

Sandip University

Neelam Vidya Vihar, Vill.: Sijoul. P.O. : Mailam, Dist.:Madhubani, Bihar -847235

Website : <http://www.sandipuniversity.edu.in>

Toll-Free No.- 1800-313-2714 Ph: 7549991044.

School: Engineering & Technology	Programme: B.Tech –Civil Engineering
Year:- Third Year	Semester:- V
Course:- Reinforced Cement Concrete-I	Course Code:- CE 501T
Theory:- 4 Hours/Week	Max. University Theory Examination:- 60 Marks
	Continuous Internal Assessment:- 40 Marks
Max. Time for Theory Exam.:- 2.5 Hrs	Credit:- 4

Objectives:-

1	The course would begin with the basic concepts of RCC.
2	The student will be able to design beams, slabs, column, footing & staircase of the building.
3	The student will be able to understand the reinforcement details also.

Unit Number	Details	Hours
1	Basic Principles of Structural Design : Assumptions, Mechanism of load transfer, Various properties of concrete and reinforcing steel, Introduction to working stress method and limit state methods of design, partial safety factor for load and material.	8
2	Design of Beams: Doubly reinforced rectangular & Flanged Beams, Lintel, Cantilever, simply supported and continuous beams, Beams with compression reinforcement.	8
3	Columns & Footings: Effective length of columns, Short and long columns-Square, Rectangular and Circular columns, Isolated and combined footings, Strap footing.	8
4	Design of Slabs: Slabs spanning in one direction. Cantilever, Simply supported and Continuous slabs, Slabs spanning in two directions.	8
5	Staircases: Staircases with waist slab having equal and unequal flights with different support conditions, Slab less tread-riser staircase.	8
Total (Hrs)		40

Course Outcome	
Student Should able to :	
CO1	Use IS code of practice for the design of concrete elements
CO2	Draw various RCC structural elements
CO3	Design the beams, slab, stairs, column and footing

Resources	
Recommended Books	<ol style="list-style-type: none"> 1. Plain & reinforced concrete - Ramamurtham 2. Plain & reinforced concrete – B.C. Punmia
Reference Books	<ol style="list-style-type: none"> 1. Plain & Reinforced Concrete Vol. I & II – O.P. Jain & Jay Krishna 2. Limit State Design by P.C.Varghese ; Prentice Hall of India, New Delhi 3. Design of Reinforced Concrete Elements by Purushothman; Tata McGraw Hill, New Delhi 4. Reinforced Cement Concrete by Gupta & Mallick, Oxford and IBH
E-Resources	<ol style="list-style-type: none"> 1. http://nptel.ac.in/courses/105105105/ 2. http://www.nptelvideos.in/2012/11/design-of-reinforced-concrete-structures.html

Sandip University

Neelam Vidya Vihar, Vill.: Sijoul. P.O. : Mailam, Dist.:Madhubani, Bihar -847235

Website : <http://www.sandipuniversity.edu.in>

Toll-Free No.- 1800-313-2714 Ph: 7549991044.

School: Engineering & Technology	Programme: B.Tech – Civil Engineering
Year:- Third Year	Semester:- V
Course:- Structural Analysis-II	Course Code:- CE 502T
Theory:- 4 Hours/Week	Max. University Theory Examination:- 60 Marks
	Continuous Internal Assessment:- 40 Marks
Max. Time for Theory Exam:- 2.5 Hrs	Credit:- 4

Objectives:-

1	To introduce the student to the importance and objectives of Structure analysis.
2	The course would begin with the basic concepts of structure.
3	The student will be able to analyze load and forces.

Unit Number	Details	Hours
1	Moment distribution method in analysis of frames with sway, analysis of box frames, analysis of portals with inclined members, analysis of beams and frames by Kani's method.	8
2	Plastic analysis of beams and frames.	8
3	Analysis of tall frames, wind and earthquake loads, codal provisions for lateral loads. Approximate analysis of multistory frames for vertical and lateral loads.	8
4	Matrix method of structural analysis: force method and displacement method.	8
5	Muller Breslau principle, Analysis of Beam-Columns.	8
Total (Hrs)		40

Course Outcomes

Student Should able to :

CO1	Learn Analysis of structures.
CO2	Demonstrate the concepts of qualitative influence line diagram for continuous beams and frames
CO3	Analyze multistory frames subjected to gravity loads and lateral loads

Resources

Recommended Books	<ol style="list-style-type: none">1. Reddy C.S., Basic Structural Analysis, Tata McGraw Hill Publishing Company, New Delhi2. Structural Analysis Vol-I & II by S.S.Bhavikatti, Vikas Publishers, New Delhi
Reference Books	<ol style="list-style-type: none">1. Ghali A & Neville M., Structural Analysis - A Unified classical and matrix Approach, Chapman and Hall, New York.2. Wang C.K. Intermediate structural analysis, McGraw Hill, New York.3. Kinney Streling J. Indeterminate structural Analysis, Addison Wesley.4. Norris C.H., Wilbur J.B. and Utkys. Elementry Structural Analysis, McGraw Hill International, Tokyo
E-Resources	<ol style="list-style-type: none">1. http://nptel.ac.in/downloads/105105109/2. https://www.uacg.bg/filebank/att_1551.pdf

Sandip University

Neelam Vidya Vihar, Vill.: Sijoul. P.O. : Mailam, Dist.:Madhubani, Bihar -847235

Website : <http://www.sandipuniversity.edu.in>

Toll-Free No.- 1800-313-2714 Ph: 7549991044.

School: Engineering & Technology	Programme: B.Tech – Civil Engineering
Year:- Third Year	Semester:- V
Course:- Engineering Hydrology	Course Code:- CE503T
Theory: 3 Hours/Week	Max. University Theory Examination: 60 Marks
	Continuous Internal Assessment: 40 Marks
Max. Time for Theory Exam.: 2.5 Hrs	Credit: 3

Objectives:-

1	The course relates to the fundamentals related to Hydrology Engineering.
2	The course moves on hydrological cycle, evaporation, flood routing etc.

Unit Number	Details	Hours
1	Introduction: Hydrologic cycle and processes, Precipitation, Infiltration and Evapotranspiration, Forms of precipitation, measurement & analysis, depth-area-duration and intensity-duration frequency relations.	8
2	Evaporation: Process, measurement and estimation, Infiltration process, measurement and estimation, Evapotranspiration measurement and estimation, Stream flow measurements.	8
3	Runoff and Hydrographs, Factors affecting flow hydrograph, Rainfall Runoff correlations, Flow duration curve, Mass curve, Unit hydrograph, its analysis and S-curve hydrograph. Synthetic and introduction of instantaneous unit hydrographs.	8
4	Statistical analysis, flood frequency studies, Rational method, time Area curves, Design flood, Design Storm, Risk, reliability and safety factor	8
5	Channel and flood routing, time series analysis of droughts and floods. Introduction to ground water engineering.	8
	Total (Hrs)	40

Course Outcomes

Student Should able to :

CO1	Select suitable type of ground water recharge
CO2	Visualize the occurrence and movement of groundwater
CO3	Carry out surface and subsurface investigation to locate groundwater

Resources

Recommended Books	1. Engineering Hydrology by K. Subramanya, Tata McGraw Hill Pub., New Delhi.
Reference Books	1. Applied Hydrology by V.T.Chow et. al., McGraw Hill International, New York. 2. Elementary Hydrology by V.P.Singh Prentice Hall. 3. Groundwater by H.M.Raghunath, Wiley Easter Ltd. 4. Groundwater Hydrology by D.K. Todd, John Wiley and sons.
E-Resources	1. http://nptel.ac.in/courses/105107129/ 2. http://people.ucalgary.ca/~hayashi/geog415/lectures.htm

Sandip University

Neelam Vidya Vihar, Vill.: Sijoul. P.O. : Mailam, Dist.:Madhubani, Bihar -847235

Website : <http://www.sandipuniversity.edu.in>

Toll-Free No.- 1800-313-2714 Ph: 7549991044.

School: Engineering & Technology	Programme: B.Tech – Civil Engineering
Year:- Third Year	Semester:- V
Course:- Advanced Soil Mechanics	Course Code:- CE504T
Theory: 4 Hours/Week	Max. University Theory Examination:- 60 Marks
	Continuous Internal Assessment:- 40 Marks
Max. Time for Theory Exam:- 2.5 Hrs	Credit:- 4

Objectives:-

1	To introduce critical thinking in the analysis and design of geotechnical systems
2	To lay a firm theoretical background necessary in the design of geotechnical systems
3	To introduce the theory of stress path in the Geotechnical design

Unit Number	Details	Hours
1	Shallow Foundations:- Type of foundations shallow and deep. Bearing capacity of foundation on cohesion less and cohesive soils. General and local shear failures. Factors effecting B.C. Theories of bearing capacity - Prandle, Terzaghi, Balla, Skempton, Meyerh of and Hansan. I.S. code on B.c. Determination of bearing capacity. Limits of total and differential settlements. Plate load test.	8
2	Deep Foundation:- Pile foundation, Types of piles, estimation of individual and group capacity of piles in cohesion less and cohesive soils. Static and dynamic formulae. Pile load test, Settlement of pile group, Negative skin friction, under- reamed piles and their design. Piles under tension, inclined and lateral load Caissons. Well foundation. Equilibrium of wells. Analysis for stability tilts and shifts, remedial measures.	8
3	Soil Improvement Techniques : Compaction. Field and laboratory methods, Proctor compaction tests, Factors affecting compaction. Properties of soil affected by compaction. Various equipment for field compaction and their suitability. Field compaction control. Lift thickness. Soil stabilization:- Mechanical, Lime, Cement, Bitumen, Chemical, Thermal, Electrical stabilization and stabilization by grouting. Geo-synthetics, types, functions, materials and uses.	8

4	Soil Exploration and Foundations on Expansive and Collapsible soils:- Methods of soil exploration. Planning of exploration programme for buildings, highways and earth dams. Disturbed and undisturbed samples and samplers for collecting them. Characteristics of expansive and collapsible soils, their treatment, Construction techniques on expansive and collapsible soils. CNS layer	8
5	Sheet piles/Bulkheads and Machine foundation:- Classification of sheet piles/bulkheads. Cantilever and anchored sheet piles, Cofferdams, materials, types and applications. Modes of vibration. Mass-spring analogy, Natural frequency. Effect of vibration on soils. Vibration isolation. Criteria for design. Design of block foundation for impact type of machine	8
Total (Hrs)		40

Course Outcomes

Student Should able to :

CO1	Determine the appropriate type of soil shear strength to be used for analysis and design of geotechnical structures
CO2	Evaluate effects of submergence, partial draining boundaries, time-dependent loading and radial drainage on the consolidation properties of soil
CO3	Time-rates of consolidation of compressible soils for a variety of engineering problems

Resources

Recommended Books	1. Soil Mech. & Found. by Dr. B.C.Punmia- Laxmi Publications, Delhi. 2. Soil Mech. & Found. Engg. by S.K. Garg- Khanna Publishers, Delhi
Reference Books	1. Soil Mech. & Found. Engg. by Dr. K.R. Arora - Std. Publishers Delhi. 2. Modern Geotech Engg. by Dr. I Aram Singh - IBT Publishers, Delhi. 3. Geotech Engg. by C. Venkatramaiah - New Age International Publishers, Delhi 4. Soil Testing for Engg. by T.W. Lambe - John Wiley & Sons. Inc. 5. Relevant I.S. Codes
E-Resources	1. http://nptel.ac.in/downloads/105101001/ 2. http://nptel.ac.in/courses/105108069/

Sandip University

Neelam Vidya Vihar, Vill.: Sijoul. P.O. : Mailam, Dist.:Madhubani, Bihar -847235

Website : <http://www.sandipuniversity.edu.in>

Toll-Free No.- 1800-313-2714 Ph: 7549991044.

School: Engineering & Technology	Programme: B.Tech – Civil Engineering
Year:- Third Year	Semester:- V
Course:- Transportation Engineering-I	Course Code:- CE505T
Theory:- 3 Hours/Week	Max. University Theory Examination:- 60 Marks
	Continuous Internal Assessment:- 40 Marks
Max. Time for Theory Exam:- 2.5 Hrs	Credit:- 3

Objectives:-

1	The course relates to the fundamentals related to transportation.
2	The course moves on to highway, bituminous, drainage & airport etc.
3	The course explains in detail about the construction of airport & roadways.

Unit Number	Details	Hours
1	High way planning, Alignment & Geometric Design: Principles of highway planning, road planning in India and financing of roads, classification patterns. Requirements, Engg. Surveys for highway location.	8
2	Bituminous & Cement Concrete Payments: seal coat, tack coat, prime coat, wearing coats, grouted macadam, bituminous concrete specification, construction and maintenance. Advantages and disadvantages of rigid pavements	8
3	Low Cost Roads, Drainage of Roads, Traffic Engg. & Transportation Planning: Principles of stabilization, mechanical stabilization, requirements, advantages, disadvantages and uses, quality control, macadam roads-types, specifications.	8
4	Airport Planning, Runway & Taxiway: Airport site selection. air craft characteristic and their effects on runway alignments, wind rose diagrams, basic runway length and corrections, classification of airports. Geometrical elements: taxi ways and runways, pattern of runway capacity.	8
5	Airport, Obstructions, Lightning & Traffic control: Zoning regulations, approach area, approach surface-imaginary, conical and horizontal.	8
Total (Hrs)		40

Course Outcomes	
Student Should able to :	
CO1	Carry out preliminary surveying in the field of civil engineering applications such as structural, highway engineering
CO2	Undertake measurement and plotting in civil engineering
CO3	Use various conventional instruments involved in surveying with respect to utility and precision

Resources	
Recommended Books	<ol style="list-style-type: none"> 1. Highway Engineering by Gurucharan Singh 2. Laboratory Manual by Dr. S.K. Khanna 3. Airport Planning & Design by S.K. Khanna & M. G. arora 4. Highway Engineering by S.K Khanna & Justo
Reference Books	<ol style="list-style-type: none"> 1. Principles of Pavement Design by E.J. Yoder & M.W. Witzech 2. Highway Engineering by O’Fleherty 3. Highway Engineering by S.K. Khanna & C.E.G. Justo 4. Foresch, Charles “Airport Planning” 5. Horonjeff Robert “The Planning & Design of Airports” 6. Sharma & Sharma, Principles and Practice of Highway Engg. 7. Haung, Analysis and Design of Pavements 8. Relevant IRC & IS codes 9. Highway Engg. By Hews & Oglesby 10. Highway Material by Walker
E-Resources	<ol style="list-style-type: none"> 1. http://nptel.ac.in/downloads/105101087/ 2. http://nptel.ac.in/courses/105101087/2

Sandip University

Neelam Vidya Vihar, Vill.: Sijoul. P.O. : Mailam, Dist.:Madhubani, Bihar -847235

Website : <http://www.sandipuniversity.edu.in>

Toll-Free No.- 1800-313-2714 Ph: 7549991044.

School: Engineering & Technology	Programme: B.Tech – Civil Engineering
Year:- Third Year	Semester:- V
Course:-Transportation Engineering Lab	Course Code:- CE506P
Practical:- 3 Hrs/Week	Max. University Practical Examination:- 10 Marks
Max. Time for Exam:- 2 Hrs	Lab Continuous Internal Assessment:- 15 Marks TW :- 25 Marks
	Credit:- 1

Practical Objectives:-

1	Identify engineering properties of aggregate
2	Identify the grade & properties of bitumen

Sr. No.	Practical Description
1	Aggregate Crushing Value Test
2	Determination of aggregate impact value
3	Determination of Los Angeles Abrasion value
4	Determination of California Bearing Ratio values
5	Determination of penetration value of Bitumen
6	Determination of Viscosity of Bituminous Material
7	Determination of softening point of bituminous material
8	Determination of ductility of the bitumen
9	Determination of flash point and fire point of bituminous material
10	Determination of Bitumen content by centrifuge extractor
11	Determination of stripping value of road aggregate
12	Determination of Marshall stability value for Bituminous mix

Notes	
1	Each student should perform at least 8 experiments from the list of experiments.
2	The experiments from the regular practical syllabus will be performed
3	The regular attendance of students during the syllabus practical course will be monitored and marks will be given accordingly.
4	Minimum two tutorials must be conducted from the remaining list of experiments.

Practical/Oral/Presentation:

Practical/Oral/Presentation shall be conducted and assessed jointly by internal and external examiners. The performance in the Practical/Oral/Presentation examination shall be assessed by at least a pair of examiners appointed as examiners by the University.

Sandip University

Neelam Vidya Vihar, Vill.: Sijoul. P.O. : Mailam, Dist.:Madhubani, Bihar -847235

Website : <http://www.sandipuniversity.edu.in>

Toll-Free No.- 1800-313-2714 Ph: 7549991044.

School: Engineering & Technology	Programme: B.Tech – Civil Engineering
Year: Third Year	Semester –V
Course:- Reinforced Cement Concrete LAB	Course Code:- CE507P
Practical : 3 Hrs/Week	Max. University Practical Examination: 10 Marks
Max. Time for Exam.: 2 Hrs	Lab Continuous Internal Assessment:- 15 Marks TW :- 25 Marks
	Credit: 1

Practical Objectives:-

1	The student will be able to draw the beams, slabs, column, footing & staircase of the building.
2	The student will be able to understand the reinforcement details also.

Sr. No.	Practical Description
1	Drawing of various types of Beams and detailing of reinforcement.
2	Drawing of various types Columns & Footings.
3	Drawing of various types of Slabs.
4	Drawing of various types of Staircases.
5	Drawing of Portal Frame.
6	Two Hinge Arches.
7	Three Hinge Arches.
8	Suspension Cables.

Notes

1	Each student should perform at least 8 experiments from the list of experiments.
2	The experiments from the regular practical syllabus will be performed
3	The regular attendance of students during the syllabus practical course will be monitored and marks will be given accordingly.
4	Minimum two tutorials must be conducted from the remaining list of experiments.

Practical/Oral/Presentation:

Practical/Oral/Presentation shall be conducted and assessed jointly by internal and external examiners. The performance in the Practical/Oral/Presentation examination shall be assessed by at least a pair of examiners appointed as examiners by the University.

Sandip University

Neelam Vidya Vihar, Vill.: Sijoul. P.O. : Mailam, Dist.:Madhubani, Bihar -847235

Website : <http://www.sandipuniversity.edu.in>

Toll-Free No.- 1800-313-2714 Ph: 7549991044.

School: Engineering & Technology	Programme: B.Tech – Civil Engineering
Year: Third Year	Semester –V
Course:- Structural Analysis Lab	Course Code:- CE508P
Practical : 3 Hrs/Week	Max. University Practical Examination: 10 Marks
Max. Time for Exam.: 2 Hrs	Lab Continuous Internal Assessment:- 15 Marks TW :- 25 Marks
	Credit: 1

Practical Objectives:-

1	To operate modern surveying equipment and stationary levels
2	To assess which points are appropriate to survey for well defined topographic mapping

Sr. No.	Practical Description
1	To verify the Betti's law.
2	Study of a three hinged arch experimentally for a given set of loading and to compare the results with those obtained analytically.
3	To obtain experimentally the influence line diagram for horizontal thrust in a three hinged arch and to compare the same with the theoretical value.
4	To determine the flexural rigidity of a given beam.
5	To study the behavior of different type of struts.
6	To verify moment area theorem for slopes and deflection of a beams.
7	To find the deflection of a pin-connected truss and to verify the results by calculation and graphically.
8	To determine the carry over factors for beam with rigid connections.
9	To determine the rotational stiffness of a beam when far end is (a) fixed (b) pinned.
10	Determine experimentally the horizontal displacement of the roller end of a two hinged arch for a given set of a loading and to compare the results with those obtained analytically.

11	To obtain experimentally the influence line diagram for horizontal thrust in a two hinged arch and to compare the same with the theoretical value
----	---

Notes	
1	Each student should perform at least 8 experiments from the list of experiments.
2	The experiments from the regular practical syllabus will be performed
3	The regular attendance of students during the syllabus practical course will be monitored and marks will be given accordingly.
4	Minimum two tutorials must be conducted from the remaining list of experiments.

Practical/Oral/Presentation:

Practical/Oral/Presentation shall be conducted and assessed jointly by internal and external examiners. The performance in the Practical/Oral/Presentation examination shall be assessed by at least a pair of examiners appointed as examiners by the University.