

WM9D6-15 Systems Engineering

23/24

Department

WMG

Level

Taught Postgraduate Level

Module leader

David Wright

Credit value

15

Module duration

5 days

Assessment

100% coursework

Study location

University of Warwick main campus, Coventry

Description

Introductory description

The Systems Engineering module aims to provide the students with an understanding of systems thinking and systems engineering in complex automotive engineering programmes.

Module aims

To establish an understanding of the concepts, key principles and methods associated with systems thinking to enable students to address complex problems. To provide students with an understanding of the implications of system design and engineering on the the whole product lifecycle from concept formulation, design, manufacture, in-service use and support through to decommissioning. To provide an awareness and appreciation of the major systems engineering management tools and processes to design and deliver complex programmes, with a focus their application in the automotive engineering industry.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

Systems thinking and systems engineering concepts & tools
Linking vision, outcomes and goals

Prioritising goals, stakeholders and needs

Developing rich pictures and high level Concept of Operations (Conops)

System development lifecycles and processes for successful outcomes

Learning outcomes

By the end of the module, students should be able to:

- Critically evaluate the role of Systems Thinking and Systems Engineering methodology to design complex, multi-stakeholder systems
- Create more effective and sustainable development, delivery, in-service support and end-of-life in Automotive Engineering guided by Systems Engineering methodology.
- Evaluate Systems Engineering development processes individually and as part of a group, including the analysis of systems needs and translation to appropriate requirements.
- Relate systems principles to the design of complex automotive applications, considering the complete life cycle of a vehicle.
- Evaluate Systems Engineering tools to support the prioritisation of goals and stakeholders.

Indicative reading list

Thinking in Systems – A Primer, D. Meadows. Chelsea Green Publishing, 2008. ISBN: 9781603580557.

Designing Complex Products with System Engineering Processes and Techniques, V.D. Bhise. CRC Press, 2014. ISBN: 9781466507036

System Engineering Management, B.S. Blanchard. Wiley, 2008. ISBN: 9780470167359

2015 ISO Standard, 'ISO/IEC/IEEE 15288:2015, Systems and software engineering -- System life cycle processes', 2015.

Systems Engineering: A 21st Century Systems Methodology, D.K. Hitchins. Wiley-Blackwell, 2007 ISBN: 9780470058565

[View reading list on Talis Aspire](#)

Subject specific skills

Systems Thinking, Systems Development Lifecycle vs Programme Lifecycles, Risk Management, Systems Engineering Processes

Transferable skills

Systems Thinking, Collaborative working, Critical thinking and analysis, Academic writing skills, Technical responsibility for complex engineering systems

Study

Study time

Type	Required
Lectures	20 sessions of 1 hour (13%)
Seminars	10 sessions of 1 hour (7%)
Tutorials	(0%)
Supervised practical classes	(0%)
Online learning (scheduled sessions)	(0%)
Online learning (independent)	60 sessions of 1 hour (40%)
Assessment	60 hours (40%)
Total	150 hours

Private study description

No private study requirements defined for this module.

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group A1

	Weighting	Study time
Written Assessment	60%	36 hours
An essay in which a systems engineering analysis is conducted upon an existing automotive engineering system, with an emphasis on sustainability. The essay will cover evaluation of systems engineering development processes and associated competencies, including the capture, analysis of customer, social and legislative needs needs for sustainability and translation into technical/engineering requirements and systematic alignment of the design of complex, sustainable systems. The students will finally make a decision as to whether any improvements or changes have been made to the system through their analysis.		
Self guided learning assessment	20%	12 hours
A self-assessment test launched prior to the module designed to test the student's grasp of the key principles of Systems Engineering acquired from recommended reading resources.		
Group Presentation	20%	12 hours
Tutor-directed and self-guided activities conducted in groups and culminating in a group presentation. The topic of this presentation will be based on certain aspects of the work done during the taught week of the module. The mark awarded to each member of the group will be		

Weighting

Study time

informed by a peer adjustment marking process.

Feedback on assessment

Written feedback on the essay, of approximately 300 - 400 words, will be provided 4 weeks after the date of submission. The feedback will be focussed on the strengths and weaknesses of the work with regards to the module learning objectives and the assessment's marking guidelines. Suggestions for improvement will also be provided. Feedback on the group presentation will be given verbally during the module and supplemented with written comments provided separately.

Availability

There is currently no information about the courses for which this module is core or optional.