



## Course Outline

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<b>Objective</b>	<p><i>After completing this course:</i> the student should be able to know:</p> <ul style="list-style-type: none"><li>- The propagation of a transverse electromagnetic wave through different mediums: free-space, lossless and lossy dielectric, and good conductor</li><li>- The propagation characteristic of: surface, sky and space waves</li><li>- Introduction to antennas, basic antenna types and parameters</li><li>- Solving the radiation problem of wire antenna: infinitesimal, small, finite length, loop antennas</li></ul>
<b>Text Book</b>	<p><b>1-William H. Hayt, Jr. and John A. Buck "Engineering Electromagnetics", McGraw Hill, 8<sup>th</sup> Edition, 2012 (Ch.11, Ch.12, and Ch.14 – All appendices)</b></p> <p><b>2-Nathan Ida, "Engineering Electromagnetics", Springer-Verlag, 2<sup>nd</sup> Edition, 2004 (Ch.12, Ch. 13 and Ch.18 – All appendices)</b></p>
<b>References</b>	<p><b>1-John A. Richards, "Radio Wave Propagation" Springer-Verlag Berlin Heidelberg, 2008 (Ch.1, Ch.2, Ch.3 and Ch.4)</b></p> <p><b>2-Constantine A. Balanis, "Antenna Theory: Analysis and Design", 3<sup>rd</sup> Edition, Wiley &amp; Sons Inc., 2005 (Ch.1 to Ch.5)</b></p>
<b>Grading</b>	<p><b>7<sup>th</sup> Week (30%):</b> ✓ 7<sup>th</sup> Exam: 30% Exam</p> <p><b>12<sup>th</sup> Week (20%):</b> ✓ 12<sup>th</sup> Exam: 20% Exam</p> <p><b>Attendance and Activities (10%):</b> ✓ Quiz-1 + Assignment#1 5% ✓ Quiz-2 + Assignment#2 5%</p> <p><b>Final Exam (40%)</b></p>

Week No.		E V E N T	
1	7 <sup>th</sup> Feb.	Lecture	Maxwell equations in integral and differential forms – Time_Harmonic Maxwell equations – Wave equation
		Tutorial	Review of Maxwell equations, phasor and complex numbers
2	14 <sup>th</sup> Feb.	Lecture	Solution of Maxwell equations in free-space and ideal dielectrics
		Tutorial	<u>Wave-Sheet #1</u>
3	21 <sup>th</sup> Feb.	Lecture	Solution of Maxwell equations in lossy medium & good conductor
		Tutorial	<u>Wave-Sheet #2</u>
4	28 <sup>th</sup> Feb.	Lecture	Wave polarization - Plane wave Reflection of normal incident interface (free space-dielectric, Air-conductor, Losless dielectrics)
		Tutorial	<u>Wave-Sheet # 3</u>
5	7 <sup>th</sup> <u>March</u> <u>Quiz-1</u> <u>Assign-1</u>	Lecture	Standing Wave - Multy-Layers reflections - Reflection at oblique incidence (parallel polarization)
		Tutorial	<u>Wave-Sheet # 4</u>
6	14 <sup>th</sup> <u>March</u>	Lecture	Reflection at oblique incidence (prependicular polarization)
		Tutorial	<u>Wave-Sheet # 4</u>
7	21 <sup>th</sup> <u>March</u>	<b>7<sup>th</sup> Exam</b>	
8	28 <sup>th</sup> <u>March</u>	Lecture	Total transmission and Total reflection – Wave Dispersion
		Tutorial	<u>Wave-Sheet # 5</u>
9	4 <sup>th</sup> <u>April</u>	Lecture	Classification of different charactersics of radio waves: Surface, Sky and Space waves
		Tutorial	<u>Wave-Sheet # 5</u>
10	11 <sup>th</sup> <u>April</u> <u>Quiz#2</u> <u>assign#2</u>	Lecture	Introduction to Antennas - Basic antenna parameters
		Tutorial	Introduction to antenna concept and types
11	18 <sup>th</sup> <u>April</u>	Lecture	Basic antenna parameters – Antenna circuit model – Antenna modeling
		Tutorial	<u>Antenna-Sheet # 1</u>
12	25 <sup>th</sup> <u>April</u>	<b>12<sup>th</sup> Exam</b>	
13	2 <sup>nd</sup> <u>May</u>	Lecture	Short Electric dipole - Short magnetic dipole antenna
		Tutorial	<u>Antenna-Sheet # 1</u>
14	9 <sup>th</sup> <u>May</u>	Lecture	Half wave length dipole antenna
		Tutorial	<u>Antenna-Sheet # 2</u>
15	16 <sup>rd</sup> <u>May</u>	Lecture	Monopole antenna - Loop antennas
		Tutorial	<u>Antenna-Sheet # 2</u>
16	<b>Revision</b>		
<b>Final Exam</b>			
<i>Good Luck</i>			