

COURSE PROFILE

Course Number : EE461	Course Title : Microwave Engineering
Required / Elective : Elective	Pre-requisite : CoI, Fundamental topics in Electronics, Electromagnetic Field and Waves
Catalog Description: Introduction to microwave engineering. Transmission line theory. Transmission lines and waveguides. Impedance transformation and matching techniques. Smith Chart. Microwave network analysis and matrix representations, generalized scattering parameters and signal flow graphs. Power dividers and directional couplers. Microwave filters. Microwave amplifiers.	Textbook / Required Material : “Microwave Engineering”, 3rd Ed., David M. Pozar, John Wiley & Sons, 2005
Course Structure / Schedule : (3+0+0) 3 / 6 ECTS	
Extended Description : <ul style="list-style-type: none"> - Transmission line theory. Transmission line analysis and Smith Chart. - Planar transmission lines, microstrip, stripline and coplanar line structures. - Impedance Matching. Design of matching networks with distributed elements - Microwave Network analysis: Z,Y, ABCD matrices. Generalized Scattering parameters and signal flow graphs. - Power Divider, Coupler, and Hybrid Circuit Design. Microwave Filter Design - Microwave Amplifier Design. 	
Design content : The course requires a term project which requires the analysis, simulation and design of a microwave circuit.	Computer usage: Matlab based design, simulation and analysis of microwave circuits.
Course Outcomes: [relevant program outcomes in brackets]: <ul style="list-style-type: none"> a) An ability to apply differential and complex calculus, circuit and electromagnetic wave concepts to model and solve microwave frequency circuit problems [2] b) A thorough understanding of transmission line theory and its application in high frequency electronics [2] c) An ability to identify, formulate and evaluate engineering problems in high frequency communication systems in a multidisciplinary frame.[3],[6],[10] d) An ability to use high frequency network analysis tools, techniques and CAD tools [11]. e) An ability to analyze and design passive microwave circuits (matching networks, power dividers, couplers, hybrids and filters) [6],[7] f) An ability to analyze and design basic microwave amplifiers with matching networks[6],[7] g) An ability to work in a design project as a team and communicate effectively [8] ,[9] 	
Level of Contribution of Course to Program Outcomes: Strong: [2],[6],[3] Average: [7],[9],[11] Some:[8],[10]	

<p>Recommended reading: “RF Circuit Design”, Theory and Applications, R. Ludwig and P. Bretchko, Prentice Hall “Field and Wave Electromagnetics”, 2nd Ed., David K. Cheng, Addison-Wesley, 2002</p>																	
<p>Teaching Methods: Pre-readings, lectures, individual homework exercises, design project, presentations.</p>																	
<p>Assessment Methods: [Related to course outcomes] Homeworks, Midterm exams, Final exam, [a,c,d,e] Project and presentation, Class survey [b,c,d,f,g]</p>																	
<p>Student Workload:</p> <table> <tr> <td>Preparatory reading</td> <td>54 hrs</td> </tr> <tr> <td>Lectures</td> <td>40 hrs</td> </tr> <tr> <td>Project</td> <td>34 hrs</td> </tr> <tr> <td>Presentation</td> <td>1 hrs</td> </tr> <tr> <td>Homeworks</td> <td>14 hrs</td> </tr> <tr> <td>Midterm Exams</td> <td>4 hrs</td> </tr> <tr> <td>Final Exam</td> <td>3 hrs</td> </tr> <tr> <td>TOTAL</td> <td>150 hrs ... to match 25 x 6 ECTS</td> </tr> </table>		Preparatory reading	54 hrs	Lectures	40 hrs	Project	34 hrs	Presentation	1 hrs	Homeworks	14 hrs	Midterm Exams	4 hrs	Final Exam	3 hrs	TOTAL	150 hrs ... to match 25 x 6 ECTS
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Prepared by : Prof..Dr. Ahmet Aksen	Revision Date : 02.02.2010																