ES2H6-15 Future Automotive Mobility

26/27

Department
School of Engineering
Level
Undergraduate Level 2
Module leader
Umang Parekh
Credit value
15
Module duration
10 weeks
Assessment
50% coursework, 50% exam
Study location
University of Warwick main campus, Coventry

Description

Introductory description

There are 3 strands to future automotive mobility: Connected Autonomous Vehicles (CAVs), Electric Vehicles (EV's) and Mobility-as-a-Service (MaaS). The combination of these three key technology-driven disruptive trends is introducing unpresented changes to the automotive sector. This module will provide the key knowledge and understanding to support automotive engineers in the future.

Module aims

Future automotive mobility aims to introduce students to the key challenges associated with smart, connected, and autonomous electric vehicles: SAE levels of autonomy and their safety implications; the robustness of embedded systems; environmental perception; connectivity and communication infrastructure; new mobility models; Human Factors.
This module aims to provide students with knowledge about the current and future technical challenges of smart, connected, and autonomous vehicles.

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.

Connected Autonomous Vehicles (CAVs): perception sensors, sensor fusion, machine learning & probabilistic techniques for CAV, wired and wireless communications (e.g. 5G) for CAV, CAV security risks
Human Factors : Trust, AV stakeholders, wellbeing and sensing the human
Mobility-as-a-Service (MaaS) -MaaS schemes, vehicle management, public transport integration, MaaS regulations.

Learning outcomes

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

- Critique the limits of the performance of different automotive perception sensors. (C1, M1)
- Understand the limits of machine learning and sensor fusion in the context of safe Automated Vehicles. (C1, M1, C2, M2, C9, M9)
- Critically evaluate the limitations of wired and wireless communication technologies in CAV systems, including associated security risks and vulnerabilities.(C2, M2, C10, M10)
- Critically assess the impact of mobility solutions on users, society, and the environment, including considerations of sustainability, accessibility, and MaaS ecosystems.(C3, M3, C7, M7)
- Analyse the role of human factors and regulatory standards in the design and deployment of connected and smart vehicle systems. (C3, M3, C5, M5)

Indicative reading list

Reading lists can be found in Talis

Subject specific skills

Knowledge and understanding of the need for a high level of professional and ethical conduct in engineering and the use of technical literature, other information sources including appropriate codes of practice and industry standards.

Transferable skills

Be professional in their outlook, be effective communicators, and be able to exercise responsibility and sound management approaches.
Communicate (written and oral; to technical and non-technical audiences)
Exercise initiative and personal responsibility, including time management, which may be as a team member or leader

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Study

Study time

Type	Required
Lectures	15 sessions of 1 hour (10%)
Seminars	14 sessions of 1 hour (9%)
Demonstrations	1 session of 1 hour (1%)
Private study	120 hours (80%)
Total	150 hours

Private study description

120 Hours of student self-guided study to prepare for assessments. Guidance on topics to be studied is provided during lectures (with some extra contents on Moodle) and assessment instructions.

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group C1

	Weighting	Study time	Eligible for self-certification
Assessment component			
Mini Design Portfolio Design portfolio 2000 words	50%		Yes (extension)
Reassessment component is the same			
Assessment component			
Centrally-timetabled examination (On-campus) Examination	50%		No

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	Weighting	Study time	Eligible for self-certification

- Answerbook Pink (12 page)

Reassessment component is the same

Feedback on assessment

Written comments and electronically marked-up assignments for the design portfolio.
Cohort level feedback on examinations

Past exam papers for ES2H6

Availability

Courses

This module is Option list A for:

- Year 2 of UESA-H335 BEng Automotive Engineering
- Year 2 of UESA-H112 BSc Engineering
- Year 2 of UESA-H336 MEng Automotive Engineering