INTEGRAL UNIVERSITY
LUCKNOW

SYLLABUS

OF

II Year

(IV Semester)

B.TECH (CBCS)

CIVIL ENGINEERIG

STUDY & EVALUATION SCHEME

Branch: Civil Engineering

INTEGRAL UNIVERSITY
STUDY & EVALUATION SCHEME
Branch: Civil Engineering
SYLLABUS REVISED-2016
w.e.f. July-2016

Year II, Semester IV

S. No	Course Category	Course Code	Subject	Periods				Evaluation Scheme				Subject Total
								Sessional (CA)			Exam ESE	
				L	T	P	C	CT	TA	TOTAL		
THEORY SUBJECTS												
1	ESA	MT202	Computer Based Numerical and Statistical Techniques	3	1	0	4	25	15	40	60	100
2	DC	CE209	Hydraulic & Hydraulic Machines	3	1	0	4	25	15	40	60	100
3	DC	CE210	Advance Surveying	3	1	0	4	25	15	40	60	100
4	DC	CE211	Concrete Technology	3	1	0	4	25	15	40	60	100
5	DC	CE212	Structural Analysis-I	3	1	0	4	25	15	40	60	100
6	ESA	CS203/ ES202	Cyber Law & Information Security/ Disaster Management	2	1	0	3	25	15	40	60	100
7	HM	BM226	Human Values & Professional Ethics	3	0	0	0	_	_	_	50	50
PRACTICAL / DRAWING/DESIGN												
8	ESA	MT209	Numerical Techniques Lab	0	0	2	1	30	30	60	40	100
9	DC	CE213	Hydraulic & Hydraulic Machines Lab	0	0	2	1	30	30	60	40	100
10	DC	CE214	Advance Survey Field Work	0	0	2	1	30	30	60	40	100
11	DC	CE215	Concrete Technology Lab	0	0	2	1	30	30	60	40	100
TOTAL				**20**	**6**	**8**	**27**					**1000**

L – Lecture **T** – Tutorial **P** – Practical **C** – Credits **CT** – Class Test **TA** – Teacher Assessment

Sessional Total (CA) = Class Test + Teacher Assessment

Subject Total = Sessional Total (CA) + End Semester Examination (ESE)

BS – Basic Sciences
HM – Humanities
DE – Departmental Elective
DC – Departmental Core
OE – Open Elective
ESA – Engineering Sciences & Arts (Foundation Course & Engineering Courses)

Hydraulic & Hydraulic Machines
CE 209

L	T	P
3	1	0

UNIT – I

Introduction: Difference between open channel flow and pipe flow, geometrical parameters of a channel, continuity equation. **[3]**

Uniform Flow: Chezy's and Manning's Equations for uniform flow in open channel, velocity distribution, most efficient channel section. **[5]**

UNIT – II

Energy and Momentum Principles: Critical depth, concept of specific energy and specific force, application of specific energy principle for interpretation of open channel phenomenon, flow through vertical and horizontal contractions. **[8]**

UNIT – III

Non-uniform flow in open channel: Equation of gradually varied flow and its limitations, flow classification and surface profiles, integration of varied flow equation by analytical, graphical and numerical methods, flow in curved channel. **[8]**

UNIT – IV

Hydraulic Jump, Surges, Water Waves: Classical hydraulic Jump, evaluation of the jump elements in rectangular and non-rectangular channels on horizontal and sloping beds, equation of motion for unsteady flow, open channel surge, celerity of the gravity wave, deep and shallow water waves. **[5]**

Hydraulic Pumps: Rotodymanic pumps, basic equations, axial and mixed flow pumps, cavitation in pumps, characteristic curves. **[3]**

UNIT – V

Hydraulic Turbines: Introduction, rotodynamic machines, Pelton turbine, equation for jet and roter size, efficiency, spear valve, reaction turbines, Francis and Kaplan type, head on reaction turbine, basic equation for type, head on reaction turbine, basic equation for rotodynamic machines, similarity law and specified speed, cavitations, characteristic curves. **[8]**

REFERENCES:

1. Grade,R.J and A.G Mirajgaoker, 'Engineering Fluid Mechanics (including hydraulic Machines), Second Edition, Nem Chand and Bros., Roorkee,1983.
2. Grade,R.J 'Fluid Mechanics through problems.', Wiley Eastern Limited, New Delhi, 1989
3. Streeter, V.L and Wylie E.B," Fluid Mechanics", McGraw Hill, NewYork 8th Edition.
4. Asawa,G.L ," Experimental Fluid Mechanics", Vol.1 Nem Chand and Bros.,Roorkee.
5. Ranga Ram, R.G, Flow through Open channels", TMH.
6. "Hydraulics and Fluid Mechanics" by Modi and Seth

ADVANCE SURVEYING
CE-210

L	T	P
3	1	0

UNIT – I

Plane Table Surveys: Principles, advantages and disadvantages, plane table equipment, Use of Telescopic Alidade and Indian Patterns Tangent Clinometer, different methods of plane table surveying, resection- two and three point problems, Field work in plane table surveying and contouring. **[8]**

UNIT – II

Trilateration and Triangulation: Principle of Trilateration, EDM instrument and their uses, reduction of observation, principle and classification of Triangulation system, Triangulation chains, strength of figures, station marks and signals, satellite station, intersected and resected points, Field work- Reconnaissance, intervisibility of station, angular measurement, base line measurement and its extension, adjustment of field observation and computation of coordinates. **[8]**

UNIT – III

Adjustment Computations: Weighting of observations, treatment of random errors, probability equation, normal law of errors, most probable value and measures of precision, propagation of errors and variances, most probable value, principle of least square, observations and correlative normal equations, adjustment of triangulation figures and level nets.

[8]

UNIT – IV

Curves: Classification of curves, elements of circular, transition and vertical curves, theory and methods of setting out simple, transition and vertical curves, special field problem.

[8]

UNIT – V

Project Surveys: General requirements and specifications for engineering project surveys, Reconnaissance's, preliminary and locations surveys for highways, railways and canals. Correlation of surface and underground surveys in case of culverts, bridges and tunnels.Principles and practice of hydrographic surveys, Layout of culverts, canals, bridges and buildings. **[5]**

Field Astronomy: Astronomical terms, coordinate systems, spherical trigonometry, Astronomical Triangle, relationship between coordinates.

[3]

References

1. Agor, R., “Surveying”, vol. II & III Khanna Publications, Delhi, 1995
2. Arora, K. R., “Surveying”, vol. II & III Standard Publishing House, Delhi, 1993
3. Bannister, A. and Baker, R., “Solving Problems in surveying”. Longman Scientific Technical, U.K,
1994
4. Kennie, T.J.M. and Petrie,G., “Engineering Surveying Technology”, Blackie & Sons Ltd., London, 1990.
5. Punmia, B.C., “Surveying”, vol. II & III , Laxmi Publications, New Delhi, 1996

CONCRETE TECHNOLOGY
CE211

L	T	P
3	1	0

UNIT – I

Concrete as a Building Material and its Gradients:

Cement: Manufacture of Portland cement, its composition. Hydration of cement, physical and chemical properties, concept of strength development, Gel space ratio, power's Law, Gel structure **[4]**

Testing of cement for general physical and chemical properties as per BIS specifications. **[4]**

UNIT – II

Different types of cement such as Slag cement, Portland Pozzolana cement and high Alumina cement, their characteristics, composition, use and properties, aggregates and testing of aggregates, classification source, physical and mechanical properties. Testing of aggregates for physical and mechanical properties **[8]**

UNIT – III

Tests on fresh concrete and Hardened concrete: Proportioning of concrete, operation involved in concrete production. Workability, factors affecting workability, measurement of workability, problem of segregation, bleeding and Laitance, NDT(Rebound hammer, PUNDIT) methods [**8]**

UNIT – IV

Concrete Mix Design: Principle and methods, Statistical quality control, concrete rheology, maturity concept, IS code method, ACI code method **[6]**

Admixture in concrete: Introduction, functions, classification, and IS specification. **[2]**

UNIT – V

Special Concrete: Light weight concrete. High density concrete. Sulphar Impregnated concrete, polymer concrete, lime concrete, constituents and uses. High Strength Concrete, Fibre Reinforced Concrete **[8]**

References:

1. Rai Mohan and Jai Singh M.P. "Advances in Building Materials and Construction" ,CBRI , Roorkee.
2. Civil Engineering materials, "Technical Teachers" Training Institute, Chandigarh, Tata McGraw Hill Publishing Company Ltd. ,New Delhi.
3. Spence RJS and Cook DJ- "Building Materials in Developing Countries" , John Willey and sons.
4. Shetty M.S, "Concrete Technology, Theory and practices", S. Chand & Company Ltd., New Delhi.
5. Neville A.M., properties of Concrete, pitman publishing Company,
6. Gambhir M.L., "Concrete Technology", - Tata McGraw Hill publishing Company Ltd., New Delhi.,
7. Gambhir M.L, "Concrete Manual ", Dhanpal Rai & Sons, Delhi.
8. SP: 23, BIS Publication.

STRUCTURAL ANALYSIS-I
CE-212

L	T	P
3	1	0

Unit –I:

Classification of Structures, Types of structural framework, stress resultants, degrees of freedom per node, Static and Kinematic determinacy for beam trusses and building frames, Type of supports. **[03]**

Classification of Pin jointed determinate trusses, Analysis of determinate plane and space trusses (compound and complex). Method of substitution and method of Tension co-efficient. **[05]**

Unit – II

Rolling loads, influence lines for determinate beams and trusses, Absolute maximum bending moment and shear force, Muller-Breslau's principal & its applications for determinate structures. **[08]**

Unit – III

Arches, Types of Arches, Analysis of Arches, Linear arch, Eddy's theorem, Analysis of three hinged arch, spandrel braced arch, moving load & influence lines diagram for three hinged arches. **[08]**

Unit – IV

Strain Energy of deformable systems, Maxwell's reciprocal & Betti's theorem, Castigliano's first theorem, unit load methods for determinate structures. **[08]**

Unit – V

Unsymmetrical bending, location of neutral axis, computation of stresses and deflection, Shear Centre and its location for common structural section. **[05]**
Bending of curved bars in plane of bending, stresses in bars of small & large initial curvatures. **[03]**

References

1. Wilbur and Norris, "Elementary Structural Analysis", Tata McGraw Hill.
2. Reddy, C.S., "Basic Structural Analysis", Tata McGraw Hill.
3. Jain, O.P. and Jain, B.K., "Theory & Analysis of Structures". Vol. I & II Nem Chand.
4. Coates, R.C., Coutie, M.G. & Kong, F.K., "Structural Analysis", English Language Book Society & Nelson, 1980.
5. Jain, A.K., "Advanced Structural Analysis", Nem Chand & Bors, Roorkee, India 1996.
6. Jain O.P & Arya A.S., "Theory of Structures" Vol. II. New Chand Bors., Roorkee 1976.
7. Kinney, J.S., "Indeterminate Structural Analysis " McGraw Hill Book Company, 1957.
8. Theory of structures Vol . II Vazirani and Ratwani

HYDRAULICS AND HYDRAULIC MACHINE LAB
CE 213

L	T	P
0	0	2

1. To determine the Manning's coefficient of roughness 'n' for the bed of a given flume.
2. To study the velocity distribution in an open channel and to determine the energy and momentum correction factors.
3. To study the flow characteristics over a hump placed in an open channel.
4. To study the flow through a horizontal contraction in a rectangular channel.
5. To calibrate a sharp-crested rectangular and triangular weirs
6. To calibrate a broad-crested weir and study the pressure distribution on the upstream face of the weir.
7. To calibrate a Venturiflume
8. To study the characteristics of free hydraulic jump.
9. To study the flow over a free overfall in an open channel and to determine the end depth.
10. To study rotodynamic pumps and their characteristics.
11. To study rotodynamic turbines and their characteristics

ADVANCE SURVEY FIELD WORK

CE214

L	T	P
0	0	2

1. Setting up the plane table and plotting the given area by radiation method.
2. Setting up the plane table and plotting the given area by intersection method.
3. Traversing of the given area by plane table.
4. To solve three point problem by mechanical method.
5. To solve three point problem by graphical method.
6. To solve two point problem.
7. To carry out Triangulation and Trilateration of a given area
8. Layout a simple circular curve on the ground using tape by perpendicular offset method.
9. Layout a simple circular curve on the ground using tape by radial offset method.
10. Layout a simple circular curve on the ground using two theodolite method.
11. Layout a building on the ground.
12. To plot the details as well as contours (topographic mapping) of area .
13. Demonstration and working of Electronic Total Survey Station.

CONCRETE TECHNOLOGY LAB

CE215

L	T	P
0	0	2

I. Cement

1. Normal Consistency of cement.
2. Initial & final setting time of cement
3. Compressive strength of cement
4. Fineness of cement by air permeability method.
5. Tensile strength

II. Coarse Aggregate

6. Water absorption of aggregate
7. Sieve Analysis of Aggregate
8. Specific gravity & bulk density
9. Grading of aggregates.

III Fine Aggregate:

10. Sieve analysis of sand
11. Silt content of sand
12. Bulking of sand

IV Test on Fresh Concrete:

13. Slump Test
14. Compaction factor test
15. Vee Bee Consistometer test

V Tests on Hardened Concrete:

16. Compressive Strength test
17. Flexural Strength test
18. Non-Destructive Test(Rebound Hammer and PUNDIT)