**Indian Institute of Information Technology, Design and Manufacturing Kancheepuram**

<table>
<tr><td>Course Title</td><td>Antenna Theory and Design</td><td>Course No</td><td colspan="5">EC51XX</td></tr>
<tr><td rowspan="2">Department/ Specialization</td><td rowspan="2">Electronics & Communication Engineering</td><td rowspan="2">Credits</td><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td>3</td><td>1</td><td>0</td><td>4</td></tr>
<tr><td>Faculty proposing the course</td><td>Dr. Rinkee Chopra</td><td>Status</td><td colspan="2">Core □</td><td colspan="2">Elective ■</td></tr>
<tr><td>Offered for</td><td>UG, PG, Ph.D.</td><td>Type</td><td colspan="2">New □</td><td colspan="2">Revision ■</td></tr>
<tr><td>To take effect from</td><td></td><td rowspan="2">Submitted for approval</td><td colspan="4" rowspan="2">48th Senate</td></tr>
<tr><td>Prerequisite</td><td>Basic knowledge of electromagnetics (Engineering Electromagnetics/Electromagnetic Waves/Any equivalent course)</td></tr>
<tr><td>Learning Objectives</td><td colspan="7">The objective of this course is to provide an in-depth understanding of antenna fundamentals, modern antenna concepts and practical antenna design for various applications.</td></tr>
<tr><td>Learning Outcomes</td><td colspan="7">At the end of this course, the students will be able to:<br>▪ Understand the foundational design aspects and performance parameters of antennas.<br>▪ Critically analyze and characterize antennas from antenna parameters.<br>▪ Analyze and design different types of antennas such as wire antennas, loop antennas, aperture antennas, reflector antennas, microstrip antennas and broadband antennas to achieve a specified performance.<br>▪ Design antenna arrays with required radiation pattern characteristics.</td></tr>
<tr><td>Course Contents (with approximate breakup of hours for lecture/ tutorial/practice)</td><td colspan="7">▪ Fundamental Concepts: Physical concept of radiation, basic antenna parameters, reciprocity theorem, Friis transmission equation. (5L+2T)<br>▪ Radiation from Wires and Loops: Dipole antennas, monopole antennas, loop antennas. (5L+1T)<br>▪ Aperture and Reflector Antennas: Huygens' principle, radiation from rectangular and circular apertures, Babinet's principle, horn antennas, reflector antennas. (6L+2T)<br>▪ Broadband Antennas: Log-periodic antennas, Yagi-Uda antennas, helical antennas, biconical antennas, spiral antennas. (6L+2T)<br>▪ Microstrip Antennas (MSAs): Radiation mechanism, parameters and applications of MSAs, feeding methods, rectangular and circular MSAs, broadband MSAs, compact and tunable MSAs, circularly polarized MSAs. (6L+2T)<br>▪ Antenna arrays: Basic concepts, linear arrays, planar arrays. (7L+2T)<br>▪ Case Study: Design and analysis of different kinds of antennae- like dipole, monopole and microstrip, etc.(5L+1T)</td></tr>
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| Essential Reading | 1. C. A. Balanis, Antenna Theory: Analysis and Design, 4th edition, John Wiley & Sons., ISBN: 9781118642061, 2016.<br>2. W. L. Stutzman, and G. A. Thiele, Antenna Theory and Design, 3rd edition, John Wiley & Sons., ISBN: 9780470576649, 2012. |
| Supplementary Reading | 1. J. D. Kraus and R. J. Marhefka, Antennas for All Applications, 3rd edition, Mc Graw Hill, ISBN: 9780072321036, 2002.<br>2. R. S. Elliot, Antenna Theory and Design, Revised edition, Wiley-IEEE Press., ISBN: 9780471449966, 2003.<br>3. R. E. Collin, Antennas and Radio Wave Propagation, McGraw-Hill., ISBN: 9780070118089, 1985. |