



MUTAH UNIVERSITY
Faculty of Engineering
Department of Electrical Engineering



Course Syllabus
Study Plan 2017: Communication Track

Course Code	Course Name	Credits	Contact Hours
0401215	Networks Synthesis and Filters	3	3 T

INSTRUCTOR/COORDINATOR	
Name	Dr. Amneh Al-Mbaideen
Email	a.mbaideen@mutah.edu.jo dr.a.almbaideen@gmail.com
Office Hours	

TEXTBOOK	
Title	1. "Analog And Digital Filters: Design And Realization," HARRY Y-F. LAM. Prentice-Hall, Inc
Other Supplemental Materials	
Title	1. "Network Analysis and Synthesis," F. F. Kuo, Wiley international Edition, 2008. 2. "Network Analysis And Synthesis," Singh, Mc Graw Hill India, 2013. 3. "Principles of Active Network Synthesis & Design," GobindDaryanani, John Wiley 2003 4. "Analog Filter Design", M.E. Van Valkenberg, Harcourt Brace Jovanovich College Publishers. 5. "Network Analysis and Synthesis," CL Wadhwa, New Age International Publishers.

SPECIFIC COURSE INFORMATION
A. Brief Description of the Content of the Course (Catalog Description)

This course provides the principles for Network analysis and design and Analog filters: Circuit components, Network Function, Hurwitz Polynomial, Positive Real (PR) Functions, and their properties. Properties and realization of RC, RL, and LC Driving points. Completion of Transfer functions. Passive filter approximation; The Butterworth Approximation, the Chebyshev Approximation, the Bessel Approximation, and the Bessel Approximation. Frequency scaling and network transformations. Active Filters; Direct Realization Approach and Cascade Realization Approach.

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

Signals and Systems (0401208) (P), Electric Circuits 2 (0401212) (P)

C. Course Type (Required or Elective)

Elective

SPECIFIC GOALS

A. Course Learning Outcomes (CLOs)

- CLO1:** Understand the importance of the frequency domain in the analysis of the Analog filters and networks [1].
- CLO2:** Understand the concepts of the basic building blocks used in the implementation of the Analog filters [1].
- CLO3:** Understand the Properties of Network Functions [1].
- CLO4:** Understand the concepts of Positive Real Functions and Passivity. [1].
- CLO5:** Understand the properties and Realizations of Lossless, RL, and RC Driving-Point Functions [1]
- CLO6:** Understand the methods of Passive Realization of Transfer functions [1].
- CLO7:** Understand the Filter Approximation concepts; Basic properties, Transfer function, and Circuit realization [1]
- CLO8:** Understand the concepts of frequency and network transformations and impedance scaling.
- CLO9:** Understand the concepts of the Active filters [1]
- CLO10:** Provide students with the essential tools for designing Passive filter, Active filters, RC and LC networks [2].

B. Student Learning Outcomes (SOs) Addressed by the Course

1	2	3	4	5	6	7
✓	✓					

BRIEF LIST OF TOPICS TO BE COVERED

List of Topics	No. of Weeks	Contact Hours
Chapter 1: Introduction	0.66	2
Chapter 2: Building Blocks	0.34	1

Chapter 3: Properties Of Network Functions	1	3
Chapter 4: Positive Real Functions And Passivity	1	3
Chapter 5: Properties And Realizations of Lossless Driving-Point Functions	1	3
Chapter 6: Properties And Realizations Of Passive Rc Driving-Point Functions	2	6
Chapter 7: Passive Realization Of Transfer Functions	2	6
Chapter 8: Filter Approximation	3	9
Chapter 10: Active Filters	3	9
Total	14	42

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

ABET's Students Learning Outcomes (Criterion # 3)		
Relationship to program outcomes		
ABET 1-7	Engineering Student Outcomes	
1	√	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 factors.
3		an ability to communicate effectively with a range of audiences.
4		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 meet objectives.
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.

