Course N	o. Course Name	L-T-P - Credits	Year of			
MA 20	Drobobility distributions	310/				
WIA20.	Tronsforms and Numerical Methods	5-1-0-4	2010			
Proroquis	Transforms and Numerical Methods					
Prerequisite: Nil						
	introduce the concent of random variables, probab	vility distributions	pacific discrete			
• 10 and	continuous distributions with practical application	n in various Engine	ering and social			
life	situations.		and social			
• To	know Laplace and Fourier transforms which has y	wide application in a	ll Engineering			
cou	rses.					
• To	enable the students to solve various engineering	problems using nun	nerical methods.			
Syllabus	EIKIN/ED CI	TV				
Discrete rat	dom variables and Discrete Probability Distributio	n.				
Continuous	Random variables and Continuous Probability Dist	ribution.				
Fourier tra	nsforms.					
Laplace Tr	ansforms.					
Numerical	methods-solution of Algebraic and transcendenta	l Equations, Interpo	lation.			
Numerica	solution of system of Equations. Numerical	Integration, Num	erical solution of			
ordinary d	fferential equation of First order.					
E-master	anteeme					
A fter the	completion of the course student is expected to h	ave concept of				
(i) Discre	te and continuous probability density functions an	ave concept of	distributions			
(i) Discle	ce and Fourier transforms and apply them in their	· Engineering brand				
(iii) Lapla	rical methods and their applications in solving E	ngineering problems				
(III) Huill	area metrous and then appreadons in solving L	ingineering problem	· ·			
Text Boo	ks:					
1. Mi	ler and Freund's "Probability and statistics for En	gineers"-Pearson-E	ighth Edition.			
2. Erv	vin Kreyszig, "Advanced Engineering Mathematic	es", 10 th edition, Wi	ley, 2015.			
Reference	es: Estd					
1. V.	Sundara <mark>pandian, "Probab</mark> ility, Statistics and Qu <mark>eu</mark>	ing theory", PHI Le	arning, 2009.			
2. C.	Ray Wylie and Louis C. Barrett, "Advanced Engineer	ing Mathematics"-Six	th Edition.			
3. Jay	L. Devore, "Probability and Statistics for Engineering	and Science"-Eight F	dition.			
4. Ste	ven C. Chapra and Raymond P. Canale, Numeric	al Methods for Eng	ineers -Sixtn			
Ed	tion-Mc Graw Hill.					
Course Plan						
Module	Module Contents Hours Sem. Exam					
	Discrete Probability Distributions, (Relevant to	ppics in	IVIAI NO			
	section 4.1.4.2.4.4.4.6 Text1)	r				
	Discrete Random Variables. Probability distribut	ion function.	2			
	Cumulative distribution function.					
I Mean and Variance of Discrete Probability Distribution. 2						
	Binomial Distribution-Mean and variance.		2			
	Poisson Approximation to the Binomial Distribut	tion. Poisson	2			
	distribution-Mean and variance.					
			15%			

	Continuous Probability Distributions (Relevant tonics in		
	section 51525557 Toxt1)		
	Section 5.1, 5.2, 5.3, 5.7 Text	2	
	Continuous Random Variable, Probability density function,	2	
	Cumulative density function, Mean and variance.		
II	Normal Distribution, Mean and variance (without proof).	4	
	Uniform Distribution.Mean and variance.	2	
	Exponential Distribution. Mean and variance.	2	
	r · · · · · · · · · · · · · · · · · · ·		
	A DI A DIDITI IZATAA		15%
	FIRST INTERNAL EXAMINATION	M	
	Fourier Integrals and transforms. (Relevant topics in section		15%
	11.7, 11.8, 11.9 Text2)		
	Fourier Integrals, Fourier integral theorem (without proof)	3	
III	Fourier Transform and inverse transform	3	
	Fourier Sing & Cosing Transform inverse transform	3	
	Fourier Sine & Cosine Transform, inverse transform.	5	
			15%
	I anlace transforms (Relevant topics in section		1370
	6 1 6 2 6 2 6 5 6 6 Tout 2)		
	0.1, 0.2, 0.3, 0.3, 0.0 $1 ext2)$		
	Laplace Transforms, linearity, first shifting Theorem.	3	
	Transform of derivative and Integral, Inverse Laplace	4	
IV	transform, Solution of ordinary differential equation using		
	Laplace transform.		
	-1		
	Unit step function second shifting theorem	2	
	One step function, second sinting theorem.	2	
	Convolution Theorem (without proof)	2	
	Convolution Theorem (without proof).	2	
	Differentiation and Integration of transforms	2	
	SECOND INTERNAL EXAMINATION	_	
	Numerical Techniques.(Relevant topics in		20%
	section 19 1 19 2 19 3 Text2)		
	Solution Of aquations by Iteration Newton, Penhan Mathed	2	
	Solution of equations by heration, ive with - Raphson Method.	2	
V	Intermoletion of Unaquel intervals Learnings's Intermoletion	2	
	Interpolation of Onequal Intervals-Lagrange's Interpolation	2	
	formula.		
	Interpolation of Equal intervals-Newton's forward difference	3	
	formula, Newton's Backward difference formula.		
	Numerical Techniques (Pelevent tonics in section		200/
	19.5.20.1.20.3. 21.1 Text?)		2070
	Solution to linear System- Gauss Elimination Gauss Seidal	3	
VT	Iteration Mathed	5	
V I	Numaria Integration Transmidel Dule Simmer's 1/2 D-1.	2	
	Numeric integration-trapezoidal Kule, Simpson's 1/3 Kule.	3	
	Numerical solution of firstorder ODE-Euler method,	5	
	Kunge-Kutta Method (fourth order).		
	END SEMESTER EXAM		

QUESTION PAPER PATTERN:

Maximum Marks : 100

Exam Duration: 3 hours

The question paper will consist of 3 parts.

Part A will have 3 questions of 15 marks each uniformly covering modules I and II. Each question may have two sub questions.

Part B will have 3 questions of 15 marks each uniformly covering modules III and IV. Each question may have two sub questions.

Part C will have 3 questions of 20 marks each uniformly covering modules V and VI. Each question may have three sub questions.

Any two questions from each part have to be answered.



ear of oduction	2016	ysis with	ig energy methods,	al Jf Lof	sis, II, Laxmi ctures, India		Sem. Exam	Marks 15%
Y Intr		al analy	ems usin Energy	structur lection c method	al Analy me I & ate Stru ate Hall		Hours	~
L-T-P- Credits	3-1-0-4	of structur	ctural syste res, Strain ches.	leterminate ation of def method and	rs of Structur alysis Volu y Determir Hill w Hill			thods of
Course Name	STRUCTURAL ANALYSIS -I	CE201 Mechanics of Solids ctives: quip the students with the comprehensive methods tasis on analysis of elementary structures.	is, Displacement response of statically determinate stru inciple of virtual work, Statically indeterminate structu s and influence lines, Cables and Suspension bridges, Ar	utcomes: will be able to se trusses and study displacement response of statically ms using energy methods: unit load method and strain energy method for determin ally determinate beams, frames & pin jointed trusses se statically indeterminate structures using strain energy stent deformation	and Timoshenko, Mechanics of materials, CBS. Publishe teth Leet, Chia M Uang& Anne M Gilbert., Fundamentals raw Hill idyanathan and P.Perumal, Comprehensive Structural An cations (P) Ltd g C.K., Intermediate Structural Analysis, McGraw Hill n Kassimali., Structural Analysis, Cenage Learning dramouli P N, Structural Analysis, Cenage Learning dramouli P N, Structural Analysis, I-Analysis of Statical DeePublishing Pvt Ltd., Chennai, Tamil Nadu. lasMenon, Structural Analysis, Narosa Publications eler., Structural Analysis, Narosa Publications eler., Structural Analysis, Narosa Publications eler., Structural Analysis, Pearson Education ey S., Indeterminate Structural Analysis, Oxford & IBH Gambhir, Fundamentals of structural Analysis, Tata McGraw shenko S.P.& Young D.H., Theory of Structures, McGraw	COURSE PLAN	Contents	USS ANALYSIS: Analysis of determinate truss-Me
Code	02	iisite: objec To ec	ls : nalysi s, Prii loads	ed Ou dents analys syster apply statics analys consis consis	MCCreases Geres & Kenne McCran R. Vaig Public Wang Wang Wang Wang Wang Wang Mul. Mul. Mul.			TR
Course	CE2	Prerequ Course	Syllabu Truss au methods Moving	Expected The stude i. i. ii. i. ii. i. ii. i. ii. i. ii. i. iv. J.	Text B (1) TextB		Module	Г

	joints and sections (Numerical problems) Elastic theorems and energy principles - strain energy due to axial load, bending moment, shear and torsion - strain energy method, Castigliano's method for deflection (Derivations only)		
П	Principle of virtual work – Unit load method-Betti's theorem – Maxwell's law of reciprocal deflections - principle of least work - application of unit load method and strain energy method for determination of deflection of statically determinate beams, frames - pin jointed trusses (simple numerical problems) Concepts of temperature effects and lack of fit.(No numerical problems) Statically indeterminate structures: Degree of static and kinematic indeterminacies – Introduction to force and displacement method(step by step procedure)	6	15%
	FIRST INTERNAL EXAMINATION		
Ξ	Strain Energy methods: Analysis of beams, frames and trusses with internal and external redundancy – (Simple problems with maximum two redundants) Concepts of effect of prestrain, lack of fit, temperature changes and support settlement.(No numerical problems) Method of Consistent deformations: Analysis of beams frames and trusses with internal and external redundancy(Simple problems with maximum two redundants) Concepts of effect of prestrain, lack of fit, temperature changes and support settlement.(No numerical problems)	6	15%
IV	Moving loads and influence lines. Introduction to moving loads - concept of influence lines - influence lines for reaction, shear force and bending moment in simply supported beams and over hanging beams - analysis for different types of moving loads - single concentrated load - several concentrated loads, uniformly distributed load on shorter and longer than the span.	10	15%
	SECOND INTERNAL EXAMINATION		
>	Cables:Analysis of forces in cables under concentrated and uniformly distributed loads - Anchor CablesSuspension Bridges :Un-stiffened suspension bridges, maximum tension in the suspension cable and backstays, pressure on towers.	10	20%
IA	Arches : Theory of arches - Eddy"s theorem - analysis of three hinged arches-Support reactions-normal thrust and Radial shear at any section of a parabolic and segmental arch due to simple cases of loading. Moving loads on three hinged arches (simple problems)	10	20%
	END SEMESTER EXAMINATION		

QUESTION PAPER PATTERN (End semester examination):

Maximum Martis: 100 Exam Duration: 3 Hrs
Part A -Module I & II : 2 questions out of 3 questions carrying 15 marks each
Part C - Module V & VI: 2 questions out of 3 questions carrying 20 marks each
Note: I.Each part should have at least one question from each module
2. Each question can have a maximum of 4 subdivisions (a,b,c,d)

Creation Creation Introduction CE204 CONSTRUCTION TECHNOLOGY 4-0-0-4 2016 Prerequisite : Nil	Course Code Course Name L-			Year of			
CE204 CONSTRUCTION TECHNOLOGY 4-0-04 2016 Prerequisite : Nil - Course objectives: - 2016 - - - - - - - - - - - - - - - - - - -			Credits	Introduction			
Prerequisite : Nil Course objectives: • To study details regarding properties and testing of building materials, • To study properties of concrete and concrete mix design • To study properties of concrete and concrete mix design • To study properties of concrete and concrete mix design • To study properties of concrete and concrete mix design • To develop understanding about framed construction and building failures Syllabus: Construction Materials Timber -Mortar - Iron and Steel Structural steel - Modern materials. Concrete-Admixtures -Making of concrete -Properties of concrete - mix proportioning Building construction - foundations -Introduction to Cost-effective construction -Masonry - Lintels and arches -Floors and flooring - Roofs and roof coverings -Doors, windows and ventilators -Finishing works. Tall Buildings - steel and concrete frame -prefabricated construction - slip form construction. Vertical transportation - Stairs -Elevators - Escalators -ramps. - Building failures and Retrofitting-failures in RCC and Steel structures - Foundation failure- Expected Outcomes: The students will be able to i. understand the details regarding the construction of building components iii. understand the details regarding the construction of building construction of masonry domestic buildings. v. define and describe the concepts and design criteria of tall framed and load bearing bu	CE204	CONSTRUCTION TECHNOLOGY	4-0-0-4	2016			
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	9. Tall build	ting systems & concepts, Monograph on planning and	design of Tal	building,			

COURSE PLAN				
Module	Contents	Hours	Sem. Exam Marks	
I	 Properties of masonry materials – review of specifications; Mortar – Types – Sand – properties – uses. Timber products: properties and uses of plywood, fibre board, particle board. Iron and Steel –Reinforcing steel – types – specifications. Structural steel – specifications Miscellaneous materials (only properties, classifications and their use in construction industry): Glass, Plastics, A.C. Sheets, Bitumen, Adhesives, Aluminium 	9	15%	
Π	Concrete – Aggregates – Mechanical & Physical properties and tests – Grading requirements – Water quality for concrete – Admixtures – types and uses – plasticizers – accelerators – retarders –water reducing agents Making of concrete - batching – mixing – types of mixers – transportation – placing – compacting – curing Properties of concrete – fresh concrete – workability – segregation and bleeding - factors affecting workability & strength – tests on workability – tests for strength of concrete in compression, tension & flexure Concrete quality control – statistical analysis of results – standard deviation –acceptance criteria – mix proportioning (B.I.S method) – nominal mixes.	9	15%	
	FIRST INTERNAL EXAMINATION			
III	Building construction - Preliminary considerations for shallow and deep foundations Masonry – Types of stone masonry – composite walls - cavity walls and partition walls -Construction details and features – scaffoldings Introduction to Cost-effective construction - principles of filler slab and rat-trap bond masonry	9	15%	
IV	Lintels and arches – types and construction details. Floors and flooring – different types of floors and floor coverings Roofs and roof coverings – different types of roofs – suitability – types and uses of roofing materials Doors, windows and ventilators – Types and construction details Finishing works – Plastering, pointing, white washing, colour washing, distempering, painting. Methods of providing DPC. Termite proofing	9	15%	
	SECOND INTERNAL EXAMINATION			

V	Tall Buildings – Framed building – steel and concrete frame – structural systems –erection of steel work–concrete framed construction– formwork – construction and expansion. joints Introduction to prefabricated construction – slip form construction Vertical transportation: Stairs – types - layout and planning- Elevators – types – terminology – passenger, service and goods elevators – handling capacity - arrangement and positioning of lifts – Escalators – features –use of ramps	10	20%	
VI	 Building failures – General reasons – classification – Causes of failures in RCC and Steel structures, Failure due to Fire, Wind and Earthquakes. Foundation failure – failures by alteration, improper maintenance, overloading. Retrofitting of structural components - beams, columns and slabs 	10	20%	
END SEMESTER EXAMINATION				

QUESTION PAPER PATTERN (End semester examination):

Maximum Marks :100

Exam Duration: 3 Hrs

- Part A -Module I & II : 2 questions out of 3 questions carrying 15 marks each
- Part B Module III & IV: 2 questions out of 3 questions carrying 15 marks each
- Part C Module V & VI : 2 questions out of 3 questions carrying 20 marks each
- Note : 1. Each part should have at least one question from each module

2014

Course	Code	Course Name	L-T-P- Credits	Ye Intro	ar of duction	
CE2	206	FLUID MECHANICS -II	3-0-0-3	2	016	
Prerequis	site : CE2	203 Fluid Mechanics I		•		
Course objectives						
 To study the Basic principles and laws governing fluid flow to open channel flow including hydraulic jump & gradually varied flow. To understand basic modeling laws in fluid mechanics and dimensional analysis. To apply the fundamental theories of fluid mechanics for the analysis and design of hydraulic machines 						
Syllabus H	ydraulic 1 radually y	nachines, Turbines, Pumps, Open channel flow, u	niform flow,	, Hydrau	lic Jump,	
Expected	Outcom	e	·			
The stude	nts will	-				
i. be	come cap	able of analysing open channe <mark>l fl</mark> ows & designing o	open channel	s.		
ii. ge	t an in <mark>sig</mark>	ht into the working of hydraulic machines.				
iii. be	come cap	able of studying advanced topics such as design of	hydraulic str	uctures.		
 Text Books: Kumar D.S., Fluid Mechanics and Fluid power Engineering, S. K. Kataria & Sons, New Delhi, 2013 Modi P. N. and S. M. Seth, Hydraulics and Fluid Mechanics (Including Hydraulic Machines), Standard Book House, New Delhi, 2013. Narayana Pillai, N. Principles of Fluid Mechanics and Fluid Machines, University Press, 2011. References: Arora.K.R. Fluid Mechanics, Hydraulics and Hydraulic Machines, Standard Publishers, 2005. Bansal R. K., A Textbook of Fluid Mechanics and Hydraulic Machines, Laxmi Publications, 2010. C S P Ojha, P N Chandramouli and R Brendtsson, Fluid Mechanics and Machinery, Oxford University Press, India , New Delhi Hanif Choudhary, Open channel flow, Prentice Hall, 2010 Jain A. K., Fluid Mechanics, Khanna Publishers, Delhi, 1996. Subramanya K., Open Channel Hydraulics, Tata McGraw Hill, 2009. 						
COURSE PLAN						
Module		Contents		Hours	Sem. Exam Marks	
	Hydrau force of	lic Machines - Impulse momentum principle, impa f a jet on fixed and moving vanes. Turbines- clas	ct of jets, sification			

COURSE PLAN					
Module	Contents	Hours	Sem. Exam Marks		
Ι	Hydraulic Machines - Impulse momentum principle, impact of jets, force of a jet on fixed and moving vanes. Turbines- classification and comparison of velocity triangles for Pelton wheel and reaction turbines (Francis and Kaplan), work done and efficiency, specific speed, draft tube- different types, penstock, surge tank - types, cavitation in turbines (Concepts only).	7	15%		

II Pumps- classification of pumps - Centrifugal pumps- types, work done, efficiency, minimum speed, velocity triangle for pumps, specific speed, priming, limitation of suction lift, net positive suction head, cavitation in centrifugal pump (Concepts only).	7	7 15%
FIRST INTERNAL EXAMINATION		-
 Introduction : Open channel flow and its relevance in Civil Engineering, Comparison of open channel flow and pipe flow. Flow in open channels-types of channels, types of flow, geometric elements of channel section, velocity distribution in open channels, uniform flow in channels, Chezy's equation, Kutter's and Manning's formula, Most economic section for rectangular and trapezoidal channels. Condition for maximum discharge and maximum velocity through circular channels, computations for uniform flow, normal depth, conveyance of a channel section, section factor for uniform flow. 	1 6	5 15%
IVSpecific energy, critical depth, discharge diagram, Computation of critical flow, Section factor for critical flow. Specific force, conjugate or sequent depths, hydraulic jump, expression for sequent depths and energy loss for a hydraulic jump in horizontal rectangular channels, types of jump, length of jump, height of jump, uses of hydraulic jump.	6	5 15%
SECOND INTERNAL EXAMINATION		
Gradually varied flow - dynamic equation for gradually varied flow, different forms of dynamic equation, Approximation for a wide rectangular channel, classification of surface profiles, BackwaterVand drawdown curves, characteristics of surface profiles in prismatic (Rectangular and trapezoidal only). Computation of length of surface profiles, direct step method. Design of lined open channels : trapezoidal cross-sections only	8	3 20%
VI Dimensional analysis and model studies - dimensions, dimensional homogeneity, methods of dimensional analysis, Rayleigh method, Buckingham method, dimensionless numbers, Similitude - geometric, kinematic and dynamic similarities. Model laws - Reynold's and Froude model laws, scale ratios, types of models, Concepts of distorted and undistorted models. END SEMESTED EXAMINATION	8	3 20%

QUESTION PAPER PATTERN (End semester examination) :Maximum Marks :100Exam Duration: 3 Hrs

Part A -Module I & II : 2 questions out of 3 questions carrying 15 marks each

Part B - Module III & IV: 2 questions out of 3 questions carrying 15 marks each

Part C - Module V & VI: 2 questions out of 3 questions carrying 20 marks each

Note: 1. Each part should have at least one question from each module

2. Each question can have a maximum of 4 subdivisions (a,b,c,d)

Course Code	Course Name	L-T-P- Credits	Year of Introduction				
CE208	GEOTECHNICAL ENGINEERING I	3-0-0 -3	2016				
Prerequis	Prerequisite : CE 205 Engineering Geology						
Course of	bjectives:						
• To	o impart to the fundamentals of Soil Mechanics prin	ciples;					
• To	provide knowledge about the basic, index and eng	neering proper	ties of soils.				
	ALLADULN	1L/1	V 1				
Syllabus:	TECHNOLOG	ICA					
Major so	il deposits of India, Basic soil properties, Rel	ationship betw	ween basic soil				
properties	s, Index properties-Sieve analysis, Hydrometer a	nalysis, Atterb	berg Limits and				
Relative	density, Soil classification, Permeability of soils,	Principle of	effective stress,				
Quick sar	nd condition, Critical hydraulic gradient, Shear str	ength of soils,	Mohr-Coulomb				
failure cri	terion, Different types of shear tests, Liquefactio	n of soils, Cor	npressibility and				
Consolida	ation, Void ratio versus pressure relationship,	Normally con	solidated, under				
consolida	ted and over consolidated states, Estimation	of magnitude	of settlement,				
Terzaghi's theory of one-dimensional consolidation, Coefficient of consolidation, Stability							
of finite slopes, Swedish Circle Method- Friction circle method ,use of Stability,							
Compaction of soils, light and heavy compaction tests, Control of compaction							

Expected Outcomes:

The students will be able to

- i. understand the basic principles governing soil behavior.
- ii. understand the procedure, applicability and limitations of various soil testing methods.

Text Books:

- 1. Das B. M., Principles of Geotechnical Engineering, Cengage India Pvt. Ltd., 2010.
- Ranjan G. and A. S. R. Rao, Basic and Applied Soil Mechanics, New Age International, 2002.

References:

- 1. A V Narasimha Rao and C Venkatramaiah, Numerical Problems, Examples and Objective questions in Geotechnical Engineering, Universities Press (India) Ltd., 2000
- 2. Arora K. R., Geotechnical Engineering, Standard Publishers, 2006.
- 3. Purushothamaraj P., Soil Mechanics and Foundation Engineering, Dorling Kindersley(India) Pvt. Ltd., 2013
- 4. Taylor D.W., Fundamentals of Soil Mechanics, Asia Publishing House, 1948.
- 5. Terzaghi K. and R. B. Peck, Soil Mechanics in Engineering Practice, John Wiley, 1967.
- 6. Venkatramaiah, Geotechnical Engg, Universities Press, 2000.

	COURSE PLAN		
Module	Contents	Hours	Sem. Exam Marks
Ι	Introduction to soil mechanics -Major soil deposits of India Basic soil properties - Void ratio, porosity, degree of saturation, air content, percentage air voids, moisture content, specific gravity, unit weight - Relationship between basic soil properties - Sensitivity - Thixotropy - numerical problems	6	15%
II	Index properties - Sieve analysis – Well graded, poorly graded and gap graded soils - Stoke's law - Hydrometer analysis (no derivation required for percentage finer and diameter) - numerical problems- – Relative density Consistency-Atterberg Limits - Practical Applications - numerical problems I.S. classification of soils.	6	15%
	FIRST INTERNAL EXAMINATION		
III	Permeability of soils - Darcy's law – Factors affecting permeability - Practical Applications - Constant head and falling head permeability tests - Average permeability of stratified deposits (no derivation required) - numerical problems. Principle of effective stress - Total, neutral and effective stress variation diagrams - Quick sand condition - Critical hydraulic gradient - numerical problems– Definition of phreatic line and axit gradient	7	15%
IV	Shear strength of soils- Practical Applications - Mohr- Coulomb failure criterion – Mohr circle method for determination of principal planes and stresses- numerical problems – relationship between shear parameters and principal stresses [no derivation required} Brief discussion of direct shear test, tri-axial compression test, vane shear test and unconfined compression test – Applicability - numerical problems -UU and CD tests [Brief discussion only]	7	15%
	SECOND INTERNAL EXAMINATION		
V	Compressibility and Consolidation - Void ratio versus pressure relationship - Coefficient of compressibility and volume compressibility – Compression index Practical Applications - Change in void ratio method - Height of solids method - Normally consolidated, under consolidated and over consolidated states - Estimation of pre consolidation pressure - Practical Applications - Estimation of magnitude of settlement of normally consolidated clays - Numerical problems Terzaghi's theory of one-dimensional consolidation(no derivation required) - average degree of consolidation – Time	8	20%

END SEMESTER EXAMINATION			
	- Control of compaction - numerical problems		
	light & Heavy Compaction Tests – OMC - Zero Air voids line		
	Compaction of soils - Standard Proctor, Modified Proctor, I.S.		
VI	Stability number - Stability charts.	8	20
	safety with respect to cohesion and angle of internal friction -		
	- Swedish Circle Method- Friction circle method- Factor of		
	Stability of finite slopes - Toe failure, base failure, slip failure		
	Numerical problems		
	Square root of time and logarithm of time fitting methods -		
	factor - Coefficient of consolidation - Practical Applications -		

QUESTION PAPER PATTERN (End semester examination):

Maximum Marks :100

Exam Duration: 3 Hrs

- Part A -Module I & II : 2 questions out of 3 questions carrying 15 marks each
- Part B Module III & IV: 2 questions out of 3 questions carrying 15 marks each
- Part C Module V & VI : 2 questions out of 3 questions carrying 20 marks each

Note : 1. Each part should have at least one question from each module

2. Each question can have a maximum of 4 subdivisions (a,b,c,d)



Course Code	Course Name	L-T-P-Credits	Year of Introduction	
CE232	MATERIAL TESTING LAB -I	0-0-3-1	2016	

Prerequisite : CE201 Mechanics of Solids

Course objectives:

The experimental work involved in this laboratory should make the student understand the fundamental modes of loading of the structures and also make measurements of loads, displacements and strains. Relating these quantities, the student should be able to obtain the strength of the material and stiffness properties of structural elements.

Course Outcomes:

The students will be able to undertake the testing of materials when subjected to different types of loading.

List of Experiments: (10 Experiments mandatory)

- 1. Tension test on Structural Materials: Mild Steel and Tor steel (HYSD bars) (Universal Testing machine and suitable extensometer)
- 2. Shear test on mild steel rod (Compression Testing Machine and Shear Shackle)
- 3. Bending test on mild steel (I sections) (Universal Testing Machine)
- 4. Torsion test on Mild steel circular bars (Torsion Testing Machine)
- 5. Torsion test on Steel/Copper/ Aluminum wires
 - a. Using Torsion Pendulum with Central disk
 - b. Using Torsion Pendulum with distributed Mass
- 6. Impact test
 - a. Izod test (Impact Testing Machine)
 - b. Charpy test (Impact Testing Machine)
- 7. Hardness test
 - a. Brinell Hardness test (Brinnel Hardenss Testing Machine)
 - b. Rockwell Hardness test (Rockwell Hardness Testing Machine)
 - c. Vickers Hardness test (Vickers Hardness Testing Machine)
- 8. Test On Springs
 - a. Open coil (Spring Testing Machine)
 - b. Close coil (Spring Testing Machine)
- 9. Bending Test on Timber (Universal Testing Machine and dial Gauge)
- 10. Bend & Rebend test on M S Rods
- 11. Verification of Clerk Maxwells Theorem 014
- 12. Demonstration of Fatigue Test
- 13. Study/demonstration of Strain Gauges and load cells

Books/Manuals /References:-

- 1. Testing of Engineering Materials by George E Troxell, Harmer E Davis, G Hauck, McGraw-Hill, Newyork
- 2. Testing of Metallic Materials by Prof. A V K Suryanaraya, Prentice Hall, India, Pvt Ltd.
- 3. Mechanical Behavior of Materials, by N Dowling, Prentice Hall, 1993.

Internal Continuous Evaluation - 100 marks

Record/output (Average) - 60 marks Viva-voce (Average) - 10 marks

Final practical exam – 30 marks

Course Code	Course Name	L-T-P-Credits	Year of Introduction	
CE234	FLUID MECHANICS LABORATORY	0-0-3-1	2016	

Prerequisite : CE203 Fluid Mechanics- I

Course objectives

1. Students should be able to verify the principles studied in theory by performing the experiments in laboratory

Expected Outcome

- 1. The students will be able to understand the different flow measurement equipment's and their procedures.
- 2. The students will be able to analyze the performance characteristics pumps/turbines.
- 3. Able to develop the skill of experimentation techniques for the study of flow phenomena in channels/pipes.

List of Experiments (Minimum 12 nos. mandatory)

- 1. Study of taps, valves, pipe fittings, gauges, pitot tubes, water meters and current meters.
- 2. Calibration of Pressure gauges
- 3. Determination of metacentric height and radius of gyration of floating bodies.
- 4. Verification of Bernoulli's theorem
- Hydraulic coefficients of orifices and mouth pieces under constant head method and time of emptying method.
- 6. Calibration of Venturimeter.
- 7. Calibration of Orifice meter
- 8. Calibration of water meter.
- 9. Calibration of rectangular and triangular notches.
- 10. Time of Emptying : unsteady flow
- 11. Determination of Darcy's and Chezy's constant for pipe flow.
- 12. Determination of Chezy's constant and Manning's number for open channel flow.
- 13. Plotting Specific Energy Curves in Open Channel flow
- 14. Study of Parameters of Hydraulic Jump in Open channel Flow.
- 15. Determination of friction co-efficient in pipes
- 16. Determination of loss co-efficient for pipe fittings

- 17. Performance characteristics of centrifugal pump.
- 18. Performance characteristics of Pelton wheel.
- 19. Performance characteristics of Francis turbine.
- 20. Performance characteristics of Kaplan turbine.



Course code	Course Name	L-T-P - Credits	Year of	
			Introduction	
HS200	Business Economics	3-0-0-3	2016	
Prerequisite:	Nil			

Course Objectives

- To familiarize the prospective engineers with elementary Principles of Economics and Business Economics.
- To acquaint the students with tools and techniques that are useful in their profession in Business Decision Making which will enhance their employability;
- To apply business analysis to the "firm" under different market conditions;
- To apply economic models to examine current economic scenario and evaluate policy options for addressing economic issues
- To gain understanding of some Macroeconomic concepts to improve their ability to understand the business climate;
- To prepare and analyse various business tools like balance sheet, cost benefit analysis and rate of returns at an elementary level

Syllabus

Business Economics - basic concepts, tools and analysis, scarcity and choices , resource allocation, marginal analysis, opportunity costs and production possibility curve. Fundamentals of microeconomics - Demand and Supply Analysis, equilibrium, elasticity, production and production function, cost analysis, break-even analysis and markets. Basics of macroeconomics - the circular flow models, national income analysis, inflation, trade cycles, money and credit, and monetary policy. Business decisions - investment analysis, Capital Budgeting decisions, forecasting techniques and elementary Balance Sheet and taxation, business financing, international investments

Expected outcome.

A student who has undergone this course would be able to

- i. make investment decisions based on capital budgeting methods in alignment with microeconomic and macroeconomic theories.
- ii. able to analyse the profitability of the firm, economy of operation, determination of price under various market situations with good grasp on the effect of trade cycles in business.
- iii. gain knowledge on Monetary theory, measures by RBI in controlling interest rate and emerging concepts like Bit Coin.
- iv. gain knowledge of elementary accounting concepts used for preparing balance sheet and interpretation of balance sheet

Text Books

- 1. Geetika, Piyali Ghosh and Chodhury, Managerial Economics, Tata McGraw Hill, 2015
- 2. Gregory Mankiw, Principles of Macroeconomics, Cengage Learning, 2006.
- 3. M.Kasi Reddy and S.Saraswathi, *Economics and Financial Accounting*. Prentice Hall of India. New Delhi.

References:

- 1. Dornbusch, Fischer and Startz, Macroeconomics, McGraw Hill, 11th edition, 2010.
- 2. Khan M Y, Indian Financial System, Tata McGraw Hill, 7th edition, 2011.
- 3. Samuelson, Managerial Economics, 6th edition, Wiley
- 4. Snyder C and Nicholson W, *Fundamentals of Microeconomics*, Cengage Learning (India), 2010.
- 5. Truett, Managerial Economics: Analysis, Problems, Cases, 8th Edition, Wiley
- 6. Welch, *Economics: Theory and Practice* 7th Edition, Wiley
- 7. Uma Kapila, Indian Economy Since Independence, 26th Edition: A Comprehensive and Critical Analysis of India's Economy, 1947-2015
- 8. C Rangarajan, *Indian Economy, Essays on monetary and finance*, UBS Publishers'Distributors, 1998
- 9. A.Ramachandra Aryasri, *Managerial Economics and Financial Analysis*, Tata McGraw-Hill, New Delhi.
- 10. Dominick Salvatore, *Managerial Economics in Global Economy*, Thomas Western College Publishing, Singapore.
- 11. I.M .Pandey, *Financial Management*, Vikas Publishing House. New Delhi.
- 12. Dominick Salvatore, *Theory and Problems of Micro Economic Theory*. Tata Mac Graw-Hill, New Delhi.
- 13. T.N.Hajela. Money, Banking and Public Finance. Anne Books. New Delhi.
- 14. G.S.Gupta. Macro Economics-Theory and Applications. Tata Mac Graw-Hill, New Delhi.
- 15. Yogesh, Maheswari, Management Economics, PHI learning, NewDelhi, 2012
- 16. Timothy Taylor, Principles of Economics, 3rd edition, TEXTBOOK MEDIA.
- 17. Varshney and Maheshwari. Managerial Economics. Sultan Chand. New Delhi

Course Plan			
Module	Contents	Hours	Sem. Exam Marks
I	Business Economics and its role in managerial decision making- meaning-scope-relevance-economic problems-scarcity Vs choice (2 Hrs)-Basic concepts in economics-scarcity, choice, resource allocation- Trade-off-opportunity cost-marginal analysis- marginal utility theory, Law of diminishing marginal utility -production possibility curve (2 Hrs)	4	15%
п	Basics of Micro Economics I Demand and Supply analysis- equillibrium-elasticity (demand and supply) (3 Hrs.) -Production concepts-average product-marginal product-law of variable proportions- Production function-Cobb Douglas function-problems (3 Hrs.)	6	15%
FIRST INTERNAL EXAMINATION			
III	Basics of Micro Economics II Concept of costs-marginal, average, fixed, variable costs-cost curves-shut down point-long run and short run (3 Hrs.)- Break Even Analysis-Problem-Markets-Perfect Competition, Monopoly and Monopolistic Competition, Oligopoly-Cartel and collusion (3 Hrs.).	6	15%
IV	Basics of Macro Economics - Circular flow of income-two sector and multi-sector models- National Income Concepts-Measurement methods-problems-Inflation, deflation (4 Hrs.)-Trade cycles-Money- stock and flow concept-Quantity theory of money-Fischer's Equation and Cambridge Equation -velocity of circulation of money-credit control methods-SLR, CRR, Open Market Operations-Repo and Reverse Repo rate-emerging concepts in money-bit coin (4 Hrs.).	8	15%

SECOND INTERNAL EXAMINATION				
V	Business Decisions I-Investment analysis-Capital Budgeting-NPV,		20%	
	IRR, Profitability Index, ARR, Payback Period (5 Hrs.)- Business			
	decisions under certainty-uncertainty-selection of alternatives-risk	9		
	and sensitivity- cost benefit analysis-resource management (4 Hrs.).	-		
VI	Business Decisions II Balance sheet preparation-principles and		20%	
	interpretation-forecasting techniques (7 Hrs.)-business financing-			
	sources of capital- Capital and money markets-international	9		
	financing-FDI, FPI, FII-Basic Principles of taxation-direct tax,			
	indirect tax-GST (2 hrs.).	1		
END SEMESTED EVAM				

END SEMESTER EXAM

Question Paper Pattern

Max. marks: 100, Time: 3 hours

The question paper shall consist of three parts

Part A

4 questions uniformly covering modules I and II. Each question carries 10 marks Students will have to answer any three questions out of 4 (3X10 marks = 30 marks)

Part B

4 questions uniformly covering modules III and IV. Each question carries 10 marks Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part C

6 questions uniformly covering modules V and VI. Each question carries 10 marks Students will have to answer any four questions out of 6 (4X10 marks =40 marks)

Note: In all parts, each question can have a maximum of four sub questions, if needed.