JABALPUR ENGINEERING COLLEGE, JABALPUR (MP)
(An Autonomous Institute of Govt. of M.P.)
Affiliated to Rajiv Gandhi Technological University, Bhopal (MP)

Scheme of Study and Examination **(w.e.f. July 2010)**

M.E. III Sem. Branch : Civi Engg. Specialization : Structural Engineering

Course Code	Subject	Periods			EVALUATION SCHEME					Credits
					SESSIONAL EXAM			ESE	SUB TOTAL	
		L	T	P	TA	CT	TOT			
CE-150	Stability Theory in Structural Engineering	3	1	-	10	20	30	70	100	4
	Elective - III (Any One)									
CE-151A	Design of Tall Structures									
CE-151B	Design of Offshore Structures	3	1	-	10	20	30	70	100	4
CE-151C	Reliability Based Civil Engineering Design									
CE-151D	Rock Mechanics & Foundation Engg.									
(PRACTICAL/DRAWING/DESIGN)										
CE-152L	Seminar/ Project	-	-	4	100	-	100	-	100	4
CE-153L	Industrial Training (4 weeks)	-	-	-	-	-	-	100	100	4
CE-154L	Preliminaries of Dissertation Presentation	-		4	40	-	40	60	100	4
	Total	**6**	**2**	**8**	**160**	**40**	**200**	**300**	**500**	**20**

T.A. Teachers Assessment, CT- Class Test, ESE - End Semester Examination, Total Marks 500
Total Periods : 16 Total Credits : 20

NOTE : The students shall go on industrial training at the end of second semester and the evaluation shall be done at the end of third semester. The student has to present a report on the training and also has to face a viva voice examination infront of a panel headed by head of the department. The seminar /project shall be asigned by the supervisor

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	STABILITY THEORY IN STRUCTURAL ENGINEERING	**CE- 150**	Min "D"	Min "D"	5.0

STABILITY THEORY IN STRUCTURAL ENGINEERING

Unit – I : Concepts of Stability, Euler Bucking Load, Critical Load of Laced. Battened and Tapped columns, Inelastic Bucking of column.

Unit – II : Tensional Buckling, Tensional Flexural Buckling.

Unit – III : Lateral Instability of Beams, Beam Columns.

Unit – IV : Local Buckling and post buckling behavior of plates.

Unit – V : Application of Energy method and matrix method in stability problems.

Reference Books :

Theory of Elastic Stability by Timoshenko TMH Pub.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	DESIGN OF TALL STRUCTURES	**CE- 151A**	Min "D"	Min "D"	5.0

DESIGN OF TALL STRUCTURES

Unit – I : Behaviour of Tall Structures under static and Dynamic Loads, Model Analysis

Unit – II : Characteristics of wind and Earthquake Forces

Gust Factor and Karman Vortices.
Approximate and Regorions Methods of analysis for wind and Earthquake Forces

Unit – III : Shear walls, Frame Structures, coupled shear walls, Tabular Structures, Ductility and reinforcement details at joint.

Unit – IV : Criteria for design of Chimneys T.V. Towers and other Tall Structure

Unit – V : Modeling of tall structures, case studies.

Reference Books :

Coull, Smith, Design of Tall Buildings
Taranath, Design of Tall Buildings.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	DESIGN OF OFFSHORE STRUCTURES	CE- 151B	Min "D"	Min "D"	5.0

DESIGN OF OFFSHORE STRUCTURES

Unit – I : Loads and structural forms of different types of offshore structures, Elements of single degree of freedom (d.o.f.) system subjected to free and forced vibration.

Unit – II : Analysis for transient and steady state force, Equivalent damping for nonlinear systems, Dynamics of multi d.o.f. systems, Eigen values and vectors, iterative and transformation methods.

Unit – III : Mode superposition. Fourier series and spectral method for response of single d.o.f. systems, vibrations of bars, beams and cones with reference to soil as half space.

Unit – IV : Behaviour of concrete gravity platform as a rigid body on soil as a continuum, short and long term statistics of wind.

Unit – V : Static wind load, Effect of Size, shape and frequency, Aerodynamic admittance function and gust factor, spectral response due to wind for various types of structures, wave loads by morison's equation, static and dynamic analysis of fixed structures, use of approximate methods.

Reference Books :

1. Brebbia C.A. walker, Dynamic Analysis of Offshore Structures Newnes Butterworth.
2. Sarpakaya T and isaacson M, Mechanics of wave forces on offshore structures, Van Nostrand Reinhold New York 1981.
3. Hallam M.G. heaf N.J and wootton L.R. Dynamics of Marine Structures, CIRIA Publications Underwater Engineering Group, London 1978
4. Graff W.J. Introduction to offshore structures Gulf Publishing Co. Houston Eaxes 1981
5. Clough R.W. and penzine J Dynamic of Structures –II Ed. Mc Graw Hill Book Co.Inc 1992
6. Simiu E and Scanian R.H. Wind Effects on Structures, Wiley, New York 1978
7. Codes of Practice (latest versions) Such as APIRP-2A ureau ventas etc
8. Proceedings of Offshore Technology Conference (OTC) Behaviour of Offshore Structures (BOSS) and other Conferences on offshore Engineering .

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	RELIABILITY BASED CIVIL ENGINEERING DESIGN	CE- 151C	Min "D"	Min "D"	5.0

RELIABILITY BASED CIVIL ENGINEERING DESIGN

Unit – I : Probability Theory : Mutually exclusive events set theory, sample points and sample space, laws of probability, total probability theorem. Bayes rule, random variables discrete and continuous, jointly distributed discrete variables, marginal distribution, conditional distribution, jointly distributed continuous variables functions of random variables, moments and expectations, common probability distribution, normal lognormal, gamma and Beta distributions, external distributions.

Unit – II : Resistance Distribution and Parameters : Statics of properties of concrete and steel statics of strength of bricks and mortal characterization of variables, allowable stresses based on specified reliability. Probabilistic Analysis of loads. Load as a stochastic process, dead load statistical analysis of live loads-maximum sustained load intensity model, maximum total load model, wind load-probability model for wind load.

Unit – III : Structural Reliability : General expression for reliability expression for probability of failure, reliability when strength (S) and loan (L) follow normal distribution lognormal distribution, exponential distribution, extreme value distributions, factor of safety corresponding to a given reliability.

Monte Carlo Study of Reliability : Monte Carlo Method inverse transformation technique, Application to columns beams and frames.

Level 2. Reliability Method : Basic variables and failure surface, first order second moment methods-hasofer and lind's method. Non normal distributions, determination of reliability index of β structural elements.

Unit – IV : Reliability Based Design : Determination of partial safety checking formats, development of reliability based criteria, optimal safety factors calibration of IS 456 and IS 800.

Unit – V : Reliability of Structural Systems : System reliability, modeling of structural systems bounds on system reliability, automatic generation of a mechanism, generation of dominant mechanisms, reliability analysis of RCC and steel frames.

Reference Books :

1. Ranganathan R. Reliability Analysis and Design of Structures, TMH
2. Rao S.S. Reliability Based Design Mc Graw Hill Book Co. Inc.
3. Ghosh D.I. A Primer Reliability Theory, John Wiley, New York.
4. Lawis E E Introduction to Reliability Engineering John whey new York.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	ROCK MECHANICS & FOUNDATION ENGINEERING (Elective – III)	**CE- 151D**	Min "D"	Min "D"	5.0

ROCK MECHANICS & FOUNDATION ENGINEERING

Unit – I : Exploration and classification of rocks, rock masses structural features of rock masses.

Unit –II : Classification of rocks; lithology and engineering of rocks, their lab & field determination, fractured rocks, slope stability , ground water analysis, yield criteria and control.

Unit – III : Foundations on rocks; improvement of rock properties.

Unit – IV : Strength and deformation behavior of rock masses state of stress of rock masses & their distribution.

Reference Books :

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	SEMINAR/ PROJECT	CE- 152L			5.0

SEMINAR/PROJECT

The student shall take up a small project under the supervision of a supervisor and shall complete the task. He has to present the report before a committee credit by H.O.D. and answer the queries

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	INDUSTRIAL TRAINING	**CE- 153L**	Min "D"	Min "D"	5.0

INDUSTRIAL TRAINING

The student shall go to an Industry at the end of Second Semester during summer and shall prepare a report on the Practical Training undergone there. He has to present the report at the time of practical examination of Third Semester.

COURSE CONTENT & GRADE (w.e.f. July 2010)

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
	PRELIMINARIES OF DISSERTATION PRESENTATION	**CE- 154L**	Min "D"	Min "D"	5.0

PRELIMINARIES OF DISSERTATION PRESENTATION

The student shall prepare a literature review of the dissertation work to be undertaken. He shall also prepare the scheme of dissertation.