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Module Code: 2AAD0026

Title of Module

Full Title: Engineering Science

Short Title: Eng Science

MODULE

2AAD0026 (A 05/6)

Engineering Science...

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Version: 1

Credit Points: 15

Level / ECTS Level: 2

First Offered: 1/9/2004 00-00-00

6. Home Department:

AAD

7. Departments(s) contributing to teaching:

9. Module Aims:

* develop an understanding of Mechanical Science and Thermo-Fluid Mechanics relevant to Aerospace and Automotive Technology

* develop skills in measurement, observation and analysis in a laboratory

10a. Learning Outcomes: Knowledge and Understanding:

* demonstrate a knowledge and understanding of rigid body statics and dynamics

* have a knowledge of fundamental structural mechanics

* demonstrate a knowledge of Fluid Mechanics

* have a knowledge of the fundamentals of Thermodynamics

10b. Learning Outcomes: Skills and Attributes:

* apply fundamental principles of mechanics to engineering problems

* use Fluids Mechanics Principles in the analysis of fluid systems

* calculate energy transfers in simple thermofluid systems

11. Module Content

11a Module Content:

The Engineering Science module seeks to introduce the students to the relevant fundamental concepts of

mechanical science and thermofluid mechanics. The module aims to develop a strong qualitative understanding supported, as appropriate via quantitative methods. Topics include-

Static equilibrium and analysis, force vectors, moments and couples. Simple one-dimensional stress-strain analysis (direct and shear), shear force and bending moment diagrams, Engineers' theory of bending and torsion. Newton's laws of motion, work energy equation, vector diagrams, rotational motion, moment of inertia, simple harmonic motion, vibration of undamped systems, engine balancing (Mechanical Science).

Classifications of flow regimes and flow measurement devices. Hydrostatics, mass and energy balances, boundary layers and pressure losses through pipe networks. Heat transfer and the vapour compression refrigeration cycle (Thermofluid Mechanics).

11b. Further details on how the learning outcomes of the module will be achieved:

The Mechanical science part of the module covers the following topics-

- Fundamental rigid body statics and structural behaviour of materials when subjected to load
- Simple free body diagrams and analysis of systems in equilibrium
- Linear motion and acceleration, impulse and momentum, velocity and acceleration diagrams
- Newton's Laws of motion and the work - energy equation.
- The concept of second moment of area and inertia and its application to simple static and dynamic problems
- Shear force and bending moment diagrams and the calculation of stresses due to bending
- Primary and secondary balance in different engine configurations
- Static or dynamic analysis of shafts in torsion

The Thermofluid mechanics part of the module covers the following topics-

- The different types of fluid flow regimes
- The different energies associated with simple thermo-fluid systems
- The concept of energy and mass balance
- The concept of fluid boundary layers
- The principles of a vapour compression refrigeration cycle/four stroke internal combustion engine
- The basic mechanisms of heat transfer (convection, conduction and radiation) and see their relevance to aerospace or automotive technology
- The resistance pipe fittings impose on hydraulic circuits

12. Language of Delivery:

English

13. Language of Assessment:

English

14. Assessment Details (Academic):

Coursework: 50

Exam: 50

Other: Typically, the in-course assessment will consist of-

- Laboratory reports
- A phase test
- Weekly assessed tutorial sheets

Assessment Notes:

Separate passes are required in both the coursework and examination elements of the assessment.

15. Locations(s):

UH HATFIELD

16. Pre and Co-Requisite:

Pre-Requisite

Co-Req

Prohibited

17. Subject Board of Examiner/s:
AERO/CIVIL/MECH ENG L2/3

18. Comments

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