COME 471 – Antennas & Propagation II

Curricular Area	**Electrical Engineering/ Communication Section**	
Type of Course	Mandatory – Major	
Catalogue Description	Microstrip lines. Radar systems. Line of sight radio links. Satellite systems. Special Antennas: Traveling wave antenna. Helical antenna. Yagi antenna, Antennas types that were not covered in COME372 course. Aperture principles. Microwave antennas: Horn, parabolic and microstrip. Antenna applications in remote sensing.	
Prerequisites by Courses	COME372: Antennas & Propagation I	
Prerequisites by Topics	Antennas parameters, radiation potentials. linear antennas (elementary dipole, short dipole, linear dipole), antenna arrays, loop antenna.	
Instructors	Dr. Hamza Issa Office: Faculty of engineering - Debbieh Email: h.issa@bau.edu.lb Phone: +961 7 985858 ext: 3403	
Office Hours	Monday: 14:00 – 16:00; Wednesday: 14:00 – 16:00; Friday: 12:00 – 14:00;	
Load	2 credits; 2 Lecture-sessions/week – 50 min per session, Lecture room: EB211; Lectures: Wednesday 10:00-12:00	
Textbook	C. A. Balanis, "Antenna Theory, Analysis & Design", John Wiley & Sons, 3rd edition, 1996	
Topics	*Subjects covered*	*Weeks*
	Microstrip Transmission Lines *or* Antenna parameters, arrays *(depends on advancement in COME372 pre-requisite course)*	1: 06/09/2017 2: 13/09/2017 3: 20/09/2017
	Loop antennas	4: 27/09/2017 5: 04/10/2017
	Traveling wave and helical antennas	5: 04/10/2017 6: 11/10/2017
	Yagi antennas, **Quiz 1**	7: **18/10/2017**
	Aperture, Horn and parabolic antennas	8: 25/10/2017 9: 01/11/2017 10: 08/11/2017
	Microstrip antennas	11: 15/11/2017 12: 22/11/2017 substituted 24/11/2017
	Radar: Concepts, types and systems	12: 22/11/2017 substituted 24/11/2017
	Radar: Equations and applications	13: 29/11/2017
	Line of Sight Comm: System, design procedure, analysis, links budget	13: 29/11/2017 14: 06/12/2017

	<u>Projects submission and presentations</u> **<u>Topics:</u>** Satellites Concept, types, systems, equations, applications, advancements in antenna communications. Cf: attached document.	13/12/2017
	Total	14

At the end of this course the student should be able to:

Learning Outcomes **Correlation with**	**Program Outcomes**	**Program Objectives**
Identify, formulate and evaluate engineering problems in high frequency communication system	a, d, e, i, k	1, 2, 3, 5
Describe the geometry of different planar transmission lines	d, e	1, 2
Differentiate the differences between different planar transmission lines	d, e, k	1, 2
Solve problems related to microstrip transmission lines	a, d, e	1, 2
Design microstrip transmission lines	d, e, k	1, 2
Explain the principle of antenna arrays	d, e	1
Design uniform antenna arrays for a specified radiation pattern	a, d, k, e	1, 2
Explain the operation of loop, traveling wave, Yagi and helical antennas	d, e	1
Solve problems related to loop, traveling wave, Yagi and helical antennas	a, d, e	1, 2
Design loop, traveling wave, Yagi and helical antennas	a, d, k, e	1, 2
Explain the operation of horn and parabolic reflector antennas	d, e	1
Solve problems related to horn and parabolic reflector antennas	a, d, e	1, 2
Design horn and parabolic reflector antennas	a, d, k, e	1, 2
Explain the operation of microstrip antennas	d, e	1
Solve problems related to microstrip antennas	a, d, e	1, 2
Design microstrip antennas	a, d, k, e	1, 2
Design suitable antennas for a specified pattern and application	a, d, e, i, k	1, 2, 3, 5
Analyze microwave links communication systems	a, d, e, i, k	1, 2, 3, 5
Paraphrase the theory of radar systems and identify the different types of applications	a, d, e, i, k	1, 2, 3, 5
Illustrate the concept and the analysis of satellite communication system	a, d, e, i, k	1, 2, 3, 5

Learning Outcomes Assessment Tools	**Exams**	**HW s**	**Lab Reports**	**Project**	**Course Survey**
Identify, formulate and evaluate engineering problems in high frequency communication system	☒	☒			☒
Describe the geometry of different planar transmission lines	☒				☒
Differentiate the differences between different planar transmission lines	☒	☒			☒
Solve problems related to microstrip transmission lines	☒	☒			☒
Design microstrip transmission lines	☒	☒			☒
Explain the principle of antenna arrays	☒	☒			☒
Design uniform antenna arrays for a specified radiation pattern	☒	☒			☒
Explain the operation of loop, traveling wave, Yagi and helical antennas	☒	☒			☒
Solve problems related to loop, traveling wave, Yagi and helical antennas	☒	☒			☒

Design loop, traveling wave, Yagi and helical antennas	☒	☒			☒
Explain the operation of horn and parabolic reflector antennas	☒	☒			☒
Solve problems related to horn and parabolic reflector antennas	☒	☒			☒
Design horn and parabolic reflector antennas	☒	☒			☒
Explain the operation of microstrip antennas	☒	☒			☒
Solve problems related to microstrip antennas	☒	☒			☒
Design microstrip antennas	☒	☒			☒
Design suitable antennas for a specified pattern and application	☒	☒			☒
Analyze microwave links communication systems	☒	☒		☒	☒
Paraphrase the theory of radar systems and identify the different types of applications	☒	☒		☒	☒
Illustrate the concept and the analysis of satellite communication system	☒			☒	☒

Assessment:

Assessment type	Dates	Weighing
Quiz 1 + *Assignments* + **Drop Quizzes**	Weeks 1 → 7 Wednesday: 18/10/2017	25%+5%= 30%
Class work + **Drop Quizzes**	Weeks 8 → 12	2.5%+**17.5%**= 20%
Project + Drop Quizzes	Weeks 13, 14	**7.5%**+2.5%= 10%
Assignments	Per two weeks	Included above
Final Exam	TBS	40%
Total		100%

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 "AW". The first attendance warning is issued after 10% absence. The second is issued when the absence percentage becomes 15%. The course is withdrawn when the percentage exceeds 20%. The "AW" grade is not taken into account in the calculation of the SGPA.

Course Coordinator	Dr. Hamza Issa

31/08/2017