澳門大學
UNIVERSIDADE DE MACAU
UNIVERSITY OF MACAU

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| Major Programme: | Bachelor of Science in Electrical and Computer Engineering | | |
| Course Type: | □ CM – Compulsory Major □ CPE – Community and Peer Education □ GE – General Education □ MI – Minor<br>☑ RE – Required Elective □ L&S – Languages and Skills □ FE – Free Elective | | |

GE Area in 2017/2018 model (applicable to students admitted in academic year 2017/2018 onwards)

□ Science and Technology, FHS
□ Society and Behaviour, FSS
□ Literature and Humanities, FAH
□ Global Awareness, FSS

Equivalent to 2011/2012 GE model (applicable to students admitted in academic year 2016/2017 or before)

□ Area 1 – English Language
□ Area 2 – Chinese/Foreign Language
□ Area 3 – Communication
□ Area 4 – Mathematics/Quantitative Reasoning
□ Area 5 – Information Technology and Knowledge Society
□ Area 6 – Physical Science and the World
□ Area 7 – Life Science, Health and the Human Condition
□ Area 8 – World Histories and Cultures
□ Area 9 – Macao, China and other Societies
□ Area 10 – Values, Ethics and Meaning of life
□ Area 11 – Physical Education
□ Area 12 – Visual and Performing Arts
□ Area 13 – University Life

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| Course Title:<br>(in English, Chinese and Portuguese) | Radio Frequency and Microwave Techniques for Wireless Systems<br>無線系統射頻及微波技術<br>Técnicas de Radiofrequência e Microondas para Sistemas Sem Fios | | |
| Course code | ECEN3013 | Credit Units: | 3 |
| Duration: | ☑ Semester Course □ Yearly Course | Suggested Year of Study: | Year 3 |
| Grading System: | ☑ Letter Grade □ P/NP | Pre-requisite:<br>(if any) | None |
| Medium of Instruction: | | English | |
| Text Book and Reference | • R. Ludwig and P. Bretchko, *RF Circuit Design Theory and Applications*, 2nd ed., Prentice-Hall, 2008.<br>• A. Luzzatto and M. Haridim, *Wireless Transceiver Design: Mastering the Design of Modern Wireless Equipment and Systems*, 2nd ed., Wiley, 2016. | | |
| Course Description: | This course includes the basic RF and microwave circuit design techniques for receivers and transmitters in modern wireless analog and digital communication systems. The distributed circuitry theory is discussed, including transmission line, impedance transformation, matching, smith chart, S-parameters, filters, couplers, mixers, oscillators, low noise amplifiers, and so forth. The content also includes linear and nonlinear microwave circuitry simulation, and elementary RF/microwave measurement techniques using scalar and vector network analyzers. Besides, the architectures of transmitters and receivers and their figures of merit will be discussed. The course objective allows the students to acquire the basic engineering technique | | |

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| | and ability to design and analyze the RF and microwave circuits using modern high-frequency simulation software as well as advanced RF and microwave testers. |
| Course Content | 1. Introduction to RF/MW Circuits and Systems<br>2. Transmission Line Theory<br>3. Smith Chart<br>4. Passive Components – Design of Matching Network, Filter and various Passive Components<br>5. Active Component and Its Modeling<br>6. Transceiver Network Architectures |
| Course Intended Learning Outcomes (CILO): | CILO 1: Ability to apply knowledge of mathematics, science and engineering.<br>CILO 2: Ability to design and conduct experiments.<br>CILO 3: Ability to identify, formulate and solve engineering problems.<br>CILO 4: Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.<br>CILO 5: Ability to design a system, component or process to meet desired needs.<br>CILO 6: Broad education necessary to understand the impact of engineering solutions in global and societal context.<br>CILO 7: Ability to use the computer/IT tools relevant to the discipline along with an understanding of their processes and limitations. |

| Major Assessment Methods: | Case Study | Role Playing | Student Presentation | Individual project / paper | Group project / paper | Group discussions | Writing Assignment | Exercises & problems | Service learning | Internship | Field study | Company visits | Reading & Writing Assessments / tests | Listening & Oral Assessments / tests |
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| Assignment(s) 70% | | | | | ✓ | | | | | | | | | |
| Quiz 30% | | | | | | | | ✓ | | | | | ✓ | |