

DEREE COLLEGE SYLLABUS FOR:													
ITC 2101 PRINCIPLES OF WIRELESS, IoT, AND MOBILE NETWORKS													
(Fall 2020)	3/0/3 UK LEVEL: 4 UK CREDITS: 15												
PREREQUISITES:	ITC 2024 Computer Networks & Cybersecurity Fundamentals												
COREQUISITES:	None.												
CATALOG DESCRIPTION:	Signals in the time and frequency domains. Propagation of radio frequencies. Noise, large-scale path loss, small scale fading and multipath. Modulation techniques for mobile radio. Capacity of wireless channels. Error correction principles and techniques. Multiple access techniques (TDMA, CDMA, OFDM) and interference in wireless networks. Main subsystems of mobile telephony networks. Examples of existing wireless standards including IEEE 802.11 (WiFi), 3G, 4G.												
RATIONALE:	The purpose of the course is to expose students to the fundamentals of wireless telecommunications and their application in the design and operation of modern wireless and mobile networks.												
LEARNING OUTCOMES:	As a result of taking this course, the student should be able to: <ol style="list-style-type: none"> 1. Demonstrate understanding of the basic propagation properties of signals in wireless channels and the role of modulation and error correction coding. 2. Interpret basic architectures of wireless transceivers including IoT devices. 3. Explain the role of the main subsystems of modern mobile telephony networks. 4. Demonstrate understanding of the importance of standardisation in the computing and telecommunication industry. 												
METHOD OF TEACHING AND LEARNING:	In congruence with the teaching and learning strategy of the college, the following tools are used: <ul style="list-style-type: none"> • Classroom lectures, laboratory practical sessions using various simulations tools and progress meetings. • Office hours held by the instructor to provide further assistance to students. • Use of the Blackboard Learning platform, where instructors post lecture notes, assignment instructions, timely announcements, as well as additional resources. 												
ASSESSMENT:	<table border="1"> <tr> <td colspan="2">Summative:</td> </tr> <tr> <td>1st assessment: Coursework Simulations of wireless signals and their properties.</td> <td>30%</td> </tr> <tr> <td>2nd assessment: Portfolio of student work and oral assessment (not eligible for 2nd marking)</td> <td>10%</td> </tr> <tr> <td>Final assessment: Final exam Short essay questions and problem-solving cases.</td> <td>60%</td> </tr> <tr> <td colspan="2">Formative:</td> </tr> <tr> <td>Take-home short problems, quizzes, independent readings</td> <td>0%</td> </tr> </table>	Summative:		1 st assessment: Coursework Simulations of wireless signals and their properties.	30%	2 nd assessment: Portfolio of student work and oral assessment (not eligible for 2 nd marking)	10%	Final assessment: Final exam Short essay questions and problem-solving cases.	60%	Formative:		Take-home short problems, quizzes, independent readings	0%
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	<p>The formative assessments aim to shape teaching and prepare students for the summative assessments.</p> <p>The 1st summative assessment tests the LOs 1 and 2.</p> <p>The 2nd summative assessment tests the LOs 1-4.</p> <p>The final summative assessment tests the LOs 1-4.</p> <p><i>The final assessment tests all learning outcomes of this module, therefore students pass the module if the average module grade is 40% or higher.</i></p>
INDICATIVE READING:	<p>REQUIRED READING:</p> <ol style="list-style-type: none"> Digital Communications, Ian Glover and Dr. Peter Grant, Prentice Hall, 3rd edition (2009). Instructor material (notes and slides). <p>RECOMMENDED READING:</p> <ol style="list-style-type: none"> Matlab for Communications: A seminar by Prof. Dr.-Ing. Andreas Czyllwik, Free online.
INDICATIVE MATERIAL: (e.g. audiovisual, digital material, etc.)	<p>REQUIRED MATERIAL: N/A</p> <p>RECOMMENDED MATERIAL: N/A</p>
COMMUNICATION REQUIREMENTS:	<p>Daily access to the course's site on the College's Blackboard CMS.</p> <p>Effective communication using proper written and oral English.</p>
SOFTWARE REQUIREMENTS:	<p>C, Python</p> <p>Octave, Matlab (including Simulink)</p>
WWW RESOURCES:	<ul style="list-style-type: none"> • IEEE Access: https://ieeaccess.ieee.org/ • IEEE Spectrum: https://spectrum.ieee.org/ • ETSI: https://www.etsi.org/ • MIT Opencourseware: <ul style="list-style-type: none"> ○ Bits, Signals, and Packets: An Introduction to Digital Communications and Networks ○ Principles of Digital Communication II ○ Information Theory
INDICATIVE CONTENT:	<ol style="list-style-type: none"> 1. Time and frequency domain signals, Fourier transformations 2. Deterministic and stochastic signals, noise 3. Source and channel coding 4. Mobile channels 5. Analogue and digital modulations 6. Error correction codes 7. Multiples access schemes: TDMA, FDMA, CDMA 8. Transceivers' architectures 9. IoT definition, advantages and impact 10. IoT sensors and actuators 11. Cellular systems architecture 12. Overview of standards, IEEE802.11, GSM, 3G, 4G, 5G