

Summary Information

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| Module Code | 4305CIV |
| Formal Module Title | Hydraulics |
| Owning School | Civil Engineering and Built Environment |
| Career | Undergraduate |
| Credits | 10 |
| Academic level | FHEQ Level 4 |
| Grading Schema | 40 |

Teaching Responsibility

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| LJMU Schools involved in Delivery |
| Civil Engineering and Built Environment |

Learning Methods

| Learning Method Type | Hours |
|----------------------|-------|
| Lecture | 22 |
| Practical | 6 |
| Tutorial | 11 |

Module Offering(s)

| Display Name | Location | Start Month | Duration Number Duration Unit |
|--------------|----------|-------------|-------------------------------|
| SEP-CTY | CTY | September | 12 Weeks |

Aims and Outcomes

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| Aims | To introduce fundamental fluid properties and then consolidate students' knowledge to the concepts, theory and application of fluid mechanics and establish their relevance in civil engineering. To demonstrate and explore key hydraulic phenomena through experimentation and e-laboratory activities. To introduce key principles of the analysis of pipelines for fluid transport. |
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After completing the module the student should be able to:

Learning Outcomes

| Code | Number | Description |
|------|--------|--|
| MLO1 | 1 | Apply knowledge and understanding of hydrostatics and applications to floating and submerged bodies. |
| MLO2 | 2 | Identify the properties and nature of a fluid and evaluate the forces associated with static and dynamic fluids. |
| MLO3 | 3 | Analyse the flow of water in simple pipeline systems and apply the concepts of mass conservation and Bernoulli's equation to one-dimensional flow. |
| MLO4 | 4 | Perform laboratory experiments and present appropriate findings of experimental and e-activities. |

Module Content

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| Outline Syllabus | Properties of fluids: density, viscosity, surface tension, compressibility. Hydrostatic pressure: static pressure and head, Pascal's Law, measurement of fluid pressure and pressure differentials, centre of pressure on submerged plane surfaces both inclined and vertical. Fluid dynamics: classification of flow, continuity equation, energy and momentum of a fluid, Bernoulli's equation for frictionless flow, flow measurement devices, energy losses in pipelines, gravity pipelines, Reynold's number and pipe flow problems. |
| Module Overview | |
| Additional Information | The module provides students with an introduction to the inherent properties of fluids, predominantly water, both at rest and in motion and examines the behaviour of fluids in civil engineering applications. The lectures will provide the structure for learning while the laboratory activities / e-laboratory activities will foster the development of practical understanding and the acquisition of knowledge, through applied learning. The content of the module will encourage students to combine knowledge and mathematical skills to solve engineering problems. |

Assessments

| Assignment Category | Assessment Name | Weight | Exam/Test Length (hours) | Module Learning Outcome Mapping |
|---------------------|-----------------|--------|--------------------------|---------------------------------|
| Portfolio | Portfolio | 100 | 0 | MLO1, MLO2, MLO3, MLO4 |

Module Contacts

Module Leader

| Contact Name | Applies to all offerings | Offerings |
|--------------|--------------------------|-----------|
| Clare Harris | Yes | N/A |

Partner Module Team

| Contact Name | Applies to all offerings | Offerings |
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