# Microwave and Optical Communication Laboratory

This Laboratory enables IV year I Semester ECE students to perform the various experiments in the area of Microwave Engineering, Optical Communication and Antenna analysis.

**Objectives:**

1. To study and analyze microwave components by measuring various parameters.
2. To verify the characteristics of optical sources.
3. To measure attenuation and distortions in optical fiber link.
4. To analyze radiation pattern of horn antenna

**Lab Outcomes:**

1. Able to identify and demonstrate the working of various microwave and optical components.
2. Able to analyze Microwave Passive Devices by conducting experiments and measuring various parameters.
3. Able to analyze Microwave Active Devices by conducting experiments and measuring various parameters.
4. Able to analyze the characteristics of Optical Sources by conducting experiments and measuring various parameters.
5. Able to analyze the characteristics of optical fiber by conducting experiments and measuring various parameters.
6. Able to analyze antenna performance by conducting experiments and measuring various parameters.

**Faculty In-Charge** :**Mr.A Kabir Das**

**Technician** :**Mr. Nagesh**

**Area** :**66 Sq.m**

**Total Investment** :**Rs. 8,53,523.93**

**No. of experiment** : **14**

**Courses conducted** : **Microwave Engineering, Optical Communications and Antenna and Wave Propagation**

**Exclusive / Shared** : **Exclusive**

sasi INSTITUTE OF TECHNOLOGY & ENGINEERING
Accredited by NBA & NAAC with "A" Grade
Recognised by UGC under sections 2(f) & 12(B)
Approved by AICTE - New Delhi
Permanently Affiliated to JNTUK, SBTET
Ranked as "A" Grade by Govt. of A P
Department of Electronics & Communication Engineering

# Microwave and Optical Communication Laboratory

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## List of Equipment

| S.No. | Date of Purchase | Name of the Equipment | Quantity | Cost/ unit Rs/- | Total cost Rs/- |
|---|---|---|---|---|---|
| 1 | 06-08-2005 | Solid State Klystron Power Supplies | 3 | 17920 | 47523.84 |
| 2 | 06-08-2005 | Klystron Mount With Klystron Tubes | 4 | 5078.58 | 20314.32 |
| 3 | 29-09-2007 | Klystron power tubes | 2 | 3808 | 7616 |
| 4 | 06-08-2005 | Gunn power supply (X-110) | 3 | 6630 | 19890 |
| 5 | 06-08-2005 | Gunn oscillator 10mwpower (X-2152) | 4 | 11057.76 | 48231.04 |
| 6 | 06-08-2005 | Frequency Meter (Direct) (X-4155) | 3 | 8203.52 | 24610.56 |
| 7 | 06-08-2005 | Frequency Meter (micrometer type) (X-4055) | 2 | 3783.52 | 7567.04 |
| 8 | 06-08-2005 | Isolators(x-6021) | 5 | 3509.48 | 17547.4 |
| 9 | 06-08-2005 | Variable Attenuator (0-20db) (x-5020) | 5 | 3677.44 | 18387.2 |
| 10 | 06-08-2005 | Slotted Section With Probe Carriage (x-6051) | 5 | 5494.94 | 27474.7 |
| 11 | 06-08-2005 | Tunable probe (x-6055) | 5 | 2019.94 | 10099.7 |
| 12 | 06-08-2005 | Wave guide detector mount tunable Probe (x-4051) | 5 | 2934.88 | 14674.4 |
| 13 | 06-08-2005 | VSWR Meter (x-411) | 5 | 10236.72 | 51183.6 |
| 14 | 06-08-2005 | Matched termination low power (x-4000) | 5 | 1900.6 | 9503 |
| 15 | 06-08-2005 | 3-port circulator (x-6022) | 3 | 3580.2 | 10740.6 |
| 16 | 06-08-2005 | Magic Tee (x-3045) | 2 | 1927.12 | 3854.24 |
| 17 | 06-08-2005 | E-plane Tee (x-3061) | 2 | 1334.84 | 2669.68 |
| 18 | 06-08-2005 | H-plane Tee (x-4051) | 2 | 1334.84 | 2669.68 |
| 19 | 06-08-2005 | Cross directional coupler (x-6062) | 2 | 1997.84 | 3995.68 |
| 20 | 06-08-2005 | Fixed attenuator (5db) (x-5000) | 1 | 2174.64 | 2174.64 |
| 21 | 06-08-2005 | Fixed attenuator (10db) (x-5000) | 1 | 2174.64 | 2174.64 |
| 22 | 06-08-2005 | Slide screw tuner (x-4041) | 2 | 2386.8 | 4773.6 |
| 23 | 06-08-2005 | Movable short (x-4081) | 2 | 1838.72 | 3677.44 |
| 24 | 06-08-2005 | Wave guide stands (x-5035) | 30 | 406.64 | 12199.2 |
| 25 | 06-08-2005 | Cooling Fans (x-5000) | 5 | 512.72 | 2563.6 |
| 26 | 06-08-2005 | FT-2105 Analog fiber optic trainer kit | 2 | 8985.6 | 17971.2 |
| 27 | 06-08-2005 | FT-2106 digital fiber optic trainer kit | 2 | 8985.6 | 17971.2 |
| 28 | 06-08-2005 | FT-2107 LASER Diode Intensity Modulation kit | 1 | 21616.4 | 21616.4 |

| | | | | | |
|---|---|---|---|---|---|
| 29 | 22-11-2014 | Solid State Klystron Power Supplies(SKPS-610) | 3 | 15724.8 | 47,174.40 |
| 30 | 22-11-2014 | Klystron Mount With Klystron Tubes | 2 | 10327.8 | 20655.6 |
| 31 | 22-11-2014 | Gunn power supply (GS-610) | 1 | 8173.2 | 8173.2 |
| 32 | 22-11-2014 | Frequency Meter (Direct) (XF-710) | 2 | 7749 | 15498 |
| 33 | 22-11-2014 | Isolators(XI-621) | 2 | 4532 | 9072 |
| 34 | 22-11-2014 | Variable Attenuator (0-20db) (XA-520) | 2 | 3750.6 | 7501.2 |
| 35 | 22-11-2014 | Slotted Section With Probe Carriage (XS-651) | 2 | 6321 | 12642 |
| 36 | 22-11-2014 | Tunable probe (XP-655) | 2 | 1797.6 | 3595.2 |
| 37 | 22-11-2014 | Wave guide detector mount tunable Probe (XD-451) | 2 | 2940 | 5880 |
| 38 | 22-11-2014 | VSWR Meter (SW-155) | 2 | 11100.6 | 22201.2 |
| 39 | 22-11-2014 | Matched termination low power (XM-400) | 1 | 1806 | 1806 |
| 40 | 22-11-2014 | Movable short (XT-581) | 1 | 1772.4 | 1772.4 |
| 41 | 22-11-2014 | Wave guide stands | 6 | 634.2 | 3805.2 |
| 42 | 22-11-2014 | Cooling Fans | 2 | 1050 | 2100 |
| 43 | 22-11-2014 | Pyramidal Horn (XH-541) | 2 | 2444.4 | 4888.8 |
| 44 | 22-11-2014 | Parabolic Disc with feed, 8 ’’ diameter (XPD-815) | 1 | 9177 | 9177 |
| 45 | 22-11-2014 | Radiation Pattern Turn Table includes 360 degree | 1 | 9122.4 | 9122.4 |
| 46 | 01-11-2014 | DC voltmeter | 2 | 618.75 | 1238 |
| 47 | 01-11-2014 | DC Ammeter | 2 | 618.75 | 1237.8 |
| 48 | 22-11-2014 | BNC cable | 5 | 319.2 | 1596 |
| 49 | 22-11-2014 | TNC cable | 1 | 319.2 | 319.2 |
| 50 | 04-12-2014 | Digital storage oscilloscope 50MHzBW, 2channel | 5 | 16826.5 | 84133 |
| 51 | 04-12-2014 | Function pulse generator 10MHz | 2 | 9160.3 | 18321 |
| 52 | 04-12-2014 | Dual power supply (0-30)v/2Amp | 2 | 7752.6 | 15505 |
| 53 | 04-12-2014 | 31/2 Digital Multimeter (DMM-4011) | 2 | 2775.7 | 5551 |
| 54 | 21-12-2011 | Fiber optic analog transmission trainer | 1 | 6531.84 | 6531.84 |
| 55 | 05-09-2011 | Digital fiber optic link | 1 | 5537.79 | 5537.79 |
| 56 | 10-05-2010 | 20 mhz oscilloscope | 4 | 6055.53 | 24222.1 |
| 57 | 10-08-2009 | RPS Dc/02 AMP 0-30V | 1 | 1073.48 | 1073.48 |
| 58 | 11-01-2010 | RPS Single channels 30v/2A | 3 | 894.56 | 2683.7 |
| 59 | 27-04-2010 | RPS DUAL Channel 30v/1A | 3 | 1576.14 | 4728.42 |
| 60 | 21-12-2011 | Reflex klystron bench | 1 | 29030.4 | 29030.4 |
| 61 | 21-12-2011 | Gunn diode bench | 1 | 29030.4 | 29030.4 |
| 62 | 27-04-2010 | 5 KVA Servo stabilizer | 1 | 4046.85 | 4046.85 |
| **Total Cost** | | | | | **8,53,523.93** |

# Microwave and Optical Communication Laboratory
## List of Experiments

**List of Experiments as per the syllabus**

| S.No. | Name of the Experiment |
|---|---|
| **1** | Reflex Klystron Characteristics. |
| **2** | Gunn Diode Characteristics |
| **3** | Attenuation Measurement. |
| **4** | Directional Coupler Characteristics. |
| **5** | VSWR Measurement. |
| **6** | Waveguide parameters measurement. |
| **7** | Scattering parameters of Magic Tee. |
| **8** | Characterization of LED. |
| **9** | Characterization of Laser Diode. |
| **10** | Measurement of Data rate for Digital Optical link. |
| **11** | Measurement of NA |
| **12** | Measurement of losses for Analog Optical link. |

**Experiments Beyond the Syllabus:**

| S.No. | Name of the Experiment |
|---|---|
| **1** | Measurement of radiation pattern of an Horn antenna |
| **2** | Measurement of gain of an Horn antenna |