

## COME 472 – Microwave Engineering

<b>Curricular Area</b>	<b>Electrical Engineering/ Communication Section</b>	
<b>Type of Course</b>	Mandatory – Major	
<b>Catalogue Description</b>	Scattering parameters. Microwave instrumentations: Reflection coefficient, transmission coefficient, S-parameters, powers, dielectric constant, and frequency. Microwave passive components using waveguide technology: T-junction, attenuators, isolators, circulators, couplers. Microstrip components: Power dividers, hybrid couplers. Microwave semiconductor devices: Bipolar transistor, MESFET, GUNN diode, avalanche - transit - time devices.	
<b>Prerequisites by Courses</b>	COME372: Antennas & Propagation I	
<b>Prerequisites by Topics</b>	Maxwell's equations, high frequency transmission lines, matching techniques, Smith chart, rectangular and cylindrical waveguides.	
<b>Instructors</b>	Dr. Hamza Issa Office: Faculty of engineering - Debbieh Email: <a href="mailto:h.issa@bau.edu.lb">h.issa@bau.edu.lb</a> Phone: BAU Debbieh ext: 3403	
<b>Office Hours</b>	M: 14:00-16:00, T: 10:00-11:00, W: 15:00-16:00, F: 10:00-12:00	
<b>Load</b>	3 credits; 2 Lecture-sessions/week – 50 min per session. Monday: 10h00-11h20 – and Wednesday: 10h00-11h20, Room: G130	
<b>Textbook</b>	David M. Pozar, “Microwave Engineering”, John Wiley & Sons, 4 <sup>th</sup> edition.	
<b>Topics</b>	<i>Subjects covered</i>	<i>50 min. lectures</i>
	Scattering Parameters	6
	Microwave measurements (Power, Reflection coefficient, Transmission coefficient, Scattering parameters, Dielectric constants, Frequency)	9
	Design and analysis of directional couplers	9
	Design and analysis of attenuators	3
	Design and analysis of power dividers	6
	Design and analysis of waveguide components	6
	Design and analysis of filters	6
	Total	45

<b>Learning Outcomes</b>	<b>Correlation with</b>	<b>Program Outcomes</b>	<b>Program Objectives</b>
Apply appropriate theories, principles and concepts relevant to the microwave engineering circuits and systems		A, E	1, 2
Identify, formulate and evaluate engineering problems in high frequency communication systems		D, E, K	1, 2
Analyze and design microwave measurement systems (scattering parameters, power and dielectric measurements)		E, G	1, 2
Analyze and design passive microwave circuits (matching networks,		E, K, G	1, 2

power dividers, couplers, hybrids circuits and filters)		
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Learning Outcomes Assessment Tools	Exams	HW s	Lab Reports	Project	Course Survey
Apply appropriate theories, principles and concepts relevant to the microwave engineering circuits and systems	☒	☒			☒
Identify, formulate and evaluate engineering problems in high frequency communication systems	☒	☒			☒
Analyze and design microwave measurement systems (scattering parameters, power and dielectric measurements)	☒	☒			☒
Analyze and design passive microwave circuits (matching networks, power dividers, couplers, hybrids circuits and filters)	☒	☒		☒	☒

### Assessment:

Assessment Methods	Assessment skills	Average weight
open and closed-book examinations	knowledge base and intellectual qualities	80%
Assignments submissions (problem set)	intellectual qualities and professional skills	10%
Reports and exams	intellectual qualities and professional skills	10%
Total	Total	100%

### **Schedule and Weighing of Assessments**

Assessment:	Dates	Weighing
Quiz 1 + Drop quizzes + Assignments +class work	1 <sup>st</sup> - 7 <sup>th</sup> Week	15%+ 10%+ 5%+Bonus= 30%
Quiz 2+ Drop quizzes + Assignments +class work	8 <sup>th</sup> - 12 <sup>th</sup> Week	10%+5%+5%+Bonus= 20%
Assignments+research project	13 <sup>th</sup> - 15 <sup>th</sup> Week	5%+5%= 10%
Final Exam	TBS	40%
Total		100%

### Vacations

Date	Remarks	Substitution
09/02/2015	Saint Maroun	Extending lectures
06,08,13/04/2015	Easter Holidays	NA

### Attendance:

*As set by BAU regulations, and specified in Student Manual, students who miss more than 20% of the sessions of any course excluding the first week of the semester will be withdrawn from the course with and will get a grade of "WF". The first attendance warning is issued after 10% absence. The second sued when the absence percentage becomes 15%. The course is withdrawn when the percentage reaches 20%. The "WF" grade is not taken into account in the calculation of the SGPA.*

<b>Course Coordinator</b>	Dr. Hamza Issa
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January 2016