澳門大學
UNIVERSIDADE DE MACAU
UNIVERSITY OF MACAU

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 □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

Course Title: (in English, Chinese and Portuguese)	Electromagnetism 電磁學 Electromagnetismo		
Course code	ECEN2005	Credit Units:	3
Duration:	☑ Semester Course □ Yearly Course	Suggested Year of Study:	Year 2
Grading System:	☑ Letter Grade □ P/NP	Pre-requisite: (if any)	None
Medium of Instruction:		English	
Text Book and Reference	Fawwaz T. Ulaby & Umberto Ravaioli "Fundamentals of Applied Electromagnetics" 7th Ed. Pearson @2015, ISBN-13: 978-0-13-335681-6 or 8th Ed. @2020 William Hayt and John Buck, "Engineering Electromagnetics" 8th Ed. McGraw-Hill Education @2012 or 9th Ed@2018 ISBN-13: 978-1260084566 David K. Cheng, "Field and Wave Electromagnetics" 2nd Ed. Pearson@1989 ISBN-13: 978-0201128192 Matthew Sadiku, "Elements of Electromagnetics" 7th Ed. Pearson Oxford University Press @2018 ISBN-13: 978-0190698614		
Course Description:	The basic relations for static electric fields in free space and material media, Coulomb's law, Gass' Law; The steady electric current and static magnetic field, Ohm's Law, Joule Law, Kichhoff's Law, Biot-Savart Law, Ampere's Law; The static magnetic field of ferromagnetic materials; Magnetic materials and hysteresis; comparison of electric and magnetic relations		

	involving polarization and magnetization; Bounded fields and Laplace's equation; Time changing electric and magnetic fields; Faraday's Law. Maxwell's displacement current; Boundary relations for electric and magnetic fields; The relation between field and circuit.
Course Content	1. Introduction to Why EM?, Wave & Phasor Notations 2. Quick Review of Commonly used coordinates & Vector Analysis 3. Brief Electrostatic Fields Principle & Applications with Dielectric Materials & simple EM Boundary Value Problems 4. Steady Electric Currents -- Ohm's Law, Joule Law, Kichhoffs Law 5. Brief Magneto-static Fields & Application Points with Magnetic Materials 6. Ferromagnetic Materials and Magnetic Circuits 7. The relation between field and circuit (and circuit elements R, L, C, etc.) 8. Analytical, Numerical and Computational EM Techniques (elementary BVP, FDM, MOM) [if time permit] 9. Time varying fields (Faraday's Law. Maxwell's displacement current) and Maxwell's equations 10. Simple Transmission Lines (only if time is permitted)
Course Intended Learning Outcomes (CILO):	CILO 1: Ability to apply knowledge of mathematics, science and engineering. CILO 2: Ability to identify, formulate and solve engineering problems. CILO 3: Ability to use the techniques, skills and modern engineering tools necessary for engineering practice. CILO 4: Ability to design and conduct experiments. CILO 5: Ability to design a system, component or process to meet desired needs. CILO 6: 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
Assignment(s) 32%					✓			✓						
Quiz 28%								✓					✓	
Final 40%													✓	