Liverpool John Moores University

Title: AEROSPACE TECHNOLOGY
Status: Definitive
Code: 5513ENGIOM (107414)
Version Start Date: 01-08-2011

Owning School/Faculty: Engineering
Teaching School/Faculty: Isle of Man College

<table>
<thead>
<tr>
<th>Team</th>
<th>Leader</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gary Colquhoun</td>
<td>Y</td>
</tr>
</tbody>
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Academic Level: FHEQ5
Credit Value: 12.00
Total Delivered Hours: 26.00

Total Learning Hours: 120
Private Study: 94

Delivery Options
Course typically offered: Semester 1

<table>
<thead>
<tr>
<th>Component</th>
<th>Contact Hours</th>
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<tbody>
<tr>
<td>Lecture</td>
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<tr>
<td>Practical</td>
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<tr>
<td>Tutorial</td>
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Grading Basis: 40%

Assessment Details

<table>
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<tr>
<th>Category</th>
<th>Short Description</th>
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<th>Weighting (%)</th>
<th>Exam Duration</th>
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<tr>
<td>Essay</td>
<td>AS1</td>
<td>Laboratory report(s)</td>
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<td>Exam</td>
<td>AS2</td>
<td>Examination</td>
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Aims

To develop the students' ability to understand the advanced technologies that the aerospace industry relies on in particular aerodynamics, propulsion and environmental aspects.

Learning Outcomes
After completing the module the student should be able to:

1. apply the principles of thermodynamic and fluid mechanics principles to the solution of engineering problems.
2. apply the theories and procedures associated with the aerodynamics and propulsion of aerospace vehicles.
3. recognise the causes and methods for prevention of environmental issues within the aerospace industry.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

- CW: 1, 2
- EXAM: 1, 2, 3

Outline Syllabus

Fluid Mechanics – Aerodynamics
- Introduction to basic internal/external aerodynamics at various Mach No’s.
- Evaluation of lift and drag wrt aerospace vehicles and air flow through a jet engine.

Applied Thermodynamics and Heat Transfer
- Gas power cycles, gas turbine analysis, 1-d steady flow and jet propulsion.
- Advanced forced convection, boundary layer theory, dimensional analysis, radiation.

Propulsion Technology
- Appraisal of basic methods of propulsion associated with aerospace including i.c.engines, jet engines, turbomachinery and rockets. Fuels employed. Future developments.

Environmental aspects

Learning Activities

Lectures, tutorials and laboratory work.

References

<table>
<thead>
<tr>
<th>Course Material</th>
<th>Book</th>
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<tbody>
<tr>
<td>Author</td>
<td>Franzini, J.B., Finnemore, E.J.</td>
</tr>
<tr>
<td>Publishing Year</td>
<td>2001</td>
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<tr>
<td>Title</td>
<td>Fluid Mechanics with engineering applications</td>
</tr>
<tr>
<td>Subtitle</td>
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<td>Edition</td>
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Notes

The module introduces the student to the underlying theory and practice of aerospace technology to enable a basic understanding of aerodynamics, propulsion and environmental aspects.
This book is for civil engineers that teach fluid mechanics both within their discipline and as a service course to mechanical engineering students. As with all previous editions this 10th edition is extraordinarily accurate, and its coverage of open channel flow and transport is superior. There is a broader coverage of all topics in this edition of Fluid Mechanics With Engineering Applications. Furthermore, this edition has numerous computer-related problems that can be solved in Matlab and Mathcad. Fluid Mechanics With Engineering Applications Book (PDF) By E. John Finnemore, Joseph B Franzini Covers the practical side of fluid mechanics for the practicing engineer. Bloomer, a product manager, begins with a review of the definitions, equations, and derivations that are useful for the material that follows. 

Fluid Mechanics is the branch of physics concerned with the mechanics of fluids (liquids, gases, and plasmas) and the forces on them. It has applications in a wide range of disciplines, including mechanical, civil, chemical and biomedical engineering, geophysics, oceanography, meteorology, astrophysics, and biology. It can be divided into fluid statics, the study of fluids at rest; and fluid dynamics, the study of the effect of forces on fluid motion. It is a branch of continuum mechanics, a Fluid Mechanics: Fundamentals and Applications (McGraw-Hill Series in Mechanical Engineering).