Jabalpur Engineering College, Jabalpur

Semester VIII Credit Based Grading System (CBGS) w.e.f. July 2018
Scheme of Examination
Bachelor of Engineering B.E. (Civil Engineering)
Subject Wise Distribution of Marks and Corresponding Credits
Scheme of Examination w.e.f. July 2018 Academic Session 2018-19

S.No.	Subject Code	Subject Name & Title	Maximum Marks Allotted					Total Marks	Hours/Week			Total Credits
			Theory			Practical			L	T	P	
			End. Sem.	Mid Sem. MST	Quiz, Assignment	End Sem.	Lab Work					
1	CE8001	Structured Design & Drawing-IV (Steel)	70	20	10	30	20	150	3	1	2	6
2	CE8002	Estimating Costing & Tendering	70	20	10	30	20	150	3	1	2	6
3	CE8003	Elective-V	70	20	10	-	-	100	3	1	-	4
4	CE8004	Elective-VI	70	20	10	-	-	100	3	1	-	4
5	CE8005	Project-II	-	-	-	120	80	200	-	-	8	8
6	CE8006	Concrete Technology Lab (Internal Assessment)	-	-	-	-	50	50	-	-	2	2
7	CE8007	Group Discussion/Seminar (Internal Assesment)	-	-	-	-	50	50	-	-	2	2
		Total	**280**	**80**	**40**	**180**	**220**	**800**	**12**	**4**	**16**	**32**

MST: Minimum of two mid semester tests to be conducted.

L: Lecture **T: Tutorial** **P: Practical**

Department Elective-V (Three Subjects)			Department Elective-VI (Three Subjects)	
S.No.	Subject Code	Subject Name	Subject Code	Subject Name
1	CE8003A	Prestressed Concrete	CE8004A	Advanced Water Resource Engineering
2	CE8003B	Pavement Design	CE8004B	Air Quality Monitoring & Control
3	CE8003C	Ground Improvement Techniques	CE8004C	FRP Composites

Principal
Jabalpur Engineering College
Jabalpur - 482 011 (M.P.)

Jabalpur Engineering College, Jabalpur
(Credit Based Grading System Based Scheme)
Bachelor of Engineering (CBGS) Semester: VIII (Civil Engg.)

(w.e.f. July 2018)

Subject Code	Subject Name & Title	Maximum Marks Allotted						Hours/Week			Total Credits
		Theory			Practical		Total Marks	L	T	P	
		End Sem	Mid Sem MST	Quiz, Assignment	End Sem	Lab Work					
CE8001	Structured Design & Drawing-IV (Steel)	70	20	10	30	20	150	3	1	2	6

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

Unit - II :
Trussed girder bridges for railways and highways (RC & 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 :-

I. 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

List of Experiment

I Design aid drawing of riveted plate girder bridge.
2. Design and drawing of welded plate girderbridge.
3. Design and drawing of truss girderbridge.
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 Articulation Matrix (CIVIL 8th Sem CBGS)

SUBJECT NAME	SUBJECT CODE	STATEMENT	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1
Structural Design & Drawing IV(Steel) (CE8001)	CO1	Design plate Girder Bridge, trussed girder bridges and bearings for bridges, steel water tanks, guyed self supporting steel stacks Bunkers, Silos and Towers.			3										3
Structural Design - IV Lab (Steel) (CE8001)	CO1	Design and draft riveted & welded plate girder bridge,self supporting stack, steel tanks, bunker & silo			2						1	2			3

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Subject Code	Subject Name & Title	Maximum Marks Allotted						Hours/Week			Total Credits
		Theory			Practical		Total Marks	L	T	P	
		End Sem	Mid Sem MST	Quiz, Assignment	End Sem	Lab Work					
CE8002	Estimating Costing & Tendering	70	20	10	30	20	150	3	1	2	6

Unit – I

Introduction: Purpose and importance of estimates, principles of estimating. Methods of taking out quantities of items of work. Mode of measurement, measurement sheet and abstract sheet; bill of quantities.Types of estimate, plinth area rate, cubical content rate, preliminary, original, revised and supplementary estimates for different projects.

Unit-II

Rate Analysis: Task for average artisan, various factors involved in the rate of an item, material and labour requirement for various trades; preparation for rates of important items of work. Current schedule of rates. (C.S.R.)

Unit-III

Detailed Estimates: Preparing detailed estimates of various types of buildings, R.C.C. works, earth work calculations for roads and estimating of culverts Services for building such as water supply,

drainageandelectrification.

Unit-IV

Cost of Works: Factors affecting cost of work, overhead charges, Contingencies and work charge establishment, various percentages for different services in building. Preparation ofDPR.

Unit-V

Valuation: Purposes, depreciation, sinking fund, scrap value, year's purchase, gross and net income, dual rate interest, methods of valuation, rent fixation of buildings.

LIST OF EXPERIMENTS

1. Preparation of detailed estimate.
2. Detailed estimate for services of plumbing and water supply or Electrification work.
3. Detailed estimate for earth work for the road construction or arched culvert.
4. Rate analysis for at least 8 items of construction.
5. Preparation of DPR of Civil Engineering Project.

Reference books:-

1. hakraborti M "Estimating and Costing" Published by the author 21 B, Bhabananda Road,Calcutta,2002.
2. Dutta B N "Estimating and Costing in Civil Engineering" UBS Publishers' Distributors Ltd., New Delhi, 1999.
3. Birdie G S "Estimating and Costing" Dhanpat Rai & Sons, Delhi,1994.
4. Kohli D. D.,Kohli R.C.,'Estimating and Costing",S.Chand & Company,New Delhi,2004
5. Spence Gedder,"Building and Public Works Administration, Estimating and Costing",Newnes Publishers,London,UK,1950.

Course Articulation Matrix (CIVIL 8th Sem CBGS)

SUBJECT NAME	SUBJECT CODE	STATEMENT	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1
Estimating Costing & Tendering (CE8002)	CO1	Illustrate various type of estimate, their purpose and importance.	1												
	CO2	Analyse the rates of important item, material and labour requirement for various trades.		2											1
	CO3	Prepare detailed estimates of construction works such as building , earth work, water supply, etc.		2											1
	CO4	Evaluate gross income based on depreciation of property, mortgage and lease problems.	1												

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		Theory			Practical		Total Marks	L	T	P	
		End Sem	Mid Sem MST	Quiz, Assignment	End Sem	Lab Work					
CE8003A	(Elective-V) Prestressed Concrete	70	20	10	-	-	100	3	1	-	4

PRESTRESSED 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, prestressing 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 :

I. 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 Articulation Matrix (CIVIL 8th Sem CBGS)

SUBJECT NAME	SUBJECT CODE	STATEMENT	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1
Prestressed concrete (Elective-V) (CE8003) A	CO1	Explain different types of pre-stressing systems.	2												
	CO2	Analyze different types of prestressed concrete structural members.		3											3
	CO3	Design pre-stressed concrete simple & continuous beam, slab, column and miscellaneous structural members.			3										3
	CO4	Calculate pre-stressing losses, short term, long term deflection and crack width.		2											2

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		Theory			Practical		Total Marks	L	T	P	
		End Sem	Mid Sem MST	Quiz, Assignment	End Sem	Lab Work					
CE8003B	(Elective-V) Pavement Design	70	20	10	-	-	100	3	1	-	4

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 firnctions, 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 stesses, 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 Stengthening of Existing Pavements : Benkleman beam method, Serviceability Index Method.Rigid and flexible overlays and their design procedures.

Reference Books :--

I. Principles of pavement design by E.J.Yoder & M.W. Witczak

2. AASHO, "A'r{SHO 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 Articulation Matrix (CIVIL 8th Sem CBGS)

SUBJECT NAME	SUBJECT CODE	STATEMENT	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1
Pavement design (Elective-V) (CE8003) B	CO1	Calculate ESWL, repetition of load and their effects on pavement structures	2												
	CO2	Determine stresses in flexible and rigid pavements.		2											
	CO3	Design rigid pavements as per IRC methods, PCA Chart methods and AASHTO methods.			2										
	CO4	Evaluate and strengthen existing pavement by Benkleman beam method and serviceability index method	1	2											

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		Theory			Practical		Total Marks	L	T	P	
		End Sem	Mid Sem MST	Quiz, Assignment	End Sem	Lab Work					
CE8003C	(Elective-V) Ground Improvement Techniques	70	20	10	-	-	100	3	1	-	4

Ground Improvement Techniques

Unit – I : Meaning & scope of term, fields of application, conventional methods. Compaction methods and other methods of ground-improvements, effect of compaction on soil properties.

Unit – II : Methods for bearing capacity improvement. Methods for road-construction. Effect of water on ground improvement technique.

Unit – III : Ground improvement methods like pitting, pre-loading soil nailing vibro floatation, sand drains, stone columns, soil stabilization by the use of admixtures, grouting.

Unit –IV: Electrical and thermal methods. Use of fly ash. In situ techniques. Jute as a ground-improving material.

Unit – V : Reinforced Earth : Concept and philosophy, Materials for earth reinforcement. Geotextiles, properties & uses.

Reference Books :

1. Basic & Applied soil Mechanics. Gopal Ranjan & ASR Rao, New age International (P) Ltd. Publishers, New Delhi.
2. Soil Mechanics and Foundation Engg. Vol –II VNS Murthy, Sri priya Technical Consultants, Bangalore.
3. CECR Journals
4. IGC Proceeding
5. Soil Mechanics by Alam Singh.

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		Theory			Practical		Total Marks	L	T	P	
		End Sem	Mid Sem MST	Quiz, Assignment	End Sem	Lab Work					
CE8004A	(Elective-VI) Advanced Water Resource Engineering	70	20	10	-	-	100	3	1	-	4

ADV WATER RESOURCE ENGINEERING

Unit -I Gravity dams

Design Criteria, forces acting on gravity dams, elementary profiie, 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 presswes, 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

Energry 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 structutes, 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 fubes, 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&ID by Creager. Justin & Hinds
2. Hydroelectric Hand Book by Creager

Course Articulation Matrix (CIVIL 8th Sem CBGS)

SUBJECT NAME	SUBJECT CODE	STATEMENT	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1
Advance Water Resource Engineering (Elective VI) (CE8004)	CO1	Calculate the forces acting on gravity dam and stability analysis of hydraulic structures		3											
	CO2	Determine the rate of seepage using flownets		2											
	CO3	Design various types of spillways, energy dissipators and canal regulating structures.			3										
	CO4	Explain the functioning & elements of hydropower plants.	2												

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		End Sem	Mid Sem MST	Quiz, Assignment	End Sem	Lab Work					
CE8004B	(Elective-VI) Air Quality Monitoring & Control	70	20	10	-	-	100	3	1	-	4

Air Quality Monitoring & Control

UNIT- I : Air-pollution : Definition, Atmosphere and global effects, Pollutants and their sources, classification. Air Pollution Meteorology : Interaction of Meteorology parameters, Transport and Diffusion Models and mechanism, Wind rose diagram, Particulates Visibility. Dynamics of pollutant dispersion and disposal. Effects on environment including living and non-living matter.

UNIT- II : Air Pollutant Chemistry: Properties of Pollutant, Units for expression of concentrations, Effects on Vegetation, Physical Environment and Human Health Mechanisms of Effect, Estimation Methodology. Human Health Hazard: Units of Measurement, Measurement of Concentration on Human Health. Nature of process Emissions: Mobile Combustion. Sources, Stationary Source, Measurement of Monitoring.

UNIT- III : Ambient air quality monitoring techniques: Air pollution indices, standards, norms, rules and regulations. Removal processes. An introduction to air pollution meteorology. Air Laboratory - High Volume
Sampling, Handy Sampling, Bio aerosols sampling, Indoor Air Sampling, Stack Sampling.

UNIT- IV : Prevention and Control of Air Pollution: Regulated Release of Air Pollutant Practicability, Mechanisms of Control, Equipment Mathematical Model

of Control Processes, Mechanical Collectors, Wet Collectors, Filtration, Electrostatics Precipitators Of Form Bed Reactors and Ventury Scrubbers, After Burners And Dispersion. Industrial

Application: Wood Working Operation, Open Hearth Neel Making, Manufacture of Sulfuric Acid, Coffee Roasting, Environmental Industrial Location, Theories And Facilities, Impact of Industrial Products.

UNIT- V : Legislation : Standards of Air Qualities in Various Countries , Evolution of Standards, Standards and Criteria, Emission Standards and Air Qualities Standards, Clean Air Act, Total Environmental Protection, Social Responsibility, Economics and Production..

Reference Books :

1. "Air Pollution : It's Origin and Control" By Kenneth Wark & Cecil F. Warner.
2. "Air Pollution Control Volume (I to VII)" By A.C. Stern.
3. "Air Pollution" By Henery C. Perkins (Mc-Graw Hill Publication)
4. "Air Pollution and It's Control" By M.N. Rao & C.S. Rao.

Course Articulation Matrix (CIVIL 8th Sem CBGS)

SUBJECT NAME	SUBJECT CODE	STATEMENT	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1
Air quality monitoring & control (Elective VI) (CE8004) B	CO1	Identify the sources of air pollution.	1												
	CO2	Relate general diseases and toxicity of pollutants.	2												
	CO3	Explain the design and operation of various air pollution control equipments.		1											
	CO4	Apply air pollution control legislation, public education pollution standards, etc. to practice.			1				2					2	

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		End Sem	Mid Sem MST	Quiz, Assignment	End Sem	Lab Work					
CE8004C	(Elective-VI) FRP Coposites	70	20	10	-	-	100	3	1	-	4

FRP Composites

UNIT -1 Introduction

Composites- Advantages of FRP –Role of resin and reinforcements - Applications of FRP. Designing in FRP – Selection criteria - material and process selection

UNIT 2 Molds for FRP

Polyester resins. Introduction – Plaster mold, wooden Mold - GRP molds- Epoxide moldsSteel molds- Aluminum alloy molds- Nickel shell molds.

UNIT 3 Reinforcements:

Introduction - Surfacing tissue –Glass fiber - Continuous filament rovings- Chopped strands- Chopped strand mats- Continuous strand matWoven glass fabrics- Carbon fiber- Aromatic polyamide (aramid) fibers - Polyester fibers- Polyacrylonitrile fibers - Nylon - PVC and PVDC Cotton – Sisal - Asbestos– Jute- Boron fibers

UNIT 4 Molding Processes.

Introduction - Contact molding -hand lay up - Spray lay-up- Vacuum bag molding - Pressure bag molding – Resin transfer or resin injection molding-pressure injection- Vacuum impregnation and injection - Hot press/matched metal molding - Filament winding- Centrifugul molding - Continuous sheet manufacture – Pultrusion - Sandwich construction.

UNIT 5

Bulk, Dough and Sheet molding Compounds and Prepregs. Introduction- Dough and bulk molding compounds - Sheet mould compounds- manufacture of SMC- Prepregs - Commercial products.

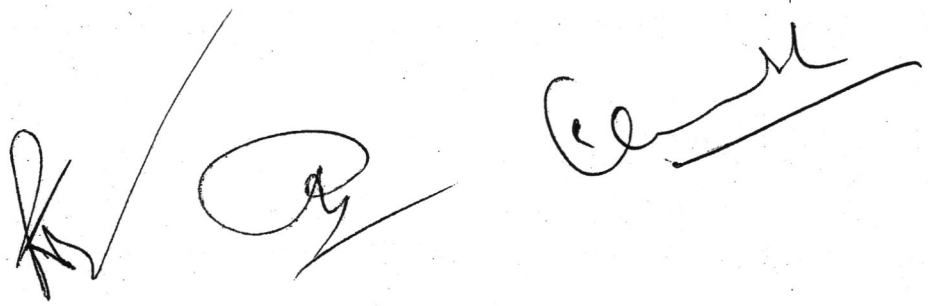
Reference Books:

1. FRP TECHNOLOGY by Weatherhead.

2. FIBERREINFORCED COMPOSITES- Materials, Manufacturing, and Design by P.K. Mallick

3. COMPOSITES MANUFACTURING- Materials, Product, and Process Engineering by Sanjay K. Mazumdar 4. Hand book of Reinforcement for plastics – Milewski .

5. M O W Richardson "Polymer Engineering Composite" – Applied Science.



JABALPUR ENGINEERING COLLEGE, JABALPUR

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Semester VIII **Credit Based Grading System (CBGS)**

B.E. (CIVIL ENGINEERING) **Subject wise distribution of credits**

w.e.f. July 2018

COURSE	SUBJECT TITLE	SUBJECT CODE	Hours per week			Total Credits
			L	T	P	
BE	PROJECT II	CE -8005			8	8

PROJECT II

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

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Semester VIII **Credit Based Grading System (CBGS)**

B.E. (CIVIL ENGINEERING) **Subject wise distribution of credits**

w.e.f. July 2018

COURSE	SUBJECT TITLE	SUBJECT CODE	Hours per week			Total Credits
			L	T	P	
BE	GROUP DISCUSSION	CE -8007	-	-	2	2

Objective of Group Discussion is to improve the Mass Communication and Convincing/understanding skills of students and it is to give student an opportunity to exercise their rights to express themselves. Evaluation will be done by assigned faculty based on group discussion and power point presentation.

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Semester VIII **Credit Based Grading System (CBGS)**

B.E. (CIVIL ENGINEERING) **Subject wise distribution of credits**

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COURSE	SUBJECT TITLE	SUBJECT CODE	Hours per week			Total Credits
			L	T	P	
BE	Concrete Technology Lab	CE -8006			2	2

1. Find out grading of fine and coarse aggregate.
2. Combining of given coarse and fine aggregate to obtain desired grading.
3. Design of concrete mix of various grades
4. Design of concrete mix using admixture
5. Design of concrete mix using fly ash.
6. Design of Pumpable concrete mix.