

DSGN C1609: Aircraft Anatomy and Design 2

| Modulo THI:::::::::::::::::::::::::::::::::::: | | | | | | | |
|---|--------------------------------|--|--|--|--|--|--|
| Credits: 5 Credits: 5 NFQ Level: 6 Module Delivered In 3 programme(s) Teaching & Learning Strategies: The module will be delivered with a blend of lectures, tutorials and problem based learning activities. The laboratory sessions will involve flight simulation and 'learn as you fly. The deging component of the syllabus the development and evaluation of the final design. The final design range inclusion to in a flight simulator package such as X-Plane. Module Alm: To provide students with the skills and techniques required to understand the basic concepts used in the conceptual design of an aircraft using industry standard tools. To provide students with a foundation tor aubsequent modules in the area of andraft design. Learning Outcomes To provide students with the skills and techniques required to understand the basic concepts used in the conceptual design of an aircraft using industry standard tools. To provide students with a foundation tor aubsequent modules in the area of andraft design. LO1 Describe the basic theory of stress, strain and elasticity and how it relates to the loading of an aircraft. LO2 Solve problems in mechanics. LO3 Demonstrate an ability to fly a light aircraft in a flight simulator, from preflight to landing. LO4 Identify a conceptual design solution path given airplane performance specifications. LO5 Evaluate the effect of a high/low wing loading and power loading on the aircraft performance. | Module Title: | | Aircraft Anatomy and Design 2 | | | | |
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DSGN C1609: Aircraft Anatomy and Design 2

Module Content & Assessment

Indicative Content

Mechanics - Statics

Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion; Direct stress and direct strain, Modulus of elasticity, Application to compound sections. Poisson's ratio, area and volumetric strain; three dimensional stress systems.

Aircraft Conceptual Design

• Parameter recordings in a flight simulator to include: Forces in flight, controls and stability, aspect ratio, wing loading and power loading. • Performance design specifications – Weight – Wing Loading calculations and validation – Wing area/span – Power requirements – Power Loading – Range – Performance trade-offs – Design optimization. • Computer aided 3D design model manipulation – Performance analysis in a flight simulation package.

| Assessment Breakdown | % |
|----------------------------------|--------|
| Continuous Assessment | 20.00% |
| Practical | 40.00% |
| End of Module Formal Examination | 40.00% |

| Continuous Assessment | | | | |
|-----------------------|------------------------|----------------------|---------------|--------------------|
| Assessment Type | Assessment Description | Outcome addressed | % of total | Assessment Date |
| Examination | in class test | 1,5 | 10.00 | Week 6 |
| Examination | In class test | 1,2 | 10.00 | Week 9 |

No Project

| Practical | | | | |
|--------------------------------|---|----------------------|---------------|--------------------|
| Assessment Type | Assessment Description | Outcome addressed | % of total | Assessment Date |
| Practical/Skills Evaluation | The student will undertake the design or modification of an aircraft, which may include a project plan, a literature, design development using industry standard tools, presentation of results and a formal report. | 3,4,5 | 40.00 | n/a |

| End of Module Formal Examination | | | | |
|----------------------------------|--|----------------------|---------------|---------------------|
| Assessment Type | Assessment Description | Outcome addressed | % of total | Assessment Date |
| Formal Exam | The student will complete a terminal exam covering the topics of mechanics and aircraft loading | 1,2,5 | 40.00 | End-of- Semester |

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



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Module Workload

| Workload: Full Time | | |
|----------------------|-----------------------|---------------------------------------|
| Workload Type | Frequency | Average Weekly Learner Workload |
| Lecture | 12 Weeks per Stage | 2.00 |
| Laboratory | 12 Weeks per Stage | 2.00 |
| Independent Learning | 15 Weeks per Stage | 5.13 |
| | Total Hours | 125.00 |

Module Delivered In Delivery Programme Code Semester Programme CW_EEAER_B 2 Bachelor of Engineering (Honours) in Aerospace Engineering Mandatory CW_EEACS_D 2 Mandatory Bachelor of Engineering in Aircraft Systems CW_EEPLT_D 2 Bachelor of Science in Pilot Studies Mandatory