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|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module Title:</b>                                                                                                | Fluid Mechanics 2                                                                                                                   |
| <b>Language of Instruction:</b>                                                                                     | English                                                                                                                             |
| <b>Credits:</b>                                                                                                     | 5                                                                                                                                   |
| <b>NFQ Level:</b>                                                                                                   | 7                                                                                                                                   |
| <b>Module Delivered In</b>                                                                                          | <a href="#">2 programme(s)</a>                                                                                                      |
| <b>Module Aim:</b>                                                                                                  | To provide students with an understanding of the behaviour of fluids in engineering systems and processes.                          |
| <b>Learning Outcomes</b>                                                                                            |                                                                                                                                     |
| <i>On successful completion of this module the learner should be able to:</i>                                       |                                                                                                                                     |
| LO1                                                                                                                 | Analyse the types and characteristics of flow within a pipe.                                                                        |
| LO2                                                                                                                 | Apply simplified fluid dynamic models to representative systems in order to determine the steady state performance of such systems. |
| LO3                                                                                                                 | Analyse the performance of pumps and fans in terms of the systems in which they are operating.                                      |
| LO4                                                                                                                 | Design pipe and duct networks for the distribution of liquids and air.                                                              |
| LO5                                                                                                                 | Quantify by calculation and experimental measurement the characteristics of fluid dynamic processes.                                |
| <b>Pre-requisite learning</b>                                                                                       |                                                                                                                                     |
| <b>Module Recommendations</b>                                                                                       |                                                                                                                                     |
| <i>This is prior learning (or a practical skill) that is recommended before enrolment in this module.</i>           |                                                                                                                                     |
| No recommendations listed                                                                                           |                                                                                                                                     |
| <b>Incompatible Modules</b>                                                                                         |                                                                                                                                     |
| <i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module.</i> |                                                                                                                                     |
| No incompatible modules listed                                                                                      |                                                                                                                                     |
| <b>Co-requisite Modules</b>                                                                                         |                                                                                                                                     |
| No Co-requisite modules listed                                                                                      |                                                                                                                                     |
| <b>Requirements</b>                                                                                                 |                                                                                                                                     |
| <i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.</i>  |                                                                                                                                     |
| No requirements listed                                                                                              |                                                                                                                                     |

**Module Content & Assessment**
**Indicative Content**
**Fluid Dynamics - Fluid Friction**

Pressure drops/Head Losses, Primary losses, Secondary losses, Equivalent lengths, System characteristics.

**Centrifugal pumps & fans**

Pump/Fan Characteristics & performance, Pump/Fan selection, Series & Parallel Pumping.

**Analysis of pipe and conduit systems**

Pressure drop in non circular ducts, Duct design methodologies.

**Differential analysis of fluid flow.**

Continuity equation, Momentum equation, Navier–Stokes equations, Introduction to Computational Fluid Dynamics.

**Assessment Breakdown**

|                                  | %      |
|----------------------------------|--------|
| Continuous Assessment            | 10.00% |
| Practical                        | 30.00% |
| End of Module Formal Examination | 60.00% |

**Continuous Assessment**

| Assessment Type | Assessment Description | Outcome addressed | % of total | Assessment Date |
|-----------------|------------------------|-------------------|------------|-----------------|
| Examination     | Class Test             | 1,2,3             | 10.00      | Week 6          |

No Project

**Practical**

| Assessment Type             | Assessment Description                                                                             | Outcome addressed | % of total | Assessment Date |
|-----------------------------|----------------------------------------------------------------------------------------------------|-------------------|------------|-----------------|
| Practical/Skills Evaluation | Computer Competencies Assignment                                                                   | 1,2,3             | 10.00      | Week 9          |
| Practical/Skills Evaluation | Fluid Mechanics Labs: Darcy's Formula, Secondary losses, Fluid Momentum, Series & Parallel pumping | 1,2,3,5           | 20.00      | n/a             |

**End of Module Formal Examination**

| Assessment Type | Assessment Description | Outcome addressed | % of total | Assessment Date |
|-----------------|------------------------|-------------------|------------|-----------------|
| Formal Exam     | n/a                    | 1,2,3,4           | 60.00      | End-of-Semester |

SETU Carlow Campus reserves the right to alter the nature and timings of assessment

**Module Workload**

| <b>Workload: Full Time</b> |                       |                                                |
|----------------------------|-----------------------|------------------------------------------------|
| <i>Workload Type</i>       | <i>Frequency</i>      | <i>Average Weekly<br/>Learner<br/>Workload</i> |
| Lecture                    | 12 Weeks<br>per Stage | 4.00                                           |
| Laboratory                 | 12 Weeks<br>per Stage | 1.00                                           |
| Independent Learning       | 15 Weeks<br>per Stage | 4.33                                           |
| Total Hours                |                       | 125.00                                         |

**Module Delivered In**

| Programme Code | Programme                                                                   | Semester | Delivery  |
|----------------|-----------------------------------------------------------------------------|----------|-----------|
| CW_EMMEC_B     | <a href="#">Bachelor of Engineering (Honours) in Mechanical Engineering</a> | 5        | Mandatory |
| CW_EEMEC_D     | <a href="#">Bachelor of Engineering in Mechanical Engineering</a>           | 5        | Mandatory |