

Title of Subject	:	<u>Applied Hydraulics (Th + Pr)</u>	
Code	:	CE241	
Discipline	:	Civil Engineering (4 th Semester)	
Effective	:	19-Batch and onwards	
Pre-requisite	:	Fluid Mechanics and Hydraulics	Co-requisite: Nil
Assessment	:	Theory: 20% Sessional, 80% Written Semester Examination (20% Mid, 60% Final)	
		Practical: 40% Sessional, 60% Final Semester Examination	
Credit Hours	:	03 + 01	Marks : 100 + 50
Minimum Contact Hours	:	45 + 45	

Course Learning Outcomes (CLOs):

Upon successful completion of the course, the student will be able to:

CLO	Description	Taxonomy Level	PLO
1	ANALYZE states of flow with respect to water surface and channel bed profiles due to sediment transport in open channels.	C4	2
2	DESIGN effective solution (flow computation) of pipes looping, branching, network and water hammer problems.	C6	3
3	MANAGE experimentally the open channel, pipe network flows and investigate technically the usage of hydraulic machines in daily life and their effect on environment.	P5	4

Course outline:

- **Gradually Varied Flow in Open Channels**

Dynamic equation of gradually varied flow, Surface profiles, Computation of backwater curve length and surface profiles.

- **Sediment Transport in Open Channels**

Importance of sediment transport, Bed load and suspended load, Threshold motion of the sediment, Use of different empirical methods/formulae to estimate sediment load in ppm, Open channel bottom deformation (theory and practical aspects).

- **Waterpower Development**

Hydroelectric power, Important terms and definitions and principal components of a hydroelectric scheme, Classification of hydel plants, Runoff plants, Storage plants, Pumped storage plants, Tidal plants, Low head, medium head and high head schemes.

- **Flow in Pipes**

Flow through simple pipes, Compound pipes, Pipes in series and parallel, Looping and branching pipes, Analysis of network of pipes and water hammer.

- **Steady Incompressible Flow in Pressure Conduits**

Major and minor losses, Reynold's number and its significance, Viscous flow through circular pipes, Turbulent flow through pipes, Universal velocity distribution and Prandtil's mixing length theory.

- **Reaction and Centrifugal Turbine**

Types, Construction features, Operations, Specific speed.

- **Pumps:**

Centrifugal pumps their classification, Cavitation, Draft tube, Construction features and operation and specific speed, Reciprocating pumps their classifications (single acting and double acting pumps), Acceleration head, Maximum suction lift, Use of air vessels, Specific speed.

- **Introduction/use of the subject related software's.**

Practical Work to be carried out:

1. To determine the coefficient of weir for a broad –crested weir.
2. To determine the coefficient of weir for a Sharp –crested weir.
3. To determine the coefficient of discharge for an Ogee weir.
4. To determine the friction factor of a pipe by using fluid friction apparatus.
5. To determine the friction factor of a slanted seat valve using fluid friction apparatus.
6. To determine the friction factor of a socket shut-off gate valve using fluid friction apparatus.
7. To determine minor losses due to a pipe bend using fluid friction apparatus.
8. To determine minor losses due to a 90° elbow.
9. To determine minor losses due to a 45° elbow using fluid friction apparatus.
10. To determine minor losses due to gradual enlargement and constriction.
11. To determine minor losses due to Line and Branched flow at 90° Tee.
12. To determine minor losses due to a sharp 90° elbow.
13. To determine the loss coefficient of a bent pipe using Losses in pipes & bends apparatus.
14. To determine the real fluid flow using Laminar flow analysis table.
15. To perform an open-ended lab.

Recommended Books:

- Open Channel Hydraulics, Ven Te Chow, International Students Edition McGraw Hill Book Company
- Irrigation and Waterpower Engineering, Dr. B. C. Punmia and Pande B. B. Lal, Standard Publishers, Delhi, Latest Edition
- Applied Fluid Mechanics, Robert L. Mott and Joseph A. Untener, Pearson Education Inc, Latest Edition
- A Textbook of Fluid Mechanics and Hydraulic Machines, Er. R.K. Rajput. S. Chand & Company Ltd. Latest Edition
- A Textbook of Hydraulics, Fluid Mechanics and Hydraulic Machines, R.S. Khurmi, S. Chand & Company Ltd. Latest Edition

Approval:

Board of Studies:

Resolution No. 32.3

Dated: 03-10-2020

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Dated: 07-10-2020

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Resolution No. 98.7(ii)

Dated: 22-10-2020

Title of Subject	:	<u>Surveying-II (Th + Pr)</u>
Code	:	CE202
Discipline	:	Civil Engineering (4 th Semester)
Effective	:	19-Batch and onwards
Pre-requisite	:	Surveying-I Co-requisite: Nil -
Assessment	:	Theory:20% Sessional, 80% Written Semester Examination (20% Mid,60% Final) Practical: 40% Sessional, 60% Final Examination
Credit Hours	:	03 + 01 Marks : 100 + 50
Minimum Contact Hours:	:	45 + 45

Course Learning Outcomes (CLOs):

Upon successful completion of the course, the student will be able to:

CLO	Description	Taxonomy Level	PLO
1	APPLY different survey techniques for indirect linear measurements in horizontal and vertical plane, and measurements in water bodies and larger areas.	C3	2
2	USE data for setting out of curves on highways and setting out works for different structures.	C3	3
3	CONDUCT the various survey tasks in groups.	P4	5

Course outlines:

- **Theodolite Traversing**
Adjustment of transit theodolite, traversing with theodolite, Traverse computations, Closing error and its adjustment, Computation of Omitted measurements.
- **Tachometric Surveying**
Tachometry, System of tachometry, Principles and field procedures of tachometry, Use of tachometry for traversing.
- **Trigonometric Levelling**
Determination of Reduced levels of elevated objects when the base is accessible and inaccessible.
- **Highway Curves**
Introduction to curves, Types of curves, Simple circular curves, Compound curves, reverse curves, transition curves, vertical curves, Computation and setting out of curves by different methods.
- **Hydrographic Surveying**

Hydrographic Surveying and its applications, sounding and instruments used in soundings, Shore line survey and location of soundings.

- **Triangulation**
Classification of triangulation, Operations in triangulation, Selection of stations, Base line measurement.
- **Photogrammetry**
Photographic surveying, Principles of aerial and terrestrial Photogrammetry, Aerial surveying.
- **Setting out works**
Setting out the buildings, roads, culverts, bridges.
- **Remote Sensing, GPS and GIS**
Introduction to remote sensing, Use of GPS and GIS in the field of Survey.

Practical work to be carried out:

1. Introduction to Digital Theodolite and its temporary adjustment.
2. To determine the horizontal angles, vertical angles and bearing of lines.
3. To determine the latitudes and departures of lines and to calculate the Coordinates of Points.
4. To determine the Area of a Closed Traverse by Coordinates method.
5. To determine the horizontal distances by Tacheometric Surveying when the line of sight is horizontal.
6. To determine the horizontal distances and Vertical distances by Tacheometric Surveying when the line of sight is Inclined.
7. Orientation of total station and its adjustment.
8. To determine the independent coordinates of an existing building. Theodolite Traversing.
9. To draw the Plan of an existing building by plotting the Coordinates using Auto CAD software / Microsoft Excel.
10. To set out the Simple Circular Curve by deflection Angle method.
11. Measuring the Heights of buildings using Trigonometric Leveling.
12. To determine the R.L at top of elevated object by Trigonometric Leveling.
13. Introduction to GPS, Angular coordinates system, Base camp software and Google earth.
14. To record the World Geographic Coordinates System (WGS) / Angular Coordinates of points in the field by GPS.
15. To perform an open-ended lab.

Recommended Books:

- Plane Surveying, Dr A M Chandra, Latest Edition
- Surveying Vol: (I + II), B.C Punmia, Latest Edition
- Surveying Practice, Jerry. A. Nothanson and Philip Kissam, Latest Edition

Approval:

Board of Studies:
Board of Faculty:
Academic Council:

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Dated: 03-10-2020
Dated: 07-10-2020
Dated: 22-10-2020

Title of Subject	: <u>Construction Engineering (Th)</u>	
Code	: CE231	
Discipline	: Civil Engineering (4 th Semester)	
Effective	: 19-Batch and onwards	
Pre-requisite	: Civil Engineering Materials	Co-requisite: Nil
Assessment	: 20% Sessional, 80% Written Semester Examination (20% Mid, 60% Final)	
Credit Hours	: 03 + 00	Marks : 100 + 00
Minimum Contact Hours:	45 + 00	

Course Learning Outcomes (CLOs):

Upon successful completion of the course, the student will be able to:

CLO	Description	Taxonomy Level	PLO
1	DISCUSS different construction methodologies being used in construction industry.	C2	1
2	APPLY acquired knowledge to supervise different components of building works.	C3	2

Course outline:

1. Introduction

An overview of constructional aspects for different types of engineering projects, e.g. building retaining structures, bridges, pavements and special structures, General consideration common to all projects with special reference to building structures.

2. Layout Techniques

Building layout, De-watering Techniques, shoring to prevent excavations, Scaffolding techniques and their purposes, Introduction to earth walls, Use of bentonite etc., Form works for super structures, Types and costs involved (in construction), Thermal insulation of building and water proofing technique and materials, Use of admixtures to prevent efflorescence of brick and brick works, Dampness, Wall-dampness etc, Construction techniques etc.

3. Constructional Methodologies

Floor its types and construction, Floor finishing, Roofs and their construction types and Roofing Systems-finishes and waterproofing, Walls and their construction and types etc, Non-structural elements especially wood-construction and wood framing, Masonry, Stone-masonry, Brick works with sufficient details related to constructional aspects, Doors, and windows allied services, e.g. Acoustics and maintenance of buildings etc.

Recommended Books:

1. Building Construction, A. Kumar, Mir-Publisher Karachi, Latest Edition
2. Building Construction, S.K Sharma, S. Chand & Company New Delhi, Latest Edition.
3. Building Construction, Thomson J.F, Butter worth London, Latest Edition
4. Building Construction, Whitney C. Huntington, National Book Foundation Pakistan, Latest Edition

Approval:

Board of Studies:	Resolution No. 32.3	Dated: 03-10-2020
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Academic Council:	Resolution No. 98.7(ii)	Dated: 22-10-2020

Title of Subject	:	<u>Mechanics of Solids -II (Th)</u>	
Code	:	CE251	
Discipline	:	Civil Engineering (4 th Semester)	
Effective	:	20-Batch and onwards	
Pre-requisite	:	Strength of Materials-I	Co-requisite: Nil
Assessment	:	20% Sessional, 80% Written Semester Examination (20% Mid, 60% Final)	
Credit Hours	:	03 + 00	Marks : 100+ 00
Minimum Contact Hours:		45 + 00	

Course Learning Outcomes (CLOs):

Upon successful completion of the course, the student will be able to:

CLO	Description	Taxonomy Level	PLO
1	UNDERSTAND plane stress and strain in the members subjected to various loading conditions.	C2	1
2	ANALYZE the horizontal shear stress/force in thin walled sections and circular sections within the elastic limits; and describe unsymmetrical bending, curved beams, theories of failure, creep, fatigue and inelastic materials.	C4	2

Course outline:

- **Stress and Strain during General Loadings**

Analysis of plane stresses, including principal stresses (Analytically and graphically), Principal stresses in beams. Analysis of plane strain (Analytically and graphically), Strain rosette, Stresses due to combined loading (bending and torsion).

- **Horizontal Shear Stress/Force**

Horizontal shear stresses in beams, Stress in built-up beams, Shear flow and shear centre.

- **General Topics**

Unsymmetrical bending, Analysis of curved beams, Theories of failure, Creep and fatigue fracture, Introduction to inelastic materials, limit torque, limit moment, position of neutral axis and residual stresses.

Recommended Books:

- Strength of Materials, F.L Singer, Harper & Row Publishers New York, Latest Edition
- Elements of Strength of Materials, S. Timoshenko & D.H Young, D Van Nostrand Company Inc. Princeton, New Jersey, Latest Edition
- Strength of Materials, R. L Ryder, Macmillan Education Limited, Latest Edition

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Dated: 30-11-2021
Dated: 09-12-2021
Dated:

Title of Subject	:	<u>Architecture and Town Planning (Th)</u>	
Code	:	CE246	
Discipline	:	Civil Engineering (4 th Semester)	
Effective	:	19-Batch and onwards	
Pre-requisite	:	Nil	Co-requisite: Nil
Assessment	:	20% Sessional, 80% Written Semester Examination (20% Mid, 60% Final)	
Credit Hours	:	02 + 00	Marks : 50 + 00
Minimum Contact Hours:		30 + 00	

Course Learning Outcomes (CLOs):

Upon successful completion of the course, the student will be able to:

CLO	Description	Taxonomy Level	PLO
1	EXPLAIN concepts of Architecture and its implications on Engineering and Design.	C2	1
2	APPLY the principles of town planning in the development of modern cities and towns based on best practices and guidelines.	C3	3

Course outline:

1. Architecture

Historical Development, General introduction to history of architecture, Emergence/Development of Islamic Architecture, Geographical, climatic, religious, social and historical influences, Architectural beauty.

2. Qualities, Factors and Use of Materials

Strength, Vitality, Grade, Breadth and scale, Proportion, Bolour and balance, Stone, Wood, Metals, Concrete, Composites, Ceramics.

3. Architectural Aspects of Building Planning

Walls and their construction, Openings and their position, Character and shape, Roofs and their development and employment, Columns and their position, Form and decoration, Moulding and their form decoration, Wind orientation of buildings, Energy efficient materials and thermal insulation, Modern Architecture and use of advance materials, Ornament as applied to any buildings.

4. Town Planning

Definitions, Trends in Urban growth, Objectives of town planning, Modern planning in Pakistan and abroad.

5. Preliminary Studies

Study of natural resources, Economic resources, Legal and administrative problems, Civic surveys, Preparation of relevant maps.

6. Land Use Patterns, Street Patterns

Various theories of land use pattern, Location of Parks and recreation facilities, Zoning and its aspects, Public and semi-public buildings, Civic centres, Commercial centres, Local shopping centres, Public schools, Industry & residential areas, Layout of street, Road crossing & lighting, Community planning.

7. City Extensions and Urban Planning

Sub Urban development, Neighbourhood Units, Issues related to inner city urban design and emergence/upgradation of squatter settlements, Satellite Towns and Garden City.

Recommended Books:

1. A History of Architecture, Dan Cruickshank, Sir Banister Fletcher's Architectural Press; Latest Edition
2. Origins of Modern Town Planning, Leonard Benevolo; MIT Press, Latest Edition
3. Town Planning in Practice, Sir Rymond Unwin, FQ Legacy Books, Latest Edition

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