

Department of Electrical Engineering			
Microwaves (63573)			
Total Credits	3		
major elective			
Prerequisites	P1 : Electromagnetic II (63374)		
Course Contents			
Fundamentals of microwave technology, analysis of transmission lines. Wave propagation on transmission lines, the terminated lossless lines, Smith chart, slotted lines, generator-load mismatch, rectangular and circular wave guides, equivalent circuit analysis of microwave systems, impedance transformation and matching techniques, directional coupler, power divider, TEM, TE, TM modes.			
Intended Learning Outcomes (ILO's)		Student Outcomes (SO's)	Contribution
1	Analyze and design simple Microwave components	C	35 %
2	Design required solutions for microwave sensitive devices using Smith Chart	K	35 %
3	Prepare related research	D	30 %
Textbook and/ or References			
1. Microwave Engineering, David M. Posar, Addison-Wesley Publishing Company. 2. W. Tomasi, Electronic Communications Systems, Prentice Hall. 3. Online Resources			
Assessment Criteria		Percent (%)	
Mid. Term Exam		25 %	
Projects		25 %	
Final Exam		50 %	
Course Plan			
Week	Topic		
1	Fundamentals of Microwave Technology		
2	Fundamentals of Microwave Technology		
3	Transmission line theory, field analysis of transmission line; general transmission line equations, transmission-line parameters.		
4	Transmission line theory: wave characteristics on infinite transmission line.		
5	Transmission line theory: the terminated lossless transmission line, lossy transmission lines, reflection on transmission lines.		
6	MIDTERM EXAM		
7	Transmission line theory: reflection coefficient and standing wave ratio, power on transmission line, the smith chart, admittances on smith chart.		
8	Impedance matching with smith chart		
9	Transmission line and wave guides: general solutions for TEM, TE and TM waves, transverse electromagnetic waves, transverse electric waves.		
10	Wave guides; rectangular wave guides; TM waves in rectangular wave guide		
11	TE waves in rectangular waveguides.		
12	S-Parameters		
13	Microwave devices (H-Tee, E-Tee, Magic Tee)		
14	Project		
15	Microwave devices (directional coupler, Isolator, attenuator)		
16	Final Exam		