# PROPOSED SCHEME OF COURSE WORK

**Course Details:**

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| **Course Title** | **: MICROWAVE AND OPTICAL COMMUNICATION LAB** | | |
| **Course Code** | **: 13EC1135** | **L T P C** | **: 0 0 3 2** |
| **Program:** | **: B. Tech.** | | |
| **Specialization:** | **: Electronics and Communication Engineering** | | |
| **Semester** | **: VII** | | |
| **Prerequisites** | **: Microwave Engineering, Optical Communications** | | |
| **Courses to which it is a prerequisite** | **: MICROWAVE AND ANTENNA DESIGN** | | |

**Course Outcomes (COs):**

At the end of the course the student will be able to

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| 1 | Verify characteristics of Reflex Klystron |
| 2 | Analyze various parameters of Waveguide Components |
| 3 | Estimate the power measurements of RF Components such as directional Couplers |
| 4 | Demonstrate characteristics of various optical sources. |
| 5 | Measure data Rate, Numerical Aperture and Losses in Optical Link. |

**Course Outcome Vs Program Outcomes:**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO-1** | **M** | **S** | **S** | | **M** | **M** | | | **M** | **M** | **S** | **S** |
| **CO-2** | **S** | **S** | **S** | **S** | | **S** | **M** | | | | | |
| **CO-3** | **S** | **S** | **S** | **S** | **M** | | | | | | | |
| **CO-4** | **S** | **S** | **S** | **S** | | **S** | **M** | | | | | |
| **CO-5** | **S** | **S** | **S** | **S** | **S** | **S** | **M** | | | | | |

*S* - Strongly correlated, *M* - *Moderately* correlated, *Blank* - *No correlation*

| Assessment Methods: | Assignment / Mid-Test / End Exam |
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## Teaching-Learning and Evaluation

| Week | TOPIC / CONTENTS | Course Outcomes | Sample questions | TEACHING-LEARNING STRATEGY | Assessment Method |
|---|---|---|---|---|---|
| 1 | Introduction to Cycle-1 | | 1.Explain different types of Microwave components | Lecture | |
| 2. | To verify Reflex Klystron Characteristics and to determine the frequency and tuning range of reflex klystron. | CO1 | 1.Verify Reflex Klystron characteristics and measure tuning range of Reflex Klystron for each mode. | Lecture Analyse | Mid-I |
| 3. | To verify Gunn Diode Characteristics. | CO1 | 1. Verify Gunn diode characteristics and identify the negative resistance region.<br>2. Obtain the frequency response characteristics of a Gunn diode. | Lecture Analyse | Mid-I |
| 4 | To analyze the fixed and variable attenuator and plot the micrometer reading Vs attenuation. | CO2 | 1. Measure attenuation for a given fixed attenuator.<br>2. Obtain the attenuation characteristics for Variable attenuator. | Lecture Analyse | Mid-I |
| 5. | To determine the coupling factors and directivity of directional coupler. | CO3 | 1. Determine the coupling factor and directivity of Directional Coupler. | Lecture Analyse | Mid-I |
| 6. | To measure the power distribution of various wave guide Tee Junctions. | CO2, CO3 | 1. When input is applied to E-plane port, measure power distribution in two other ports of E plane Tee junction. Comment on the result. | Lecture Analyse | Mid-I |
| 7. | Design Experiment-1 using HFSS Software | CO3 | | Design | Assignment-1 |

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| 8 | Revision | CO1, CO2, CO3, CO4 | | | |
| 9. | Internal-1 | CO1, CO2, CO3, CO4 | | | |
| 10. | Introduction to Cycle-2 | | 1.Explain different types of Optical sources | Lecture Analyse | |
| 11 | VSWR Measurement and load impedance calculations using smith chart. | CO3 | 1. Measure VSWR and Reflection coefficient for Magic Tee.<br>2. Measure VSWR and Reflection coefficient for a Matched load. | Lecture Analyse | Mid-II |
| 12 | Scattering parameters of Circulator. | CO2 | 1. Obtain S-matrix for Circulator. Explain how circulator can be used as Isolator. | Lecture Analyse | Mid-II |
| 13 | Characterization of Laser Diode. | CO4 | 1. Obtain characteristics of Laser diode. | Lecture Analyse | Mid-II |
| 14. | Intensity modulation of Laser output through an optical fiber. | CO5 | 1. Obtain AC characteristics of Laser Intensity modulation system. | Lecture Analyse | Mid-II |
| 15. | Measurement of Numerical Aperture of fiber cable. | CO5 | 1. Measure Numerical aperture of a given optical fiber. | Lecture Analyse | Mid-II |
| 16 | Design Experiment-2 using HFSS Software | | | Design | Assignment-2 |
| 17 | Revision | CO3<br>CO3<br>CO5 | | | |
| 18. | Internal-2 | CO3<br>CO3<br>CO5 | | | |
| 19/ 20 | END EXAM | CO1<br>CO2<br>CO3<br>CO4<br>CO5 | | | |