Bachelor of Technology – Civil Engineering

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Programme Structure
Curriculum & Scheme of Examination

2014

AMITY UNIVERSITY CHHATTISGARH
RAIPUR
## B.Tech-Civil Engineering
### Programme Structure

### SIXTH SEMESTER

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Lecture (L) Hours Per week</th>
<th>Tutorial (T) Hours Per week</th>
<th>Practical (P) Hours Per week</th>
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### SUMMER INTERNSHIP-II
ENVIRONMENTAL ENGINEERING - I

Course Code: CIV2601  Credit Units: 03

Course Objective:
Based on course Environmental studies, the water resources and their management for environmental suitability are studied in this course.

Course Contents:

Module I: Scope of Environmental Engineering

Module II: Sources of water

Module III: Treatment of water

Module IV: Water supply schemes

Examination Scheme:

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<th>Components</th>
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CT: Class Test, HA: Home Assignment, S/V/Q: Seminar/Viva/Quiz, EE: End Semester Examination; Att: Attendance

Text & References:

- Relevant BIS Codes.
Course Objective:
This course deals with the design concept of designing concrete structure. As a prerequisite the students should have knowledge of principal of structural design.

Course Contents:

Module I: Design of Columns
Design of Columns by Limit State Design Method- Effective height of columns, Assumptions, Minimum eccentricity, Short column under axial compression, requirements for reinforcement, Column with helical reinforcement, Short column under axial load and uni-axial bending, Design of columns under bi-axial loading by Design Charts
Note: All designs shall be conforming to IS : 456 – 2000

Module II: Design of Footing
Analysis and design of beam curved in plan. 2 Structural behavior of footings, design of footing for a wall and a single column, combined rectangular and trapezoidal footings, Design of strap footing.

Module III: Design of Tank
Design criteria, material specifications and permissible stresses for tanks, design concept of circular and rectangular tanks situated on the ground / underground, design of overhead tanks.

Module IV: Design of Retaining Wall
Structural behavior of retaining wall, stability of retaining wall against overturning and sliding, Design of T-shaped retaining wall, Concept of Counter fort retaining wall. Loads, forces and I.R.C. bridge loadings, Design of R.C. slab culvert.

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Text & References:
- Punmnia B.C., Reinforced Concrete Structures Vol. I, Standard Book House,2005
- Jain & Jaikrishna, Plain & Reinforced Concrete Vol. I, Nemchand, 2000
- Sinha S.N., Reinforced Concrete Design, Tata McGraw Hill, 2005
- BIS codes ( IS 456, SP 16, SP 24, SP 34)
Course Objective:
Advanced topics of soil mechanics and the design of foundations are covered in this course.

Course Contents:

Module I: Earth pressure

Module II: Bearing capacity

Module III: Foundations

Module IV: Pile foundations

Examination Scheme:

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Text & References:

- Teng W.C., Foundation Design, PHI, 1984
- Terzaghi & Peck, Soil Mechanics in Engineering Practice, Asia Publishing
- Murthy V.N.S., Soil Mechanics & Foundations.
CONCRETE TECHNOLOGY

Course Code: CIV2603
Credit Units: 03

Course Objective:
Types of concrete and their manufacture and applications are covered in this course.

Course Contents:

Module I: Materials
Materials: cement - different types - chemical composition and physical properties - tests on cement - I.S. specifications - aggregates - classification - mechanical properties and tests as per I.S. - alkali aggregate reaction - grading requirements - heavy weight - light weight - normal weight - aggregate - sampling of aggregate - water - quality of water - permissible impurities as per I.S - admixtures - accelerators - retarders - water reducing agents – super plasticizers- use of silica fumes.

Module II: Manufacture

Module III: Properties of Concrete

Module IV: Special Concretes

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Text & References:
- Neville A.M., Properties of Concrete, Pitman
- John. H. Bungey, The Testing of Concrete in Structures, Urrey University of Press Hall
BUILDING DESIGN AND DRAWING

Course Code: CIV2604 Credit Units: 03

Course Objective:
The objective of the course is to develop the capability for carrying out independent design. Information in the form of sketch and images to be illustrated as a part of discussion.

Course Contents:
PART A: PLANNING

Module I: Function, Structure and Appearance
Evolution of architectural styles. Roman, Greek, Medieval and Modern architecture. Examples.

Module II: Creative principles

Module III: Functional factors
Lighting, ventilation, thermal and acoustics factors and their effects on architectural form.

Module IV: Spaces
Space planning of buildings such as residential, public and commercial. Design process. Activity areas and linkages. Proximity matrix. Adjacency diagram. Form development with respect to site conditions and functional requirements. Preparation of drawings. Elementary perspective and rendering.

PART B: DRAWING
Planning, designing from given requirements of areas and specifications and preparation of sketch design and working drawings for:
1. Residential building- flat and pitched roof, economic domestic units, cottages, bungalows and building flats.
2. Public building – small public utility shelters, dispensaries, banks, schools, offices, libraries, hostels, restaurants, commercial complexes, factories etc.
3. Preparation of site plans and service plans as per Building Rules
5. Plumbing, water supply and drainage for buildings.

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Text & References:
- SP 7:2005, National Building Code of India
- Local Building Bye-laws
- Chiara, Callender, John Hancock, Time Saver Standards for Building Type, McGraw Hill
- Chiara, Joseph De, Time Saver Standards for Site Planning, McGraw Hill
- Scott, Robert Gillan, Design Fundamentals, Mc-Graw Hill.
- Balagopal T S Prabhu, Building Drawing and Detailing, Spades Publishers
GEOTECHNICAL ENGINEERING LAB

Course Code: CIV2605  Credit Units: 01

Course Contents:

1. Specific gravity of coarse and fine grained soils.
2. Grain size analysis (a) Sieve analysis (b) Pipette analysis
3. Atterberg’s limits and indices
4. Determination of field density (a) sand replacement method (b) core cutter method
5. Determination of coefficient of permeability by 
   (a) Constant head method (b) Variable head method
6. Consolidation test
7. Compaction test (a) IS light compaction test (b) IS heavy compaction test
8. California Bearing Ratio test
9. Direct shear test
10. Triaxial shear test
11. Unconfined compressive strength test
12. Laboratory vane shear test

Examination Scheme:

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Note: IA – Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.
COMPUTER APPLICATION IN CIVIL ENGINEERING

Course Code: CIV2606  
Credit Units: 03

Course Objective:
Application of the course on Numerical Analysis & Programming and use of linear and non-linear programming are given in this course.

Course Contents:

Module I: Overview of Numerical Methods
System of Linear Algebraic Equations: solution of linear algebraic equations using Gauss elimination method and LU decomposition method - solution by iterative method - conditions of convergence-conditioned system of equations. Applications in Civil Engineering Problems

Module II: Application of Eigenvalue Problems and Interpolations to Civil Engineering
Eigen Value Problems: determination of eigen values and eigen vectors by Power method and Jacobi’s method. Interpolation: Newton’s formulae - Gauss” formulae - Lagrangian interpolation – Cubic spline interpolation. Applications in Civil Engineering Problems

Module III: Numerical differentiation and integration
Numerical differentiation using Newton’s formula - maximum and minimum values of tabulated functions - numerical integration -trapezoidal formula - Simpson’s formulae and Gauss quadrature - development of computer algorithms for numerical integration. Numerical solution of ordinary differential equations. Applications in Civil Engineering Problems

Module IV: Linear and Non-Linear Programming Problems

Examination Scheme:

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Text & References:

- Scarborough J.B., Numerical Mathematical Analysis, Oxford & IBH
PRESTRESSED CONCRETE

Course Code: CIV2607 Credit Units: 04

Course Objective:
This course deals with advanced concept of structural concrete design.

Course Contents:

Module I: Materials for prestressed concrete and prestressing systems
High strength concrete and high tensile steel – tensioning devices – pretensioning systems – post tensioning systems.

Module II: Analysis of prestress and bending stresses
Analysis of prestress – resultant stresses at a sector – pressure line or thrust line and internal resisting couple – concept of load balancing – losses of prestress – deflection of beams.

Module III: Strength of prestressed concrete sections in flexure, shear and torsion
Types of flexural failure – strain compatibility method – IS code procedure – design for limit state of shear and torsion.

Module IV: Design of prestressed concrete beams and slabs
Transfer of prestress in pre tensioned and post tensioned members – design of anchorage zone reinforcement – design of simple beams – cable profiles – design of slabs.
A design project for the design and detailing of a large span beam is envisaged at this stage.

Examination Scheme:

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Text & References:

☐ N. Krishna Raju, Prestressed concrete, Tata McGraw Hill, 2000
☐ P. Dayaratnam, Prestressed Concrete, Oxford & IBH, 1982
☐ BIS codes (IS 1343)
Course Objective:
The students acquire comprehensive knowledge of traffic surveys and studies such as „Volume Count”, „Speed and delay”, „Origin and destination”, „Parking”, „Pedestrian” and „Accident surveys”. They achieve knowledge on design of „at grade” and „grade separated” intersections. They also become familiar with various traffic control and traffic management measures.

Course Contents:

Module I: Introduction
Significance and scope, Characteristics of Vehicles and Road Users, Skid Resistance and Braking Efficiency (Problems), Components of Traffic Engineering- Road, Traffic and Land Use Characteristics

Module II: Traffic Surveys and Analysis
Surveys and Analysis - Volume, Capacity, Speed and Delays, Origin and Destination, Parking, Pedestrian Studies, Accident Studies and Safety Level of Services- Basic principles of Traffic Flow.

Module III: Traffic Control
Traffic signs, Road markings, Design of Traffic signals and Signal co-ordination (Problems), Traffic control aids and Street furniture, Street Lighting, Computer applications in Signal design

Module IV: Geometric Design of Intersections
Conflicts at Intersections, Classification of „At Grade Intersections, - Channallised Intersections - Principles of Intersection Design, Elements of Intersection Design, Rotary design, Grade Separation and interchanges - Design principles.

Module V: Traffic Management
Traffic Management- Transportation System Management (TSM) - Travel Demand Management (TDM), Traffic Forecasting techniques, Restrictions on turning movements, One way Streets, Traffic Segregation, Traffic Calming, Tidal flow operations, Exclusive Bus Lanes, Introduction to Intelligent Transportation System (ITS).

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Text & References:

- Indian Roads Congress (IRC) specifications: Guidelines and special publications on Traffic Planning and Management
- Guidelines of Ministry of Road Transport and Highways, Government of India.