

<b>COURSE TITLE</b>	<b>TE142320: Electromagnetic Wave Propagation</b> Credits: 2 Semester: II
<b>LEARNING OBJECTIVES</b>	To study theory and mechanisms of electromagnetic propagation over various media and diverse conditions, especially for application in radio communication systems.
<b>COMPETENCY</b>	The students will understand: <ul style="list-style-type: none"> <li>• Maxwell theory and its applications in EM wave propagation and radiation</li> <li>• EM wave propagation mechanisms in various environment conditions and related phenomena in atmospheric layers, as well as its characteristics</li> <li>• Design radio communication systems</li> </ul>
<b>SUBJECTS</b>	<ul style="list-style-type: none"> <li>• Maxwell equation for dynamic field</li> <li>• Helmholtz equation</li> <li>• Homogenous planewave</li> <li>• Wave propagation in dielectric medium and in conductor</li> <li>• Reflection and transmission mechanisms</li> <li>• Wave propagation in transmission line</li> <li>• Radiation by small antenna. Antenna parameters,</li> <li>• Radiation equation for far fields</li> <li>• Freespace propagation mechanism. Power as a function of distance. Reflection mechanism. Two path propagation model</li> <li>• Diffraction mechanism</li> <li>• Knife-edge diffraction</li> <li>• Ellipsoid Fresnel zone</li> <li>• Analytical model of multiple diffraction</li> <li>• Deterministic channel model</li> <li>• Ray tracing method</li> <li>• Stochastic channel model</li> <li>• Scattering geometrical models.</li> <li>• Empirical prediction models</li> <li>• Propagation channel variation in space and time</li> <li>• Large scale variation: log normal shadowing. Small scale radiation: Rayleigh and Rician channel model. Scattering. Ducting. Rain attenuation.</li> <li>• Ionosphere layer. Refraction. Scintillation.</li> <li>• Design and evaluation of radio communication system.</li> </ul>
<b>MAIN REFERENCES</b>	<ul style="list-style-type: none"> <li>• H. Sizon, <u>Radio Wave Propagation for Telecommunication Applications</u>, Springer, 2005.</li> </ul>
<b>OPTIONAL REFERENCES</b>	<ul style="list-style-type: none"> <li>• Jean G. Van Bladel, <u>Electromagnetic Fields</u>, Wiley-IEEE, 2007.</li> <li>• IEEE Transaction on Antenna and Electromagnetic Propagation</li> <li>• IEEE Transaction on Wireless Communications</li> </ul>
<b>PREREQUISITE</b>	-