

## ADVANCED COMMUNICATION SYSTEMS LAB

Optical and Microwaves laboratory provides the student with facilities to learn fiber optic communication techniques and the working principle of various Microwave components. This lab is equipped with fiber optic trainer kits along with its associated modules and with microwave benches at X-band, which includes Klystron tubes, Gunn diodes, directional couplers and VSWR meters. Students carry out microwave measurements on impedance, power, frequency, VSWR, and Study the characteristics of LED and LASER and fibers. This lab is also well equipped with an anechoic chamber which is a shielded room that has radio-wave absorbing material applied to the walls, ceiling, and floor. The low level of reflections allows us to accurately measure antenna's gain, efficiency, and radiation patterns.

| S.N<br>O | NAME OF THE COMPONENTS   | QTY   |
|----------|--|-------|
| 1        | <b>Micro Wave Keytran Based Trainer Kit</b>                    | 2 Set |
|          | a) Soled State Klystran Power Supply Square Wave Sawtboth Wave |       |
|          | b) Klystran Mount Klystroun Tube                               |       |
|          | c) Isolator  |       |
|          | d) Direct Frequency Meter                                      |       |
|          | e) Vareable Attenaution  |       |
|          | f) Slatted Section   |       |
|          | g) Tunable Probe for Slotted Section                           |       |
|          | h) Detector  |       |
|          | i) Movabale Short  |       |
|          | j) Matched Termination   |       |
|          | k) VSWR Meter  |       |
|          | l) Cooling Fan   |       |
|          | m) Universal Wave Guile Stand                                  |       |
|          | n) Slide Screw Tunes   |       |

|           |  |       |
|-----------|--|-------|
|           | o) BNC to BNC Cable  |       |
| 2         | Fiber Optic Transmitter Kit                                  | 1     |
|           | Fiber Optic Receiver Kit                                     | 1     |
|           | Optical Power Meter  | 1     |
|           | Single Mode Fiber Characteristics With X, Y Planner          | 1     |
| 3         | <b>Microwave gunn diode based test based bench in x band</b> |       |
|           | 1) Gunn Power Supply   | 2     |
|           | 2)Gunn Modulator   | 2     |
|           | 3)Pin Modulator  | 2     |
|           | 4) Isolator  | 2     |
|           | 5) Frequency Meter   | 2     |
|           | 6) Variable Attenuator                                       | 2     |
|           | 7)Slotted section with probe carriage                        | 2     |
|           | 8) Tunable Probe   | 2     |
|           | 9) Detector mount  | 2     |
|           | 10) Movable Short  | 2     |
|           | 11) Termination  | 2     |
|           | 12) VSWR Meter   | 2     |
|           | 13) Waveguide stand  | 10    |
|           | 14)Slide Screw Tuner Accessories                             | 2     |
|           | Cooling Fan , TNC Cable & BNC Cable                          | Ech 2 |
| BNC Cable | 4  |       |
| 4         | Power Meter  | 1     |
| 5         | Electric Work Bench  | 4     |
| 6         | <b>Microwave Klystron Based Trainer Kit</b>                  |       |
|           | 1)a) Solid State Klystron Power Supply with digital display  | 1 Set |
|           | 2)Klystron mount with klystron tube                          |       |
|           | 3)Isolator   |       |
|           | 4)Frequency Meter  |       |
|           | 5)Variable Attenuator  |       |

|   |   |       |  |
|---|---|-------|--|
|   | 6) Slotted section with probe carriage                                      |       |  |
|   | 7) Tunable Probe Slotted section  |       |  |
|   | 8) Detector mount   |       |  |
|   | 9) Movable Short  |       |  |
|   | 10) Matched Termination   |       |  |
|   | 11) VSWR Meter  |       |  |
|   | 12) Slide Screw Tuner Accessours  |       |  |
|   | 13) Cooling Fan , TNC Cable & BNC Cable                                     |       |  |
|   | <b>Gunn diode Charactristics</b>  |       |  |
|   | 1) Gunn Power Supply  |       |  |
|   | 2) Pin Modulator  |       |  |
|   | 3) Gunn Oscillator  |       |  |
|   | 4) Isolator   |       |  |
|   | 5) Frequency Meter  |       |  |
|   | 6) Matched Termination  |       |  |
|   | 7) Variable Attenuator  |       |  |
| 3 | 6) Slotted section with probe carriage                                      | 1 Set |  |
|   | 7) Tunable Probe for Slotted section  |       |  |
|   | 8) Detector mount   |       |  |
|   | 9) VSWR Meter   |       |  |
|   | 10) Movable Short   |       |  |
|   | 11) H- Plane Tee  |       |  |
|   | 12) E- Plane Tee  |       |  |
|   | 13) Magic Tee   |       |  |
|   | 14) Multihole Directional coupler   |       |  |
|   | Cooling Fan   |       |  |
| 8 | <b>Microwave Trainer Kit to conduct Directional coupler characteristics</b> |       |  |
|   | 1) Solid State Klystron Power Supply with digital display                   |       |  |
|   | 2) Klystron mount with klystran tube  |       |  |
|   | 3) Isolator   |       |  |
|   | 4) Frequency Meter  |       |  |

|    |   |       |
|----|---|-------|
|    | 5)Variable Attenuator   |       |
|    | 6) Detector mount   |       |
|    | 7)VSWR Meter  |       |
|    | 8)Waveguide stand   |       |
|    | 9) Cooling Fan, BNC Cable   |       |
|    | 10) Multihole Directional coupler   |       |
|    | 11) Matched Termination for Directional coupler   |       |
|    | <b>S-Parameter Measurement of Isolator,Circulator,E-Plane tee,H-Plane Tee,Magic Tee,Attenuation and power measurement</b> |       |
| 9  | 1)Solid State Klystron Power Supply   | 1 Set |
|    | 2)Klystron mount with klystran tube   |       |
|    | 3)Isolater  |       |
|    | 4)Frequency Meter   |       |
|    | 5)Variable Attenuator   |       |
|    | 6) Slotted section with probe carriage  |       |
|    | 7)Tunable Probe for Slotted section   |       |
|    | 8)Detector mount  |       |
|    | 9) VSWR Meter   |       |
|    | 10)Waveguide stand  |       |
|    | 11)Cooling Fan, BNC Cable   |       |
|    | 12)Isolater   |       |
|    | 13)T-Circulator   |       |
|    | 14)E-Plane Tee,H-Plane Tee,Magic Tee  |       |
|    | 15)Fixed Attenuator And variable Attenuator   |       |
|    | 16)Matched Termination for Magic Tee,T-Circulator   |       |
| 10 | Ring resonator  | 1 Set |
|    | Power divider   |       |
|    | Power divider with Resister   |       |
|    | Branch line directional coupler   |       |
|    | Hybrid ring coupler   |       |

|    |   |   |
|----|---|---|
|    | Parallel Coupled line coupler                                   |   |
|    | Low pass filter   |   |
|    | Band pass filter  |   |
|    | High pass filter  |   |
|    | Band stop filter  |   |
|    | 50 ohm lines  |   |
|    | Power supply  |   |
|    | Mount with adapter  |   |
|    | Klystron tube   |   |
|    | Detector with adapter   |   |
|    | Mount with Horn   |   |
|    | MIC Tripod stand  |   |
|    | 50 ohm terminator   |   |
|    | Attenuator  |   |
|    | MIC Stands  |   |
|    | SMA to SMA Cable 1 feet   |   |
|    | BNC to BNC Cable  |   |
|    | VSWR Meter  |   |
|    | Power cords   |   |
| 11 | Full two port USB vector network analyzer (100 KHz - 6 GHz)     | 1 |
| 12 | Optical Fiber add Digital Communication Trainer                 | 2 |
|    | Optical fiber trainer ber measurement & pure                    | 2 |
| 13 | <b>Optical Fiber Training System - Device , Characteristics</b> |   |
|    | a) LED , Module with Power Supply                               | 2 |
|    | b) PD Module with Power Supply                                  | 2 |
|    | c) Hand Held Fibre optic Power Meter                            | 2 |
|    | d)Hand Held Fibre Optic Power Source                            | 2 |
| 14 | Optical Fibre Digital Communication Trainer                     | 2 |
| 15 | Software defined RF scalar network analyzer                     | 2 |
| 16 | 70MHz DSO   | 2 |

|    |                     |   |
|----|---------------------|---|
| 17 | Digital Multi meter | 2 |
| 18 | Antenna Chamber     | 1 |