

**Departmental Elective – III**

**Fifth year of Integrated M.Sc. (Physics)**

**M.Sc. - V, Semester – IX**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**MP 571: Electromagnetic Communication**

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| <ul style="list-style-type: none"> <li>• <b>TRANSMISSION LINES AND CABLES</b><br/>Primary Line Constants, Phase Velocity and Line Wavelength, Characteristic Impedance, Propagation Coefficient, Phase and Group Velocities, Standing Waves, Lossless Lines at Radio Frequencies, Voltage Standing-wave Ratio, Slotted-line Measurements at Radio Frequencies, Transmission Lines as Circuit Elements, Smith Chart, Time-domain Reflectometry, Telephone Lines and Cables, Radio-frequency Lines, Microstrip Transmission Lines, Use of Mathcad in Transmission Line Calculations</li> <li>• <b>INTRODUCTION TO MICROWAVE THEORY AND WAVEGUIDES</b><br/>Electromagnetic wave equation, Microwave, microwave frequency bands, Categories of microwave systems, Applications, Introduction to Waveguides, Rectangular Waveguides, Other Modes</li> <li>• <b>RADIO-WAVE PROPAGATION</b><br/>Propagation in Free Space, Tropospheric Propagation, Ionospheric Propagation, Surface Wave, Low Frequency Propagation and Very Low Frequency Propagation, Extremely Low-frequency Propagation, Summary of Radio-wave Propagation</li> <li>• <b>ANTENNAS</b><br/>Antenna Equivalent Circuits, Coordinate System, Radiation Fields, Polarization, Isotropic Radiator, Power Gain of an Antenna, Effective Area of an Antenna, Effective Length of an Antenna, Hertzian Dipole, Half-wave Dipole, Vertical Antennas, Folded Elements, Loop and Ferrite-rod Receiving Antennas, Nonresonant Antennas, Driven Arrays, Parasitic Arrays, VHF-UHF Antennas, Microwave Antennas</li> <li>• <b>SATELLITE COMMUNICATIONS</b><br/>Telephone Systems, Wire Telephony, Public Telephone Network, Problems Facsimile And Television, Facsimile Transmission, Television, Television Signal, Problems, Introduction, Kepler's First Law, Kepler's Second Law, Kepler's Third Law, Orbits, Geostationary Orbit, Power Systems, Attitude Control, Satellite Station Keeping, Antenna Look Angles, Limits of Visibility, Frequency Plans and Polarization, Transponders, Uplink Power Budget Calculations, Downlink Power Budget Calculations, Overall Link Budget Calculations, Digital Carrier Transmission, Multiple-access Methods</li> </ul> | <p><b>(10 Hours)</b></p> <p><b>(08 Hours)</b></p> <p><b>(08 Hours)</b></p> <p><b>(06 Hours)</b></p> <p><b>(10 Hours)</b></p> |
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**Total Contact Time (Theory): 42 Hours**

**BOOKS RECOMMENDED:**

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| <ol style="list-style-type: none"> <li>1. <b>Roddy D., Coolen J.</b></li> <li>2. <b>Blake R.</b></li> <li>3. <b>George K.</b></li> <li>4. <b>Simon H.</b></li> <li>5. <b>Taub and Schilling</b></li> </ol> | <p><i>Electronic Communications</i></p> <p><i>Electronic Communication Systems</i></p> <p><i>Electronic Communication Systems"</i></p> <p><i>Communication Systems</i></p> <p><i>Principles Of Communication Systems</i></p> | <p>Prentice-hall of India Pvt Ltd.</p> <p>Thomson Asia</p> <p>McGraw-Hill</p> <p>Wiley Eastern</p> <p>McGraw-Hill</p> | <p>2007</p> <p>2008</p> <p>1992</p> <p>2007</p> <p>1991</p> |
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