



BHARATI VIDYAPEETH UNIVERSITY, Pune.

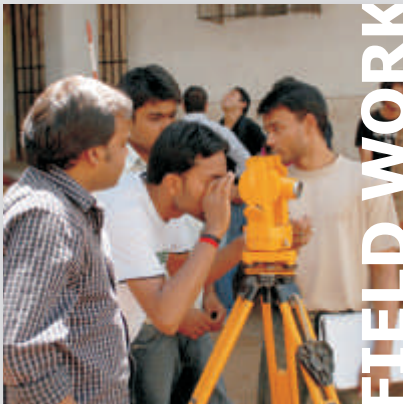
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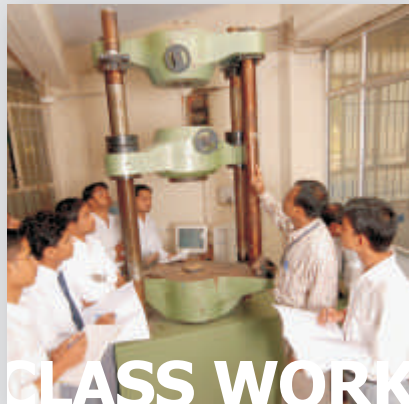
PRACTICAL

C O U R S E S T R U C T U R E A N D S Y L L A B U S

**B. Tech. (CIVIL)
(Sem. III & IV)**



FIELD WORK



CLASS WORK



COURSE STRUCTURE & SYLLABUS

BHARATI VIDYAPEETH UNIVERSITY, PUNE

B. Tech. (CIVIL) (Sem. III & IV)

Rs. 150/-



HIGHLIGHTS

Bharati Vidyapeeth University College of Engineering is the largest engineering college in Maharashtra with an intake of 700 students in each academic year. Imparting quality technical education from undergraduate to doctorate Level, BVUCOE is probably the only engineering college in India with an accreditation from both NAAC as well as NBA. The faculty at BVUCOE boasts of highly qualified academicians, a quality that is further emphasized by the fact that 15 of them are presently pursuing their Ph.D. degree.

BVUCOE has been ranked 29th amongst the Top50 Technical Schools of India in survey conducted by DATAQUEST-IDC. We have Enjoyed a ranking in this list for the last 4 years. Research is of utmost importance in all our programs. A total of 113 research papers were published in 2007-2008.

Currently we have 12 outgoing research projects. The infrastructure BVUCOE is state-of-the-art with 62 classrooms, 59 laboratories and a well-stocked library that currently holds 27,130 titles. The college has an international presence with MOUs signed with the North Carolina A&T State University (Greensboro, USA), University of Venice (Italy), Actel Corporation (USA). Corporate interaction is also inculcated in our programs through our association with Oracle India Ltd., Infosys Ltd. and Tata Consultancy Services.

SALIENT FEATURES

The Construction activity is the second largest economic activity in India next only to agriculture. The amount of money invested and the jobs provided by the Civil Engineering industry are much larger than any other industry. Overall globalization of the economy has resulted in more and more demand for better infrastructure facilities like roads, bridges, airports and project related to water resources. The Civil Engineer therefore has to play a major role in the development of the country. The Department of Civil Engineering desires its students to excel in the changing trends in global economy.

The department of Civil Engineering has developed two fold:

It has well-established laboratories in subjects of Structural Engineering, Environmental, Hydraulics, Geotechnical, Transportation, Geology, Surveying and Computer Engineering. The department also maintains a well-equipped audio - visual room with facilities like VCR, TV, and overhead and slide project for projecting videocassettes, CDs, slides and transparencies containing technical demonstrations. There are more than 200 videocassettes and CDs, 35 wall charts demonstrating various Civil Engineering theories and techniques.

The department has developed linkages with C. W. P. R. S. Pune and INSWAREB Vishakhapattanan for research works in Hydraulics and concrete materials. The department also has access to laboratories of CW & PRS and libraries of IAT, Pune and I. I. T. Powai, Mumbai. The department maintains a separate departmental library consisting of some rare books.

The teaching staff of the department is actively involved in research works. The research works on protection of scour around bridge piers by riprap, use of mineral admixtures in concrete are some of the research work successfully done. The faculties of the department routinely publish their works in reputed journals and conferences at national and international level. The testing and consultancy cell of the department caters to the various technical services in Hydraulics, Soil Mechanics, Bridge and Dam foundations, Environmental Engineering, Concrete Materials and Surveying.

The department also runs a postgraduate course in Hydraulic Engineering. This course is blessed by the guidance of some of the internationally recognized scientists in the field of Hydraulics. The P.G. Students perform their dissertation works in collaboration with CW & PRS laboratories, especially the model studies. The undergraduate and postgraduate students have unlimited access to the Internet facility provided by the department. The Civil Engineering Students Association (CESA) serves as a platform for the overall development of the students. The CESA organizes personality development programs, guest lectures of experts; site visits to Civil Engineering projects and is also actively involved in social programs. The department has also organized national level workshop on artificial neural network, Hydraulic structures and advances in concrete technology in the last few years.

MAJOR GROUPS/AREAS

Hydraulic Engineering, Structural Engineering, Computer Aided Analysis and Design, Concrete Technology, Environmental Engineering, Foundation Engineering, Surveying, Project feasibility, Engineering Geology.

EXPERTISE IN RESEARCH AND CONSULTANCY

Pump Testing, Precision Survey works, Analysis and Design of Structures, Testing of Concrete, Building materials and Metals, Concrete Composites, Air & noise pollution, Water quality, Geological Investigation for Civil Engineering Structures.

MAJOR EQUIPMENTS

Universal Testing Machine (1000KN & 200KN) with computer attachment, Compression Testing Machine (2000KN), Concrete Mixer, Torsion Testing Machine, Polariscope, Wind Tunnel, Tilting Flume, Airflow Bench, Standard Penetration Tests set up, Electronic Distance Meter, High Volume Sampler with PMIO, Spectrophotometer, Nephelo Turbidity meter, Flame Photometer, Noise Level Meter.

SOFTWARE

Auto CAD 2000, STAAD-PRO, Geo-Concept GIS, MATLAB, Hit-Office

LABORATORIES

Testing of Materials, Engineering Mechanics, Geotechnical & Transportation Engineering Environmental Engineering , Fluid Mechanics & Hydraulic Machinery, Survey Laboratory, Geology Laboratory



STRUCTURE & EXAMINATION PATTERN

B. Tech. - Civil Engineering

Semester III									Total Duration : 34Hrs/Week
									Total Marks : 750
Subject Code	Subject	Teaching Scheme Hrs/Week			Examination Scheme				Total
		L	P	D	Theory	Unit Test	TW & Pr	TW & Or	
K20201	Building Construction Practices	04	-	04	80	20	-	50	150
K20202	Engineering Geology	04	02	-	80	20	50	-	150
K20203	Mechanics of Materials	04	02	-	80	20	-	50	150
K20204	Concrete Technology	04	02	-	80	20	-	50	150
K20205	Engineering Economics & Management	04	-	-	80	20	-	-	100
K20206	Computer Applications in Civil Engineering- I	-	04	-	-	-	50	-	50
Total		20	10	04	400	100	100	150	750

Teaching Scheme			Examination Scheme				Total
Lectures	Practical	Drawing	Theory	Test	T. W. & Pr.	T. W. & Or.	
20	10	04	400	100	100	150	750

Semester IV									Total Duration : 34Hrs/Week	
									Total Marks : 750	
Subject Code	Subject	Teaching Scheme Hrs/Week				Examination Scheme				Total
		L	P	D	T	Theory	Unit Test	TW & Pr	TW & Or	
K70207	Engineering Mathematics-III	04	-	-	-	80	20	-	-	100
K20208	Building Planning and Design	04	-	04	-	80	20	-	50	150
K20209	Surveying and Leveling	04	04	-	-	80	20	50	-	150
K20210	Structural Mechanics-I	04	-	-	01	80	20	-	50	150
K20211	Fluid Mechanics-I	04	02	-	-	80	20	-	50	150
K20212	Computer Applications in Civil Engineering- II	01	02	-	-	-	-	50	-	50
Total		21	08	04	01	400	100	100	150	750

Teaching Scheme				Examination Scheme				Total
Lectures	Practical	Drawing	Tutorial	Theory	Test	T. W. & Pr.	T. W. & Or.	
21	08	04	01	400	100	100	150	750



RULES FOR CONDUCTING TESTS

Mode of the test

In each semester for each subject three tests shall be conducted. The Schedule for the same will be declared at the commencement of academic year in the academic calendar.

Each test shall carry 20 marks.

University examination pattern has given weightage of 20 marks for the tests.

To calculate these marks following procedure is followed:

- i) Out of the three tests conducted during the semester, the marks of only two tests in which the candidate has shown his/her best performance shall be considered, to decide the provisional marks in each subject.
- ii) Average marks obtained in two tests in which students have performed well, shall be considered as provisional marks obtained by the student in the tests.
- iii) If the candidate appears only for two tests conducted during the semester, he/ she will not be given benefit of the best performance in the tests.
- iv) If the candidate appears only for one test conducted during the semester, to calculate the marks obtained in the tests it will be considered that the candidate has got 0 (zero) marks in other tests.
- v) The provisional marks obtained by the candidate in class tests should reflect as proportional to theory marks. In cases of disparity of more than 15% it will be scaled down accordingly; These marks will be final marks obtained by the student. No scaling up is permitted.
- vi) If the candidate is absent for theory examination or fails in theory examination his final marks for tests of that subject will not be declared. After the candidate clears the theory, the provisional marks will be finalized as above.

Paper Pattern for Tests

- i) All questions will be compulsory with weightage as following

Question 1	-	7 marks
Question 2	-	7 marks
Question 3	-	6 Marks

- ii) There will not be any sub-questions.

For granting the term it is mandatory to appear for all the three tests conducted in each semester.

Roll numbers allotted to the students shall be the examination numbers for the tests.



SEMESTER - III



K20201: BUILDING CONSTRUCTION PRACTICES

TEACHING SCHEME

Lectures : 04 Hrs/Week

Practical : 04 Hrs/Week

EXAMINATION SCHEME

Theory : 80 Marks

Duration : 03 Hours

Unit Test : 20 Marks

T. W. & Or. : 50 Marks

Unit-I

(08 Hours)

Building and Building Foundations:

Building and its components, Types of Structures and their suitability, Different types of foundations, Design criterion for R.C.C. Column, footing and plinth beams, Earthquake resistant foundations.

Unit-II

(08 Hours)

Stone Masonry and Brick Masonry:

Different types of Stones, Characteristics of good building stones, Principles of masonry construction, Types of stone masonry, various proportions of mortar used in constructions. Bricks: Qualities, tests and special types of bricks. I.S. Sizes of bricks, Types of bonds, Reinforced brickwork, composite masonry, Hollow and solid block masonry, cavity walls.

Unit-III

(08 Hours)

Arches, Lintels and Floors:

Arches: Terms used, methods of construction, Types of arches, stability of arches

Lintels: Types, details of RCC lintel & Chhajja

Flooring: Types & I.S. Specifications, Ground Floor & Upper floor design & construction requirements, varieties of floor finishes, types of floorings. Precast flooring, factors for selection of flooring.

Unit-IV

(08 Hours)

Roof Construction:

Types of roof & their suitability, roof structure, selection of roof covering material, R.C.C., G.I Sheets, A.C. Sheets, water proofing, rainwater drainage system. Truss types, advantages of steel trusses, false ceiling materials & method of fixing. Different types of shell structures.

Unit-V

(08 Hours)

Doors, Windows and Stairs:

Types of doors, windows, different types of materials used for frames and shutters. Fixtures and fastenings used, Types of stairs, Design and construction of stairs ramps, lifts and escalators.

Unit-VI

(08 Hours)

Building Finishes and Miscellaneous Materials:

Building Finishes & Miscellaneous Materials, Plastering, pointing, Types and material used, Mortars, White washing lime & its types, colour washing, Distempering, Types of paints. Wall cladding materials and their fixing methods, use of glazing work for windows.

Glass: types & properties, Fiber glass. Use of plastics

Water proofing: Methods and Systems.

Term Work

A) Plates (1/4 imperial size)

B) Drawings on full imperial size sheets

A) Plates :- Plates are prepared by drawing as per list specified below;

Symbols and conventional signs of materials

Different Types of Foundations (Any Five)

Types of stone masonry

Arches in stone & brick masonry to be drawn using AutoCAD

Bonds in Brick work to be drawn using AutoCAD

Types of floors (any Three)

Different types of roofs to be drawn using AutoCAD

C.C.T.W. Panelled door – Plan, Elevation Section.

Flush door

Types of Windows

Types of stairs

Reports of site visit to construction sites. (min. 2 visits)

Collection of advertisement related to construction materials & Machinery. (Minimum ten)

B) Drawing on imperial size sheets.

Sheet No.1: Single Storied Residential building with load bearing structure.

Details to be drawn – Plan, elevation and section to the scale of 1:50. And Site plan to the scale of 1:200.

Sheet No.2: Axonometric View of Sheet No.1.

Sheet No.3: G+1, R.C.C. Residential building from given data. Details to be drawn:

1. Plan, front elevation, section to the scale of 1:50
2. Site plan to the scale of 1:200

Text Books/References

“A to Z Building Construction”, Mantri Publication

Rangwala, “Building Construction”, Charotar Book House

Bindra Arora, “Building Construction”, Laxmi Publication

“Hand book on Water Proofing”, ACC

Syllabus for Unit Test

Unit Test 1	Unit I & IV
Unit Test 2	Unit II & V
Unit Test 3	Unit III & VI

**TEACHING SCHEME**

Lectures : 04Hrs/week

Practical : 02Hrs/week

EXAMINATION SCHEME

Theory : 80 Marks

Duration : 03 Hours

Unit Test : 20 Marks

T. W. & Pr. : 50 Marks

Unit -I

(08 Hours)

Introduction: Objects, Scope and Subdivisions.

General Geology: Surface relief of the earth. External and internal agents modifying the earth, Weathering, Erosion, Denudation and

Decomposition. Earth Movement, Metamorphism, Volcanism.

Petrology: Rock and mineral. Silicate and non silicate minerals, Rock forming minerals, Primary and secondary minerals, Essential and accessory minerals.

Igneous rocks: Mineral composition, Felsic and mafic minerals. Textures, Reasons for textural variation. Dependence of degree of crystallization and shape and size of crystals on conditions of cooling. Conditions of cooling of Plutonic, Hypabyssal and Volcanic rocks. Gas cavities and secondary infillings in volcanic rocks. Classification : Study common rock types described in practical work.

Secondary rocks: Rock weathering, Decomposition and disintegration, favorable conditions, Processes and products of decomposition and disintegration transport and deposition. Classification: Residual, Sedimentary, Chemical and Organic Deposits.

Sedimentary Deposits: Agents of transport. Textural characteristics Clastic texture, Stratification and Lamination. Consolidation by welding and cementation. Grain size classification.

Metamorphic Rocks: Agents and types of metamorphism. Metamorphic textures, Contact, Cataclastic, Dynamothermal and Plutonic metamorphism.

Unit-II

(08 Hours)

Physical Geology:

Geological action of running water, River valley development, Normal and Regional cycle of river erosion. Water falls, Ox-bow lakes, flood plain deposits, Deltas. Rejuvenation and resulting features such as canyons,

River terraces and incised meanders. Earth movements, Earthquakes, Interior of the earth, Earthquake zones. Geological considerations for choosing sites of buildings in seismic areas Earthquake Resistant structures Volcanism, Types of mountains.

Unit-III

(08 Hours)

Structural Geology and Indian Geology:

Structural Geology: Outcrop, Dip and Strike, Conformable series. Unconformity and overlap. Different types of faults and folds in rocks. Inlier and outlier. Modes of occurrence of igneous rocks, Joints and fractures

Indian Geology: General principles of stratigraphy. Age of the earth and divisions of geological time. Physiographic divisions of India and their characteristics. Geological history of Peninsula. Study of formations in Peninsula and the significance of their structural characters in major Civil Engineering activities, Economic minerals and building stones.

Unit-IV

(08 Hours)

Ground Water: Meteoric. Connate and Juvenile water, Depth zones of groundwater. Perched watertable. Influence of textures and structures of rocks on ground water storage and movement. Pervious and impervious rocks. Geological work of groundwater, Effects of solution and deposition. Natural springs and seepages, Depression and contact springs. Hot springs and geysers, wells. Effects of dams and canals, Effect of pumping, Cone of depression, Circle of influence. Conservation of groundwater. Artesian wells, Waterbearing capacity of common rocks. Locating groundwater supplies. Case histories.

Building stones: Requirements of a good building stone. Dependence of strength, durability, ease of dressing, availability of blocks of suitable size and appearance on mineral composition, textures and field structures. Suitability of common rocks as building stone.

Landslides: Causes. Role of water. Stability of slopes in consolidated materials. Influence of dip and slope. Safe and unsafe slopes. Prevention of landslides, Keeping slopes free from water. Retaining walls. Vegetation. Slope treatment, Precautions to be taken while aligning roads etc. across hills and making cuts in hill side. Case histories.

Unit-V

(08 Hours)

Geological Investigations:

Preliminary Geological Investigations: Use of Geological maps and sections, Verification of surface data by subsurface exploration. Drill holes. Test pits, trenches, Exploratory tunnels, Shafts, Adits, Drifts etc. Compilation and interpretation of information obtained from these. Correlation of surface data with results of subsurface exploration. Limitations of drilling. Engineering significance of Geological structures such as Stratification. Dips. Folds, Faults, Joints. Fractures. Crush zones, Fault zones. Dykes etc. Case histories.

Tunneling: Influence of geological conditions on design and construction methods. Preliminary geological investigations for tunnels. Important geological considerations while choosing alignment. Difficulties during tunneling as related with lithology, nature and structures of materials to be excavated. Role of groundwater. Geological conditions likely to be troublesome. Suitability of common rock types for tunneling. Unlined tunnels. Case histories.

Unit-VI

(08 Hours)

Geology of Sites:

Geology of Dam Sites: Dependence of strength, Stability and watertightness of foundation rocks on their physical characters and geological structures. Influence of geological conditions on the choice of types and design of dam. Preliminary geological work on dam sites. Favourable and unsuitable geological conditions for locating a dam. Precautions to be taken to counteract conditions. Treatment of leaky rocks, Faults Folds Dykes, Crush zones, Joints. Fractures, Unfavourable dips. etc. Earthquakes in regions of dams. Case histories. Geology of reservoir sites: Dependence of water tightness on physical properties and structures of rocks, Geological conditions suitable and unsuitable for reservoir sites. Conditions likely to cause leakage through reservoir rim. Importance of ground water studies and effects of raising of water table. Case histories. Geology of Bridge Sites: Importance of bridge foundations, Preliminary geological exploration for bridge piers and bridge abutments. Scouring and erosion around bridge piers. Influence of nature and structures of rocks on bridge foundations. Case histories.

List of Practical

Identification of the following minerals in hand specimens: (Two Experiments)
Quartz and its varieties, Gypsum, Fluorite, Barytes, Tourmaline, Beryl, Graphite, Asbestos, Talc, Kyanite, Garnet, Galena. Magnetite. Haematite. Limonite, Iron pyrites, Chromite, Bauxite.

Identification of the following rock types in hand specimens: (Seven Experiments)
Granites, Syenites, diorites, gabbros, rhyolites, trachytes, andesites, basalts, varieties of Deccan Trap rocks, volcanic breccias. Tachylytes pegmatites, dolerites, graphic granites - Laterites, bauxites, conglomerates, breccias, sandstones, quartzites, grits, arkoses, shales, mudstones, chemical and organic limestones.

Maps: (Twelve Experiments)

Construction of geological sections from countoured geological maps, interpreting geological features without drawing sections, solution fo engineering geological problems such as alignment of dams, tunnels, roads canals, bridges etc., based on geological maps.

Data interpretation: (Two Experiments)

Logging of drill core and interpretation of drilling data. Graphical representation of core log.

Text Books/References

Gupte R. B., "A Text Book of Engineering Geology", P. V. G. Publications, Pune

Legget R., "Geology and Engineering", McGraw Hill Book Co., London

Trefethen J. M., "Geology for Engineers", D Van Nostrand Co. Inc.

Schultz J. R. and A. B. Cleaves, "Geology in Engineering", John Wiley Inc.

Syllabus for Unit Test

Unit Test 1	Unit I & II
Unit Test 2	Unit III & IV
Unit Test 3	Unit V & VI



TEACHING SCHEME

Lectures : 04Hrs/week

Practical : 02Hrs/week

EXAMINATION SCHEME

Theory : 80 Marks

Duration : 03 Hours

Unit Test : 20 Marks

T. W. & Or. : 50 Marks

Unit-I

(08 Hours)

General Anatomy:

Concept of Stress and Strain: Concept of stress and strain: Normal, lateral, shear and volumetric stresses and strains, Stress-strain curve. Elastic constants and their inter relationship. Generalized Hooke's law.

Axial and Thermal Stresses: Axial force diagram; Stresses, strains and deformation of determinate and indeterminate, prismatic and tapered cross section, homogenous and composite bars; due to concentrated loading, self weight and temperature effect; Axial rigidity.

Unit-II

(08 Hours)

Axially Loaded Long Columns:

Concept of critical load and buckling; Differential equation of elastic curve; Euler's formula for hinged ends; Equivalent length for different end conditions; Limitation of Euler's formula; Rankine's formula; Johnson's formula; Direct and Bending Stress : Concept; Resultant stress due to the axial load and uniaxial or biaxial bending; Core of section; Effect of lateral force and self weight; Application to columns, retaining walls, dams, chimneys etc.

Unit-III

(08 Hours)

Principal Stresses and Principal Planes:

Normal and shear stresses on any oblique plane. Concept of principal stresses and principal planes. Maximum shear stress; Analytical and graphical method. (Mohr's circle method); Combined effect of axial force, bending moment, shear force and torsion; Theories of failure;

Strain Energy: Concept of strain energy; Modulus of Resilience and Toughness; Strain energy for axially loaded members due to gradual, sudden and impact load; Strain energy due to self weight;

Unit-IV

(08 Hours)

Shear Force and Bending Moment in Beams:

Concept of Shear Force and Bending Moment; Relation between Shear Force, Bending Moment and intensity of loading; Shear Force Diagram and Bending Moment Diagram due to point load, uniformly distributed load, uniformly varying load and moments for the simple and compound beams; Elastic curve.

Flexural Stresses: Theory and assumptions of pure bending; Moment of resistance; Flexure formula; Flexural rigidity; Modulus of rupture; Flexural stress distribution diagram for various sections; Force resisted by partial cross section.

Unit-V

(08 Hours)

Shear Stresses:

Concept of direct and transverse shear; Shear stress formula; Concept of complementary shear stress; Shear stress distribution diagram for symmetrical and unsymmetrical section.

Torsion of Circular Shafts: Theory, assumptions and derivation of torsional formula; Shear stress distribution across cross section; Twisting moment diagram; Shear stresses and strains in determinate and indeterminate shafts of hollow, solid, homogeneous and composite cross sections subjected to twisting moment; Torsional rigidity.

Unit-VI

(08 Hours)

Slope and Deflection of Beams:

Concept of relation between deflection, slope, bending moment, shear force and intensity of loading; Double Integration method; Macaulay's method.

Pressure Vessels: Stresses, strains and deformation in thin walled cylindrical and spherical vessels due to internal fluid pressure; Thick cylinders; Lamé's equation of stresses.

Term-work and Oral

A) Term work

The term-work shall consist of minimum TWELVE experiments.

1. Tension test – Mild Steel, Tor Steel, Aluminum.
2. Compressive Strength test- Bricks.

3. Bending test – Timber.
4. Transverse test- Roof tiles.
5. Flexure test- Flooring tiles.
6. Bend Re-bend test- Mild Steel, Tor Steel.
7. Direct Shear test- Mild Steel, Aluminum.
8. Torsion test- Mild Steel, Aluminum.
9. Izod & Charpy Impact test- Mild Steel, Aluminum, Brass, Copper
10. Rockwell Hardness test- Mild Steel, Aluminum, Brass, Copper
11. Abrasion test- Flooring tiles
12. Fatigue test- Mild Steel, Aluminum
13. Water Absorption test- Bricks
14. Block board test
15. Brittle coat

B) Oral:

Oral shall be based on above term work.

Text Books/References

- Beer F.P. and Johnston E.R., “Mechanics of Materials”, McGraw Hill Publication
 Gere J.M. & Timoshenko S.P., “Mechanics of Materials”, CBS Publishers & Distributors
 Singer F. L. & Pytel A., “Strength of Materials”, Harper and Row Publication
 Popov E. P., “Engineering Mechanics of Solids”, Prentice Hall of India (P) Ltd.
 Benham P. P., Crawford R. J. & Armstrong C. G., “Mechanics of Engineering Materials”, ELBS Longman Publication
 Rajput R. K., “Strength of Materials”, S. Chand Publication
 Junnarkar S. B. & Adavi, “Mechanics of Materials”, Charotar Publishing House
 Ramamrutham S. & Narayan R., “Strength of Materials”, Dhanpat Rai Publishing Co.

Syllabus for Unit Test

Unit Test 1	Unit I & IV
Unit Test 2	Unit II & V
Unit Test 3	Unit III & VI



TEACHING SCHEME

Lectures : 04Hrs/week

Practical : 02Hrs/week

EXAMINATION SCHEME

Theory : 80 Marks

Duration : 03 Hours

Unit Test : 20 Marks

T. W. & Or. : 50 Marks

Unit-I

(08 Hours)

Ingredients of Concrete:

Cement: Manufacture of Portland cement, Chemical Composition, Bogues compounds, Hydration of cement, Structure of Hydrated cement, ASTM classification and types of cement, Tests of cement and I.S. requirements for ordinary Portland cement.

Aggregates: Classification, Properties of aggregates, Deleterious materials, Soundness, Alkali-Aggregate Reaction, Grading of aggregates, Standard Grading curves, Testing of aggregates, Artificial & recycled aggregates.

Water: Quality of water IS requirements, Use of sea water.

Unit-II

(08 Hours)

Fresh Concrete:

Workability: Factors affecting workability, Measurements of workability, Suitability of concrete based on degree of workability, Segregation, bleeding.

Concreting Process: batching, mixing, transporting, placing and compaction.

Curing of Concrete: Methods of curing (study of machinery not expected), Effect of temperature on curing, Steam curing, curing compounds, period for curing, stripping time, Analysis of fresh concrete.

Unit-III

(08 Hours)

Hardened Concrete:

Properties of Hardened concrete

Strength of Concrete: General, Compressive strength, Factors affecting strength, Maturity Concept, Tensile strength, Relation between compressive and tensile strength, Flexural strength, Testing under central and third point loading, Shear strength, Bond strength,

Elasticity, Creep and Shrinkage: Stress-Strain relation, Modulus of Elasticity, Creep-time curve, classification of shrinkage.

Non Destructive Testing: Schmidth's Rebound hammer, Pull out test, Ultrasonic Pulse velocity method.

Unit-IV

(08 Hours)

Concrete Mix Design:

Concept of mix design, Variables in mix design, Statistical Quality Control, Various methods of mix design, Design of mix by Indian Standard recommended method (IS: 10262-1982 & IS: 456-2000), and DO method, Acceptance criteria.

Unit-V

(08 Hours)

Admixtures in Concrete and Special Concreting Techniques:

Purpose and functions, Classification

Chemical Admixtures: Plasticizers, Super-Plasticizer, Retarders, Air entraining agents, Compatibility of admixtures and cement, Marsh Cone Test.

Mineral Pozzolanic/Admixtures:- Fly ash, Silica fume, GGBS, Rice Husk Ash

Special Concreting: Under water concreting, Cold weather concreting

Unit-VI

(08 Hours)

Special Concrete and Durability of Concrete:

Special Concrete: Light weight concrete, Polymer Concrete, Fiber reinforced concrete, Roller Compacted Concrete, Self Compacting Concrete, Ferro-cement, Pumped Concrete, Ready mix concrete; High Performance Concrete.

Durability of Concrete: Definition, Significance, Strength and durability relationship; Permeability, Chemical attack; Sulphate attack; Chloride attack, attack by sea water, Carbonation and measurement of depth of carbonation, Requirement for durability as per IS 456-2000.

Term-work:

The term-work shall consist of (ANY FIFTEEN) experiments from PART A where as PART B is compulsory.

PART A: List of Experiment

- 1) Fineness test on Cement
- 2) Standard consistency and Setting time test on cement
- 3) Soundness test on Cement
- 4) Compressive strength test on Cement.
- 5) Moisture content & Water absorption of aggregates.
- 6) Specific gravity of Aggregates.
- 7) Elongation and Flakiness Index of Aggregates.
- 8) Fineness Modulus of Aggregate.
- 9) Aggregate Impact Value.
- 10) Aggregates Crushing Value.
- 11) Measurement of Workability of Concrete (Slump, Compaction factor, Flow table and Vee-bee test)
- 12) Study of effect of admixtures (Superplastsizer & Retarding agent) on concrete.
- 13) Concrete mix design using IS code method.
- 14) Compressive strength of Concrete.
- 15) Split Tensile strength of Concrete.
- 16) Flexural Test of Concrete.
- 17) Non Destructive Test on concrete –Schmidth's Rebound hammer test

PART-B: Site Visit with site visit report:

- 1) NDT Project on any site under construction
- 2) Study of any of the advances in Concrete Technology (RMC Plant, Pumped Concrete, Roller Compacted Concrete, Self Compacted Concrete, Tremix flooring etc)

Text Books/References

- Neville A. M. & Brooks J. J., "Concrete Technology", Pearson Education Publication
Neville A. M., "Properties of Concrete", ELBS & Longman Publication

Shetty M. S., "Concrete Technology", S. Chand & Company Ltd.

Gambhir M. L., "Concrete Technology", Tata McGraw Hill Publication

Syllabus for Unit Test

Unit Test 1	Unit I & IV
Unit Test 2	Unit II & V
Unit Test 3	Unit III & VI



K20205 -ENGINEERING ECONOMICS AND MANAGEMENT

TEACHING SCHEME

Lectures : 04Hrs/week

EXAMINATION SCHEME

Theory : 80 Marks

Duration : 03 Hours

Unit Test : 20 Marks

Unit-I

(08 Hours)

Elementary Economics and Production:

Definition of Economics, nature, scope and importance of engineering economics, basic economics concept - Human wants. Utility, value, cost, price, profit, capital, wealth, equilibrium etc. law of demand, elasticity of demand. The law of supply. Factors influencing production: land, labour, capital and organization. Characteristics and rewards, factors of production. Division of labors, specialization, scales of production, economics of scale.

Unit-II

(08 Hours)

Finance and Construction:

Types of capitals - Fixed and Working Capital Use of Capital. Shares, Debentures. Public deposits. Forms of foreign capital. Money and capital market in India. Constituents of Indian capital market. Various sources of building finance and nature of their operations. New economic policy, liberalisation, Extending privatization and globalisation. Role of Financial institutions in economic development. Forms of business organization: Sole, Proprietorship, Partnership, Joint Stock Company. Private line. Co-operative Society, Unlimited.

Unit-III

(08 Hours)

Introduction to Management:

Management Theories and Principles. Contributions by Taylor, Mayo, Fayol, McGregor, Frank and Gilberth. Management by objectives and decision-making. Manager: Qualities, Functions and Experience. Role of "Project Manager. Introduction to Project Life cycle. Major types of constructions. Selection of professional services --contractors.

Unit-IV

(08 Hours)

Construction Organization:

Importance of organization. Principles of forming organization Span of control, Types of organization - Line, Function, Line and Staff, Committee and matrix. Motivation for the Project team-Interpersonal behaviour in project organization-perceptions of Owners and Contractors. Manpower Planning, Organising, Staffing, directing and Controlling-Personnel Principles.

Unit-V

(08 Hours)

Project Planning:

Planning - Purpose and objective, Strategies, Policies and Rules, Steps in planning. Execution, Operation and maintenance in relation with various Civil Engineering projects. Resources required for construction projects.

Unit-VI

(08 Hours)

Personnel Management:

Nature and Scope of Personnel management, Manpower planning, Job - Analysis, Description, Recruitment, selection, job evaluation techniques, Human relations in construction: client-contractor, Contractor- project staff, Labour, Public etc.

Text Books/References

Dewett K. K., "Elementary Economic Theory"

Stonier and Hague, "A Text Book of Economic Theory"

Panneerselvam R., "Engineering Economics"

Koontz Harold, Heinz Weihrich, "Management", McGraw Hill Company International Editions

Sherlekar S. A. and V. S. Sherlekar, "Modern Business Organization Management", Himalaya Publishing House

Davis Gordon Band Margrethe R Olson, "Management Information Systems", McGraw Hill International Editions

Khanna O. P., "Industrial Engineering and Management", Dhanpat Rai and Sons

Syllabus for Unit Test

Unit Test 1	Unit I & IV
Unit Test 2	Unit II & V
Unit Test 3	Unit III & VI





K20206 - COMPUTER APPLICATION IN CIVIL ENGINEERING - I

TEACHING SCHEME

Practical : 04Hrs/week

EXAMINATION SCHEME

T. W. & Pr. : 50 Marks

To a Civil engineer drawing is of immense importance, Civil engineer in his scope may not draw but needs to read the drawings. Application of AutoCAD is widely used by the industry and there is basic need of knowing AutoCAD by an engineer. In this subject AutoCAD software, a Civil Engineering application will be taught. This subject covers all the commands used to create and modify the drawing. Students as guided by the faculty have to draw different drawings related to civil engineering, details of which are mentioned below:

Learning Auto Cad:

1. Introduction
2. Getting Started
3. Learning commands: Draw and Modify menu
4. Learning commands through drawings
5. Centerline drawing
6. Layers / Filters
7. Blocks
8. Area command
9. Drawing Presentation: Sheet size and Text Format.

List of Practicals

Drawing plan, Elevation and Section of G +1 Building
Theory assignment giving details of all commands used
Drawing plates. (minimum 10 numbers)

Text Book/References

AutoCAD: Users Guide. 2000



SEMESTER - IV





TEACHING SCHEME

Lectures : 04 Hrs/Week

EXAMINATION SCHEME

Theory : 80 Marks

Duration : 03 Hours

Unit Test : 20 Marks

Unit-I

(09 Hours)

Differential Equations:

Solution of Linear differential equation of nth order with constant coefficients, Method of variation of parameters, Cauchy's and Legendre's linear equations. Simultaneous Linear differential equations, Total differential equations, Symmetrical Simultaneous differential equations.

Unit-II

(09 Hours)

Applications of Differential Equations:

Applications to cantilever, bending of beams, whirling of shafts, Mass spring systems.

Applications of Partial Differential Equations:

Solution of wave equation, one and two dimensional heat flow equations by method of separating variables. Applications to civil and allied engineering problems.

Unit-III

(08 Hours)

Numerical Methods:

Numerical solutions of System of Linear equations by Gauss elimination, LU Decomposition, Cholesky, Jacobi and Gauss-Seidel methods. Numerical solutions of Ordinary differential equations by Euler's, Modified Euler's, Runge- Kutta 4th order, and Predictor-Corrector methods.

Unit-IV

(09 Hours)

Statistics and Probability:

Measure of Central tendency, Standard deviation, Coefficient of variation, Moments, Skewness and Kurtosis, Correlation and Regression, Reliability of Regression Estimates.

Probability density function and Probability mass function, Binomial, Poisson, Normal and Hypergeometric distributions, Test of Hypothesis: Chi-square test of goodness of fit and Independence of attributes, Introduction to Decision and Quality Control.

Unit-V

(09 Hours)

Vector Differentiation:

Radial, Transverse, Tangential, Normal components of linear velocity and acceleration, Gradient, Divergence and Curl, Directional derivative, Vector identities, Irrotational and Solenoidal Vector fields.

Unit-VI

(08 Hours)

Vector Integration:

Line integral, Surface integral and Volume integral, Work done, Gauss's-Divergence theorem, Stoke's theorem and Green's lemma. Applications to fluid flow, Streamlines, Continuity equation, Motion equation and Bernoulli's equation.

Text Books/References

- Peter. V'Neil, "Advanced Engineering Mathematics", 5e, Thomson Learning
Erwin Kreyszing, "Advanced Engineering Mathematics", Wiley Eastern Ltd.
Wylie C. R. and Barrett L. C., "Advanced Engineering Mathematics", Mc Graw Hill
M. D. Greenberg, "Advanced Engineering Mathematics", 2e, Pearson Education
B. S. Grewal, "Higher Engineering Mathematics", Khanna Publication, Delhi
P. N. Wartikar and J. N. Wartikar, "Applied Mathematics" (Volume I & II), Pune Vidyarthi Griha Prakashan
Irwin Miller and John E. Freund, Probability and Statistics for Engineers, Prentice-Hall of India
P.N. Wartikar and J.N. Wartikar, "A Text Book of Engineering Mathematics - III"

Syllabus for Unit Test

Unit Test 1	Unit I & IV
Unit Test 2	Unit II & V
Unit Test 3	Unit III & VI



K20208: BUILDING PLANNING AND DESIGN

TEACHING SCHEME

Lectures : 04 Hrs/Week

Drawing : 04 Hrs/Week

EXAMINATION SCHEME

Theory : 80 Marks

Duration : 04 Hours

Unit Test : 20 Marks

T. W. & Or. : 50 Marks

Unit-I

(08 Hours)

Building Planning Natural and Built Environment, Ecology, Environment and Man relationship, Principles of planning for building, Integrated approach necessity, concept of building as Environmental Filter. Building Rules Regulations and Byelaws necessity, plot size, open space around the building. FSI, Building line, control line. Height, room size, Built up area, floor area, carpet area. Rules of lighting ventilation, Drainage and Sanitation.

Unit-II

(08 Hours)

Design of Building: Climate, elements of climate, global climate, thermal design Principles, comfort sectors, Heat exchange of building. Heat transfer loads - definition, calculation of U value of temperature gradient. Thermal insulation of roof and wall. Ventilation comfort factors, function of ventilation, stack effect wind effect. Mechanical ventilation, ventilation rate, Air conditioning-design data, cooling load, Air conditioning systems.

Unit-III

(08 Hours)

Lighting Principles of Day Lighting Design of Windows, Sky components, Noise and acoustics -Effect of noise, comfort standards, Noise control sound insulation, Acoustics reverberation Sabines formula acoustical defects conditions of good acoustics. Fire Protection - Fire safety, fire load, grading of occupancies by fire load, fire escape elements.

Unit-IV

(08 Hours)

Building Services:

Constructional requirements for different building services, Electrical, Telecommunication services, Circulation-Lift escalators, Entertainment services plumbing services, Layout of water supply & drainage system, Rate of water supply, storage and distribution arrangement, Plumbing systems, septic tank, garbage disposal arrangement.

Unit-V

(08 Hours)

Design concept of ECO building, Green buildings, Intelligent building, Low Cost Housing, Planning considerations in High rise buildings.

Unit-VI

(06 Hours)

Perspective drawing, one point and two point perspective.

Term Work

- 1) Sheet No1-Perspective Drawing of different objects.
- 2) Project Work-Detailed planning, designing and drawing of any one of the buildings listed below:

1. Residential Building
2. Commercial Building
3. Educational Building
4. Industrial Building
5. Recreational Building
6. Health Club

Sheets to be drawn in project work

- Layout plan of project with a suitable scale
- Plan/Typical floor plan to a suitable scale.
- Elevation and section to a suitable scale.
- Parking plan/Terrace plan to a suitable scale.
- Foundation Plan to a suitable scale.
- Lay out plan showing water supply and Drainage
- Line plan of any five buildings mentioned in project work.

Report File

File shall consist of

1. Data collection, line plan, planning considerations and approximate cost of building
2. Visit report to project buildings
3. Advertisement / Brochures regarding scheme of promoters and Builders

Oral examination shall include sketching and viva.

Text Books/References

Calendar, "Time Saver Standards for Architectural Design", Tata McGraw Hill Publishers

Merit, "Building Design and Construction", Tata McGraw Hill Publishers

Bindra Arora, "Building Construction", Laxmi Publication

M. L. Shah, C. M. Kale, B. Y. Patki, "Building Drawing with integrated approach to Built Environment", Tata McGraw Hill Publishers

Syllabus for Unit Test

Unit Test 1	Unit I & II
Unit Test 2	Unit III & IV
Unit Test 3	Unit V & VI



TEACHING SCHEME

Lectures : 04Hrs/week

Practical : 04Hrs/week

EXAMINATION SCHEME

Theory : 80 Marks

Duration : 03 Hours

Unit Test : 20 Marks

T. W. & Pr. : 50 Marks

Unit-I

(08 Hours)

Leveling:

Study of -Dumpy level, Auto level, Laser Level. Profile leveling - Longitudinal section and cross-section .Plotting of L section and cross section, Ground profile and cross section, working profile. Reciprocal leveling; Curvature and refraction correction, Distance to visible horizon. Principle Axes of dumpy level; Permanent Adjustment of level Adjustment of bull's eye bubble or Round Bubble. Line of collimation and Sensitiveness of bubble tube.

Unit-II

(08 Hours)

Theodolite Survey:

Introduction to 20" Vernier theodolite, Types of theodolites, Principal axes of Theodolite. Use of Theodolite -Measurement of horizontal angle, vertical angle, Magnetic bearing, Prolonging a line, Lining-in, Measuring deflection angles, setting out angles. Finding out elevation of objects, (Base accessible and inaccessible) by trigometrical observations. Theodolite traversing: Items of work checking of traverse open and close, Computation of consecutive and independent co-ordinates, Adjustment of closed traverse, balancing the traverse using Gales traverse table.

Unit-III

(08 Hours)

E.D.M.:

Omitted measurements, Area calculations by Co-ordinates. Testing and permanent adjustment of transit theodolite. Principal of stadia, fixed hair method with vertical staff to determine horizontal distance and elevation of points. Introduction to tachometric surveying. Introduction to Digital Theodolite, Digital angle Measurement. Introduction and Theory of EDM.

Unit-IV

(08 Hours)

Horizontal and vertical curves:

Horizontal and vertical curves Purpose. Simple circular curves-Elements and setting out of circular curves by linear i.e. Offsets from chords produced, offsets from long chord and angular methods i.e. Rankin's method, Two theodolite method. Compound curves - Elements and setting out compound curves. Introduction to reverse curves-Elements, Location and Uses.

Unit-V

(08 Hours)

Transition Curves and Plane Table Survey:

Transition Curves -Types and uses, Length of transition curves, Elements of cubic parabola, process to set out a transition curve by deflection angle method. Accessories required for plane table survey and uses of accessories: Advantages and disadvantages and Limitation of Plane table Survey. Methods of plane table survey, Radiation, Intersection, Traversing, Resection, Errors in plane table surveying.

Unit-VI

(08 Hours)

Minor Instruments used in surveying:

Two point and three point problems and their solutions by different methods. Reconnaissance survey Preliminary survey locating obligatory points fixing gradients paper and field locations, Construction Survey. Study and use of Abney level, Box sextant.

Term work

The term Work shall consists of

Field book containing record of all exercises and project listed below.

- | | |
|--|----------|
| a) Theodolite traverse survey project. | 1 Sheet |
| b) Plane table traverse survey project. | 1 Sheet |
| c) Road project showing L- Section plan
of road with contours and typical cross section | 2 Sheets |

List of Practicals

Details of practical to be performed, Exercise projects and assignments

Study and use of auto level and double check leveling

Study of laser level, Compound levelling and fly levelling, calculation By Rise and Fall Method

Study of theodolite and Practice of reading

Measurement of Horizontal angle of triangle by repetition method and applying Check

Measurement of vertical angle by Transit Theodolites

Project I- Theodolite traverse survey of closed traverse for minimum 0.5 Hectares including building, roads, etc.

Computation of Horizontal distance and elevation of points by tachometry for horizontal and inclined sights

Introduction and study of outfit of plane table and method of Radiation

Intersection Methods of plane table survey

Project II- Plane table survey project of closed traverse of Minimum of four sides for at least 0.5 Hectares Area including building, roads, etc.

Solution of Three point problem in plane tabling

Setting out of a simple circular curve by Rankin's Method of Deflection angles, by offsets from Chords produced

Study and use of Abney level, Box sextant

Setting out a simple Building on Ground from a given a foundation plan

Project III- Road project of Minimum length of 250 m including fixing of Alignment, Profile leveling and cross sectioning and calculations to be done at the site

Two peg test for dumpy level.

Setting out angle using Theodolite.

Measurement of distance by using EDM

Text Books/References

Prof. Kanetkar T. P., Prof. S. V. Kulkarni, "Surveying and Leveling", (Vol-I and II), P. V. G. Publishers

Dr. B. C. Punmia, "Surveying", Vol-I and II, Laxmi Publishers

Late David Clark, "Plane and Geodetic Surveying for Engineers", Vol I - II, C.B.S

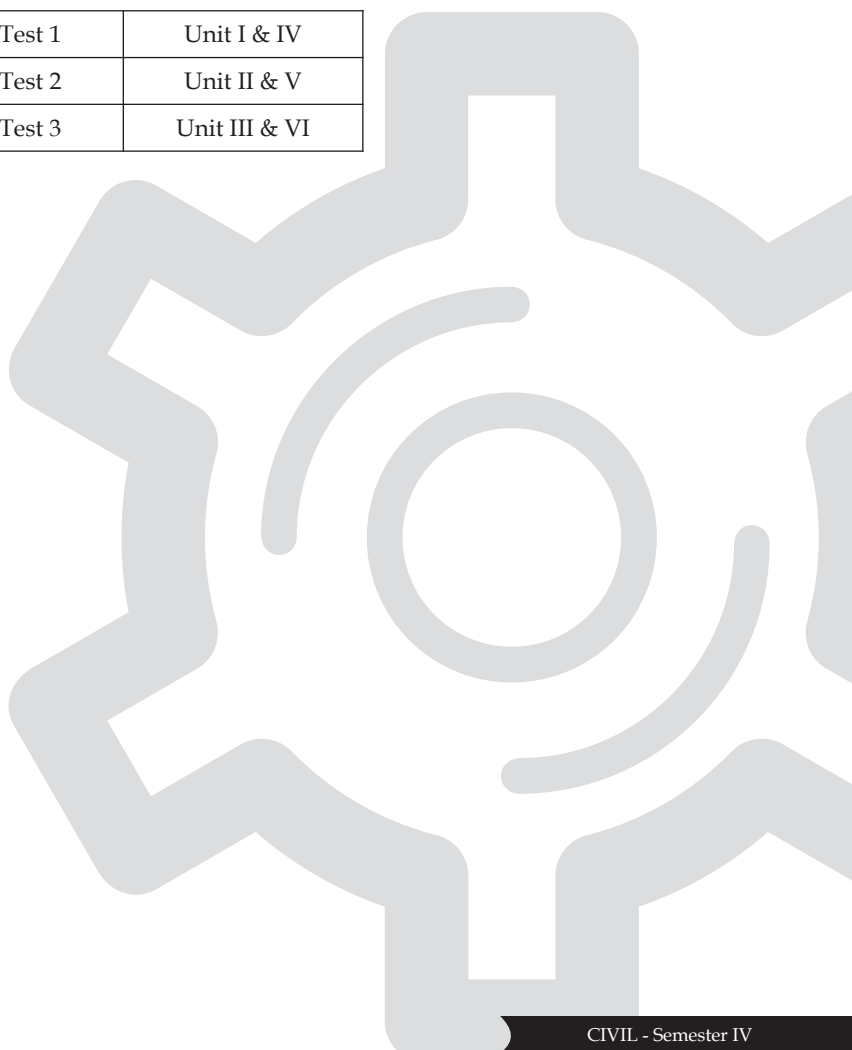
Publishers

Alake De, "Plane Surveying", S. Chand and Company

Dr. A. M. Chandra, "Plane Surveying", New Age International Publishers

Syllabus for Unit Test

Unit Test 1	Unit I & IV
Unit Test 2	Unit II & V
Unit Test 3	Unit III & VI





TEACHING SCHEME

Lectures : 04Hrs/week

Tutorials : 01Hrs/week

EXAMINATION SCHEME

Theory : 80 Marks

Duration : 03 Hours

Unit Test : 20 Marks

T. W. & Or. : 50 Marks

Unit-I

(08 Hours)

Basic Concepts of Structural Analysis:

Types and classification of skeletal structures, members, joints, supports, loads and load effects; Concept of stability; Concepts of indeterminacy and degrees of freedom; Static and Kinematic degree of indeterminacy; Concepts of strain energy; Strain energy due to axial force, shear force, bending moment and torsion; Deflection of determinate beams by Moment area method and Conjugate beam method.

Unit-II

(08 Hours)

Analysis of Plane Trusses using Strain Energy Method:

Castigliano's first theorem; Deflections of determinate trusses; Castigliano's second theorem; Analysis of redundant Trusses; Lack of fit and temperature changes in members; Sinking of supports; Graphical method-Williot diagram.

Unit-III

(08 Hours)

Analysis of Beams and Plane Frames using Strain Energy Method:

Deflection of determinate beams and rectangular portals by application of Castigliano's first theorem; Analysis of indeterminate beams and rectangular portals by application of Castigliano's second theorem with indeterminacy up to two degrees; Maxwell's theorem of reciprocal displacements and Betti's law.

Unit-IV

(08 Hours)

Fixed Beams and Three Moment Theorem:

Analysis of propped cantilevers and fixed Beams; Sinking of support; Analysis of continuous beams by Clapeyron's theorem of three moments.

Unit-V

(08 Hours)

Slope Deflection Method:

Analysis of continuous beams using slope deflection method-sinking and rotation at support; Deflected shape of beam; Analysis of sway and non-sway rectangular portal frames. (Involving not more than three unknowns); Deflected shape of frame.

Unit-VI

(08 Hours)

Moment Distribution Method:

Analysis of continuous beams using moment distribution method-sinking and rotation at support; Analysis of sway and non-sway rectangular portal frames. (Involving not more than three unknowns)

Term-work

The term-work shall consist of total TWELVE assignments (two from each unit).

Text Books/References

Hibbeler R. C., "Structural Analysis", Prentice Hall Publication

Timoshenko S. P. & Young, "Theory of Structures", McGraw Hill Publication

Norris, Wilbur & Utku, "Elementary Structural Analysis", TMH Publication

Ramamrutham S. & Narayan R., "Theory of Structures", Dhanpat Rai Publishing Company

Reddy C. S., "Basic Structural Analysis", Tata McGraw Hill Publication

Junnarkar S. B. & Adavi, "Mechanic of Structures", Charotar Publishing House

Pandit G. S. & Gupta S. P., "Theory of Structures Vol-I", Tata McGraw Hill Publication

Prakash Rao D. S., "Structural Analysis", Universities Press Publication

Syllabus for Unit Test

Unit Test 1	Unit I & IV
Unit Test 2	Unit II & V
Unit Test 3	Unit III & VI



TEACHING SCHEME

Lectures : 04 Hrs/Week
Practical : 02 Hrs/Week

EXAMINATION SCHEME

Theory : 80 Marks
Duration : 03 Hours
Unit Test : 20 Marks
T. W. & Or. : 50 Marks

Unit-I

(10Hours)

Introduction & Properties of Fluids:

Scope and application of fluid mechanics, Newton's law of viscosity, SI system of units, Physical properties of fluids- Density, Specific Weight, Specific Volume, Relative density, Dynamic & Kinematic Viscosity, classification of fluids, Newtonian & Non Newtonian fluids, Ideal and Real fluids Compressibility, Cohesion, Adhesion, Surface Tension, Capillarity, Vapor pressure.

Statics:

Pressure at a point, Pascal's law, Pressure density height relationship, Measurement, Hydrostatic pressure on a plane & curved surface, Centre of pressure, Pressure diagrams, Practical application related to Hydrostatic pressure and Centre of Pressure. Buoyancy, Stability of floating bodies, Metacentre and metacentric height, Submerged bodies, Relative Equilibrium, Fluid masses subjected to uniform linear acceleration and rotation about vertical axis, Free and forced vortices.

Unit-II

(08Hours)

Kinematics and Dynamics:

Kinematics: Methods of describing the motion of fluid, Velocity and acceleration of fluid particle, Types of flow- steady and unsteady, Uniform and non-uniform, Laminar and turbulent, one, two, and three dimensional flows, streamlines, path lines and streak lines, stream tubes, Equation of continuity for one dimensional flow along a stream line and for three dimensional flow in Cartesian coordinate system, Circulation and Vorticity, Rotational and Irrotational motion, Velocity potential, Stream functions and flow net, Methods of drawing flow net, Uses of flow net.

Dynamics: Forces acting on fluid masses in motion, Euler's equation of motion along a stream line and for three dimensional flow in Cartesian coordinate, Introduction of Euler's equation of motion, Bernoulli's Equation motion, Limitations, Kinetic energy correction factor, Total

energy and hydraulics grade line, Cavitation, Linear momentum equation, Momentum correction factor, Application of continuity equation-Bernoulli and momentum equation, flow measuring devices and Pitot tube, Venturimeter, Orifice Meter, Nozzle meter, Rota meter, orifices, Mouthpieces, Notches and weirs.

Unit-III

(08 Hours)

Dimensional Analysis and Model Studies:

Dimensions of physical quantities, Dimensional homogeneity, Dimensional analysis using Rayleigh's and Buckingham's π theorem, important dimensionless parameters and their significance, Model studies: Geometric, Kinematics and Dynamic similitude, Model laws, Types of models, Application of dimensional analysis and model studies to fluid flow problems.

Unit-IV

(08 Hours)

Laminar Flow:

Laminar flow in circular pipe, Laminar flow between parallel plates, Stokes law, Methods of measurement of viscosity, Flow through porous media, Darcy's law Reynolds experiment, Transition from laminar to turbulent flow,

Flow through pipes: Pipe flow problems, Energy losses in pipe flow, parallel and series pipes, pumps and turbines in pipeline, pipe network various arrangements of pipes, siphons, Hydraulic transmission through pipes, three reservoir problem.

Unit-V

(08 Hours)

Boundary layer theory:

Concept of boundary layer, Development of Boundary layer over a flat plate, Laminar and transitional boundary layer, laminar sub layer, General characteristic of boundary layer, Boundary layer thickness, Velocity distributions within boundary layer, Momentum equation for obtaining boundary layer thickness, local and mean drag Coefficient, Hydro dynamically smooth and rough boundaries, Boundary layer separation and its control.

Unit-VI

(08 Hours)

Turbulent flow:

Phenomenon of turbulence, characteristics of turbulent flow- velocity and pressure fluctuations, instantaneous velocity, Temporal mean velocity, Scale of turbulence and intensity of turbulence, mixing length hypothesis, Velocity distributions in turbulent flow for smooth and rough pipes and their integration- Darcy- Weisbach equation, Variation of friction factor for laminar flow and for smooth and rough turbulent flow, Nikuradse's experiment on artificially roughened pipes, Stanton diagram, friction factor for commercial pipe, Moody's diagram, White Colebrook's equations.

Term Work

Term work will consist of journal giving the detailed report of experiments and assignments performed.

Oral Examination

Oral examination shall be based on the above term work.

List of Practicals

Following experiments (Any Eight) and assignments (Any Two) on the above theory are to be performed

Measurement of viscosity

Study of Pressure measuring devices

Stability of floating bodies

Flow net by Electrical Analogy for flow below weir (with and without sheet pile)

Verification of Bernoulli's theorem with reference to losses of energy

Calibration of Venturimeter / Orifice meter

Calibration of Orifice / Notch

Study of Laminar flow using Reynold's apparatus / Heleshaw's apparatus

Study of Laminar and Turbulent flow through pipes

Study of Boundary layer on smooth and rough plate

a) Flow net by Graphical Method

b) Trial and error solution of three reservoir problem

c) Solution of pipe network problem by 'Hardy-Cross Method'

In addition to above experiments and assignments, it is desirable to solve problem on the following experiments

a) Study of minor losses in pipe flow

b) Study of development of boundary layer over a flat plate

Text Books / References

Garde R. J. and Mirajgaonkar, "Engineering Fluid Mechanics", Publication-Scitech

Garde R. J., "Fluid Mechanics through Problems", New Age International, New Delhi

Modi P. N. and Seth S. M., "Fluid Mechanics", Publication-Standard Book House

Streeter -Wylie, "Fluid Mechanics", Tata McGraw Hill Publication

Subramanya K., "Theory and Application of Fluid Mechanics", Tata McGraw Hill Publication

Syllabus for Unit Test

Unit Test 1	Unit I & IV
Unit Test 2	Unit II & V
Unit Test 3	Unit III & VI



K20212 - COMPUTER APPLICATIONS IN CIVIL ENGINEERING - II

TEACHING SCHEME

Lectures : 01 Hrs/Week

Practical : 02 Hrs/Week

EXAMINATION SCHEME

T.W. & Pr. : 50 Marks

Use of computers in Civil Engineering is increasing day by day, applications and development of new software's has created openings for the civil engineers in the software industry. This subject covers introduction to the basic languages C and C++.

Exercises covered under this subject should help logical development of the students through problem solving and all the syntaxes required to write the programs in this languages should be taught. Object oriented programming approach should be used for writing the program. Details of practicals are given below:

CONCEPT:

1. Numerical Problems for logical development

- a. Algorithms
- b. Flow Charts
- c. Home Assignments for logical development (Minimum. Ten Nos.)

2. Syntaxes of C ++

- a. Variables, Operators, Data Types
- b. Input, Output
- c. If, if-else, switch ... case
- d. While, do ... while, for
- e. Arrays, strings, structures
- f. Functions
- g. Classes, objects, data access specifiers.
- h. Object Oriented Programming approach of writing program.

3. Civil Engineering applications using above syntaxes

List of Practicals

Programs on Civil Engineering problems. (Minimum. Ten Nos.)

Emphasis should be given on logical development

Text Books/References

Rohert Lafore, "Object Oriented Programming in Turbo C++"

E. Balagulusamy, "Object Oriented Programming with C++"

Yashwant Kanetkar, "Let us C" (For Problems)

J.S. Chitode, "Numerical Computational Techniques" (For Problems)





RULES REGARDING ATKT, CONTINUOUS ASSESSMENT AND AWARD OF CLASS

A. T. K. T.

A candidate who is granted term for B.Tech. Semester-I will be allowed to keep term for his/her B.Tech. Semester-II examination even if he/she appears and fails or does not appear at B.Tech. Semester-I examination.

A candidate who is granted term for B. Tech. Semester - III will be allowed to keep term for his/her B.Tech. Semester-IV examination even if he/she appears and fails or does not appear at B.Tech. Semester-III examination.

A candidate who is granted term for B.Tech. Semester-V will be allowed to keep term for his/her B.Tech. Semester-VI examination if he/she appear and fails or does not appear at B.Tech. Semester-V examination.

A candidate who is granted term for B.Tech. Semester-VII will be allowed to keep term for his/her B.Tech. Semester-VIII examination if he/she appears and fails or does not appear at B.Tech. Semester-VII examination.

A student shall be allowed to keep term for the B.Tech. Semester-III course if he/she has a backlog of not more than 3 Heads of passing out of total number of Heads of passing in theory examination at B.Tch. Semester-I & II taken together.

A student shall be allowed to keep term for the B.Tech. Semester-V of respective course if he/she has no backlog of B.Tech Semester-I & II and he/she has a backlog of not more than 3 Heads of passing in theory examination and not more than 3 heads of passing in termwork and practical examination or termwork and oral examination.

A student shall be allowed to keep term for the B.Tech. Semester-VII course if he/she has no backlog of B.Tech. Semester-III & IV and he/she has a backlog of not more than 3 Heads of passing in theory examination and not more than 3 Heads of passing in termwork and practical examination or termwork and oral examination.

CONTINUOUS ASSESSMENT

In respect of Term work at B.Tech. Semester-I & II, B.Tech. Semester- III & IV and B.Tech. Semester-V & VI, target date shall be fixed for the completion of each job, project experiment or assignment as prescribed in the syllabus and the same shall be collected on the target date and assessed immediately at an affiliated college by at least one pair of the concerned teachers for the subject and the marks shall be submitted at the end of each term to the Principal of the college.

Termwork and performance of Practical/Oral examination shall be assessed on the basis of the depth of understanding of the principles involved, correctness of results and not on ornamental or colorful presentation.

For B.Tech. Semester-VII & VIII, termwork assessment will be done by external and internal examiners jointly during the examination schedule declared by the university. The record of continuous assessment shall be made available to the examiners during Term work and practical and Term work and oral examinations. Examiner shall use this record for overall assessment of the performance of the student. Every practical/termwork assignment shall be assessed on the scale of 20 marks and weightage of 20 marks shall be distributed as follows:

Sr. No.	Activity	Marks
1	Timely Submission	04
2	Presentation	06
3	Understanding	10

Marks obtained out of 20 for all assignments together will be converted on scale of marks assigned to term work of respective subject in the structure of the course.

CLASS

The class should be awarded to the student on the basis of aggregate marks obtained together in both the semesters of the respective year by him. The award of class shall be as follows.

A	Aggregate 66% or more marks	First Class with Distinction
B	Aggregate 60% or marks but less than 66%	First Class
C	Aggregate 55% or more marks but less than 60%	Higher Second Class
D	Aggregate 50% or more marks but less than 55%	Second Class
E	Aggregate 40% or more marks but less than 50%	Pass Class

