Module specification

1. Factual information

Module title	**TM355- Communications Technology**	**Level**	**3**
Module tutor	Dr. Naser Zaeri	**Credit value**	**30**
Module type	Taught	**Notional learning hours**	**8**

2. Rationale for the module and its links with other modules

Communications technology (TM355) – looks at the underlying technologies of modern electronic communications, such as mobile data and telephony, broadband, Wi-Fi, and optical fiber. Electronic communication is ubiquitous in homes, offices and urban environments. This module gives students an insight into these and other questions, by looking at the fundamental principles of communications technologies. Through these principles students will gain an insight into the possibilities and constraints of modern communications technology. This module complements other modules relating to networking (e.g., T215A/B, T216A/B and T316).

3. Aims of the module

TM355 is framed fairly precisely by its areas of interest: layers 1 and 2 of the OSI seven-layer model, that is the Physical Layer (layer 1) and the Data Link Layer (layer 2); and the three access technologies of optical fibre, DSL broadband and wireless.
Within this framing, TM355 is concerned to reveal and explore commonalities that cut across these technologies, such as Shannon's law, multiple access (which increasingly means orthogonal frequency division multiple access, or OFDMA), modulation techniques (in the digital world, almost synonymous with quadrature amplitude modulation, or QAM), error detection and correction, and coding. A thorough understanding of the principles of these common technologies will equip students to understand a range of communication technologies, and to understand their potential and limitations.

4. Pre-requisite modules or specified entry requirements

T215B for ITC track students.

5. Intended learning outcomes	
A. Knowledge and understanding	**Learning and teaching strategy**

Upon completing this course, students will be able to:
 	
A1. Have a sound grasp of the essential vocabulary of communications technology, be able to deploy it appropriately, and be able to explain them
 	
A2. Understand the main principles and constraints of digital communications technology at the physical and data link layers, and employ them to analyse and assess communication scenarios.
 	
A3. Understand the essential limits and trade-offs that are inherent in practical communication systems
	• The different Learning outcomes are covered in the study materials which are covered during the face-to-face meetings.
	
	• The LOs will be assessed through a number of formative and summative assessments
	
	    ○ Formative assessments include activities within module components; Activities are designed to enable students to apply the concepts that have been taught, or to explore issues that extend students' knowledge and skills. These frequently involve reading parts of the module book or other documents. Some of the activities are done during the module meetings and others are done at students' own time and discussed with each other's and the module tutor during the module meetings. Formative assessments are also in the form of feedback on the tutor marked assignment (TMA) provided by the module tutor.
	
	    ○ Summative assessments in the form of continuous assessment provided by the midterm assessment (MTA) and the tutor marked assessment (TMA) and the final exam

B. Cognitive skills	Learning and teaching strategy
Upon completing this course, students will be able to: **B1.** Use relevant data related to a communication system to model its behaviour and assess performance and resource requirements. **B2.** Explain how and why particular communications configurations and systems are used, discuss their potential and limitations.	• The module blocks include a number of activities that provides students with the mentioned cognitive skills and at the same time constitute a formative assessment of these skills. In addition, the TMA assesses and validates the cognitive skills related learning outcomes (LOs). The other assessments (MTA and Final exam) are also means for validation of the LOs.

C. Practical and professional skills	Learning and teaching strategy
Upon completing this course, students will be able to: **C1.** Write a short report or essay discussing applications of communications technology. **C2.** Be able to use third-party material critically. **C3.** Be able to incorporate copyrighted material appropriately	• The module material exposes students to real world examples of applications of communication technologies. These examples are analyzed and discussed as part of the module activities during the face-to-face meetings (some of them are done at student's own time but discussed during the tutorial sessions). • The practical and professional skills are mainly assessed in the TMA, where students apply the taught concepts by writing short report/essay discussing the applications of communications technology.

D Key transferable skills	Learning and teaching strategy
Upon completing this course, students will be able to: **D1.** Assess and synthesise information from a range of sources in order to offer an informed judgement on applications of communication technology. **D2.** Develop your own learning skills in topics related to communications technology.	• Some of the module activities require students to do scientific search to collect, assess and synthesize information from various reliable resources (research articles, magazine articles, etc.). These activities are mainly done at student's own time but under the guidance of the module tutor.

D Key transferable skills	Learning and teaching strategy
D3. Be able to learn independently from third-party materials, in order to keep up to date in communications technology.	• The transferrable skills are mainly assessed in the TMA (formative and summative).

6. Indicative content.
The module is organised in three major blocks: **Block 1** Properties of optical fibre and copper cable; the radio spectrum and propagation in a variety of environments; time-domain and frequency-domain representation; digitisation and modulation; multiplexing and multiple access; Shannon's law; the regulation and use of radio spectrum. **Block 2** Data coding and compression, including audio and video coding; motion compensation; error detection and correction; audio-visual streaming; medium access mechanism of IEEE 802.11; quality-of Service (QoS) and related issues, latency. **Block 3** Distinction between core network and access network; optical fibre in the core and access network; wavelength division multiplexing and passive optical networks; DSL broadband, how it works and why it persists; wireless and cellular communication; scheduling of resource allocation; some higher-layer protocols for authentication, confidentiality and security.

7. Assessment strategy, assessment methods and their relative weightings
MTA 30% TMA 20% Final exam 50 %

8. Mapping of assessment tasks to learning outcomes										
Assessment tasks	**Learning outcomes**									
	A1	**A2**	**A3**	**B1**	**B2**	**C1**	**C2**	**C3**	**D1**	**D2**	**D3**
TMA	X	X	X	X	X	X	X	X	X	X	X
MTA	X	X	X	X	X						
End of Semester Exam	X	X	X	X	X						

9. Teaching staff associated with the module
Name and contact details
Dr. Naser Zaeri, n.zaeri@aou.edu.kw

10. Key reading list				
Author	Year	Title	Publisher	Location
Course adopted from OU, UK.				

11. Other indicative text (e.g. websites)
https://lms.arabou.edu.kw