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|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Module Title:                                                                                                | Structural Design II                                                                                                                                                                                                                                                                                                                |                       |
| Language of Instruction:                                                                                     | English                                                                                                                                                                                                                                                                                                                             |                       |
|                                                                                                              |                                                                                                                                                                                                                                                                                                                                     |                       |
| Credits:                                                                                                     | 5                                                                                                                                                                                                                                                                                                                                   |                       |
|                                                                                                              |                                                                                                                                                                                                                                                                                                                                     |                       |
| NFQ Level:                                                                                                   | 8                                                                                                                                                                                                                                                                                                                                   |                       |
|                                                                                                              |                                                                                                                                                                                                                                                                                                                                     |                       |
| Module Delivered In                                                                                          | <a href="#">2 programme(s)</a>                                                                                                                                                                                                                                                                                                      |                       |
|                                                                                                              |                                                                                                                                                                                                                                                                                                                                     |                       |
| Teaching & Learning Strategies:                                                                              | Lectures, Project work, Private study                                                                                                                                                                                                                                                                                               |                       |
|                                                                                                              |                                                                                                                                                                                                                                                                                                                                     |                       |
| Module Aim:                                                                                                  | The aims of this module are: 1) to extend the learner's knowledge of structural design in reinforced concrete and structural steelwork; 2); to enable the learner's to apply structural principles to the design of timber structures; 3) to enable the learner's to apply structural principles to the design of masonry elements. |                       |
|                                                                                                              |                                                                                                                                                                                                                                                                                                                                     |                       |
| Learning Outcomes                                                                                            |                                                                                                                                                                                                                                                                                                                                     |                       |
| On successful completion of this module the learner should be able to:                                       |                                                                                                                                                                                                                                                                                                                                     |                       |
| LO1                                                                                                          | describe and design structural foundation in reinforced concrete for broadly defined engineering problems to the relevant National and European design standards.                                                                                                                                                                   |                       |
| LO2                                                                                                          | describe and design reinforced concrete retaining walls to the relevant National and European design standards.                                                                                                                                                                                                                     |                       |
| LO3                                                                                                          | describe and design steel portal frame type buildings to the relevant National and European design standards.                                                                                                                                                                                                                       |                       |
| LO4                                                                                                          | describe and design steel and concrete composite floor beams for broadly defined engineering problems to the relevant National and European design standards.                                                                                                                                                                       |                       |
| LO5                                                                                                          | describe and design structural timber elements for broadly defined engineering problems to the relevant National and European design standards.                                                                                                                                                                                     |                       |
| LO6                                                                                                          | describe and design load bearing masonry walls for broadly defined engineering problems to the relevant National and European design standards.                                                                                                                                                                                     |                       |
|                                                                                                              |                                                                                                                                                                                                                                                                                                                                     |                       |
| Pre-requisite learning                                                                                       |                                                                                                                                                                                                                                                                                                                                     |                       |
| Module Recommendations                                                                                       |                                                                                                                                                                                                                                                                                                                                     |                       |
| This is prior learning (or a practical skill) that is recommended before enrolment in this module.           |                                                                                                                                                                                                                                                                                                                                     |                       |
| 6567                                                                                                         | DSGN H4501                                                                                                                                                                                                                                                                                                                          | Structural Design I   |
| 6804                                                                                                         | ANAL H4501                                                                                                                                                                                                                                                                                                                          | Structural Analysis I |
| Incompatible Modules                                                                                         |                                                                                                                                                                                                                                                                                                                                     |                       |
| These are modules which have learning outcomes that are too similar to the learning outcomes of this module. |                                                                                                                                                                                                                                                                                                                                     |                       |
| No incompatible modules listed                                                                               |                                                                                                                                                                                                                                                                                                                                     |                       |
| Co-requisite Modules                                                                                         |                                                                                                                                                                                                                                                                                                                                     |                       |
| No Co-requisite modules listed                                                                               |                                                                                                                                                                                                                                                                                                                                     |                       |
| Requirements                                                                                                 |                                                                                                                                                                                                                                                                                                                                     |                       |
| This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.  |                                                                                                                                                                                                                                                                                                                                     |                       |
| No requirements listed                                                                                       |                                                                                                                                                                                                                                                                                                                                     |                       |

## Module Content & Assessment

| Indicative Content                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Design of Reinforced Concrete Foundations</b><br>a. Isolated column bases b. Combined bases c. Punching shear d. Pile cap design                                                                                                                                                                                     |
| <b>Design of Reinforced Concrete Retaining Walls</b><br>a. Types of retaining walls b. Design of cantilever retaining wall                                                                                                                                                                                              |
| <b>Frame Analysis, Stability and robustness</b><br>a. Braced frames b. Unbraced frames c. Sub-frames d. Robustness requirements                                                                                                                                                                                         |
| <b>Steel Portal Frame Type Buildings</b><br>a. Dead, imposed and wind loads on portal frames b. Analysis of portal frames c. Restraints and member stability d. Serviceability checks e. Design of connections                                                                                                          |
| <b>Composite floor beams</b><br>a. Analysis of a composite section b. Shear connectors c. Design of a composite floor beam                                                                                                                                                                                              |
| <b>Design of structural timber</b><br>a. Strength classes b. Types of timber structures c. Permissible span tables d. Load duration and load sharing e. Flexural strength f. Deflection g. Timber size factors and effective length h. Design for axial compression i. Design for compression and bending j. Connection |
| <b>Masonry Walls</b><br>a. Bricks, blocks and mortars b. Characteristic and design strengths c. Design of a vertically loaded masonry wall d. Design of a laterally loaded masonry wall                                                                                                                                 |

| Assessment Breakdown             | %      |
|----------------------------------|--------|
| Project                          | 40.00% |
| End of Module Formal Examination | 60.00% |

No Continuous Assessment

| Project         |                        |                   |            |                 |
|-----------------|------------------------|-------------------|------------|-----------------|
| Assessment Type | Assessment Description | Outcome addressed | % of total | Assessment Date |
| Project         | Design Projects        | 1,2,3             | 20.00      | n/a             |
| Project         | Design Projects        | 4,5,6             | 20.00      | n/a             |

No Practical

| End of Module Formal Examination |                        |                   |            |                 |
|----------------------------------|------------------------|-------------------|------------|-----------------|
| Assessment Type                  | Assessment Description | Outcome addressed | % of total | Assessment Date |
| Formal Exam                      | Final Exam             | 1,2,3,4,5,6       | 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                    | 30 Weeks<br>per Stage | 3.00                                           |
| Estimated Learner Hours    | 30 Weeks<br>per Stage | 4.17                                           |
| Total Hours                |                       | 215.00                                         |

**Module Delivered In**

| Programme Code | Programme                                                                          | Semester | Delivery  |
|----------------|------------------------------------------------------------------------------------|----------|-----------|
| CW_CMHCE_B     | <a href="#">Bachelor of Engineering (Honours) in Civil Engineering - Ab Initio</a> | 7        | Mandatory |
| CW_CMCEN_B     | <a href="#">Bachelor of Engineering (Honours) in Civil Engineering - Add On</a>    | 3        | Mandatory |