# Structural and Stress Analysis

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| **Reference No.**
  *(showing level)* | EAX_S_264/DSGN04C03           |
| **Credit Value** | 10 credit points              |

**Student Study Hours**
- Contact hours: 12, 2h lectures + 12, 1h tutorials
- Student managed learning hours: 100 hours on average

**Pre-requisite learning**
- 

**Co-requisites**
- 

**Excluded combinations**
- 

**Module co-ordinator**
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**Faculty/Department**
- Engineering/Petroleum and Natural gas

**Short Description**
- This module concerned with stress, strain, axial loading, torsion, bending, stress transformation, failure, experimental.

**Aims**
- The aim of this module is to consolidate ideas and skills acquired through their previous study of mechanics, realise and comprehend the concept and types of stress and strain, carry out strength and deformation analysis for a variety of load types, single or combined, and appreciate the value of stress analysis and failure prediction in the context of mechanical design.

**Learning Outcomes**

**Knowledge and understanding**
- On completion of this module students should be able to demonstrate knowledge and understanding of:
  1. stress and its types and strain;
  2. relate between load and deformation;
  3. differentiate between types of loadings;

**Subject-specific cognitive skills**
- On completion of this module students should be able to/demonstrate ability in:
  4. compute the stresses and deformations on loaded structures;
  5. design beams, columns and shafts;

**Subject-specific practical skills**
- On completion of this module students should be able to/demonstrate ability in:
  6. Apply stress analysis for preventing solid failure/fatigue
  7. Calculate maximum and minimum stress for eng structures

**Practical Skills:**
- 6. Apply stress analysis for preventing solid failure/fatigue
- 7. Calculate maximum and minimum stress for eng structures

**Key/transferable skills**
- On completion of this module students should be able to/demonstrate ability in:
  8. synthesise simple real life structures;
  9. Perform strength analysis based on material failure criteria.

**Employability**
- To prepare student to get job and be professional graduate in future, the development of one or more of top engineering skills, namely problem solving, communication, management and environment and economics, is addressed in this module.
- Personal development planning is also one of our focuses in this module.
### Teaching and learning pattern

1. 12, 2h lectures. This method informs learning outcomes 1, 2, 3, 4.
2. 12, 1h tutorials. This method informs learning outcomes 5, 6, 7, 8.

### Indicative content

- Equilibrium (2D, 3D, FBD)
- Trusses (joint and section methods)
- Geometrical properties of sections
- Stress, Strain, and Axial loading;
- Analysis of Beams
- Bending Stresses;
- Shearing Stresses; (Transverse and Torsional)
- Combined Stresses;
- Deflection

### Assessment Elements & weightings

- **Examination**: A 180 minute unseen written Examination assesses learning outcomes 1, 2, 3, 5, 6, 7, 8.  
  70%
- **Course Work**: 10% in-class assignments assesses learning outcomes 1-8 and 20% unseen in class test assesses learning outcomes 5 and 8.  
  30%

Students must achieve (i) 40% for the total module mark and (ii) at least 30% in the unseen examination and the course work in order to achieve an overall passing mark for this module.

### Indicative Sources (Reading lists)