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)

B.E. Fourth Year **Branch: Civil Engineering** **SEM: Eighth**

Course Code	Subject	Periods			EVALUATION SCHEME					Credits
		L	T	P	SESSIONAL EXAM			ESE	SUB TOTAL	
					TA	CT	TOTAL			
CE-37	Transportation Engineering-II	3	1	-	10	20	30	70	100	4
CE-50	Structural Design – IV (Steel)	3	1	-	10	20	30	70	100	4
CE-62	Water Resource Engineering-II	3	1	-	10	20	30	70	100	4
Refer Table	Elective – II	3	1	-	10	20	30	70	100	4
(PRACTICAL/DRAWING/DESIGN)										
CE-51L	Structural Design-IV Lab (Steel)	-	-	2	20	-	20	30	50	2
CE-63L	Water Resource Engineering Lab - II	-	-	2	20	-	20	30	50	2
CE-65L	Structural Analysis Lab -II	-	-	2	20	-	20	30	50	2
CE-66L	Major Project	-	-	08	80	-	80	120	200	8
CE-67L	Seminar / Group Discussion			2	50	-	50	-	50	2
	Total	12	4	16	230	80	310	490	800	32

T.A. = Teachers Assessment, CT= Class Test, ESE= End Semester Examination

Total Marks= 800, Total Periods= 32, Total Credits= 32

Elective-II					
CE-064A	1. Pre stressed Concrete	CE-064B	2. Pavement Design	CE-064C	3. Air Quality Monitoring & Control

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

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	**TRANSPORTATION ENGINEERING-II**	CE-37	Min "D"	-	5.0

TRANSPORTATION ENGINEERING-II

Unit – I : High way planning, Alignment & Geometric Design : Principles of highway planning, road planning in India and financing of roads, classification patterns. Requirements, Engg. Surveys for highway location. Cross sectional elements – width, camber, super-elevation, sight distances, extra widening at curves, horizontal and vertical curves, numerical problems.

Unit – II : Bituminous & Cement Concrete payments : Design of flexible pavements, design of mixes and stability, WBM, WMM, BM, IBM, surface dressing, interfacial treatment – seal coat, tack coat, prime coat, wearing coats disadvantages of rigid pavements, general principles of design, types, construction, maintenance and joints dowel bars, tie bars. Brief study of recent developments in cement concrete pavement design, fatigue and reliability.

Unit – III Low Cost Roads, Drainage of Roads, Traffic Engg. & Transportation Planning : Principles of stabilization, mechanical stabilization, requirements, advantages, disadvantages and uses, quality control, macadam roads- types, specifications, construction, maintenance and causes of failures. **Surface and sub-surface drainage, highway materials :** Properties and testing etc. Channelised and unchannelised intersections, at grade & grade separated interections, description, rotary-design elements, advantages and disadvantages, marking, signs and signals, street lighting. Principles of planning, inventories, trip generation trip distribution, model split, traffic assignment, plan preparation.

Unit – IV : Airport Planning, Runway & Taxiway : Airport site selection. Air craft characteristic and their effects on runway alignments, windrose diagrams, basic runway length and corrections, classification of airports.
Geometrical elements : Taxi ways and runways, pattern of runway capacity.

Unit – V : Airport, Obstructions, Lightning and Traffic Control : Zoning regulations, approach area, approach surface imaginary, conical horizontal. Rotating beacon, boundary lights, approach lights, runway and taxiway lighting etc. instrumental lending system, precision approach radar, VOR enroute traffic control.

Reference Books :

Highway Engineering by S.K.Khanna & C.E.G. Justo
Airport Planning & Design by S.K.Khanna & M.G. arora

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

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	**STRUCTURAL DESIGN – IV (STEEL)**	CE-50	Min "D"	Min "D"	5.0

STRUCTURAL DESIGN – IV (STEEL)

Unit – I :
Plate girder bridges (Riveted and welded)

Unit – II :
Trussed girder bridges for railways and highways (IRC & IRS holding). Bearings for bridges.

Unit – III :
Water Tanks: Pressed steel tanks, tanks with ordinary plates, square, rectangular, circular with hemispherical
bottom and conical bottom.

Unit – IV :
Chimneys: Guyed and self supporting steel stacks.

Unit – V :
Bunkers, Silos & Towers

Reference Books :-
1. Design of Steel Structures – Ramammutham
2. Design of Steel Structures – Punia
3. Steel Str. by Ramchandra Vol II
4. Steel Str. by Arya & Ajmani
5. Design of steel structures – L.S. Negi

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

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	**WATER RESOURCE ENGINEERING-II**	CE-62	Min "D"	Min "D"	5.0

WATER RESOURCE ENGINEERING-II

Unit –I :Gravity dams : Design Criteria, forces acting on gravity dams, elementary profile, low and high gravity dams, stability analysis, evaluation of profile by method of zoining, practical profile, foundation treatment, construction joints, galleries in gravity dams.

Unit – II :Earth and Rock fill dams :
Earth Dams : Types, causes of failure and design criteria, soils suitable for earth dam construction, construction methods, foundation requirements, typical earth dam sections, estimation of seepage through and below the dam, seepage control, stability of slopes by slip circle method of analysis, pore pressures, sudden draw down, steady seepage and construction pore pressure condition.

Unit – III : Spillways : Various Types of Spillways, Ogee spillway and its design details of siphon shaft, chute and side channel spillways, emergency spillways.

Unit – IV : Energy dissipation and gates : Principles of energy dissipation, Energy dissipaters based on tail water rating curve and jump height curves spillway crest gates – vertical lift and radial gates, their design principles and details.
Design of canal regulating structures, detailed design of sarda type canal fall.
Types of cross drainage works – Aqueduct siphon aqueduct, super passage, level crossing & inlet & outlets.

Unit – V : Hydropower Plants : Introduction of Hydropower development, assessment of power potential, types of hydropower plants, general features of hydro-electric schemes, selection of turbines, draft tubes, surge tanks, penstocks, power house dimensions, development of micro hydel stations, tidal plants, pumped storage plants and their details.

Reference Books :

1. Engineering for Dams (Volumes I,II&III) by Creager. Justin & Hinds
2. Hydroelectric Hand Book by Creager
3. Hydraulic Structures by Varshney & Gupta
4. Irrigation Engineering & Hydraulic Structures by S.K. Garg
5. Water Power Engineering by Dandekar & Sharma.

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

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	**PRE STRESSED CONCRETE**	**CE-064A**	Min "D"	-	5.0

PRE STRESSED CONCRETE

Unit – I :

Pre-stressing Systems and losses of pre-stressing, introduction various systems of pre-stressing, Types of loss and their analysis.

Working Stress Design of Simple Beams : Critical load conditions allowable stresses, flexural design criteria axially pre-stressed members design of pre-stressing cable for a given cress section, design procedure based on flexure, design by load balancing method and multiple stage pre-stressing.

Unit – II :

Continuous Beams : Analysis of two span beam analysis of two span beam with eccentricities at outer supports, continuous beams with variable section design of continuous beam.

Miscellaneous Structural Members : Columns subjected to combined bending and axial force, piles, poles, piers and abutments, Tension members, ring beams circular tanks and pipes pavement sleepers roads and runways.

Unit – III :

Limit State Design of Beams : Limit state of strength in flexure, shear and torsion permissible stresses limit state of serviceability against deflection. Cracking and durability, design of simply supported and continuous beams.

Unit – IV :

Bond and Anchorage of Pre-stressing cables Bond in pre tensioned and post tensioned construction, pre-stressing cable at centroid axis symmetric multiple cables causing axial thrust cable with eccentricity, inclined pre-stressing cable spanning stress, end zone reinforcement.

Unit – V :

Pre-stressed Concrete Slabs : One way slab two way slabs, pre-stressed concrete beam slab construction, pre-stressed flat slab,

Deflection and Crack Width : Factors influencing deflection, short term deflections of un cracked members, long term deflection deflections of cracked members. Estimation of crack width using British code and FIP recommendations.

Reference Books :

1. N.Krishna Raju, Pre-stressed Concrete, Tata Mc Graw Hill Book Co.
2. P. Dayaratran, Pre-stressed Concrete Structures, Oxford & IBH Co. Delhi
3. Jain & Jai Krishna, Plain & Reinforced Concrete Vol – II Nem chand & Bros Roorkee.
4. IS 1343-980 code of Practice for Pre-stressed Concrete < Bureau of India Standards New Delhi.

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

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	**PAVEMENT DESIGN**	**CE-064B**	Min "D"	-	5.0

PAVEMENT DESIGN

Unit –I :
Equivalent Single Wheel Load (ESWL) : Definition, calculation of ESWL, repetition of loads and their effects on the pavement structures.

Unit –II :
Flexible Pavements : Component parts of the pavement structures and their functions, stresses in flexible pavements, Stress distribution through various layers, Boussinesque's theory, Burmister's two layered theory,methods of design, group index method, CBR method, Burmister's method and North Dakota cone method.

Unit –III :
Rigid Pavements : Evaluation of subgrade, Modulus-K by plate bearing test and the test details, Westergaard's stress theory stresses in rigid pavements, Temperature stresses, warping stresses, frictional stresses, critical combination of stresses, critical loading positions.

Unit –IV :
Rigid pavement design : IRC method, Fatigue analysis, PCA chart method, joints, design and construction & types, AASHTO Method, Reliability analysis.

Unit –V :
Evaluation and Strengthening of Existing Pavements : Benkleman beam method, Serviceability Index Method.Rigid and flexible overlays and their design procedures.

Reference Books :--
1. Principles of pavement design by E.J.Yoder & M.W. Witczak
2. AASHO, "AASHO Interim Guide for Design of Pavement Structures", Washington, D.C.
3. Portland Cement Association, Guidlines for Design of Rigid Pavements, Washington
4. DSIR, Conc. Roads Design & Construction.
5 Srinivasan M. "Modern Permanent Way"

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

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	**AIR QUALITY MONITORING & CONTROL**	**CE-064C**	Min "D"	-	5.0

AIR QUALITY MONITORING & CONTROL

Unit – I :
Air pollution problem: Economics and social aspects, historical episodes of air pollution. Sources of Air pollution, effects of air pollution on health, animal, plants and materials

Unit – II :
Role of meteorological condition, properties of typical air pollutants, air diffusion and concentration pollutants.general diseases caused by air pollutants. toxicity of various pollutants. Plums patterns and height of chimneys.

Unit – III :
Atmospheric chemistry, formation of secondary pollutants – PNN, PBN, Photolytic cycles, general diseases and toxicity of pollutants

Unit – IV :
Sampling and Analyzing of Air Pollutants: Instruments pollution survey, standards of air pollution.Principle of air pollution control, site selection and zoning, various control methods, process and equipment changes, design and operation of various air pollution control equipments.

Unit – V :
Air pollution control legislation, public education pollution standards, status of air pollution control in various countries.
Industrial Hygiene: Concept and importance, factory Involved in environmental hazards, industrial ventilation occupational diseases, control methods.

Reference Books :--
1. "Air Pollution" - Faith W.L, John Wiley & Sons
2. "Air Pollution" - Mc Cabe L.C., Mc. Graw Hill, International
3. Air Pollution - Stern A.C., Academic Press N. York
4. Fundamentals of Air Pollutions - Raju BSN Oxford & IBH Publishing Co. Pvt. Ltd.
5. "Air Pollution" - Rao M.N. & Rao HVN - Tata Mc Graw Hill
6. Air Pollution – Wark and Warner

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

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	**STRUCTURAL DESIGN -IV LAB(STEEL)**	CE-51L	Min "D"	Min "D"	5.0

List of Experiment

1. Design and drawing of reveted plate girder bridge.
2. Design and drawing of welded plate girder bridge.
3. Design and drawing of truss girder bridge.
4. Self supporting stack design and drawing.
5. Design and drawing of pressed steel tank/rectangular tank.
6. Design and drawing of hemispherical bottom circular tank.
7. Design and drawing of steel bunker.
8. Design and drawing of steel silo.

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

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	**WATER RESOURCE ENGINEERING LAB-II**	CE-63L	Min "D"	Min "D"	5.0

WATER RESOURCE ENGINEERING LAB- II

1. Determination of forces acting on gravity dam.
2. Determination of principle stresses in gravity dam.
3. Determination of elementary profile of gravity dam.
4. Checking the stability of gravity dam.
5. Determination of phreatic line of earthen dam without toe filter.
6. Determination of phreatic line of earthen dam with toe filter.
7. Checking the stability of slope of earthen dam.
8. Determination of upstream and downstream of gravity dam.
9. Study of arch and buttress dam.
10. Study of power house.

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

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	**STRUCTURAL ANALYSIS LAB-II**	CE-65L	-	Min "D"	5.0

STRUCTURAL ANALYSIS LAB

1. To verify "Theorem of reciprocal deflection or Maxwell reciprocal theorem " using simply supported beam.

2. To verify" theorem of deflection or Maxwell reciprocal theorem "using cantilever beam.

3. To verify "principle of super position for deflection" using simply supported beam made with linearly elastic material.

4. Top verify "principle of super position for deflection" using cantilever beam made with linearly elastic material.

5. To draw "influence line diagram for bending moment" at a section of ssb using bending moment apparatus.

6. To obtain horizontal thrust at support of "circular three hinged arch" and to draw ILD for this horizontal thrust,also to campare experimental result with analytical solution.

7. To obtain horizontal thrust at support of a" semi circular two hinged arch" and to draw ILD for this horizontal thrust,also to campare experimental result with analytical solution.

8. To obtain force in members of shear leg apparatus and to compare result with those obtaining using analytical method.

9. To obtain deflecttion at free end of a curved member consisting of a "quadrant with straight edge" and to compare result with those obtaining using analytical solution.

10. To obtain elastic deflection at free end of a semi circular frame with straight edge due to load applied at free end and to compare result with those obtaining using analytical solution.

11. To obtain" influence line diagram" for intermediate reaction of continous beam of to unequal span using "Muller Breslaun's principle" and to compare result with those obtaining using analytical solution.

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

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	**MAJOR PROJECT**	CE-66L	-	Min "D"	5.0

MAJOR PROJECT

Each candidate shall work on an approved Civil Engg. Project and shall submit design and a set of drawings on the project.

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

Course	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	P	
BE	**SEMINAR/GROUP DISCUSSION**	CE-67L	-	Min "D"	5.0