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	
	ADVANCED MATHEMATICS & SOFT COMPUTING	MA-101	Min "D"	Min "D"	5.0

ADVANCED MATHEMATICS & SOFT COMPUTING

UNIT – I
Numerical solution of Partial Differential Equation (PDE) Numerical solution of PDE of hyperbolic, parabolic and elliptic types by finite difference method.

UNIT – II
Integral transforms : General definition, introduction to Mellin, Hankel and fourier transforms and fast Fourier transforms, application of transforms to boundary value problems in engineering.

UNIT – III
Integral equations : Conversion of Linear Differential equation (LDE) to an integral equation (IE), conversion of boundary value problems to integral equations using Green's function, solution of Integral equation, IE of convolution type, Abel's IE integro differential equations, IE with separable variable, solution of Fredholm Equation with separable kernels, solution of Fredholm and volterra equations by method of successive approximations.

UNIT – IV
Calculus of variation : Functionals, solution of Euler's equation, Isoperimetric problems, solution of boundary value problems (Rayleigh – Ritz method) Hemilton's principle, Langrange's equation.

UNIT – V
Fuzzy sets, Operation of fuzzy sets, fuzzy arithmetic and relations, fuzzy relation equations, fuzzy logic. Approximate reasoning, Applications of fuzzy logic in Civil Engineering.

References :
1. Introduction to Numerical Analysis by CF Froberg.
2. Introductory Methods of Numerical Analysis by S.S.Sastry.
3. Integral Equations by Krasnove, Kiselevanded Makarenho.
4. Finite Element Analysis (Schaum Outline Series) by Buchanan TMH
5. Finite Element Analysis by Krishnamurthy TMH
6. Higher Engineering Mathematics by B.V. Ramana, Tata Mc Hill
7. Advance Engineering Mathematics by Ervin Kreszig, Wiley Easten Ed
8. Applied Numerical Methods with MATLAB by Steven C Chapra TMH
9. Numerical Methods in Engineering by Salvadori and Baron
10. Theory and Problems of Numeric Analysis (Schaum Outline Series) by Schied 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	
	GEOMECHANICS	CE-101	Min "D"	Min "D"	5.0

UNIT – I : SHEAR STRENGTH :

Mechanism, effective stress, states of stress-strain , stress and strain paths and invariant, Failure theories. Hvorslev parameters, Effect of intermediate principal stress. Shear strength characteristics of saturated soils under drained and untrainedcondition; shear behavior of dry and partially saturated soils, numerical problems.

UNIT – II : DETERMINATION OF SHEAR STRENGTH PARAMETERS :

Laboratory and field methods for determination of shear strength parameters. Selection of shear-strength parameters for the analysis of geotechnical problems. numerical problems, shear strength of rocks, case histories.

UNIT – III : SOIL-PHYSICS :

(1) The soil as a dispersed system, clay-the active soil-fraction, surface behavior of clay particles.

(2) Physical behavior of soil-water systems. Hydration of clays, Viscosity of colloidal clays, Swelling of colloidal clays, Soil consistency. Forms of soil-consistency, consistency of moist and wet soils, soil plasticity, Soil structure-classification and genesis, Soil as a 3-phase system.

UNIT – IV : CLAY-MINERALOGY:

(1) Bonding, crystal structure and surface characteristics. Minerals in soils. Non-clay and clay minerals.

(2) Clay minerals, their lattice patterns, genesis, sizes, colloidal particles and their effect on the soil-structure and expansiveness.

(3) Clay minerals relationship with water and swelling. Swelling theories. Determination of swelling values. Identification of clay-minerals . Clay and engineering structures.

References :

1. Soil Mechanics by Lambe & Whitman, John Wiley & sons, New York.
2. Basic & Applied soil Mechanics. by Gopal Ranjan & ASR Rao. New Age International (P) Ltd. Publishers, New Delhi.
3. Soil-Mechanics and Foundation Engineering by VNS Murthy, Sai Kripa Tech.Consultants Bangalore.
4. Soil-Physics by C.D. Waver, John Wiley & Sons, New York.
5. Clay Mineralogy by Grim.
6. Soil Mechanics by A.R. Jumikis, Trans Tech, Pub. Co. Jermany

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	
	GEOTEHCHNICAL BEHAVIOR OF EARTH MATERIALS	CE-102	Min "D"	Min "D"	5.0

GEOTECHNICAL BEHAVIOR OF EARTH MATERIALS

UNIT –I GROUND WATER AND SEEPAGE :

Fundamentals of ground water flow. Basic equation for ground water flow. Unconfined flow. Flow through earth & rock fill dams. Seepage from canals & ditches. Seepage towards wells. Unsteady flow through earth dams, Analog methods for obtaining flow net, computation of flow through porous media.

UNIT – II CONSOLIDATION & SETTLEMENT ANALYSIS :

General theory of transient flow in porous media. One dimensional consolidation, vertical & radial flow. Three dimensional consolidation, Rendulic analysis & Biots theory. Secondary consolidation – Taylor merchant & Gibson approaches, field compression curve. Computation of settlement of foundation resting on freely draining & non freely draining Geotechnical materials including U.C., N.C. & O.C. soils.

UNIT –III BEARING CAPICITY OF SHALLOW FOUNDATION

Modes of failure, ultimate criteria, computation of ultimate load. Bearing capacity of foundations. Homogeneous soils. Methods of Terzaghi Meyerhoff, Brinch Henson IS Code, Kerisel & Graphical determination. Factors affecting bearing capacity, choice of factor of safety, bearing capacity of foundation on layered strata.

UNIT – IV Case histories pertaining to settlement, seepage and shear failure. Effect of seismic forces on the seepage, consolidation & bearing capacity of soils, field problems pertaining to settlement determination.

References :

1. Modern Geotechnical Engineering by Alam Singh, CBS Publishers & Distributors, New Delhi
2. Soil-Mechanics and Foundation Engineering by K.R. Arora, Standard Publishers & Distributors, New Delhi
3. Soil Engineering- Fundamental & General Principles Vol.I by Alam Singh CBS Publishers & Distributors, New Delhi
4. Geotechnical Engineering by P.Purushothama Raj, Tata Mc-Graw Hill Publishing Co., New Delhi
5. Soil Mechanics by Lambe & Whitman, John Wiley & sons, New York.
6. Geotechnical Engineering by C. Venkataramaiah, New Age International (P) Ltd. Publishers, New Delhi.
7. Basic & Applied soil Mechanics. by Gopal Ranjan & ASR Rao. New Age International (P) Ltd. Publishers, New Delhi.

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**	
	GEOTECHNICAL EXPLORATION AND INSTRUMENTATION	CE-103	Min "D"	Min "D"	5.0

GEOTECHNICAL EXPLORATION AND INSTRUMENTATION

UNIT – I Use of Engineering Geology in Geotechnical Exploration. Collection and use of geological data geological maps and their Engineering interpretation. Construction and uses of stereo-nets, study of case histories on application of Engineering Geology.

UNIT – II   Objectives of sub-surface investigation-data collection, codes of practice and drilling rigs. Sampling undisturbed and disturbed samples, factors which affect sample disturbances; sampler design; sampling procedure various types of samplers and their selection; block sampling; treatment of undisturbed samples; representative sampling. Vane shear testing, penetration testing. Large scale field tests. Pressure meters and their uses, In-situ permeability test. Geophysical logging, study of case histories. Modern instruments & practices.

UNIT – III   Attributes of instrumentation, objectives of instrumentation, parameters most frequently measured. Basic design consideration, Basic instrumentation systems. Selection of instrumentation system. Planning, design installation and monitoring of instrumentation system for various types of Geotechnical Engineering structures subjected to static, dynamic and seismic forces. Case histories of instrumented structures including strutted excavations, embankments, tunnels, excavated slopes ground anchors, piles, slurry trench excavations, earth retaining structure and machine foundations.

UNIT – IV Instrumentation for dynamic bearing capacity, measurement of settlements, block vibration test, strength and deformational measurements of rocks.

References :
1. Geotechnical Engineering Investigation Manual by R.E. Hunt, Mc Graw Hill Co. New York
2. An Introduction to Geophysical Exploration by P. Kearey & M. Brooks, ELBS London.
3. Soil Engineering- Geotechnical Testing & Instrumentation Vol.II by Alam Singh CBS Publishers & Distributors, New Delhi
4. Engineering Properties of Soil & their Measurement by Joseph E. Bowles, , Mc Graw Hill International Book Co.
5. Basic & Applied soil Mechanics. by Gopal Ranjan & ASR Rao. New Age International (P) Ltd. Publishers, New Delhi.

Branch	Subject Title	Subject Code	Grade for End Sem		CGPA at the end of every even semester
			T	**P**	
	GEOTECHNICAL EARTHQUAKE ENGINEERING	CE-104	Min "D"	Min "D"	5.0

GEOTECHNICAL EARTHQUAKE ENGINEERING

UNIT –I : ELEMENTARY SEISMOLOGY :
   Earth and its interior, seismic waves, plate tectonics, plate boundaries, Elastic rebound theory, size of earthquakes –magnitude, intensity, Intensity scales, locating the earthquakes, Iso- seismal map, past earthquakes, seismic zoning of India.

UNIT – II : STRONG GROUND MOTION :
   Strong ground motion measurements – seismograph, seismograms; strong motion records ; characteristics of strong ground motion - peak ground acceleration, velocity and displacement PGA, PGV, & PGD ; seismic hazard analysis.

UNIT – III :
   DYNAMIC BEARING CAPACITY, EARTH PRESSURE & STABILITY ANALYSIS :
   Dynamic soil properties , Dynamic earth pressure theories, Mononobe-Okabe theory , Seismic slope stability analysis, pseudo static method, dynamic bearing capacity of shallow foundations problems.

UNIT – IV : LIQUEFACTION OF SOILS :
   Theory of liquefaction, factors affecting liquefaction, determination of liquefaction potential, Seed and Idriss method, Use of SPT data for assessment of liquefaction potential, Anti liquefaction measures, problems & case histories.

References :
   1. Geotechnical Earthquake Engineering by Kramer S.L. Prentice Hall Pub.
   2. Geotechnical Earthquake Engineering hand book by Robert W Day,Mc Graw Hill Hand Book
   3. Soil Dynamics by Samsher Prakash
   4. Soil Dynamics and Machine Foundation s by Swamisaran, Galgotia Pub.Pvt. Ltd. New Delhi.
   5. Dynamics of Bases & Foundations by D.D. Barken Mc Graw Hill Co. New York.
   6. Soil Dynamics and Earthquake Engineering by Bharat Bhusan Prasad, PHI Learning Pvt. Ltd. New Delhi.

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	
	NUMERICAL COMPUTATION LAB	CE-105L	Min "D"	Min "D"	5.0

NUMERICAL COMPUTATION LAB

The exercises in this component shall be designed to demonstrate the basic principles outlined in different units of the theory paper. After completing the exercises the student should have developed a good grasp of the practical utilities of the theory content.

(Suggested Exercise)

Review of the following components :

1. Algorithms & Flow Charts
2. 'C' Programming
(i) Preliminaries (ii) Constants & Variables (iii) Arithmetic Expressions (iv) Input-Output Statements (v) Control Statements (vi) Looping Statements (vii) Subscripted Variables (viii) Elementary Format Specifications (ix) Logical Statements & Decision Tables (x) Functions & Subroutines
3. Computer Oriented Numerical Methods
(a) Solution of Non Linear Equation (i) Bisection Method (ii) Newton Method
(b) Numerical Integration (i) Trapezoidal Method (ii) Simpson's 1/3 & 3/8 rule
(c) Curve Fitting (i) Construction of forward, backward difference table (ii) Interpolation
4. Application of statistical packages

(Suggested Exercise)

1. To find the largest among three numbers
2. To check whether a given string is a palindrome or not.
3. To find factorial of a given number by iteration.
4. To find whether the given integer is a prime number.
5. To find sum of n terms of series:
     a. $n - n*2/2! + n*3/3! - n*4/4! + ...$
6. To find sum and average of n integers using a linear array.
7. To read n numbers from the keyboard and display these numbers in the reverse order their entry.
8. To search a given number within a linear array.
9. To generate the fibbonacci series.
10. To find factorial of a given number using a function.
11. To deduce error involved in polynomial equation.
12. To Find out the root of the Algebraic and Transcendental equations using Bisection, Regula-falsi, Newton Raphson and Iterative Methods. Also give the rate of convergence of roots in tabular form for each of these methods.
13. To implement Newton's Forward and Backward Interpolation formula.

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**	
	GEOTECH FIELD TESTING LAB -I	CE-106L	Min "D"	Min "D"	5.0

GEOTECH FIELD TESTING LAB -I

The exercises in this component shall be designed to demonstrate the basic principles outlined in different units of the theory paper. After completing the exercises the student should have developed a good grasp of the practical utilities of the theory content.

(Suggested Exercise)

1. To determine safe bearing capacity of soil using plate load test.

2. To prepare bore log using SPT-data

3. To determine safe bearing capacity using SPT-data.

4. To determine modulus of sub grade reaction using plate bearing test.

5. Geophysical exploration of soil using electrical resistivity method.

6. To determine unconfined compressive strength of rock samples.

7. Shear strength parameters using vane-shear test

8. Field density by sand replacement method

9. Field density by core cutter method

10. To determine load carrying capacity of pile (load test)