2024 / 25

School of Science and Computing
+353 (0)51 302037
Eleanor.Reade@setu.ie
www.wit.ie/schools/science_computing

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South East Technological University

Module Descriptor

The Connected Car (Computing and Mathematics)

The Connected Car (A11583)

Short Title: The Connected Car
Department: Computing and Mathematics
Credits: 5 **Level:** Advanced

Description of Module / Aims

In this module, students explore and use the technologies required to exchange data between Electronic Control Units within the vehicle and with external systems outside of the vehicle, such as other vehicles, diagnostic tools, recharging stations and roadside infrastructure.

Programmes

		stage/semester/status
COMP-0575	BSc (Hons) in Applied Computing (WD_KACCM_B)	4 / 8 / E
COMP-0575	BSc (Hons) in Applied Computing (WD_KCOMP_B)	4 / 8 / E
COMP-0575	BSc (Hons) in Computer Science (WD_KCMSC_B)	4 / 8 / E
COMP-0575	BSc (Hons) in Physics for Modern Technology (WD_KPHTE_B)	4 / 8 / E

Indicative Content

- Vehicle network architectures
- Event-triggered network protocols (CAN-FD; XCP; ISO 15765)
- Time-triggered network protocols (LIN; FlexRay)
- Infotainment network protocols (MOST; IP)
- Measurement, Calibration and Diagnostics
- Car2x protocols (Context Awareness; Event Notification; Topology)
- Car2x use cases
- Network simulation and testing
- Network security

Learning Outcomes

On successful completion of this module, a student will be able to:

1. Distinguish the characteristics of the different network protocols.
2. Compare and contrast common automotive protocols.
3. Formulate application networking requirements.
4. Design gateway network protocols.
5. Evaluate security requirements for a connected vehicle.
6. Set up and appraise industry standard network development and testing tools.

Learning and Teaching Methods

- Combination of lectures and laboratory-based practicals.
- Self-directed learning.

Learning Modes

Learning Type	F/T Hours	P/T Hours
Lecture	24	
Practical	24	
Independent Learning	87	

Assessment Methods

	Weighting	Outcomes Assessed
Continuous Assessment	100%	
Assignment	30%	1,3,5
Assignment	70%	2,4,6

Assessment Criteria

<40%: Inability to specify a coherent network design.

40%–49%: Able to describe the basic network design concepts.

50%–59%: All the above and in addition is able demonstrate a technical understanding of the common automotive network protocols.

60%–69%: In addition, is able to develop and test a network using two or more protocols connected with a gateway.

70%–100%: All of the above and able to debug network issues at a low level.

Supplementary Material(s)

- Schaeuffele, J. and T. Zurawaka. *Automotive Software Engineering.*. NY: SAE International, 2005.

Requested Resources

- Room Type: Computer Lab