriculum	Contont				Hours		
		Curriculuin	Content						
Bearing Capacity a	and	Settlement of Foundatio	n				,		
Bearing Capacity u	inde	r eccentric loading and	moment, beari	ing capacit	y of layere	ed s	soils,		
Bearing Capacity of	f Ge	osynthetic reinforced soil	l, Bearing Capa	city of Roo	ek mass, sei	smi	city,		
liquefaction, Elastic	c ar	nd consolidation settleme	ent, secondary	consolidat	tion, estima	atio	n of		
settlement.							9		
UNIT 2 Introduction to Gr	oun	d Improvement Techniq	lues						
Stabilization, vibro	tec	hnique, dynamic compac	ction, Grouting,	, Band Dra	ain, vertical	dr	ains,		
stone columns, grar	nula	r piles, sand drains, Prefa	bricated Vertic	al Drains (PVD), soil	nai	ling,		
geosynthetics, case	histo	ories of Ground Improvem	nent Techniques	5.					

	o
UNIT 3 Pile Foundation Design	o
Parring consists of pilos in $C_{\alpha} \Phi$ and $C_{\alpha} \Phi$ sails astimation of pilo sottlement laterally loaded	
Bearing capacity of pries in C, Φ and C- Φ sons, estimation of prie settlement, laterary loaded	
pile, Uplift capacity of pile, pile groups, Bearing capacity of pile groups, Settlement of pile	
group, uplift capacity of pile group – Negative drag on piles.	
UNIT 4	9
Raft foundations: Types of rafts, Bearing capacity and settlements of raft, Design	
consideration and I.S. Code method of analysis	
UNIT 5	0
Sheet Bile wells and Coffeedance trace and uses of sheet riles, design of contileurs sheet rile	
Sheet Pile walls and Collerdams types and uses of sheet piles, design of cantilever sheet pile	
walls in granular and cohesive soils, anchored bulkhead-free earth support and fixed earth	
support method-coffer dams-uses- braced and cellular cofferdams.	
UNIT 6	8
Foundations in Special soils: Foundation in expansive soil, soft and compressible soils,	
problems associated with foundation installation- ground water lowering and drainage- shoring	
and underpinning-different methods-damage and vibrations due to constructional operation	
Text Books	<u> </u>
1) Dr. B. J. Kasmalkar, "Foundation Engineering", Pune Vidyarthi Griha Prakashan, Pune.	
2) Gopal Ranjan and A S Rao, "Basic and Applied Soil Mechanics", New Age International Public	lishers,
(2010). 2) D.C. Durmin, "Soil Machanics and Foundation Engineering". Loumi Dublication	
4) A K. Arora "Soil Mechanics and Foundation Engineering" Standard Publishers 2009	
5) P.C. Varghese," Foundation Engineering", PHI learning private limited, 2014.	
Reference Books :	
1) J. E. Bowles, "Foundation Analysis and Design", McGraw-Hill International.	
2) B. M. Dass, "Foundation Engineering", Cengage Learning; / edition. 3) N.V. Navak, "Foundation Design Manual" Dhannat Rai and Sons First Edition	
4) IS Codes such as, IS:1904 (1986), IS: 6403 (1981), IS: 8009Part I (1986), IS: 12070 (1987).	

Class and Semester	:	Final. Y. B. Tech (Civil E	ngir	neering) Part	IV, Sem: VI	II	
Course Title	:	DEVELOPMENT EN	IGINEE	RIN	G	Course Code:	:	CE 440
Teaching Scheme		4 hours/weeks = 4×13	Total Credits	:	04+00			
(Hours)	:	Tutorial=hr/week			+01 =			
(1100015)		Practical= 02hr/week			05			
Evaluation Scheme (Marks)	:	CIE = (20+20+10) SEE = 50	EOE	:	+50 = 150	Duration of SEE	:	3 hrs
Revision:	:	Second				Month	:	June 2019

Pre-requisites	:	
The prerequisite for this course is to possess	the	fundamental knowledge of Studying the Community.
Type of Course	:	Theory
Course Domain	:	Elective
Skills Imbibed	:	Cognitive, Affective domain, Psychomotor

Student is evaluated during Continuous Internal Evaluation (Internal Test I and Internal Test II) and Semester End Examination.

Course Objectives:

The objective of the course is to prepare an engineering student for professional work in the development sectors, i.e., to work as a development engineer.

This requires a

- 1. To basic understanding of society and development and the data-sets that surround it.
- 2. The role of agents, professions and value-creation, and
- 3. The ability to formulate problems, analyses them into its constituent disciplinary parts, solve and report them for stakeholders, and
- 4. The ability to design, conduct and report field-work, and finally
- 5. A particular discipline of engineering and how it contributes to development.

- 1. Students will be able to determine Household and the development agenda.
- 2. Students will be able to determine The Society and its Organization
- 3. Students will be able to understand A Sectorial Engineering System.
- 4. Students will be able to understand GIS.
- 5. Students will be able to understand conduct fieldwork as case study.

Curriculum Content	Hours
UNIT 1: The Household and the development agenda	08
The Engineer as a change agent	
The method of Science. The method of engineering. Delivering value by solving societal	
problems. Interdisciplinary. The need for design and synthesis. The case-study and the skills	
required. Organization of the course	
The household as the basic unit. The needs of the household. Cultural, biological needs. The	
notion of development as a life of less drudgery, more certainty and more culture. Environmental	
needs and the development engineering sectors.	
Development Indices. HDI and OECD indices. The data needed to compute these. Core values of	
equity, efficiency and sustainability. Paradigms of development.	
Introduction to the village-level census data. Engineering content in various amenities indices.	
Agents and Value. How is value created in a household. The peasant and the artisan. Resources	
and amenities. The employee. The teacher. Various modes of payments. Seasons and history of	
accounting. Knowledge of agents.	
UNIT 2: The Society and its Organization	08
The basic divisions - State, Market and Civil Society. The environment. Assets and institutions.	
The environment -land, air, water. Attributes-cultural and as a resource. Pollution. Demands of	
people and other members of the biosphere. Pollution and sustainability.	
The structure of the State. The center and the state. The District Collector and the district planning	
committee. The district and sub-district hierarchy. Various departments. The hierarchy of elected	
repress Production. The factory and its history. Factors of production-capital, labour and	
technology. Operations-energy, depreciation, rents, regulation, market access. The small producer	
and the ecosystem. The Market. The notion of money. Loans and repayments and the role of	
capital. Money transaction vs. seasonal transactions and others based on trust. The anonymity and	
instanteity of money. corporation. entatives.	
The 5-fold layering of engineering as development engineering, informal India, Make by India,	
Make for India and finally the global Make in India. Matching cultural and manpower layers.	
Appropriate technology.	

UNIT 3: A Sectoral Engineering System. Example: Irrigation Water.	09
The geography of Sinnar Taluka and its irrigation systems. Listing stakeholders, i.e., villages-	
farmers, people with and without land, local industrial workers, agriculture-cash crops and	
traditional crops, irrigation department and the market. Description of the engineering assets.	
Key environmental and scientific variables such as crop data, reservoirs and irrigation schedules,	
soils and rainfall. Agents and their interactions and key decisions on rotations, cropping pattern.	
Key transactions and decisions.	
The planning framework and its representation. Stocks and flows. Measuring supply parameters, demand parameters and allocations. Key infrastructure and institutions and their role. Allocation regimes and the connection with development paradigms. History of irrigation for the region. Beale's report and design objectives. Protective vs. command	
irrigation and its consequences. Reading the Jal Yukta Shivar GR. Developing a methodology for	
assessment. An example of a design document.	
Socio-Technical challenges-increasing irrigated area, drip irrigation and better farm practices.	
Groundwater regulation. Collective vs. Individual solutions.	
To an irrigation system. Meeting with an NGO, farmers, a state officer and an elected	
representative.	
UNIT 4: GIS	08
Loading QGIS and a district data-set. Using a given data-set. Writing queries and manipulating	
appearances.	
Types of objects and manipulating objects. Linking Census data to GIS. Basic analysis and	
representation.	
Introduction to a case-study. Basics of spatial planning queries such as computing net supply and	
net demand.	
UNIT 5: Fieldwork, Village Report and Case-Study	
Reading the CTARA Village Report. The sectors and its indices. The methodology. The reporting	
The basics of PRA-1. The Demand Side. Household-surveys. Focus group discussions. Drinking	
water and irrigation water. Community vs. Farmers. The issue ranking. Non water issues and	10
issue ranking	
The basics of PRA-2. The supply side. Resource map. Assets, institutions and allocation	
documents. Time-line. Changes in crops and in welfare.	
The basics of PRA-3. The allocations. Questions of equity, efficiency and sustainability. Regional	
vs. Household balance.	
What should an engineer know about Caste, Class and Gender	
Preparing for the village meeting. Census data. Key contacts. What to look for.	
2 days and 2 nights at the village. Village meeting, household meeting.	

Resources.			
UNIT 6: capstone project via a case study			09
Framing the project. Understanding the dem	and	What needs to be achieved. Studying the options	
available. Measurement of social and econor	mic	parameters as inputs.	
The activities and the analysis. The reporting	g. Pi	cking your case-study.	
e-resources	:		
1. http://www.cse.iitb.ac.in/~sohoni/TD603 2. http://www.ctara.iitb.ac.in/tdsc/uma/Deve	lopr	nent_engineering.html	
Reference Books	:		
1. Village level Census Data 20	11-F	Part I and II (i.e., amenities) and the metadata.	
2. MRSAC. Various maps and c	lata-	sets. Revenue map, GIS layers obtained from MRS	AC.
Village, taluka and district boundarie	es, w	atershed boundaries, roads, drainage, water bodies.	
3. Agriculture. Village and talu	ka ag	gricultural data. Soil maps and other watershed map	S.
4. Irrigation. Salient features of	tank	as and projects. Irrigation rounds and canal network	
Command area maps and cropping p	atter	ns.	
5. This course is based on the T	D60	3 Water course taught at CTARA and also the TD6	09 and
TD604 courses			

Class and Semester	:	Final. Y. B. Tech (Civil Engineering) Part IV, Sem VIII							
Course Title	:	DESIGN OF CO	ONCRET	E I	BRIDGES	Course Code:	:	CE 441	
Teaching Scheme		4 hours/weeks = 4 minimum	4 x 13 we	eeks	= 52 hrs	T . 1 C . 15	: 04+00 +01 = 05		
(Hours)	:	Tutorial= 00hr/v	Total Credits	:	+01 =05				
		Practical=02hrs/w	veek						
Evaluation Scheme (Marks)	:	CIE = (20+20+10) SEE = 50	IOE	:	+50=150	Duration of SEE	:	3 hrs	
Revision:	:	Second		-		Month	:	June 2019	

Pre-requisites	:	
The prerequisite for this c	ourse	is to possess the fundamental knowledge of planning, development of

town and country.

Type of Course	••	Theory
Course Domain	:	Elective
Skills Imbibed	:	Cognitive, Affective domain, Psychomotor

Course Assessment Methods:

Student is evaluated during Continuous Internal Evaluation (Internal Test I and Internal Test II) and

Semester End Examination.

Course Objectives:

- 1. To select the appropriate bridge type for a given site conditions
- 2. To have state-of-the-art knowledge and practices in bridge engineering
- 3. To analyze and design of bridge substructure and superstructure

Course Outcomes:

Student will be able to:

- 1. Select the appropriate bridge type for a given site conditions
- 2. Have state-of-the-art knowledge and practices in bridge engineering
- 3. Analyze and design of bridge substructure and superstructure

Curriculum Content	Hours
UNIT 1	9
Standard specifications for Road Bridges. I.R.C. bridge code, width of carriage way, clearances,	
loads to be considered i.e. D.L., L.L., Impact load, wind load, Earthquake load, Longitudinal	
force, Centrifugal force, buoyancy, Earth pressure, water current force, thermal force etc.	
UNIT 2	
Aesthetics of bridges, general design considerations for R.C.C. and P.S.C. bridges, Traffic	9
aspects for highway bridges	
UNIT 3	
Design of R. C. deck slab, beam and slab, T beam, Pigeaud's theory, Courbon's theory,	9
balanced cantilever bridge, box culvert	
UNIT 4	9
Design of bridge components - Abutments, Wing walls, Piers, Approach slab	
UNIT 5	8
Construction techniques – construction of sub structure footing, piles, caissons, construction of	
reinforced earth retaining wall and reinforced earth abutments, super structure - erection	
method bridge deck construction, by cantilever method, Inspection maintenance and repair of	
bridges	
UNIT 6	8
Bearing and expansion joints – forces on bearings – Types of bearings, design of unreinforced	
elastomeric bearings, expansion joints	
Repair, Strengthening, and Rehabilitation of Existing Bridges	
Text Books :	
1. Krishnaraju N., "Advanced reinforced concrete design", CBS Publication and Distribution	itors, 2000,
Edition.	
2. Victor D. Johnsan, "Essential of Bridge Engineering", Oxford and IBH Publishing Co	., Pvt. Ltd.
Reference Books :	
1. Dr. V.K. Raina, "Concrete Bridge Practice", Tata McGraw Hill.	1 1122
 Dr. B.C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, "Reinforced Concrete Structures – Vo Lovmi Dublications, 1002, 7thEdition. 	ol II",

- 3. Jagadesh T. R. and Jayram M.A., "Design of Bridge Structure", Prentice Hall of India Pvt. Ltd.
- 4. Rowe R. E., "Concrete Bridge Design" John Wiley and Sons, 1963, 1st Edition.

Class and Semester	:	Final. Y. B. Tech (Civil Engineering) Part IV, Sem VIII							
Course Title	:	STRUCTURAL I	Course Code:	:	CE 442				
Teaching Scheme (Hours)	:	3 hours/weeks = 33 minimum	Total Credits	:	03+00 +01 = 04				
		Tutorial= 00hr/we							
		Practical= 02/week							
Evaluation Scheme (Marks)	•	$\begin{array}{c} \text{CIE} = & & \text{IPE} & : \\ (20+20+10) & & \text{IOE} & : \\ \text{SEE} = 50 & & \text{EPE/EOE} & : +50=150 \end{array}$			Duration of SEE	:	3 hrs		
Revision:	:	Second				Month	:	June 2019	

Pre-requisites	:					
The prerequisite for this course is to possess the fundamental knowledge of equation of motion for SDOE						

The prerequisite for this course is to possess the fundamental knowledge of equation of motion for SDOF and MDOF and partial differential equations.

Type of Course	•	Theory
Course Domain	:	Elective
Skills Imbibed	:	Cognitive, Affective domain, Psychomotor

Course Assessment Methods:

Student is evaluated during Continuous Internal Evaluation (Internal Test I and Internal Test II) and

Semester End Examination.

Course Objectives:

- **1.** To analyze structures subjected to any kind of dynamic excitation and computing quantities like displacements, forces, stresses, etc.
- **2.** To understand the analytical methods and procedures in a way that emphasizes physical insight.
- **3.** To apply the structural dynamics theory to real-world problems like seismic analysis and design of structures.

Course Outcomes:

Students shall able to

- 1. Analyze structures subjected to any kind of dynamic excitation and computing quantities like displacements, forces, stresses, etc.
- 2. Understand the analytical methods and procedures in a way that emphasize physical insight.
- **3.** apply the structural dynamics theory to real-world problems like seismic analysis and design of structures.

	Hours				
UNIT 1	8				
Single – Degree of Freedo					
Damping, Types of dampi	ing, Types of damping, Response to harmonic loading, Resonance,				
Support motion, Transmiss	sibility, Vibration isolation				
UNIT 2		8			
SDOF system subjected to	periodic and impulsive loading, Fourier series loading, Rectangular				
pulse, Introduction to Freq	uency –Domain Analysis				
UNIT 3		8			
SDOF systems subjected	to general dynamic loading, Duhamel's integral, Application to				
simple loading cases, nume	erical evaluation of response integral, and Piece wise exact method				
UNIT 4					
MDOF systems, selection	of DOFs, formulation of equations of motion, Structure matrices,	6			
Static condensation, Free	Vibration Eigen Value problem, Frequencies and Mode Shapes,				
Determination of natural	frequencies and mode shapes by Stodola- Vianello method,				
Orthogonality conditions					
UNIT 5	5				
Discrete systems, Fundame					
to dynamic loading, Mod	de superposition method, Coupled and Uncoupled equations of				
motion, Model Contributio	on				
UNIT 6		4			
Distributed- parameter Sy					
Vibration, Application to b					
Text Books :					
1. Mario Paz, "Structural Dynamics", CBS Publication					
Reference Books :					
1. Chopra A.K., "Dynamics of Structures", Dhanapat Rai and sons, New Delhi					
2. Gosh S. K., "E 3. Clough R. M.	and Ponian, "Dynamics of Structures". McGraw Hill co. New Delhi	i			
4. Grover G. R., "Mechanical Vibrations", Roorkee University, Roorkee.					

Elective III

Class and Semester	:	Final. Y. B. Tech (Civil Engineering) Part IV, Sem VIII							
Semester		1							
Course Title	:	ENGINEERING OF	PTIMIZ	ZA I	TION	Course Code:	:	CE 448	
Teaching Scheme (Hours)	:	3 hours/weeks = 3x 13 weeks = 39 hrs minimum Tutorial= 00hr/week Practical= 02hrs/week				Total Credits	:	03+00 +01 = 04	
Evaluation Scheme (Marks)	:	CIE = $(20+20+10)$ SEE = 50	Duration of SEE	:	3 hrs				
Revision:	:	Second				Month	:	June 2019	

Pre-requisites	:	
The prerequisite for this	cou	rse is to possess the fundamental knowledge of optimization aspects.
Type of Course	:	Theory
Course Domain	:	Elective
Skills Imbibed	:	Cognitive, Affective domain, Psychomotor

Course Assessment Methods:

Student is evaluated during Continuous Internal Evaluation (Internal Test I and Internal Test II) and Semester End Examination.

Course Objectives:

- 1. To build knowledge among students about various optimization techniques in engineering.
- 2. To understand usage of these techniques in specific regions.
- 3. To understand the importance of optimization techniques in construction sector.

- 1. To apply optimization concepts to solve actual problems in engineering field.
- 2. To formulate the field problem and then select appropriate technique to optimize the same within the constraints.
- 3. To familiarize with optimizing the given engineering problem by adopting a suitable technique effectively.

Curriculum Content	Hours					
UNIT 1						
Engineering applications, various techniques, single and Multivariate optimization; Linear						
Programming - Standard form, simplex method, Decomposition principle, applications to						
structural design problems.						
UNIT 2						
Nonlinear Programming - Unimodal function, Elimination and Interpolation methods;						
Unconstrained Optimization Techniques - Direct search methods, Descent methods, Conjugate						
gradient method.	~ -					
UNIT 3	07					
Constrained Optimization Techniques - Characteristics of the Problem. Direct methods and						
indirect methods, Convex programming problem.						
UNIT 4	06					
Optimization in Structural design -Minimum weight and optimum cost considerations,						
application to Trusses and Frames, design of reinforced beams and slabs.						
UNIT 5	06					
Classical optimization techniques-differential calculus-Lagrange multipliers, Newton Raphson						
approximation, Kutin tucker conditions, examples.						
UNIT 6						
Geometric Programming- Calculus viewpoint, polynomials, orthogonality conditions, degree						
of difficulty, geometric inequality, primal-dual relations, inequality constraints, example.						
Text Books :						
1. W. S. Hemp, "Optimum Structures", Oxford Engineering Science Series						
2. Leonard Spunt, "Optimum Structural Design", Prentice Hall, New Jersey						
3. S. S. Rao, "Optimisation", Wiley Eastern Ltd.						
Reference Books :						
1. Narsingh Rao, "Graph Theory", Prentice Hall						
2. Gallagher and O C Zienkiewics, "Optimisation", John Wiley and Sons, London						
3. Taha, H. A., "Operation Research", Mac-Millan						
4. Wagner, "Operation Research", Wiley Eastern Ltd.						
5. Lick D., "Project Management", Gower Publication England						

Class and : Final. Y. B. Tech (Civil Engineering) Part IV, Sem VIII								
Semester								
Course Title	:	ENGINEERING ECONOMICS ANDCourseVALUATIONCode						CE 449
		3 hours/weeks						
Teaching Scheme		minimum				Total		$03 \pm 00 \pm 00 =$
(Hours)	:	Tutorial $-$ 00)hr/week			Credits	:	03 00 100 =
(110013)		Tutofial = 00	Creuis		05			
		Practical = U2nrs/week						
Evaluation		CIE =	IPE	:	50 150	Duration		
Scheme (Marks)	:	(20+20+10) SEE = 50	IOE EPE/EOE	:	+50 =150	of SEE	:	3 hrs
Revision:	:	Second				Month	:	June 2019
Pre-requisites	:	The prerequis	ite for this c	ourse	is to possess the	he fundament	al k	nowledge of
1		engineering n	nathematics.	build	ling material sp	ecifications.	bui	lding planning.
		drawing estir	nation		8	· · · · · · · · · · · · · · · · · · ·		8 F 8,
	1	<i></i>						
Type of Course	•	Theory						
Course Domain	•	Elective						
Skills Imhihed	•	Cognitive Af	fective dom	ain F	Sychomotor			
Course Assessmen	• • M	othods.		, 1	sychomotor			
Student is e	vali	uated during Co	ontinuous In	torna	l Evaluation (I	nternal Test I	and	Internal Test
II) and Semester Fi	nd I	Transformed and the second	Sintinuous III	terna		iternar rest r	and	i internar i est
Course Objectives								
1 To provide	0.04	aund understan	ding of conc	onta	and principles	fangingaring	7 00	onomu
					and principles (1 in a la marte	3 60	
essential for	r ec	conomic leasibi	inty studies r	elatii	ig to design and	1 implementa	lioi	or engineering
projects.								
2. To develop	pro	oficiency with r	nethods for v	valua	tion of immova	ble properties	s.	
3. To acquaint	t the	e students with	use of excel	for e	quivalence con	nparisons as v	vell	as
computation	ns f	or valuation.						
Course Outcomes:								
At the end of this c	our	se, student will	be able to					
1. describe ele	eme	nts of Engineer	ing Econom	V				
2. describe ele	eme	nts of valuatior	n of immova	ble p	roperties			
3. value immo	vał	ole properties b	y physical m	etho	ds			
4. value immo	vał	ole properties b	y methods b	ased	on rent, profit,	development	pol	icy
	Curriculum Content Hours							
UNIT 1								7
Introduction to E	ngi	neering Econo	my					
Micro-Economics-	Čo	nsumption: Ind	lifference Cu	irve.	Consumer's Su	rplus, Elastic	itv.	
Price Mechanism: Determinants of Price Mechanism. Individual and Market Demand								
Schedules, Law of Demand, Exceptions and Limitations of Law of Demand, Highest,								
Lowest and Equili	Lowest and Equilibrium Price, Importance of Time Element. Pricing of Products under							
different market conditions: Perfect and Imperfect Competition. Monopoly, Factors of								of
Production and their pricing – Land, Labor, Capital, Entrepreneur and other factors								
Theory of Rent, Theory of Wages, Capital and Interest, Organization and Profit -								
Functions of Entrepreneur, Meaning of Profit and Theories of Profit.								
		,						
UNIT 2 Principles of Economics	7							
--	---							
Macro-Economics- Functions and Role of Money, Inflation, Inflationary Gap, Control of Inflation, Monetary, Fiscal and Direct Measures. Deflation, Deflationary Gap, Measures to Control Deflation, Deficit Financing. Savings and Investment, Relationship between Savings and Investment. Components of Economy: Primary Sector, Secondary Sector, Tertiary Sector, Concepts of GDP and GNP, Capital Formation Parallel Economy Causes and Effects of Parallel Economy on use of Land and its Valuation. It's Impact on Real Estate Market, Construction Industry.								
UNIT 3 Laws Conorol	7							
Indian Legal System: Salient Features of the Indian Constitution, Fundamental Rights, Directive Principles of the State Policy. Law of Contract: Formation of a Contract, Parties, Void, Voidable and Unenforceable								
Contract, Termination of Contract, Indemnity and Guarantee, Law of Agency. Law of Arbitration and Conciliation, Laws of Evidence, Insolvency and Bankruptcy Code 2016 concerning Valuation. Salient Features of the Companies (Registered Valuers and Valuation) Rules, 2017. Salient Features of the Securitization and Reconstruction of the Financial Assets and Enforcement of Security Interest Act, 2002 (SARFAESI Act, 2002) concerning Valuation								
UNIT 4 Laws Bool Estato	7							
The Right to Fair Compensation and Transparency in the Land Acquisition, Rehabilitation and Resettlement Act, 2013. Building Rules and Regulations of Local Bodies as well as different urban development, Rent Control Laws and its effect on value of property. Indian Easements Act, 1882. Real Estate (Regulation and Development) Act, 2016, The Transfer of Property Act, 1882. Lease of Immovable Property, Lease granted by Private and Statutory Bodies, Impact of each on Valuation. Personal Laws, The Hindu Succession Act, 1956, The Indian Succession Act, 1925, Will and Testament; Succession Certificate	7							
UNIT 5 Valuation of Paul Estato	6							
Various purposes of Valuation, Income Approach to Value, Market Approach to Value Cost Approach to Value, Asset Valuation under the SARFAESI Act 2002, the LARAR Act 2013, the Companies Act 2013, the Insolvency and Bankruptcy Code, 2016. Concept of Transferable Development Rights (TDR), Concept of Time Share Interest in Real Property. Valuation of TDR, Time Share Interest and Easement Rights.								
UNIT 6 Study of Indian Accounting Standards (Ind AS), International Valuation Standards (IVS) as applicable to Valuation of Real Estate. Environmental Issues in Valuation. Valuers' Functions and Responsibilities, Code of Conduct for valuers and Professional Ethics for valuers.	6							

t Ba	ooks	:							
1. "Engineering Economy", Brajesh Kumar, Arshad Noor Siddiquee, Zahid A.KhanPublisher:									
	Pearson India,1st	Edit	ion, 2012						
2.	"Civil Engineerin	g Co	ontracts and Estimates", B. S. Patil, Orient Langman Ltd., 1st Edition,						
	1981.								
3.	"Professional Pra	ctice	s (Estimating and Valuation)", Roshan Namavati., LBD Publishers, 4 th						
	Edition, 1984.								
eren	ice Books	:							
1. "Valuation of Real Properties" Rangwala, Charotar Publishing House, 10thEdition : 2015									
2. "Engineering Economy", Zahid A khan, New Delhi: Dorling Kindersley, 1stEdition, 2012									
	<i>t Ba</i> 1. 2. 3. <i>"eren</i> "V "E	 <i>t</i> Books "Engineering Eco Pearson India,1st "Civil Engineering 1981. "Professional Prace Edition, 1984. <i>terence Books</i> "Valuation of Real Pr "Engineering Econom	t Books:1. "Engineering Econom Pearson India,1st Edit2. "Civil Engineering Constraints1981.3. "Professional Practice Edition, 1984.erence Books:"Valuation of Real Proper "Engineering Economy", "						

Class and Semester	:	Final. Y. B. Tech (Civ	vil Engineering	g) Part IV, S	Sem VIII			
					Course	<u> </u>		
Course Title	:	FINITE ELEMENT	METHODS		Code	:	CE 450	
Teaching Scheme		3 hours/weeks = 3x 13	weeks $= 39$ hrs	s minimum	Total		03+00+01	
(Hours)	:	Tutorial= 00hr/week		Credits	:	= 04		
(110000)		Practical= 02hrs/week				<u> </u>		
Evaluation Scheme		CIE = $(20+20+10)$	IPE :	50-150	Duration of		2 hrs	
(Marks)	•	SEE = 50	EPE/EOE :	+30-130	SEE	•	5 111 5	
Revision:	:	Second			Month	:	June 2019	
Pre-requisites	:	The prerequisite for thi	is course is to p	ossess the fu	ndamental kno	owle	edge of soil	
		mechanics, determinati	ion of engineer	ing and index	x properties.			
Type of Course	•	Theory						
Course Domain	:	Elective						
Skills Imbibed	:	Cognitive, Affective do	omain, Psychor	notor				
Course Assessment M	lethod	ls:						
Student is evaluated d	luring	Continuous Internal Eva	aluation (Intern	al Test I and	Internal Test I	I) a	nd Semester	
End Examination.								
1 To und	erstan	d fundamentals of finite	element metho	d (FFM) of a	nalvsis			
2. To und	erstan	d the power of FEM in a	reas other than	classical me	chanics.			
3. To und	erstan	d modeling of systems u	sing FEM					
4. To und	erstan	d the use Fem software i	n real life struc	cture.				
Course Outcomes								
Course Ouicomes:								
Upon completion of the	his cou	arse, the student will be abl	le to:					
1. Learn the	e fund	lamentals of finite elemen	t method					
2. Model th	the stru	ictural behavior through	FE analysis lea	ding to desig	n of structures	.		
5. Enhance	ше к	nowledge in numerical a	inalysis with Fr	e sonware s	and FE program	ms		
		Curricului	m Content				Hours	
UNIT 1							5	
Basic Concepts								
Introduction to finite e	lemer	nt method. History, appli	cations. Stress	strain relatio	nship, strain			
displacement relations	hip. E	Equilibrium equations (M	linimum potent	ial energy ap	proach, virtua	l wo	ork	
approach), Basic bar e	lemen	nt						
UNIT 2								
One-dimensional Fin	ite El	ements					5	
Bar Element, Beam Element, Consistent nodal loads, Element displacement fields, Shape functions and								
interpolation polynom	ials							
							1	

LINIT 3	
UNIT 5 Two-dimensional Flements	6
Equations from theory of Elasticity. Potential energy for the continuum General finite-element	
formulation Triangular elements CST I ST elements Rectangular elements	
INIT 4	6
Method of Weighted Residuals	U
Method of Weighted Residuals. The Galerkin Finite Element Element Formulation. Application of	
Galerkin''s Method to Structural Elements, Bar Element, Beam Element	
UNIT 5	8
Three-dimensional Analysis	
Tetrahedral elements, Constant strain tetrahedron Triangular Elements, Rectangular hevahedral	
Elements, Avisummetric Elements, Isoperimetric Formulation, Numerical Integration: Gaussian	
Quadratura	9
UNII 0 Applications in Solid Machanics	
Applications in Solid Mechanics	
Plane-stress, Plane-Strain Formulation, Isoperimetric formulation for Plane Quadrilateral Element,	
Axisymmetric stress Analysis, Strain and Stress Computation	
Text Books :	
1. Cook R.D., "Concepts and Applications of Finite Element Analysis", John Wiley, New York 1995	
2. Reddy J.N., "An Introduction to finite element method", Tata McGraw Hill publication, 3 rd edition	i, 2006.
3. Desai C.S., "An Introduction to finite element method", CBS publication and Distruibutors, 4 th edi	tion,
2011.	
Reference Books :	
1. Dawe D. J., "Matrix and Finite Element Displacement Analysis of Structures", Oxford Uni Press, T	1984
2. David Hutton, "Fundamentals of Finite Element Analysis", McGraw-Hill,2004	
3. Belegundu A.D. And Chandrupatla T.R., "Finite Element Methods in Engineering", Prentice hall I	ndia
1991	
4. Reddy J.N, "Finite Element Methods", John Wiley and sons 1982	
5. Buchanan G.R., "Finite Element Analysis", McGraw Hill Publications New York 1995	
6. Chandrupatla T.R.and BelegundaA.D.," Introduction to Finite Elements in Engineering", Prentice H	Iall
India.	
7. Seshu P., Textbook of Finite Element Analysis, PHI Learning Private Ltd. New Delhi,2010.	
8. Bathe K.J., -Finite Element Procedures, Prentice-Hall of India(P) Ltd., New Delhi.	

Class and Semester	:	Final Year B. Tech (CIVIL ENGINEERING) Part IV (Semester VIII)									
Course Title	:	NUMERICAL METHO	NUMERICAL METHODSCourse Code::CE 451								
Teaching Scheme (Hours)	:	3 hours/weeks = 3 x 13 y Tutorial= 00hr/week Practical= 02hrs/week	3 hours/weeks = 3 x 13 weeks = 39 hrs minimum Tutorial= 00hr/week Practical= 02hrs/week					03+ 00 +01 =04			
Evaluation Scheme (Marks)	:	CIE = (25+25) SEE = 50	IPE IOE EPE/EOE	:	+50=150	Duration of SEE	:	3 hrs			
Revision:	:	Second	<u>.</u>	Month	:	June 2019					

Pre-requisites	:	Mathematics					
The prerequisite for this course is to posses	The prerequisite for this course is to possess the fundamental knowledge of Numerical Methods for						
Engineers.							
Type of Course	:	Theory					
Course Domain	:	Elective					
Skills Imbibed	:	Cognitive, Affective domain, Psychomotor					
Course Assessment Methods:	•						

Student is evaluated during Continuous Internal Evaluation (Internal Test I and Internal Test II) and

Semester End Examination.

Course Objectives:

- *1.* To provide the numerical methods of solving the non-linear equations, interpolation, differentiation, and integration.
- 2. To improve the student's skills in numerical methods by using the numerical analysis software and computer facilities.

Course Outcomes:

- 1. Explain the consequences of finite precision and the inherent limits of the numerical methods considered. 2. Select appropriate numerical methods to apply to various types of problems in engineering and science inconsideration of the mathematical operations involved, accuracy requirements, and available computational resources.
- 3. Demonstrate they understand the mathematics concepts underlying the numerical methods considered.

4. Demonstrate understanding and implementation of numerical solution algorithms applied to the following classes of problems:

- a. Finding roots of equations
- b. Solving systems of algebraic equations
- c. Curve fitting
- d. Interpolation

Curriculum Content	Hours
UNIT 1	6
The meaning of Numerical Methods, Significance of Numerical Methods, Accuracy and	
Precision, Error, Round-off Error, Truncation Error, Total Error, Relative Error, Percentage	
Error, Significance of Error Computation in Numerical Methods, Pre-specified Error, Error	
Propagation, and Importance of Modern Computers in Numerical Methods.	
UNIT 2	6
Roots of Nonlinear Equations, Simple One-Point Iteration, Newton-Raphson Method,	U
Secant Method, Multiple Roots, System of Nonlinear, Equations.	
UNIT 3	_
Systems of Linear Algebraic Equations, Review of Graphical Method, Cramer's Rule.	7
Naïve gauss elimination Method, pitfalls of elimination method. Techniques for improving	
solution. Gauss Jordan method. Gauss Seidel Method.	
UNIT 4	6
Curve fitting Difference between regression and interpolation	Ū
Interpolation: Linear interpolation quadratic interpolation. General form of Newton's	
Interpolation. Enter interpolation, quadratic interpolation, General form of Newton's	
Interpolating Polynomial, Newton's divided difference interpolation polynomials, Lagrange's	
Interpolating Polynomials.	
	7
UNIT 5	/
Necessity of statistical approach, review of basic concepts of statistics, Linear Regression: Least	
Squares Method, Polynomial Regression, Nonlinear Regression.	
	7
UNIT 0	/
Numerical Differentiation and integration, Trapezoidal Rule, Simpson's Rule, Solutions of	
Ordinary Differential Equations, Runge-Kutta Method, Classification of Partial Differential	
Equations, Solution by Liebmann's Method. Introduction to Finite Element Method.	

Text Books	:							
1. Rao S. S., "Numerical Methods', Tata McGraw Hill Publications, 2002, 3rd Edition.								
2. E. Balguruswamy, "Numerical Methods"	,							
Reference Books	:							
1. Chapra S.C. And Canale R.P., "Numeric	al M	ethods for Engineers", Tata McGraw Hill						
Publications, 2002, 4th Edition.								
2. Goldberg D.E., "Genetic Algorithm", Pearson Education, 2000, 1st Edition.								
3. Gerald. C.F. And Wheatly. P.O., "Applied Numerical Analysis", Addison Wesley, 1994, 5th								
Edition.								

Class and Semester	:	Final. Y. B.Tech (Civil Engineering) Part IV, Sem VIII								
Course Title	:	APPLICATI	ENSIN ONS	G A	AND GIS	Course Code:	:	CE 452		
Teaching Scheme (Hours)	:	3 hours/weeks hrs minimum Tutorial=h Practical=02 h	s = 3x 1 nr/week hrs/weel	3 w k	Total Credits	:	03+00 +01 =04			
Evaluation Scheme (Marks)	:	CIE = (20+20+10) SEE = 50	IPE IOE EPE/E OE	:	+50 = 150	Duration of SEE	:	3 hrs		
Revision:	:	Second	•	Month	:	June 2019				

Pre-requisites	:						
The prerequisite for this course is to possess the fundamental knowledge of material properties,							
calculation of shear force and benc	calculation of shear force and bending moment.						
Type of Course	:	Theory					
Course Domain	:	Elective					
Skills Imbibed	:	Cognitive, Affective domain, Psychomotor					

Course Assessment Methods:

Student is evaluated during Continuous Internal Evaluation (Internal Test I and Internal Test II)

and Semester End Examination.

Course Objectives:

- 1. To get a basic and advanced level insight into the approach of latest remote sensing techniques
- 2. To understand the subject of Geographical information system as an extension of application software in civil engineering
- 3. To understand various applications of remote sensing in Civil Engineering

Course Outcomes:

Students will able to

- 1. get a basic and advanced level insight into the approach of latest remote sensing techniques
- 2. understand the subject of Geographical information system as an extension of application software in civil engineering
- 3. understand various applications of remote sensing in Civil Engineering

Curriculum Content	Hours
UNIT 1	8
Introduction and Basic Concepts Introduction, basic concepts of remote sensing, airborne and space born sensors, passive	
and active remote sensing emr spectrum, energy sources and radiation principles energy	
interactions in the atmosphere energy interactions with earth surface features, spectral	
reflectance curves	
UNIT 2	8
Remote Sensing Systems Satellites and orbits, polar orbiting satellites spectral, radiometric and spatial resolutions,	
temporal resolution of satellites multispectral, thermal and hyperspectral sensing. Indian	
remote sensing satellites and their features	
UNIT 3	
Digital Image Processing - Image Restoration and Image Enhancement Geometric corrections co-registration of data, ground control points (GCP) atmospheric corrections, solar illumination corrections concept of color, color composites contrast stretching – linear and non-linear stretching filtering techniques, edge enhancement density slicing, thresholding, Intensity Hue saturation (IHS) images, time composite images, synergetic images	9
UNIT 4	
Digital Image Processing - Information Extraction and Digital Image Processing Software	9
Introduction to Multispectral classification, Ground truth correction, Supervised and	
unsupervised classification Change detection analysis, Principal component analysis	
Ratio images, Vegetation indices Image processing software, Multispectral classification	
algorithms Image processing using software	
UNIT 5 Digital Elevation Modeling Introduction, Sources of digital elevation data, Types of DEM Radar interferometry, Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) data,	9
DEM for Slope, Aspect, Flow direction, Flow pathways, Flow accumulation, Streams,	
Catchment area delineation, Counter and draining extraction. Developing stereopairs	
and anaglyphs.	

UNIT	6			9				
Remote Sensing Applications Remote Sensing Applications in: Watershed management, Rainfall-runoff modeling, Irrigation management, Flood mapping, Drought assessment, Environmental monitoring Geomorphology, land use and land cover, soil mapping, site selection, route alignment,								
cartog	raphy, highway engineering	, rese	ervoir siltation					
GIS								
Defini	tion, functions of GIS, Typ	es o	f data – spatial, non-spatial, point, line polygon,					
vector	and raster database, Spatial	data	bases, Coordinate systems and georeferencing,					
Interp	olation methods – Determ	inist	ic and Statistical, Strategies for development,					
implei	mentation and management	of G	IS					
Text	Books	:						
1	T M Lillesand and R W Ki	efer	'Remote Sensing and Image Interpretation' John W	ilev and				
1.	Sons, New York. 6th edition	, 200	8	ney and				
2.	J.B. Campbell, 'Introduction T. I. M. Kennie and M. C. N.	1 to F Aathe	Remote Sensing', Taylor and Francis, London, 1996	iversity				
5.	press, London, 1985	iaun	way remote sensing in civit Engineering , Surry Or	liversity				
Refer	ence Books	:						
1. 2. 3.	F.F. Sabins, 'Remote Sense New York, 1997. Paul Longley, M.F. Goodc Wiley and Sons, Inc. 1999. Agarwal C.S. and Garg	ing: hild, P.K	Principles and Interpretation', W.H. Freeman and G 'Geographical Information System, Volume I and ., "Textbook on Remote Sensing in Natural F	Company, II', John Resources				
	Monitoring and Manageme	ent",	Wheeler Publishing, Allahabad.					
4.	Keith P.B. and Thompson	n et	al., "Remote sensing and water resources mana	gement",				
	American Water Resources	s Ass	sociation, Urbana Illinois					
5.	Lillesand T.M. and Kiefer	R.V	V., "Remote sensing and Image interpretation", Jo	hn Wiley				
	and Sons, New York.							
6.	Meijerink M.J., HAM de H	Brou	wer, Mannaerts C.M. and Velenzuela C.R., "Introc	luction to				
	the use of Geographical I	nfor	mation Systems for Practical hydrology", ITC Pu	ublication				
	No. 23, UNESCO, Paris							
7.	• Sweain P.H. and Davis S.M., "Remote sensing – The quantitative approach". McGraw Hill							
	Publications, New York							
Usefi	ıl Links	:						
1.	http://nptel.ac.in/courses/105	1080	 77/Dr. D. Nagesh KumarIISc Bangalore					
2.	http://nptel.ac.in/courses/121	1070	09/Dr.ArunK.Saraf,IIT Roorkee					

Class and Semester	:	Final Year B. Tech (Civil Engi VIII	neering), Pa	rt IV	, Sem
	-	1			1
Course Title	:	MAJOR PROJECT PHASE-II	Course Code:	:	CEL 424
Pre-requisites	:	The prerequisite for this course is to perform knowledge of Civil Engineering	ossess the fund	ament	al
Course Domain	:	core			
Skills Imbibed	:	Cognitive, Affective domain, Psychon	notor		
Course Assessment Met Student is evaluated during	t ho Inte	<i>ds:</i> rnal and External Oral Examination			
Course Objectives:					
 3. To draw infe 4. To learn press Course Outcomes: At the end of this cour 1. study and and 2. carry out det 3. draw inference 4. learn present 	se, s alyz ailec ces 1 atio	tes from the findings and present conclu- ation skills for technical report students will be able to e technical literature on the research top d mathematical modeling or experiment from the findings and present conclusion n skills for technical report	sion. bic of work. al validation n.		
Practical covered	:				
Methodology of Evaluation During the Second Stage of the formulation they have presen out during second stage of the problem formulation and met The project report would be examiners. The presentation evaluation of the project spect of the project team. The assessment of the project Project Guide. The guide v average. Each group will su the departmental library.	ne P ted o pros of ific ct w will	Project Students would present their project during first stage. Based on the literature re- oject student would write a report which woology adopted and the findings of the pro- sented through a seminar which would be the project shall be of 45min followe attention would be given to find out the could will be done at the end of the semester b award the marks for the individual s it the copies of the completed project r	et work complet review and proj vould give a rev ject work. e evaluated by a d by 50 min v contribution of e y external exar tudent dependi eport. One cop	ed bas ect wo view of a panel viva vo each te niners ing on by will	ed on the rk carried f literature, l of internal oce. During am member along with the group be kept in

Class and Semester	:	Final Year B. Tech (Civil Engineering	g), Part IV, S	em	VIII
	1				
Course Title	:	LAB-I STRUCTURAL DESIGN AND DRAWING-III	Course Code	:	CEL 425
Pre-requisites	:	Design of RCC structures I			
Type of Course	:	Practical			
Course Domain	:	core			
Skills Imbibed	:	Cognitive, Affective domain, Psychome	otor		
Course Assessment M	etho	ds:			
Student is evaluated du	uring	External Oral Examination			
Course Objectives:		an a sial DC stars sturges			
2 To prepare detailing	gn of of re	inforcement of special RC structures as provide the special RC structures as provide	per IS provisio	ns	
		1	Ĩ		
Course Outcomes:					
Student will be able to					
1 convey the concepts	of st	ructural design procedure			
2 design the various sp	ecia	RC structures 3 draft the detailing of rei	nforcement as	per	site
requirements					
Practical covered		:			
A) Assignments					
At least 6 assignments	wou	ld include design calculations and hand s	ketches in ske	tch	books for
the design work carried	d out	for assignments.			
B) Design Project on	Pres	tressed Concrete			
Minimum three half in	onori	al sheets based on project of PCC			
	ipen	ar sheets based on project of RCC			
C) Design Project on	Adv	anced Design of RCC Structures			
Minimum three half in	nperi	al sheets based on project on Advanced I	Design of RCC	C Sti	ucture.
	-	~ ~	-		
D) Analysis and Dosi	on of	Small Structure Using Computer Pro	oramme		
	511 01	Sman Structure Using Computer 110			
Analysis of small RCC	stru	cture using software such as STAAD.PR	O, STRUD, E	ΓA	BS, etc.
would be carried out a	nd re	port on analysis and design would be sub	omitted as a pa	nrt o	f Laboratory
work.					

Lab II Elective II

Class and Semester	:	Final Year B. Tech (Civil En VIII	gineering), Pa	art	IV, Sem						
Course Title	:	LAB-II ADVANCED DESIGN OF STRUCTURES	Course Code:	:	CEL 443						
Pre-requisites	•	The prerequisite for this course is to knowledge of soil mechanics, deter- index properties.	possess the fun mination of engi	dam neei	iental ring and						
Type of Course	:	Practical									
Course Domain	:	Elective									
Skills Imbibed	:	Cognitive, Affective domain, Psych	omotor								
Course Assessment											
Methods:											
Student is evaluated during External Oral Examination											
 2 To study analysis and 3 To study the detailing Course Outcomes: At the end of this course, 1 understand behaviour 2 analyze and design species 3 draft detailing of reinformation 	desig of re of sp ecial orcer	n special RC structures inforcement in special RC structures ecial RC structures under various loading RC structures nent in special RC structures as per IS pr	gs ovisions								
Practical covered	:										
The laboratory worl I) Assignments on the fo	k sho ollov	ould include the following: ving topics									
1. Design of Flat Sla	ıbs										
 Analysis of Deep Design of Chimp(Bea	ms									
4 Design of overhea	ed w	ater tank									
5. Design of retainin	ici w	alls									
6. Design of shear w	alls										
7. Yield line analysi	s of	slabs									

Class and Semester	:	Final Year B. Tech (Civil Enginee VIII	ering), Pa	rt	IV, Sem								
		·											
Course Title	:	LAB-II ADVANCED GEOTECHNICAL ENGINEERING	Course Code:	:	CEL 444								
Pre-requisites	:	The prerequisite for this course is to posse knowledge of soil mechanics, determination	ess the function of engin	lam neer	ental ring and								
		index properties.											
Type of Course	•	Practical											
Course Domain	:	Elective											
Skills Imbibed	<i>kills Imbibed</i> : Cognitive, Affective domain, Psychomotor												
Course Assessment Methods:													
Student is evaluated dur	ring E	External Oral Examination											
Course Objectives:													
 To study ground To study founda To study method Course Outcomes: Students will able to Students will be able Student will be able t Student will be able t Student will be able t Student will be able t	to pla o dec o des o dete	on expansive soils. ground improvement. an and execute soil exploration activity. ide soil parameters for foundation design. ign foundation for expansive soil. ermine bearing capacity of rock.											
The laboratory wo	rk sh	ould include the following:											
I) Assignments on the	follov	ving topics											
1. Computation of	Beari	ng Capacity and settlement for eccentric fo	oting										
2. Computation of	Beari	ng Capacity of pile											
3. Laterally loaded	pile a	and pile group											
4. Uplift capacity of	of pile	and pile group											
5. Design of sheet	pile												
6. Design of under	ream	ed pile											
7. Design of PVD													

Class and : Final Year B.Tech (Civil Engineering), Part IV, Sem														
Semester		VIII	0, /		,									
Course Title	:	LAB-II DEVELOPMENT ENGINEERING	Course Code	:	CEL 445									
Pre-requisites	:		0000											
Type of Course	:	Practical												
Course Domain	:	Elective												
Skills Imbibed	:	Cognitive, Affective domain, Psychomotor												
Course Assessment	<i>Metho</i> during	ds: External Oral Examination												
Course Objectives:														
1. To understand delivering value by solving societal problems														
2. To understand the. Sectoral Engineering System														
3. To apply knowledge Linking Census data to GIS														
<i>Course Outcomes:</i> Students shall able to	C													
1. To understa	nd abo	ut Society and its Organization												
2. To understa	nd the	detail report based on fieldwork.												
3. To identify	finally	what has been achieved.												
Practical covered		:												
The laboratory wor	k shou	ald include the following:												
A) Assignment based	on top	ics												
B) Field Visit	action	system Mosting with an NGO f	ormore e e	toto o	fficer and									
an elected	Sanon	system. weeting with an 1000, 1	amers, a s											
Visit 2:2 days and	1 2 nig	hts at the village. Village meeting	g, househol	d mee	eting.									
C) Village Report a	nd Ca	se-Study												

Class and Semester	:	Final	Year	B. 7	Tech	ı (Civ	vil En	gineer	ring),	Part IV	V, Se	em VIII			
												C	-		
Course Title	:	LAB-	II DE	ESIG	GN O	OF C	CONC	RETE	E BRI	IDGES		Course Code		:	CEL 446
Pre-requisites	:														
Type of Course	:	Practic	cal												
Course Domain	:	Electiv	ve	A ffo	otivo	don	noin I	Davaha	moto						
Skills Intoloea Course Assessment Methods	•	Cogini	uive, <i>F</i>	Alle	cuve	e don	nam, r	sycho	mote)[
Student is evaluated during E	xterna	Oral E	Exami	inati	ion										
Course Objectives:															
1. To analyze structures subjected to any kind of dynamic excitation and computing quantities like															
displacements, forces, stresses, etc.															
2. To understand the	2. To understand the analytical methods and procedures in a way that emphasize physical insight.														
3. To apply the structural dynamics theory to real-world problems like seismic analysis and design of															
structures.															
<i>Course Outcomes:</i> Students shall able to															
1. Analyze structures su	1. Analyze structures subjected to any kind of dynamic excitation and computing quantities like														
displacements, forces	s, stres	ses, etc	с.												
2. Understand the analy	tical r	nethods	s and p	proc	cedur	res in	a wag	y that	emph	asize ph	nysica	al insigh	t.		
3. apply the structural d	ynami	cs theo	ory to a	real-	-wor	ld pr	oblem	ıs like	seisn	nic analy	ysis a	and desig	gn o	of	
structures.															
Practical covered			:												
The laboratory work should	l inclu	de the	follov	wing	g:										
A) Assignment based on follow	ving to	pics													
i. Classification of Bridge	es														
ii. Components of Bridges	5														
iii. Design loads and its co	mbina	ion													
iv. Design of R. C. deck sl	ab, be	im and	slab, T	T be	am										
v. Box culvert															
vi. Design of bridge comp	onents	- Abutr	ments,	, Wi	ing w	alls,	Piers,	Appro	oach s	lab					
vii. Bearing and expansion	joints														
viii. Construction Techniqu	es														
B) Design of any one type of b	oridge														
C) Visit to bridge construction	site														

Class	and Semester	:	Final Year B. Tech (Civil Engineeri	ng), Part IV	, Sei	n VIII						
<i>c</i>			LAB-II STRUCTURAL	Course								
Cours	e Title	:	DYNAMICS	Code	:	CEL 447						
Pre-re	equisites	:										
Type of	of Course	:	Practical									
Cours	e Domain	:	Elective									
Skills	Imbibed	:	Cognitive, Affective domain, Psychor	notor								
Cours Stude	<i>e Assessment Methods:</i> nt is evaluated during Exter	nal	Oral Examination									
Cours	e Objectives:											
1.	To analyze structures subj	jecte	d to any kind of dynamic excitation an	d computing	qua	ntities like						
	displacements, forces, stre	esses	s, etc.									
2.	2. To understand the analytical methods and procedures in a way that emphasize physical insight.											
3.	3. To apply the structural dynamics theory to real-world problems like seismic analysis and design of structures.											
Cours	e Outcomes:											
Stude	nt will be able to											
1.	Analyze structures subject	ted t	o any kind of dynamic excitation and c	computing qu	antit	ties like						
	displacements, forces, stre	esses	s, etc.									
2.	Understand the analytical	met	hods and procedures in a way that emp	hasize physio	cal ii	nsight.						
3.	Apply the structural dynamic structures.	mics	theory to real-world problems like sei	smic analysis	s and	l design of						
Practi	ical covered		:									
The la	aboratory work should inc	clud	e Assignment based on following units:									
i.	Three assignments based or	n Si	ngle Degree of Freedom Systems									
ii.	Multiple Degree of Freedor	m S	ystems									
iii.	Stodola-Vianello method											
iv.	Discrete systems											
v.	Distributed- parameter Sys	tems	3									
vi.	Free and forced Vibration											

Lab III Elective III

Class and Semester	:	Final Y VIII	ea	ar B. Tech (Civil Engine	ering), Par	rt IV,	Sem				
Course Title	:	Lab-III	EN	IGINEERING	Course		CEL 453				
	•	OPTIM	[Z	ATION	Code:	•					
Pre-requisites			:	The prerequisite for this cou fundamental knowledge of C	rse is to poss Optimization.	ess the	•				
Type of Course			:	Practical							
Course Domain			:	Elective							
Skills Imbibed	Skills Imbibed : Cognitive, Affective domain, Psychomotor										
Student is evaluated du Course Objectives: 1. To build knowle 2. To understand us 3. To understand th	dge a	Internal Ora	al l	Examination s about various optimization tea iques in specific regions.	chniques in er	ngineer	ing.				
 Course Outcomes: 1. To apply optimiz 2. To formulate the the constraints. 3. To familiarize w effectively. 	zation fielc ith o	n concepts to l problem an ptimizing th	os nd	solve actual problems in engined then select appropriate techniq given engineering problem by a	ering field. ue to optimize dopting a suit	e the sa table te	ume within echnique				
Practical covered			:								
The laboratory wo	rk sl	hould inclu	ıde	e the following:							
1. At least One As	signi	ment on eac	ch '	topic.							
 Real life problem optimization solving using few techniques. 											

Class and	:	Final Year B.Tech (Civil Engine	Final Year B.Tech (Civil Engineering), Part IV, Sem VIII											
Semester		C C C C C C C C C C C C C C C C C C C	0, /		, 									
Course Tials		LAB-III ENGINEERING	Course		CEL 454									
Course Tille	•	ECONOMICS and VALUATION	Code	•	CEL 454									
Pre-requisites	:													
Type of Course	:	Practical												
Course	:	Elective												
Domain														
Skills Imbibed	••	Cognitive, Affective domain, Psychome	otor											

Course Assessment Methods:

Student is evaluated during Internal Oral Examination

Course Objectives:

To provide students necessary knowledge and skills in economics.

To make students aware of professional practices.

Course Outcomes:

At the end of this course, student will be able to

- 1. describe elements of Engineering Economy
- 2. describe elements of valuation of immovable properties

:

- 3. value immovable properties by physical methods
- 4. value immovable properties by methods based on rent, profit, development policy

Practical covered

The laboratory work should include the following:

A) At least one Assignment based on each unit

- B) Minimum two out of the following
 - 1. Valuation Report of residential buildings using cost approach
 - 2. Valuation Report of public buildings using rental approach
 - 3. Valuation Report of commercial buildings using market approach
 - 4. Valuation Report of industrial buildings using income approach
- C) Site Visits for Case Study of Valuation

Class and Semester	:	Final Y	ear	r B. Tech (Civil Eng	ineering), Part	IV, S	em VIII		
	1								
Course Title	:	LAB-III		NITE ELEMENT	Course	:	CEL455		
		ANALY	<u>515</u>	The prerequisite for the	<i>Code</i> : is course is to posse	ss the			
Pre-requisites			•	fundamental knowledg Graphics, Matrix Alge	e of programming, bra	Engir	eering		
Type of Course			:	Practical					
Course Domain			:	Elective					
Skills Imbibed			:	Use of ANSYS softwa	re and using simula	tion s	oftware's		
Course Assessmen	it M	ethods:							
Student is evaluated of	luring	g Internal P	ract	ical Examination					
 To understand To understand To understand To understand 	l the j l moc l the	power of Fl leling of sy use Fem so	EM sten ftwa	in areas other than classi ns using FEM are in real life structure.	cal mechanics.				
Upon completion of	this c	ourse, the st	uder	nt will be able to:					
 Learn the fund Model the stru Enhance the known 	amer ctura 10wle	ntals of finit l behavior t edge in nun	te ele thro nerio	ement method ugh FE analysis leading cal analysis with FE soft	to design of structur ware's and FE prog	res. rams			
Practical covered			:						
The laboratory v	vork	should inc	lud	e the following:					
The work shall consis	st of f	following:							
1. Two Assignm	ent o	n Basic Co	ncep	pts					
2. Two Assignm	ents	on FE Anal	lysis	s of Plane Truss and Plan	e Frame				
3. Three Assignment	3. Three Assignments on Analysis of beams, rigid jointed space frame, Galerkin method								
4. Use of ANSYS, ABAQUS and MATLAB to carryout FE analysis of plane structures									

Class and Semester	: Final Year B	.]	Tech (CIVIL ENGINEERING	G), Part IV (Sen	nester VIII)
Course Title	: Lab III-NUM	ЛE	ERICAL METHODS	Course Code:	: CEL 456
Pre-requisites		:	Mathematics	Coue.	
The prerequisite for th	is course is to pos	sse	ess the knowledge of C' progra	mming language	2.
Type of Course		:	Practical		
Course Domain		:	Elective		
Skills Imbibed		:	Cognitive, Affective domain,	Psychomotor	
Course Assessmen	t Methods:				
Student is evaluated d	uring Internal Pra	ict	ical Examination		
 Develop humerical Nonlinear Equations Code various numerical Course Outcomes: Use the bisection iterations in the algorit Use polynomial intermethod to evaluate the 	methods to appro and Linear Regre rical methods in a method, false po thm to achieve de erpolations includ e interpolations.	vess a m osit esii lin	tion, Newton's, Secant methor red accuracy with the given tology the Lagrange polynomial, Newton	and to estimate therance.	he number of r curve fitting
Practical covered		•			
The laboratory w	ork should inclu	Ide	e the following:		
Experiments shall	consist of at least	t 1:	2 programs with flowcharts, so	ource listing, inpu	it and
outputs based on a	bove topic in 'C'	pr	rogramming language on	6, 1	
Roots of Nonli	near Equations	1			
i) Newt	ton-Raphson Met	ho	d		
ii) Seca	int Method				
Cramer's Rule	2				
i) Pitfal	lls of elimination	m	ethod		
ii)Gaus	s Jordan method				
iii)Gau	ss Seidel method				
Curve fitting					

Interpolation i) Linear interpolation ii) quadratic interpolation iii) General form of Newton's Interpolating Polynomial iv) Newton's divided difference interpolation polynomials v) Lagrange's Interpolating Polynomials Linear Regression: i) Least Squares Method ii) Polynomial Regression iii) Nonlinear Regression Trapezoidal Rule Simpson's Rule

Class and Semester	:	Fina	l Year I	B.	Tech (Civil Engineering), P	art IV, S	lem	VIII				
Course Title	:	LAB APP	-III REM LICATI(10 21	DTE SENSING AND GIS NS	Course Code:	:	CEL 457				
Pre-requisites			:				•					
Type of Course			:		Practical							
Course Domain			:		Elective			-				
Skills Imbibed			:		Use of ANSYS software and using	g simulatio	n so	oftwares				
Course Assessment Methods:												
Student is evaluated during Internal Practical Examination												
Course Objectives:												
 To get a basic and advanced level insight into the approach of latest remote sensing techniques To understand the subject of Geographical information system as an extension of application software in civil engineering To understand various applications of remote sensing in Civil Engineering 												
Course Outcomes:												
Students will able	to											
 get a bas understand software understand 	ic an nd th in ci nd va	d advai e subje vil eng trious a	nced level ct of Geog ineering pplication	in gra	usight into the approach of latest rem aphical information system as an extension of remote sensing in Civil Engineeri	ote sensing ension of aj ng	tec oplie	hniques cation				
Practical covered	d		:			0						
The laboratory	woi	rk shou	ıld includ	łe	the following:							
Following work has	to b	e perfo	ormed in t	he	e practical hours:							
1. Complete de	etails	to be j	procured of	on	satellites and their orbits through s	study						
2. Assignment	s on	"Image	e enhance	m	ent techniques"							
3. Application	of re	emote s	sensing an	ıd	GIS to civil engineering – report a	nd presenta	atio	1				
4. Any one ass	ignn	nent us	ing MATI	L	AB or any remote sensing software							
5. Application	stud	y will l	be submitt	teo	d in report and a presentation will b	e done on	it.					
6. CD of the re	port	and pr	esentation	n v	will be submitted by the student to t	the concerr	ned	faculty				
and will be g	grade	ed acco	ordingly									
				_								

Class and Semester	:	Final Year B	.Te	ch (C	Civil Engineer	ring)), Part	IV, Semester V	/11	I
Course Title	•••	PROFESSIONAL ETHICS					Course Code:	:	AC 427	
Teaching Scheme (Hours)	:	2 hr /Week= 2 x13= 26 hours					Credits	:	Nil	
Evaluation Scheme (Marks)	:	Assignment s Viva voce	::	50 25	Written Test Grand Total	:	25 100	Duration of Exam	:	Not Applicable
Revision	:	Second					Month	:	June 2019	

Pre-requisites	••	It does not require any pre-requisite as such but eager to know about our profession's connectivity and role and responsibility towards society and environment.
Type of Course	:	Audit Course at institute level
Course Domain	:	Humanities and Social Sciences
Skills Imbibed	<i>kills Imbibed</i> Cognitive: Understand, Predicting Situation, Comprehend, Affective: Receive, Listen, Respond, Showing self-reliance, Org Psychomotor: Imitation, adaptation, articulation, origination	

Course Assessment Methods:

The students will be given five assignments each for 10 marks. At the end of the course, there will be a written test of 25 marks and a viva voce of 25 marks. There will be assessment for a total of 100 marks. Based on the marks obtained, they will be awarded with a grade similar to other credit courses. Though it is an audit course, obtaining passing grade is essential.

Course Objectives:

- 1.To understand of the relation between engineering and society/environment
- 2. To be aware of ethics and responsibility of engineers as professionals
- 3. To be able to make ethical judgments and solve problems
- 4. To develop attitudes required of engineers and values shared by engineers

Course Outcomes: At the end of the course, the students will be able to:

- 1. Realize the role of engineers towards society and environment
- 2. Become aware of ethical practices and responsibility as a professional
- 3. Take ethical judgements and solve problems
- 4. Engineers attitude development and sharing of values

Curriculum Content	Hours			
Unit I: Engineer, Society and Environment: 1. Understanding of the relation between engineering and society/Environment. 1.1 Understanding of the effects and impacts of science and technology on human society. 1.2 Understanding the effects and impacts of science and technology on the natural environment. 1.3 Understanding the characteristics of the modern globalized world.	07			
Unit II: Ethics and engineering Profession: 2 Understanding of ethics and responsibilities of engineers as Professionals. 2.2 Understanding of the roles and responsibilities of engineers in Society. 2.3 Understanding of the basic concepts and theories of ethics. 2.4 Understanding the relation between law and ethics and having basic legal literacy. 2.5 Understanding of the nature of professional ethics.2.6 Understanding of the purposes and roles of codes of ethics and those of conduct set by engineering societies and associations. 2.7 Understanding of the social responsibility (SR) of organizations (companies in particular). 2.8 Understanding of ethics in specific areas (and knowledge of concrete cases)2.9 Understanding the nature of ethics in research and development	07			
Unit III: Ethical Perception and Problem solving: 3 Ability to make ethical judgments and solve problems. 3.2 Understanding and application of methods to identify related factors in ethical issues and to make a structural analysis of them. 3.3 Understanding and application of methods to analyse technical factors in ethical issues and make structural analysis of them. 3.4 Understanding and application of methods to analyse organizational factors and provide organizational solutions. 3.5 Ability to design one's conduct to solve ethical problems Based on the abilities to analyze factors gained through 3.2–3.4,3.6 Comprehensive problem-solving capability	07			
Unit IV: Engineer's attitude and Social Responsibility: 4 Attitude required of engineers and values shared by engineers. 4.1 Attitude to think autonomously and independently based on an understanding of the responsibility of an engineer. 4.2 Attitude to accept a diversity of values (recognizing the existence of the various value systems different from their own as well as the multiplicity of values). 4.3 Attitude to share values (such as safety emphasized in the codes of ethics) to which engineers should assign paramount importance. 4.4 Attitude and willpower to act on ethical judgments of their own.	07			
Reference Book:				
 Charles D.Fleddermann, "Engineering Ethics", Prentice Hall, New Mexico, 1999. Seth M. L. "Principles of Economics". Lakshmi Narain Agarwal. Agra 				
2. Seth, M. L., Principles of Economics, Lakshmi Narain Agarwai, Agra.				

- 3. Agarwal, A. N., "Indian Economy", Vikas Publishing House Pvt. Ltd., New Delhi.
- 4. Datta R. and Sundharam, "Indian Economy", K. P. M., S. Chand and Co. Ltd., New Delhi
- 5. Prof. M P Raghavan, "Professional Ethics in Engineering", SCITECH Publication(India) Pvt. Ltd, Second Edition

Name Course (Old Syllabus)	Equivalent Course (New Syllabus)				
Design of RCC Structures -I	Design of RCC Structures -I				
Earthquake Engineering	Structural Dynamics and Earthquake				
	Engineering				
Estimating and Costing	Estimating and Costing				
Water Resources Engineering - II	Water Resources Engineering - II				
Elective-I					
Lab-I Structural Design and Drawing - II	Lab-I Structural Design and Drawing - II				
Lab-II Earthquake Engineering	Lab-II Structural Dynamics and				
	Earthquake Engineering				
Lab-III Estimating and Costing	Lab-III Estimating and Costing				
Lab IV Elective-I	Lab IV Elective-I				
Design of RCC Structures-II	Design of RCC Structures-II				
Construction Practices	Construction Practices				
Town and Country Planning	Town and Country Planning				
Elective-II	Elective-II				
Elective-III	Elective-III				
Lab-I Structural Design and Drawing - III	Lab-I Structural Design and Drawing - III				
Lab-II Elective-II	Lab-II Elective-II				
Lab-III Elective-III	Lab-III Elective-III				

Equivalence of subject