



**MUTAH UNIVERSITY**  
**Faculty of Engineering**  
**Department of Electrical Engineering**



**Course Syllabus – 1<sup>st</sup> Semester 2022/2023**

Course Code	Course Name	Credits	Contact Hours
0401599	Mobile Communication Systems	3	3 T

**INSTRUCTOR/COORDINATOR**

<b>Name</b>	Dr. Saqer S. Alja' Afreh
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<b>Office Hours</b>	-----
<b>Classroom Time</b>	-----

**TEXTBOOK**

<b>Title</b>	From GSM to LTE an introduction to mobile networks and mobile broadband”,
<b>Author/Year/Edition</b>	Martin Sauter, - First Edition, 2011.

**Other Supplemental Materials**

<b>Title</b>	<ol style="list-style-type: none"> <li>1. Jon W. Mark, “Wireless communications and networking”, Printice Hall 2003.</li> <li>2. Theodore S. Rappaport, “Wireless communications principles and practices”, second edition, Printice Hall.</li> <li>3. Joseph Hoy, “Forensic radio survey techniques for cell site analysis.</li> </ol>
<b>Author/Year/Edition</b>	<ol style="list-style-type: none"> <li>1. Jon W. Mark/ Printice Hall/ 2003.</li> <li>2. Theodore S. Rappaport/ Second edition/ Printice Hall.</li> <li>3. Joseph Hoy.</li> </ol>

**SPECIFIC COURSE INFORMATION**

**A. Brief Description of the Content of the Course (Catalog Description)**

This course is an introductory course into the industry of mobile communications systems and networks. It covers the followings: Fundamentals of Cellular Communications: cellular concept, coverage principle, frequency reuse understanding cell and cluster size concept. Interferences in mobile communications. Mobility management and hand over. Understanding GSM/ UMTS radio principle (2G/ 3G), network planning and optimization. Understanding LTE radio principle (4G), network planning and optimization. Introduction to 5G systems. Learning technical skills related to mobile communications industry: Understanding site survey, survey equipment and documents, Understanding drive test, Understanding antennas types and their installation.

**B. Pre-requisites (P) or Co-requisites (C)**

Digital Communications (0401521) (P)

**C. Course Type (Required or Elective)**

Required

<b>SPECIFIC GOALS</b>						
<b>A. Course Learning Objectives (CLOs)</b>						
By the end of this course, the student should be able to:						
<b>CLO1:</b> To recognize the fundamental theory of cellular mobile communications [1]						
<b>CLO2:</b> To discriminate between different mobile systems generations. [1].						
<b>CLO3:</b> To discriminate between different base station sites and their equipment [1].						
<b>CLO4:</b> To understand RF network planning and optimizations. [1].						
<b>CLO5:</b> To know the required technical skills in cellular communications industry [4].						
<b>B. Student Learning Outcomes (SOs) Addressed by the Course</b>						
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
✓			✓			

<b>BRIEF LIST OF TOPICS TO BE COVERED</b>		
<b>List of Topics</b>	<b>No. of Weeks</b>	<b>Contact Hours</b>
Fundamentals of cellular mobile communications & RF measurements	3	9
- Cellular concept, coverage principle, and frequency reuse - 2G, 3G and 4G Radio principles	4	12
2G, 3G and 4G networks planning and optimization	4	12
5G radio principles	1.5	4
Technical Skills related to the mobile communications industry.	1.5	5
<b>Total</b>	<b>14</b>	<b>42</b>

<b>EVALUATION</b>		
<b>Assessment Tool</b>	<b>Due Date</b>	<b>Weight (%)</b>
Mid Exam	According to the university calendar	30
Course Work (Homeworks, Quizzes, , ...etc.)	One week after being assigned	20
Final Exam	According to the university calendar	50

**ABET's Students Learning Outcomes (Criterion # 3)**

<b>Relationship to Program Outcomes</b>			
<b>ABET 1-7</b>		<b>Weights (1-5)</b>	<b>Electrical Engineering Student Outcomes</b>
1.	✓	4	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2.			an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic
3.			an ability to communicate effectively with a range of audiences
4.	✓	1	an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5.			an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and
6.			an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7.			an ability to acquire and apply new knowledge as needed, using appropriate learning strategies