Module Code	EEU44C21
Module Name	Open Reconfigurable Networks
ECTS Weighting	5 ECTS
Semester taught	Semester 2
Module Coordinator/s	Marco Ruffini, Shreejith Shanker
Module Learning Outcomes with reference to the Graduate Attributes and how they are developed in discipline	On successful completion of this module, students should be able to: 1. Explain the concept of control and data plane separation, network virtualisation and control plane programmability through Software Defined Networking and how they represents an evolution over previous networking paradigms. 2. Explain the concept of Software Defined Radio, its advantage in terms of reconfigurability and upgradeability and its application to spectrum sharing. 3. Be capable of working on software programmable networking environments, including Mininet or Mininet Optical for software defined networks (SDN) controllers, software defined radio (SDR) software stack, and access remote labs. 4. Be capable of developing control plane application and test them on emulated Mininet and Mininet optical environments and hardware testbed. 5. Be capable of developing software radio functionalities and test them in SDR laboratory.
Module Content	The module focuses around the concept of reconfigurable software defined networks, both from a fixed and wireless networking perspective. The module will start with an introduction to the concepts of Software Defined Networking, control/data plane separation and the OpenFlow protocol, and control of optical networks before going into the details of specific network controllers and the testing Mininet or Mininet Optical environment. The wireless part of the module will start with the concept of software defined radio and its use in today's networks. It will show implementation of SDR systems, and its application to dynamic spectrum access. The material learnt through the lectures will also be applied in laboratory work. This will consist of a number of introductory classes, followed by marked laboratory exercises.

Teaching and Learning Methods	Teaching and learning will be based on lectures, lab tutorials, tests and laboratory assignments.

Assessment Details[1]
Please include the following:

- **Assessment Component**
- **Assessment description**
- **Learning Outcome(s) addressed**
- **% of total**
- **Assessment due date**

Assessment Component	Assessment Description	LO Addressed	% of total	Week due
SDN application	Implement and test a network application over an SDN controller and test it over the Mininet or Mininet Optical environment.	LO 1,3,4	40%	6
SDR test	Implement SDR functionalities in a testbed platform	LO 2,3,5	40%	12
Written test 1	Test on SDN and SDR plane programmability	LO 1,2	20%	11

Reassessment Requirements	All laboratories and an assignment in place of the written tests.

Contact Hours and Indicative Student Workload

Contact hours (per student): 33
Independent Study (preparation for course and review of materials): 15 hours
Independent Study (preparation for lab assignments): 60 hours
Independent Study (preparation for written tests): 15 hours

Recommended Reading List	Reading will be based on online material that will be provided throughout the module. Although not a pre-requisite, students are

	advised to take the Next Generation Networks (4th year first semester). This is thought both to SCSS and EE 4th year students.
Module Pre-requisite	
Module Co-requisite	
Module Website	
Are other Schools/Departments involved in the delivery of this module? If yes, please provide details.	Yes, Electronic Engineering will also teach this module to his 4th year cohort. The delivery will be shared across the two schools.
Module Approval Date	
Approved by	
Academic Start Year	2024/2025
Academic Year of Date	