

MODULE CODE:	M3X0062
TITLE:	Systems Engineering
DATED:	April 2014
LEVEL:	6
CREDITS:	20
JACS CODE:	H110

AIM(S)

To provide the students with a comprehensive and systematic understanding of the concepts underlying systems engineering;

To provide the students with an holistic and interdisciplinary approach as a means of enabling the realisation of systems engineering in a test and evaluation environment.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to demonstrate the ability to:

1. Demonstrate a sound understanding of the holistic role of systems engineering, including needs analysis, developing options, assessing risk and constraints.
2. Using suitable engineering design methods and tools, design a safe, instrumented test trial and/or simulation, including a robust solution to test a military system or weapon.
3. Critically evaluate the processes, design methods and tools used in the development and design of a range trial. Justification of chosen solution(s), system's thinking and risk mitigation are key outcomes.

INDICATIVE CONTENT

- Structure of Complex Systems;
- Systems Development Process;
- Validation and verification;
- Systems Engineering Management
- Engineering Design Methods and Tools (inc V diagrams)
- Design of robust, practical and safe solutions
- Combining instrumentation, Range operation and safety systems to design a trial
- Needs Analysis;
- Integration and Evaluation.

LEARNING AND TEACHING STRATEGY

E.g. Lectures will introduce the students to the concepts, principles and practices. Tutorials and seminars will introduce practical examples which will be used to support the application, discussion, and critical evaluation of techniques learned. Case studies will also be used to develop understanding and application of the techniques.

The allocation of teaching to deliver the module is:

Activity type	Hours	Percentage
Scheduled learning	60	30%
Independent learning	140	70%
Placement learning		
TOTAL	200	100%

ASSESSMENT

Description of each assessment component and its weighting, together with an example for new forms of assessment:

Assessment Component 1 (Coursework) – 50%

The assignment will consist of a one practical-based report on the building and evaluation of small scale test trial project with respect to the principles of systems engineering. This type of assessment allow topics to be studied to a greater depth and gives students' time for reflection. Coursework (1 x 2500 words equivalent).

Assessment Component 2 (Examination) – 50%

The examination will be used to assess the student's understanding of the underlying theory, and their ability to apply that knowledge appropriately.

Assessment Summary

Activity type	Percentage
Examination	50%
Coursework	50%
Practical	
TOTAL	100%

BIBLIOGRAPHY

Essential

Kossiakoff, A., Sweet, W., Seymour, S. and Biemer, S., *Systems Engineering Principles and Practice*, Wiley-Blackwell (2011).

Recommended

Blanchard, B., *Systems Engineering Management 4th Edition*, Wiley (2009).

Kasser, J., *A Framework for Understanding Systems Engineering 2nd Edition*, CreateSpace Independent Publish Platform (2013).

Background

Jenney, J., Gangl, M., Kwolek, R., Melton, D., Ridenour, N. and Coe, M., *Modern Methods of Systems Engineering: With an Introduction to Pattern and Model Based Methods*, CreateSpace Independent Publish Platform (2011).

Kasser, J., *Holistic Thinking: Creating innovative solutions to complex problems*, CreateSpace Independent Publish Platform (2013).

Journals

ACM Transactions on Information Systems;

Journal of Data and Information Quality;

Journal of the ACM;

Journal of Systems Engineering and Electronics

Websites

Google Scholar: scholar.google.co.uk/