Advanced Radio Frequency Engineering

Course Code: CT451

Students: B. Tech. VII Semester

Structure: 3-0-2-4

Faculty: Deepak K. Ghodgaonkar (deepak_ghodgaonkar@daiict.ac.in) (Extn. 623)

Pre-Requisite: Electromagnetic Theory (SC217)

Time Table: Tuesday, Thursday and Friday (8:30 to 9:30 am)

Objectives

The objectives of this course is to develop understanding of microwaves and RF technologies in areas such as TEM mode lines, waveguides, vacuum tube and solid state devices, MMIC technology, radiation hazards, microwave measurements and applications of microwaves.

Syllabus

1. Design and analysis of TEM mode transmission lines such as open two-wire lines, coaxial line, stripline and microstripline.
3. Theory, design and analysis of rectangular and circular waveguides.
4. Rectangular and circular waveguide components such as couplers, waveguide couplings, waveguide junctions, impedance matching using irises, attenuators, resonators and phase shifters.
5. Operation and applications of microwave vacuum tube devices such as klystron, magnetron and traveling-wave tube (TWT) amplifiers.
6. Operation and applications microwave solid state devices such as Gunn diode oscillator, IMPATT diode amplifiers, bipolar transistors and MOSFET.
7. Introduction to MMIC (Monolithic Microwave Integrated Circuits) and MIC technologies.
8. Microwave Measurements with slotted lines, network analyzers, spectrum analyzers.
10. Applications of Microwaves such as radar, microwave oven, RF-ID

Course Outcome

At the end of this course students will be able to design TEM mode lines and waveguides for microwave applications. Also, students will develop expertise in making measurements such as SWR, scattering parameters, antenna gain and radiation pattern at microwave frequencies. This course gives good knowledge of all aspects of microwave technology.

Suggested Texts and References:

1. Peter A. Rizzi, Microwave Engineering: Passive Circuits, Prentice Hall.
2. G. S. Raghuvanshi, Microwave Engineering, Cengage Learning
4. Samuel Y. Liao, Microwave Devices and Circuits, Prentice Hall
Evaluation:

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<tr>
<th>Evaluation Event</th>
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<tbody>
<tr>
<td>First Quiz (23 August)</td>
<td>7%</td>
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<td>First In-Sem. Exam (24 Aug. to 27 Aug.)</td>
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<td>Second Quiz (1 October)</td>
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<td>Second In-Sem. Exam. (3 to 5 October)</td>
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<td>End-Sem. Exam. (25 Nov. to 29 Nov.)</td>
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Office Hours: Wednesday 5 to 6 pm