G.PULLA REDDY ENGINEERING COLLEGE (Autonomous): KURNOOL

Department of Civil Engineering Accredited by NBA of AICTE and NAAC of UGC Affiliated to JNTUA, Anantapuramu



SCHEME – 2017

(Scheme and Syllabus for Four B.Tech III to VIII Semester)

Department of Civil Engineering

G. Pulla Reddy Engineering College (Autonomous): Kurnool Accredited by NBA of AICTE and NAAC of UGC Affiliated to JNTUA, Anantapuramu

FOUR YEAR B. Tech. DEGREE COURSE Scheme of Instruction and Examination (Effective from 2017–18)

III Semester (CE)

Scheme : 2017

S.	Subject	Code	Credits	Scheme of Instruction periods/week			Duration of end	Scheme of Examination Maximum Marks		
110.				L	D/T	Р	(Hours)	End Exam	Internal Assessment	Total
Ι	Theory									
1	Mechanical Engineering & Energy Science	ME216	3	2	1	-	3	60	40	100
2	Strength of Materials - I	CE201	3	2	1	-	3	60	40	100
3	Surveying and Geomatics	CE202	4	3	1	-	3	60	40	100
4	Fluid Mechanics	CE203	4	3	1	-	3	60	40	100
5	Building Technology	CE204	4	3	1	-	3	60	40	100
6	Mandatory Learning Course-1	ML	-	2	-	-	-	-	-	-
II	Practical									
7	Soft Skills Lab	HU204	1	-	-	2	-	-	100	100
8	Surveying Lab	CE205	1.5	-	-	3	3	50	50	100
9	Strength of Materials Lab	CE206	1	-	-	2	3	50	50	100
	Total		21.5	15	5	7		400	400	800

MECHANICAL ENGINEERING AND ENERGY SCIENCE (MEES)

III Semester : C	CE						Sche	eme: 2017		
Course Code	Category	Hou	ırs / W	/eek	Credits	Max	imum Mar	ks		
ME216	ESC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		2	1	-	3	40	60	100		
Sessional Exam	Duration:	2 Hrs				End Ex	xam Durati	on: 3 Hrs		
	A 1	1 0 1			1	11.				
Course Outcom	es: At the er	nd of the	ne cou	rse stu	dents will be	e able to		1		
substan	ces.	CS OI I	inermo	aynan	nics, Zeroth	law of thern	nodynamics	and pure		
CO2: Understand the principle of first law of thermodynamics and its application on open and closed system and principle of second law of thermodynamics.										
CO3: Understa	nd the basi	cs of tion. F	refrige Propert	eration	and air-co	onditioning what whether the synchrony of the synchrony o	nich include chart proce	es Vapour		
CO4: Identify	CO4: Identify sources of renewable energy and their primary applications.									
CO5: Understand use of wind, solar, hydropower and energy auditing.										
				UN	IT - I					
Basic concepts Thermodynamic Thermodynamic Pure substance diagrams, forma	of thermod equilibrium s and its app s : P ropertition of steam	<i>dynam</i> n, ther lication es of n and it	<i>ics</i> : T modyn ns, ene pure s s prop	Thermo amic ergy tra substan erties.	odynamics s process, the ansfer in the nces, phase	systems- close ermodynamic c form of work change proce	d open and cycles, Zero and heat. ss, phase e	d isolated, oth law of quilibrium		
				UNI	T - II					
<i>First law of The</i> system, concept steady flow syste <i>Second law of t</i>	ermodynami of total end ems, steady f hermodynam	cs: Fir ergy, i low de nics: I	st law nternal evices, Energy	of the l energy simple reserve	rmodynamic gy, specific e problems l voir, heat en	es for a cycle a heats, enthalp based on first la gine principle,	nd process i y, energy b aw. statements	in a closed alance for of second		
		ot cyc	le, em				problems.			
UNIT - III										
<i>Kejrigeration:</i> Working principle of refrigerator and heat pump, vapour compression refrigeration system, commonly used refrigerants, simple problems to find power required and COP.										
<i>Psychrometry:</i> Properties of moist air, psychrometric chart, psychrometric processes, working principle of simple air conditioning system, human comfort, building requirements and energy conservation in air conditioned buildings.										

UNIT - IV

Fundamentals of energy, science and Technology: Classification of energy sources, consumption trend of primary energy resources, Importance of Non conventional energy sources, Energy chain, common forms of energy, Advantages and Disadvantages of conventional energy sources, Salient features of non conventional energy sources, Environmental Aspects of energy, Environmental- Economy, Energy sustainable development energy densities of various fuels, World energy status.

UNIT - V

Energy sources: Overview of energy systems, Sources, Transformations efficiency and storage. Fossil fuels, past, present and future remedies & alternatives for fossil fuels. Introduction wind, solar and hydropower. Concept of green building and green architecture, *Energy Auditing:* Level of responsibility, energy conservation schemes, industrial energy usage, energy conversion, energy index, energy costs, cost index, representation of energy consumption.

Text Books :

- 1. P.K. Nag [2007], Engineering Thermodynamics, TMH Publishers, New Delhi
- 2. R S Khurmi, *Refrigeration and air conditioning*
- 3. B.H.Khan, Non-conventional Energy Sources, TMH Publishers, New Delhi.
- 4. W R Murphy, Energy management

Reference Books :

- 1. Joel Rayner [1996], *Basic Engineering Thermodynamics*, Addison- Wesley Publication, Masachusette
- 2. G.D Rai, Non-conventional Energy Sources, Khanna Publishers, New Delhi.
- 3. C.P.Arora, Refrigeration and Air Conditioning, TMH Publishers, New Delhi.

Web References:

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

STRENGTH OF MATERIALS - I (SM1)

III Semester :	СЕ						Sche	eme: 2017				
Course Code	Category	Hou	ırs / W	eek	Credits	Max	imum Mar	ks				
CE201	РСС	L 2	T	Р	C	Continuous Internal Assessment	End Exam	Total				
Sessional Evan	n Duration• '	4) Hrs	1	-	3	Find Fi	om Durati	100 on $\cdot 3$ Hrs				
Sessional Exam		2 1115						011.31115				
Course Outcomes: At the end of the course students will be able to												
CO1: Determine shear force and bending moment for determinate beams under transverse												
loading and draw shear force and bending moment diagrams.												
CO2: Determine the bending and shear stress variation for determinate beams.												
CO3: Determi	CO3: Determine slope and deflection of determinate beams using Double integration method,											
Macaula	y's method a	nd Mo	ment a	rea me	ethod.							
CO4: Analyse	the short c	olumn	and 1	long_c	olumn unde	er axial and e	eccentric lo	ading and				
thermal	thermal stresses and strains in composite sections.											
CO5: Analyse the effect of torsion on circular shafts and Understand the concepts of springs.												
UNIT - I												
bending momen loads, uniformly Relationship be beam.	nt diagrams y distributed etween shear	for ca load, u force	ntileve uniforn and be	r, sim nly va ending	ply support rying loads moment a	ed, over hang and couples, cond rate of load	ing beams ombination ling at a se	with point of loads – ection of a				
				UNI	T - II							
<i>Flexural Stress</i> Bending stresse hollow) - I, T, A	ses: Theory constants and the seams angle and cha	of simp - Sectionnel se	ole ben ion mo ections	ding - dulus 5 – Eff	- Assumptic of rectanguiciency of va	ons – Equation llar and circula arious cross sec	for simple ar sections ctions of bea	bending – (solid and ums.				
Shear Stress: D rectangular, tria	Derivation of f Ingular, circul	formul lar, I a	ae – Sl nd T se	near st ections	ress distribu , Built up se	tion in various ection.	beam section	ns like				
				UNI	Г - III							
Deflection of Determinate Beams : Slope, deflection and radius of curvature and their relationship – Strength and stiffness of beams – Finding slope and deflections using Double integration method, Macaulay's method and Moment Area method.												
UNIT - IV												
<i>Stresses and Strains in Composite Sections:</i> Analysis of bars of composite section, Thermal Stresses in simple and composite bars.												
<i>Direct and Bending Stresses:</i> Combined direct and bending stresses – Eccentric loading – Limit of eccentricity and core of section, wind pressure on walls and chimney shafts.												

Columns and Struts: Introduction, slenderness ratio – Euler's formulae for long columns with different end conditions – Limitations of Euler's theory – Rankine's theory – Derivation of Rankine's Formula – Long Columns under eccentric loading– Secant formula.

UNIT - V

Torsion of Circular Shafts: Theory of pure Torsion – Derivation of Torsion equation – Assumptions made in pure torsion – Torsional theory applied to hollow and solid circular shafts – Power transmission by shafts.

Springs: Introduction – Types of Springs - Closed and open coiled helical springs under axial loads and axial twist – Springs in series and parallel– Carriage springs.

Text Books :

- 1. B.C Punmia, Ashok Kumar Jain & Arun Kumar Jain [2009], *Mechanics of Materials*, Laxmi Publications, New Delhi.
- 2. R.K. Rajput [2012], Strength of materials, S.Chand & Co., New Delhi.
- 3. R.K. Bansal [2010], Strength of materials, Laxmi Publications, New Delhi.

Reference Books :

- 1. F.L. Singer and A.Y. Pytel [1987], Strength of materials, Harper & Row Publications.
- 2. Bhavikatti [2009], Strength of materials, S. Chand & Co., New Delhi.
- 3. Timoshenko & Young [1968], *Elements of Strength of materials*, Eastern Wiley Publications.
- 4. D.S. Prakash Rao [2009], *Strength of Materials*, University Press Publications, Hyderabad.

Web References:

- 1. https/www.coursera.org
- 2. www.nptel.ac.in/courses

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

SURVEYING AND GEOMATICS (SURG)

III Semester :	СЕ						Sche	eme: 2017				
Course Code	Category	Ηοι	ırs / W	/eek	Credits	Max	imum Mar	ks				
CE202	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total				
		3	1	-	4	40	60	100				
Sessional Exam	n Duration:	2 Hrs				End Ex	xam Durati	on: 3 Hrs				
Course Outcomes: At the end of the course students will be able to												
CO1: Use various conventional instruments involved in surveying with respect to utility and precision.												
CO2: Plan a plotting	CO2: Plan a survey, taking accurate measurement, booking of field measurements, plotting and adjustment of traverse.											
CO3: Understa	and the meth cessible object	ods of ts.	f level	ling, o	contouring a	and find the e	levations &	distances				
CO4: Underst	and the sett	ing o	ut me	thods	of differen	t types of cu	urves and	building /				
CO5: Understa	and the applic	ations	of adv	anced	surveying in	nstruments and	methods.					
	11											
	UNIT - I											
Basics of Surve survey - Metho obstacles - Plo of bearing - P methods - Error <i>Triangulation</i> angles - Omitte	eying : Defin ods of measu otting of chair Plotting of a t rs. & Trilateration ed Measureme	ition, j uring l surve ravers on: Th ents -	princip horizor ey - Co e - De neodoli Triang	les and ntal ar onstruc cclinati ite trav gulation	d classificati nd slope dis ction and wo ion, dip, loc versing - Me n network –	on of surveyin tance - Rang orking of prism al attraction - easurement of l Signals - Ba	g - Principle ging - Cha latic compas Plane table horizontal as se line meas	es of chain ining past ss - Types surveying nd vertical surement -				
and Inter-visibi	lity of station	s.	0			6						
				UNI	T - II							
<i>Levelling</i> : Prin Trigonometric	nciple of leve levelling and	lling - Axis s	Meth ignal c	nods o orrect	f levelling - ions.	Booking of re	adings – Co	ontouring -				
<i>Tacheometric</i> 3 and inclined lin	<i>Tacheometric Surveying:</i> Principle of tacheometric surveying - Distance equation for horizontal and inclined line of sights -Tangential Tacheometry - Errors.											
UNIT - III												
<i>Curves:</i> Types of curves – Terminology - Elements of simple circular curve - Setting out methods - Elements of compound curve - Transition curve – Types - Methods of determination of length - Characteristics and elements of transition curve - Vertical curve – Types and length of vertical curves - Setting out of foundation trench of a building and culvert.												

UNIT - IV

Modern Field Survey Systems:

EDM and Total Station: Measurement principle of EDM - EDM instrument characteristics - Accuracy in EDM - Total station – Introduction – Advantages - Types and applications of total station - Field procedure.

Global Positioning System (GPS): Introduction - Working principle - GPS receivers - Applications of GPS.

UNIT - V

Photogrammetry: Principles of photogrammetry and branches of photogrammetry - Types of photographs - Scale of photographs - Overlap and photo interpretation.

Remote Sensing and GIS: Principle and types of remote sensing - Elements in remote sensing - Definition of GIS - Components of GIS - GIS architecture - Data types and applications.

Text Books :

- 1. B.C. Punmia, A.K. Jain and A.K. Jain [2005], *Surveying Vol. I, II & III*, Laxmi Publications (P) Ltd., New Delhi.
- 2. R. Agor, A text book of Surveying & Levelling, Khanna Publishers, New Delhi.
- 3. R. Agor, A text book of Advanced surveying, Khanna Publishers, New Delhi.
- 4. Satheesh Gopi, R. Sathi Kumar and N. Madhu, *Advanced Surveying*, Person Education, Dorling Kindersley (India) Pvt. Ltd, New Delhi.
- 5. M. Anji Reddy [2017], A text book of remote sensing and Geographical Information Systems, B.S Publications, Hyderabad

Reference Books :

- 1. Arora K.R, Surveying vol. I, II & III, standard book house.
- 2. R. Subramanyam [2012], Surveying and Levelling, Oxford University Press, New Delhi.
- 3. N.N. Basak [1994], Surveying and Levelling, Tata McGraw Hill Publishers, New Delhi

Web References:

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

FLUID MECHANICS (FM)

III Semester : C	CE						Sche	eme: 2017			
Course Code	Category	Hou	rs / V	Veek	Credits	Max	imum Mar	ks			
CE203	РСС	L	T	Р	C	Continuous Internal Assessment	End Exam	Total			
C		3		-	4	40	60 D	100			
Sessional Exam	Duration: 2	Hrs				End Ex	kam Durati	on: 3 Hrs			
Course Outcom	At the on	dofth	0.001	raa tha	etudonte wi	ll ba abla ta					
CO1: Understand types of fluids and their properties											
CO2: Apply the concept of hydrostatic law and Pascal's law.											
CO3: Determin	CO3: Determine the stability of floating and submerged bodies.										
CO4: Solve pro	blems related	l to sta	tic an	d dyna	mic condition	ons of fluid.					
CO5: Determin	ne discharge	e thro	ugh	pipes,	tanks and	d channels u	sing Ventu	urimeter /			
Orificem	neter, Orifice	/ mout	hpiec	e and	notches.						
CO6: Understand the laminar and turbulent flows, major and minor losses in pipes.											
CO7: Understand the concepts of boundary layer analysis.											
CO8: Determine an equation for a phenomenon using dimensional analysis.											
UNIT - I											
Fluid Properties	: Definition	of a flu	$\operatorname{iid} - 1$	Densit	y – Specific	weight - Spec	ific volume	- Specific			
gravity – Compr	essibility –Va	apour j	pressu	re - S	urface tensio	on and capillari	ty –Viscosit	ty.			
<i>Fluid Statics:</i> If absolute pressur differential many surfaces.	Pascal's law es – Measure ometer – Bou	 Present urdon' 	ssure of pre s pres	variati essure ssure g	on in a sta – Piezomete gauge – Hyd	tic fluid – Atı er – U–tube m Irostatic forces	mospheric, aanometer a on plane a	gauge and nd U–tube and curved			
				UNI	T - II						
Buoyancy and F metacentric height.	F <i>loatation:</i> Bu ht – Stability	uoyanc of su	y – B bmerg	suoyan ged and	t force and o d floating bo	centre of buoya odies – Determ	ancy – Meta anation of r	acentre and metacentric			
<i>Fluid Kinematics:</i> Types of flow – Streamline – Streak line – Path line – Stream tube – General control volume equation – Continuity equation in one and three dimensional forms – Stream function and velocity potential function – Flow net – Acceleration of a fluid particle – Local and convective accelerations – Tangential and normal accelerations.											
				UNI	Г - III						
<i>Fluid Dynamics</i> Bernoulli's ener Momentum corre Analysis of free l	<i>Fluid Dynamics:</i> Surface and Body forces - Euler's equation of motion along a streamline – Bernoulli's energy equation – Energy correction factor – Impulse–momentum equation – Momentum correction factor – Force on a bend – Energy gradient line – Hydraulic gradient line – Analysis of free liquid jets – Forced vortex and free vortex .										
<i>Flow Measurement:</i> Velocity measurement by Pitot tube and Pitot static tube – Discharge measurement by Venturimeter and Orificemeter – Flow through Orifices and mouthpieces – Notches and weirs.											

UNIT - IV

Laminar and Turbulent Flow: Reynold's experiment – Regimes of flow, laminar flow, turbulent flow, transitional flow – Reynold's number – Laminar flow through circular pipes – Hagen Poiseuille equation – Laminar flow through parallel plates - Velocity distribution for turbulent flow in pipes – Rough and smooth pipes – Darcy–Weisbach equation – Variation of friction Factor – Moody's chart.

Boundary Layer Theory: Boundary layer – Definition – Growth over a flat plate – Boundary layer thickness – Nominal, displacement, momentum and energy thickness – Laminar sub layer – Separation of boundary layer.

UNIT - V

Dimensional Analysis and Similitude: Units and dimensions – Dimensional homogeneity – Rayleigh's method – Buckingham π theorem – Superfluous and omitted variables – Geometric, kinematic and dynamic similarities – Dimensionless numbers – Model and prototype relations – Distorted models.

Forces on Submerged Bodies: Drag and lift over a submerged body – Pressure drag – Friction drag – Total drag at small and large Reynold's number over cylinder and sphere.

Text Books :

- 1. P.N. Modi & S.M. Seth [2015], *Hydraulics and Fluid Mechanics including Hydraulic Machines*, Standard Book House, New Delhi.
- 2. R.K.Bansal [2011], A text book of Fluid Mechanics and Hydraulic machinery, Laxmi Publications (P) Ltd.

Reference Books :

- 1. Streeter & Wylie [1979], *Fluid Mechanics*, McGraw Hills Publications.
- 2. C.M. White [2011], Fluid Mechanics, McGraw Hills Publications.
- 3. Bernard Massey [1998], Mechanics of Fluids, Taylor & Francis.

Web References:

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

BUILDING TECHNOLOGY (BT)

III Semester :	СЕ						Sche	eme: 2017			
Course Code	Category	Hou	rs / V	Veek	Credits	Max	imum Mar	ks			
CE204	РСС		T	Р	С	Continuous Internal Assessment	End Exam	Total			
Carrier al Error	. D	3		-	4	40	60 Doct	100			
Sessional Exan	n Duration: 2	Hrs				End Ex	kam Durati	on : 3 Hrs			
Course Outcomes: At the end of the course students will be able to											
Course Outcomes: At the end of the course students will be able to											
CO2: Understand the applications of advanced building materials.											
CO3: Explain the principles and methods of construction of building components											
CO4: Understand the building services required with respect to safety and other											
requiren	nents.		501 (equirea w	in respect t	o survey .				
CO5: Apply th	CO5: Apply the principles & bye-laws in planning Public and Residential buildings.										
	1 1			1			U				
	UNIT - I										
Basic Building materials:											
<i>Introduction:</i> Construction matrix	Importance – aterials – Prope	Objec erties o	ctives of mat	of st erials.	udy of bui	lding material	s – Classif	ication of			
Stones: Propert of stones- Dres	ties of building sing of stones	g stone – Nati	es– Re ural be	elation ed – To	to their structure to the total to the the total tota tota	uctural requirent nes.	ments – Cla	ssification			
<i>Bricks:</i> Composed between clamp	sition of good burning and k	l brick iln bur	c eartl ning -	h — M – Qual	ethods of m ities of a go	nanufacturing o od brick –Testi	of bricks– c ng of bricks	omparison			
<i>Lime:</i> Technica lime.	al terms – Con	stituer	nts of	lime s	tone – Class	sification of lin	ne – Manufa	acturing of			
Cement: Proper	rties of cement	z – typ	es of c	cemen	ts – Testing	of cements.					
Wood: Structur	e – Seasoning	of tim	ber –	Defec	ts in timber.						
	6			UNI	T - II						
Advanced Build	ding Materials			0112							
Tiles Character	ristics of good	tile - 1	Manut	facturi	ng methods	- Types of tile	s - Testing (of tiles			
Other Material	s: Properties a	nd use	s of ir	on. gl	ass. ceramic	s. plastics, stee	l. aluminum	, bitumen.			
fiber-reinforced plastics, gypsum.											
UNIT - III											
Building Const	ruction ·			0112							
Foundations S	Shallow found	ations	_ Snr	ead co	mbined stre	an and mat foot	tings				
Masonmy Rond	le in Stone & k	rick n	196001	$r_{\rm V}$ - C	witze Dartit	ion walls					
Elears: Materials used Different types of floors concrete mossic terrazzo tiled floors											
<i>rioors:</i> Materia	us used – Diffe	erent t	ypes o	0011100	rs – concrete	e, mosaic, terra	zzo, tilea flo	JOIS.			

Roofs: Pitched, flat & curved roofs – Lean-to-roof, couple roofs, trussed roofs – King and queen post trusses – RCC roofs.

Stairs: Terminology – Types of stairs.

Surface Finishes: Plastering – Pointing – White washing, distempering and Painting – Damp proofing.

Form work and scaffolding.

UNIT - IV

Building Services:

Ventilation: Necessity – Functional requirements – Natural and mechanical ventilation.

Lighting: Day and artificial lighting – Types of lighting in working places.

Fire Protection: Causes – Fire load – General fire safety requirements – Fire resistant construction.

Green Building: Concept of Green Building.

UNIT - V

Principles of Building Planning: Introduction – Selection of site – Aspect, prospect, furniture requirements, roominess, grouping, circulation, privacy, sanitation, elegance, economy, flexibility and practical considerations.

Building Bye-laws and Regulations: Introduction – Objectives of building bye-laws – Principles underlying building bye-laws – Terminology – Floor area ratio (FAR), Floor space index (FSI) – Classification of buildings – Open space requirements – Built up area limitations – Height of the buildings – Wall thickness – Lighting and ventilation requirements.

Planning of Residential Buildings: Introduction – Minimum standards for various parts of the buildings – Requirements of different rooms and their grouping – Verandah – Drawing room – Bed room – Kitchen – Dining room – Store room – Bath room – Water closet – Staircase – Garrage.

Text Books :

1. S.C.Rangwala, K.S. Rangwala and P.S. Rangwala [2012], *Engineering materials*, Charotar Publishers, Anand.

2. Dr. B.C. Punmia [2008], Building construction, Laxmi Publications (P) Ltd., New Delhi.

- 3. Dr. N. Kumara Swamy & A. KameswaraRao [2012], *Building Planning & Drawing*, Charotar Publishers, Anand.
- 4. Gurucharan Singh and Jagdish Singh [2009], *Building Planning Designing and scheduling*, Standard publishers Distributors.

Reference Books :

- 1. S.K. Duggal [2012], *Building materials*, New Age international (P) Ltd., New Delhi.
- 2. N.L. Arora and B.L. Gupta [2014], *Building construction*, Satyaprakshan publications, New Delhi.

3. S.V. Deodhar [2005], Building science and planning, Khanna Publishers, New Delhi.

- 4. Bureau of Indian Standards, National Building Code of India 2005, New Delhi.
- 5. V.K. Jain [2009], Automation Systems in smart and Green Buildings, Khanna Publications, New delhi.

6. S.C. Rangwala [2009], *Civil Engineering Drawing*, Charotar Publishing House.

Web References:

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

ENVIRONMENTAL STUDIES (ES)

III Semester : C	Common for	CE, E	EE, N	ИЕ	Scheme : 2017						
Course Code	Category	Hou	rs / W	Veek	Credits	Maxi	mum Mark	KS			
ML201	МС	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total			
		2	-	-	-	100	-	100			
Sessional Exam	Duration:					End Ex	am Duratio	on:			
Course Outcomes: At the end of the course students will be able to											
CO1: Apply the knowledge of environmental issues in his area of work. Appreciate the need											
for the conservation of natural resources for sustainable development.											
CO2: Understands the importance of ecosystem and conservation of biodiversity.											
CO3: Understands the problems due to environmental pollution with remedial measures and issues related to environment.											
CO4: Appreciate the disaster management in prevention of loss of life and property.											
CO5: Apprecia health.	ate the use o	of IT	& rela	ated t	echnology t	o conserve en	vironment a	& human			
				UNI	[T - I						
Introduction to	Environment	al stu	dies a	nd Na	tural resou	rces:					
Definition – Sco for public aware	pe – Importai ness.	nce an	d mul	tidisc	iplinary natu	are of Environn	nental studio	es – Need			
Energy Resourd Hydroelectric, so	es: Growing olar, wind and	energ l nucle	gy nee ear ene	eds no ergy r	onrenewable esources.	and renewable	e energy rea	sources –			
Water Resource on forest and tril	s: Use and ov bal people.	ver exp	oloitat	ion of	f surface and	l ground water.	Dams and i	its effects			
Forest Resources: Uses of forest – Deforestation causes and effects.											
<i>Food Resources</i> effects. Role of i	: Changes can individual in c	used b conser	y agri vatior	cultur of na	e and over g atural resour	grazing – Mode ces.	ern agricultu	re and its			
				UNI	T - II						

Concepts of Ecosystem:

Structure and function of an ecosystem – Energy flow in an ecosystem (single channel energy flow model) – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features and functions of grasslands, desert, pond and ocean ecosystems.

UNIT - III

Biodiversity and its Conservation:

Definition – Levels of biodiversity –Values of biodiversity – Consumptive, productive, social,

ethical and ecological services – Hot spots of biodiversity – Biogeographical classification of India – Endangered and endemic species of India – Threats to biodiversity – Habitat loss, poaching of wild life and man-wild life conflict – Conservation strategies – In situ and ex situ conservation.

UNIT - IV

Environmental Pollution:

Definition – Causes, effects and control measures of air, soil, water and noise pollution. *Disaster Management:* Floods – Earth quake – Cyclone and landslides. Global warming – Acid rain – Ozone layer depletion.

Waste Management : Municipal solid waste. Role of an individual in prevention of pollution.

UNIT - V

Social Issues and the Environment:

Consumerism and waste products – From unsustainable development to sustainable development – Salient features of Air Act, Water Act and Forest conservation Act – Process involved in the enforcement of environmental legislation – Role of Information Technology in environment and human health.

Text Books :

1. C.P. Kaushik and Anubha Kaushik, *Environmental Studies*, New Age International(p) Ltd., New Delhi

2. R.Rajagopalan, Environmental Studies, Oxford University press, Chennai

3. Y.Anjaneyulu, Introduction to Environmental sciences, BS Publications, Hyderabad

Reference Books :

1. Benny Joseph, Environmental Studies, Tata McGraw Hill, New Delhi.

2. Barucha Erach, Environmental studies, Universities press.

Web References:

SOFT SKILLS LAB [SS(P)]

III /IV Semest	er : Common f	or all	branc	hes			Sche	eme: 2017			
Course Code	Category	Ηοι	ırs / W	/eek	Credits	Max	imum Mar	ks			
HU204	HSMC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total			
		-	-	2	1	100	-	100			
Course Outeer	nose At the one	lofth	2 0011	o atud	onto will h	a abla ta					
CO1: Commu skills wi	inicate effecti th renewed self	vely confic	and e lence.	e stud	e their i	interpersonal	relationship	building			
CO2: Work together in teams and accomplish objectives in a cordial atmosphere.											
CO3: Face interviews, GDs and give presentations.											
CO4: Understand and develop the etiquette necessary to present themselves in a											
professi	professional setting.										
CO5: Learn the Principles of Personal effectiveness.											
			List o	of Exp	eriments						
1. Ice break	ing Activities,	Princip	oles of	Time a	and Stress	Management					
2. Art of spe	eaking -1 (Prep	ared)									
3. Art of spo	eaking -2 (Exte	mpore)								
4. Art of wr	riting - Essay / I	Picture	/ Stor	У							
5. Business	etiquette - Tele	phone	and er	nail							
6. Presentat	ion Skills - Pov	ver poi	nt mak	ting		<u></u>		1 1			
7. Group D	iscussion – Obj	ectives	s and S	kills te	ested in a (GD, types of G	D, Dos and	don'ts			
8. Group D	iscussion - Prac	tice									
9. Team wo	ork - Drama / Sk	at / Ro	ole play	/							
10. Paper / P	oster Presentati	$\frac{n}{1}$	1 •	1							
11. Problem	Solving by late	ral thir	$\frac{1 \times 100}{1 \times 100}$	uzzies							
12. Know yo	ur General Awa	arenes	s / Knc	wledg	e - Quiz						
13. Principle	s of Personal ex	cellen	ce								
Reference Boo	ke •										
1. Stephen Publisher	1. Stephen R. Covey, The Seven Habits of Highly Effective People, Pocket Books Publishers London										
2. Priyadars Books.	2. Priyadarshani Patnaik, Group Discussion and Interview Skills with VCD, Foundation Books.										
3. Sangeeta PHI Lear	Sharma & Bir ning Private Li	od M mited.	ishra,	Comm	unication	Skills for Eng	ineers and S	Scientists,			
4. Shiv Khe	era, You Can Wi	n, Ma	cMilla	n India	Publisher	rs, New Delhi					
5. Campus	Connect Por	tals ·	- TCS	5 -	https://can	npuscommune.	tcs.com; I	nfosys -			

SURVEYING LAB [SUR(P)]

III Semester :	СЕ						Sche	eme: 2017			
Course Code	Category	Hou	rs / W	'eek	Credits	Max	imum Mar	ks			
CE205	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total			
		-	-	3	1.5	50	50	100			
						End Ex	xam Durati	on: 3 Hrs			
Course Outcor	nes: At the end	d of the	e cour	se stu	idents will b	e able to					
CO1: Apply th	e knowledge, t	echniq	ues, sl	kills a	and applicab	ole tools of the	discipline to)			
engineer	ing and survey	ing acti	ivities	•							
CO2: Perform survey, taking accurate measurements, booking of field measurements,											
plotting and adjustment of traverse.											
CO3: Prepare	CO4: Calculate the Elevations and Distances of accessible and inaccessible points										
CO5: Relate th	e the Elevation	$\frac{5 \text{ and } L}{f \text{ Surve}}$	ving	to the	modern ins	truments and n	nethods				
	Totale the Mowledge of Surveying to the modern instruments and methods.										
			List	of Ex	periments						
1. Finding the area using basic surveying instruments.											
2. Solving th	ne obstacle prol	blem u	sing c	hain a	and prismati	c compass.					
3. Perform d	lifferent method	ds of le	vellin	ig and	l find the rea	duced level of g	given points				
4. Collection	n of data for co	ontour	map	of an	area and L	ongitudinal &	Cross Secti	ons of the			
given pro	ject.										
5. Practice d	lifferent method	ds of T	rigono	ometr	ical levellin	g and find the	elevations &	z distances			
of accessi	ble/inaccessible	e point	s usin	g the	odolite.						
6. Setting ou	it the simple cil	cular c	urve-	linea	r/ angular m	ethod.					
7. Setting of	lt the foundatio	n trenc	$\frac{n \text{ of } a}{n \text{ of } a}$	bull	ung/cuivert.	ng Total Station	n				
9 Data colle	etion using To	tal Stat	ion	prog	rannnes usn	lig Total Station					
10. Demonstr	ation of Advan	ced su	rvevir	o ins	truments and	d E-Survey CA	D.				
			i ve j ii	Plo1	tting						
1. Conventio	onal signs and s	ymbol	s used	in su	rveying.						
2. Plotting of	f closed travers	e and a	adjusti	ing th	e closing er	ror.					
3. Plotting of	f L.S. & C.S.										
4. Plotting of Contour map											
Reference Boo	ks :										
Web Reference	Web References:										

STRENGTH OF MATERIALS LAB [SM(P)]

III Semester :	СЕ						Sche	eme: 2017			
Course Code	Category	Hou	rs / W	'eek	Credits	Maximum Marks					
CE206	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total			
		-	-	2	1	50	50	100			
						End Ex	xam Durati	on: 3 Hrs			
Course Outcomes: The student shall be able											
CO1: Determin	ne the mechanic	cal pro	pertie	s of s	teel, brass, a	aluminum and o	other				
engineer	ing materials.		• 1		. 1 1						
CO3: Determine the hardness, compressive strength, shear strength and impact strength of											
CO3: Determine the hardness, compressive strength, shear strength and impact strength of materials											
materials.											
CO4: Develop skills to analyse and interpret the experimental data.											
List of Experiments											
1. Determination of the stress–strain characteristics of mild steel bar using universal testing											
machine											
2 (a) Deter	mination of co	mpres	sive s	treng	th of wood s	specimen					
(b) Determ	nination of dir	ect she	ear str	ength	n of circular	steel bar usin	g compress	ion testing			
mach	ine.			0			6 i i	0			
3. Determina	ation of modu	lus of	elast	icity	of given n	naterial by me	asuring det	flection in			
simply su	pported and ov	erhang	ing be	eam.	U	-	U				
4. Determina	ation of modul	us of e	lastic	ity of	rolled steel	joist by meas	uring deflec	ction using			
5 Determine	testing machine	e. 19. of mi	aidity	ofgi	von motorio	lucing torsion	tasting mag	hina			
5. Determine	ation of module	$\frac{15 \text{ OI II}}{16 \text{ of } ri}$	giuity gidity	of gi	ven materia	l using torsion	esting mach	nine.			
7 Determine	ation of tensil		nnress	or gr	and shear	strengths of a	viven mater	inic. ials using			
tensomete	er.	c, coi	npres	5170	and shear	strengths of g	,iven mater	lais using			
8. Determina	ation of hardne	ess of	given	n met	al specimen	using Brinne	ll's Hardne	ss Testing			
Machine a	and Rockwell H	Hardne	ss Tes	ting 1	Machine.	C		C C			
9. Determina	ation of impact	streng	th (Ize	od an	d Charpy) u	sing impact tes	ting machin	ie.			
10. Determina	ation of modulı	us of el	astici	ty by	conducting	flexural test on	carriage sp	ring.			
Reference Books :											
1. R.K. Rajput	[2012], Streng	th of N	1ateri	<u>als, S</u>	. Chand & C	Co. New Delhi					
2. R.K. Bansal	[2010], Streng	th of N	1ateri	als, L	axmi Public	cations, New D	elhi				
Web Reference	es:										
1.https/www.c	oursera.org										
2.www.nptel.a	c.m/courses										

FOUR YEAR B. Tech. DEGREE COURSE Scheme of Instruction and Examination (Effective from 2017–18)

IV Semester (CE)

Scheme : 2017

S.	Subject	Code	edits	S Ir per	cheme o nstructio riods/wo	of on eek	Duration of end	Sche N	eme of Examina Iaximum Marl	ation ks
INO			C	L	D/T	Р	(Hours)	End Exam	Internal Assessment	Total
Ι	Theory									
1	Strength of Materials - II	CE207	3	2	1	-	3	60	40	100
2	Concrete Technology	CE208	3	3	-	-	3	60	40	100
3	Managerial Economics & Principles of Accountancy	HU202	3	3	-	-	3	60	40	100
4	Hydraulics & Hydraulic Machinery	CE209	4	3	1	-	3	60	40	100
5	Engineering Geology	CE210	3	3	-	-	3	60	40	100
6	Mandatory Learning Course-2	ML	-	2	-	-	-	-	-	-
II	Practical									
7	Advanced Communication Skills Lab	HU203	1	-	-	2	3	50	50	100
8	Fluid Mechanics Lab	CE211	1	-	-	2	3	50	50	100
9	Engineering Geology Lab	CE212	1	-	-	2	3	50	50	100
	Total		19	16	2	6		450	350	800

STRENGTH OF MATERIALS – II (SM2)

IV Semester :	СЕ						Scheme	: 2017			
Course Code	Category	Hou	irs / V	Veek	Credits	Maxin	um Mark	S			
CE207	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total			
		2	1	-	3	40	60	100			
Sessional Exam	n Duration: 2	Hrs				End Exam	Duration	: 3 Hrs			
Course Outcomes: At the end of the course students will be able to											
Course Outcomes: At the end of the course students will be able to CO1: Analyse thin cylindrical and spherical shells subjected to pressure											
CO2: Analysis of two dimensional stress at a point and understand the concepts of theories of failure.											
CO3: Analyse the propped cantilever and fixed beams subjected to transverse loads and draw shear force and bending moment diagrams											
CO4: Analyse and ber	CO4: Analyse the continuous beams subjected to transverse loads and draw shear force and bending moment diagrams										
CO5: Analyse	structural elem	ents s	ubjec	ted to	unsymmetri	cal bending.					
CO6: Understa	CO6: Understand the concepts of shear flow and shear centre.										
UNIT - I											
Thin Cylinders	Thin Cylinders: Thin cylindrical and thin spherical shells – Wire wound thin pipes.										
<i>Thick Cylinder</i> Compound cyli	s: Thick cylind nders – Shrink	ders – fit all	- Lam owan	ie's eq ce – In	uation – De itial differer	sign of thick c ne of radii at the	ylindrical s	shells –			
				UNIT	- II						
Analysis of Pla planes – Princip	ne Stress at a l bal stresses and	P <i>oint:</i> strair	Anal ns – M	lysis o: Iohr's	f two dimens circle of stre	sional stress at	a point – P	rincipal			
<i>Elastic Theorie</i> principal strain Maximum disto	es of Failure: theory – Maxi ortion energy th	Introc imum eory -	luctio shea - App	n – M r stres licatio	aximum pri s theory – N n to shafts a	ncipal stress th Maximum strai nd thick cylind	neory – Ma n energy tl lers.	ıximum heory –			
			۱	UNIT	- III						
Indeterminate .	Structures: Intr	oduct	tion								
Propped Canti forces, slopes at	<i>lever:</i> Analysis nd deflections.	s of j	propp	ed car	ntilever bear	ms for bending	g moments	s, shear			
<i>Fixed Beams:</i> Analysis of fixed beams for bending moments, shear forces, slopes and deflections with and without sinking of supports for point loads, uniformly distributed loads, uniformly varying loads and couples.											
			۱	UNIT	- IV						
<i>Continuous Beams:</i> Clapeyron's theorem of three moments – Derivation of theorem – Application to continuous beams – Effect of sinking of supports – Shear force and bending moment diagrams.											

UNIT - V

Unsymmetrical Bending of Beams: Centroidal principal axes of bending – Moment of inertia about the principal axes – Resolution of bending moment into two components along principal axes – Determination of stresses.

Shear Centre: Shear Flow and Shear Centre for Thin walled Channel, I-sections.

Text Books :

- 1. B.C. Punmia Ashok Kumar Jain and Arun Kumar Jain (2009), SMTS- 2, *Theory of Structures*, Laxmi Publications.
- 2. R.K. Rajput [2012], Strength of Materials, S. Chand & Co., New Delhi.
- 3. R.K. Bansal [2010], Strength of Materials, Laxmi Publications, New Delhi.

Reference Books :

- 1. F.L. Singer and A.Y. Pytel [1987], Strength of Materials, Harper & Row Publications.
- 2. Bhavikatti [2009], Strength of Materials, S. Chand & Co., New Delhi.
- 3. Timoshenko & Young [1968], *Elements of Strength of Materials*, Eastern Wiley Publications.

Web References:

- 1. https/www.coursera.org
- 2. www.nptel.ac.in/courses

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

CONCRETE TECHNOLOGY (CT)

IV Semester :	CE						Schem	e:2017				
Course Code	Category	Hou	ırs / V	Neek	Credits	Maxir	num Mark	S				
CE208	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total				
		3	-	-	3	40	60	100				
Sessional Exam	Sessional Exam Duration: 2 Hrs End Exam Duration : 3 Hrs											
Course Outcomes: At the end of the course students will be able to												
CO1: Determine the properties of concrete Ingredients.												
CO2: Understand the properties of concrete both in fresh and hardened state.												
CO3: Understand the long term durability characteristics of concrete.												
CO4: Compute	and the usage of	$\frac{11010}{1}$	vial co	ncrete	<u>g mulan S</u>	to the existing	ls.					
COS. Ondersta	and the usage of	r spec		mercie	s according	g to the existing	situations.					
				UNIT	' - I							
<i>Cement & Adm</i> fineness of cem Water held in composition an Plasticizers – S <i>Aggregates:</i> Cl mechanical pro moisture conten Soundness of a Fineness modu aggregates – M	<i>Cement & Admixtures :</i> Portland cement – Chemical composition – Hydration – Setting and fineness of cement – Structure of hydrated cement – Mechanical strength of cement gel – Water held in hydrated cement paste – Heat of hydration – Influence of compound composition and properties of cement – Tests on cements – Types of admixtures – Plasticizers – Super plasticizers – Mineral admixtures. <i>Aggregates:</i> Classification of aggregates – Particle shape & texture – Bond, strength & other mechanical properties of aggregate – Specific gravity, bulk density, porosity, absorption & moisture content of aggregate – Bulking of sand – Deleterious substances in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse aggregates – Gap graded											
				UNIT	- II							
Fresh & Hard of workability penetration test	ened Concrete. – Slump test, – Effect of tim	Wor Com e and	rkabil pactio temp	ity – H on fac erature	Factors affe tor test, F e on worka	ecting workabi low test, Vee- bility – Segrega	lity – Meas -Bee test a ation and B	urement and Ball leeding.				
Water/Cement ratio – Abrams' law – Gel space ratio – Effective water in the mix – Strength in tension and compression – Factors affecting strength of concrete – Effect of age and temperature on strength of concrete – Relationship between compressive and tensile strengths – Curing of concrete – Methods – Quality of mixing water – Destructive and Non-Destructive Tests on hardened concrete												
	UNIT - III											
<i>Elasticity, Crea</i> Poisson's ratio time – Nature o	ep & Shrinkag – Creep of con f creep – Effect	e: M crete ts of c	odulu – Fac creep	s of e ctors in – Shrii	lasticity – nfluencing nkage – Ty ncks.	Dynamic mod creep – Relatic pes of shrinkag	ulus of ela on between ge.	sticity – creep &				
Duraonity 01 CC	mercie – i ypes		auses	5 01 012	UND.							

UNIT - IV

Mix Design: Statistical quality control of concrete – Various methods of mix designs -Proportioning of concrete mix by IS Method – Relation between mean and maximum strengths – Maximum size of aggregate – Grading and type of aggregate – Aggregate/Cement ratio – Mix proportions and weights per batch.

UNIT - V

Special Concretes: Ready mix concrete – Pumped concrete – Pre–Packed concrete – Polymer concrete – Bacterial concrete – Light weight aggregate concrete – Cellular concrete – Fibre reinforced concrete – Fly ash concrete – High density concrete – High performance concrete – Self compacting concrete.

Text Books :

1. A.M.Neville [2011], *Properties of Concrete*, Pearson Education, New Delhi.

2. A.M.Neville [2008], Concrete Technology, Pearson Education, New Delhi.

3. M.S.Shetty [2006], Concrete Technology, S.Chand Company Ltd.

Reference Books :

- 1. P.D. Kulkarni, R.K.Ghosh and Y.R.Phaul [2009], Text Book of Concrete Technology, New Age International.
- 2. M.L.Gambhir [2013], Concrete Technology, Tata McGraw Hill Publishers

Web References:

- 1. https/www.coursera.org
- 2. www.nptel.ac.in/courses

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

MANAGERIAL ECONOMICS AND PRINCIPLES OF ACCOUNTACY (MEPA)

	С С	CE		D			Calara		
Tv Semester :	Cotogowy				Credita	Movi	Schen		
Course Coue	Category	Ποι	ITS / W	еек	Creatis	Continuous		.8	
111/202		L	Т	Р	С	Internal	End	Total	
HU202	HSMC					Assessment	Exam		
		3	-	-	3	40	60	100	
Sessional Exan	n Duration: 2	Hrs				End Exa	m Duratio	n:3Hrs	
Course Outcor	nes: At the er	nd of t	he cou	rse st	udents will	l be able to			
CO1: Underst demand	and the nature analysis.	e and	scope	of m	anagerial e	economics and	various co	ncepts of	
CO2: Underst forecast	CO2: Understand the significance of demand elasticity and different concepts of demand forecasting.								
CO3: Understand the concepts of production and cost analysis and different market									
Structur	es and their co	ompeti	tive si	uation	18. If comital hu	daatina			
CO4: Understa	and the principal	inles i	and sic	nifice	on capital of	countancy and	preparation	of final	
accounts	and the prine.	ipies a	and sig	giintea		countaincy and	preparation	i or iiiai	
	accounts.								
				UNI	Г - I				
Introduction to	Managerial I	Econo	mics d	& Den	nand :				
Managerial Ec	onomics: Def	finitio	n – Na	ture a	nd Scope.				
<i>Demand:</i> Mean exceptions – La	ning – Types w of Diminish	of den ning N	mand - Iargina	– Der al Util	nand deter ity – Indif	rminants – Law ference curve.	v of deman	d and its	
			1	UNIT	' - II				
Elasticity of De	mand and De	mand	Forec	astin	g:				
Elasticity of De	mand : Types	– Me	asurer	nent a	nd Signifi	cance.			
Demand foreco	<i>usting:</i> Impor	tance	– Fact	ors –	Purposes –	- Methods of de	emand forec	asting.	
			J	JNIT	- III				
Theory of prod	uction & cost	analy	sis and	ł Mar	ket Struct	ures			
<i>Production Analysis:</i> Meaning - Isoquants & Isocosts - The law of diminishing marginal returns – Law of returns to scale – Internal and External economies of scale.									
<i>Cost Analysis:</i> Cost concepts – Cost output relationship for short run and long run – Break even analysis – Its importance – Limitations and Managerial uses.									
<i>Market Structu</i> – Monopoly – Monopoly – Monopetition and	<i>res:</i> Types an Monopolistic a I Monopoly.	d Fea and Ol	tures o ligopol	of diff istic -	erent mark - Price out	ket structures – put determinati	Perfect con on in case of	mpetition of perfect	

UNIT - IV

Capital and Capital Budgeting: Introduction – Significance of capital budgeting – Steps in capital budgeting – Optimum level of capital – Decision to invest under certainty-payback period method – Net discounted present value method – internal rate of return method – Sources of capital – Decision to invest under risk and uncertainty.

UNIT - V

Introduction to Financial Accountancy:

Principles of Accountancy: Introduction – Double entry system of book keeping – Journal – Ledger – Preparation of Trial balance.

Preparation of Final Accounts: Trading Account – Profit & Loss Account and Balance sheet with adjustments – Final accounts problems.

Text Books :

1. A.R. Aryasri, *Managerial Economics and Financial Analysis*, McGraw Hill Education Edition-2011.

Reference Books :

- 1. Varshiney and Maheswari, *Managerial Economics*, Sultan Chand & Co., New Delhi
- 2. Vanita Agarwal, Managerial Economics, Pearson Education
- 3. Domnick Salvatore, *Managerial Economics in a Global Economy*, 4th Edition, Thomson
- 4. S.P. Jain and K.L. Narang, *Financial Accounting*

Web References:

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

HYDRAULICS AND HYDRAULIC MECHINARY (HHM)

IV Semester :	IV Semester : CE Scheme : 2017										
Course Code	Category	Hou	rs / W	eek	Credits	Maxin	num Mar	ks			
CE209	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total			
		3	1	-	4	40	60	100			
Sessional Exam Duration: 2 Hrs End Exam Duration : 3 Hrs											
Course Outcomes: At the end of the course the students will be able to											
CO1: Determi	ne the dimensio	ons of 1	most e	econo	mical secti	ons for open ch	annel.	~			
CO2: Understand the flow characteristics of open channel with respect to types of flows.											
CO3: Analyze the characteristics of surface profiles and hydraulic jump in open channel.											
CO4: Determ	ine work done	and er	rncier	icy ai	nd evaluate	e the performan	nce of turi	ones and			
CO5. Underst	and the working	nrine	inles	oftur	hines and r	nimps					
CO6: Understa	and the concer	t of 1	init c	<u>nianti</u>	ties and s	pecific quantit	ies for pu	mps and			
turbines.				laanti		peenie quantit		inpo una			
			I	UNIT	' - I						
Basics of Flow channel flow – Velocity distrib Uniform Flow section of char velocity open c	<i>in Open Char</i> - Types of flow oution in channed in <i>Open Char</i> nuels – Rectan hannel section -	<i>mels:</i> v in cl el section <i>nnels:</i> gular, – Com	Introc hanne on. Chez trapez putati	luctio ls – (y's a zoidal on of	n – Differo Geometrica nd Mannir I, triangula uniform fl	ences between al properties of ng's formulae - ar and circular ow.	pipe flow f channel - Most ec shapes –	and open section – onomical Constant			
			U	J NIT	- II						
<i>Critical Flow:</i> Specific force – velocity of flow	Specific energed - Critical flow a in channel.	gy – (and its	Critica comp	al dej utatic	pth – Mor on – Froude	mentum in op e number – Det	en channe erminatior	l flow – 1 of mean			
Non – Uniform – Classification	n Flow in Open and characteris	e Chan stics of	<i>nels (</i> f surfa	GVF): Graduall ofiles – Int	ly varied flow - egration of var	- Dynamic ied flow ec	equation quation.			
<i>Non – Uniform</i> Hydraulic jump	n Flow in Ope – Types – Jum	e n Ch a p in re	<i>annel</i> ectang	s (RV ular c	F): Rapic channels –	lly varied flow Loss of Energy	SpecifiApplica	c force - tions.			
			U	NIT	- III						
Basics of Fluid Machinery: Impact of free jets – Force exerted by fluid jet on stationary and moving plates – Flat, inclined and curved vanes – Velocity triangles at inlet and outlet of the vane – Angular momentum equation – Evaluation of torque exerted on a wheel with curved vanes.											
Basics of Hydr turbines – Class	<i>copower:</i> Elements sification of tur	ents of bines.	hydro	pelect	ric power	plants – Heads	and effici	encies of			
			U	NIT	- IV						

Hydraulic Turbines : Pelton wheel – Main components and working principle, Expressions for work done and efficiency, Working proportions and design – Radial flow reaction

turbines – Modern Francis turbine – Work done and efficiency, Working proportions and design – Draft tube theory – Kaplan turbine – Working proportions.

Performance of Turbines: Performance under unit head – Unit quantities – Performance under specific conditions – Specific speed – Expressions for specific speed – Performance characteristic curves – Model testing of turbines – Cavitation in turbines – Selection of turbines – Governing of turbines – Runaway speed.

UNIT - V

Centrifugal Pumps: Advantages of centrifugal pumps over reciprocating pumps – Classification and types of pumps – Components and working of a centrifugal pump – Work done by the impeller– Heads and efficiencies – Net positive suction head (NPSH). Priming – Priming devices – Minimum starting speed – Multistage pumps – Pumps in series and parallel – Submersible pumps – Limiting suction head – Cavitation – Expression for specific speed – Model testing – Performance characteristics.

Reciprocating Pumps: Main components – Working of a Reciprocating Pump – Types of reciprocating pumps – Work done by single acting and double acting pumps – Coefficient of discharge, slip, percentage slip – Negative slip – Acceleration head – Indicator diagrams – Air vessels – Operating characteristics.

Text Books :

- 1. P.N. Modi & S.M. Seth [2015], *Hydraulics and Fluid Mechanics including Hydraulic Machines*, Standard Book House, New Delhi.
- 2. R.K.Bansal [2011], A text book of Fluid Mechanics and Hydraulic machinery, Laxmi Publications (P) Ltd.
- 3. K.Subramanya [2009], Flow in open channels, Tata McGraw Hill Publishing Co. Ltd, New Delhi.

Reference Books :

- 1. Jagadish Lal [1988], *Fluid Mechanics and Hydraulics with computer Applications*, Metropolitan Book Company Pvt. Ltd.
- 2. C.M. White [2011], Fluid Mechanics, McGraw Hills Publications.
- 3. Ven Te Chow [2009], Open channel Hydraulics, Tata McGraw Hill Publishing Co. Ltd, New Delhi.

Web References:

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

ENGINEERING GEOLOGY (EG)

IV Semester :	CE						Sche	me: 2017		
Course Code	Category	Hou	rs / W	/eek	Credits	Maxin	num Mai	:ks		
CE210	BSC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		3	-	-	3	40	60	100		
Sessional Exam	n Duration: 2	Hrs				End Exan	n Duratio	on: 3 Hrs		
Course Outcon	mes: At the end	$\frac{d \text{ of the}}{c}$	$\frac{1}{1}$	se stu	idents will	be able to	• ,			
CO1: Emphasi	ize the branches	s of ge	ology	in va	rious Civil	Engineering pi	rojects.	aundation		
sites and	sites and as building material.									
CO3. Obtain	CO3: Obtain knowledge on geological structures and their significance in Civil									
Engineering projects.										
CO4: Understand the mitigation & assessment of geological hazards and necessary										
precauti	ionary measures	s to saf	èguar	d Civ	il Engineer	ring structures.		-		
CO5: Assessr	CO5: Assessment, selection and improvement of competency of sites for construction of									
dams, re	eservoirs, tunne	els etc.								
					T					
					-1					
Introduction: If of geological s some Civil Eng Physical Geolo	Branches of geo urveys for vari ineering constr gy: Weathering	ious C ious C uctions g of ro	ind th ivil E s on g ocks -	eir us Ingine eolog - Sus	efulness to ering projection ical ground ceptibility	o Civil Enginee ects - Case his ds. of rocks to we	ering – Sig stories of eathering	failure of – Role of		
exogenous ager	nts like river, w	ind & o	ocean	s - Er INIT	ngineering	considerations	of weathe	ring.		
		.1 1	C · 1			. 1 11	с• .·	с · 1		
by physical pro	perties - Study	of com	of ide	rock	forming mi	inerals - Identif inerals.	fication o	f minerals		
<i>Petrology:</i> Geo Igneous, Sedim	logical classific entary & Metar	cation morphi	of roc c rocl	:ks – ks - S	Genesis, cl tudy of cor	lassification, str nmon rocks of	ructures, t each grou	extures of up.		
			U	NIT	- III					
<i>Structural Geo</i> structures like f Civil Engineeri	<i>logy:</i> Attitude folds, faults, joi ng works.	- Outer ints, ur	rop of confo	ð beds ormiti	- Study of es etc In	formation, typ nportance & sc	es, identii ope of str	fication of ructures in		
<i>Ground Water Geology:</i> Advantages of ground water - Potentiality of rocks as aquifers - Geological controls on ground water movement - Geological action and Engineering significance of ground water.										
UNIT - IV										
Geological Hazards:										
Earth Quakes. Depth of focus	: Terminology, s, Intensity, Ma	, Caus agnituc	es, C le, Pr	Classif redicti	ication, E on, Seism	arthquake wav ic belts - Shie	ves, Seisn ld areas	nograph - – Seismic		

zones of India – Civil Engineering considerations & precautions in seismic regions. Landslides: Causes, effects, preventive measures.

UNIT - V

Rock Mechanics : Definition, scope of rock mechanics.

Geophysical Prospecting: Principle, Instrumentation, Operation and Interpretation of Electrical and Seismic surveys - Core logging - Rock Quality Designation (RQD) for site selection to Civil Engineering projects.

Engineering properties of rocks - Field & laboratory tests for rocks used as foundation sites - Improvement in properties of rock mass.

Engineering classification of rock mass based on weathering of rock mass, Geomechanical parameters & C - factor

Engineering Geology of Dams - Reservoirs - Tunnels.

Text Books :

- 1. N.Chenna Kesavulu [2014], *Text book of Engineering Geology*, MacMillan India Ltd, Hyderabad.
- 2. D.Venkat Reddy [2010], *Engineering Geology for Civil Engineers*, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi

Reference Books :

- 1. Dr. Anil Kumar Mishra [2014], *Engineering Geology*, S. Chand & Company Ltd., New Delhi.
- 2. S.K.Garg [2015], A Text book of Geology, Khanna Publishers, New Delhi.
- 3. B.S. Sathyanarayana Swamy [2009], *Structural Geology*, Dhanpat Rai & Sons, New Delhi

4. Dr. B.P. Verma, *Rock Mechanics for Engineers*, Khanna Publishers, New Delhi. Web References:

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

CONSTITUTION OF INDIA (CI)

IV Semester : CE Scheme : 2017								e: 2017	
Course Code	Category	Hou	rs / W	eek	Credits	Maxim	num Mark	S	
ML201	МС	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total	
		2	-	-	2	-	-	-	
Sessional Exam	Duration:					End	Exam Du	ration :	
	A / /1	1 0 1		.1	. 1	1 11 /			
Course Outcom	es: At the en	d of the	e cour	se the	student will	be able to			
CO2: Understa	nd the formation	on and	otions	of U	bi Indian Co	nstitution.	avacutiva	Duties	
of Presid State legi	of President, Vice president, Prime Minister, Governor, Chief Minister cabinet and State legislature.								
CO3: Understa	CO3: Understand constitutional amendments of 42, 44,74,76,86 and 91. Central-State								
relations, President rule.									
CO4: Understa and then	CO4: Understand Indian social structure and languages in India. Rights of women, SC, ST and then weaker section.								
CO5: Understand the structure of Judiciary, Role and functions of Supreme Court, High									
court and Subordinate courts, Judicial review.									
				JNIT	-1				
Historical back g the Constituent A	ground – Sigr Assembly. Sa	ificanc	e of C atures	Constit – Pre	tution – Mal amble.	king of the con	stitution –	Role of	
Citizenship – Pr Principles of stat	cocedure for a te policy – Ele	amendn ections	nent o in Ind	of Cor ia.	stitution –	Fundamental r	ights – De	rivative	
			U	NIT	- II				
Union Executiv President – Prim	e: Structure of Minister –	of the U Cabinet	Union – Par	Gove liame	ernment & i nt.	ts functions –	President	– Vice-	
<i>State Executive</i> Legislature.	: Structure a	nd fund	ctions	– Go	overnor – C	hief Minister	– Cabinet	– State	
			U	NIT ·	· III				
Central – State I & 91] – Constitu	Relations, Pre itional function	sident's	s Rule – Wor	- Co king o	nstitutional of Parliamer	Amendments ntary system in	42, 44, 74 India.	, 76, 86	
			U	NIT ·	· IV				
Indian Social Structure – Languages in India – Political Parties & Pressure groups – Rights of Women – S.Cs, S.Ts & other weaker sections.									
			U	NIT	- V				
<i>Judiciary:</i> Structure functions of Sup	eture, Organis reme Court, I	ation of High Co	f Judio ourts &	ciary & Sub	 Independ ordinate Co 	ence of the Juc purts – Judicia	liciary – R l Review.	ole and	

Text Books :
1. Durga Das Basu, Introduction to the Constitution of India, Wadwa & Company
2. Macivel, Page, An Introduction Analysis Society
3. M.V. Pylee, Indian Constitution, S. Chand Publications
4. Subhash C Kashyap, Our Constitution, National Book Trust of India.
5. Dr. S.M.Rajan , Constitutional Law of India
Reference Books :
1. The Constitution of India, By the Ministry of Law and Justice, The Govt. of India.
2. C. Kashyap Subhasah, Constitutional Law of India
3. M.P.Jain, Indian Constitution Law
4. H.M Seervai, Constitutional Law of India
Web References:
1. https://www.india.gov.in/my-government/constitution-india

ADVANCED COMMUNICATION SKILLS LAB [ACS(P)]

III /IV Semeste	er : Common for	r all b	ranch	es			Schem	e:2017	
Course Code	Category	Hou	irs / W	eek	Credits	Maxim	um Marl	KS	
HU203	HSMC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total	
		-	-	2	1	100	-	100	
Course Outcor	nes: At the end	of the	course	e stud	ents will b	e able to			
CO1: Speak in	English confide	ntly, f	luently	and	effectively	<i>.</i>			
CO2: Exhibit t	eam playing and	leade	rship s	kills.					
CO3: Give Pre	esentations effect	ively.							
CO4: Compreh	nend the Verbal a	nd No	on-vert	oal te	xts.				
CO5: Prepare	Resume, Compar	ny pro	files a	nd Pr	oject prese	entations.			
CO6: Enhance	possibilities of J	ob pr	ospects	5.					
				-	• •				
– – – – – – – – – – – – – – – – – – –	1 1 1 .		ist of E	Lxper	iments				
Focus in t	he lab is more or	n fluer	ncy tha	n on	accuracy				
$\frac{1. \text{ Ice break}}{2}$	ng Activities								
2. JANI 2. Listoping	Comprohension	Dro	ation to	ata					
J. Cral Press	comprehension	- Fla		sts					
5 Presentati	on Strategies								
6 Group Di	scussion – Team	Plavi	ng Les	aders	hin Skills				
7 Debate		I luyi	iig, Let	100151	inp okins				
$\frac{7.}{8}$ PPT's – P	Principles and For	mats							
9. Information	on Transfer – Ve	rbal to	o Non-	verba	l and Vice	-Versa			
10. Resume P	reparation								
11. Company	Profiling								
12. Interview	Skills – a) Telep	honic	Interv	iew					
	b) Perso	nal In	terview	V					
13. Project Pr	resentation								
Reference Boo	ks :								
1. Commun	ication Skills, Sa	njay I	Kumar	and I	Pushp Lata	, Oxford Unive	ersity Pres	s.	
2. English L	anguage Laborat	tories	A Con	npreh	ensive Ma	nual, Nira Kon	ar, PHI.		
3. Technica	3. Technical Communication 3 E, Raman and Sharma, Oxford University Press.								
4. Personali	ty Development	and S	oft Ski	lls, B	arun k. Mi	tra, Oxford Un	iversity Pr	ess.	

FLUID MECHANICS LAB [FM(P)]

Course Code Category Hours / Week Credits Maximum Marks CE211 PCC L T P C Continuous Internal Assessment End Exam Total - - 2 1 50 50 100 End Exam Duration : 3 Hrs Course Outcomes: At the end of the course the students will be able to CO2: Measure the rate of flow in pipes using Venturimeter / Orificemeter. CO2: CO3: Measure the rate of flow through tanks using Orifice / Mouthpiece. CO3: CO4: Calculate the loss of head due to friction in a given pipe. CO5: CO5: Calculate the loss of head due to Bend / Elbow in pipe line. End List of Experiments 1 Determination of coefficient of discharge, velocity and contraction for a small orifice by Constant head method. 2 2. Determination of a rectangular notch. 4 Calibration of a triangular notch. 3. Calibration of friction factor for a given pipe. 7 Calibration of Venturimeter. 3. Calibration of Venturimeter. 8 Calibration of Venturimeter. 5	IV Semester :	CE			Scheme : 2017						
CE211 PCC L T P C Continuous Internal Assessment End Exam Total - - 2 1 50 50 100 End Exam Duration : 3 Hrs Course Outcomes: At the end of the course the students will be able to COU: Measure the rate of flow in pipes using Venturimeter / Orificemeter. CO3: Measure the rate of flow through tanks using Orifice / Mouthpiece. CO4: Calculate the loss of head due to friction in a given pipe. CO5: Calculate the loss of head due to Bend / Elbow in pipe line. List of Experiments 1. Determination of coefficient of discharge, velocity and contraction for a small orifice by Constant head method. 2. Determination of a rectangular notch. 4 4. Calibration of a triangular notch. 5 5. Losses in pipe lines due to bends and elbows (Minor losses). 6 6. Determination of Coefficient for a given pipe. 7 7. Calibration of friction factor for a given pipe. 7 7. Calibration of friction factor for a given pipe. 7 7. Calibration of Orificemeter. 8 2<	Course Code	Category	Hou	rs / W	eek	Credits	num Marl	KS			
- - 2 1 50 50 100 End Exam Duration : 3 Hrs Course Outcomes: At the end of the course the students will be able to Course Outcomes: At the end of the course the students will be able to CO1: Measure the rate of flow in pipes using Venturimeter / Orificemeter. CO2: Measure the rate of flow through tanks using Orifice / Mouthpiece. CO3: Measure the rate of flow in channels using Rectangular / Triangular Notch. CO4: Calculate the loss of head due to friction in a given pipe. CO5: Calculate the loss of head due to Bend / Elbow in pipe line. List of Experiments 1. Determination of coefficient of discharge, velocity and contraction for a small orifice by Constant head method. 2. Determination of coefficient of discharge of an external mouthpiece by Constant head method. 3. Calibration of a rectangular notch. 4. Calibration of a triangular notch. 5. Losses in pipe lines due to bends and elbows (Minor losses). 6. Determination of friction factor for a given pipe. 7. Calibration of Venturimeter. 8. Calibration of Orificemeter. 9. Determination of loss coefficient for sudden contraction and sudden expansion (Minor <th>CE211</th> <th>РСС</th> <th>L</th> <th>Т</th> <th>Р</th> <th>С</th> <th>Continuous Internal Assessment</th> <th>End Exam</th> <th>Total</th>	CE211	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
End Exam Duration : 3 Hrs Course Outcomes: At the end of the course the students will be able to CO1: Measure the rate of flow in pipes using Venturimeter / Orificemeter. CO2: Measure the rate of flow through tanks using Orifice / Mouthpiece. CO3: Measure the rate of flow in channels using Rectangular / Triangular Notch. CO4: Calculate the loss of head due to friction in a given pipe. CO5: Calculate the loss of head due to Bend / Elbow in pipe line. List of Experiments 1. Determination of coefficient of discharge, velocity and contraction for a small orifice by Constant head method. 2. Determination of coefficient of discharge of an external mouthpiece by Constant head method. 3. Calibration of a rectangular notch. 4. Calibration of a triangular notch. 5. Losses in pipe lines due to bends and elbows (Minor losses). 6. Determination of friction factor for a given pipe. 7. Calibration of Venturimeter. 8. Calibration of Orificemeter. 9. Determination of loss coefficient for sudden contraction and sudden expansion (Minor			-	-	2	1	50	50	100		
 Course Outcomes: At the end of the course the students will be able to CO1: Measure the rate of flow in pipes using Venturimeter / Orificemeter. CO2: Measure the rate of flow through tanks using Orifice / Mouthpiece. CO3: Measure the rate of flow in channels using Rectangular / Triangular Notch. CO4: Calculate the loss of head due to friction in a given pipe. CO5: Calculate the loss of head due to Bend / Elbow in pipe line. List of Experiments 1. Determination of coefficient of discharge, velocity and contraction for a small orifice by Constant head method. 2. Determination of coefficient of discharge of an external mouthpiece by Constant head method. 3. Calibration of a rectangular notch. 4. Calibration of a triangular notch. 5. Losses in pipe lines due to bends and elbows (Minor losses). 6. Determination of friction factor for a given pipe. 7. Calibration of Venturimeter. 8. Calibration of Orificemeter. 9. Determination of loss coefficient for sudden contraction and sudden expansion (Minor 							End Exar	n Duratio	n:3Hrs		
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 CO1: Measure the rate of flow in pipes using Venturimeter / Orificemeter. CO2: Measure the rate of flow through tanks using Orifice / Mouthpiece. CO3: Measure the rate of flow in channels using Rectangular / Triangular Notch. CO4: Calculate the loss of head due to friction in a given pipe. CO5: Calculate the loss of head due to Bend / Elbow in pipe line. List of Experiments 1. Determination of coefficient of discharge, velocity and contraction for a small orifice by Constant head method. 2. Determination of coefficient of discharge of an external mouthpiece by Constant head method. 3. Calibration of a rectangular notch. 4. Calibration of a triangular notch. 5. Losses in pipe lines due to bends and elbows (Minor losses). 6. Determination of friction factor for a given pipe. 7. Calibration of Orificemeter. 9. Determination of loss coefficient for sudden contraction and sudden expansion (Minor 	Course Outcon	nes: At the end	d of the	e cour	se the	e students v	will be able to				
 CO2: Measure the rate of flow through tanks using Orifice / Mouthpiece. CO3: Measure the rate of flow in channels using Rectangular / Triangular Notch. CO4: Calculate the loss of head due to friction in a given pipe. CO5: Calculate the loss of head due to Bend / Elbow in pipe line. List of Experiments 1. Determination of coefficient of discharge, velocity and contraction for a small orifice by Constant head method. 2. Determination of coefficient of discharge of an external mouthpiece by Constant head method. 3. Calibration of a rectangular notch. 4. Calibration of a triangular notch. 5. Losses in pipe lines due to bends and elbows (Minor losses). 6. Determination of friction factor for a given pipe. 7. Calibration of Orificemeter. 9. Determination of loss coefficient for sudden contraction and sudden expansion (Minor Venturimeter) 	CO1: Measure	the rate of flow	<i>w</i> in pi	pes us	ing V	^v enturimete	er / Orificemete	er.			
 CO3: Measure the rate of flow in channels using Rectangular / Triangular Notch. CO4: Calculate the loss of head due to friction in a given pipe. CO5: Calculate the loss of head due to Bend / Elbow in pipe line. List of Experiments 1. Determination of coefficient of discharge, velocity and contraction for a small orifice by Constant head method. 2. Determination of coefficient of discharge of an external mouthpiece by Constant head method. 3. Calibration of a rectangular notch. 4. Calibration of a triangular notch. 5. Losses in pipe lines due to bends and elbows (Minor losses). 6. Determination of friction factor for a given pipe. 7. Calibration of Venturimeter. 8. Calibration of Orificemeter. 9. Determination of loss coefficient for sudden contraction and sudden expansion (Minor 	CO2: Measure	the rate of flow	w throu	igh tai	nks u	sing Orific	e / Mouthpiece	•			
 CO4: Calculate the loss of head due to friction in a given pipe. CO5: Calculate the loss of head due to Bend / Elbow in pipe line. List of Experiments 1. Determination of coefficient of discharge, velocity and contraction for a small orifice by Constant head method. 2. Determination of coefficient of discharge of an external mouthpiece by Constant head method. 3. Calibration of a rectangular notch. 4. Calibration of a triangular notch. 5. Losses in pipe lines due to bends and elbows (Minor losses). 6. Determination of friction factor for a given pipe. 7. Calibration of Venturimeter. 8. Calibration of Orificemeter. 9. Determination of loss coefficient for sudden contraction and sudden expansion (Minor 	CO3: Measure	the rate of flow	w in ch	annel	s usin	ig Rectangi	ular / Triangula	r Notch.			
 CO5: Calculate the loss of head due to Bend / Elbow in pipe line. List of Experiments 1. Determination of coefficient of discharge, velocity and contraction for a small orifice by Constant head method. 2. Determination of coefficient of discharge of an external mouthpiece by Constant head method. 3. Calibration of a rectangular notch. 4. Calibration of a triangular notch. 5. Losses in pipe lines due to bends and elbows (Minor losses). 6. Determination of friction factor for a given pipe. 7. Calibration of Venturimeter. 8. Calibration of Orificemeter. 9. Determination of loss coefficient for sudden contraction and sudden expansion (Minor 	CO4: Calculate	e the loss of he	ad due	to frie	ction	in a given	pipe.				
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 by Constant head method. 2. Determination of coefficient of discharge of an external mouthpiece by Constant head method. 3. Calibration of a rectangular notch. 4. Calibration of a triangular notch. 5. Losses in pipe lines due to bends and elbows (Minor losses). 6. Determination of friction factor for a given pipe. 7. Calibration of Venturimeter. 8. Calibration of Orificemeter. 9. Determination of loss coefficient for sudden contraction and sudden expansion (Minor 	1. Determina	ation of coeffic	cient of	f discl	harge	, velocity a	and contraction	for a sma	ll orifice		
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 method. 3. Calibration of a rectangular notch. 4. Calibration of a triangular notch. 5. Losses in pipe lines due to bends and elbows (Minor losses). 6. Determination of friction factor for a given pipe. 7. Calibration of Venturimeter. 8. Calibration of Orificemeter. 9. Determination of loss coefficient for sudden contraction and sudden expansion (Minor 	2. Determina	ation of coeffic	eient of	disch	narge	of an exte	rnal mouthpiec	e by Cons	tant head		
 Calibration of a rectangular notch. Calibration of a triangular notch. Losses in pipe lines due to bends and elbows (Minor losses). Determination of friction factor for a given pipe. Calibration of Venturimeter. Calibration of Orificemeter. Determination of loss coefficient for sudden contraction and sudden expansion (Minor 	method.	C .	1 /	1							
 Calibration of a triangular notch. Losses in pipe lines due to bends and elbows (Minor losses). Determination of friction factor for a given pipe. Calibration of Venturimeter. Calibration of Orificemeter. Determination of loss coefficient for sudden contraction and sudden expansion (Minor 	3. Calibratio	on of a rectangu	ilar not	ch.							
 5. Losses in pipe lines due to bends and elbows (Minor losses). 6. Determination of friction factor for a given pipe. 7. Calibration of Venturimeter. 8. Calibration of Orificemeter. 9. Determination of loss coefficient for sudden contraction and sudden expansion (Minor 	4. Calibratio	on of a triangula	ar note	n.	- 11		1				
 6. Determination of friction factor for a given pipe. 7. Calibration of Venturimeter. 8. Calibration of Orificemeter. 9. Determination of loss coefficient for sudden contraction and sudden expansion (Minor 	5. Losses in	pipe nnes due	to benc	is and		ws (Minor	losses).				
 7. Calibration of Venturimeter. 8. Calibration of Orificemeter. 9. Determination of loss coefficient for sudden contraction and sudden expansion (Minor 	6. Determina	ation of iriction	1 factor	for a	give	n pipe.					
 Calibration of Orificemeter. Determination of loss coefficient for sudden contraction and sudden expansion (Minor 	7. Calibratio	on of Venturime	eter.								
9. Determination of loss coefficient for sudden contraction and sudden expansion (Minor	8. Calibration of Orificemeter.										
10 Varification of Domenulli's equation	10 Verificati	an of Domeoull		tion							
10. Vermeation of Bernoulli S equation.	10. vernicati	on of Bernoulli	i s equa	1110II.							

ENGINEERING GEOLOGY LAB [EG(P)]

IV Semester :	CE		Scheme : 2017									
Course Code	Category	Hours / Week			Credits	Maxin	num Marl	ks				
CE212	РСС	L	Т	Р	С	C Continuous Internal Assessment End Exam Tot						
		-	-	2	1	50	50	100				
						End Exar	n Duratio	n: 3 Hrs				
Course Outcon	nes: On comp	letion	of thi	s cour	se, the stud	lent will be able	e to					
CO1: Identify	mineral based	on ph	ysical	chara	cteristics.							
CO2: Identify rocks and understand the properties of each rock type.												
CO3: Interpret	geological ma	ps and	d their	suitat	oility to civ	il engineering v	works.					
CO4: Understa	and problems o	n stru	ctural	geolo	gy.							
CO5: Understa	and suitability of	of site	s base	d on s	tudy of geo	ological maps.						
			List o	of Exp	eriments							
1. Megascop	oic identificatio	n of r	ninera	ıls.								
2. Megascop	oic identificatio	n of c	commo	on ign	eous rocks.							
3. Megascop	oic identificatio	n of c	commo	on sed	imentary ro	ocks.						
4. Megascopic identification of common metamorphic rocks.												
5. Structural geology problems.												
6. Study and	interpretation	of geo	ologic	al map	os.							

FOUR YEAR B. Tech. DEGREE COURSE Scheme of Instruction and Examination (Effective from 2017–18)

V Semester (CE)

Scheme : 2017

S.	Subject	Code	Credits	Scheme of Instruction periods/week			Duration of end	Scheme of Examination Maximum Marks		
140				L	D/T	Р	(Hours)	End Exam	Internal Assessment	Total
Ι	Theory									
1	Analysis of Structures	CE301	3	2	1	-	3	60	40	100
2	Environmental Engineering	CE302	3	2	1	-	3	60	40	100
3	Reinforced Concrete Design & Drawing	CE303	4	3	1	-	3	60	40	100
4	Water Resources Engineering-I	CE304	3	2	1	-	3	60	40	100
5	Transportation Engineering	CE305	3	2	1	-	3	60	40	100
6	Open Elective- I		3	2	1	-	3	60	40	100
II	Practical									
7	Hydraulics & Hydraulic Machinery Lab	CE306	1	-	-	2	3	50	50	100
8	Concrete Technology Lab	CE307	1	-	-	2	3	50	50	100
9	Computer Aided Civil Engg. Drawing Lab	CE308	1.5	-	-	3	3	50	50	100
	Total		22.5	13	6	7		510	390	900

ANALYSIS OF STRUCTURES (AS)

V Semester: CE							Sche	eme: 2017		
Course Code	Category	Hou	rs/We	ek	Credits	Ma	ximum M	larks		
CE301	РСС	L	T	Р	С	Continuous Internal Assessment	End Exam	Total		
	(*)) T	2	1	-	3		60			
Sessional Exam D	uration: 2 F	$\frac{1}{1}$		actud	onto will be	End Exa	m Duratio	on: 3 Hrs		
Course Outcomes	effects of m	oving	loads	on sim	nly support	ted beams and	truccae by	influence		
line diagran	ns.	oving	10405		ipiy suppoi	fied beams and	uusses by	mnuchee		
CO2: Analyse determinate beams and trusses by strain energy theorems.										
CO3: Analyse indeterminate beams and trusses by strain energy theorems.										
CO4 : Analyse continuous beams and portal frames by slope deflection method.										
CO5 : Analyse cont	CO5 : Analyse continuous beams and portal frames by Moment distribution method.									
UNIT-I										
<i>Moving Loads</i> : Maximum shear force and bending moment for loads on simply supported beams – Curves for maximum bending moment and shear force for single point load, two point loads, UDL longer than span, UDL shorter than span and several point loads. <i>Influence Lines:</i> Influence lines for reaction, bending moment and shear force in simply supported beams – Influence line diagram for the forces in members of simple trusses										
			۱	UNIT-	- II					
<i>Strain Energy Th</i> bending, torsion, S determinate beams	<i>eorems (De</i> Strain energy , pin jointed	<i>termi</i> y due trusse	<i>nate s</i> to im es.	<i>tructu</i> pact le	res): Strai oading- Ca	n energy in te astigliano's the	ension, cor corem – A	npression, nalysis of		
			τ	J NIT –	· III					
<i>Strain Energy Th</i> beams and trusses strain energy – Bet	up to two c ti's law and	<i>deteri</i> legree Maxw	<i>minate</i> e of ind vell's r	e struc determ recipro	<i>etures):</i> Aninacy by Cal theorem	nalysis of stat Castigliano's th n.	ically indeneorem of	eterminate minimum		
			J	U NIT -	- IV					
<i>Slope Deflection M</i> spans (with and with frames with and	<i>ethod:</i> Slope thout sinkin hout sway.	e defle g of s	ection e support	equations) – A	n – Applica Analysis of	ation to continue single bay and	bus beams single sto	up to three prey portal		
	UNIT– V									
<i>Moment Distribution Method:</i> Stiffness and carry over factors – Distribution factors – Analysis of continuous beams up to three spans (with and without sinking of supports) – Effect of yielding of supports – Analysis of single bay and single storey portal frames with and without sway.										
Text Books:										
1. B.C. Punmia, A.H	K Jain & A.K	Jain	[2014],	, SMTS	–2, Theory	of Structures, I	.axmi Publ	ications.		
2. C.S.Reddy [2011], Basic Structural Analysis, Tata McGraw Hill.

3. C.K.Wang, Indeterminate Structural Analysis, Standard Publication House.

4. L.S.NEGI, R.S.JANGID, Structural Analysis, Tata McGraw Hill.

Reference Books:

1. Timoshenko & Young, Theory of Structures, Tata McGraw Hill

2. Wilbur and Norri's , *Elementary Structural Analysis*, Tata McGraw Hill.

3. Vazirani & Ratwani [2013], Analysis of Structures-Vol.II, Khanna Publishers.

4. Ramamrutham [2012], *Theory of Structures*, Dhapat Rai Publications

Question paper pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

Question Paper Contains Six Questions. Question 1 contains 5 short Answer questions each of 2 marks. (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e., there will be two questions from each unit and the student should answer any one question.

ENVIRONMENTAL ENGINEERING (EE)

V Semester : C	СЕ —						Sch	eme : 2017		
Course Code	Category	Hou	irs / V	Veek	Credits	Max	imum Mar	·ks		
CE 302	РСС	L	Τ	Р	С	Continuous Internal Assessment	End Exam	Total		
		2	1	-	3	40	60	100		
Sessional Exan	n Duration: 2	Hrs				End Ex	am Durat	ion: 3 Hrs		
0	A (1	1 6 4			1 4 111	11 /				
Course Outcor	nes: At the end	1 01 tr	ne cou	Irse stu	idents will b	e able to	ion			
CO2: Evaluate	various source	s of v	vater	in term	uture project	v and quality	IOII			
CO3: Analyze	and design uni	t oper	ation	of wat	er treatment	y and quanty.				
CO4: Distribut	CO4: Distribute the treated water to public including pipe network.									
CO5: Understand the different aspects of Air & Noise pollution.										
				UN	[T - I					
<i>Introduction:</i> Need for protected water supply – Objectives of water supply systems- Water borne diseases and their control.										
<i>Quantity of Water:</i> Design period – Population forecast – Rate of consumption for various purposes – Fluctuations in demand – Factors governing the rate of demand – Fire demand.										
				UNI	T - II					
<i>Quality of Wate</i> characteristics a	er : Sampling – and their signifi	- Rout	tine w e – Sta	vater an andarda	halysis for p s for drinkin	hysical, chemic g water	cal and bac	teriological		
Sources of Wat	ter Supply: Cla tion galleries ar	ussific nd we	ation lls- cl	 Suit noice of 	ability of so f source	ources with refe	erence to q	uantity and		
<i>Collection and</i> – Types of con Laying and test	<i>Conveyance oj</i> duits – Hydrau ing of pipes.	f Wate lic de	<i>er:</i> In esign	take st of pres	ructures – L ssure pipes -	ake, canal, rive – Materials for	er and reser pipes – Pi	rvoir intake ipe joints –		
				UNI	Г - III					
<i>Treatment of Water:</i> Layout and general outline of water treatment units – Principles and design of plain sedimentation and coagulation tanks –Working and design of slow sand filters, rapid sand filters and pressure filters – Different methods of disinfections – Chlorination practices – Breakpoint chlorination – Aeration – Softening – Defluoridation – Iron and Manganese removal.										
	UNIT - IV									
<i>Distribution System:</i> Water supply systems – Layouts of distribution system – Analysis of water distribution system using Hardy Cross method – Mass curve application to calculate the storage capacity of the distribution reservoir –Different types of valves and fire hydrants										

UNIT - V

Air Pollution: Types of pollutants, their sources and impacts - Air pollution meteorology - Air pollution control - Air quality standards and limits.

Noise Pollution: Impacts of noise - Permissible limits of noise pollution - Measurement of noise and control of noise pollution.

Text Books :

- 1. Santosh Kumar Garg (2010), Environmental Engineering Vol.1, Khanna Publications.
- 2. S.K.Hussain (2017), Water supply and sanitary Engineering, Oxford & IBH.
- 3. C.S. Rao (2006), *Environmental Pollution Control Engineering*, New Age International publishers.

Reference Books :

- 1. H.W.Peavy (2013), D.G. Rowe and George Tchobanoglaus, *Environmental Engineering*, Tata McGraw Hill.
- 2. E.W. Steel (1991), Water supply and Sewerage, Tata McGraw Hill.
- 3. Sawyer and McCarthy (2003), *Chemistry for Environmental engineering*, Tata McGraw Hill.
- 4. CPHEEO, Ministry of Urban Development (1996), *Manual on water supply and Treatment*, New Delhi.
- 5. Mark J. Hammer & Mark J. Hammer Jr. (2012), *Water and Waste Water Technology*, John Wiley Publications.

Web References:

- 1. https/www.coursera.org
- 2. www.nptel.ac.in/courses

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

Question paper contains Six questions. Question 1 contains 5 short Answer questions each of 2 marks (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions i.e. there will be two questions from each unit and the student should answer any one question.

REINFORCED CONCRETE DESIGN AND DRAWING (RCDD)

V Semester : CI	E						Schem	e: 2017			
Course Code	Category	Hou	ırs / W	eek	Credits	Maxi	mum Mark	S			
CE303	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total			
		3	1	-	4	40	60	100			
Sessional Exam	Duration: 2	Hrs				End Exa	m Duration	i : 3 Hrs			
Course Outcom	es: At the end	d of the	e cours	e stud	ents will be	able to					
CO1: Understar	nd the concept	ts of li	mit sta	te met	hod for rein	forced concrete	elements.				
CO2: Design sin	mply supporte	ed and	contin	uous b	eams with c	letailing.	·	1. : 1:4			
CO3: Design or	ie-way, 1wo-	-way a	nd con	ntrico	is slabs alon	g with limit sta	te of service	eability.			
CO4: Design ax	CO5: Design isolated footings										
besign isolated rootings.											
				UNIT	' - I						
- 2000 - Basic safety factors - reinforcement - mild steel bars. reinforced rectar section.	- 2000 - Basic concepts - Assumptions in limit state design - Characteristic values - Partial safety factors - Stress block - Reinforcement and its significance characteristics - Types of reinforcement - Permissible stresses - Stress-strain curves for cold worked deformed bars and mild steel bars. Limit state of collapse - Ultimate flexural strength - Analysis of singly reinforced rectangular beam - Concept of under reinforced, over reinforced and balanced section.										
				UNIT	- II						
Analysis and D flanged), cantiley	esign of Bea ver and contin	ums: A nuous t	Analyze beams.	e and	Design of	simply suppor	ted (rectang	ular and			
Shear, Torsion a anchorage and de	and Bond: Linevelopment le	mit sta ength, l	te desi I.S. coc	gn of s le prov	section for size visions.	hear and torsion	n – Concept	of bond,			
			I	UNIT	- III						
Design of Slabs:	Design one v	way, tw	vo way	and c	ontinuous sl	abs.					
<i>Limit State of Serviceability:</i> Limit state design of serviceability for deflection, cracking as per codal provisions.											
			۱	UNIT	- IV						
<i>Design of Colur</i> Uniaxial momen	<i>mns</i> : Design t – Biaxial mo	of col oment.	umns	– Axi	ally loaded	& eccentricall	y loaded co	olumns –			
				UNIT	- V						
Design of Footin	ngs: Types of	footin	gs – D	esign o	of isolated s	quare and recta	ngular footi	ngs.			

Note: Following plates should be prepared by the students

- 1. Reinforcement detailing of Rectangular and Flanged beams.
- 2. Reinforcement detailing of one way and two way slabs.
- 3. Reinforcement detailing of continuous beams and continuous slabs.
- 4. Reinforcement detailing of columns and footings.

Text Books :

- 1. N. Krishna Raju and R. N. Pranesh [2009], *Reinforced Concrete Design IS:456–2000 Principles and Practice*, New Age International (P).Limited.
- 2. Neelam Sharma, Reinforced Cement Concrete Design, S.K. Kataria& Sons, New Delhi.

Reference Books :

- 1. Dr. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain [2007], *Limit state design of Reinforced Concrete (As per IS 456:2000)*, Laxmi Publications (P)Ltd.
- 2. M.L. Gambhir [2006], *Fundamentals of Reinforced concrete design*, Printice Hall of India Private Ltd., New Delhi.
- 3. N. Subramayanan, Design of Reinforced Concrete Structures, Oxford Publications.

Web References:

Question Paper Pattern:

Sessional Exam:

The Sessional examination paper should consist of Part A and Part B. Part A consists of *Two* questions in Design and Drawing out of which one question is to be answered. Part B should consist of *Three* questions on design out of which *Two* are to be answered. Weightage for Part – A is 40% and for Part-B is 60%.

End Exam:

The end examination paper should consist of Part A and Part B. Part A consists of *Two* questions in Design and Drawing out of which one question is to be answered. Part B should consist of *Five* questions on design out of which three are to be answered. Weightage for Part – A is 40% and for Part-B is 60%.

WATER RESOURCES ENGINEERING – I (WER1)

V Semester : C	E							Scheme: 2017			
Course Code	Category	Ho	urs/W	'eek	Credit	Ma	ximum M	arks			
CE304	РСС	L	T	Р	C	Continuous Internal Assessment	s End Total t (0 100				
Sectional Even	Durations	2	I	-	3	40	00 d Even Di	100			
Sessional Exan	Duration:	2 Hrs				En	d Exam D	uration: 3 Hrs			
Course Outcomes At the end of the course students will be able to											
Course Outcomes: At the end of the course students will be able to											
CO1: Understand the meteorology parameters and weather seasons											
CO2: Estimate	CO2 : Estimate and measure precipitation, Evaporation and stream flow										
hydrogra	nh Unit hyd	rogram	n pau sh		u estima		y apprying	the concept of			
CO4 · Understa	and the proce	ss of i	rrioati	on and	l water re	auirement of c	rons				
CO5 : Understand the occurrence and distribution of ground water											
				UN	IT–I						
<i>Hydrology:</i> Sco applications. <i>Hydrometeorola</i> seasons in India <i>Precipitation:</i> I interpretation o precipitation – I	 Hydrology: Scope and definition – Hydrologic cycle – Water-budget equation - Practical applications. Hydrometeorology: Formation of precipitation – Types and forms of precipitation – Weather – seasons in India – Meteorological observations. Precipitation: Measurement – Recording and non recording type of rain gauges – Analysis and interpretation of rain fall data – Mass curve of rain fall – Hyetograph –Average depth of 										
							- <u>Buages</u> .				
Abstractions fi affecting – Es Evapotranspirat	rom Precipi timation and ion.	tation	Eva Eva Exection	aporati nent –	on and - Reduct	evapotranspira ion of evapor	tion: Proc ation – T	ess – Factors Transpiration –			
Infuration. De	minuon– rac	1015 a	necun	g– m		quations and n		easurement.			
<i>Stream flow:</i> Discharge measurement – Area velocity method – Moving boat method – Stage – discharge relations.											
UNIT– III											
Runoff: Compo	onents – Facto	ors aff	fecting	– Rai	n fall – R	unoff relations	nips – Flow	v mass curve.			
<i>Hydrograph Analysis:</i> Features of hydrograph – Separation of base flow – Unit hydrograph (UH theory – Derivation – UH from complex storms – UH for various durations) – S–Curve hydrograph – Use and application of Unit Hydrograph.											

UNIT-IV

Irrigation: Definition of irrigation – Necessity – Scope – Benefits – Ill-effects – Types

Methods of Irrigation: Surface irrigation - Subsurface irrigation - Sprinkler irrigation - Drip irrigation.

Well Irrigation: Types of wells – Selection of suitable site for tube well – Yield of wells – Pumping test and recovery test – Well losses – Merits and demerits of well irrigation.

Water Requirements of Crops: Functions of irrigation water – Depth and frequency of irrigation – Definitions - Duty, Delta, Base period and their relation — Factors affecting duty – Methods of improving duty – Consumptive use of water – Irrigation efficiencies – Crop rotation.

UNIT-V

Groundwater: Occurrence of groundwater – Aquifer, aquiclude, aquifuge and aquitard – Types of aquifers – Specific yield, retention – Velocity of ground water – Movement of ground water – Darcy's law – Permeability, transmissibility, storage coefficient – Thiem's equilibrium formula – Dupuit's formula – unsteady radial flow.

Text Books :

- 1. P. Jaya Rami Reddy, A Text book of Hydrology (3rd Edition, 2011), Laxmi Publications, New Delhi.
- 2. K.Subramanya [2013], *Engineering Hydrology*, Tata Mc Graw Hill Publishing Co. Ltd, New Delhi.
- 3. Dr. B.C. Punmia & B.B. Lal [2012], *Irrigation and Water power Engineering*, Laxmi Publications (P) Ltd.
- 4. Dr. P.N. Modi [2014], Irrigation and water Resources Engineering, Standard Book House.

Reference Books :

- 1. Linsley, Kohler and Phaulus [1982], *Hydrology for Engineers*, Tata Mc Graw Hill Publishing Co. Ltd, New Delhi.
- 2. Vijay Singh [1991], Engineering Hydrology, John Wiley & Sons, Ltd.

Web References:

- 1. https/www.coursera.org
- 2. www.nptel.ac.in/courses

Question Paper Pattern :

Sessional Exam:

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End Exam:

Question paper contains Six questions. Question 1 contains 5 short answer questions each of 2 marks (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions i.e. there will be two questions from each unit and the student should answer any one question.

TRANSPORTATION ENGINEERING (TE)

V Semester : C	E						Sche	me: 2017		
Course Code	Category	Hou	ırs / W	/eek	Credits	Max	imum Marl	ks		
CE305	PCC	L	T	Р	С	Continuous Internal Assessment	End Exam	Total		
		2	1	-	3	40	60	100		
Sessional Exan	n Duration:	2 Hrs				End Ex	xam Durati	on: 3 Hrs		
Course Outeer	At the or	d of t		na atu	donto will he	abla ta				
Course Outcom	nd the impor	tance	of tran	sporta	tion classifi	e able to	wave and o	onduct the		
	required for h	iohwa	v aligr	isporta	tion, classin	ication of high	ways and G	Juduct the		
CO2: Understa	and the eleme	nts of	highwa	av geo	metric desig	'n				
CO3: Understa	CO3: Understand and apply the principles of Traffic Engineering									
CO4: Understa	and the variou	s traff	ic cont	rol de	vices along v	with the design	of signals			
CO5: Analyze	and design th	ne flex	ible an	d rigid	pavements	as per IRC spe	cifications			
				UN	[T - I					
Highway Development and Planning: Importance of transportation – History of Planned Highway Development in India- Twenty Year Road development plans - Classification of roads – Road patterns Highway Alignment: Highway alignment – Basic requirements – Controlling factors – Engineering surveys for highway logation – Boints considered in a new highway project										
	, ,	5		UNI	T - II		, <u>, , , , , , , , , , , , , , , , , , </u>			
<i>Geometric Des</i> design – Cross Design of super Intersections – R	<i>ign of Stree</i> sectional elem elevation – Rotary intersec	<i>ts and</i> nents - Transi ction –	<i>High</i> - Sight tion cu Grade	ways: distar irve - separa	Introduction ices — Hori Extra widen ted intersecti	n – Parameters zontal alignme ing on curves ons (interchang	controlling nt – Super e - Vertical al ges).	geometric elevation – lignment –		
				UNI	Г - III					
<i>Traffic Engineering:</i> Introduction – Basic parameters of traffic - Speed, flow and density –their interrelationship – Traffic studies – Traffic volume counts - Speed studies-Presentation of volume and speed data, Statistical and graphical methods – Parking parameters and parking studies – Accident studies.										
				UNI	Γ - IV					
<i>Traffic Control</i> road signs and th Webster method	and Manage neir design spo – Onstreet an	ement: ecifica d Off-	· Introd tions- I street p	luction Road n parking	– Traffic co narkings –Ch systems.	ntrol devices – annelization - 7	Signs; Class Fraffic signa	ification of l design by		
				UNI	T - V					
<i>Flexible Pavem</i> Flexible paveme	<i>Flexible Pavement Design:</i> Pavement types – Components and their functions – Design factors – Flexible pavement design – IRC method based on CBR only.									

Rigid Pavement Design: Calculation of stresses – Design of joints, dowel bars, tie bars – Design of thickness of rigid pavement by IRC method.

Text Books :

1. C.E.G.Justo and S.K. Khanna, Highway Engineering, Nemchand & Bros, Roorkee

2. G.V. Rao, Principles of Transportation and Highway Engineering, Tata McGrew Hill

3. L.R.kadiyali [2011], *Traffic Engineering and Transportation Planning*, Khanna Purblishers **Reference Books :**

1. Jotin Khisty [2003], Introduction to Transportation Engineering, Prentice Hall Publications.

2. L.R. Kadiyali [2011], Principles of Highway Engineering, Khanna Publications.

3. S.K. Sharma [2012], *Principles, Practice and design of Highway Engineering*, Prentice Hall Publications, New Delhi.

Web References:

1. https/www.coursera.org

2. www.nptel.ac.in/courses

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

Question paper contains Six questions. Question 1 contains 5 short Answer questions each of 2 marks (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions i.e. there will be two questions from each unit and the student should answer any one question.

HYDRAULICS & HYDRAULIC MACHINERY LAB [HHM(P)]

V Semester : C	E						Sche	me: 2017		
Course Code	Category	Hou	rs / W	eek	Credits	Maximum Marks				
CE 306	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		-	-	2	1	50	50	100		
						End Ex	am Durati	on: 3 Hrs		
Course Outcor	nes: At the end	of the	cours	se stu	dents will be	e able to				
CO1: Determin	ne the force exe	erted by	y jet o	of wat	er on fixed y	vane.				
CO2: Determin	ne the open cha	nnel ro	oughn	ess.						
CO3: Determin	ne the performation	ance of	hydra	aulic	turbines.					
CO4: Determin	ne the efficienc	y of Co	entrifu	ıgal/F	Reciprocatin	g pump.				
CO5: Establish the characteristic curves of pumps										
CO6: Determin	ne the specific	speed of	of the	pump	DS					
			List	of Ex	periments					
1. Impact of je	t on vanes.		. •	<u> </u>						
2. Performance	e test on single	stage o	centril	ugal	pump.					
3. Performance	e test on multi	stage c	entriti	ugai p	oump.					
4. Performance	e test on subme	rsible	pump	(Mari	able aread)					
5. Performance	e test on centri	ugai p	ump.	(vari	able speed).					
6. Performance	e test on recipio	Jeanny	, pum	p.						
7. Open channel	e and specific s	nood ta	act on	Dolto	n whool					
9. Performance	e and specific s	peeu u	est on	Fran	cis turbino					
9. Performance and specific speed test on Francis turbine.										
Demonstration										
1. Performance	e and specific s	peed to	est on	Kapl	an turbine.					
2. Study of hy	draulic jump.	1		ľ						
	5 1									

CONCRETE TECHNOLOGY LAB [CT(P)]

V Semester : C	E						Sche	eme: 2017			
Course Code	Category	Hou	rs / W	eek	Credits	Max	imum Marl	ks			
CE307	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total			
		-	-	2	1	50	50	100			
	•		•	•		End Ex	am Durati	on: 3 Hrs			
Course Outcor	mes: On comp	letion of	of this	cour	se, the stude	nt will be able	to				
CO1. Determin	ne the propertie	s of ce	ment	as pe	r IS specific	ations.					
CO2: Determin	ne the propertie	es of ag	ggrega	tes as	s per IS spec	ifications.					
CO3: Determin	ne the propertie	es of fr	esh co	oncret	e as per IS s	pecifications.					
CO4: Determin	ne the propertie	es of ha	ardene	ed cor	ncrete as per	IS specificatio	ns.				
CO5: Determin	ne the strength	of con	crete 1	using	Rebound ha	mmer method.					
			List	of Ex	periments						
1.a) Finenes	1. a) Fineness of cement by dry-sieving method & Blair's air permeability apparatus										
b) Specific	e gravity of cen	nent									
2. a) Standard	d consistency o	f ceme	nt pas	ste							
b) Soundn	ess of cement (By Lee	chatel	ier m	ethod)						
3. Initial a	nd final setting	of cer	nent								
4. Compre	ssive strength o	of ceme	ent								
5. a) Grain si	ze distribution	of fine	aggre	egate							
b) Specific	c gravity of fine	aggre	gate								
6. a) Grain si	ze distribution	of coar	se ag	grega	te						
b) Specific	c gravity of coa	rse agg	gregat	e							
7. Bulking	g of sand		1 1		.1 1						
8. a) Workab	ility of fresh co	oncrete	by slu	ump c	cone method	(1 1					
b) Workab	b) Workability of fresh concrete by compaction factor method										
9. a) Compre	ssive strength o	of conc	rete								
b) Split ter	isite strength o		ele								
10 Domono	s of rupture of	und too	t hom	more	nd concrete	aora auttar					
10. Demons		ind tes	i nam	mer a		core cutter.					

COMPUTER AIDED CIVIL ENGINEERING DRAWING LAB [CACED(P)]

V Semester : C	E				Scheme : 2017					
Course Code	Category	Hou	rs / W	eek	Credits	Max	imum Mar	ks		
CE308	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		-	-	3	1.5	50	50	100		
						End Ex	xam Durati	on: 3 Hrs		
Course Outcon	mes: At the end	of the	cours	se stu	dents will be	e able to				
CO1: Develop	Parametric desi	ign and	the c	conve	ntions of for	mal civil engin	neering draw	vings.		
CO2: Understan	nd the use and a	pplicat	ion of	Auto	-cad comma	nds				
CO3: Draw a li	ne diagram of O	office, I	Health	centr	e and Librar	y Buildings.				
CO4: Draw the	Plan and Sectio	nal vie	ws of	reside	ential and Inc	dustrial building	gs			
CO5: Draw det	ailing of reinfor	cement	in str	uctura	al elements					
<i>Introduction:</i> I drawings to sho	<i>Introduction:</i> Introduction to concept of drawings - Interpretation of typical drawings - Planning drawings to show information concisely and comprehensively - Optimal layout of drawings and Saclas - Introduction to concept of drawings - Coordinate systems - Reference									
Scales - Introd	luction to com	puter	aided	draw	ving - Coor	dinate systems	s - Referen	ce planes.		
Commands: Ini	tial settings - D	rawing	g aids	- Dra	wing basic	entities - Modi	fy command	ds - Layers		
- Text and Dimensioning - Blocks. Drawing presentation norms and standards.										
Building Draw drawing and do residential build	<i>ing:</i> Terms - E etailed drawing lings - Foundat	Elemen g. Site ion pla	ts of plan, in - Us	plann floo se of [ing building r plan, elev Notes to imj	g drawing - Mo ation and sect prove clarity.	ethods of m ion drawing	naking line g of small		
<i>Pictorial View</i> : Fundamentals of	Principles of is of Building Info	sometri rmatio	ics an n Mo	d pers delins	spective drav g (BIM).	wing - Perspect	tive view of	building -		
			List	of Ex	periments					
1 Line d	is another of a ffice	. h								
1. Line d	agram of boolt	e Dulla	ing.	1 T : hr	0.001					
2. Lille u	and Windows		er and	I LIUI	al y.					
3. Doors	lation of area of	faloso	d trou	oreo						
h) Quanti	ty of earth wor	l Cluse le in ev	cavati	tist.	nd cutting of	a road in two	level section	n		
5 Plan of	section and elex	vation 4	of regi	ion al denti	al building	a ioau iii two				
5. 1 I I I I I, S	section and elev	vation of	$\frac{1}{100}$	o-Sto	ried building.	σ				
7 Plan α	section and elev	vation	$\frac{1}{2}$	ltistor	ied building	5. (Framed Strue	rture)			
$\frac{7.11}{8}$ Draw	the Reinforcer	ent de	tailing	t of ty	mical clab	eam column a	and spread f	ooting		
0. Didw	Industrial build	inge	North	5 01 13 light	roof structu	$r_{\rm res} = T_{\rm russes}$	inu spitau I	ooung.		
10 Darson	neusural bulle	me / true	i voi ui	rev b	ildinge	100 - 1100000				
			0 5101		munigs.					

Reference Books :

- 1. Dr. N. Kumara Swamy & A. KameswaraRao [2012], *Building Planning & Drawing*, Charotar Publishers, Anand.
- 2. Gurucharan Singh and Jagdish Singh [2009], *Building Planning Designing and scheduling*, Standard Publishers Distributors.
- 3. Muneer Hamad, *AutoCAD Beginning And Intermediate*, (Mercury Learning and Information LLC) Stylus Publishing.
- 4. George Omura, Mastering AutoCAD and AutoCAD LT, Wiley India Pvt. Ltd, Delhi.

FOUR YEAR B. Tech. DEGREE COURSE

Scheme of Instruction and Examination

(Effective from 2017–18)

	VI Semester (CE)	,		Sc	heme : 2017					
S.	Subject	Code	edits	Scheme of Instruction periods/week			Duration of end	Scheme of Examination Maximum Marks		
INO			C	L	D/T	Р	(Hours)	End Exam	Internal Assessment	Total
Ι	Theory									
1	Steel Structures Design & Drawing	CE309	3	2	1	-	3	60	40	100
2	Water Resources Engineering-II	CE310	3	2	1	-	3	60	40	100
3	Soil Mechanics	CE311	3	2	1	-	3	60	40	100
4	Professional Elective-I		3	2	1	-	3	60	40	100
5	Professional Elective-II		3	2	1	-	3	60	40	100
6	Open Elective- II		3	2	1	-	3	60	40	100
II	Practical									
7	Environmental Engg. Lab	CE312	1	-	-	2	3	50	50	100
8	Transportation Engg. Lab	CE313	1	-	-	2	3	50	50	100
9	Geographical Information Systems Lab	CE314	1	-	-	2	3	50	50	100
10	Industrial Training & CAA		-	-	-	-	-	-	-	-
	Total		21	12	6	6		510	390	900

STEEL STRUCTURES DESIGN & DRAWING (SSDD)

VI Semester :	CE						Sche	me: 2017			
Course Code	Category	Hou	ırs / W	eek	Credits	Maxi	imum Marl	KS			
CE309	PCC	L	T	Р	С	Continuous Internal Assessment	End Exam	Total			
		$\frac{2}{1}$	1	-	3	40	<u>60</u>	<u>100</u>			
Sessional Exan	n Duration: 2	2 Hrs				End Ex	am Duratio	$\mathbf{on}: 3$ Hrs			
Course Outcor	nes: At the er	nd of t	he cour	rse stu	dents will be	e able to					
CO1: Design	CO1: Design welded and bolted connections.										
CO2: Design	tension memb	pers.									
CO3: Design	compression	membe	ers.								
CO4: Design laterally restrained and unrestrained beams.											
CO5: Design slab and gusset bases for columns.											
				TINI	T _ I						
	TI I G I I			UNI	1-1						
Introduction to	Limit State I	Method	d:								
 Welded Joints: Introduction – Advantages and disadvantages of welding – Strength of welds – Welded connections with butt and fillet welds. Bolted Connections: Introduction – Behaviour of bolted joints – Design strength of ordinary black bolts – Design strength of high strength friction grip bolts – Simple connections – Lap and butt joints. 											
				UNI	T - II						
Tension Memb Design of Tensi	ers: Types o on member-I	f secti Lug an	ons – gles.	Net et	ffective sect	ion for angles	and tees in	tension –			
				UNI	Г - III						
Compression M end conditions -	<i>lembers:</i> Sin – Design of b	nple an uilt up	nd bui colum	lt up c ins wit	compression h battens an	members – A d laces.	ssumptions	regarding			
				UNI	Γ - IV						
Beams: Allowable stresses – Design requirements as per IS Code – Design of beams with restrained and unrestrained compression flanges – Built up sections.											
UNIT - V											
Column Bases	: Design of S	lab and	d Guss	eted b	ases for Colu	umns.					
Note: The stud	ents should p	repare	the fol	llowin	g plates:						
Plate 1 -	Detailing of	simple	beams	s and c	compound be	eams					
Plate 2 -	Detailing of	Colun	nn incl	uding	lacing						
				0	-						

Plate 3 - Detailing of Column including battens

Plate 4 - Detailing of Column bases - Slab base

Plate 5 - Detailing of Column bases – Gusseted base

Text Books :

- 1. S.K.Duggal [2014], *Limit State Design of Steel Structures*, Tata McGraw Hill, New Delhi.
- 2. Prof. Dr.V.L. Shah, Prof. Veena Gore [2012], *Limit State Design of Steel Structures (IS:* 800-2007), Structures Publications.
- 3. K.S. Sai Ram [2015], Design of Steel Structures, Pearson India Education Services Pvt. Ltd.
- 4. M.R. Sheyekar, *Limit State Design in Structural Steel (IS:800-2007)*, PHI Learning Private Limited, New Delhi.
- 5. N. Subramanian, Design of Steel Structures(as per IS:800-2007), Oxford Higher Education.

Reference Books :

- 1. S.S. Bhavikatti, *Design and Drawing of Steel Structures (as per IS:800-2007)*, I.K. International Publishing House Pvt. Ltd., New Delhi.
- 2. M.L. Ghambhir, *Fundamentals of Structural Steel Design (as per IS:800-2007)*, Mc Graw Hill Education, New Delhi.
- 3. L.S. Negi, *Design of Steel Structures (as per IS:800-2007),* Mc Graw Hill Education, New Delhi.
- 4. S. Kanthimathinathan, *Limit State Design of Steel Structures as per IS: 800-2007*, I.K. International Publishing House Pvt. Ltd., New Delhi.
- 5. Dr. Ramachandra & Virendra Gehlot, *Limit State Design of Steel Structures Vol.1*, Scientific Publishers (India), Jodhpur

Web References:

1. www.nptel.ac.in/courses

Question Paper Pattern:

Sessional Exam:

The Sessional examination paper should consist of Part A and Part B. Part A consists of *Two* questions in Design and Drawing out of which one question is to be answered. Part B should consist of *Three* questions on design out of which *Two* are to be answered. Weightage for Part – A is 40% and for Part- B is 60%.

End Exam:

The end examination paper should consist of Part A and Part B. Part A consists of *Two* questions in Design and Drawing out of which one question is to be answered. Part B should consist of *Five* questions on design out of which three are to be answered. Weightage for Part – A is 40% and Part- B is 60%.

WATER RESOURCES ENGINEERING - II (WRE2)

VI Semester : CE							Sc	heme: 2017			
Course Code	Category	Hou	rs/We	ek	Credit	Maximum M	arks				
CE310	РСС	L	T	Р	C	Continuous Internal Assessment	End Exam	Total			
Sagional Evan D		<u> </u>	I	-	3	40 End I		100			
Sessional Exam D	uration: 2 f	Irs				End F	Lxam Dura	tion: 3 Hrs			
Course Outcomes	• At the end	of the	course	stude	ents will b	e able to					
CO1 : Understand	CO1 : Understand the design of canals using silt theories										
CO2 : Determine t	he storage c	apacity	v of res	servoii	and viel	d from the rese	rvoir				
CO3 : Analyze the stability of gravity dam											
CO4 : Understand the seepage pattern and suggest the suitable seepage control measures for											
earth dam	10	1		00		1 0					
CO5: Understand	the concept	s of C	ross D	rainag	e works a	and Canal Regu	lation worl	KS			
				UNIT	' - I						
Canal Irrigation and Silt Theories: Canals – Classification – Alignment of canals - Channel design - Kennedy's theory –Silt supporting capacity – Drawbacks – Lacey's regime theory – Comparison of Lacey's and Kennedy's theories – Longitudinal section of canal – Balancing depth - Water logging – Canal Lining – Types of lining– Advantages of canal lining. UNIT– II Reservoir Planning: Introduction – Investigations for reservoir planning – Selection of site – Zones of storage – Storage capacity and yield – Sedimentation of reservoirs – Control of sedimentation – Types of flood control reservoirs – Determination of yield – Fixation of storage capacity – Relation between capacity and yield – Density currents – Trap efficiency – Capacity – Inflow ratio – Useful life of a reservoir. Dams – General: Classification – Factors governing selection of type of dam – Selection of site for a dam.											
			l	JNIT-	- 111						
<i>Gravity Dams</i> : Forces acting – Modes of failure – Stability requirements – Principal and shear stresses – Stability analysis – Elementary and practical profiles – Limiting height – Galleries – Keys, joints and water seals – Control of cracking in concrete dams.											
UNIT-IV											
<i>Earth and Rockfill Dams:</i> Types of earth dams – Causes of failures – Criteria for safe design – Earth dam section – Downstream drainage system – Seepage analysis – Stability analysis – Stability of earth dam slopes against critical conditions – Stability against shear – Slope protection – Seepage control measures – Rockfill dams – Compaction.											

Spillways: Introduction – Types of spillways – Profile and discharge equation of Ogee spillway

– Dynamic force on spillway – Energy dissipation below spillways – Indian Standards on criteria for design of hydraulic jump type stilling basins – Horizontal and sloping aprons – Crest gates.

UNIT-V

Diversion Head works: Introduction – Components – Weir – Causes of failures of weirs – Remedies – Design of impervious floor – Bligh's creep theory – Lane's weighted creep theory – Khosla's theory – Location of head works.

Cross Drainage Works: Types – Selection of suitable type – Classification – Features of design of cross drainage works – Aqueducts – Syphon aqueduct.

Canal Regulation Works: Canal Outlets: Types of outlets – Definitions – Canal Fall – Necessity and location – Classification – Head regulator and cross regulator.

Text Books :

1. Dr. B.C. Punmia & B.B. Lal [2012], *Irrigation and Water power Engineering*, Laxmi Publications (P) Ltd

2. Dr. P.N. Modi [2014], *Irrigation and water Resources Engineering*, Standard Book House **Reference Books :**

1. K.B. Khushalani & M. Khushalani [1984], Irrigation Practice and Design, Oxford & IBH. Web References:

- 1. https/www.coursera.org
- 2. www.nptel.ac.in/courses

Question Paper Pattern :

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

Question paper contains Six questions. Question 1 contains 5 short answer questions each of 2 marks (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions i.e. there will be two questions from each unit and the student should answer any one question.

SOIL MECHANICS (SMECH)

VI Semester:	CE						Sc	heme: 2017		
Course Code	Category	Ho	ours/W	'eek	Credits	Max	imum Ma	nrks		
CE311	РСС	L 2	T	Р	C	Continuous Internal Assessment	End Exam	Total		
Sessional Exa	m Duration · 2	- Hrs	1	-	5	End	Exam Dui	ration · 3 Hrs		
		1115				Liiu				
Course Outco	mes: At the end	d of tl	ne cour	se, the	e student w	ill be able to				
CO1 : Unders	tand the import	tance	of func	ctional	l relationsh	ips related to so	oil			
CO2 : Determ	ine the index pr	ropert	ies of s	soils fo	or its classi	fication.				
CO3 : Determine the permeability and seepage of soils for fluid flow characteristics analysis										
CO4: Estimate the vertical stresses in soils due to self weight, point and distributed loads										
required for settlement calculation.										
CO5 : Underst	and the importation	ance a	and mo	difica	tion of soil	properties by c	ompactior	1		
CO6 : Comput	CO6 : Compute the consolidation characteristics and settlement of soils.									
UNIT– I										
Basic Definitions and Functional Relations: Introduction - Soil as a 3-phase system – Basic definitions – Volumetric relationships – Water content – Volume-mass relationships – Volume-weight relationships – Specific gravity – Functional relations in terms of volume and weight.										
				UNI	T– II					
<i>Physical Prope</i> Relative Densit soils – Consist Different Indice	rties of Soils: y - Grain size ency limits – 1 es – Use of con	Deter analy Deter	mination ysis by mination ncy lim	on of sieve on of its.	specific gr e and hydro liquid limi	avity, water co ometer – Grad t, plastic limit	ntent, in–s ation char and shrin	situ density – acteristics of kage limit –		
<i>Soil Classificat</i> classification sy	tion: Particle structure s	ize cl Stand	assifica ard cla	ation ssifica	– AASHT(ation system	O classification n – Plasticity cl	system – nart.	Unified soil		
				UNI	Γ– III					
Geostatic Strest capillary action	sses: Total, neu	utral a	and eff	ective	stress in s	oil deposits – S	Soil depos	its subject to		
Stresses Due to Applied Loads: Boussinesq's theory – Vertical stress due to concentrated load, line load, strip load, uniformly loaded circular and rectangular areas – Isobar diagram – Newmark's influence chart – Westergaard's theory – Comparison of Boussinesq's and Westergaard's theories – Approximate methods – Contact pressure beneath foundations.										

UNIT-IV

Permeability: Darcy's law – Factors affecting permeability – Laboratory methods for determination of permeability – Permeability of stratified soil deposits.

Seepage: Seepage pressure – Quick sand condition – Characteristics and uses of flow net.

UNIT– V

Compaction: Theory of compaction – Optimum moisture content – Standard Proctor test – Modified Proctor test – Compaction of sands – Factors affecting compaction – Effect of compaction on soil properties.

Consolidation: Mechanism of consolidation – Pressure–void ratio curve – Consolidation settlement – Terzaghi's theory of one–dimensional consolidation – Laboratory consolidation test – Coefficient of consolidation – Time fitting methods – Normally and over–consolidated soils.

Text Books :

1. K.R. Arora [2008], *Soil Mechanics and Foundation Engineering*, Standard Publishers Distributors.

2. Gopal Ranjan and A.S.R.Rao [2000], *Basic and Applied Soil Mechanics*, New Age International Publishers

Reference Books :

1. P.Purushothama Raj [2013], Soil Mechanics and Foundation Engineering, Pearson Publishers.

2. C. Venkataramaiah [2009], *Geotechnical Engineering*, New Age International.

3. B.C. Punmia, A.K.Jain [2005], Soil Mechancis and Foundations, Lakshmi Publications.

4. A.V. Narasimha Rao and C. Venkataramaiah [2000], *Numerical Problems, Examples and Objective Questions in Geotechnical Engineering*, University Press.

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

Question paper contains Six questions. Question 1 contains 5 short Answer questions each of 2 marks (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question.

ENVIRONMENTAL ENGINEERING LAB [EE(P)]

VI Semester :	CE						Sche	me: 2017			
Course Code	Category	Hou	rs / W	'eek	Credits	Max	imum Marl	ks			
CE312	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total			
		-	-	2	1	50	50	100			
						End Ex	am Durati	on: 3 Hrs			
Course Outcor	mes: At the end	of the	cours	se stu	dents will be	e able to					
CO1: Perform	common envir	onmer	ntal ex	kperii	nents relation	ng to water an	d wastewat	er quality,			
and know	w which tests a	re appi	opriat	te for	given envir	onmental probl	ems.				
CO2: Statistica	ally analyze and and and use the	1 interr	and w	borat	orial results.	ng procedures	and sample				
preserva	tions	water	and w	asiev	vater sampli	ing procedures a	and sample				
CO4: Demonst	trate the ability	to wri	te clea	ar tec	hnical labora	atorial reports					
CO5: Able to r	maintain safety	standa	rds in	the l	aboratory.						
	List of Experiments										
1 Determinatio	List of Experiments										
2 Determinatio	on of Various fo	rms of	Aciu	linitv							
2. Determinatio	n of Hardnass	11115 01	7 IIKu	minty	•						
3. Determinatio											
4. Determinatio	on of Chlorides.										
5. Determinatio	on of Sulphates.										
6. Determinatio	n of Dissolved	Oxyge	en.								
7. Determinatio	on of various for	rms of	solids	5.							
8. Determinatio	n of pH, Turbio	lity an	d Elec	trical	l Conductivi	ty.					
9. Determinatio	n of Optimum	Coagu	lant D	ose.							
10. Determinati	on of Residual	Chlori	ne.								
			De	emon	stration						
11. Determinati	on of Biochem	ical O	xygen	Den	nand (BOD)						
12. Determinati	on of Chemica	l Oxyg	gen D	eman	d (COD)						

TRANSPORTATION ENGINEERING LAB [TE(P)]

VI Semester :	CE						Sche	eme: 2017	
Course Code	Category	Hou	rs / W	'eek	Credits	Max	imum Mar	ks	
CE313	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total	
		-	-	2	1	50	50	100	
Course Outcomes: The student shall be able to C01: Determine the properties of aggregates and bitumen C02: Determine the Marshall stability and flow value of bitumen mix C03: Determine and report the traffic volume and speeds of vehicles of a given stretch C04: Develop skills to analyze and interpret the experimental data. List of Experiments Tests on Aggregate									
 Determination of strength of the aggregate by crushing test using compression testing machine 2 a) Determination of toughness value of aggregate by impact test 									
b) Determina	2. a) Determination of toughness value of aggregate by impact testb) Determination of water absorption value of aggregate by using water absorption test								
3. Determinati and length	on of flakiness gauge	index	and el	longa	tion index b	y shape test usi	ing thicknes	s gauge	
Tests on Bitum	ien								
4. a) Determina b) Determina	tion of grade or tion of strippin	f bitum g value	en by of ag	gene ggreg	etration test u ate by using	using penetrom stripping value	eter e test		
5. a) Determina b) Determina	tion of ductile tion of softenin	value c ig valu	of bitu e of tl	men ne bit	using ductili umen using	ty testing mach ring and ball te	nine est		
Field Studies									
6. Determination	on of traffic vol	ume o	n sele	cted s	stretch				
7. Determination	on of instantane	eous sp	eed o	f vehi	cles on sele	cted stretch			
Demonstration	1								
8. Determination	on of hardness	propert	ty of a	iggreg	gate using L	os Angeles Abi	rasion Test		
9. Determination	on of Stability a	and flo	w valı	ue of	bitumen mix	x using Marsha	ll Stability '	Гest	
10. Determinat	ion of extractio	n of bi	tumei	n fror	n bitumen m	nix using bitum	en extractio	n Test.	
Reference Boo1. Khanna, S.H5th Edition2. Kadiyali, L.	ks : X., Justo, C.E.C , Nem Chand a R. Traffic Eng	and And Bro nd Bro	A. Veo os, Roo ig and	eraraș orkee l Trai	gavan Highy , India, 2009 1sport Plann	vay Materials a 9. ing, Khanna P	and Paveme	nt Testing, Jew Delhi,	

India, 1997.
3. IRC codes; IS Codes; ASTM Codes
Web References:
1. https/www.coursera.org
2. www.nptel.ac.in/courses

GEOGRAPHICAL INFORMATION SYSTEMS LAB [GIS(P)]

VI Semester : CE							Sche	eme: 2017	
Course Code	Category	Hou	rs / W	eek	Credits	Max	imum Mar	ks	
CE314	PCC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total	
		-	-	2	1	50	50	100	
						End Ex	xam Durati	on: 3 Hrs	
		0.1							
Course Outcon	nes: At the end	of the	cours	se stu	dents will be	e able to			
CO2: Digitize point polyline and polygon features									
CO3: Manage the attribute data									
CO4: Build a model and perform spatial analysis using clip, buffer, overlay and selection tools									
CO5: Prepare high quality maps									
Introduction: Investigation of geographic information systems (GIS) including theory and applications areas. A major portion of the course will be based on use of a current widely-used GIS computer software system. Aspects of geographic data entry and editing, spatial analysis, and map development and display will be considered. List of Experiments 1. Georeferencing a Toposheet									
2. Digitization	on of a Toposh Man Registrati	eet							
4. a) Adding b) Join an	; X,Y data d Relate								
5. Attribute	data manageme	ent							
6. Usage of a	analysis tools t	o perfo	orm ve	ector (data analysis	5			
7. Spatial an	alysis								
8. Model Bu	ilder								
9. Raster pro	ocessing (Mosa	ic and	clip)						
10. Map Layo	out								
Reference Bool1. Kang Tsung2. Anji ReddyPublications	ks: Chang, <i>Introd</i> , <i>Textbook of</i> Hyderabad	uction Remo	to Ge ote Se	ograj ensing	phic Informa g and Geog	ation Systems, I graphical Info	McGraw Hi rmation Sy	ll, India stems, BS	

FOUR YEAR B. Tech. DEGREE COURSE

Scheme of Instruction and Examination

	VII Semester (CE)	,		Scl	heme : 2017					
S.	Subject	Code	edits	S Li pe	Scheme Instruct riods/w	of ion veek	Duration of end	Scheme of Examination Maximum Marks		
INO			C	L	D/T	Р	(Hours)	End Exam	Internal Assessment	Total
Ι	Theory									
1	Construction Project Planning & Systems	CE401	3	2	1	-	3	60	40	100
2	Estimation, Costing & Valuation	CE402	3	2	1	-	3	60	40	100
3	Professional Elective-III		3	2	1	-	3	60	40	100
4	Professional Elective-IV		3	2	1	-	3	60	40	100
5	Open Elective- III		3	2	1	-	3	60	40	100
6	Open Elective- IV		3	2	1	-	3	60	40	100
II	Practical									
7	Geotechnical Engg. Lab	CE403	1	-	-	2	3	50	50	100
8	Structural Analysis and Design Lab	CE404	1	-	-	2	3	50	50	100
9	Mini Project	CE405	2	_	-	4	_	50	50	100

(Effective from 2017–18)

CONSTRUCTION PROJECT PLANNING & SYSTEMS (CPPS)

VII Semester:	СЕ						S	cheme: 2017			
Course Code	Category	Hou	rs/We	ek	Credits	Ma	ximum M	arks			
CE401	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total			
~		2	1	-	3	40	60	100			
Sessional Exam	Duration: 2	Hrs				End	Exam Du	ration: 3 Hrs			
Course Outcomers On completion of this course, the student will be able to											
Consecution of the methods of planning scheduling and principles of construction											
CUI: Understand the methods of planning, scheduling and principles of construction											
CO2: Formul	ate solve CPI	<u>и & F</u>	PERT r	networ	ks						
CO3: Underst	tand the struct			organ	ization & 1	acource allocat	ion				
CO3. Underst		dure		organ	ization of ton	dens southe sta					
CO4: Unders	tand the proce	aure o		imenta		ders, contracts	& time-co	st analysis.			
CO5: Underst	tand basics of	engin	eering	econo	omic and so	olving of cash f	low proble	ms			
CO6: Underst	tand the conce	epts of	f qualit	y cont	rol and saf	ety managemen	nt.				
UNIT– I											
Construction A Construction A Scheduling – A – Bar charts – I	anagement – 7 Planning an Advantages an Milestone cha	fypes Gypes d Scl d clas rts.	<i>anag</i> – Reso <i>hedulii</i> sificat	ement ources ng: O ion of	Significa – Stages – bjectives schedules	Team of const of planning – – Methods of	ruction uni Stages o planning a	functions of it. f planning – nd scheduling			
				UN	IT– II						
<i>Network Techr</i> – Breakdown s Network – Nur	<i>viques in Con</i> structures – F nbering of net	s <i>truci</i> Repres work	tion m entation – Deve	<i>anage</i> on and elopm	<i>ment:</i> Eler l specifyin ent of netw	nents of networ g of activities ork – Types of	rk – Netwo and event networks.	ork techniques s – Rules for			
Program Eval critical path – N	<i>uation and l</i> Network analy	Reviev sis an	v <i>Tecl</i> d com	<i>hnique</i> putatio	e (PERT): on problem	Introduction s.	, time est	imates, slack,			
				UN	IT– III						
<i>Critical Path</i> estimates – Flo	<i>Method</i> (<i>CP</i>) at – Critical p	M): In ath – 1	ntrodu Netwo	ction rk ana	 Differen lysis and c 	ce between Cl omputation pro	PM and P blems.	ERT – Time			
<i>Cost-Time Analysis in Net Work Planning:</i> Importance of time – Project cost analysis in network planning – Updating – Resources allocation.											
				UN	IT–IV						
Tenders and C Contracts defin	Contracts: Ty ition – Essent	pe of ials –	tender Types	rs – P – Doc	rinciples o cuments – (f tendering – I Conditions of c	Notice invition invition invition in the second sec	iting tender –			

Arbitration: Definition – Arbitrator – Arbitration agreement – Qualification of arbitrator – Advantages of arbitration.

Organisation and System of Accounts of P.W.D.: Principles of organization – Types of organization – Organisation of construction firm – Organisation of Engineering department – Classification of works – Methods of carrying of works – Measurement book.

UNIT-V

Engineering Economics: Basic Principles – Equivalence – Cash Flow diagram – Single Payment present worth factor – Uniform series present worth factor- Capital recovery factor-uniform series compound amount factor.

Construction Safety, Inspection and Quality Control: Importance of safety – Safety Measures – Personal Protection Equipments – Need for inspection at construction work – Principles of inspection – Importance of quality – Elements of quality – Organisation for quality control.

Text Books :

- 1. Dr. B.C. Punmia & K.K. Kandelwal [2014], *Project Planning & Control with PERT & CPM*, Laxmi Publications (P) Ltd, New Delhi.
- 2. J.L. Sharma [2010], *Construction Management and Accounts*, Satya Prakasan (P), New Delhi.
- 3. S. Parameswari, S. Ramachandran, & R. Devaraju, *Engineering Economics*, Air Walk Publications, Chennai.

Reference Books :

- 1. Dr. U.K. Shrivastava [2010], *Construction planning and Management*, Galgotia (P), New Delhi.
- 2. S. Seetha Raman [2009], *Construction Engineering and Management*, Umesh (P), New Delhi.
- 3. Chitkara [2008], *Construction project management Planning, Scheduling and Control*, Tata McGraw Hill (P), Noida (UP).
- 4. Halpin, D.W [1985], *Financial and Cost Concepts for Construction Management*, John Wiley and Sons, New York.

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

Question paper contains Six questions. Question 1 contains 5 short Answer questions each of 2 marks (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions. i.e. there will be two questions from each unit and the student should answer any one question.

ESTIMATION, COSTING AND VALUATION (ECV)

VII Semester:	СЕ						Sc	cheme: 2017	
Course Code	Category	Hours/Week			Credits	Max	imum Ma	arks	
CE402	РСС	L 2	T	Р	C	Continuous Internal Assessment	End Exam	Total	
Sessional Eva	m Duration · ?	4 Hrs	I	-	5	Fnd	UU Fyam Duu	ration: 3 Hrs	
Sessional Exa		1115				Enu			
Course Outco	mes : At the en	d of t	he cou	rse stu	dents will	be able to			
CO1: Discuss	the concept of	detail	ed esti	imatio	n and other	approximate n	nethods.		
CO2: Determi	ne quantities c	of iten	ns of v	works	required for	or construction	of buildin	ngs, culverts,	
roads and canals.									
CO3: Prepare the specifications for Civil Engineering works and analyse the rates of various items of works.									
CO4: Prepare bar bending schedules and estimates the quantity of steel required for beams, lintel cum sunshade and one way slab.									
CO5: Estimat	tes the value of	a pro	perty.						
UNIT– I									
<i>Introduction:</i> Purpose of estimation – Rules and methods of measurement of works – Units of measurements for various items of works. Types of estimates – Preliminary estimate – Plinth area estimate – Cube rate estimate – Detailed estimate – Revised estimate – Supplementary and revised estimate – Annual repair or maintenance estimate – Contingencies – L.S. Item.									
				UNI	1-11				
Specification v building – Plai C.M – White w Second class bu	writing for the join cement concount of the join cement concount of the second	<i>follow</i> crete– ur was	r ing ite R.C.C shing –	e ms of 2. – Br - Paint	works: Ea rick masom ing to steel	rth work excav ry – Stone mas and iron work	ation in fo sonry – Pl – First cla	undation of a astering with ass building –	
<i>Reinforcement</i> Example problem	t Estimation: ems on beams,	Reinf lintel	orcem cum s	ent – unshac	Bar bendi le and one	ing and bar reway slab.	equirement	t schedule –	
				UNI	Γ– III				
Analysis of Ra schedule of rat mortar (1:4) – Columns in 1:1 CM (1:6) – Flo iron and wood	<i>ates</i> : Definition res - Preparatio Cement concre 1 ¹ / ₂ :3 – Brick w poring – Plaster work .	n – P n of I te (1:4 vork u ring –	urpose Rates f 4:8) – 1 sing fi Painti	of ra for the Reinfo rst clas ng – V	tes – Facto Following orced cements ss bricks in White wash	ors affecting ra Items of Worl nt concrete: Lin a CM (1:6) – S ing and colour	ate analysi k for Build ntels – Sla tone maso washing –	s – Standard ding: Cement bs – Beams – nry: C.R.S in - Painting for	

Valuation: Definition and purpose of valuation – Different kinds of Properties for which valuation is required – Different methods of valuation – Cost of land – Factors affecting the

value of plot – Factors affecting the value of building – Rent Fixation – Mortgage – Depreciation – Valuation of residential building.

UNIT-V

Earth work Computations: Earth work computations in banking and cutting for roads and canals.

Preparation of Detailed Estimates for Items of Construction: Simple residential buildings – R.C.C. Slab culvert and box culvert – Septic tank and soak pit.

Text Books :

- 1. B.N. Dutta [2012], *Text book of Estimating and Costing in Civil Engineering*, UBS Publishers, New Delhi.
- 2. M. Chakraborthy, *Estimating, Costing, Specifications and valuation in Civil Engineering,* Khanna Publications.
- 3. V.V.Vazirani and S.P.Chandola, *Estimating & Costing in Civil Engineering*, Khanna publishers, New Delhi.

Reference Books :

- 1. Agarwal, Kumar, Chaudary, *Civil Estimating, Costing, and Valuation in Civil Engineering*, DhanpatRai Publications.
- 2. G.S.Biridie, *Estimation and costing*, Dhanpat Rai Publications.
- 3. Mahajan, *Text book of Estimating and costing*, UBS Publications.

4. Bureau of Indian Standards, National Building Code of India, New Delhi.

A.P. Dept, Standard Specifications and Standard schedule of rates – Public Work Department
 Rangwala, *Estimation and costing*, UBS Publications.

Question Paper Pattern:

Sessional Exam:

Internal Assessment: The question paper shall consist of *FOUR* questions. First *THREE* questions shall be from the syllabus of unit I to IV with 25% of the marks for each question. The student shall answer any *TWO* questions. *FOURTH* question is a compulsory question with 50% of the marks from the syllabus of unit V.

End Exam:

The question paper shall consist of *SIX* questions. First *FIVE* questions shall be from the syllabus of the units I to IV with at least *ONE* question from each unit with 12 marks for each question. The student shall answer any *THREE* questions. *SIXTH* question is a compulsory question for 24 marks from the syllabus of unit V.

GEOTECHNICAL ENGINEERING LABORATORY [GTE(P)]

VII Semester :	СЕ						Sche	eme: 2017	
Course Code	Category	Hou	rs / W	eek	Credits	Max	imum Marl	ks	
CE403	РСС	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total	
		-	-	2	1	50	50	100	
						End Ex	kam Durati	on: 3 Hrs	
Course Outcor	mes: On compl	etion o	f this	cours	e the studer	nt will be able t	<u>.</u>		
CO1: Determine	ine the index pr	opertie	$\frac{1}{2}$ s of s	oils	e, the studen		.0		
CO2: Classify the soil for engineering applications									
CO3: Determine the permeability and shear parameters of the soils									
CO4: Estimate the compaction characteristics and CBR of soils									
CO6: Analyse the data for real time applications									
Coo. Analyse the data for real time applications.									
List of Experiments									
1.(a) Grain size	distribution by	sieve	analy	sis					
(b) Specific g	ravity by densit	y bott	le						
2. Liquid lin	nit and plastic li	imit							
3. (a) Shrinkage	e limit								
(b) Different	ial free swell in	dex							
4. Permeabi	lity by constant	t head	metho	od					
5. Permeabi	ility by falling h	nead m	ethod						
6. Field den	sity by core cut	ter me	thod a	and sa	and replacen	nent method			
7. Shear para	ameters by dire	ct shea	r test						
8. Unconfine	ed compressive	streng	th						
9. OMC and	MDD using I.S	S. light	com	pactio	n				
10. C.B.R. va	lue								
			D	emon	stration				
1. Grain size	e distribution by	hydro	meter	r anal	ysis				
2. Shear para	ameters by tri-a	xial co	mpre	ssion	test				
3. Consolida	tion properties	by con	nsolida	ation	test				

STRUCTURAL ANALYSIS AND DESIGN LAB [STAAD(P)]

VII Semester : C	CE						Schen	ne: 2017	
Course Code	Category	Hou	rs / W	'eek	Credits	Max	imum Marks		
		_	_	_		Continuous			
CE404	PCC	L	Т	Р	С	Internal	End Exam	Total	
				2	1	Assessment	50	100	
		-	-	4	1	End Exam	Juration • 3	Hrs	
Course Outcome	•s• At the end	of the	cours	er sti	idents will	be able to			
CO1: Understand basic commands used in STAAD Pro and their applications									
CO2: Analyse the structure for various loading conditions									
CO3: Analyse and design 1-D and 2-D structures for various loading conditions									
CO4: Analyse and design space structures for various loading conditions									
CO5: Analyse g	CO5: Analyse gantry girder subjected to moving loads								
CO6: Analyse a	and design inc	lustrial	struc	tures					
		Lis	t of E	xperi	iments				
1. Introductio	n to STAAD	Pro an	d basi	ic cor	nmands of	STAAD Pro.			
2. Analysis of	f simply supp	orted a	nd fix	ked be	eams subje	cted to member	forces		
3. Analysis ar	nd design of c	ontinu	ous b	eam s	subjected to	o member force	S		
4. Analysis of	f plane truss s	ubject	ed to o	differ	ent types o	f forces			
5. Analysis at	nd design of r	olane fr	ame s	subied	cted to mer	nber and joint l	oads		
6 Analysis a	nd design of s	nace fi	ame s	subie	cted to gray	vity forces			
7 Analysis a	nd design of a	pace n		mbia	atad to win	d foreas			
7. Analysis al		pace n	anne s	subje		u loices			
8. Analysis of	t beam subjec	ted to	movir	ng loa	lds				
9. Analysis of	f gantry girde	r subje	cted t	o mo	ving loads				
10. Analysis an	nd design of a	ın indu	strial	struc	ture				

FOUR YEAR B. Tech. DEGREE COURSE

Scheme of Instruction and	Examination
(Effective from 2017	-18)

	VIII Semester (CE)	(,		Sche	me : 2017		
S. No	Subject	Code	edits	S Ir per	cheme struct riods/w	of ion veek	Duration of end	Scheme of Examination Maximum Marks			
INO			C	L	D/T	Р	(Hours)	End Exam	Internal Assessment	Total	
Ι	Theory										
1	Professional Elective-V		3	2	1	-	3	60	40	100	
2	Professional Elective-VI		3	2	1	-	3	60	40	100	
Π	Practical										
3	Project Work	CE406	6	-	-	12		50	50	100	
	Total		12	4	2	12		170	130	300	
	(OR)										
Ι	Internship		6	-	-	-		-	100	100	
II	Project Work	CE406	6	-	-	12		50	50	100	
	Total		12	-	-	12		50	150	200	

<u>PROFESSIONAL ELECTIVE – I (in VI Sem.)</u>

- 1. PRESTRESSED CONCRETE
- 2. URBAN HYDROLOGY AND HYDRAULICS
- 3. ECOLOGICAL ENGINEERING
- 4. ENGINEERING MATERIALS FOR SUSTAINABILITY

PRESTRESSED CONCRETE (PSC)

VIII Semester	: CE						Sche	eme: 2017		
Course Code	Category	Hou	irs / W	eek	Credits	Max	imum Mar	ks		
CE315	PEC	L 2	T	Р	C	Continuous Internal Assessment	End Exam	Total		
Sessional Exan	n Duration: (2 Hrs	I	-	5	End Ex	sam Durati	$\frac{100}{00}$ on : 3 Hrs		
								on : 0 111 5		
Course Outcomes: At the end of the course students will be able to										
CO1: Understa	and the princi	ples ar	nd syste	ems of	pre-stressin	lg.				
CO2: Determin	ne the losses i	in pre-	tensior	ned and	d post-tensic	oned members.				
CO3: Analyse the prestressed concrete beams with straight, concentric and eccentric tendons.										
CO4: Design p	prestressed co	ncrete	memb	ers for	flexure and	shear.				
CO5: Determin	CO5: Determine the short term and long term deflections in prestressed concrete beams.									
UNIT - I										
<i>Introduction:</i> Historical development – General principles of prestressing – Pretensioning and post tensioning – Advantages and limitations of prestressed concrete – Characteristics of concrete and steel.										
<i>Methods and S</i> prestressing – H	ystems of Pre Ioyer system,	es tress Magn	i ng: Pi el syste	re tens em, Fr	ioning and p eyssinet sys	oost tensioning tem and Giffor	methods – S d – Udall sy	Systems of /stem.		
				UNI	T - II					
Losses of Press instantaneous an	tress: Losses	of pro ndent l	estress osses.	in pre	e tensioned	and post tension	oned memb	ers due to		
				UNI	Г - III					
Analysis of Sec concentric, ecce	ctions for Fle	e xure: id para	Elasti bolic t	c analy endons	ysis of conc s – Kern lin	rete beams pre nes – Cable pro	stressed wit	h straight,		
				UNI	Γ - IV					
Design of Secti and I-sections f	fons for Flexa for flexure.	ure: D	esign (criteria	a as per I.S.	Code – Design	of simple r	ectangular		
Design of Secti	ons for Shea	r: Shea	ar and j	princip	oal stresses -	- Design for sh	ear.			
				UNI	T - V					
Deflections of A deflections of u	Deflections of Prestressed Concrete Beams: Importance of control of deflections – Short term deflections of uncracked members – Prediction of long term deflections.									
Text Books :										
1. N. Krishna Company Li	Raju, <i>Prest</i> mited.	tressea	Cond	crete,	Sixth Editi	on, Tata Mc	Graw–Hill	publishing		

2. Praveen Nagarajan [2013], *Prestressed Concrete*, Pearson Education, Inc, New Delhi. **Reference Books :**

1. E. G. Nawy, *Prestressed Concrete: A fundamental approach*, Prentice Hall. **Reference Codes:**

IS 1343-2012, Code of Practice for Prestressed Concrete, BIS, New Delhi.

IS 456-2000, Code of Practice for plain and reinforced concrete BIS, New Delhi.

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

Question paper contains Six questions. Question 1 contains 5 short Answer questions each of 2 marks (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions i.e. there will be two questions from each unit and the student should answer any one question.
URBAN HYDROLOGY AND HYDRAULICS (UHH)

VI Semester :	VI Semester : CE							Scheme: 2017	
Course Code	Category	Ho	urs/W	eek	Credit	Ma	ximum Ma	arks	
CE316	PEC	L 2	T 1	Р	C	Continuous Internal Assessment	End Exam	Total	
Sectional Even	Duration	2) 11ma	I	-	3	40 Em		100	
Sessional Exam	Duration:					En	I Exam Du	ration: 5 Hrs	
Course Outcon	nes: At the en	nd of	the cor	irse sti	idents wi	ll be able to			
CO1 : Understa	and the basic	conce	pts of	ground	d water				
CO2 : Analyse the movement of ground water									
CO3 : Estimate	CO3 : Estimate the rate of flow in to an aquifer								
CO4 : Understa	nd the conce	pts of	water	wells	and grou	nd water rechar	ge method	S	
CO5 : Analyze	the problems	of sa	line wa	ater in	trusion				
UNIT– I									
<i>Occurrence of Ground water:</i> Scope - Ground water in hydrologic cycle – Origin of Ground water – Rock properties affecting groundwater – Geological formation of aquifers – Types of aquifers – Vertical distribution of subsurface water – Porosity – Specific yield – Specific retention – Storage coefficient – Compressibility of aquifers. Ground water potential in India.									
UNIT– II									
<i>Movement of G</i> Hydraulic condu and isotropic ac aquifers.	round Water activity – Tra juifers – Lap	: Dar ansmi blace (cy's la ssibilit equatic	w - V zy - Edon - H	alidity of quation c lydrodyna	Darcy's law – of conservation amic equation	Velocity – of mass – – Analysis	Permeability – Homogeneous of anisotropic	
				UN	III – TII				
<i>Well Hydraulics (Steady & Unsteady Flows):</i> Drawdown curve, radius of influence – Steady state flow (Equilibrium condition) in to a well – Steady radial flow in to an unconfined aquifer – Dupuit's equation – Steady radial flow in to a confined aquifer – Theim's Equation-Unsteady radial flow in a confined aquifer – Determination of formation constants – Theis, Cooper – Jacob and Chow's method of analysis – Recovery test – Unsteady radial flow in leaky aquifers – Well flow near aquifer boundaries – Image wells – Characteristic well losses and well efficiency – Partially penetrating wells.									
UNIT– IV									
Water Wells: I casings and scr determination –	Dug, bored, or reens – Gra Protection of	driver vel p f wells	and g acks – s – Infi	jetted - Wel iltratio	wells – l develop n gallerie	Methods of droment methods s and Collector	illing deep s – Open r wells.	wells – Well wells – Yield	

Groundwater Recharge & Management : Concept of recharge– Methods – Recharge for reuse – Induced recharge – Recharge for energy purposes - Water management – Concepts of basin management – Hydrological equilibrium equation – Basin yield – Evaluation of perennial yield – Conjunctive use – Basin management by conjunctive use – Problems and remedial measures.

UNIT-V

Saline Water Intrusion: Occurrence of Saline Water intrusion– Relation between fresh and saline waters – Ghyben–Herzberg equation – Shape and structure of fresh–salt water interface – Upcoming of saline water – Control of saline water intrusion – Examples of seawater intrusion.

Text Books :

1. D.K. Todd [2007], Groundwater Hydrology, John Wiley & Sons, Singapore.

2. H.M. Raghunath [2009], Groundwater, Wiley Eastern Ltd.

Reference Books :

1. Bouwer, Groundwater Hydrology

Web References:

1. https/www.coursera.org

2. www.nptel.ac.in/courses

Question Paper Pattern :

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

ECOLOGICAL ENGINEERING (EcE)

VI Semester :	CE						Sch	eme: 2017	
Course Code	Category	Hou	irs / V	Veek	Credits	Max	imum Mar	ks	
CE317	PEC	L 2	T	Р	C	Continuous Internal Assessment	End Exam	Total	
Soccional Evan	Duration ?	4 Hrs	L	-	5	40 End Fr	vom Durati	100	
Sessional Exam	i Duration, 2	1115						1011 . 5 1115	
Course Outcon	nes: At the end	l of th	ne cou	rse stu	dents will b	e able to			
CO1: Capable	of applying bas	sic pri	inciple	es and	concepts of	ecology.			
CO2: Able to id social co	CO2: Able to identifying ecological problems and establishing solutions in a environmental and social context								
CO3: Understa	CO3: Understand the ecological modeling.								
CO4 : Apply th	e ecological en	ginee	ring f	or low	cost sanitat	ion and lakes r	estoration.		
TINITAN T									
UNIT - I									
<i>Principles and concepts:</i> Definition and Scope of Ecology - Ecological Engineering – Development and evolution of ecosystems – Principles of Ecological Engineering – Self Organization.									
UNIT - II									
<i>Ecosystem structure and Functions:</i> Structural Compounds of natural and manmade ecosystems – terrestrial and aquatic – Energy flow and nutrient cycling – Food chain and food webs – primary productivity – Biochemical cycles of nitrogen, phosphorus, sulphur and carbon dioxide, Habitat ecology Terrestrial, fresh water, estuarine and marine habitats.									
				UNI					
Ecological Mod	<i>lelling:</i> Elemer	ts of	mode	lling –	Procedure -	- Classification	application	1.	
				UNI	Γ - IV				
<i>Methods in Ec</i> ecosystem, Reh step cropping, treated wastewa	<i>Methods in Ecological Engineering:</i> Bio monitoring and its role in evaluation of aquatic ecosystem, Rehabilitation of ecosystems through ecological principles – range rehabilitation, step cropping, bio- wind screens Wetlands, Root Zone Treatment for wastewater, Reuse of treated wastewater through ecological systems.								
				UNI	Т - V				
<i>Application of Ecological Engineering:</i> Applications of Ecological Engineering in: Low cost sanitation – Aquaculture – Lakes restoration – Mining.									
Text Books :		1	117.5		NT X7	1 1000			
1. Odum, E.P., Fi 2. Mitch, J.W. an Wiley and Sor	undamental of E nd Jorgensen, S. ns, New york, 19	<i>colog</i> E., <i>E</i> . 96.	y, W.E cologi	s. Saud cal Eng	ers, New Yor gineering – A	k, 1990. In Introduction	to Ecotechn	ology, John	
3. Cast Etnur and	Bjorn Gutorstan	n, <i>Eco</i>	ologica	al Engi	neering for w	vastewater Treat	ment, Lewis	Publishers,	

London, 1996.

Reference Books :

1. Kormondy, E. J., Concepts of Ecology, Prentice Hall, New Delhi, 1996.

2. Mc Eldowney, S, Hardman D.J. and Waite S Pollution, *Ecology and Bio-treatment*, Longman Publications, Singapore 1993.

Web References:

1. https/www.coursera.org

2. www.nptel.ac.in/courses

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

ENGINEERING MATERIALS FOR SUSTAINABILITY (EMS)

VI Semester: CE							Sc	heme: 2017	
Course Code	Category	Ho	urs/W	'eek	Credits	Max	imum Ma	ırks	
CE318	PEC	L	T	Р	С	Continuous Internal Assessment	End Exam	Total	
		2	1	-	3	40	60	100	
Sessional Exa	m Duration: 2	Hrs				End	Exam Dui	cation: 3 Hrs	
Course Outer	mag . At the on	doft	ha cou	reo etu	idente will	ba abla ta			
Coll : Unders	tand the concep	$\frac{10011}{1001}$	istaina	hility	and its imp	ortance in cons	truction		
CO2 : Unders	tand the propert	ties of	- custai	nable	constructio	n materials	di detion.		
CO2 : Unders	tand the propert	tion or	d annl	iontion	of misso	llanaous angin	oring mot	orials	
CO4 : Understand the properties and applications of recycled materials									
CO5 : Development of new materials for sustainable development									
COS. Develo	pinent of new in	lateria		sustai	liable ueve	iopinent.			
				UN	IT- I				
Introduction: related to impa- importance of Production, s consideration. Miscellaneous	Introduction: Definition of Sustainability - Need of sustainability - Advantages, and issues related to impact on Environment (Major Environment Challenges) - Life-cycle Assessment. UNIT-II Importance of sustainable construction materials: Material composition and properties - Production, storage, distribution, testing, acceptance criteria, limitations of use, economic consideration. UNIT-III Miscellaneous materials: Recent development related to the following Materials to be studied -								
aluminum, pla performance. containment s	astic, ceramics, Crumb modifie tructures.	poly d bitu	mers a imen H	and nu Rubber	clear mate, Glenium	erials; material Concrete, Ma	terials use	to optimize d in nuclear-	
				UNI	T– IV				
<i>Alternative building materials:</i> Introduction - Substitute for scarce materials – Ferrocement - Gypsum boards - Timber substitutions - Industrial wastes - Agricultural wastes.									
UNIT-V									
<i>Advanced construction Materials:</i> High performance concrete - Nano technology in cement concrete - Design, evaluation, and production of green construction materials.									
Text Books .									
1 A M Nevil	e Properties of	f Con	crete. I	Pearso	n educatior	limited.			

- 2. M.S.Shetty, Concrete Technology, S.Chand Publishers, New Delhi.
- 3. M L Gambhir, Neha Jamwal, Building Materials, Tata McGraw Hill Publ.

4. New Building Materials and Construction, World magazine.

Reference Books :

- 1. William P Spence, *Construction Materials, Methods & Techniques(3e)*, Yesdee Publication Pvt. Ltd., Chennai, India
- 2. P.K & Mantreio P.J.M. Mehta, "Concrete Structure properties & Materials" Prentice hall.
- 3. Ferrocement Construction Mannual-Dr. D.B.Divekar-1030, Shivaji Nagar, Model Colony, Pune.
- 4. Civil Engineering and Construction Review magazine
- 5. V.K. Jain [2009], Automation Systems in smart and Green Buildings, Khanna Publications, New delhi.
- 6 Dr. S.V. Deodhar, *Engineering Materials*

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

<u>PROFESSIONAL ELECTIVE – II</u> (in VI Sem.)

- 1. SANITARY ENGINEERING
- 2. BASICS OF COMPUTATIONAL HYDRAULICS
- 3. URBAN TRANSPORTATION PLANNING
- 4. BUILDING CONSTRUCTION PRACTICE

SANITARY ENGINEERING (SE)

VI Semester :	CE						Sch	eme : 2017			
Course Code	Category	Hou	irs / V	Veek	Credits	Max	imum Mar	:ks			
CE319	PEC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total			
		2	1	-	3	40	60	100			
Sessional Exam	n Duration: 2	Hrs				End Ex	kam Durat	ion: 3 Hrs			
Carrier Ortean	Course Outcomes: At the end of the course students will be able to										
Course Outcomes: At the end of the course students will be able to											
CO2: Explain e	CO1: Estimate the quantity of sanitary and storm sewage.										
CO3: Identifyin	ng the physical,	chem	nical a	and bic	ological prop	perties of waste	water				
CO4: Analyze	and design uni	t oper	ation	s for w	aste water ti	reatment.					
CO5: Develop	s an ability to r	nanag	e Mu	nicipal	Solid Wast	e.					
	UNIT - I										
<i>Introduction:</i> Systems of sanitation–Classification of sewerage systems –Principles of house drainage – Plumbing systems.											
<i>Estimation of Sewage:</i> Estimation of quantity of sewage – Fluctuations in quantity of sewage – Storm water quantity estimation – Time of concentration and its significance in the design of storm sewer.											
				UNI	T - II						
Design of Sewe – Selection of s cleaning veloci gradients – Sha sewers.	erage System: H site for out fall ty - Shield exp pes and materia	Prelim – Des pressi als of	iinary ign o on fo sewei	survey f sewe or self cs – Se	y and prepar rs – Hydrau cleaning ve wer appurte	ation of plans f ilics of partially clocity - Permi nances – Testin	for a sewera y flowing se ssible vel ng and main	age scheme ewer – Self ocities and ntenance of			
				UNI	Г - III						
<i>Characteristics</i> domestic waste population equi	<i>of Domestic V</i> e water for F valent.	<i>Vaste</i> Physic	<i>Wate</i> al ar	r: Cyc nd che	les of decon emical Char	nposition – Sar racteristics –	npling and B.O.D eq	analysis of uation and			
<i>Disposal of Domestic Waste Water:</i> Disposal by dilution - Self purification of water bodies - Zones of river pollution - Dissolved oxygen sag curve and its significance – On land disposal, sewage farming – Sewage sickness and remedial measures.											
UNIT - IV											
<i>Primary Treatment:</i> Layout and general outline of various units in a domestic waste water treatment plant – Principle, working and design of screens, grit chambers, sedimentation tanks.											
Biological Trea Activated sludg	<i>atment:</i> Princip ge process, Oxid	le, wo datior	orking ditcl	g and d n, Oxic	esign of t ric lation ponds	kling filters (st s- Working and	andard and l design of	high rate), septic tank			

- Sludge digestion tank - Sludge utilisation and disposal

UNIT - V

Urban Solid Waste Management: Types, sources, quantity and composition of urban solid waste – Collection, transportation, recovery & reuse – Disposal methods such as composting, incineration, sanitary land fill.

Text Books :

1. Santosh Kumar Garg (2008), Environmental Engineering Vol.2, Khanna Publishers.

- 2. P.N.Modi, *Sewage Treatment and Disposal and Waste Water Engineering* (2015), Standard book house.
- 3. H.W.Peavy, D.G. Rowe and George Tchobanoglaus [2013], *Environmental Engineering*, Tata McGraw Hill

Reference Books :

1. Metcalf and Eddy (2002), Waste Water treatment, Disposal and Reuse, Tata McGraw Hill.

- Sawyer and Mc Carthy (2003), *Chemistry for Environmental Engineering*, Tata McGraw Hill.
 CPHEEO, Ministry of Urban Development (1999), *Manual on Sewerage and Sewage Treatment*, New Delhi.
- 4. Mark J. Hammer & Mark J. Hammer Jr. (2012), *Water and Waste Water Technology*, Prentice Hall India (P) Ltd, New Delhi.

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

BASICS OF COMPUTATIONAL HYDRAULICS (BCH)

VI Semester : C	CE							Scheme: 2017	
Course Code	Category	Ho	urs/W	eek	Credit	Ma	ximum Ma	arks	
CE320	PEC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total	
		2	1	-	3	40	60	100	
Sessional Exam	Duration:	2 Hrs				Enc	l Exam Du	ration: 3 Hrs	
Course Outcomes: At the end of the course students will be able to CO1: Understand the basics of computational hydraulics CO2: Apply conservation laws for homogeneous and stratified fluid flows CO3: Understand the hydroulic jump and its computations									
CO3 : Understand the hydraulic jump and its computations									
CO4 : Apply the Different forms of conservation laws to storm-sewer networks									
CO5 : Apply the FD techniques to steady and unsteady flows in open channels									
UNIT– I									
Introduction - Significance of computational hydraulics - Discrete forms of the laws of construction of mass - Momentum and energy - Examples of free surface flows. UNIT-II									
Homogeneous an	nd stratified	fluid f	lows.					contractions	
				UN	IT–III				
Method of chara hydraulic jump I	cteristics – ndeterminary	Chara y conc	cterist litions	ics an - Line	d invarian earised me	nts - Regions of ethod of charac	of state - C teristics.	Computation of	
				UN	IT– IV				
Difference forms Diffusion proble	s of conserva ms - River m	ation 1 horpho	laws - ology -	Weak Linea	solution ar wave p	s applications - ropagation.	- Storm-sev	wer networks -	
				UN	IT–V				
Numerical metho	ods – Finite o	liffere	ence m	ethod	with exar	nple 1-D horize	ontal flow.		
Applications of FD techniques to steady and unsteady flows in open channels.									
Text Books :									
1. Brebbia, C.A. and Ferrante, A.J., <i>Computational Hydraulics</i> , Butterworth & Company Publishers Ltd., London, 1983.									
2. Chaudhary, M York, 1987.	M.H., Applie	d Hyd	raulic	Trans	<i>sients</i> Var	Nostrand Reir	nhold Comp	pany Inc., New	
Reference Book	s :								

- 1. Mahmood, K. and Yeyjevieh, V., *Unsteady Flow in Open Channels*, Water Resources Publications, Fort Collins, Colorado, U.S.A., 1975, Vol. I & II
- 2. M.B. Abbott, Computational Hydraulics, Pitman Publication Company.
- 3. M.B. Abbott & J.A. Gunge, *Engineering Applications of Computational Hydraulics*, Pitman Books Ltd.
- 4. Vreugdenhill, C.B., Computational Hydraulics: An Introduction, Springer-Verlag, Berlin.
- 5. Abbot, M.B. & A.W. Minns, Computational Hydraulics, Ashgate Publication.

Web References:

- 1. https/www.coursera.org
- 2. www.nptel.ac.in/courses

Question Paper Pattern :

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

URBAN TRANSPORTATION PLANNING (UTP)

VI Semester :	CE						Sche	eme: 2017
Course Code	Category	Hou	irs / W	/eek	Credits	Max	imum Mar	ks
CE321	PEC	L 2	T	Р	C	Continuous Internal Assessment	End Exam	Total
Socional Evan	Duration.	2 7 Urg	I	-	3	40 End Ex	00 zom Duroti	100
Sessional Exam Duration: 2 His End Exam Duration: 2 His End Exam Duration: 2 His Course Outcomes: At the end of the course students will be able to CO1: Interpret the urban activity system and travel patterns CO2: Demonstrate the classical methods of urban transportation planning CO3: Apply four stage travel demand modelling CO4: Understand the trip generations and trip distribution concepts CO5: Understand the mode and route choice of trip makers UNIT - I Introduction to Urban Planning: Urban morphology - Urbanization and travel demand – Urban activity systems and travel patterns – Systems approach – Trip based and Activity based approach - Urban Transportation Planning – Goals, Objectives and Constraints - Inventory, Model building, Forecasting and Evaluation - Study area delineation – Zoning - UTP survey. UNIT - II								
models, Gravity	model and C	Opport	unity n	nodes.	in inpu			
				UNI	Г - III			
<i>Modal split m</i> Probabilistic mo Transportation assignment and	odels: Mod odels - Utility networks – N Multi path as	e cho / funct: /linimu ssignm	ice be ions - 1 1m Pat ent - R	haviou Logit 1 h Algo Route-o	ur – Trip nodels - Tw prithms - As phoice behav	end and trip to stage model ssignment meth viour.	interchange - Traffic ass nods – All e	e models- signment – or Nothing
				UNI	Γ - IV			
<i>User Equilibri</i> Capacity restrai	<i>User Equilibrium assignment</i> : System optimum assignment - Incremental assignment - Capacity restraint assignment - Stochastic user equilibrium assignment - Dynamic Assignment.							
UNIT - V								
<i>Land use transportation models</i> : Urban forms and structures - Location models - Accessibility – Land use models - Lowry derivative models – Micro level Planning- International Practice.								
Text Books :								
 Khisty C.J. Papacostas Delhi,2002 	, <i>Transportati</i> C.S. and Pre 2.	on Eng evedou	ros, P.	<u>ıg - An</u> D., Tr	Introduction ansportation	n, Prentice Hall	, NJ, 2007. & Planning,	PHI, New

3. Hutchinson, B.G., *Principles of Urban Transport Systems Planning*, Scripta, McGraw-Hill, NewYork, 1974.

Reference Books :

- 1. Black, Alan, Urban Mass Transportation Planning, McGraw-Hill, Inc., New York, 1995.
- 2. Vukan, R. Vuchic, *Urban Transit Systems and Technology*, John –Wiley & Sons, New Jersey, 2007.
- 3. National Urban Transport Policy

Web References:

- 1. https/www.coursera.org
- 2. www.nptel.ac.in/courses

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

BUILDING CONSTRUCTION PRACTICE (BCP)

	T Semester: CE							Scheme: 2017	
Course Code	Category	Ho	urs/W	'eek	Credits	Max	imum Ma	ırks	
CE322	PEC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total	
		2	1	-	3	40	60	100	
Sessional Exa	m Duration: 2	Hrs				End]	Exam Dui	cation: 3 Hrs	
Course Outco	omes : At the en	nd of	the cou	arse stu	udents will	be able to			
COI: Underst	and the import	ance o	of cons	tructio	on co-ordin	ation.			
CO2: Understand the bonds in masonry, types of foundations and form work									
CO3: Understand the components of steel trusses, acoustic and fire protection									
CO4: Unders	CO4: Understand the components of Sub surface construction								
CO5: Underst	CO5: Understand the Super structure construction.								
UNIT-1									
<i>Construction</i> (co-ordination –	Co-ordination: - Site Clearance	Spec e – Ma	ificatio arking	ons, de – Eart	tails and s hwork.	equence of act	ivities and	construction	
UNIT– II									
<i>Masonry & F</i> block masonry expansion joint Centering and	oundations: M y – Flooring - ts – Pre-cast p shuttering – Sli	lasoni – Dai avemo p fori	ry – S mp pro ents – ms – So	tone n oof co Buildin caffold	nasonry - ourses – C ng foundat lings – De-	Bond in maso Construction jo ions – Basemen shuttering form	nry - Con ints – Mo nts – Temp ns.	crete hollow ovement and oorary shed –	
				UNI	Γ– III				
Surface Finish brick, weather	<i>hes:</i> Fabrication and water proo	n and f roof	erectio finish	on of s es – A	steel trusse coustic and	s – Frames – H I fire protection	Braced dor	nes – Laying	
				UNI	Γ– ΙV				
<i>Sub-structure</i> : Sub Structure Construction - Techniques of Box jacking – Pipe Jacking - Underwater construction of diaphragm walls and basement - Tunneling techniques – Piling techniques - Well and caisson - Sinking cofferdam - Cable anchoring and grouting - Driving diaphragm walls, sheet piles - Shoring for deep cutting - Well points - Dewatering and stand by Plant equipment for underground open excavation.									
UNIT– V									
Super Structu platforms – Sp rise structures Support structu domes and space	<i>re:</i> Super Struecial forms for - Material h are for heavy E ce decks.	shell andlin quipn	Const s - Tec ng - E nent an	ruction chnique Crecting d conv	n - Launcl es for heav g light we veyors - Er	hing girders, b by decks – In-si bight component ection of articu	ridge decl tu pre-stre nts on tall lated struc	ks, off shore ssing in high structures - tures, braced	

Text Books :

1. B C Punmia, Ashok Kumar Jain & Arun K, Building Construction, Laxmi Publications.

2. Varghese P C, Building Construction, PHI publications

3. V N S Murthy [2010], Advanced Foundation Engineering: Geotechnical Engineering Series, CBS publishers

4. K R Arora [2009], Soil Mechanics And Foundation Engineering, Standard Publishers

Reference Books :

- 1. Mehta/ Scarborough/ Armpriest [2016], Building Construction 2e: Principles, Materials and Systems, Pearson Education India
- 2. McCarthy [2014], *Essentials of Soil Mechanics and Foundations: Basic Geotechnics*, Pearson Education India

Question Paper Pattern:

Sessional Exam:

The question paper for Sessional examination is for 30 marks, covering half of the syllabus for first Sessional and remaining half for second Sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

<u>PROFESSIONAL ELECTIVE – III</u> (in VII Sem.)

- 1. ADVANCED STRUCTURAL ANALYSIS
- 2. HYDRO POWER ENGINEERING
- 3. GROUND IMPROVEMENT TECHNIQUES
- 4. INSTRUMENTATION & SENSOR TECHNOLOGIES FOR CIVIL ENGINEERING APPLICATIONS

ADVANCED STRUCTURAL ANALYSIS (ASA)

VII Semester: Cl	E						Scl	neme: 2017			
Course Code	Category	Hou	ırs/We	ek	Credits	Ma	ximum M	arks			
CE407	PEC	L	T	Р	С	Continuous Internal Assessment	End Exam	Total			
		2	1	-	3	40	60	100			
Sessional Exam	Duration: 2	Hrs d of t	ha aou	raa atu	donta will	End E	Exam Dura	ation: 3 Hrs			
CO1: Analyse thr	CO1 : Analyse three and two hinged arches										
CO2: Analyse thr	CO2: Analyse three hinged suspension bridges										
CO3: Analyse the frames by approximate method of analysis											
CO4: Analyse the indeterminate structures using plastic analysis											
CO5 : Analyse the one dimensional elements using matrix methods											
UNIT– I											
<i>Arches:</i> Linear arches – Eddy's theorem – Analysis of three & two hinged parabolic arches for static and moving loads – Influence lines for horizontal thrust, bending moment and radial shear.											
UNIT– II											
<i>Cables and Suspe</i> different levels – S horizontal tension,	ension Bridg Simple susper bending more	es: Stansion	tress in bridges and she	suspe with t ar forc	ended cable hree hinged e.	s with the supp l stiffening gird	oorts at sar ers – Influe	ne level and ence lines for			
				UNI	Г — III — Т						
Approximate Met and cantilever met	thods of Ana hods for hori	l ysis zontal	of Fran loads -	<i>mes:</i> S – Assu	Substitute fr	ame method for d limitations.	r vertical lo	oads – Portal			
				UNI	Γ– IV						
<i>Plastic Analysis:</i> H Moment curvature plastic analysis – single storey porta	Basic concept relations – Plastic analy frame – Me	ts – El Plasti vsis of thods	lastic and ic hing f propp of com	nd plas es – C ed and bined	stic stress – Collapse me I fixed bea mechanism	Strain relations echanisms – Fu ms, continuous	hips – Plas ndamental beams and	tic bending – theorems of l single bay,			
				UNI	T– V						
<i>Introduction to Matrix Methods of Structural Analysis:</i> Static and kinematic indeterminacy of structures – Equilibrium and compatibility conditions - Introduction to force and displacement methods - Applications to continuous beams (degree of redundancy not exceeding three).											
Text Books:											
1. B.C.Punmia, A.	.K. Jain, A.K	. Jain	[2014]	, SMTS	S 2, Theory	of Structures, L	axmi Publi	cations			
2. C.K. Wang, Ind	leterminate S	tructu	ral And	alysis,	Standard P	ublishers.					
3. C.S. Reddy [20	3. C.S. Reddy [2011], Basic Structural Analysis, Tata McGraw Hill.										

Reference Books:

1. Ramachandra [2011], Design of steel structures Vol.2, Standard Book House.

2. Vazirani & Ratwani, Design of steel structures, Khanna Publications

3. Pandit & Gupta [2008], Structural Analysis- A Matrix Approach, Tata McGraw Hill.

Web References:

1.www.nptel.ac.in/courses

Question paper pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

HYDRO POWER ENGINEERING (HPE)

VII Semester : C	CE						Schen	ne: 2017									
Course Code	Category	Hou	ırs / W	eek	Credits	Maxi	mum Mark	S									
CE408	PEC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total									
		2	1	-	3	40	60	100									
Sessional Exam	Duration: 2]	Hrs				End Exa	m Duration	1:3 Hrs									
Course Outcome	es: At the end	of the	course	e stude	ents will be a	able to											
COI: Estimate a	ind assess the	water	power	potent	tial												
CO2: Understan	d the Basic C	oncept	s of Po	ower p	lants												
CO3: Analyse th	le efficiency of	of vario	ous typ	bes of p	power plants	<u> </u>											
CO4: Understan	CO5: Select suitable type of turbine for power stations																
COS: Select suitable type of turbine for power stations																	
UNIT - I																	
<i>Introduction:</i> Different sources of energy – Hydro power – Its advantages and disadvantages – Role of hydel power in the power system – Development of water power in India with particular reference to south India – Estimation of water power potential. <i>River Basin Development:</i> Selection of site – Assessment of power potential.																	
				UNIT	- II												
Basic Concepts Diversity factor – power – Predictio	<i>of Power pla</i> - Utilization f on of load.	ants:	Loads – Load	– Loa I durat	ad curves – ion curve –	Load factor Efficiencies –	 Capacity Firm and set 	factor – econdary									
<i>Storage and Po</i> Hydrograph analy	ondage: Defi ysis – Storage	nitions and p	5 – M ondage	lass c e – Po	urve – Flov ndage factor	w and power r.	duration of	curves –									
			T	UNIT	- III												
<i>Classification of Power Plants:</i> Classification on the basis of head and plant capacity – Runoff river plants and their general arrangement – Storage plants – Diversion canal plants – Underground power plants – Principles of layout – Some typical layouts of Indian projects – Pumped storage plants – Basic features – Advantages – Types – Two unit, three unit and four unit installations – Merits and demerits – Reversible pump turbines – Efficiency of pumped storage plants.																	
			I	UNIT	- IV												
<i>Water Conductin</i> diameter – Anch elastic column the	ng Systems: orages – Exp eories – Surge	Intake ansior e tanks	es – P 1 joints	ower s – Ot	canals – Tu her accessor	unnels - penst ries – Water h	ocks – Eco ammer – R	UNIT - IV <i>Water Conducting Systems:</i> Intakes – Power canals – Tunnels - penstocks – Economical diameter – Anchorages – Expansion joints – Other accessories – Water hammer – Rigid and elastic column theories – Surge tanks.									

UNIT - V

Power Houses & Turbines: Types – Layouts – Relative merits and design principles for surface power stations and underground power stations- Types of turbines – Selection of sizes and number of units setting of turbines – Cavitation in turbines – Governing of turbines.

Tidal Power: Basic principles – Location of tidal power plants – Components.

Text Books :

1. M.M. Dandekar and K.N. Sharma [2010], *A Text Book of Water Power Engineering*, Vikas Publications

2. R.K.Sharma and T.K.Sharma [2003], *A Text book of Water Power Engineering including Dams, Engg. Hydro & Fluid Power Engg.*, S. Chand Company Ltd., New Delhi–110 055

Reference Books :

1. Deshmukh M.M. [2010], Water Power Engineering.

Web References:

3. https/www.coursera.org

4. www.nptel.ac.in/courses

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

GROUND IMPROVEMENT TECHNIQUES (GIT)

VII Semester:	СЕ						Sc	cheme: 2017		
Course Code	Category	Ho	ours/W	eek	Credits	Max	imum Ma	arks		
CE409	PEC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		2	1	-	3	40	60	100		
Sessional Exa	m Duration: 2	Hrs				End	Exam Du	ration: 3 Hrs		
Course Outer		م م ۲ 41				11 ha ahla ta				
Course Outco	CO1 : Understand the ground Improvement methods used to stabilize soil									
CO2 : Understand the densification methods used in granular soils and Cohesive soils										
CO3: Unders	tand the grouti	ng tec	hnique	es and	their applic	nai sons and C				
CO4 : Unders	tand the ground	nthetia	r mate	$\frac{15 \text{ and}}{\text{rials}}$ f	inctions ar	annlications				
CO5 : Unders	tand the reinfor	rceme	nt des	ign pri	nciples and	ground anchor	r methods			
	COS. Onderstand the remoteement design principles and ground anchor methods									
UNIT– I										
 Ground Improvement: Need and Objectives - Identification of problematic soils – Mechanical, Hydraulic, physico-chemical, electrical, thermal and strengthening methods - Selection of suitable ground improvement technique based on soil condition. Densification in Granular Soils: Principles of soil densification - Properties of compacted soil - Compaction control tests – In-situ densification methods in granular soils – Blasting, Vibro-Compaction, Vibro-replacement, Dynamic Tamping, Compaction Piles, Stone Columns. 										
				UNI	1-11					
Densification Methods of D Vacuum well p – Criteria for s wick geodrains	<i>in Cohesive so</i> Dewatering – S points, Horizon selection of fill	<i>ils:</i> In Sumps Ital we I mate	n-situ o s and ells an erial ar	densifi interc d Elec cound	cation met eptor ditcl tro-osmosi drains - Ve	hods in Cohesi hes, Single, M s – Foundation ertical drains –	ve soils – lulti-stage drains- B Sand dra	Preloading – well points, lanket drains ins and Sand		
				UNI	T– III					
<i>Grouting:</i> Obj descending and	ectives of Grou l stage grouting	uting g, Hyc	- Grou Iraulic	its and fractu	their prop ring in soil	erties, Grouting s and Rocks – I	g methods Post grout	– ascending, test.		
				UNI	T– IV					
<i>Geosynthetics:</i> Properties - Physical, Mechanical, Hydraulic, Endurance, degradation – tests – Types – Geotextiles, Geogrids, Gemembranes, Geocells, Geofoam, Geocomposite etc. – Functions and Applications.										
UNIT– V										
Reinforced Ea reinforced eart	e rth: Principles h walls – Desig	– Co gn prir	ompon	ents o of rei	f reinforced nforced ear	d earth – Facto th walls.	ors governi	ing design of		

Confinment: Ground anchors – Rock bolting and soil nailing.

Text Books :

- 1. Hausmann M.R., *Engineering Principles of Ground Modification*, International Edition, McGraw-Hill, 1989.
- 2. P.Purushotham Raj [2013], Ground Improvement Techniques, Laxmi Publishers.

Reference Books:

- 1. Moseley, M.P and Kirsch. K., *Ground Improvement*, 2nd Revised Edition, Taylor Francis Ltd, United Kingdom, 2004.
- 2. Das, B.M., Principles of foundation Engineering, CENGAGE Learning India, New Delhi.

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

INSTRUMENTATION & SENSOR TECHNOLOGIES FOR CIVIL ENGINEERING APPLICATIONS (ISTCEA)

VII Semester:	CE						Scl	heme: 2017		
Course Code	Category	Ho	urs/W	eek	Credits	Max	imum Ma	rks		
CE410	PEC	L	T	Р	C	Continuous Internal Assessment	End Exam	Total		
Sectional Evan	Duration ?	<u></u>	1	-	3	40 End 1	60 Evom Dur	100		
Sessional Exam	Duration: 2	Hrs				Ena	Exam Dur	ration: 5 Hrs		
Course Outcon	es: At the end	1 of tl	ne com	se stu	dents will h	be able to				
CO1: Understa	nd the principl	es of	operat	ion an	d character	istics of instrur	nentation.			
CO2: Understa	nd right use of	senso	ors and	instru	iments for	differing applic	ations.			
CO3: Recognize and identify ways to improve measurement and evaluation										
CO4: Analyse	signal processi	ng fo	r differ	ent st	atistical cor	icents				
	CO4: Analyse signal processing for different statistical concepts.									
UNIT- I										
<i>Introduction:</i> Fundamentals of Measurement - Sensing and Instrumentation covering definition of measurement and instrumentation - Physical variables - Common types of sensors - Function of these sensors.										
	UNIT– II									
Sensor Installe	<i>ution</i> : Respon and monitorin	nse o g prog	of sens gram -	sors Order	to various and metho	inputs - Co dology for sense	onstruct a sor installa	conceptual tion.		
				UNI	III – 1					
Sensor Operation to Planning M Installation &Co	on: Types of sonitoring Proponfiguration, S	enson grams ensor	s and s, Def design	their 1 ine ta 1, Mea	modes of op arget, Sens asurement u	peration and m or selection, ncertainty.	easuremen Sensor sit	nt, Approach ing, Sensor		
				UNI	Γ– IV					
Data Analysis and Interpretation: Fundamental statistical concepts - Data reduction and interpretation - Piezometer - Inclinometer - Strain gauge - Time domain signal processing - Discrete signals - Signals and noise - Examples of statistical information to calculate mean, standard deviation, median and mode.										
UNIT-V										
<i>Frequency Domain Signal Processing and Analysis:</i> The need for frequency domain analysis and its principles - Basic concepts in frequency domain signal processing and analysis - Fourier Transform - Fast Fourier Transform (FFT) - Example problems - Noise reduction with filters - Leakage - Frequency resolution.										
Text Books :										

- 1. Alan S Morris (2001), *Measurement and Instrumentation Principles, 3rd/e*, Butterworth Hienemann
- 2. S. Tumanski (2006), Principle of Electrical Measurement, Taylor & Francis

Reference Books :

David A. Bell (2007), *Electronic Instrumentation and Measurements 2nd/e*, Oxford Press.
 Ilya Gertsbakh (2010), *Measurement Theory for Engineers*, Springer

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

<u>PROFESSIONAL ELECTIVE – IV</u> (in VII Sem.)

- 1. FOUNDATION ENGINEERING
- 2. INFRASTRUCTURE PLANNING & MANAGEMENT
- 3. HYDRAULIC MODELLING
- 4. BRIDGE ENGINEERING

FOUNDATION ENGINEERING (FE)

VII Semester:	CE						Se	cheme: 2017		
Course Code	Category	Ho	ours/W	'eek	Credits	Max	imum Ma	irks		
CE411	РЕС	L 2	T	Р	C	Continuous Internal Assessment	End Exam	Total		
Sectional Eve	m Duration 2	 11.ma	1	-	3	40		100		
Sessional Exa	m Duration: 2	Hrs				Ena	Exam Du	ration: 5 Hrs		
Course Outeo	most At the one	lofth	0.0011	sa tha	student w	ill be able to				
Coll: Determi	ine the shear str	ength	of diff	se, the ferent	soils					
CO2: Prepare	CO2: Prepare the soil investigation report after conducting the soil investigation									
CO3: Calculate the lateral earth pressure on retaining structures required for its safe design										
CO4: Apolyso	CO3: Calculate the lateral earth pressure on retaining structures required for its safe design.									
CO4: Analyse	the stability of	son s	siopes.	roquira	ad for the d	lesion of shall	ow founda	tion		
CO6: Understand the types of nile foundations and estimate the load carrying capacity of single										
and gro	and group of piles.									
UNIT– I										
Snear Strengt Triaxial compr compression te	n: Monr–Coul ression test – 7 st – Shear strei	omb Fypes ngth c	of she	ear tes eristics	$rion - She sits based of cohesive \Gamma - \Pi$	on drainage conversion	 Direct nditions – nless soils. 	Unconfined		
Soil Investigat exploration – N	<i>tion:</i> Planning Aethods of soil	and explo	executi ration	on of – Soil	soil explo samples –	ration – Recon Soil investigati	nnaissance on report.	– Depth of		
<i>Stability of Sla</i> Swedish circle Taylor's stabili	opes: Types of method – Bi ty number.	slope shop	e failu s simp	res – S plified	Stability and method of	nalysis of infin of slices – Fri	ite and fir ction circl	nite slopes – le method –		
				UNI	Γ – III					
Lateral Earth theory – Activ theory – Rebha	<i>Lateral Earth Pressure:</i> Active and passive earth pressure – Earth pressure at rest – Rankine's theory – Active and Passive earth pressure for cohesionless and cohesive soils – Coulomb's theory – Rebhann's and Culmann's graphical method.									
UNIT-IV										
Bearing Capacity of Soils: Definition of bearing capacity – Terzaghi's, Meyerhof's and Skempton's theories of bearing capacity – Bearing capacity of square, circular and rectangular footings – Effect of water table on bearing capacity – I.S. code recommendations for bearing capacity – Safe bearing pressure based on N value - Plate load test.										

UNIT-V

Pile Foundations: Classification of piles – Pile driving methods – Load carrying capacity of single pile – Dynamic formulae – Static formulae – Load test on pile - Pile groups – Load carrying capacity of pile groups – Settlement of pile groups - Negative skin friction – Under reamed piles.

Text Books :

1. K.R. Arora [2008], Soil Mechanics and Foundation Engineering, Standard Publishers.

2. P. Purusotham Raj [2013], Soil Mechanics and Foundation Engineering, Pearson Publishers.

3. Gopal Ranjan and A.S.R.Rao [2000], *Basic and Applied Soil Mechanics*, New Age International Publishers.

Reference Books :

1. Joseph E. Bowles [1997], Foundation analysis and design, McGraw Hill

2. C. Venkatramaiah [2009], Geotechnical Engineering, New Age International Publishers.

3. B.C. Punmia, A.K.Jain [2005], Soil Mechancis and Foundations, Lakshmi Publications.

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

INFRASTRUCTURE PLANNING AND MANAGEMENT (IPM)

VII Semester: CE							Sc	cheme: 2017	
Course Code	Course Code Category Hours/Week			Credits	Maximum Marks				
CE412	PEC	L 2	T	Р	C	Continuous Internal Assessment	End Exam	Total	
Socional Eva	m Duration ?			-	3	40 End I		100	
Sessional Exa	III Duration: 2	, П ГS						ation: 5 mis	
Course Outcomes • At the end of the course students will be able to									
CO1: Underst	and Infrastruct	ure de	emand	and su	pply requi	rements in India	a.		
CO2: Prepare	a forecast mod	el for	Infras	tructu	re demand.				
CO3: Unders nationa	tand the strateg	gic pla	anning	for in	ıfrastructur	e development	at urban,	regional and	
CO4: Unders	tand the concept	ots of	Infrast	ructur	e Managen	nent.			
CO5: Underst	and the Emergi	ing Tı	ends in	n Infra	structure a	nd Sectoral ove	erview.		
				UN]	IT– I				
Introduction: Definition of basic terminologies - Role of infrastructure in economic development - Types of infrastructure - Measurement of infrastructure capacity - Basis for quantification of demand and supply of various types of infrastructure - Indian scenario in respect of adequacy and quality.									
UNIT– II									
Infrastructure Planning I: Goals and objectives of infrastructure planning - Identification and quantification of the casual factors influencing the demand for infrastructure - Review and application of techniques to estimate supply and demand for infrastructure - Use of econometric, social and land use indicators and models to forecast the demand and level of service of infrastructure and its impact on land use - Critical review of the relevant forecasting techniques.									
	UNIT– III								
<i>Infrastructure Planning II:</i> Infrastructure planning to identify and prioritize preferred areas for development - Integration of strategic planning for infrastructure at urban, regional and national levels - Case studies in infrastructure planning.									
UNIT– IV									
<i>Infrastructure Management:</i> Concepts - Common aspects of urban and rural infrastructure management systems - Pavement and bridge management systems - Integrated infrastructure management - Case studies.									
UNIT- V									
<i>Emerging Trends in Infrastructure:</i> Overview of Public-private Sector participation in Infrastructure projects - Understanding stakeholder's concern - Regulatory framework - Risk management in infrastructure projects - Public policy for infrastructure.									

Sectoral Overview: Highways – Railways – Waterways – Airports - Urban and rural infrastructure: roads, housing, water supply, sanitation – Case study examples.

Text Books :

- 1. Veerendra Kumar & Sathish Chandra [1999], *Air Transportation planning and Design*, Gal Gotia publications
- 2. S.P.Bindra [1992], Docks and Harbour Engineering, Dhanapat Rai & Sons publications
- 3. R.Srinivasan [2013], Harbour Dock and Tunnel Engineering, Charotar Publishing house.

Reference Books :

- 1. Reports and research studies by Human Settlement Management Institute (HSMI)
- 2. Reader volumes by Institute of Town Planners, India (ITPI)

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

HYDRAULIC MODELLING (HML)

VII Semester : C	E						Schem	e: 2017			
Course Code	Category	Hours/Week			Credits	Maximu	Maximum Marks				
CE413	PEC	L 2	T	Р	C	Continuous Internal Assessment	End Exam	Total			
Sessional Evam	Duration: 2	4 Hrs		-	3	40 End Even	Duration	100 • 3 Hrs			
Sessional Exam Duration: 2 Hrs End Exam Duration: 3 Hrs											
Course Outcomes: At the end of the course students will be able to											
CO1 : Understar	nd the Basic	Conce	epts of	f Dime	nsional ana	lysis					
CO2 : Analyze a	and process t	the dat	ta rela	ted to]	Hydraulic N	Jodelling.					
CO3: Understar	nd the Basic	Conce	epts of	f Gravi	ty and Grav	vity friction models					
CO4: Understar	nd the Basic	Conce	epts of	f River	Modelling	<u> </u>					
CO5: Understar	nd the Limita	ations	of Hy	draulic	Modelling						
				UNI	T – I						
<i>Dimensional and Model Analysis:</i> Dimensional homogeneity – Model analysis – Similitude – types of similitude – Model laws – Classification of models.											
				UNI	T– II						
<i>Hydraulic Modelling:</i> Similarity Mechanics – Distinction between numerical and hydraulic models – Materials used in model – Scale effect – Design, construction, operation and interpretation of results – Role of instrumentation and data processing.											
UNIT– III											
<i>Gravity Dominated Models:</i> Modelling of energy dissipaters – Overflow spillways – Syphon spillways – Bridge piers – Vortex formation – Cavitation – Flow induced vibrations.											
Gravity Friction Models: Pumped flow models – Ship models – Surge tank models.											
UNIT– IV											
River Modelling: Basin and reservoir models – Tidal models with fixed and mobile beds – Harbour and break water models – Models of Offshore structures – Hybrid and Analogue models.											
UNIT– V											
Limitations of Hydraulic modelling - Complimentary aspects of numerical and hydraulic modelling.											
Text Books :											
1. Frank L Severance [2009], System modelling and simulation, Wiley Publications											
2. P.N. Modi & S.M. Seth [2015], Hydraulics and Fluid Mechanics including Hydraulic Machines,											
L	2. This field a bari bein [2015], fryaraanes and Find meenanies menaning fryaraane machines,										

Standard Book House, New Delhi.

Reference Books :

1. Byoung Kyuchoi and Donghun Kang , *Modelling and simulation of Discrete Event Systems*, Wiley Publications.

Web References:

1. https/www.coursera.org

2. www.nptel.ac.in/courses

Question Paper Pattern :

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

BRIDGE ENGINEERING (BE)

VII Semester:		Scheme: 2017								
Course Code	Category	Hou	rs/We	ek	Credits	s Maximum Marks				
CE414	PEC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		2	1	-	3	40	60	100		
Sessional Exan	n Duration:	2 Hrs	5			End Ex	am Durat	ion: 3 Hrs		
Course Outcomes : At the end of the course students will be able to										
CO1: Understand the classification of bridges and IRC specifications and loadings										
CO2: Design B	Box Culvert b	oy usi	ng wor	king s	tress metho	od				
CO3: Design D	Deck Slab bri	dges	for IRC	C loadi	ing					
CO4: Design T	-Beam Bridg	ges fo	r IRC	loading	g using wo	rking stress me	thod			
CO5: Design B	Ball bearings,	Pad	bearing	gs, Pie	rs and Abu	tments				
				UN	IT–I					
<i>Introduction:</i> Classification – Investigations and planning - choice of type – Economic span length - IRC specifications for road bridges – Standard live loads – Other forces acting on bridges – General design considerations.										
				UN	IT–II					
Design of Box Culverts: General aspects - Design loads - Design moments, shears and thrusts - Design of critical section.										
UNIT– III										
Design of Deck Slab Bridges: Effective width analysis - Working stress design and detailing of deck slab bridges for IRC loading.										
				UN	IT– IV					
Design of T-Beam Bridges: Introduction - Wheel load analysis – Bending moments in slab - Pigaud's theory – Analysis of longitudinal girders by Courbon's theory - Working stress design and detailing of reinforced concrete T- beam bridges for IRC class AA tracked vehicle.										
UNIT– V										
<i>Bridge Bearings:</i> General features - Types of bearings - Forces on bearings - Basis for selection of bearings-Design principles of steel rocker and roller bearings and its design – Design and detailing of elastomeric pad bearing.										
<i>Piers and Abutments:</i> General features - Bed block - Materials for piers and abutments - Types of piers - Forces acting on piers - Design of pier - Stability analysis of piers - General features of abutments -Forces acting on abutments - Stability analysis of abutments.										
Text Books:										
 D.Johnson Victor, <i>Essentials of Bridge Engineering</i>, Oxford & IBH Publishers Co. Pvt. Ltd. N.Krishna Raju, <i>Design of Bridges</i>, Oxford & IBH. 										

Reference Books:

- 1. Mc Aswanin, VN Vazarani and MM Ratwani, Design of Concrete Bridges, Khanna Publishers.
- 2. S. Ponnuswamy, Bridge Engineering, Tata Mc Graw Hill Publishing Co.
- 3. Taylor F.W., Thomson, S.E., and Smulski E, *Reinforced Concrete Bridges*, John Wiley and Sons, New York.
- 4. Derrick Beckett, An Introduction to Structural Design of Concrete Bridges, Surrey University press, Henlely-thomes, Oxford shire.
- 5. Bakht. B and Jaegar, L.G. Bridge Analysis Simplified, Mc Graw Hill.
- 6. TR Jagadeesh, M.A. Jay Ram, *Design of Bridge Structures*, Eastern economy edition.
- 7. MORTH Specifications for Road & Bridge Works, 5th Revision1

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

<u>PROFESSIONAL ELECTIVE – V</u> (in VIII Sem.)

- 1. ADVANCED STRUCTURAL DESIGN
- 2. ENVIRONMENTAL IMPACT ASSESSMENT
- 3. EARTHQUAKE ENGINEERING
- 4. SYSTEMS ENGINEERING & ECONOMICS

ADVANCED STRUCTURAL DESIGN (ASD)

VII Semester: C				Scl	neme: 2017				
Course Code	Category	Hou	ırs/We	ek	Credits	Maximum Marks			
CE415	PEC		T	Р	C	Continuous Internal Assessment	End Exam	Total	
Sectional Exam	Duration, 2			-	3	40 End Evo	00 m Durati	100	
Sessional Exam Duration: 2 Hrs End Exam Duration: 3 Hrs Course Outcomes : At the end of the course students will be able to									
CO1: Design dog legged and open well type stair cases by limit state method.									
CO2: Design combined footing by limit state method.									
CO3: Design cant	ilever and cou	inter fo	ort retai	ining w	alls by limit	t state method.			
CO4: Design wate	er tanks.								
CO5: Design decl	k slab bridge,	bridge	bearing	gs.					
				UNI	T– I				
Stair Cases: Types of stair cases, design of dog legged and open well types by limit state method.									
				UNI	T– II				
Combined Footing: Design of rectangular combined footing by limit state method.									
				UNI	Γ– III				
Retaining Walls: Design of cantilever and counter fort retaining walls by limit state method.									
UNIT– IV									
Concept of Working Stress Method:									
R.C. Circular Wat	ter Tanks:								
Design of circular water tank resting on ground with rigid and flexible bases using concept of working stress method.									
R.C Rectangular Water Tanks: Design of rectangular water tank resting on ground (working stress method).									
UNIT– V									
R.C. Bridges: I.R.C. loading and impact factor – Deck slab bridges by effective width method for Class AA Tracked vehicle using concept of working stress method.									
Bridge bearings: Types of bearings – Design of R.C. bearings and neoprene bearings.									
Text Books :									
1. N. Krishna Raju [2003], <i>Reinforced Concrete Design IS:456–2000 Principles and Practice</i> , New Age International (P) Limited.									
2. Ashok K.Jain, Reinforced Concrete Limit State Design, Nem Chand & Bros.									
3. Dr. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain [2015], Limit state design of Reinforced Concrete (As per IS 456:2000), Laxmi Publications (P) Ltd.									
Reference Books :									

- 1. N. Krishnaraju, Design of Bridges, Oxford IBH.
- 2. H.J. Shah [2014], R.C.Structures, Charoter Publications.
- 3. I.C. Syal and Goel [2003], Reinforced Concrete Structures, S. Chand & Co.

4. S.S. Bhavikatti [2008], Advanced R.C.C. Design-RCC Vol. II, New Age International.

5 N. Krishnaraju [2014], Advanced RCC, CBS Publications, New Delhi.

6. M.L. Gambhir [2013], Design of RCC structures, PHI Publishers, New Delhi

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:
ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

VIII Semester	VIII Semester : CE Scheme : 2017											
Course Code	Category	Hou	rs / V	Veek	Credits	Max	timum Ma i	rks				
CE416	PEC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total				
		2	1	-	3	40	60	100				
Sessional Exam	Duration: 2	Hrs				End E	Exam Dura	tion: 3 Hrs				
Course Outcomes: At the end of the course students will be able to												
Course Outcom	the environme	ntal a	ttribu	tes to	be consider	d for the FIA	tudy					
CO2: Fully understand the IEE and EIA Regulatory Framework as specified in EPA and EPR												
and the s	teps and proc	ess in	volve	d in IE	EE and EIA.	le work us spee		r i una Er ix,				
CO3: Formulat	e objectives o	of the	EIA s	studies								
CO4: Identify t	the methodolo	ogy to	prepa	are rap	id EIA							
CO5: Prepare I	EIA reports an	nd env	vironn	nental	managemen	t plans						
				UN	11 - 1							
<i>Introduction to EIA:</i> Concepts of E.I.A – Initial environmental Examination-Elements of EIA (Full scale EIA) - Factors affecting EIA- preparation of Environmental Base map-Classification of environmental parameters.												
				UN	IT - II							
<i>EIA Methodolo</i> Ad-hoc method method, overlay	<i>gies:</i> Introdu ls, matrix mo methods, Co	etion, ethods st/ben	Crite s, Ne efit A	eria foi twork Analysi	the selection method - is.	n of EIA Meth Environmental	odology, E Media Qu	IA methods, uality Index				
				UN	IT - III							
<i>Methods for pr</i> Vegetation and deforestation.	<i>ediction and</i> wildlife-, e	<i>asses</i> nviror	smen iment	a t of in al imp	<i>npact:</i> Air - pact of De	– Water – Soil forestation – (– Noise – Causes and	- Biological- l effects of				
				UN	IT - IV							
<i>Environmental</i> Environmental A Audit - Onsite a	<i>Audit:</i> Env Audit - Types ctivities - Eva	ironm of en aluatic	ental viron on of 2	Audi mental Audit o	t and Env l Audit - Au data and pre	ironmental leg dit protocol - S paration of Auc	gislation ol tages of En lit report.	bjectives of wironmental				
Environmental	Acts (Protect	ion a	nd Pr	eventi	on): The En	vironmental po	ollution Act	- The water				
Act - The Air (Prevention & Control of pollution Act.) - Wild life Act.												
UNIT - V												
<i>Case studies:</i> Social and environmental impact of large dams – Watershed management schemes												
– Mining, oil ret	finery, nationa	al higl	iways	s and p	ort projects	– Computer ap	plications i	in EIA.				
Text Books :												

1. Y. Anjaneyulu (2011), *Environmental Impact Assessment Methodologies*, B.S. Publication, Hyderabad.

2. <u>Larry W. Canter</u> (1996), *Environmental Impact Analysis*, McGraw Hill Book Co. **Reference Books :**

 Public Involvement and Dispute Resolution – Volume–1. Institute for Water resources, U.S. Army corps of Engineers, Alexandria, VA–22315USA, IWR Research report 82–R1, 1998.Copies available from the national Technical Information Services, 5285 Port Royal Road, Spring Field, VA–22161, USA.

2. R.E. Munn (1979), Environmental Impact Assessment, John Wiley & sons.

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

EARTHQUAKE ENGINEERING (EQE)

VIII Semester:	СЕ						Scl	heme: 2017		
Course Code	Category	Ho	ours/W	'eek	Credits	Max	imum Ma	rks		
CE417	PEC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		2	1	-	3	40	60			
Sessional Exan	n Duration: 2	Hrs				End I	Exam Dur	ation: 3 Hrs		
Course Outcomes • At the end of the course students will be able to										
Coll: Understa	and the earthqu	iu or i iake c		$\frac{150}{8}$ effe	$\frac{1}{cts of grou}$	nd motion				
CO2: Underste	and the free an	d dan	ned vi	bratio	ns modelli	ng of structure	<u>c</u>			
CO2: Understand the free and damped vibrations, modelling of structures.										
CO3: Understa	and the structu	ral dy	$\frac{1}{1}$	$\frac{s, \text{ free}}{c}$	and forced	vibrations.	11	1 111		
CO4: Understa	and the ductile	e deta	ailing o	of reir	iforced cor	crete and mas	sonry wall	building as		
CO5: Understa	and the variou	s. s eart	hauake	e prote	ective system	ms				
		b curt	inquary	- prote						
UNIT– I										
and occurrence earthquakes - In motion accelero spectra – Design	of earthquake atensity and M gram – Seism a spectrum - Re	es - S agnitu ic zon elatior	Seismic ude sca ning - n betwe	e wav ales of Eartho een the UNI	es - Effect earthquake quake grou nature of t T-II	ts of earthqual e – Tsunami - nd motion chan he ground and s	kes - Mea Seismogra racteristics structural d	asurement of aphs - Strong - Response lamage.		
Vibration of S Modelling of s structures - Ste spectrum represe	Structures una tructures and eady state for entations.	<i>der (</i> equa	G round tions d ibratio	d Mot of mo ns -]	tion: Elast tion - Fre Non-steady	ic vibration o e and damped state forced	f simple vibration vibrations	structures - as of simple - Response		
				UNI	Γ – III					
<i>Introduction to</i> prescribed loadiand damped, un	<i>Introduction to Structural Dynamics:</i> Fundamental objective of dynamic analysis - Types of prescribed loading - Methods of descretization – Basic concepts of free and forced vibrations and damped, undamped systems.									
UNIT– IV										
<i>Ductile Detailing:</i> Review of latest Indian seismic codes IS:1893, IS: 4326 and IS:13920 – Codal provisions – Importance of ductility - Designing and ductile detailing of R C Structural members like beams, columns and joints as per codes -Masonry wall buildings.										
				UNI	$\overline{\mathbf{I}} - \mathbf{V}$					
Earthquake Provident	otective System	ns: E	Base Is	olation	techniques	s – types and 1	materials u	used for base		

isolators – Vibration control measures – Important points in mitigating effects of earthquake on structures.

Text Books :

1. S.K. Duggal, *Earthquake Resistant Design of Structures*, Oxford Publishers

2. Pankaj Agarwal and Manish Shrikhanda, Earthquake Resistant Design of Structures, PHI. **Reference Books :**

- 1. A.K Chopra, Dynamics of Structures: Theory and Applications to Earthquake Engineering, Prentice Hall.
- 2. Mario Paz, Structural Dynamics- Theory & Computations, Kluwer Acadamic Publishers

3. Neelam Sharma, Earthquake Resistant Building Construction, S.K. Kataria & Sons.

4. IS Codes: IS: 1893, IS: 4326 and IS: 13920.

Ouestion Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

SYSTEMS ENGINEERING & ECONOMICS (SEE)

VIII Semester:	CE				Scheme:					
Course Code	Category	Hours/Week			Credits	Maxii	num Mar	ks		
CE418	PEC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		2	1	-	3	40	60	100		
Sessional Exam	Duration: 2	Hrs				End Exam	Duration	: 3 Hrs		
Course Outcor	os · At the end	lofth	COURS	o stud	lants will be	able to				
CO1: Understa	nd the differen	$\frac{101 \text{ th}}{1 \text{ math}}$	ematic	al mo	dels linear n	able to	plications			
CO2: Understa	nd the simplex	algori	thm te	chnia	ues and linea	r programming	models of	f network		
flow.										
CO3: Solve the integer programming and non-linear programming problems.										
CO4: Understand queuing theory and decision support systems in civil engineering.										
CO5: Understa	CO5: Understand and analyze the engineering economics problems.									
				UNI	Γ–Ι					
Applications of <i>Linear Program</i> linear programs.	 Introduction to Mathematical Modelling: Building mathematical models - Systems analysis-Applications of linear programming - Sample decision model settings. Linear Programming: Models in civil and environmental engineering - Graphical solutions to linear programs. 									
				UNIT	-II					
<i>Simplex Algorit</i> Simplex pivoting	t hm for Solvin g.	ıg Lin	ear Pr	ogran	ns: Simplex	x algorithm - S	ensitivity	analysis -		
Linear Program and integer solut	aming Models tions.	of Ne	twork	Flow:	Shortest par	th problem - N	etwork for	mulations		
			۱	UNIT	– III					
Integer Program bound algorithm	nming and Its	Applie	cations	s: Mix	ed integer pr	rogramming pro	oblems - B	ranch and		
<i>Nonlinear Programming:</i> Dynamic programming - Nonlinear programming - Unconstrained optimization - Calculus with substitution - Lagrange multipliers - Gradient search.										
	UNIT– IV									
Queuing Theory	<i>Queuing Theory:</i> Principles of queuing theory, queuing models.									
<i>Decision Support Systems in Civil Engineering:</i> Fuzzy logic - Artificial neural networks - Case- based reasoning - Expert systems.										

UNIT-V

Engineering Economics - Interest and Equivalence: Compound interest - Single payment - Nominal and effective interest rate - Continuous compounding - Standard cash flow series.

Choice Between Alternatives: The analysis methods - Present worth - Annual cash flow - Incremental B/C ratio - Incremental rate of return - Payback period - Breakeven analysis.

Text Books :

- 1. Revelle, C.S., Whitlatch, E.E. and Right, J.R. (2004) *Civil and Environmental Systems Engineering*, Prentice Hall, New Jersey.
- 2. Mathur, N. (2011), *Basics Of Linear Programming*, Anmol Publisher.
- 3. Donald Gross, John F. Shortle, James M. Thompson, Carl M. Harris. (2012). *Fundamentals of Queueing Theory*, Wiley.

Reference Books :

- 1. Mishra, Sasmita, (2010). *Engineering Economics and Costing*, Prentice Hall India Learning Private Limited.
- 2. David G. Luenberger, Yinyu Ye. (2016), *Linear and Nonlinear Programming (International Series in Operations Research & Management Science)*, Springer Nature.

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

<u>PROFESSIONAL ELECTIVE – VI</u> (in VIII Sem.)

- 1. DESIGN & DRAWING OF HYDRAULIC STRUCTURES
- 2. INTELLIGENT TRANSPORTATION SYSTEM
- 3. RURAL WATER SUPPLY AND ONSITE SANITATION SYSTEMS
- 4. FINITE ELEMENT METHODS

DESIGN AND DRAWING OF HYDRAULIC STRUCTURES (DDHS)

Course Code CE419 Sessional Exam I Course Outcome CO1: Design the	Category PEC Duration: 2 es: At the er e component	Hou L 1 2 Hrs	T	reek P -	Credits C	Max Continuous Internal Assessment	imum Marl End Exam	ks Total							
CE419 Sessional Exam I Course Outcome CO1: Design the	PEC Duration: 2 es: At the er e component	L 1 2 Hrs	T 2	P -	C 3	Continuous Internal Assessment	End Exam	Total							
Sessional Exam I Course Outcome CO1: Design the	Duration: 2 es: At the er	2 Hrs	4	-		40	60	100							
Course Outcome CO1: Design the	es: At the er	d of t		Sessional Exam Duration: 2 Hrs End Exam Duration : 3 Hrs											
Course Outcome CO1: Design the	es: At the er	d of th	·												
CO1: Design the	component	Course Outcomes: At the end of the course students will be able to													
CO1: Design the components of tank sluice and surplus work of a tank															
CO2: Design car	nal drop and	l cana	l regul	ator cu	um road brid	ge									
CO3: Draw the	features of	surplu	is weir	and sl	uice of a tar	ik									
CO4: Design abutments, wing walls and return walls of irrigation structures															
CO5: Check the	stability of	side w	all of a	a sluic	e barrel and	pier of a canal	regulator								
CO6: Draw the f	CO6: Draw the features of canal drop, canal regulator cum road bridge and under tunnel.														
					-										
				UN	IT - I										
Design of	Design of														
Surplus Weir: In Length of surplus Tank Sluice with Stability analysis	ntroduction Weir – Cre <i>Tower He</i> – Tower he	– Est est wid <i>ad:</i> Ve ad des	timatic th – Ba entway ign – (on of t ase wid desig	flood discha dth – Abutm n – Sluice b 1.	rge – Selection Nents – Wings – Nenter – R.C. S	on of type - Returns – 2 lab – Earth	of work – Aprons. pressure –							
Canal drop (Note of drop wall – No	c h type): Tr otch pier – P	apezoi Protecti	idal no ive wo	tch –] rks.	Length of dr	op wall betwee	en abutment	s – Profile							
<i>Canal regulator</i> Piers – Shutters Revetments – Ene	<i>cum Road</i> – Abutmer ergy dissipa	Bridg nts – tion.	e: Ver Wing	it way Walls	design – D – Return v	prowning ratio walls – Solid s	method – F apron for r	Roadway – egulator –							
<i>Under Tunnel:</i> D levels – Tail chan of returns – Wing	Design of ba nnel – Afflu walls and r	arrel ro x over returns	oof – A drop - Upli	Abutme wall – ft – Ci	ent pressure Loss of hea reep lost in p	under Pier – F d calculation – percolation.	ixing maxir Depth of fo	num flood oundations							
				UNI	T - II										
 Design and Draw 1) Surplus weir 2) Tank sluice w 3) Canal drop (N 4) Canal regulate 5) Under tunnel 	v ing of vith tower he Notch type) or cum road	ead I bridg	e												

Text Books :

1. C.Satyanarayana Murthy [2009], *Water Resources Engineering Principles and practice*, New Age International Publishers, New Delhi.

Reference Books :

1. S.K. Garg [2008], Irrigation and Hydraulic structures, Khanna Publishers.

Question Paper Pattern:

Sessional Exam:

1. The Question paper shall consist of TWO questions related to Design and drawing. The student shall answer ONE question.

End Exam:

1. The question paper shall consist of TWO units with TWO questions in each unit. The student shall answer any ONE question from each unit.

2. First unit shall have questions related to theory and design aspects only for 20 marks from the Unit - I of the syllabus. Second unit shall have design and drawing question from Unit- II of the syllabus for 40 marks.

INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

VIII Semester	VIII Semester : CE Scheme : 2017									
Course Code	Category	Hou	ırs / W	eek	Credits	Maxir	num Mark	S		
CE420	PEC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		2	1	-	3	40	60	100		
Sessional Exam	n Duration: 2	2 Hrs				End Exar	n Duration	: 3 Hrs		
Course Outcor	nos. At the er	nd of t	he cou	rea etu	dents will be	able to				
CO1: Understa	and the sensor	r techn	ologie	s						
CO2: Understa	and the comm	unicat	ion tec	hnique	es					
CO3: Apply th	e various ITS	s meth	odolog	ies						
CO4: Understand the user needs										
CO5: Define the	ne significanc	e of IT	FS und	er Indi	an conditior	18				
UNIT - I										
<i>Introduction:</i> Objectives- Advantages - Data Collection Techniques - Detectors - Automatic Vehicle Location - Automatic Vehicle Identification - Geographical Information Systems - Video Data Collection.										
UNIT - II										
<i>Telecommunica</i> Information M communication	<i>ations in II</i> anagement - – Vehicle Po	T S: In Traf	nportar fic Mang Sys	nce of anager stem.	telecommu nent Center	unications in rs (TMC) -	the ITS sy Vehicle–Ro	ystem - ad side		
				UNIT	- III					
<i>ITS functional</i> Information Sy Control System Rural Transport	<i>areas:</i> Advant stems (ATIS) as (AVCS) - cation System	nced T) - Co Advan s (AR	Traffic mmerc ced Pu ΓS).	Manag ial Ve ıblic T	gement Syste hicle Opera Fransportatio	ems (ATMS) - tions (CVO) - on Systems (A	Advanced Advanced PTS) - Ad	Fraveler Vehicle dvanced		
				UNIT	- IV					
ITS User Need Management - Management -	ds and Serva Electronic Advanced Ve	<i>ices:</i> ' Paym hicle s	Travel ient - afety s	and Com ystem	Γraffic man mercial Vε s - Informati	agement - Pu ehicle Operati ion Manageme	blic Transp ons - Em nt.	ortation ergency		
				UNIT	- V					
Automated Highway Systems: Vehicles in Platoons – Integration of Automated Highway Systems - ITS Programs in the World – Overview of ITS implementations in developed countries - Case studies.										
Text Books : 1. ITS Hand Book 2000: Recommendations for World Road Association (PIARC), Kan Paul Chen, John Miles.										

- 2. Sussman, J. M., Perspective on ITS, Artech House Publishers, 2005.
- 3. *National ITS Architecture Documentation*, US Department of Transportation, 2007 (CD-ROM).

Reference Books :

1. Chowdhary, M.A. and A Sadek, *Fundamentals of Intelligent Transportation systems planning*, Artech House Inc., US, 2003.

Web References:

1. www.nptel.ac.in/courses

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

RURAL WATER SUPPLY AND ONSITE SANITATION SYSTEMS (RWSS)

VIII Semester	: CE						Sche	eme: 2017	
Course Code	Category	Hou	ırs / V	Veek	Credits	Max	imum Mar	ks	
CE421	PCC	L	T	Р	C	Continuous Internal Assessment	End Exam	Total	
Sossional Evan	Duration: 2	4 Hrs	T	-	3	40 End Ex	00 vom Duroti	$\frac{100}{00 \cdot 3 Hrs}$	
Sessional Exam	i Duration, 2	1115							
Course Outcon	nes: At the end	l of th	ne cou	rse stu	dents will b	e able to			
CO1: Identify	the problems p	ertain	ing to	rural	water supply	and sanitation			
CO2: Understa	and the differen	t wate	er sup	ply an	d sanitation	system for rura	l communit	zy.	
CO3: Design low cost treatment system for rural areas.									
CO4: Design low cost waste management systems for rural areas.									
CO5: Plan and	design an efflu	ient d	isposa	al mec	hanism				
UNIT - I									
Concept of environmental and scope of sanitation in rural areas-Issues of rural water supply – Various techniques for rural water supply- merits- National rural drinking water program- rural water quality monitoring and surveillance- operation and maintenance of rural water supplies UNIT - II Low Cost Water Treatment: Introduction – Epidemiological aspects of water quality methods for									
	reament - Spe		ontan	UNI	Γ - III				
Planning of di emergencies of wastewater/s	stribution syst Planning of wa ewage.	tem i stewa	n rur iter co	al are	eas. Water on system in	supply during rural areas -T	fires, fes reatment ar	tivals and nd disposal	
				UNI	Г - IV				
Compact and si septic tanks - so	mple wastewat oak pits- low co	er tre st exc	atmen creta d	t units lisposa	and system l systems.	s in rural areas	- stabilizati	on ponds -	
				UNI	T - V				
Disposal of solids waste: Composting -Biogas plants - Rural health - Other specific issues and problems encountered in rural sanitation.									
Tort Declar									
1. Eulers, V.MCompany, 12. Wright, F.B	., and Steel, E. 1965. ., Rural Water	W., M	Iunici oly an	ipal ar d San	nd Rural Sar itation, E. R	nitation, 6th Ec	l., McGraw Publishing	Hill Book Company,	

Huntington, New York, 1977

Reference Books :

- 1. Juuti, P., Tapio S. K., and Vuorinen H., *Environmental History of Water: Global Views on Community Water Supply and Sanitation*, IWA Publishing (Intl Water Assoc), 2007
- 2. *Low cost on site sanitation option*, Hoffman & Heijno Occasional Nov.1981 paper No 21, P.O. Box 5500 2280 HM Rijswijk, the Netherlands offices, J.C. Mokeniaan, 5
- 3. Manual of Water Supply and Treatment, 3rd edition, CPHEEO, GOI, New Delhi.
- 4. Rijswijk (the Haque). Wagner, E.G. and Lanoik, J.N., *Water Supply for Rural Areas and Small Communities*, Geneva: W.H.O.1959

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

FINITE ELEMENT METHODS (FEM)

VIII Semester	·: CE						Sc	heme: 2017	
Course Code	Category	Но	urs/W	'eek	Credits	Max	imum Ma	irks	
CE422	PEC	L	T	Р	C	Continuous Internal Assessment	End Exam	Total	
		<u> </u>	I	-	3	40	00		
Sessional Exa	m Duration: 2	Hrs d of t	ha aqu	rao atu	donta will	Ena E	xam Dura	ation: 3 Hrs	
Coll: Underst	and the concepts	$\frac{u \text{ of } t}{s \text{ of } F}$	FM and	d Ener	av principle				
CO2: Analyze	Axi-symmetric	bodie	es of re	volutio	on				
CO3: Analyze	stiffness matrix	and S	Shape 1	Functio	ons for Bear	m & Bar elemer	nts		
CO4: Analyze	Two Dimension	nal ele	ments	for pla	ne stress ar	d plane strain c	onditions		
CO5: Analyze Two Dimensional Isoparametric elements with Four and Eight nodes									
UNIT– I									
Introduction: Concepts of FEM-Steps involved - Merits an									
d demerits - Energy principles – Descretization - Rayleigh – Ritz method of functional approximation.									
				UNI	T– II				
Principles of	Flasticity. Stro	SS 601	uation	s – Str	ain displac	ement relation	shins in n	natrix form -	
Plane stress and	d plane strain a	nd ax	i-symn	netric	bodies of r	evolution with a	axi-symme	etric loading.	
				UNI	Γ– III				
One Dimension elements – Stat	nal FEM: Stiff	fness of glo	matrix bal stit	for be	eam and ba matrix – So	ar elements – S lution.	hape func	tions for 1-D	
				UNI	Γ– ΙV				
<i>Two Dimensio</i> Displacement of Area and vo Static condensa	<i>nal FEM:</i> Diff models – Gener olume coordina ation.	ferent ralize tes –	types d coor Genei	of elen dinates ration	nents for p s – Shape t of element	plane stress and functions – Nat t stiffness and	plane stra ural coord nodal loa	in analysis – linate system d matrices –	
				UNI	T– V				
<i>Isoparametric Formulation:</i> Concept - Different isoparametric elements for 2-D analysis - Formulation of 4-noded and 8-noded isoparametric quadrilateral elements.									
1 CS Krishne Murthy Finite Floment Analysis Theory & Decongruine Toto McCrew Hill									
2. Tirupathi C Publishers	ChandruPatla A	&Be	ent An elugum	<i>alysis</i> - udu,	–Ineory & Introductio	Programming, on to Finite Ele	ement Met	hod, Khanna	

Reference Books :

1. Cook, R.D., *Concepts and Applications of Finite Element Analysis*, John Wiley and sons Inc., New York.

2. J.N. Reddy, Introduction to Finite Element Method, McGraw Hill Book Co.

3. Bathe K.J., Finite Element Procedures in Engineering Analysis, Prentice Hall.

4. Gallagher R.H., & Wilson, Finite Element Analysis Fundamentals, Prentice Hall Inc.

5. Hinton and Owen, Finite Element Programming, Academic press, London.

- 6. O.C. Zienkiewicz, *Finite Element Method*, Butterworth-Heinemann
- 7. V.K. Manicka Selvam, Concepts of Finite Element Methods, Scitech Publications

Question Paper pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

OPEN ELECTIVE - I

S. No.	Course No.	Course Name	Offered by the Department
1	OE301	Artificial Intelligence & Expert Systems	CSE
2	OE302	Introduction to Information Systems	CSE
3	OE303	Web Development Programming	CSE
4	OE304	Introduction to Cyber Security	CSE
5	OE305	Internet of Things	ECE
6	OE306	Nano Technology	ECE
7	OE307	Remote Sensing & GIS	CE
8	OE308	Optimization Techniques	ME
9	OE309	Renewable Energy	EEE
10	OE310	Introduction to Java	CSE

OPEN ELECTIVE - II

S. No.	Course No.	Course Name	Offered by the Department
1	OE311	Object Oriented Programming through JAVA	CSE
2	OE312	Ethical Hacking	CSE
3	OE313	Principles of Programming Languages	CSE
4	OE314	Advanced Information Systems	CSE
5	OE315	Scientific Programming with Python	CSE
6	OE316	Fuzzy Logic & Neural Networks	ECE
7	OE317	Building Information Modeling	CE
8	OE318	Product Lifecycle Management	ME
9	OE319	Simulation of Engineering Systems	EEE

ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS (AIES)

V Semester : B	B.Tech.						Sche	eme: 2017		
Course Code	Category	Hou	rs / We	eek	Credits Maximum Marks					
OE301	OEC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		2	1	-	3	40	60	100		
Sessional Exam	n Duration: 2	2 Hrs				End Ex	xam Durati	on: 3 Hrs		
Course Outcom	mes: At the en	nd of th	e cours	e stud	ents will be	e able to				
CO1: Understa	and how to fo	rmulate	e an effi	cient	problem sta	ate space for a	problem			
CO2: Discuss h	now search st	rategies	s will fi	nd sol	utions to p	roblems by sys	tematically	generating		
new states and testing them against goals										
CO3: Apply Hill-climbing, simulated annealing, Local Beam Search, Genetic Algorithms										
(Local se	earch problem	(s) for A	Agent's	Probl	ems	·				
CO4: Describes how to solve unpredictability, contingencies of agent's problem-solving										
process,	in which the a	agents	$\frac{\text{GAME}}{1}$	goals	are in cont	flict				
CO5: Understa	and the featur	es and	working	g of E	xpert Syste	em.				
				TINIT	гт					
	UNIT - I									
Intelligent Age The Nature of E Solving Proble Solutions.	ents: Agents Environments ms by Searc	and En , And tl <i>hing:</i> I	ivironm ne Struc Problem	ents, cture c n-Solv	Good Beh of Agents. ing Agents	aviour: The C s, Example Pro	oncept of F oblems, Sea	Rationality, arching for		
				UNIT	' - II					
Uninformed Se Informed (Heu heuristic search	earch Stratege eristic) Search , Learning to	ies: BF h Strate search	S, DFS, egies- C better. 1	, Dept Freedy Heuris UNIT	h –limited ⁷ best-first stic Functic - III	search, IDA, B search, A* sea ons.	idirectional rch, Memor	search y-bounded		
Beyond Classic	cal Search: I	Local S	earch A	lgorit	hms and C	Optimization Pr	roblems, Lo	cal Search		
In Continuous	Spaces, Sea	rching	with Pa	artial	Observatio	ons. Searching	with Nonde	terministic		
Actions			1		TX7					
A du ang gri gl S a	mah. Comos	Ontim	al Daai		- 1 V [n Comos	Almha Data D	mina			
<i>Constraint Satisfaction Problems:</i> Defining Constraint Satisfaction Problems, Constraint Propagation: Inference In Csps, Backtracking Search For Csps, Local Search For Csps, The Structure Of Problems										
UNIT - V										
<i>Introduction to</i> of good expert between expert	UNIT - V <i>Introduction to Expert System:</i> What are Expert Systems, Features of Expert system, Features of good expert system, Role of human in Expert system, Expert system organization, Difference between expert system and conventional program. Basic activities of expert system and the areas									

in which they solve problems, Prospector system features, working.

Text Books :

- 1. Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, Third Edition, 2010, Pearson Education.
- 2. Donald A.Water man, A Guide to expert systems, Addison Wesley publishing company.

Reference Books :

1. Elaine Richie Kevin Knight [2008], [3rd Edition], Artificial Intelligence, TMH

Web References:

1. https://onlinecourses.nptel.ac.in/noc18_cs51

2. https://www.geeksforgeeks.org/artificial-intelligence-an-introduction/

3.

https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_expert_systems.htm

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

INTRODUCTION TO INFORMATION SYSTEMS (IIS)

V Semester : B	B.Tech.						Sche	eme: 2017	
Course Code	Category	Hou	ırs / We	eek	Credits	Max	imum Mar	ks	
OE302	OEC	L	T	Р	С	Continuous Internal Assessment	End Exam	Total	
		2	1	-	3	40	60	100	
Sessional Exar	n Duration:	2 Hrs				End Ex	xam Durati	on : 3 Hrs	
	A	1 0 1				1.1			
Course Outcon	mes: At the en	nd of th	e cours	e stud	ents will b	e able to	0	0	
CO1: Understa	and the conce	pts of c	ompute	er arch	itecture an	d functionalitie	es of system	software	
CO2: Understa	ind the page re	placem	ent and	<u>CPU S</u>	Scheduling	Algorithms			
CO3: Understa	ind the phases	of softv	vare dev	elopm	ent life cyc	le and process n	nodels		
CO4: Design E	ER model for r	eal life	scenario	S					
CO5: Apply SQL commands to create, update, modify and retrieve data from the data bases									
CO6: Apply normalization techniques to normalize the database									
UNIT - I									
Fundamentals	of Computer.	s & Co	mputer	Archi	tecture:				
Introduction, C	Organization	of a si	mall co	mpute	er, Central	Processing U	Jnit, Execut	tion cycle,	
Instruction cate	egories, meas	ure of	CPU 1	perform	mance, Me	emory, Input/	output devi	ces, BUS,	
addressing mod	es								
System Softwar	re:								
Assemblers, Lo	aders and lin	kers, Co	ompiler	s and	interpreter	S.			
				UNII	· - 11				
Operating Syste	em:			. 1	. D		-1 : : : 1	D	
Introduction,	Memory ma	anagem	ient so	cneme	s, Page	replacement	algorithms	, Process	
management, C	PU schedulin	ig algor	unins.						
Software engin	eering: eering: Intro	Justion	to Sof	twora	anginaarir	ng Life cycle	of a softwa	ra project	
software Dovel	opmont mode		10 501	twale	engineern	ig, Life cycle	of a softwa	ie projeci,	
Software Devel	opinent mode	15.	1		ш				
Relational Date	ahaso Manaa	omont	Sustam	•	- 111				
Introduction to	DRMS the d	emeni atabase	techno	logy	data model	ls. Database Us	ers		
Entity Relation	shin (E-R) M	atabase Indellin	σ•	iogy,		is, Database Us			
Introduction N	otations Mo	delling	s. E-R Di	aoram	ns. Case St	udies Merits	and Deme	rits of E-R	
modelling	01110115, 1010	aening		ugrun					
- mouoning.			1	UNIT	- IV				
Structured Oue	erv Language	(SOL)	•						
Introduction to SOL Data types. Data Definition language commands. Data Manipulation									
Language Com	mands and 1	Data co	ontrol I	Langua	age Comm	ands, Candida	te Key, Pri	mary key.	
Foreign key, S	elect Clause,	Where	clause	e. Log	gical Conn	ectives – ANE	D. OR, Ran	ge Search,	
Pattern Matching, Order By, Group By, Set Operations – Union, Intersect and Minus, Aggregate									
Functions, Join	Operations.	. I .	<i>,</i> ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	T	-	,	,	00 0	
,	•			UNIT	- V				
L									

Normalization:

Introduction, Need for Normalization, Process of Normalization, Types of Normal Forms (1 NF, 2 NF, 3 NF & BCNF), Merits and Demerits of Normalization

Text Books :

- 1. Campus Connect Foundation Program Computer Hardware and System Software Concepts, Programming Fundamentals- Vol. 1, INFOSYS.
- 2. Campus Connect Foundation Program Relational Database Management System, Client Server Concepts, Introduction to Web Technologies Vol. 4, INFOSYS
- 3. Henry F. Korth& Abraham Silberschatz, *Data Base System Concepts*, 5th Edition, 2005, Mc Graw hill

Reference Books :

- 1. M. Morris Mano [2011], [3 rd Edition], *Computer system architecture*, Pearson Education, 2011
- 2. Sommerville [2008], [7th Edition], Software Engineering, Pearson education.
- 3. Raghu Ramakrishna and Johannes Gehrke [2003], [3rd Edition], *Data Base Management Systems*, TATA Mc GrawHil
- 4. Tanenbaum [2000], Modern Operating System, Pearson Education

Web References:

- 1. https://www.w3schools.com/sql/
- 2. https://www.geeksforgeeks.org/dbms/

3. https://www.tutorialride.com/software-engineering/software-engineering-tutorial.htm

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

WEB DEVELOPMENT PROGRAMMING (WDP)

V Semester : E	S.Tech.						Sche	eme : 2017	
Course Code	Category	Hou	irs / We	eek	Credits	Max	imum Mar	ks	
OE303	OEC		T	Р	C	Continuous Internal Assessment	End Exam	Total	
Sessional Evan	n Duration•	2 <u>4</u> 2 Hrs		-	5	Fnd Fy	uu vam Durati	100 $\cdot 3$ Hrs	
Sessional Exa		2 111 5					sam Durau		
Course Outcou	mes: At the end	nd of th	e cours	e stud	ents will be	e able to			
CO1: Understa	and the funda	mental	concept	ts of v	veb designi	ng.			
CO2: Design a	a static web p	age usii	ng HTM	IL tag	s and attrib	outes.			
CO3: Develop	CO3: Develop web pages using HTML and Cascading Styles sheets.								
CO4: Understand the concepts of server side programming.									
CO5: Create d	CO5: Create dynamic and interactive websites using database connection.								
UNIT - I									
URL and its Anatomy, Message Format, Persistent and Non-persistent connections, Web Caching, Proxy, Java and the Net, Java Network Classes and Interfaces, Looking up Internet Address.									
UNIT - II									
<i>HTML:</i> HTMI Advanced Tags Website, Desig	and its Fla , Frames, Im ning Web pag	ivors, H nages, N ges, Mu	HTML Meta tag Iltimedi	basics g, Plai a cont UNIT	, Elements nning of W ent. - III	s, Attributes a /eb page, Mod	nd Tags, B lel and Stru	asic Tags, cture for a	
Cascading Sty layout, Selector	le Sheets : A 's.	Advanta	ges, Ao	dding	CSS, Bro	wser compatil	bility, CSS	and page	
			۱	UNIT	- IV				
Server Side Programming: Server-side Java, Advantages over Applets, Servlet alternatives, Servlet strengths, Servlet architecture, Servlet life cycle, Generic and HTTP Servlet, First servlet, Passing parameters to servlets, Retrieving parameters, Server-side include, Cookies, Filters, Problems with servlet, Security issues, JSP and HTTP, JSP Engines, How JSP works, JSP and Servlet, Anatomy of a JSP page, JSP syntax, JSP components.									
Database Com	noctivity. Do	tahaca	connect			vers Rasia sta	ne Loadin	a a driver	
Making a connection, Execute and SQL statement, SQL statements, Retrieving the result, Getting database information.									
Text Books :									
1. UtamK.Rov	, Web Techno	ologies.	Oxford	High	er Educatio	on, 1 st Edition.	Seventh Im	pression.	
2. K.L.James,	The Internet-	A User	Guide,	2nd E	Edition, PH	I Publications.			
5.									

Reference Books :

- 1. Y.Daniel Liang, Introduction to Java Programming-II, 6th Edition, Pearson Education, 2007
- 2. Srinivasan, Web Technologies, Pearson Education, 2012.
- 3. Kognet Learning Solutions inc., HTML5 in Simple Steps, DreamTech press.

4. Ivan Bayross, Sharanam Shah, Cynthia Bayrossand, Vaishalishai, SPD, Java EE 5 for Beginners

Web References:

1. https://www.tutorialspoint.com/html/

2. https://www.tutorialspoint.com/css/

3. https://www.javatpoint.com/java-tutorial

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

INTRODUCTION TO CYBER SECURITY (ICS)

V Semester : B.Tech. Scheme : 2017										
Course Code	Category	Hou	rs / We	eek	Credits	redits Maximum Marks				
OE304	OECLTPCContinuous Internal AssessmentEnd ExamTot							Total		
		2	1	-	3	40	60	100		
Sessional Exar	n Duration: 2	2 Hrs				End Ex	xam Durati	on: 3 Hrs		
Course Outcomes: At the end of the course students will be able to										
CO1: Understand cyber security architecture principles										
CO2: Identifyi	ng different c	classes of	of attacl	KS						
CO3: Understa	and about cyb	ercrime	e with n	nobile	and wirele	ess devices				
CO4: Understa	and about the	tools a	nd meth	ods u	sed in cybe	ercrime.				
CO5: Understa	and about cyb	er secu	rity and	l socia	l media ma	arketing.				
				UNI	Г - I					
<i>Introduction to Cybercrime:</i> Introduction, Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, Who are Cybercriminals, Classifications of Cybercrimes, Cybercrime: The Legal Perspectives, Cybercrimes: An Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens.										
UNIT - II										
<i>Cyber offenses:</i> How Criminals Plan Them –Introduction, How Criminals Plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector Cloud Computing.										
UNIT - III										
Cybercrime Mobile and Wireless Devices: Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones. Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.										
UNIT - IV										
Tools and Methods Used in Cybercrime: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks, Phishing.										
Cyher Security	•			UNII	- v					
Cyber Security.	•									

Organizational Implications Introduction, Cost of Cybercrimes and IPR issues, Web threats for Organizations, Security and Privacy Implications, Social media marketing: Security Risks and Perils for Organizations, Social Computing and the associated challenges for Organizations.

Text Books :

- 1. Nina Godbole, Sunit Belapure, Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley.
- 2. MichealE.Whitman and Herbert J.Mattord, *Principles of Information Security*, Cengage Learning.

Reference Books :

1. Mark Rhodes, Ousley, Information Security, MGH.

2. James Graham, Richard Howard and Ryan Otson, Cyber Security Essentials, CRC Press

Web References:

1.

https://www.tutorialspoint.com/fundamentals_of_science_and_technology/cyber_crime_and_cyber_security.htm

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

INTERNET OF THINGS (IOT)

V Semester : B.Tech. Scheme : 2017												
Course Code	Category	Hours / Week			Credits Maximum Marks							
OE305	OEC	L 2	T	Р	PCContinuous Internal AssessmentEnd ExamTotal-34060100							
Sessional Evan	n Duration•	2 Hrs	L	-	3	Find Fy	00 vəm Durəti	$\frac{100}{00 \cdot 3 \text{ Hrs}}$				
Sessional Exam Duration: 2 mrs End Exam Duration : 3 mrs												
Course Outcomes: At the end of the course students will be able to												
CO1: Understand the basic knowledge of Internet of things and its design												
CO2: Understar	nd the purpose	of sense	ors and A	Actuate	ors in IoT	0						
CO3: Analyze V	arious IoT Pr	otocols										
CO4: Design Io	T Projects Usi	ng Ardu	ino									
CO5: Understar	nd Raspberry-F	Pi Proces	ssor and	Raspb	ian Operati	ng Systems						
Terter de chiere de	LT			UNI	[-]							
Introduction to					1 Declar							
Definition and	Characterist	ICS OF	101, P	nysica Tomm	il Design	and Logical I	Jesign, IoI	Enabling				
Technologies, IoT Levels and Deployment Templates, IoT Vs M2M.												
Songing and A	tuation.			UNII	- 11							
Definition of S	ansor Sensor	· footur	as Dasc	Jution	Classes	Different type	s of sensors	Actuator				
Definition of Sensor, Sensor features, Resolution, Classes, Different types of sensors, Actuator, Different types of Actuators, purpose of Sensors and Actuators in IoT												
UNIT - III												
Wireless Techn	ologies and	Data Tr	ransmis	sion f	for IoT:							
Wi-Max, Wi-F	i (802.11), I	Bluetoo	th/Blue	tooth	smart, Zig	gbee/ Zigbee	smart, Cellu	ular, NFC,				
Serial Transmis	ssion, RS-232	2, RS-4	85, I2C	Inter	r-Integrated	d Circuit, Ethe	rnet, CAN	bus, USB,				
Firewall, Serial	ATA, Paralle	el Trans	smission	n.	C							
UNIT - IV												
Building IoT w	ith Arduino:											
Arduino IDE, F	Programming	of Ard	uino, In	terfac	ing LED, s	switch, potentio	ometer, Sens	sors, LCD,				
Bluetooth, Wi-Fi, GPS, RFID with Arduino.												
UNIT - V												
Raspberry Pi:												
Linux basics, Linux File system, Navigating the File system, Text Editors, Accessing Files,												
Permissions, Processes, Linux Graphic user Interface, Raspberry Pi Processor, Raspberry Pi Vs Arduino, Operating system banefits, Raspberry Pi Set up, Configuration												
Arduno, Opera	ung system t	benefits.	, Kaspo	erry P	i set up, C	omiguration.						
Toxt Books .												
1 Arsheen R	ahga Viiav	Madise	tti Into	rnet i	of Things.	A Hands-On	Annroach	Panerhack				
2015.	ungu, vijuy	1,100150	, 11110		., 1 111155.		ippioucit,	aperoder,				
2. Rajkumar B	huyya, <i>Intern</i>	et of Th	nings: P	rincir	oles and Pa	radigms, 2016						
5		5	0	ſ		0 /						

- 3. Adeel Javed, Building Arduino Projects for the Internet of Things, Apress, 2016
- 4. Wolfram Donat, Learn Raspberry-Pi with Python, Apress, 2016

Reference Books :

1. Charles Bell, Beginning Sensor Networks with Arduino and Raspberry-Pi, Apress, 2016

- 2. Andrian McEwen, Hakim Casimally, Designing of Internet of Things, John Wiley, 2014
- 3. Warren Gay, Mastering the Raspberry-Pi, Apress, 2016

4.

Web References:

- 1. https://nptel.ac.in/courses/106105166/
- 2. https://onlinecourses.nptel.ac.in/noc17_cs22/course
- 3. https://nptel.ac.in/courses/108108098/4
- 4. https://onlinecourses.nptel.ac.in/noc19_ee28

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

NANO TECHNOLOGY (NNT)

Course Code Category Hours / Week Credits Maximum Marks OE306 OEC L T P C Continuous Internal Assessment End Exam Total Sessional Exam Duration: 2 Hrs End Exam Duration : 3 H End Exam Duration : 3 H Course Outcomes: At the end of the course students will be able to CO1: Acquire some of the fundamental principles behind nanotechnology and nanomateria and their vital role in novel sensing properties and applications. CO2: Understand the fabrication, characterization, and manipulation of nanomaterial Nanosensors and introduction to sensors. CO3: Understand about metal nanoparticle based sensors and nanowire based sensors. CO4: UNIT - I Introduction to Nanotechnology: UNIT - I Introduction for Cores of Mathematerials; types of nanostructures (0D, 11 and 2D structures); nanocomposites; and main chemical/physical/electrical/poil properties on nanomaterials.Methods for characterizing the nanomaterials; types of nanostructures (0D, 4FM Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), at spectroscopy- and spectrometry-based surface analysis techniques. Fabrication of sensors to bottom-up and top-down approaches; self-assembly of nanostructures; and examples f nanotechnology application. UNIT - II Introduction to Sensors' Science and Technology: Definition of sensors; main elements of sensors; similarities between living organisms at artificial sensoris (osmelling and tasting);	V Semester : B.Tech. Scheme : 2017										
OE306 OEC L T P C Continuous Internal Assessment End Exam Total Total 2 1 - 3 40 60 100 Sessional Exam Duration: 2 Hrs End Exam Duration : 3 H End Exam Duration : 3 H Course Outcomes: At the end of the course students will be able to CO1: Acquire some of the fundamental principles behind nanotechnology and nanomateria and their vital role in novel sensing properties and applications. CO2: Understand the fabrication, characterization, and manipulation of nanomaterial Nanosensors and introduction to sensors. CO3: Inderstand about metal nanoparticle based sensors and nanowire based sensors. CO4: Understand about sensors based on nanostructures of metal oxides. UNIT - I Introduction to Nanotechnology: main features of nanomaterials; types of nanostructures (0D, 11 and 2D structures); nanocomposites; and main chemical/physical/electrical/optical properties nanomaterials. Methods for characterizing the nanomaterials: Atomic Force Microscopy (AFM Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), ar spectroscopy- and spectrometry-based surface analysis techniques. Fabrication of sensors b bottom-up and top-down approaches; self-assembly of nanostructures; and examples f nanotechnology application. UNIT - II Introduction to Sensors' Science and Technology: Definition of sensors; main elements of sensors; simil	Course Code	Category	Hours / Week			Credits	Maximum Marks				
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Sessional Exam Duration: 2 His End Exam Duration: 5 H Course Outcomes: At the end of the course students will be able to CO1: Acquire some of the fundamental principles behind nanotechnology and nanomateria and their vital role in novel sensing properties and applications. CO2: Understand the fabrication, characterization, and manipulation of nanomaterial Nanosensors and introduction to sensors. CO3: Understand about metal nanoparticle based sensors and nanowire based sensors. CO4: Understand about sensors based on nanostructures of metal oxides. UNIT - I Introduction to Nanotechnology: Definition of nanotechnology: nain features of nanomaterials; types of nanostructures (0D, 11 and 2D structures); nanocomposites; and main chemical/physical/electrical/optical properties on nanomaterials. Methods for characterizing the nanomaterials: Atomic Force Microscopy (AFM Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), ar spectroscopy- and spectrometry-based surface analysis techniques. Fabrication of sensors b bottom-up and top-down approaches; self-assembly of nanostructures; and examples f nanotechnology application. UNIT - II Introduction to Sensors' Science and Technology: Definition of sensors; main elements of sensors; similarities between living organisms ar artificial sensors; working mechanism of physical sensation (seeing, hearing, and feeling) ar chemical sensation (smelling and tasting); the parameters used for characterizing th performance of sensors: accuracy, precision, sensitivity, detection limit, dynamic rang selectivity, linearity, resolution, response time, hysteresis, and life cycle. UNIT - III	Sectional Ever	Duration.	$\frac{2}{2 \text{ Hm}^2}$	1	-	3	40	<u>60</u>	100		
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Introduction to Sensors' Science and Technology: Definition of sensors; main elements of sensors; similarities between living organisms an artificial sensors; working mechanism of physical sensation (seeing, hearing, and feeling) an chemical sensation (smelling and tasting); the parameters used for characterizing th performance of sensors: accuracy, precision, sensitivity, detection limit, dynamic rang selectivity, linearity, resolution, response time, hysteresis, and life cycle. UNIT - III Metal nanoparticle-based Sensors: Definition of nanoparticle; features of nanoparticles; and production of nanoparticles by physic approach (laser ablation) and chemical approaches (Brust method, seed-mediated growt etc.) Quantum Dot Sensors. Definition of quantum dot: fabrication techniques of quantum dot	Definition of nanotechnology; main features of nanomaterials; types of nanostructures (0D, 1D, and 2D structures); nanocomposites; and main chemical/physical/electrical/optical properties of nanomaterials.Methods for characterizing the nanomaterials: Atomic Force Microscopy (AFM), Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), and spectroscopy- and spectrometry-based surface analysis techniques. Fabrication of sensors by bottom-up and top-down approaches; self-assembly of nanostructures; and examples for nanotechnology application.										
Definition of sensors; main elements of sensors; similarities between living organisms an artificial sensors; working mechanism of physical sensation (seeing, hearing, and feeling) and chemical sensation (smelling and tasting); the parameters used for characterizing the performance of sensors: accuracy, precision, sensitivity, detection limit, dynamic range selectivity, linearity, resolution, response time, hysteresis, and life cycle. UNIT - III Metal nanoparticle-based Sensors: Definition of nanoparticle; features of nanoparticles; and production of nanoparticles by physic approach (laser ablation) and chemical approaches (Brust method, seed-mediated growt etc.) Quantum Dot Sensors.	Introduction to Sensors' Science and Technology:										
UNIT - III <i>Metal nanoparticle-based Sensors:</i> Definition of nanoparticle; features of nanoparticles; and production of nanoparticles by physic approach (laser ablation) and chemical approaches (Brust method, seed-mediated growt etc.) Quantum Dot Sensors. Definition of quantum dot: fabrication techniques of quantum dot	Definition of sensors; main elements of sensors; similarities between living organisms and artificial sensors; working mechanism of physical sensation (seeing, hearing, and feeling) and chemical sensation (smelling and tasting); the parameters used for characterizing the performance of sensors: accuracy, precision, sensitivity, detection limit, dynamic range, selectivity, linearity, resolution, response time, hysteresis, and life cycle.										
<i>Metal nanoparticle-based Sensors:</i> Definition of nanoparticle; features of nanoparticles; and production of nanoparticles by physic approach (laser ablation) and chemical approaches (Brust method, seed-mediated growt etc.) Quantum Dot Sensors. Definition of quantum dot: fabrication techniques of quantum dot	UNIT - III										
Macroscopic and microscopic photoluminescence measurements; applications of quantum dot as multimodal contrast agents in bioimaging; and application of quantum dots as biosensors. UNIT - IV Nanowire-based Sensors: Definition of nanowires: features of nanowires: fabrication of individual nanowire by top dow											

approaches and bottom-up approaches; and fabrication of nanowire arrays (fluidic channel, blown bubble film, contact printing, spray coating, etc.).Carbon Nanotubes-based Sensors: Definition of carbon nanotube; features of carbon nanotubes; synthesis of carbon nanotubes; fabrication and working principles of sensors based on individual carbon nanotube; fabrication and working principles of sensors based on random array of carbon nanotubes.

UNIT - V

Sensors Based on Nanostructures of Metal Oxide:

Synthesis of metal oxide structures by dry and wet methods; types of metal oxide gas sensors (0D, 1D, and 2D); defect chemistry of the metal oxide sensors; sensing mechanism of metal-oxide gas sensors; and porous metal-oxide structures for improved sensing applications.

Text Books :

1. Jiří Janata, Principles of Chemical Sensors, Springer, 2d Edition (1989).

2. Roger George Jackson, Novel Sensors and Sensing, CRC Press (2004).

Reference Books :

- 1. Florinel-Gabriel Banica, Chemical Sensors and Biosensors: Fundamentals and Applications, John Wiley and Sons (2012).
- 2. Ramsden Jeremy, Nanotechnology, an Introduction. Elsevier (2011).

Web References:

 $\frac{1.}{2.}$

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEMS (RSGIS)

V Semester : B.Tech. Scheme : 2017									
Course Code	Category	Hou	ırs / We	eek	Credits	Max	imum Mar	ks	
OE307	OEC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total	
		2	1	-	3	40	60	100	
Sessional Exam Duration: 2 Hrs End Exam Duration : 3 Hrs									
	A (1	1 6.1		· 1	4 111	11 /			
Course Outcon	mes: At the en	nd of th	e cours	e stud	ents will be	e able to	toroation w	ith corth's	
surface	and the cond	ept of	electro	magn		ion and its in	leraction w	ith earth s	
CO2: Understa	and air borne	and s	pace bo	orne r	latforms.	space imaging	satellites o	f different	
Countrie	s.		F	r	,	-F 5			
CO3: Understa	and the image	proces	sing tec	chniqu	les and app	lications of rer	note sensing	5.	
CO4: Understa	and the conce	pt of G	IS and o	organi	zation of C	HS data structu	res.		
CO5: Understa	and primary a	nd seco	ondary r	netho	ds of captu	ring spatial and	attribute d	ata.	
UNIT - I									
of Remote Sensing – Electro Magnetic Radiation (EMR), Process and Characteristics of Remote Sensing System – Energy Interaction with the atmosphere and Earth Surface Features – Vegetation, soils, water– Spectral Reflectance Curves, atmospheric windows, Advantages and limitations of remote sensing.									
UNIT - II									
<i>Platforms and Sensors:</i> Remote Sensing Systems: Platforms: Introduction – Types – Satellites and orbits, Passive and Active sensors– Spatial, spectral, radiometric and temporal resolution of satellites, Whiskbroom and Push-broom scanners, Multi-band concepts and False Color Composites - Some remote sensing satellites and their features.									
UNIT - III									
<i>Image Processing Techniques and Remote Sensing Applications:</i> Digital Image Processing: Image enhancement – Contrast stretch, Spatial filtering and edge enhancement; Classification – Supervised and unsupervised classification – Visual image interpretation techniques.									
Remote Sensing Applications - Applications in land use and land cover analysis - Mapping of forest and agriculture -Watershed management - Drought Assessment - Environmental modeling and other applications.									
	UNIT - IV								
<i>Geographic Inj</i> - Areas of GIS Data Structures	formation Sy application - s – Raster and	s <i>tem: E</i> Advan l Vecto	Basic Co tages an or data s	oncep nd Lir structu	<i>ts:</i> Definiti nitations of res - Data	on - Compone f GIS - Informa file organizati	nts - Function ation Organion on and form	ons of GIS ization and nats - Data	

Base Management Systems.

UNIT - V

GIS Data Input & Editing: Method of Spatial and Attribute data capture– Primary and Secondarydigitization and scanning method - Techniques and procedure for digitizing, Topology– Errors of Digitization and rectification - Re-projection - Transformation and Generalization - Edge matching and Rubber sheeting - Proximity - Buffering and overlay.

Text Books :

- 1. M. Anji Reddy, *Text Book of Remote Sensing and Geographic Information System*, BS Publication.
- 2. Lo C.P. & Yeung A.K.W., (2004), *Concepts and Techniques of GIS*, Prentice-Hall of India, New Delhi.
- 3. Thomas Lillesand, Ralph W Kiefer and Jonathan Chipman, *Remote Sensing and Image Interpretation*, John Wiley & Sons, India

Reference Books :

- 1. B.Bhatta, Remote sensing and Geographic Information System, Oxford Publications.
- 2. Siddiqui, M.A.(2006), Introduction to Geographical Information System, Sharda Pustak Bhavan, Allahabad.
- 3. Curran, Paul J (1985), Principles of Remote Sensing, Longman, London.
- 4. Floyd F Sabins Jr., *Remote Sensing Principles and Interpretation*, Freeman and Co., San Francisco.

Web References:

1. www.nptel.ac.in/courses

2.

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

OPTIMIZATION TECHNIQUES (OT)

V Semester : B.Tech. Scheme : 2017											
Course Code	Category	Hou	rs / We	eek	Credits Maximum Marks						
OE308	OEC	L	T	Р	C Continuous Internal Assessment Continuous						
Socional Evan	n Duration.	2) Urs	I	-	3	40 End Er	0U xom Duroti	100 on • 3 Hrs			
Sessional Exam Duration: 2 mrs End Exam Duration: 3 Hrs											
Course Outcomes: At the end of the course students will be able to											
CO1: Understand basics of operations research, linear programming models											
CO2: Solve tra	ansportation r	elated p	oroblem	.s	F0						
CO3: Solve as	signment pro	blems a	nd sequ	iencin	g problems	5					
CO4: Solve qu	euing and ga	me theo	ory relat	ed pro	oblems						
CO5: Solve pr	oject manage	ment pi	oblems								
UNIT - I											
Introduction: I	Definition, Sig	gnificar	nce of C)perat	ions Resea	rch, Models in	Operations	Research,			
Application Areas of Operations Research											
Linear Programming: Model Formulation, Graphical solution of L.P.P, Slack, Surplus and											
Artificial variab	oles, Simplex	method	l, Big M	I meth	nod, Degen	eracy in L.P.P,	Duality Co	ncept			
				UNIT	- II						
Transportation Problems: Introduction, Balanced and unbalanced Transportation problems, Initial basic feasible solution using N-W corner rule, least cost method and Vogel's approximation method, Optimal Solution (MODI method), Degeneracy in Transportation Problem											
UNIT - III											
Assignment Problems: Introduction, The Assignment Algorithm (Hungarian Assignment method), Balanced and Unbalanced Assignment Problems, Travelling Salesman Problem as an Assignment Problem											
Sequencing Models: Introduction, General assumptions, processing n jobs through 2 machines, processing 'n' jobs through m machines, Processing 2 jobs through m machines UNIT - IV											
Game Theory: Definitions and Terminology, Two Person Zero Sum Games, Pure Strategy											
Games (with Saddle Point), Principle of Dominance, Solution for Mixed Strategy Games											
(Games without Saddle Point) Graphical method											
(Games without Saddle Point) Graphical method <i>Queuing Theory:</i> Introduction, single channel - poisson arrivals - exponential service times with infinite population, and Multi-channel - poisson arrivals - Exponential service times with infinite population.											
D				UNII	- V						
Project Manag	gement: Phas	ses of	project	mana	igement, g	uidelines for	network co	nstruction,			

critical path, forward and backward pass, floats and their significance, crashing for optimum duration.

Text Books :

1. Hamdy, A. Taha, Operations Research-An Introduction, Prentice Hall of India Pvt. Ltd

2. S.D. Sharma, Operations Research, Kedarnath, Ramnath& Co., Meerut,

3. R. Paneer Selvam, Operations Research , PHI Learning Pvt. Ltd., New Delhi

Reference Books :

1. Hillier / Lieberman, Introduction to Operations Research, Tata McGraw Hill Edition

2. J.K. Sharma, Operations Research-Problems and Solutions, Macmillan India Ltd

3. Billy E Gillett, Introduction to Operations Research A Computer Oriented Algorithmic Approach, Tata McGraw Hill Edition

4. V.K. Kapoor, Operation research

Web References:

$\frac{1.}{2.}$

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

RENEWABLE ENERGY SYSTEMS (RES)

Course Code Category Hours / Week Credits Maximum Marks									
OE309 OEC L T P C Continuous Internal Assessment Total									
Sessional Exam Duration: 2 Hrs.									
Enu Exam Duration, 2 ms									
Course Outcomes: At the end of the course students will be able to									
CO1: Understand the basics terms, definitions related to solar energy conversion solar radiation									
measuring instruments.									
CO2: Understand different types of Solar Collectors and their applications.									
CO3: Understand the fundamental principles of Wind energy types and its characteristics.									
CO4: Understand the methods to harness Electrical Energy from Geothermal and Ocean									
energies.									
CO5: Understand the principles of bio conversion, types, combustion characteristics and its									
applications.									
CO6: Understand Direct Energy Conversion principle from Fuel cells and MHD generators.									
UNIT - I									
Principles of Solar Radiation:									
The role and potential of new and renewable source, the solar energy option, Environmental									
impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar									
radiation, solar radiation on titled surface, instruments for measuring solar radiation and									
sunshine, solar radiation data.									
UNIT - II Solar Energy Collection:									
<i>Sour Energy Collection:</i> Flat plate and concentrating collectors classification of concentrating collectors, orientation and									
thermal analysis, advanced collectors.									
Solar Energy Storage And Applications:									
Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications-									
Solar heating/cooling techniques. Solar distillation and drying, photovoltaic energy conversion.									
UNIT - III									
Wind Energy:									
Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz									
criteria.									
Biomass:									
Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield,									
compusion characteristics of pio-gas, utilization for cooking, i.C. Engine operation and									
UNIT - IV									
Geothermal Energy:									

Resources, types of wells, methods of harnessing the energy, potential in India. *Ocean Energy:*

OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants and their economics. UNIT - V

Direct Energy Conversion:

MHD generators, principles, dissociation and ionization, Hall effect, magnetic flux, MHD accelerator, MHD Engine, power generation systems. Fuel cells, principle. Faradays laws, thermodynamic aspects, selection of fuels and operating conditions.

Text Books :

1. G.D. Rai, Non-Conventional Energy Sources. 2011

2. Ramesh & Kumar, Renewable Energy Technologies, Narosa. 1997

Reference Books :

1. Tiwari and Ghosal, *Renewable energy resources*, Narosa.2005

2. Ashok V Desai, Non-Conventional Energy, Wiley Eastern. 1990

3. K Mittal, Non-Conventional Energy Systems, Wheeler. 1997

4. Sukhatme, Solar Energy, TMH, 2008

Web References:

- 1. https://en.wikipedia.org/wiki/Solar_irradiance
- 2. http://sfera.sollab.eu/downloads/Schools/Eduardo_Zarza_Basic_concepts.pdf
- 3. https://en.wikipedia.org/wiki/Solar_energy
- 4. https://solarprofessional.com/articles/design-installation/solar-energy-storage
- 5. https://www.energy.gov/science-innovation/energy-sources/renewable-energy/wind

6. https://www.eia.gov/energyexplained/?page=biomass_home

- 7. https://en.wikipedia.org/wiki/Geothermal_energy
- 8. https://www.renewableenergyworld.com/ocean-energy/tech.html
- 9. http://www.mhdenergy.com/

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

INTRODUCTION TO JAVA

V Semester : B.Tech. Scheme : 2017												
Course Code	Category	Hou	ırs / We	eek	Credits Maximum Marks							
OE310	OEC	L	T	Р	P C Continuous Internal Assessment Assessment For the second seco							
Construct Error	D		I	-	3	40	<u>60</u>	100				
Sessional Exam Duration: 2 mrs End Exam Duration: 3 Hrs												
Course Outcomes: At the end of the course students will be able to												
Course Outcomes: At the end of the course students will be able to												
CO1: Understand fundamentals of oops concepts, input and output												
CO2: Understa	nd the Inherit	ance ar	Jecis.	faces								
CO4: Understa	nd the string	handlin	a meth	ode								
CO5: Understa	nd the except	ion har	dling	Jus								
CO3. Understa	ind the except	1011 1141	lunng									
				UNI	Г.Т							
Object oriented	d concents: F	Fundam	entals	Overv	view of Iay	va Data types	variables	Operators				
control statemer	nts. Reading c	onsole	input, v	vriting	console or	itput. arrays.	, vanaoies,	operators,				
	UNIT - II											
Introducing Classes: Class fundamentals, declaring objects, introducing methods, Constructors												
this keyword, finalize.												
UNIT - III												
<i>Inheritance:</i> Inheritance basics, using super, method overriding, abstract class, using final with												
inheritance, Interfaces: Defining interface, implementing interface.												
	UNIT - IV											
String Handli	ng: String c	onstruc	tors, Sp	pecial	string ope	erations, chara	cter extract	ion, string				
comparison, searching strings, modifying strings. String Buffer class and its methods.												
UNIT - V												
<i>Exception Handling:</i> Fundamentals, exception types, try, catch, throw, throws, finally. Java built-								Java built-				
in exceptions, c	reating your c	wn exc	eption s	subcla	sses.							
Text Books :												
1. Herbert Schildt [2008], [9 ^{cr} Edition], <i>The Complete Reference Java2</i> , TATA McGraw-Hill.												
2. E. Balaguruswamy [2007], [3 rd Edition], <i>Programming with Java</i> , A Primer, TATA												
McGraw-Hil.												
Defense a Decker												
Reference Books :												
1. Druce Eckel	[2008], [2 and D.I.Diata		1, 1 mm	King II Idition	n Java, Pea	arson Educatio	II. Deemeen E	ducation				
2. n.w Dietel	and P.J Diete	1 [2008	oj, lo f	cantion	ij, Java Ho	w io Program	, rearson E	uucation.				
Web Reference	06.											
1 https://www.	tutorialancir	t com/	iovolina	lav ht	ml							

1. https://www.tutorialspoint.com/java/index.html
Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

OPEN ELECTIVE - II

S. No.	Course No.	Course Name	Offered by the Department
1	OE311	Object Oriented Programming through JAVA	CSE
2	OE312	Ethical Hacking	CSE
3	OE313	Principles of Programming Languages	CSE
4	OE314	Advanced Information Systems	CSE
5	OE315	Scientific Programming with Python	CSE
6	OE316	Fuzzy Logic & Neural Networks	ECE
7	OE317	Building Information Modeling	CE
8	OE318	Product Lifecycle Management	ME
9	OE319	Simulation of Engineering Systems	EEE

OBJECT ORIENTED PROGRAMMING THROUGH JAVA (OOP)

VI Semester :	B.Tech.						Sche	eme: 2017
Course Code	Category	Hou	ırs / We	eek	Credits	Max	imum Mar	ks
OE311	OEC	L	T	Р	С	Continuous Internal Assessment	End Exam	Total
Sectional Ever	n Duration.	$\frac{2}{11m}$	I	-	3	40	60 Durati	100
Sessional Exam	n Duration:	2 Hrs				Eng Ex	kam Durati	on : 3 Hrs
Course Outcou	nos: At the e	nd of th	e cours	e stud	ents will h	e able to		
CO1: Understa	nd the basic r	rogram	ming c	onstri	icts and ob	iect oriented p	aradioms	
CO2: Compreh	end the java	concen	ts packa	ages a	nd interfac	es.	indunginis.	
CO3: Impleme	nt programs of	on strin	g handl	ing m	ethods.			
CO4: Understa	nd the fundar	nentals	of exce	ption	handling n	nechanism.		
CO5: Implement	nt programs on	multith	reading	conce	ots.			
				UNI	Г - I			
<i>Fundamentals</i> Basic Concepts	of Object – of Object Or	Oriente	e d Prog program	g ramn nming	<i>ting:</i> Intro , Benefits o	duction, Objector of OOP, and Ap	ct-Oriented	Paradigm, of OOP.
Introduction to Java: Overview of java, Java Buzzwords, Data types, Variables, Operators.								
Decision Maki else if ladder, s methods	ng-Branchin switch statem	g & La nent, W	<i>oping:</i> hile, do	simpl o-whil	e if statem e, for state	ent, if-else sta ements, Arrays	tement, nes , Classes, o	ted if-else, bjects and
				UNIT	' - II			
<i>I/O:</i> I/O Basics	, Reading Co	nsole ir	nput, wr	iting (Console ou	tput.		
<i>Inheritance:</i> B Abstract class,	asic concept final keywor	s, metł rd.	nod ove	erridin	g, super k	æyword, dyna	mic method	l dispatch,
Packages and I	Interfaces: Pa	ackages	. Acces	s prot	ection. Imr	orting package	es. Interface	s.
	<u> </u>	0	1	UNIT	- III	61		
<i>String Handli</i> Concatenation, string.	ng: String Character E	Constru Extraction	uctors, on, Str	Speci ing C	al String comparison	Operations-States. Searching	tring Litera Strings, Mo	lls, String odifying a
			1	UNIT	- IV			
<i>Exception Han</i> and finally keys	<i>idling:</i> Funda words.	amental	ls, Type	es of	Exceptions	s, Usage of try	, catch, thr	ow throws
				UNII	- V			
<i>Multithreading</i> implementing Synchronization	Concepts of Runnable in n, Inter thread	of multi iterface l comm	ithreadi , isAli unicatio	ng, Ci ve() on.	reating thr and join	eads by extend () method	ling Thread ls, Thread	class and Priorities,
Text Books :								

1. Herbert Schildt [2017], [10th Edition], Java - The Complete Reference, TATA McGraw-Hill.

Reference Books :

- 1. Bruce Eckel [2014], [2nd Edition], *Thinking in Java*, Pearson Education.
- 2. E. Balagurusamy, *Programming with Java: A primer, 5th Edition*, Tata McGraw-Hill, 2017.
- 3. H.M. Dietel and P.J. Dietel [2017], [11th Edition], Java How to Program, Pearson Education.

Web References:

- 1. https://nptel.ac.in/courses
- 2. https://www.tutorialspoint.com/java/
- 3. https://www.javatpoint.com

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

ETHICAL HACKING (EH)

VI Semester :	B.Tech.						Sche	eme: 2017	
Course Code	Category	Hou	irs / We	eek	Credits	Max	imum Mar	ks	
OE312	OEC	L 2	T	Р	C	Continuous Internal Assessment	End Exam	Total	
Sessional Evan	n Duration• '	2 Hrs	I	_	5	Fnd Fy	yam Durati	100	
Sessional Exam		2 111 5						.011 . 5 1115	
Course Outcou	Course Outcomes: At the end of the course students will be able to								
CO1: Understa	nd the import	tance of	f securit	v and	ethical had	cking.			
CO2: Understa	nd about foot	printin	g and t	vpes o	f attacks in	n social enginee	ering.		
CO3: Understa	nd about snif	fers and	1 DoS a	ttacks					
CO4: Understa	nd the import	tance of	f Sessio	n Hija	Icking type	s and SOL Inje	ection.		
CO5: Understand about buffer overflow attacks and Wireless Hacking Techniques.									
						6	I		
				UNI	Г - I				
Introduction to Ethical Hacking: Introduction, Ethical hacking terminology, Types of hacking technologies, phases of ethical hacking Essential Terminologies : Threat, Attack, Vulnerabilities, Target of Evaluation, Exploit. UNIT - II Foot printing: Footprinting, Information Gathering Methodology, Competitive Intelligence, DNS Enumeration, Who is and ARIN Lookups, Types of DNS Records, How Trace route is used in Footprinting Contents How E Mail Tracking Works Web Spiders Work									
Social Enginee	ring:	Of Atta	alta Ina	idan A	ttaalka Ida	ntity Thaft Dh	ishing Attac	lia Onlina	
Social Enginee	bfuscation S	л Аца ocial-Ei	cks, IIIs. ngineeri	ing Co	untermeas	milly Theil, Ph	Isning Attac	ks, Onnie	
Scallis, UKL O	biuscation, St					50105.			
Sniffers: Understand the Ethereal Captu Countermeasur Denial of Servi Denial of Servi	Sniffers: Understand the Protocols Susceptible to Sniffing, Active and Passive Sniffing, ARP Poisoning, Ethereal Capture and Display Filters, MAC Flooding, DNS Spoofing Techniques, Sniffing Countermeasures. Denial of Service:								
Work, "Smurf"	Attack, SYN	Floodi	ng, Do	S/ DD	oS counter	measures.			
,	,			UNIT	- IV				
Session Hijack Spoofing vs. H Session Hijacki SQL Injection: SQL Injection.	<i>ing:</i> ijacking, Typ ng, Describe Steps to Co	bes of S How Y onduct	Session Tou Wor SQL In	Hijacl uld Pro	king, Seque event Sessi n, SQL Se	ence Predictior ion Hijacking. erver Vulnerat	n, Steps in I bilities, SOI	Performing	

Countermeasures.

UNIT - V

Buffer Overflows:

Different Types of Buffer Overflow, Methods of Detection, Overview of Stack-Based Buffer Overflows, Overview of Buffer Overflow Mutation Techniques.

Wireless Hacking:

Overview of WEP, WPA Authentication Mechanisms, and Cracking Techniques, Wireless Sniffers and Locating SSIDs, MAC Spoofing, Rogue Access Points, Wireless Hacking Techniques, Methods Used to Secure Wireless Networks.

Text Books :

1. Kimberly Graves, CEH Official Certified Ethical Hacker Review Guide, Wiley publications

2. Micheal Gregg, Certified ethical hacker (CEH) Cert guide, Pearson education, 2014.

Reference Books :

1. Rajat Khare, Network Security and Ethical Hacking, Luniver Press, 2006.

2. Patrick Engebretson, *The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made Easy*, 2ed, Syngress Media, 2012.

Web References:

1. https://www.tutorialspoint.com/ethical_hacking/ethical_hacking_pdf_version.htm

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

PRINCIPLES OF PROGRAMMING LANGUAGES (PPL)

VI Semester :	B.Tech.						Sche	eme: 2017
Course Code	Category	Hou	irs / We	eek	Credits	Max	imum Mar	ks
OE313	OEC	L 2	T	Р	C	Continuous Internal Assessment	End Exam	Total
Soccional Evan	n Duration•	2 2 Hrs	1	-	3	40 End Ev	00 vom Duroti	$\frac{100}{00} \cdot 3 Hrs$
Sessional Exam		21115					xalli Dul'au	011 . 5 1115
Course Outcou	nes• At the e	nd of th	e cours	e stud	ents will be	e able to		
CO1: Understa	nd the import	tance of	f Progra	mmin	σ Langijag			
CO2: Describe	the syntax ar	nd sema	intics of	a pro	orammino	language		
CO3: Understa	nd programm	ing cor	structs	and d	ata types.	lunguuge.		
CO4: Develop	Programs in	Lisp an	d prolos	p.	ata typest			
CO5: Understa	nd and adopt	a new 1	program	<u>.</u> ming	language.			
				0				
				UNI	Г - I			
Preliminaries:								
Reasons for studying concepts of programming languages, Programming domains, Language Evolution criteria, Influences on Language Design, Language categories, Language Design Trade-offs, Implementation methods, Programming Environments. UNIT - II Syntax and Semantics: Introduction, The general problem of Describing Syntax, Formal methods of describing syntax, Attribute Grammars, Describing the Meanings of programs-Dynamic Semantics, Lexical analysis, Parsing problem, Recursive Descent parsing, Bottom up parsing. UNIT - III Names, Binding, Type checking, Scopes and Data Types: Introduction, Names, Variables, The concept of binding, Type checking, Strong Typing, Type Compatibility, Scope, Scope and Lifetime, Referencing Environments, Named constants, Data								
Associative arra	ays, Record ty	ypes, U	nion typ	pes, P	ointer and	reference types	S.	
	• •		1	UNIT	- IV			
Functional Pro Introduction, M LISP, An Introd	Aathematical duction to Sch	<i>anguag</i> functioneme, N	ges: ons, Fu /IL, Has	ındam skell. UNIT	entals of	functional pro	gramming	languages,
Logic Program	ming Langue	ages:						
Introduction, A theorems, An O The deficiencie	A brief intro Overview of lo s of prolog, A	oduction ogic pro Applicat	n to Programm	redica ning, 7 logic	te calculu The origins programm	s, Predicate of prolog, Bas ing.	calculus an sic elements	d Proving of prolog,
Text Books :								

1. Robert W. Sebesta, [Eighth Edition], *Concepts of Programming Languages*, Addison Wesley, 2007.

Reference Books :

1. Allen B Tucker, Robert E Noon,[2nd Edition], *Programming Languages, Principles & Paradigms*, TMH.

Web References:

1. https://cs.fit.edu/~ryan/cse4250/

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

ADVANCED INFORMATION SYSTEMS (AIS)

VI Semester :	B.Tech.						Sche	eme: 2017	
Course Code	Category	Hou	irs / Wo	eek	Credits	Max	imum Mar	ks	
OE314	OEC	L	T	Р	C	Continuous Internal Assessment	End Exam	Total	
Sectional Ever	n Duration	2 Ung		-	3	40 End End	00 Som Duroti		
Sessional Exal	II Duration:	2 nrs					xam Durau		
Course Outcou	nos. At the e	nd of th	e cours	e stud	ente will h	e able to			
CO1: Demonstrate the Object oriented concents									
CO2: Interpret	different type	et offen	heritana	e and	Polymorp	hism			
CO3: Classify	laver functio	nalities	of OSI	refer	ence mode	l and TCP Prof	tocol suite		
CO4: Summari	ze the concer	ots of ir	ternetw	orkin	g security	and IP address	sing		
CO5: Demonst	rate different	types of	of proto	cols a	nd web cor	tents used in y	web design		
		<i>cjpes</i> c	i pioto	c 015 u			i ee aesign		
				UNI	Г - I				
Introduction	to Obiect	Orient	ed Co	ncent	s: Introdu	action. Progra	amming T	echniques.	
Introduction to	Introduction to Object Oriented Concepts, Concept of Structured Procedural Programming.							gramming,	
Class, Object	5		1	,	1			U U,	
Characteristics of Objects: Data Abstraction, Classification, Encapsulation and Message									
Passing, Access	s Specifiers ir	ı Class,	UML (Class I	Diagrams.	-		-	
				UNII	- II				
Advanced Con	cepts in Ob	ject O	riented	Tech	nology: R	Relationships, 1	Inheritance-	Protected	
Access Specifi	ier, Multiple	and 1	Multilev	vel In	heritance,	Generalization	n and Spe	cialization,	
Abstract classes	s, Polymorph	ism, Im	plemen	tation	of OOC th	rough C++.			
.		.		UNIT	- 111	1 55 1 4			
Introduction to	o computer N	Vetwork	s: Intro	oducti	on, Netwo	rk Topology, (JSI Referen	ice Model,	
TCP Protocol S	Suite, Routing	, Device	es, Type	es of N	Networks.				
T (1)	D (1	<u>ст</u> ,			- IV	11 10	' D 1	(D 1 (
Internetworkin	g: Protocols	Ior Inte	Networ	rking,	Internet A	ddress and Doi	mains, Pack	ets, Packet	
Network Secur	orks, virtual	Privale	Authori	rk, w(Enoruptic	nemet.	Wah		
Network Secur	<i>uy.</i> Authentic	Lation, 1	Aution		, Eliciypuc	on, security on	WED.		
Introduction t	Wah Tash	nalam	Introd		Uupor T	Coxt Transfor I	Drotocol (U	TTD) Filo	
Transfer Proto	col (FTP) [Domain	Name	Serve	r (DNS)	Web Applica	tions Type	rrr), rne	
Content Multi-Tier Web Applications Performance of Web Applications								·3 01 WC0	
Content, Walti The Web Applications, Performance of Web Applications.									
Text Books :									
1. Campus Con	nnect Founda	tion Pro	ogramm	e - O	biect Orien	ted Concepts -	- System De	evelopment	
Methodolog	y, User Inter	face De	sign - V	/ol. –	3. INFOSY	(S	2 9 5 0 5 1 2 0	, eropinent	
2. Campus Co	onnect Found	lation	Progran	nme -	- Compute	er Hardware a	and System	Software	
Concepts, P	rogramming	<u>Fu</u> ndan	nentals-	Vol.	<u>– 1, </u> INFOS	SYS.	2		

- 3. Campus Connect Foundation Programme Relational Database Management System, Client Server Concepts, Introduction to Web Technologies Vol. 2, INFOSYS.
- 4. E. Balaguruswamy, *Object Oriented programming with* C++, 2017
- 5. Forouzan, Data Communications & Networking, Tata McGraw Hill, Fifth edition, 2017

Reference Books :

- 1. Herbert Schildt, *The Complete Reference* C++,McGraw Hill Education, Seventh Edition,2017
- 2. M.P. Bhave and S.A. Patekar, *Object Oriented Programming with C++*, Pearson Education, 2008
- 3. Andrew S. Tenenbaum, Computer networks, Pearson education, Fifth edition, 2013

Web References:

1. https://www.tutorialspoint.com/cplusplus/

2. https://www.geeksforgeeks.org/computer-network-tutorials/

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

Question paper contains Six questions. Question 1 contains 5 short Answer questions each of 2 marks (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions i.e. there will be two questions from each unit and the student should answer any one question.

Note:

- 1. Wireshark tool can be used to demonstrate ISO/OSI model in UNIT-III
- 2. Assignment Questions to be given from UNIT-II that maps POs like PO2, PO3.

SCIENTIFIC PROGRAMMING WITH PYTHON (SCIPYP)

VI Semester :	B.Tech.						Sche	eme: 2017
Course Code	Category	Hou	rs / We	eek	Credits	Max	imum Mar	ks
OE315	OEC	L	T	Р	С	Continuous Internal Assessment	End Exam	Total
		2	1	-	3	40	60	100
Sessional Exar	n Duration:	2 Hrs				End Ex	xam Durati	on: 3 Hrs
Course Outeer		ad of th		a a4m d	anta mill h	a alta ta		
Course Outcon	nes: At the el	nd of th	e course	e stud	ents will be	e able to	tiona Lia	Tuples
COI: Undersi	and lundam	entais	or pro	ogram	ming –va	inables, cond	luons, Lisi	is, Tuples
CO2: Understa	nd Arithmeti	c Rela	tional	Assio	nment Lo	oical Bitwise	Membershi	n Identity
Operators	and Conditio	nal Stat	ements.	113515		gical, Ditwise,	Wiembersin	p, identity
CO3: Impart F	Functions. Sco	ppe of v	ariables	s. Moo	dules. Pack	ages.		
CO4: Compreh	nend Concepts	of File	I/O, Exc	ception	n Handling,	Classes and Ob	jects.	
CO5: Develop	general scien	tific pro	ogramm	ing th	rough Mat	plotlib, NumP	y and SciPy	packages.
· · · ·	•		0			•	•	<u> </u>
				UNI	Г - І			
Introduction: History of Python, Features, Advantages, Environment setup and Interaction using								
Command pron	npt, IDLE, S	Script m	ode, IP	ython	Notebook			
Basic Syntax:	Keywords, Id	lentifiei	rs, Varia	ables.				
Data Types: Sta	rings, Numbe	rs, Boo	leans, E	Date a	nd Time, L	ists, Tuples, D	ictionaries	
			<u> </u>	UNI'I	<u>- II</u>		• •	0
Operators: Ari	thmetic Oper	rators,	Compar	1SON	(Relational) Operators, A	Assignment	Operators,
Conditional St	ors, Bitwise C	perator	rs, Men lso	idersn	np Operato	rs, identity Op	erators.	
Loons. for whi	le	II-eIII-e	150					
Control Statem	<i>ents:</i> break. c	continue	e, pass					
			<u>, puss</u>	UNIT	- III			
Functions: De	fining Function	ons, Ca	lling a	Funct	ion, Functi	on Arguments	: Required	arguments,
Keyword argui	nents, Defau	lt Árgu	iments,	Varia	able-length	arguments, A	nonymous	Functions,
The Return Star	tement, Scope	e of the	Variabl	les in	a Function	- Global and L	local Variab	oles.
Modules: Defi	ning module	, name	spacing	g, Im	porting mo	odules and mo	dule attribu	utes, from.
Import statement	nt, Module bu	uilt-in fu	unctions	s, Intro	oduction to	Packages.		
			1	UNIT	- IV			
Error and Exe	ceptions: Dif	terence	betwee	en an	error and	Exception, De	etecting and	l Handling
Exceptions, Ra	Ising Exception	ons, As	sertions	, Buil	t-in Except	tions, User Def	ined Except	ions
Classes and C	opects: Over	rview (of UUP	v tern	iinology, (creating Class	es, Creatin	g Instance
Files and Innu	<i>t/ Output</i> · Or	ning Mic	and Clo	sing F	Files Read	ing and Writin	o Files Ren	ng. aming and
Deleting Files	Directories in	Python	1.	Jing I	1105, IXedu		5 I 1103, IXCII	anng and
		. i j (1101		UNIT	- V			

Simple plotting with pylab: Basic plotting, Labels, legends and customization, More advanced plotting.

Matplotlib: Matplotlib basics, Contour plots, heatmaps and 3D plots.

NumPy: Basic array methods, Reading and writing an array to a file, Statistical methods, Polynomial, Linear algebra, Matrices, Random sampling, Discrete Fourier transforms

SciPy: Physical constants and special functions, Integration and ordinary differential equations, Interpolation, Optimization, data-fitting and root-finding.

General Scientific Programming: Floating point arithmetic, Stability and conditioning, Programming techniques and software development.

Text Books :

- 1. Richard L. Halterman, Learning To Program With Python, (2011)
- 2. Christian Hill, *Learning Scientific Programming with Python*, Cambridge University Press (2016).

Reference Books :

1. John Zelle, Python Programming-An Introduction to Computer Science, 2nd edition, 2010

- 2. Andrew Johansen, Python The Ultimate Beginner's Guide,
- 3. Wesley J. Chun, Core Python Programming, Pearson.

Web References:

1. https://www.tutorialspoint.com/python3/

2. https://realpython.com/

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

Question paper contains Six questions. Question 1 contains 5 short Answer questions each of 2 marks (Total 10 marks) covering one question from each unit. The remaining five questions shall be EITHER/OR type questions carrying 10 marks each. Each of these questions is from one unit and may contain sub-questions i.e. there will be two questions from each unit and the student should answer any one question.

Note:

- 1. Python IDLE, Ipython notebook tools can be used to develop programs in UNIT-1& UNIT-5.
- 2. Scope for develop type questions for assignment from UNIT-V

FUZZY LOGIC & NEURAL NETWORKS (FLNN)

VI Semester :	B.Tech.						Sche	eme : 2017	
Course Code	Category	Hou	rs / We	eek	Credits	Max	imum Mar	ks	
OE316	OEC	L	T	Р	C	Continuous Internal Assessment	End Exam	Total	
Sector of From	- Dunation -	$\frac{2}{11m}$	L	-	3	40 End Er	<u>60</u>		
Sessional Exar	n Duration:	2 Hrs				End Ex	kam Durati	on: 3 Hrs	
Course Outcou	mos. At the e	nd of th	A COURS	o stud	onte will h	a abla to			
COI: To Expos	e the students	to the co	ncepts (of Neu	ral network				
CO2: To provi	de adequate k	nowled	lge aboi	it Sup	ervised Le	arning feedbac	k networks.		
CO3: To provi	de adequate k	nowled	lge aboi	at Uns	upervised	Learning feedb	ack networ	ks.	
CO4: To teach	about the c	concept	of fuz	ziness	involved	in various sy	stems and	to provide	
adequate	e knowledge	about fi	izzy set	theor	y.			1	
CO5: To provi	ide adequate	knowle	dge of a	applic	ation in No	eural Networks	s & fuzzy lo	ogic to real	
time sys	stems.								
UNIT - I									
Neural network examples, Feat representation, unsupervised lea Supervised Lea Single layer per propagation al learning, Conce the Networks	Biological neurons and McCulloch and Pitts models of neuron, Types of activation functions, Neural networks architectures, Linearly separable and linearly non-separable systems and their examples, Features and advantages of neural networks over statistical techniques, Knowledge representation, learning process, error-correction learning, concepts of supervised, learning, and unsupervised learning. UNIT - II Supervised Learning Neural Networks: Single layer perception and multilayer perceptron neural networks, their architecture, Error back propagation algorithm, generalized delta rule, learning factors, step learning, Momentum learning, Concept of training, testing and cross-validation data sets for design and validation of								
			۱	UNIT	- III				
Unsupervised I Competitive L algorithms, RB networks, Con networks.	Unsupervised Learning Neural Networks: Competitive Learning networks, kohonen self-organizing networks, K-means and LMS algorithms, RBF neural network, its structure and Hybrid training algorithm for RBF neural networks, Comparison of RBF and MLP networks Learning, Hebbian learning, Hopfield networks.								
Fuzzy logic:					<u>- 1</u>				
Basic Fuzzy lo operations on linguistic varial methods, Fuzzy	<i>Fuzzy logic:</i> Basic Fuzzy logic theory, sets and their properties, Operations on fuzzy set, Fuzzy relation and operations on fuzzy relations and extension principle, Fuzzy membership functions and linguistic variables, Fuzzy rules and fuzzy reasoning, Fuzzification and defuzzification and their methods, Fuzzy inference systems.								
				UNII	. - v				

Applications:

Applications of Neural Networks: Pattern classification, Handwritten character recognition, Face recognition, Image compression and decompression.

Applications of Fuzzy Logic & Fuzzy System: Fuzzy pattern recognition, Fuzzy image processing, Simple applications of Fuzzy knowledge-based controllers like washing machines, traffic regulations, and lift control.

Text Books :

- 1. Timothy J. Ross, *Fuzzy Logic with Engineering Applications*, John Wiley and sons, III Ed, 2010.
- 2. S. Haykin, *Neural Networks, A Comprehensive Foundation*, Pearson Education Inc., III Ed 2008.
- 3. Jacek. M. Zurada, Introduction to Artificial Neural Systems, Jaico Publishing House, 2006.
- 4. Laurene Fausett, Fundamentals of Neural Networks Architectures, Algorithms and Applications, Pearson Education Inc., 2004.
- 5. J.S.R. Jang, C.T. Sun, E. Mizutani, *Neuro Fuzzy and Soft Computing A computational Approach to Learning and Machine Intelligence*, Pearson Education Inc., 2002.
- 6. Laurence Fausett, Fundamentals of Neural Networks, Pearson Education
- 7. Bart Kosko, Neural Networks and Fuzzy Systems, Pearson Education

Reference Books :

- 1. S. Rajsekaran and G. A. VijaylakshmiPai, *Neural Networks, Fuzzy Logic, and Genetic Algorithms*, PHI.
- 2. N. Sivanandam, S. Sumathi, and S. N. Deepa, *Introduction to Neural Network Using MATLAB*, Tata McGraw-Hill Publications
- 3. S. N. Sivanandam and M.PaulRaj, *Introduction to Artificial Neural Networks*, Vikas Publication House Pvt. Ltd, New Delhi.

Web References:

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

BUILDING INFORMATION MODELLING (BIM)

VI Semester :	B.Tech.						Sche	eme : 2017	
Course Code	Category	Hou	ırs / We	eek	Credits	Max	imum Mar	ks	
OE317	OEC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total	
		2	1	-	3	40	60	100	
Sessional Exam	n Duration:	2 Hrs				End Ex	xam Durati	on: 3 Hrs	
0	A / /1	1 6.1		. 1		11 /			
Course Outcon	nes: At the en	$\frac{10 \text{ of } \text{m}}{10 \text{ of } \text{m}}$	e cours	e stud	ents will be	e able to			
CO2: Understa	nd the usage	of BIM	tools a	nd To	olbar				
CO3: Use adva	nced editing	tools in	making	$\frac{10}{2}$ a 3D	model of	anv residential	/commercia	l building.	
CO4: Prepare	templates, cr	eate ba	sic wal	ls, cu	rtain walls	and also edit	the walls l	ike divide,	
creating	openings, etc.			,				,	
CO5: Apply to	ools like crea	ting flo	oors, ro	ofs, w	alls, etc. i	n making 3D 1	nodels of a	ny type of	
structure	2.								
	UNII - I								
Leveraging BIN in BIM - Staffir Accessing and U the Ribbon - De <i>The Basics of t</i> - Selection Opt Instances – Us Editing Elemen Elements - Arra Lines and Wall	Introduction: The Basics of BIM - What is Revit? - Understanding a BIM Workflow – Leveraging BIM processes - Visualizing – Analyzing - Strategizing - Focusing Your Investment in BIM - Staffing for BIM - Understanding Project Roles - Establishing a BIM Execution Plan - Accessing and Using the Application Menu - Using the Quick Access Toolbar - Getting to Know the Ribbon - Defining Project Organization - Introducing Datum Objects (Relationships). UNIT - II The Basics of the Toolbox: Selecting, Modifying, and Replacing Elements - Selecting Elements Selection Options - Filtering Your Selection - Using Selection-based Filters - Selecting All Instances – Using the Properties Palette - Matching Properties – Using the Context Menu – Editing Elements Interactively - Moving Elements - Copying Elements - Rotating and Mirroring Elements - Arraying Elements - Scaling Elements – Aligning Elements - Trimming or Extending Lines and Walls - Splitting Lines and Walls - Offsetting Lines and Walls. UNIT - III								
<i>Exploring Advanced Editing Tools:</i> Keeping Elements from Moving - Using the Join Geometry Tool - Using the Split Face and Paint Tools - Copying and Pasting from the Clipboard – Using the Create Similar Tool - Using Keyboard Shortcuts (Accelerators) - Double-click to Edit - Modelling Site Context - Using a Toposurface - Cut/Fill Schedules. UNIT - IV									
<i>Extended Mod</i> Modelling Tech Modelling Tech Walls - Creatin Dividing the Su	<i>elling Techn</i> niques for Ba niques for B g Simple Cu rface with Int	niques: asic Wa Basic W artain W ersects	Creati Ils - Cre Valls - O Valls - - Apply	ing V eating Creatin Desig ving P	Valls and Basic Wall ng Custom ning a Cu atterns - Ee	Curtain Wall Il Types - Addi 1 In-Place Wal rtain Wall - E diting the Patte	s - Using ng Wall Ar Ils - Creatin Dividing the rn Surface.	Extended ticulation - ng Stacked surface -	

Configuring Templates and Standards: Introducing Project Templates - Customizing Project -Settings for Graphic Quality - Discovering Object Styles - Using Line Settings – Defining Materials - Defining Fill Patterns – Pre-configuring Colour Schemes - Increasing Efficient view Management - Organizing Views –Saving Work - Saving at Intervals.

UNIT - V

Modelling Floors, Ceilings, and Roofs: Understanding Floor Types - Modelling a Floor - Creating a Structural Floor - Sketching for Floors, Ceilings, and Roofs - Modelling Slab Edges - Creating a Custom Floor Edge - Modelling Floor Finishes - Modelling Thick Finishes - Creating Ceilings - Creating a Roof by Face - Creating a Sloped Glazing - Using Slope Arrows - Using Additional Roof Tools - Using Advanced Shape Editing with Floors and Roofs.

Text Books :

- 1. Karen Kensek, Douglas Noble, *Building Information Modelling*: BIM in Current and Future Practice.
- 2. Danelle Briscoe [2015], *Beyond BIM Architecture Information Modelling*, Routledge Publication, ISBN: 9781317668107.

Reference Books :

- 1. Chuck Eastman, Paul Teicholz, Rafael Sacks, Kathleen Liston; BIM Handbook: A Guide to Building Information Modelling for Owners, Managers, Designers, Engineers, and Contractors, John Wiley & Sons, Inc.
- 2. Bimal Kumar, A Practical Guide to Adopting BIM in Construction Projects.

Web References:

- 1. https://www.youtube.com/watch?v=LACe3vtc8dY
- 2. https://www.youtube.com/watch?v=LQdHkuG4do4

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

PRODUCT LIFECYCLE MANAGEMENT (PLM)

VI Semester :	B.Tech.						Sche	eme: 2017	
Course Code	Category	Hou	irs / We	eek	Credits	Max	imum Mar	ks	
OE318	OEC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total	
Coord on a L Error	D	$\frac{2}{2}$		-	3	40	60 D	100	
Sessional Exar	n Duration:	2 Hrs				End Ex	xam Durati	on : 3 Hrs	
Course Outcou	nos. At the e	nd of th	e cours	e stud	ents will h	e able to			
COL: Understat	CO1: Understand basic concepts of Java such as operators classes objects inheritance packages								
Enumeration and various keywords.									
CO2: Understa develop	CO2: Understand product lifecycle management process & different steps in Product development process								
CO3: Get know	vledge on Pro	duct da	ita mana	ageme	nt.				
CO4: Understa	nd the impler	mentatio	on of PI	LM an	d its impac	ct on the organi	ization.		
CO5: Understand concept of PLM architecture and information authoring tools									
UNIT - I									
Arrays, Const	Introduction to Java (background, facts, editions), JVM, Program Structure (basics of class, object, member variables, methods, naming conventions, static, System), Installing Java, Setting PATH, Compiling & Running a minimal program. Primitive data types, cast, NaN, Two's complement, Variables (rules, types), Operators, Control Structures UNIT - II Arrays, Constructors, String class, Inheritance, Packages, Access modifiers, Relational								
Databases, SQI			1		- III				
PLM Introduce Enterprise System Product Life Cy Differences be Specification, Cy Tool design, R	UNIT - III PLM Introduction-Organization Business Models(MTS, MTO, CTO, ETO Etc), Basics of Enterprise Systems (PLM, ERP, MES), Background, Overview, Need, Benefits, and Concept of Product Life Cycle, Components / Elements of PLM, Emergence of PLM, Significance of PLM, Differences between PLM and PDM Integrated Product development process-Conceive- Specification, Concept design, Design- Detailed design, Validation and analysis (Simulation), Tool design , Realize-Plan manufacturing, Manufacture, Build/Assemble, Test(quality check)								
PLM Compor	nents - Wor	kflow	Process	ses, D	esign Col	laboration, Pr	ocesses Ma	inagement,	
Document Management, Visualization, Bill of Materials (BOM) Management, Engineering Change Control, Configuration Management, Manufacturing Process Management, Variant Management, Classification.									
			. •	UNIT	<u>- V</u>		N 1 111	a i	
PLM Technol management, C publishing), Co and ERP system	logies - PLI CAD Integrations (Pre functions (Pre functions (M Arcl ions, In (e.g., da	hitectur Iformati Ita vault	e, Va ion au ts), Da	rious PLM thoring to ata Flow to	A tools, Data ols (e.g., MCA Other systems	Modelling AD, ECAD, s such as Su	, Security Technical pply chain	

Text Books :

1. Grieves, Michael, Product Lifecycle Management, McGraw-Hill

2. Antti Saaksvuori, AnselmiImmonen, Product Life Cycle Management - Springer

3. Kari Ulrich and Steven D. Eppinger, Product Design & Development, McGraw Hill.

Reference Books :

- 1. Herbert-Schildt, Java The Complete Reference (English) 9th Edition, McHill Education
- 2. O' Reilly, *Head First Java* (English) 2 Edition, Kathy Sierra Publisher
- 3. Burden, Rodger PDM: Product Data Management, Resource Publications

Web References:

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

SIMULATION OF ENGINEERING SYSTEMS (SES)

VI Semester :	B.Tech.						Sche	eme: 2017		
Course Code	Category	Hou	ırs / Wo	eek	Credits	Max	imum Mar	ks		
OE319	OEC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		2	1	-	3	40	60	100		
Sessional Exar	n Duration:	2 Hrs				End Ex	xam Durati	on: 3 Hrs		
0										
Course Outcon	Course Outcomes: At the end of the course students will be able to									
CO2: Understa	nd control sta	tement	s funct	ions a	nd plotting	$\frac{ATLAD}{\text{in M}\Delta T I \Delta B}$				
CO3: Understa	nd developin	σ simul	ation m	odel i	ising simul	ink library				
CO4: Understa	nd the graphi	cal user	r interfa	ice in	MATLAB.					
CO5: Understa	nd various to	ol boxe	s used i	in solv	ving engine	ering problems	5.			
					0.0	01				
				UNI	Г - І					
MATLAB Env MATLAB-Key window-Works variables-Opera Data types and vectors. Arithm BODMAS Ru Basic Operation Complex numb	 MATLAB Environment: Introduction to Simulation-Installation of MATLAB-History-Use of MATLAB-Key features. Introduction to MATLAB Software- MATLAB window- Command window-Workspace-Command history-Current directory Setting-Basic commands-Assigning variables-Operations with variables. Data types and Operators: Character and string- Arrays and vectors- Column vectors-Row vectors. Arithmetic Operators- Relational Operators-Logical Operators- Operator Precedence-BODMAS Rules- Solving arithmetic equations. Basic Operations: Trigonometric functions- Complex numbers- Fractions & Real numbers-Complex numbers 									
				UNIT	- II					
MATLAB Prog The MATLAB Warnings- Typ Examining Va command line. Loops and Com Branch Control	MATLAB Programming: Working with script tools- Writing Script file- Executing script files- The MATLAB Editor- opening and saving editor. Creating M files, Saving m-files- Errors and Warnings- Types of errors- error handling- MATLAB Debugger- Setting Break Points- Examining Variables- Stepping through code- ending the debug session- Debugging from command line. Loops and Conditional Statements: Loops: for loop- nested for loop- while loop-									
statement- error	r statement- ti	ry catch	structu	ire- Pr	ogram Ter	mination — re	turn			
<i>Functions:</i> Window Win	<i>Functions:</i> Writing functions, Writing user defined functions- Built in Function-Function calling-Return Value- Types of Functions-Global Variables. String Functions- Input/ Output Functions									
<i>Plotting: Plots:</i> Plotting vector and matrix data- Plot labeling, curve labeling and editing. <i>2D Plots:</i> Basic Plotting Functions-Creating a Plot-Plotting Multiple Data Sets in One Graph-										
Specifying Line Displaying Mul	e Styles and tiple Plots in	Colors One Fi	- Graph gure-Co - Mesh	nng Ii ontrol nlot-9	maginary a ling the Ax	and Complex I ares-Subplots.	Data-Figure	Windows-		
<i>SD piols</i> . Use C	n mesn griu i	unction	- 1 VICSII			ι.				
Simulink : Int	roduction to	Simuli	nk- Sir	nulink	Environn	nent & Interfa	ce- Study of	of Library-		

Object Oriented Design-Equation Oriented Design- - Fixed Step continuous solvers- Variable step continuous solver- Data Import/ Export- Creating and masking a Subsystem- Getting help for Simulink. Simulation of Numerical Integration, Linear Algebra, Roots of Polynomials, Algebraic equations, Differential Equations-Transforms (Fourier, Laplace).

UNIT - IV

Graphical User Interface Design: Introduction of Graphical User Interface- GUI Function Property- GUI Component Design- GUI Container- Writing the code of GUI Callback- Dialog Box- Menu Designing- Creating a database-Applications.

UNIT - V

Applications with MATLAB: Image Processing: Importing and Visualizing Images- Importing and displaying images- Converting between image types- Exporting images- Interactive Exploration of Images- Obtaining pixel intensity values- Extracting a region of interest-Computing pixel statistics-Measuring object sizes.

MATLAB Applications in Control Systems, Neural Networks- Machine Learning, Digital Signal Processing, Communication Systems and Fuzzy Logic Systems.

Text Books :

- 1. Raj Kumar Bansal, Ashok Kumar Goel and Manoj Kumar Sharma, *MATLAB and its Applications in Engineering*, Dorling Kindersly India pvt. Ltd, Pearson, 5th Edition 2012.
- 2. Agam Kumar Tyagi, *MATLAB and Simulink for Engineers*, Oxford University Press, 2nd Edition, 2012.
- 3. Jaydeep Chakravarthy, *Introduction to MATLAB Programming, Tool Box and Simulink*, Universities Press, 2014.

Reference Books :

- 1. MiszaKalechman, *Practical MATLAB Basics for engineers*, CRC Press, Taylor & Francis group,1st Edition, 2012.
- 2. Rizwan Butt, An Introduction to differential equations on MATLAB, Narosa Publishing house, 2016.

Web References:

1. https://matlabacademy.mathworks.com/

2. https://www.edx.org/course/matlab-octave-beginners-epflx-matlabeoctavebeginnersx

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

<u>OPEN ELECTIVE – III</u> (in VII Sem.)

- 1. HIGHWAY, RAILWAY AND AIRPORT ENGINEERING
- 2. REPAIRS & REHABILITATION OF STRUCTURES
- 3. CIVIL INFRASTRUCTURE FOR SMART CITY DEVELOPMENT

HIGHWAY, RAILWAY AND AIRPORT ENGINEERING (HRAE)

VII Semester :							Sche	eme: 2017	
Course Code	Category	Hou	irs / W	/eek	Credits	Max	imum Mar	ks	
OE401	OEC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total	
		2	1	-	3	40	60	100	
Sessional Exan	n Duration: 2	2 Hrs				End Ex	xam Durati	on: 3 Hrs	
C O I	. 1	1 6 4			1 4 111	11 /			
Course Outcon	nes: At the er	nd of t	he cour	rse stu	dents will be	e able to	an anaifian	ions	
CO2: Understa	nd the failures	s and n	nainten	ance o	f flexible and	l rigid navemen	gn specificat ts	.10115	
CO3: Understand the components and functions of railway track									
CO4: Understand the geometric design of railway track									
CO5: Understand the various aircraft characteristics and design of runways									
				UN	IT - I				
Highway Mate bitumen mixes -	<i>rials:</i> Aggre – Mix design	gates by Ma	and b rshall	itumer Stabili	n – Desirab ity method.	le properties	– Tests –	Aggregate	
<i>Highway Construction</i> : Construction of water bound macadam roads – Construction of bituminous pavements, concrete pavements, joints in cement concrete pavements.									
UNIT - II									
<i>Highway Main</i> pavements – M repairs), and CC	ntenance: Int laintenance o C Pavements -	troduc f high – Over	tion – ways lay des	Pave – WB sign b	ment failure M roads, Fl y Benkelmar	es – Failures exible paveme 1 beam method	in flexible nts (includi	and rigid ng special	
				UNI	Γ-III				
<i>Railway Track:</i> - Functions and of sleepers — Functions of sul	Requirement requirement Sleeper dens b grade or for	ts of a s of ra ity – 1 mation	n ideal iils– Sl Ballast n – Sul	perma leepers t – Fu o grade	anent way – s and Ballast nctions and e materials a	Gauges in Indi t- Functions ar requirements, nd its improver	a – Selectio d requireme types – Su ment.	n of gauge ents, types ib grade –	
				UNI	Γ - IV				
<i>Track Alignme</i> gradient – Grad	nt: Basic req e compensati	uirem	ents – curves	Factor	rs controllin	g alignment –	Gradients -	- Types of	
<i>Geometric Dest</i> curvature – Su transition curve	<i>ign of the Tr</i> per elevation – Length of t	r ack: or ca transiti	Speed ant – (ion cur	of the Cant d ve –W	train – Spe leficiency- r idening of g	ed on curves - negative super gauge on curves	 Radius or elevation - s - Shift of t 	degree of Types of the curve.	
				UNI	T - V				
<i>Airport Engineering:</i> Selection of site for Airport – Aircraft Characteristics- Geometric Design of Runway- Computation of Runway length – Correction for runway length – Orientation of Runway – Wind Rose Diagram – Runway Lighting system.									
Text Books :									
1. Justo and S.I	K. Khanna [20	014], 1	Highwa	ay Eng	ineering, Ne	emchand & Bro	os, Roorkee		
2. C. Saxena ar	nd S.P. Arora	[2015]], Rail	way Ei	ngineering, l	Dhanpat Raj Pu	blications		

3. Khanna, S. K., Arora, M. G., and Jain, S. S. *Airport planning and Design*, Sixth Edition, Nem Chand and Bros, Roorkee, India, 2012.

Reference Books :

- 1. Satish Chandra and M. Agrawal, *Railway Engineering*, Second Edition, Oxford University Press, 2013.
- 2. Rangwala, S.C. Railway Engineering, Charotar Publishing House, Anand, India, 2008.

3. Horonjeff, R., McKelvey, F. X., Sproule, W. J., and Young, S. B. *Planning and Design of Airports*, Fifth Edition, McGraw-Hill, New York, USA, 2010.

Web References:

- 1. https/www.coursera.org
- 2. www.nptel.ac.in/courses

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

REPAIRS AND REHABILITATION OF STRUCTURES (RRS)

VII Semester :							Schem	e : 2017			
Course Code	Category	Ho	urs / V	Veek	Credits	Maxir	num Mark	5			
OE402	OEC	L	Τ	Р	С	Continuous Internal Assessment	End Exam	Total			
~		2	1	-	3	40	60	100			
Sessional Exan	n Duration: 2	2 Hrs	5			End Exa	m Duration	: 3 Hrs			
Course Outcor	Course Outcomes: At the end of the course students will be able to										
CO1: Understand the different maintenance and renair strategies											
CO2: Understa	CO2: Understand the quality assurance aspects: Analyse the mechanical durability and										
thermal	behaviour of	conc	erete	1	,,,,,,,,,,,,,,,,,,,,		,				
CO3: Underst	and the prepa	aratio	n metl	hodolo	gies of vari	ous types of co	oncretes and	l design			
special	concretes										
CO4: Underst	and the variou	us rep	pair tec	chniqu	es and prote	ction methods	for RCC str	uctures			
CO5: Unders	tand the varie	ous r	epair a	nd str	engthening (techniques for	structural el	ements,			
various case studies involving repair, rehabilitation and retrofitting.											
UNIT - I											
Maintenance and Repair Strategies: Maintenance, Repair and Rehabilitation - Facets of											
Maintenance, I	mportance of	[Ma	intenai	nce -	Inspection ·	- various aspe	cts of Insp	ection -			
Assessment pro		aiuai	ing a u	amage		- causes of dete					
				UNI	Г - II						
<i>Strength and D</i> and Thermal protoclimate, ten thickness.	<i>Durability of</i> operties of comperature, Su	Conc oncret stain	rete: (te - Cra ed ele	Quality acks - vated	v assurance f different typ temperature	for concrete – bes, causes for - Corrosion	Strength, Do cracks - Eff – Effects o	urability ects due of cover			
				UNI	Г - III						
Special Concre concrete - Geo wastes.	etes: Sulphur polymer conc	r infi rete -	iltrated - React	l conc tive po	rete - Vacu wder concre	uum concrete ete - Concrete r	- Self con nade with ir	pacting dustrial			
				UNI	Γ - ΙV						
<i>Techniques for Repair and Protection Methods:</i> Non-destructive Testing Techniques - Epoxy injection, Shoring, Underpinning, Corrosion protection techniques – Corrosion inhibitors - Corrosion resistant steels - Coatings to reinforcement - Cathodic protection.											
UNIT - V											
<i>Repair, Rehabi</i> - Repair of stru- Techniques – E	<i>litation And</i> a ctures distress distress distress distress derived der	Retro sed d noliti	<i>fitting</i> ue to c ion me	g <i>of St</i> corrosi thods	ructures: St on, fire, leak – Case studi	rengthening of cage, and earth es.	Structural e quake – Der	lements nolition			
Text Books •											

1. Denison Campbell, Allen and Harold Roper, "Concrete Structures, Materials,

Maintenance and Repair", Longman Scientific and Technical UK.

2. Allen R.T. & Edwards S.C, Repair of Concrete Structures, Blakie and Sons, UK.

Reference Books :

- 1. Shetty M.S., "Concrete Technology Theory and Practice", S.Chand and Company, 2008.
- 2. Dov Kominetzky.M.S., "Design and Construction Failures", Galgotia Publications Pvt. Ltd., 2001.
- 3 Ravishankar.K., Krishnamoorthy.T.S, "Structural Health Monitoring, Repair and Rehabilitation of Concrete Structures", Allied Publishers, 2004.
- 4. CPWD and Indian Buildings Congress, Hand book on Seismic Retrofit of Buildings, Narosa Publishers, 2008.
- 5. Gambhir. M.L., "Concrete Technology", McGraw Hill, 2013.

Web References:

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

CIVIL INFRASTRUCTURE FOR SMART CITY DEVELOPMENT (CISCD)

VII Semester:			Scheme: 2017						
Course Code	Category	Hours/Week			Credits	Maximum Marks			
OE403	OEC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total	
		2	1	-	3	40	60	100	
Sessional Exam	m Duration:	2 Hrs			End Exam Duration: 3 Hrs				
·									
Course Outcomes : At the end of the course students will be able to									
CO1: Understand the fundamental concepts of smart and sustainable cities.									
CO2: Understand the GIS applications in Smart City Planning									
CO3: Understand the component of smart cities and dwell into their technological advancement.									
CO4: Understand the involvement of stake holders in the design and implementation of responsive smart cities									
CO5: Explain the importance of different linkages and their defined roles including government, urban planners, universities, city developers and communities.									
UNIT– I									
<i>Smart City Planning – An Overview:</i> Understanding – Dimensions – Global experience, Global standards and performance bench marks. Practice codes. India 100 smart cities policy									

Global standards and performance bench marks, Practice codes. India 100 smart cities policy and mission, Smart city planning and development, Financing smart cities development, Governance of smart cities.

UNIT-II

Green Building Concepts & Sustainable Development: Green projects in smart cities, sustainability – Green building – Rating system – Energy efficient building – Energy saving systems.

GIS Applications in Smart City Planning: Coordinate system and geo-coding, vector data structure and algorithms, raster data structure and algorithms, data bases for GIS – concepts, error modelling and data uncertainty, decision making through GIS, constructing spatial data infrastructure and spatial information system. National Urban Information system. Why remote sensing, aerial & satellite remote sensing - Principles of aerial remote sensing - Aerial photo-interpretation – Photogrammetry – Stereovision - Measurement of heights/depths by relief displacement and parallax displacement. Principles of satellite remote sensing, spatial, spectral and temporal resolutions.

UNIT-III

Smart Urban Transportation Systems: Elements of Infrastructure (Physical, Social, Utilities and services) - Basic definitions – Concepts - Significance and importance; Data required for provision and planning of urban networks and services; Resource analysis, Provision of infrastructure; Role of transport, types of transport systems, evolution of transport modes, transport problems and mobility issues; Urban form and Transport patterns, land use – transport cycle, concept of accessibility. Hierarchy, capacity and geometric design elements of roads and intersections. Basic principles of Transport infrastructure design. Urban transport planning process –Transport, environment and safety issues. Principles and

approaches of Traffic Management, Transport System Management.

UNIT-IV

Water Supply And Drainage: Water – sources of water, treatment and storage, transportation and distribution, quality, networks, distribution losses, water harvesting, recycling and reuse, norms and standards of provision, institutional arrangements, planning provisions and management issues. Sanitation – points of generation, collection, treatment, disposal, norms and standards, grey water disposal, DEWATS, institutional arrangements, planning provisions and management issues. Municipal and other wastes – generation, typology, quantity, collection, storage, transportation, treatment, disposal, recycling and reuse, wealth from waste, norms and standards, institutional arrangements, planning provisions and standards, institutional arrangements, planning provisions and standards, planning provisions and management issues. Power – Sources of power procurement, distribution networks, demand assessment, norms and standards, planning provisions and management issues.

UNIT– V

Project Management For Smart Cities: Philosophy and concepts of Project management phases - Stages of project & their approval status – Planning – Scheduling - PERT model - Project cost analysis - Resource allocation & Levelling - Project monitoring and control - Risk management - Case studies.

E - Governance And IOT: The concept of management - Concept of e-management & ebusiness - e-Government Principles - Form e-Government to e-governance - e-governance and developing countries - Designing and Implementing e-Government Strategy; Egovernance: Issues in implementation. IOT- fundamentals, protocols, design and development, data analytics and supporting services, case studies.

Text Books	:

1. Gupta Tripati [2016], Smart cities transforming India, Pentagon Press.

- 2. Marta Peris-Ortize, Dag r Bennett, Diana Perez, Bustamante Yabav [2017], *Sustainable Smart Cities*, Springer
- 3. Mani, N [2016], Smart Cities and Urban Development in India, New Century Publications.

Web References :

- 1. https://smartnet.niua.org
- 2. <u>https://smartcities</u>council.com

3. https:// mygov.in/group/smart- cities.

Question Paper Pattern:

Sessional Exam:

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End Exam:

OPEN ELECTIVE – IV (in VII Sem.)

- 1. SUSTAINABLE WATER RESOURCES DEVELOPMENT
- 2. DISASTER PREPAREDNESS AND PLANNING MANAGEMENT
- 3. METRO SYSTEMS

SUSTAINABLE WATER RESOURCES DEVELOPMENT (SWRD)

VII Semester :			Scheme : 2017							
Course Code	Category	Hou	ırs / W	/eek	Credits	Credits Maximum Marks				
OE404	OEC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		2	1	-	3	40	60	100		
Sessional Exam	n Duration: 2	2 Hrs				End Exam	Duration	: 3 Hrs		
Course Outcomes: At the end of the course students will be able to										
CO2: Understa	CO2: Understand the planning requirements of irrigation project									
CO3: Evaluate	and monitor	water	auality	V	ingation pi	lojeet				
CO4: Understa	and the water	manag	gement	strate	gies					
CO5: Understa	and importance	e of ir	nterlink	king of	rivers					
				UNIT	- I					
Introduction: Water Resources Potential, Demand and Development -Role of water in National Development - Assessment of Water Resources of the country - River Basins - Hydro-meteorological and Hydrological data - Assessment of utilizable flows - Conventional and non-conventional methods - Estimation of Water need- National Water Policy. Conjunctive use of surface and ground water. Future Water Requirements - Scope of development.										
				UNIT	- II					
Water Resources Planning and Project Formulation-Purpose served by water Resources Development Projects, Water Resources Planning - Single and Multipurpose Projects - Project Formulation, Comparison of Alternatives - Cost Benefit Analysis. Cost Allocation among various purposes. Water Resources Systems Analysis - Optimization approaches										
UNIT - III										
Environmental Aspects of Integrated water Resources Development -Evaluation and monitoring of water quality and management of water distribution networks for Irrigation, Flood control and Power generation - Catchment treatment and Watershed Management. Command Area Development - Resettlement and Rehabilitation.										
UNIT - IV										
Management Strategies for Excess and Deficit Water Balances										
Flood control & Management - Various methods of Control - Administrative Planning - Management Programmes and Flood cushioning - Structural Methods. Non-structural Methods - Flood forecasting & Warning, Flood plain zoning and Flood proofing. Drought Prone Area Development - Soil conservation methods.										
UNIT - V										
Riparian Rights and Inter Basin Linking of Rivers - Indian Scenario - Various Proposals and their Status - Dr. K. L. Rao's Proposal, Capt. Dastur's Garland Canal, National Perspective Plan, NWDA Link and Peninsular Rivers Development Component - Overall										

Benefits and Major constraints. Water Laws of India - Regulating Authorities - Interstate Water Dispute Acts - River Water Tribunals - Cauvery, Krishna Godavari and Vamsadahra Tribunals.

Text Books :

- 1. S K Sharma, A Textbook Of Irrigation Engineering and Hydraulic Structures, S. Chand and Company Limited, New Delhi
- 2. R. L. Linsley & J. B. Fragini, MCgrohly, Water Resource Engineering

Reference Books :

- 1. P. N. Modi, Irrigation and Water Resources & Water Power, Standard Book House.
- 2. A.S. Gordman, Principles of Water Resource engineering
- 3. S. K. Garg, Irrigation engineering and Hydraulic structures, Standard Book House.
- 4. Punmia & Lal, Irrigation and water power engineering, Laxmi Publications Pvt. Ltd., New Delhi

Web References:

- 1. https/www.coursera.org
- 2. www.nptel.ac.in/courses

Question Paper Pattern:

Sessional Exam:

The question paper for sessional examination is for 30 marks, covering half of the syllabus for first sessional and remaining half for second sessional exam. Question No. 1 which carries 6 marks contains three short answer questions of two marks each. The remaining three questions shall be EITHER/OR type questions carrying 8 marks each.

End Exam:

DISASTER PREPAREDNESS AND PLANNING MANAGEMENT (DPPM)

VII Semester: Sch										
Course Code	Course Code Category Hours/Week				Credits	Maximum Marks				
OE405	OEC	L	T	Р	С	Continuous Internal Assessment	End Exam	Total		
		$\frac{2}{2}$	1	-	3	40	60	100		
Sessional Exar	n Duration:	2 Hrs	5			End Exa	m Durati	on: 3 Hrs		
Course Outcou										
Course Outcon	nes: At the e		I Torm	inclos	vios usod in	Disaster Mono	aomont			
CO2 : Understa	and Demition	d Cate	gories	of Di	sasters	Disaster Maria	gement			
CO3 : Understa	and the Impac	t of I	Disaster	rs on S	Socio-econo	omic and enviro	onment.			
CO4: Plan for	Disaster risk r	educt	ion, mi	tigatio	n and mana	gement strategie	es.			
CO5 : Analyze	relationship	betwe	en Dev	velopr	nent and D	isasters.				
				UNI	T– I					
<i>Introduction:</i> Concepts and definitions: disaster, hazard, vulnerability, risks, severity, frequency and details, capacity, impact, prevention, mitigation.										
				UNI	T– II					
Disasters · Disa	sters classific	eation								
<i>Natural disasters:</i> floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.,										
<i>Manmade disasters:</i> Industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills, transportation accidents, terrorist strikes, etc., Hazard and vulnerability profile of India - mountain and coastal areas - ecological fragility.										
UNIT– III										
Disaster Impacts: Disaster impacts - environmental, physical, social, ecological, economic, political, etc., Health - psycho-social issues - demographic aspects (gender, age, special needs) - hazard locations - global and national disaster trends - climate change and urban disasters.										
UNIT– IV										
Disaster Risk Reduction (DRR):										
Disaster management cycle – its phases: prevention, mitigation, preparedness, relief and recovery; Structural and non-structural measures - risk analysis, vulnerability and capacity assessment - early warning systems.										
Post-Disaster environmental response (water, sanitation, food safety, waste management, disease control, security, and communications): Roles and responsibilities of government, community, local institutions, NGOs and other stakeholders; Policies and legislation for disaster risk reduction, DRR programmes in India and the activities of National Disaster Management authority.										

Disasters, Environment and Development: Factors affecting vulnerability such as impact of developmental projects and environmental modifications (including of dams, land-use changes, urbanization etc.), sustainable and environmental friendly recovery - reconstruction and development methods.

Text Books :

- 1. Pradeep Sahni [2004], Disaster Risk Reduction in South Asia, PHI, New Delhi.
- 2. Ghosh G.K. [2006], Disaster Management, APH Publishing Corporation
- 3. Singh B.K. [2008], *Handbook of Disaster Management: Techniques & Guidelines*, Rajat Publication.
- 4. V. K. Sharma, *Disaster Management*, National Centre for Disaster Management, IIPE, Delhi,

Reference Books :

- 1. A Status Report Publication of the Govt. of India, Ministry of Home Affairs, National Disaster Management Division, *Disaster Management in India*.
- 2. A. S. Arya, Anup Karanth, and Ankush Agarwal, *Hazards, Disasters and Your Community; A Primer for Parliamentarians*, GOI–UNDP Disaster Risk Management Programme.
- 3. Inter Agency Standing Committee (IASC) (Feb. 2007). IASC Guidelines on Mental Health and Psychosocial Support in Emergency Settings. Geneva: IASC

Web Reference:

- 1. http://ndma.gov.in/ (Home page of National Disaster Management Authority)
- 2. http://www.ndmindia.nic.in/ (National Disaster management in India, Ministry of Home Affairs).
- 3. www.odihpn.org:, *Disaster Preparedness Programme in India. A Cost Benefit Analysis*, Commissioned and Published by the Humanitarian Practice Network 'at ODI HPN.
- 4. www.empowerpoor.org, *Drought in India: Challenges and Initiatives; Poorest Areas in Civil Society (PACS) Programme.* [2001–2008]

Question Paper Pattern:

Sessional Exam:

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End Exam:

METRO SYSTEMS (MS)

VII Semester :					Scheme : 2017					
Course Code	Category	Hou	irs / W	eek	Credits Maximum Marks					
OE406	OEC	L	Т	Р	С	Continuous Internal Assessment	End Exam	Total		
		2	1	-	3	40	60	100		
Sessional Exan	n Duration:	2 Hrs				End Exam	Duration	: 3 Hrs		
Course Outcomes: At the end of the course students will be able to										
COI: Understa	and the planning different	ing of i	rapid ti	ranspo	rtation syste	ms				
CO2: Understa	CO2: Understand the different types of rapid transit systems and their importance									
CO4: Design t	he transit syst	tem hv	consid	lering	all importan	t parameters				
CO5: Understa	nd the integra	nted tra	nsit sv	stem a	an important	nal management	nt			
			uisie sy	5001110	ina operation	in internegenier				
				UNI	- I					
<i>Introduction:</i> Overview of metro systems - Need for Metros - Basic Planning and Financing.										
				UNIT	' - II					
Medium-capacity rail transport system - Pre-metro systems - Automated urban metro subway systems - Monorail systems - Suburban and commuter rail systems - Funicular railways. UNIT - III Mass Transit Corridor Identification & Planning: Corridor identification - Network Compression Method - Planning of Rapid Transit System - System Selection - Supporting and Enclosing Structures - System Evaluation - Track Structures - Signal System - Aesthetics and Noise Consideration - Station Arrangements - Platform Capacity. UNIT - IV										
<i>ITS Components, Tools And Strategies:</i> Components of user services - Advanced traffic management system - Advanced traveller information system - Advanced vehicle control system - Commercial vehicle operational management - Advanced public transportation system - Electronic payment system - Advanced rural transportations - Security and safety systems - Urban traffic control.										
UNIT - V										
<i>Use Of Intelligent Transportation Systems:</i> Fundamental concepts - Data acquisition - Data processing - Information dissemination - Geographic information systems - Current ITS applications - Evaluation issues.										
Text Books :										
1. Simpson, Barry J., <i>Urban Public Transport Today</i> . Taylor & Francis, Routledge Publisher, 2003										
2. G.E. Gray and CA Hoel, <i>Public Transport Planning Operation and Management</i> , Prentice Hall; 2nd Edition, 1992										
3. John D. E	3. John D. Edwards, <i>Transportation Planning Handbook</i> , Second Edition, Institution of									

Transportation Engineers, 1999.

Reference Books :

- 1. Chowdhury, M. A. and Sadek, A, *Fundamentals of Intelligent Transportation Systems Planning*, Artech House, 2003.
- 2. Vuchic Vukan R., Urban Transit: Operations, Planning and Economics, Prentice Hall, 2005.

Web References:

1. https/www.coursera.org

2. www.nptel.ac.in/courses

Question Paper Pattern:

Sessional Exam:

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End Exam: