

Liverpool John Moores University

Title: HYDRAULIC PRINCIPLES AND APPLICATIONS
Status: Definitive
Code: **5105BEHN** (118166)
Version Start Date: 01-08-2016

Owning School/Faculty: Civil Engineering
Teaching School/Faculty: Civil Engineering

Team	Leader
Clare Harris	Y
Alan Jones	

Academic Level: FHEQ5 **Credit Value:** 24 **Total Delivered Hours:** 89
Total Learning Hours: 240 **Private Study:** 151

Delivery Options

Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	48
Practical	15
Tutorial	24

Grading Basis: BTEC

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Report	AS1		10	
Presentation	AS2		20	
Exam	AS3		70	2

Aims

To provide learners an opportunity to develop the skills required to solve hydrostatic and dynamic fluid flow problems.

To demonstrate and explore key hydraulic phenomena through experimentation.

Learning Outcomes

After completing the module the student should be able to:

- 1 Identify the properties and nature of a fluid.
- 2 Apply the theory of hydrostatic pressure to solve engineering hydrostatic problems.
- 3 Evaluate the energy possessed by a fluid in motion.
- 4 Analyse the flow of water in pipelines and undertake the design of simple pipe networks.
- 5 Identify and select appropriate pump characteristics to suit a given hydraulic situation.
- 6 Undertake hydraulic experimental procedures.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Report	6				
Presentation	1				
Exam	2	3	4	5	

Outline Syllabus

Properties of fluids: density; viscosity; surface tension; compressibility.

Pressure measuring devices: piezometer; manometer (used to measure fluid pressure and pressure differentials).

Hydrostatic forces: magnitude and location of hydrostatic forces on submerged bodies (plane, vertical and inclined surfaces).

Flow classification: laminar and turbulent flow; uniform and non-uniform flow; steady and unsteady flow.

Analytical principles: continuity; conservation of energy (Bernoulli's equation).

Closed conduit flow: frictional loss in pipes and pipe systems; minor head losses; friction factor; gravity pipelines; pipe network analysis.

Pump selection: pump performance and characteristic curves; pump selection; pumps in series and parallel.

Learning Activities

Lectures, tutorials, laboratory practicals.

Notes

This module focuses on the forces in fluids, predominately water, both at rest and in motion and examines the behaviour of fluids in civil engineering applications.