Jabalpur Engineering College, Jabalpur

Semester III Credit Based Grading System (CBGS) w.e.f. July 2017

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-2017 Academic Session-2017-18

S. No.	Subject Code	Subject Name & Title	Maximum Marks Allotted						Hours / week.			Total Credits	Total Marks
			Theory			Practical		Total Marks					
			End Sem	Mid Sem. MST	Quiz, Assign ment	End Sem.	Lab Work		L	T	P		
1	**CH3001**	Energy, Environment, Ecology & Society	70	20	10	-	-	100	3	1	-	4	
2	**CE3002**	Engineering Geology	70	20	10	30	20	150	3	1	2	6	
3	**CE3003**	Building Drawing & Design	70	20	10	30	20	150	3	1	2	6	
4	**CE3004**	Strength of Materials	70	20	10	30	20	150	3	1	2	6	
5	**CE3005**	Building Materials, Construction &Testing	70	20	10	-	-	100	3	1	-	4	
6	**CS3106**	Programming-I	-	-	-	30	20	50	-	-	2	2	
7	**CE3007**	1.Rural Outreach/Social service Activities under digital India or clean India 2.Evaluation of Industrial training (Internal Assessment)	-	-	-	-	50	50	-	-	2	2	
8	**CE3008**	NSS/NCC/Professional society activities (Internal Assessment)	-	-	-	-	50	50	-	-	2	2	
Total			**350**	**100**	**50**	**120**	**180**	**800**	**15**	**5**	**12**	**32**	**800**

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

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

B.E.CBGS III SEMESTER
ENERGY, ECOLOGY, ENVIRONMENT & SOCIETY

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E.	Energy, Ecology, Environment & Society	CH3001	Min. "D"	Min. "D"	5.0

Unit -I : Energy Sources and Energy Storing Devices :

World and Indian energy scenario, types of energy sources – renewable and non-renewable energy sources. Solar energy storage, application & maintenance of solar cell panel, introduction & applications of hydro, wind, biomass, ocean, tidal, wave and geothermal. Synergy between energy and environment. Global environment issues, greenhouse gas emission, global warming, green energy solution. Batteries – Primary and Secondary batteries- Alkaline battery – Lead (Pb) acid storage battery , Ni-cadmium battery ,Lithium battery, Fuel cell , Hydrogen Oxygen fuel cell ,Photo galvanic cell.

Unit -II : Ecosystem :

Structure & scope of ecology, Natural cycles of the environment, Hydrogen cycle, Oxygen Cycle, Carbon cycle, Nitrogen cycle, Phosphate cycle, Sulphur cycle, Biodiversity.

Society:-

Environmental problems and impact of P.A.T(Population, Affluence and Technology). Environmentally beneficial and harmful technologies, environment impact assessment policies (EIA).Ethics and regulatory act of environment.

Soil Pollution :

Sources & control measures. MSW, HWM.

Unit -III : Air Pollution:

Chemical composition of atmosphere, -primary, secondary, pollutants, Chemical and photochemical reaction, effects of CO, SOx, NOx, HC and particulates. Causes & effects of acid rain, ozone depletion: Monitoring and control of air pollutants.

Noise Pollution:

introduction, physiological effect, measurement and control of noise pollutants.

Unit -IV : Water Pollution:

Sources causes of water pollution , types and nature of water pollutants. Pollution load determination i.e. particulates ,suspended matter, total dissolved solids ,dissolved gases DO, BOD & COD. EL NINO phenomenon. Waste water treatment Domestic – Aerobic & anaerobic treatment. Industrial waste water treatment (ETP plant.) Electro dialysis membrane technique and filtration by activated charcoal and synthetic resins.

Unite -V : Corrosion & its Prevention:

Theories of Corrosion and Mechanism – Dry (Direct Chemical attack), Wet (Electro Chemical Theory) Atmospheric corrosion, Galvanic Series, Galvanic & Concentration Cell Corrosion, Corrosion by sea water. Factors Influencing & control of Corrosion – Proper Design, Use of pure metal and metal alloys, passivity, cathodes protection – Sacrificial anode and Impressed Current. Modifying the environment, Use of inhibitors.

Books References :

1. J.C. Kuriakose and J. Raja ram, "Chemistry in Engineering and Technology", Vol.1 & 2, Tata Mcgraw Hill Publishing
2. Company (P) Ltd., New Delhi
3. Mars G. Fontana, "Corrosion Engineering", Tata Mcgraw Hill Publishing Company (P) Ltd., New Delhi.
4. F.Chau, Y. Liang, J. Gao and X. Shao, "Chemometrics", Wiley Inter Science.
5. A text book of Engineering Chemistry by Jain & Jain, Dhanpat Rai Publishing Company, New Delhi
6. Chemistry of Engineering Materials by C.P. Murthy, C.V. Agarwal and A. Naidu BS Publication Hyd.
7. A text book of Environmental Chemistry and Pollution control by S.S. Dara & Dr. D. D. Mishra, S. Chand & Co, New Delhi
8. Energy,Environment Ecology and Society by Dr.Pushpendra,Vayu Education of India New Delhi .
9. Energy, Environment Ethics and Society, by Dr.S.Deswal & Dr.A.Deswal Dhanpat Rai Publishing Company, New Delhi.

B.E.CBGS III SEMESTER
ENGINEERING GEOLOGY

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E.	Engineering Geology	CE3002	Min. "D"	Min. "D"	5.0

Unit – I: Physical Geology:

The Earth as a Planet, important parts of the Earth, Action of Atmosphere, Weathering of Rocks, Principles and processes, Engineering significance of weathering, Geologic Action of wind erosion transportation and deposition, Action of River, Ground water and glaciers. Processes and features with all Engineering consideration.

Unit – II: Mineralogy & Petrology:

Study of Rocks : Their origin, composition, classification. Detailed study of important Igneous, Sedimentary, Metamorphic rocks with rock cycle. Bowens reaction series, distribution of rocks on Indian sub continent. Civil Engineering importance of rock forming minerals, Study of Minerals with their importance, hand specimen properties, Distribution of some economic minerals on Indian sub continent.

Unit – III: Structural Geology:

Structural features of rocks, Folds, Faults, Joints, Lineaments, Mountains, valleys. Terminology, classification, their Engineering properties for Civil Engineering considerations. Earth quakes & their causes.

Unit – IV: Remote Sensing, GIS & Its Application:

Remote Sensing technology, E.M.S., Spectral signatures , its Applications in Civil Engineering, Geographical Information System, data base management, use of Remote sensing in G.I.S. for soil, rock, site selection purposes.

Unit – V: Applied Geology:

Study of major and minor structures of Civil Engineering like Dam, Tunnel, Bridges, Culvert, Roads. their terminology, classification, different causes for failure, Geological considerations different methods for sub- surface, surface, aerial, satellite investigations for site selection of such structures.

Books References:

1. Engineering Geology by Kranine & Jade
2. Engineering Geology by Pravin Singh
3. Physical and Engineering Geology by S.K.Garg

ENGINEERING GEOLOGY

List of Experiments: [Expandable]

1. Meqascopic identification of rock forming minerals and important ores.
2. Identification of rocks
   i. Identification of iqneous rocks
   ii. Identification of sedimentary rocks
   iii. Identification of metamorphic rock
3. Study of geological maps
   i. Preparation of geologic sections
   ii. Simple map problems
   iii. Use of geologic maps in site selection of dams, reservoirs, roads, tunnels etc.
4. Field visits/ Geological excursion
5. Study of to posheet
6. Techniques of aerial photo interpretation
7. Satellite image study
8. Interpretation of satellite image
9. Geophysical survey.

B.E.CBGS III SEMESTER
BUILDING DRAWING & DESIGN

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E.	Building Drawing & Design	CE3003	Min. "D"	Min. "D"	5.0

Unit-I :

Components of a building and their functions. Drawing & dimensions of various types of foundations, doors, windows, ventilators, lintels, chhajjas, stairs, trusses.

Unit-II :

Basics of building planning : Orientation, sun diagram. Principles of building planning viz aspect, prospect, roominess, Grouping, elegance etc, building lay-out. Energy Efficient buildings, principle of architectural composition (i.e. unit, scale, contest etc.)

Unit-III:

Percentage built up area concept, FAR, open area, setbacks, height of buildings, municipal bye laws National building code and its important provisions. Preparation of submission drawing. Basics of colony planning. Fire safety measures.

Unit-IV:

Planning of residential buildings on different sizes of plots including plan, elevation sectional elevation. drawing to show all dimensions of various components of buildings. health buildings.

Unit-V :

Planning of school & Hostel buildings including drawings selection of site and salient features related to dimensions of each components of these buildings.

Books References:

1. Building planning, Designing & scheduling by Gurcharan Singh & Jagdish Singh
2. Building Design & Drawing by Shah, Kale & Patki
3. Building Design & Drawing by Malik & Meo
4. Building Construction by B.C. Punamia
5. Estimating & Costing by B.N. Datta

BUILDING DRAWING & DESIGN

List of Experiments:

1. Draw the sheet to show the different component of building.
2. Draw the sheet showing different types of foundations, columns, lintel, lintel with chajja projection (Including its reinforcement)
3. Draw ____ to show different type of doors and windows.
4. Draw ____ to show the different parts of residential building including plan and sectional elevation in line diagram and double line diagram (masonry thickness)
5. Draw the residential building on specific size of plot. (2 sheet)
6. Draw typical office building plan, situated at block level e.g. SDM, SDO office.
7. Draw typical plan of hostel building for collegiate students to accommodate 100/120 students.
8. Draw systematic line plan of primary health centre building located at block level.

B.E.CBGS III SEMESTER
STRENGTH OF MATERIALS

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E.	Strength of Materials	CE3004	Min. "D"	Min. "D"	5.0

Unit - I: Simple Stress and Strains:

Concept of Elastic body, stress and Strain, Hooke's law, Concept of stress and strains & their relationships, Fatigue and thermal stresses, Creep. Equilibrium equations, Elastic constants, Stresses in compound bars, composite and tapering bars, Complex Stress and Strains: Two dimensional and three dimensional stress system. Normal and tangential stresses, Principal Planes, Principal Stresses and strains, Mohr's circle of stresses and strain, Combined Bending and Torsion, Theories of failure.

Unit -II : Bending & Deflection:

Theory of simple bending: Concept of pure bending and bending stress, Equation of bending. Neutral axis, Section-Modulus, Determination of bending stresses in simply supported, Cantilever and Overhanging beams subjected to point load and uniformly distributed loading. Bending & shear stress distribution across a section in Beams.

Unit – III: Deflection of Beams:

Double Integration Method. Conjugate Beam Method, Macaulay's Method Area Moment Method.Unit load method : Strain Energy in direct stress, bending and shear. Theory of Plates and Shells, Introduction to theory of elasticity and photo-elasticity.

Unit –IV: Torsion of Shafts:

Concept of pure torsion, Torsion equation, Determination of shear stress and angle of twist of shafts of circular section, Hollow shafts, Open and closed coil springs, Leaf Spring, Helical Spring, Pressure Vessels: Thin and Thick walled cylinders and spheres. Stress due to internal pressure, Change in diameter and volume, Compound cylinders and shrink fittings. Stresses in thin, thick cylinders and rotating discs.

Unit –V: Unsymmetrical Bending:

Principal moment of Inertia, Product of Inertia, Bending of a beam in a plane which is not a plane of, symmetry. Concept of shear flow and shear centre. Curved beams: Pure bending of curvedbeams of rectangular, circular and trapezoidal sections, Stress distribution and position of neutral axis.

Columns and Struts: Euler's buckling load for uniform section, various end conditions, slenderness Ratio, Stress in columns, Rankine formulae, Eccentric loading on columns. Combined Stresses and Bending.

Books Reference:

1. E.P. Popov, Engineering Mechanics of Solids, 2nd Ed., Prentice Hill, New Delhi, 1999.
2. F.P. Beer, E.R. Johnston and J.T. DeWolf, Mechanics of Materials, 3rd Ed., Tata McGraw Hill, New Delhi, 2004.
3. I.H. Shames and J.M. Pitarresi, Introduction to the Solid Mechanics, 3rd Ed., Prentice Hill, New Delhi, 1989.
4. J.M. Gere, Mechanics of Materials, 5th Ed., Brooks/Cole, Chennai, 2001. S.H. Crandall, N.C. Dhal and T.J. Lardner,
5. Mechanics of Solids: An Introduction, McGraw Hill, Tokyo, 1994. S.M.A. Kazimi, Solid Mechanics, Tata McGraw-Hill, New

6. Delhi,1981.
7. Nash; Strength of Materials (Schaum), TMH.
8. Ramamrutham; Strength of Materials, ,
9. Subramaniam; Strength of Materials; R; Oxford

STRENGTH OF MATERIALS

List of Experiments:

1. To obtain deflection curve for a simply supported metal steel beam. Due to a concentrated load applied at mod span and to compare with that obtained with theoretical solution.
2. To obtain deflection curve for SSB timber beam due to a concentrated load applied at mid span and its compare with that obtained with theoretical solution.
3. To obtain deflection curve for a conti lever beam (steel beam) due to point load applied at free end and to compare it with that obtained with theoretical solution.
4. To obtain deflection curve for a conti lever timber that obtained with theoretical solution.
5. To obtain deflection at different section of an un symmetrically loaded SSB steel beam and to compare result with analytical solution.
6. To obtain deflection at different section of an un symmetrically loaded SSB timber beam and to check the result with analytical solution.

B.E.CBGS III SEMESTER
BUILDING MATERIALS, CONSTRUCTION & TESTING

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E.	Building Materials, Construction & Testing	CE3005	Min. "D"	Min. "D"	5.0

Unit – I :

Stones: Occurrence, varieties, characteristics and engineering properties,

bricks and tieles : Manufacturing, characteristics, classification and uses, Alternate fuels for burning, fly- ash bricks.

Mortars : Lime, cement and surkhi mortars

Timber : Engineering properties of timber & uses, defects in timber, seasoning and treatment, need for wood substitutes.

Unit – II :

Concrete : Concrete making materials : High strength concrete and light weight concrete, concrete admixtures, new materials to enhance durability of special concrete, Design of concrete mixes, Dam proofing materials, types of concrete, Different types of steel.

Unit – III :

Building Construction: An index of building components and their functions, selection of site, preliminary investigations, trail pit borings and sounding, shoring, under pinning and scaffolding.

Foundation: Types of soil bearing capacity improvement of bearing capacity, settlement and safe limits, types of foundation: cause of failure and remedial measures timbering for trenches dewatering of foundation.

Unit – IV:

Masonry & Walls : Brick masonry, bonds jointing, stone masonry, casting and laying, masonry construction, Brick cavity walls, code provisions regarding load bearing and non load bearing walls. Common defects in construction and their effects on strength and performance of walls. Pre cast stone masonry blocks, hollow cone blocks plastering and pointing, dampness and its protection.

Floors and Roofs : Types, construction, floor finishes, Different types of roofs, false ceiling, water proofing.

Unit – V:

Doors, Windows and ventilators : Types based on materials etc, size location fittings construction sun shades, sills and jambs, RCC doors / windows frames. Staris types rule of proportionality.

Services : Water supply, drainage, Electrification fire protection, thermal insulation Air conditioning. Acoustics & sound insulation.

Books References:

1. Advance in Building Materials & Construction, Mohan Rai & M.P. Jai Singh.
2. Engineering Materials, S.C. Rangwala
3. Building Construction, Sushil Kumar
4. Building Construction, B.C. Punamia
5. Building Construction, Mitchell
6. Engineering Materials, Surerndra Singh

B.E.CBGS III SEMESTER
PROGRAMMING – I (PROGRAMMING IN C++)

Course	Subject Title	Subject Code	Grade for End Sem.		CGPA at the end of every even semester
			T	P	
B.E.	Programming – I (Programming in C++)	CS3106	Min. "D"	Min. "D"	5.0

Unit I: Fundamental Concepts of Object-Oriented Programming (OOP):

Object, Class, message passing, abstraction and data hiding, encapsulation, modularity, inheritance, and polymorphism. Difference between Procedure Oriented Programming and Object Oriented Programming.

Unit II: Beginning With C++:

What is C++, Difference between C and C++, Classes and Objects in C++, defining classes, access specifier (i.e. Private, public, protected), defining member functions, creating objects of a class, access to member variables from objects etc. Friend functions and inline functions. Different types of function calls: call by value, call by address and call by Reference.

Unit III: Static Data Members, Constructor and Destructor in C++:

Default constructor, parameterized constructors and copy constructs.

Unit IV: Inheritance in C++:

Introduction, types of inheritance: single inheritance, multiple inheritance, multilevel inheritance, hierarchical inheritance and hybrid inheritance. Abstract class and Virtual base class.

Unit V: Polymorphism in C++:

Types of polymorphism, function overloading, operator overloading. Function overriding:- introduction to pointers, pointers to objects, this pointer, pointers to derived class, virtual functions, pure virtual function.

Books Reference:

1. Object Oriented Programming with C++ by E Balagurusamy, TMH.
2. Object Oriented Programming in C++ by Robert Lafore, Sams publishing.
3. Object Oriented Programming with C++, A. K. Sharma, Pearson.

PROGRAMMING – I (PROGRAMMING IN C++)

List of Experiments:

1. Write a C++ program to find the largest of three numbers using inline function.
2. Write a C++ program to sort an array of integer in ascending order using a function called exchange( ) which accepts two integer arguments by reference.
3. Create a class 'COMPLEX' to hold a complex number. Write a friend function to add two complex numbers. Write a main function to add two COMPLEX objects.
4. Write a C++ program to illustrate multiple inheritance.
5. Write a C++ program to illustrate 'this' pointer and pointers to derived classes.

6. Create a base class called 'SHAPE' having – two data members of type double – member function get-data( ) to initialize base class data members – pure virtual member function display – area( ) to compute and display the area of the geometrical object. Derive two specific classes 'TRIANGLE' and 'RECTANGLE' from the base class .Using these three classes design a program that will accept dimension of a triangle / rectangle interactively and display the area
7. Write a C++ program that uses function using overloaded functions
    a) To swap two integers,
    b) To swap two characters ,
    c) To swap two real numbers.
8. Write a C++ program to illustrate the use of overloaded constructor.
9. Write a C++ program to overload unary and binary operator, using a simple example.
10. Write a C++ program to calculate marks of postgraduate and graduate students using virtual function.
11. Write a C++ program to illustrate the use of static member function.