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 2011)

BE (PTDC) Second Sem. Branch : Civil Engineering

Course Code	Subject	Periods			EVALUATION SCHEME					Credits
		L	T	P	SESSIONAL EXAM			ESE	SUB TOTAL	
					TA	CT	TOTAL			
CE-11	Mechanics of Materials	3	1	-	10	20	30	70	100	4
CE-12	Materials of Construction	3	1	-	10	20	30	70	100	4
MA-02	Mathematics - II	3	1	-	10	20	30	70	100	4
CE-14	Surveying	3	1	-	10	20	30	70	100	4
(PRACTICAL/DRAWING/DESIGN)										
CE-13L	Material Testing Lab	-	-	2	20	-	20	30	50	2
CE-15L	Surveying Lab	-	-	2	20	-	20	30	50	2
CE-53L	Professional Activity -I	-	-	2	20	-	20	30	50	2
CE-57L	Seminar/Group Discussion	-	-	2	50	-	50	-	50	2
	Total	**12**	**4**	**8**	**150**	**80**	**230**	**370**	**600**	**24**

T.A. Teachers Assessment, CT- Class Test, ESE - End Semester Examination, Total Marks 600 Total Periods : 24, Total Credits : 24

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	
	MECHANICS OF MATERIALS	CE-11	Min "D"	Min "D"	5.0

MECHANICS OF MATERIALS

Unit 1 ***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 2 ***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 3 ***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 4 ***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 5 ***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 curved beams 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

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

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	
	MATERIAL OF CONSTRUCTION	CE-12	Min "D"	Min "D"	5.0

MATERIAL OF CONSTRUCTION

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.

Book 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

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	
B.E. Common	**ENGINEERING MATHEMATICS - II**	MA-02	Min "D"	Min "D"	5.0

ENGINEERING MATHEMATICS-II

UNIT-I

Second order ordinary differential equation with variable coefficients using methods, one solutionis known, Removal of First Derivative, Change of independent variable Method of Operational factor, Method of variation of parameters, solution of Second order ordinary differential equation by series method.

Unit-II

Bessel's equation, recurrence relations, Orthogonality, Generating Function of $J_n(x)$, Trigonomatric expansion involving Bessel's functions , Legendre's equation, , Legendre's Polynomial $P_n(x)$, Rodrigue's formula, Recurrence relation's, Generating functiuon of $P_n(x)$, Orthogonality, error function .

Unit-III

Partial differential equation, Formulation of PDE, solution of first order linear PDE, first order non-linear PDE, Homogenous linear PDE with constant coefficients of second and higher order, Method of separation of variable. Appluication of PDE in solution of one dimensional Heat and Wave equation

Unit-IV

Vector Calculus, Vector differentiation, Velocity and Acceleration, Gradient, Divergence and Curl, Line and Surface iIntgral, Stoke and Gauss's divergence theorem.

Unit-V

Binomial, Poisson and Gaussian (Normal) Distribution and their properties, Curv fitting bymethod of least square, Elementary concept of Reliability, Forecasting and decision theory

Reference Books:-

1. Higher Engineering Mathematics by B.V. Ramana TMH.
2. Adv.Engineering Maths by Ervin Kreszig, Wiley India IIT Student ed. 8th.
3. Higher Engineering Mathematics- By B.S. Grewal.
4. Mathematical Statistics- by Ray & Sharma.
5. Advance Engineering Mathematics-Wylie and Barrett.TMH.
6. Introduction to Theory of statistics- Mood,TMH.
7. Partial Differential Equation-Duchateau Schaum Series TMH.

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	
	SURVEYING	CE-14	Min "D"	Min "D"	5.0

SURVEYING

Unit – I
Reciprocal leveling, profile leveling, cross sectioning, contouring, methods of contouring trigonometrical leveling.

Unit – II
Traversing by theodolite, field work checks, traverse computations, latitude and departures, adjustments, computations of co-ordinates, plotting and adjusting of traverse, omitted measurements.

Unit – III
Tacheometry : Tacheometric systems and principles, stadia system, uses of anallatic lens, tangential system, subtense system, instrument constant field work, reduction, direct reading tacheometers, use of tacheometry for traversing and contouring.

Unit – IV
Curves : Classification and use; element of circular curves, calculations, setting out curves by offsets and by theodolites, compound curves, reverse curves, transition curves, cubic spiral and lemniscates, vertical curves setting out.

Unit – V
Control Surveys : Provieling frame work of control points, triangulation principle, reconassance selection and marking of stations.
Hydrographic Surveying : Sounding, methods of observations, computations and plotting.
Field Astronomy : Spherical trigonometry, Astronomical terms, co-ordinate systems circumpolar stars, astronomical triangle determination of Azimuth & time.

Book References :

1. Surveying & Levelling Vol.I & Vol II T.P. Kanetkar
2. Guggal, Surveying Theory & Practice, Vol.I& II,Tata McGraw Hell Pub co.ltd.
3. Surveying Vol I,II,& III B.C. Punamia
4. Surveying Vol I,II, KR.Arora

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	
	MATERIAL TESTING LAB	CE-13L	Min "D"	Min "D"	5.0

MATERIAL TESTING LAB
(Suggested Exercise)

List of Experiments

The experimental work to cover tension, compression, bending and impact test etc. on steel, cast
iron, RCC and timber, Fire Resistant Test of Structures and Combustibility of Building Materials
Test as per I.S.I. and other experiments based on the syllabus.

1. Tests on Bricks (conduct all the tests on a brick sample)
2. Conduct all the tests on cement sample.
3. Conduct all the tests on a coarse aggregates sample.
4. Conduct all the tests on fine aggregates sample.
5. Conduct tests on fresh concrete.
6. Design of concrete mixed M15, M20, M25, M30
7. Design of concrete mixed M40, M50, M60 with the help of suitable super plasticizer and chemical admixture
8. Conduct on all test on reinforcing bars.
9. Study of Non-destructive testing equipments

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	
	SURVEYING LAB	CE-15L	Min "D"	Min "D"	5.0

SURVEYING LAB
(Suggested Exercise)

1. Theodolite Traversing.
2. Profile leveling, countouring & cross sectioning
3. Curve setting by different methods.
4. Determination of tachometric constants & uses of tacheometer in various field works.
5. Field exercises using EDM
6. Electronic total station.

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	
	PROFESSIONAL ACTIVITY- I	CE-53L	Min "D"	Min "D"	5.0

PROFESSIONAL ACTIVITY- I
(Suggested Exercise)

- Student shall visit a nearby Industry and shall prepare a technical report suggesting some improvement in operation.
- Student shall Design and fabricate a new laboratory equipment. He shall prepare a design report.
- Student shall improve an existing lab equipment and prepare chart or lab manual .
- Student shall publish a review paper in some Indian Journal.
- Student shall make a report on an Industry employing latest technology/ Innovation.
- Student shall prepare a working model of a machine part.
- Student shall make a software/ comp. program for the Institute to enhance efficiency in its working.
- Student shall prepare a detailed project report to start a small-medium enterprise.
- A group of student shall register with the Industry cell and submit a report on work done there about Institute-Industry linkage.
- Experimental work on a new set of equipments.
- Seminar Presentation with a report submitted to the supervisor.

Note : The list of activities can be modified as per requirements of the department.

A hand written report of about 30 pages duly signed by the student and the concerned teacher should be submitted.

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/GROUP DISCUSSION	CE-57L			5.0

Objectives of Group Discussion & Seminar 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.