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| University of Mumbai | | | |
| CLASS: T.E. (Electronics Engineering) | | Semester - VI | |
| SUBJECT: MICROWAVE DEVICES AND CIRCUITS | | | |
| Periods per week (each of 60 min.) | Lecture | 04 | |
| | Practical | 02 | |
| | Tutorial | - | |
| | | Hours | Marks |
| Evaluation System | Theory Examination | 3 | 100 |
| | Practical examination | - | |
| | Oral Examination | - | |
| | | Term Work | 25 |
| | | Total | 125 |

| Module | Contents | Hours |
|----------------------|--|-------|
| Objective | With ever-increasing need for radio-frequency spectrum space, microwave communication and optical communication have grown rapidly. At shorter wavelengths the conventional low frequency circuit analysis no longer holds good and hence knowledge of electromagnetic field theory is required for an adequate description of the electrical phenomenon. An understanding of the microwave principles and working of microwave devices is presented in this course. | |
| Pre-requisite | Knowledge of basic engineering electro magnetics. | |
| 1 | <p>Introduction to microwave communications</p> <p>Microwave Spectrum and Bands, Limitations of conventional circuit theory concepts at microwave frequencies</p> <p>Applications of Microwaves.</p> | 2 |

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| 5 | Microwave solid state devices Principle of Operation and characteristics of Gunn diode, TRAPATT and IMPATT diodes, Microwave transistors, Introduction to strip lines | 5 |
| 6 | Microwave Measurement Measurement of Power, Attenuation, Frequency, VSWR, Cavity Q and Impedance | 6 |

Text Books:

- 1) Microwave Devices and Circuits, Samuel Y. Liao, PHI
- 2) Microwave Circuits and Passive Devices, M L Sisodia, G S Raghuvanshi, New Age International (p) Ltd
- 3) Microwave Engineering, Annapurna Sas ,Tata McGRAW Hills

Additional Reading:

- 1) Electronic Communication Systems, Kennedy, Davis 4e TMH
- 2) Microwave Engineering: Passive Circuits , Peter A. Rizzi. PHI
- 3) Foundations for Microwave Engineering , 2e, Robert E. Collin John Wiley,
- 4) Basic Microwave Techniques & Laboratory Manual Sisodia M.L, Raghuvanshi G.S 2001 New Age International (p) Ltd

Proposed Practical list

To plot the modes of Reflex Klystron Oscillator.

To plot the Power _ Frequency Characteristics of Reflex Klystron oscillator.

To plot the Radiation Pattern of Horn Antenna.

Study of Waveguide Attenuators.

Measurement of Standing Wave Ratio & Reflection Coefficient.

Measurement of Guide Wavelength.

Study of Directional Coupler.

V I characteristics of Gunn diode

Term work:

Term work shall consist of minimum eight experiments, Two Assignments and a written test.

The distribution of marks for term work shall be as follows,

Laboratory work (Experiments and Journal) : 10 marks.

Test (at least one) : 10 marks.

Attendance (Practical and Theory) : 05 marks.

The final certification and acceptance of term-work ensures the satisfactory performance of laboratory work and minimum passing in the term-work.

Theory Examination:

1. Question paper will comprise of total 7 questions, each of 20 marks.
 2. Only 5 questions need to be solved.
 3. Question number 1 will be compulsory and will cover all modules.
 4. Remaining questions will be from the same module or mixed in nature. (e.g.- suppose Q.2 has part (a) from, module 3 then part (b) will be from any module other than module 3.)
 5. In the question paper, weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.
 6. No question should be asked from pre-requisite module
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