

ES4A7-15 Human Factors of Future Mobility

22/23

Department

School of Engineering

Level

Undergraduate Level 4

Module leader

Roger Woodman

Credit value

15

Module duration

10 weeks

Assessment

100% coursework

Study location

University of Warwick main campus, Coventry

Description

Introductory description

ES4A7-15 Human Factors of Future Mobility

[Module web page](#)

Module aims

This module aims to provide students with comprehensive knowledge of the human factor's challenges associated with current and future mobility. The module will promote an understanding of the key human factors concepts associated with mobility (including autonomous, electric, and micromobility vehicles) and related technologies, infrastructure, schemes, and policies, from initial concept to implementation. This will include anthropometry, safety, trust, acceptance, drive state monitoring, distraction, interaction, wellbeing, and human sensing.

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.

The module focuses on optimising users' interaction with future mobility (including autonomous, electric, and micromobility vehicles) and related technologies, infrastructure, schemes, and policies, from initial concept to implementation.

Learning outcomes

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

- Evaluate and understand the human factors principles that underpin the design of a vehicle for occupants and other road users
- Consider the role and use of driver state monitoring systems in vehicle engineering
- Demonstrate in-depth knowledge and an advanced understanding of the legislative, social, and environmental factors relevant to human factors in vehicles
- Evaluate and design in-vehicle interfaces aimed to improve safety, trust, comfort, and convenience
- Communicate in a professional and scientific manner

Indicative reading list

Akamatsu, M. (Ed.). (2019). *Handbook of Automotive Human Factors*. Boca Raton: CRC Press.

Amanatidis, T., Langdon, P., & Clarkson, P. J. (2017, July). Toward an "Equal-Footing" Human-Robot Interaction for Fully Autonomous Vehicles. In *International Conference on Applied Human Factors and Ergonomics* (pp. 313-319). Springer, Cham.

Bonnefon, J. F., Shariff, A., & Rahwan, I. (2016). The social dilemma of autonomous vehicles. *Science*, 352(6293), 1573-1576.

Kroemer-Elbert, K.E., Kroemer, H.B., Kroemer-Hoffman, A.D. (2018). *Ergonomics: How to design for ease and efficiency*. Elsevier Science.

Langdon, P., Politis, I., Bradley, M., Skrypchuk, L., Mouzakitis, A., & Clarkson, J. (2017, July). Obtaining design requirements from the public understanding of driverless technology. In *International Conference on Applied Human Factors and Ergonomics* (pp. 749-759). Springer, Cham.

Lee, J. D., Wickens, C. D., Liu, Y., & Boyle, L. N. (2017). *Designing for people: An introduction to human factors engineering*.

Read, G.J.M., Beanland, V., Lenné, M.G., Stanton, N.A., & Salmon, P.M. (2017). *Integrating Human Factors Methods and Systems Thinking for Transport Analysis and Design* (1st ed.). CRC Press.

Sharp, H., Rogers, Y., & Preece, J. (2007). *Interaction design: beyond human-computer interaction*.

Woodman, R., Lu, K., Higgins, M., Brewerton, S., Jennings, P., & Birrell, S. (2019). A Human Factors Approach to Defining Requirements for Low-speed Autonomous Vehicles to Enable Intelligent Platooning. In *2019 IEEE Intelligent Vehicles Symposium (IV)* (pp. 2371-2376).

Subject specific skills

Ability to conceive and make a valid argument to support an engineering decision

Ability to develop solutions using published and validated literature

Ability to be pragmatic, taking a systematic approach and the logical and practical steps necessary for, often complex, concepts to become reality

Ability to seek to achieve sustainable solutions to problems and have strategies for being creative and innovative

Ability to be risk, cost and value-conscious, and aware of their ethical, social, cultural, environmental, health and safety, and wider professional engineering responsibilities

Ability to communicate across engineering disciplines in a constructive way to progress a project

Transferable skills

Apply problem solving skills, information retrieval, and the effective use of general IT facilities

Communicate (written and oral; to technical and non-technical audiences) and work with others

Plan self-learning and improve performance, as the foundation for lifelong learning/CPD

Exercise initiative and personal responsibility, including time management, which may be as a team member or leader

Awareness of the nature of engineering business and enterprise in the creation of economic and social value

Overcome difficulties by employing skills, knowledge and understanding in a flexible manner

Ability to formulate and operate within appropriate codes of conduct, when faced with an ethical issue

Appreciation of the global dimensions of engineering, customers, commerce and communication

Be professional in their outlook, be capable of team working, be effective communicators, and be able to exercise responsibility and sound management approaches.

Study

Study time

Type	Required
Lectures	30 sessions of 1 hour (20%)
Total	150 hours

Type	Required
Private study	120 hours (80%)
Total	150 hours

Private study description

120 hours guided independent learning

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Students can register for this module without taking any assessment.

Assessment group A1

	Weighting	Study time
Assessment	100%	
Word Limit 4000		

Feedback on assessment

Written comments and electronically marked-up assignment

Cohort level feedback on examinations

Availability

Courses

This module is Core for:

- Year 4 of UESA-H336 MEng Automotive Engineering
- Year 5 of UESA-H337 MEng Automotive Engineering with Intercalated Year

This module is Optional for:

- Year 4 of UESA-H116 MEng Engineering with Exchange Year
- Year 5 of UESA-H115 MEng Engineering with Intercalated Year

This module is Option list A for:

- Year 4 of UESA-H163 MEng Biomedical Systems Engineering
- Year 4 of UESA-H114 MEng Engineering
- Year 4 of UESA-H311 MEng Mechanical Engineering