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 8 – World Histories and Cultures

□ Area 2 – Chinese/Foreign Language   □ Area 9 – Macao, China and other Societies

□ Area 3 – Communication   □ Area 10 – Values, Ethics and Meaning of life

□ Area 4 – Mathematics/Quantitative Reasoning □ Area 11 – Physical Education

□ Area 5 – Information Technology and Knowledge Society   □ Area 12 – Visual and Performing Arts

□ Area 6 – Physical Science and the World   □ Area 13 – University Life

□ Area 7 – Life Science, Health and the Human Condition

Course Title: (in English, Chinese and Portuguese)	Analog Integrated Circuit Design 模擬集成電路設計 Design de Circuitos Integrados Analógicos		
Course code	ECEN3017	Credit Units:	3
Duration:	☑ Semester Course □ Yearly Course	Suggested Year of Study:	Year 3
Grading System:	☑ Letter Grade □ P/NP	Pre-requisite: (if any)	None
Medium of Instruction:		English	

Text Book and Reference	Behzad Razavi, "Design of Analog CMOS Integrated Circuits", 2nd Edition, Mc Graw Hill.
Course Description:	This course is designed to introduce analog IC design fundamentals including single/multiple-transistor amplifiers, current mirrors, current/voltage reference, output stages, frequency response, feedback, stability, and the operational amplifier design. Students will gain the basic understanding of analog IC design and become familiar with circuit analysis, layout designs and simulation tool flow.
Course Content	Basic semiconductor physics, Transistor operation modes (cutoff, subthreshold, triode, saturation) Single-transistor amplifiers and their I/O impedance and gain, bandwidth, stability, etc. OpAmp-based building blocks; filter, inverting/non-inverting Amplifiers, integrated components (resistor, inductor and capacitor, Design of Single Stage and Two-Stage OpAmps, Layout of Integrated Circuits, Circuit Simulations.
Course Intended Learning Outcomes	CILO 1: Ability to apply knowledge of mathematics, science and engineering. CILO 2: Ability to design a system, component or process to meet desired needs.

| (CILO): | CILO 3: Ability to identify, formulate and solve engineering problems.
CILO 4: Ability to design and conduct simulations and experiments.
CILO 5: Ability to use the techniques, skills and modern engineering tools necessary for engineering practice. | | | | | | | | | | | | | |

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) 70%					✓									
Quiz 20%								✓					✓	
Others: Exercises and Problems 10%								✓						