

Liverpool John Moores University

Title: TESTING PRODUCT PERFORMANCE
Status: Definitive
Code: **5004TECH** (105294)
Version Start Date: 01-08-2016

Owning School/Faculty: Maritime and Mechanical Engineering
Teaching School/Faculty: Maritime and Mechanical Engineering

| Team | Leader |
|-----------|--------|
| James Ren | Y |

Academic Level: FHEQ5
Credit Value: 12
Total Delivered Hours: 30
Total Learning Hours: 120
Private Study: 90

Delivery Options

Course typically offered: Semester 1

| Component | Contact Hours |
|-----------|---------------|
| Lecture | 10 |
| Practical | 20 |

Grading Basis: 40 %

Assessment Details

| Category | Short Description | Description | Weighting (%) | Exam Duration |
|----------|-------------------|--|---------------|---------------|
| Essay | AS1 | Product Testing Exercise | 20 | |
| Essay | AS2 | Environmental Product Testing Laboratory | 30 | |
| Essay | AS3 | Accelerated Stress Testing Assignment | 50 | |

Aims

The aim of this module is to introduce students to the important area of product testing. The techniques covered will allow students to identify design deficiencies and problems early in product development.

Learning Outcomes

After completing the module the student should be able to:

- 1 Identify a range of tests useful in optimising a design solution.
- 2 Undertake a range of dynamic tests.
- 3 Carry out a series of functional and accelerated stress tests.
- 4 Analyse test data and make design decisions to improve its quality and reliability.

Learning Outcomes of Assessments

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

| | | |
|----|---|---|
| CW | 1 | |
| CW | 2 | |
| CW | 3 | 4 |

Outline Syllabus

Dynamic Testing: Vibration; fatigue; mechanical; mechanical shock; acceleration; normal handling and shipping.

Electrical: Power surge, electro magnetic compatibility (EMF); multiburst and multiple stroke lightning; high intensity radiated fields (HIRF); electrostatic discharge (ESD).

Environmental: rain / water / moisture ingress; sand / dust ingress, thermal cycling /shock; solar radiation, solar heating, mold; altitude; explosive atmosphere; flammability.

Flow: Aero / hydro dynamics; hydraulic / pneumatic flow; fuel systems; fluid flow; pressure impulse; burst and proof pressure; icing.

Equipment and Instrumentation: Labview; Materials testing equipment; wind tunnel; vibration test rigs; drop test rig; environmental chamber; water tank; strain gauges; accelerometers, force sensors, data recording; high speed digital camera and thermal imaging camera.

Test methodology: Reliability engineering; bath tub curve; MTTF; MTBF etc.

Collecting experimental data; analysing data and design optimisation.

Learning Activities

This module will be taught predominantly within a product test laboratory environment. Lectures and test laboratory exercises will be integrated into the scheme of work, as will topical case studies.

Notes

The emphasis of this module will be learning through practical experience, although a basic understanding of reliability engineering and testing should be covered.

