Faculty of Engineering & Technology

Microwave Electronic Devices

Information :

Course Code :	ELE 514	**Level :**	Undergraduate	**Course Hours :**	3.00- Hours

Department : Specialization of Electronics & Communication

Instructor Information :

Title	Name	Office hours
Professor	Mahmoud Abdelrahman Abdelfattah Abdallah	1
Lecturer	Hussein Eissa Abd Elsalam Kotb	4
Assistant Lecturer	Ahmed Essam Fahim Zahran	5
Assistant Lecturer	Ahmed Essam Fahim Zahran	5

Area Of Study :

Develop the students' knowledge about microwave electronic devices.
Prepare students to analyze, design and evaluate the main parameters of the different devices.
Train students to choose the proper and best device suitable for different communication system.

Description :

Microwave linear beam tubes (O type), double cavity klystron, multicavity klystron amplifier, travelling wave tube, backward wave oscillator, extended interaction oscillator. Microwave crossed field tubes, (M type) Multicavity magnetron oscillator, backward wave amplifier (Amplitron), backward wave crossed field oscillator (Carcinotron), Gyrotron. Microwave solid state devices: Schottky barrier mixer diodes, tunnel diodes, Gunn diodes, IMPATT diodes, microwave transistor amplifier, and oscillator

Course outcomes :

a.Knowledge and Understanding: :	
1 -	Describe the objectives and functional parameters of microwave amplifiers .
2 -	Explain the operation of microwave transistor amplifiers.
3 -	Illustrate the principles of the vacuum tubes and solid state devices.
4 -	Define the functional parameters of microwave oscillators.
5 -	Describe the operation of microwave oscillators.
b.Intellectual Skills: :	
1 -	Deduce the response of the different vacuum devices to different high voltages and beam currents.
2 -	Evaluate the performance of the microwave oscillators and amplifiers.
3 -	Analyze the different criteria of the stability of the transistor amplifiers.

c.Professional and Practical Skills: :	
1 -	Perform practically the analysis of the transistor microwave amplifier using the Smith Chart (the gain, the bandwidth, and the noise level).
d.General and Transferable Skills: :	
1 -	Communicate effectively.

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
S matrix & S parameters of microwave amplifier	5	3	2
Analysis and design of microwave transistor amplifier	5	3	2
Stability condition and calculation of the amplifier gain	5	3	2
Solid state microwave diodes(Gunn ï IMPATT- Tunnel)	10	6	4
Crossed field tubes (linear magnetron)	5	3	2
Multicavity magnetron- frequency- tuning- strapping	10	6	4
Other types of crossed field tubes	5	3	2
Velocity modulated tubes	5	3	2
Double cavity klystron- calculation of gain	5	3	2
Slow wave structures- analysis and types	5	3	2
Travelling wave tube ï structure- analysis	10	6	4
Calculation of the gain and TWT parameters C- N	5	3	2

Teaching And Learning Methodologies :

Interactive Lecturing
Discussion
Problem Solving

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Assignment	10.00		
Final Exam	40.00		
Mid- Exam 1I	15.00		
Mid- Exam I	15.00		
Oral Exam	5.00		
Quizzes	15.00		

Recommended books :

Samuel Y. Liao," Microwave devices and circuits", Prentice Hall
M. Chodrow , C. Susskind, " Fundamentals of Microwave Electronics", Mc Graw hill