



**Gokaraju Rangaraju Institute of Engineering and Technology**  
**(Autonomous)**  
**Bachupally, Kukatpally, Hyderabad – 500 090, A.P., India. (040) 6686 4440**

Gokaraju Rangaraju Institute of Engineering and Technology  
(An Autonomous Institute under JNTUH)

**Name of the Course: Engineering physics lab**

**Course Objectives:**

1. To enable the student to draw the relevance between the theoretical knowledge and to imply it in a practical manner with respect to analyze various electronic circuits and its components.
2. To analyze the behavior and characteristics of various materials for its optimum utilization.
3. To enable the student to learn about the various electronic communication mechanisms and their usage in a practical manner.

**Course Outcomes:**

1. The student will learn to draw the relevance between theoretical knowledge and the means to imply it in a practical manner by performing various relative experiments.
2. The student will be enabled to know about the characteristics and the behavior of various materials in a practical manner and gain knowledge about various communication mediums and its usage.











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## **EXPERIMENT PLAN -1**

Academic Year: 2012-2013

Name of the Program: B.Tech BME/BT/CE/CSE/ECE/EEE/IT/ME

Course/Subject: Engineering physics Laboratory

Course Code: GR11A1007

Dept.: H&BS

Lesson No: 1

Lesson Title: **Cathode Ray Oscilloscope.**

Semester: I/II

Year: 1

Section:

Name of the Faculty:

Designation:

Duration of Lesson: 3 **hr**

### INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to measure AC and DC voltages and frequency.

TEACHING AIDS : CRO, BNC cables, battery eliminator and frequency generator.

TEACHING POINTS :

Operating function of CRO, procedure and result.

Assignment / Questions: -

1. Measure AC and DC voltages and frequency.

### **Viva questions:**

1. Define frequency and voltage.
2. Define amplitude.
3. What is sine wave and cos wave.

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## **EXPERIMENT PLAN-2**

Academic Year: 2012-2013

Name of the Program: B.Tech BME/BT/CE/CSE/ECE/EEE/IT/ME

Course/Subject: Engineering physics Laboratory

Course Code: GR11A1007

Dept.: H&BS

Lesson No: 2

Lesson Title: Digital Multimeter.

Semester: I/II

Year: 1

Section:

Name of the Faculty:

Designation:

Duration of Lesson: 3 hr

### INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to measure resistance, capacitance, voltage, frequency and test diodes.

TEACHING AIDS : Digital Multimeter, resistors, capacitors, diodes, battery eliminator and frequency generator.

TEACHING POINTS :

Color coding on resistors and capacitors, procedure and result.

Assignment / Questions: -

1. Measure the resistance on resistors, capacitance on capacitors.
2. Measure the AC and DC voltages and frequency.

### **Viva questions:**

1. Define the terms resistance, capacitance, voltage and frequency?
2. If two resistors are connected in series then what is resultant resistance?
3. If two resistors are connected in parallel then what is resultant resistance?
4. If two capacitors are connected in series then what is resultant capacitance?
5. If two capacitors are connected in parallel then what is resultant capacitance?

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### **EXPERIMENT PLAN -3**

Academic Year: 2012-2013

Name of the Program: B.Tech BME/BT/CE/CSE/ECE/EEE/IT/ME

Course/Subject: Engineering physics Laboratory

Course Code: GR11A1007

Dept.: H&BS

Lesson No: 3

Lesson Title: **Energy gap of a semiconductor.**

Semester: I/II

Year: 1

Section:

Name of the Faculty:

Designation:

Duration of Lesson: **3 hr**

#### INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to understand what is a semiconductor and energy gap magnitude inside a semiconductor.

TEACHING AIDS : Energy gap experiment kit, thermometer, coconut oil, heater and connecting wires.

TEACHING POINTS :

- 1) what is a semiconductor
- 2) forward and reverse biasing
- 3) newton's law of cooling
- 4) energy gap

#### **Assignment / Questions: -**

- 1) What is a semiconductor?
- 2) Forward and reverse biasing
- 3) Newton's law of cooling
- 4) Energy gap



**Viva questions:**

- 1) What is a semiconductor?
- 2) What is forward and reverse biasing
- 3) What newton's law of cooling?
- 4) What is energy gap?
- 5) What is intrinsic and extrinsic semiconductor?
- 6) What is n-type and p-type semiconductor?
- 7) What is doping?
- 8) Why we are taking readings only in cooling?
- 9) Why current increases with increment in temperature?
- 10) Why diode is reverse biased in this experiment?

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### **EXPERIMENT PLAN -4**

Academic Year: 2012-2013  
Name of the Program: B.Tech BME/BT/CE/CSE/ECE/EEE/IT/ME  
Course/Subject: Engineering physics Laboratory  
Course Code: GR11A1007  
Dept.: H&BS  
Lesson No: 4  
Lesson Title: **Study of magnetic field along the axis of circular coil.**

Semester: I/II  
Year: 1  
Section:  
Name of the Faculty:  
Designation:  
Duration of Lesson: **3 hr**

#### INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to understand variation of magnetic field along the axis of a circular coil carrying current.

TEACHING AIDS : Stewart & Gees type of tangent galvanometer, battery, key, rheostat, ammeter, commutator and connecting wires.

TEACHING POINTS :

- 1) Oersted discovery of magnetic field
- 2) Ampere's relation between current and magnetic field
- 3) Tangent law
- 4) Magnetic induction (B)

#### **Assignment / Questions: -**

1. What is magnetic field strength (B)?
2. What is Oersted experiment?
3. What is Ampere's Law?
4. What is Tangent Law?

#### **Viva questions:**

1. How magnetic field is produced in this experiment?
2. In what direction magnetic field is developed?
3. What is magnetic field strength?
4. What is the use of commutator in this experiment?
5. What is the direction of magnetic field at the centre?
6. How magnetic field varies with distance?

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### **EXPERIMENT PLAN-5**

Academic Year: 2012-2013

Name of the Program: B.Tech BME/BT/CE/CSE/ECE/EEE/IT/ME

Course/Subject: Engineering physics Laboratory

Course Code: GR11A1007

Dept.: H&BS

Lesson No: 5

Lesson Title: hall Effect

Semester: I/II

Year: 1

Section:

Name of the Faculty:

Designation:

Duration of Lesson: **3 hr**

#### **INSTRUCTIONAL/LESSON OBJECTIVES:**

On completion of this lesson the student shall be able to learn what are the charge carriers in given conductors or semiconductor.

**TEACHING AIDS** : Digital gauss meter, Hall Effect set up, hall probe, gauss probe, constant current supplying system, electro magnet

#### **TEACHING POINTS** :

- 1) Various charge carriers
- 2) Basic information about conductors and semiconductors
- 3) What is hall effect and hall voltage
- 4) How to find out type of charge carriers in given semiconductor or conductor

#### **Assignment / Questions: -**

- 1) What is Hall Effect and mention its applications.

#### **Viva questions:**

1. What is Hall Effect?
2. What is magnetic field strength?
3. How hall voltage is generated?
4. What is the difference between the hall voltage developed in N-type and P-type semiconductors?
5. What is hall coefficient?

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### **EXPERIMENT PLAN -6**

Academic Year: 2012-2013

Name of the Program: B.Tech BME/BT/CE/CSE/ECE/EEE/IT/ME

Course/Subject: Engineering physics Laboratory

Course Code: GR11A1007

Dept.: H&BS

Lesson No: 6

Lesson Title: **Measurement of carrier mobility and carrier density from hall experiment**

Semester: I/II

Year: 1

Section:

Name of the Faculty:

Designation:

Duration of Lesson: 3 hr

### INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to measure carrier concentration and mobility in a conductor or semiconductor.

TEACHING AIDS : Digital gauss meter, Hall Effect set up, hall probe, gauss probe, constant current supplying system, electro magnet

TEACHING POINTS :

- 1) Various charge carriers
- 2) Basic information about conductors and semiconductors
- 3) What is hall effect and hall voltage
- 4) What is mobility and carrier density in a conductor or semiconductor?
- 5) How to find out type of charge carriers in given semiconductor or conductor

**Assignment / Questions: -**

1. What is Hall Effect and mention its applications.

**Viva questions:**

1. What is Hall Effect?
2. What is magnetic field strength?
3. How hall voltage is generated?
4. What is the difference between the hall voltage developed in N-type and P-type semiconductors?
5. What is hall coefficient?
6. What is carrier mobility and carrier density in a semiconductor?

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### **EXPERIMENT PLAN -7**

Academic Year: 2012-2013  
Name of the Program: B.Tech BME/BT/CE/CSE/ECE/EEE/IT/ME  
Course/Subject: Engineering physics Laboratory  
Course Code: GR11A1007  
Dept.: H&BS  
Lesson No: 7  
Lesson Title: **Determination of numerical aperture of optical fibre.**

Semester: I/II  
Year: 1  
Section:  
Name of the Faculty:  
Designation:  
Duration of Lesson: **3 hr**

#### INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to understand significance of numerical aperture of a optical fiber.

TEACHING AIDS : numerical aperture measurement jig, optical fiber kit, one meter optical fiber cable, in-line SMA adaptor, and mandrel.

#### TEACHING POINTS :

- 1) Construction of optical fiber.
- 2) Principle of optical fiber.
- 3) Numerical aperture
- 4) Significance of Numerical Aperture.

#### **Assignment / Questions: -**

- 1) Construction of optical fiber.
- 2) Principle of optical fiber.
- 3) Numerical aperture and its Significance.
- 4) Acceptance angle and acceptance cone

#### **Viva questions:**

- 1) What are various parts of optical fiber?
- 2) Explain how light propagates in a optical fiber?
- 3) What is numerical aperture?
- 4) What is the significance of the numerical aperture?
- 5) What is Acceptance angle?
- 6) What is Acceptance cone?

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### **EXPERIMENT PLAN -8**

Academic Year: 2012-2013

Name of the Program: B.Tech BME/BT/CE/CSE/ECE/EEE/IT/ME

Course/Subject: Engineering physics Laboratory

Course Code: GR11A1007

Dept.: H&BS

Lesson No: 8

Lesson Title: **Determination of bending losses in optical fiber**

Semester: I/II

Year: 1

Section:

Name of the Faculty:

Designation:

Duration of Lesson: **3 hr**

#### INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to measure bending losses in optical fiber.

TEACHING AIDS : optical fiber kit, one-meter optical fiber, in-line SMA Adptor, Mandrel.

TEACHING POINTS :

- 1) Construction of optical fiber.
- 2) Principle of optical fiber.
- 3) Bending losses in optical fiber
- 4) Measurement of Optical Power

**Assignment / Questions: -**

- 1) What are Various Attenuations present in optical fiber?
- 2) How to measure optical power?

**Viva questions:**

- 1 Explain various parts of optical fiber?
- 2 Explain principle of optical fiber?
- 3 How losses are measured in optical fibers?
- 4 How bending of fiber leads to power loss in optical fibers?

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### **EXPERIMENT PLAN -9**

Academic Year: 2012-2013

Name of the Program: B.Tech BME/BT/CE/CSE/ECE/EEE/IT/ME

Course/Subject: Engineering physics Laboratory

Course Code: GR11A1007

Dept.: H&BS

Lesson No: 9

Lesson Title: **Determination of air gap losses in optical fiber**

Semester: I/II

Year: 1

Section:

Name of the Faculty:

Designation:

Duration of Lesson: **3 hr**

#### INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to measure airgap losses in optical fiber.

TEACHING AIDS : optical fiber kit, one-meter optical fiber, in-line SMA Adptor, Mandrel.

TEACHING POINTS :

- 1) Construction of optical fiber.
- 2) Principle of optical fiber.
- 3) Attenuation losses in optical fiber
- 4) Measurement of Optical Power

#### **Assignment / Questions: -**

1. What are Various Attenuations present in optical fiber?
2. How to measure optical power?

#### **Viva questions:**

1. Explain various parts of optical fiber?
2. Explain principle of optical fiber?
3. How losses are measured in optical fibers?
4. How airgap of fiber leads to power loss in optical fibers?

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### **EXPERIMENT PLAN -10**

Academic Year: 2012-2013

Name of the Program: B.Tech BME/BT/CE/CSE/ECE/EEE/IT/ME

Course/Subject: Engineering physics Laboratory

Course Code: GR11A1007

Dept.: H&BS

Lesson No: 10

Lesson Title: **B-H curve**

Semester: I/II

Year: 1

Section:

Name of the Faculty:

Designation:

Duration of Lesson: **3 hr**

#### INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to measure hysteresis losses in ferromagnetic materials.

TEACHING AIDS : cro, probes-h curve kit, transformer core

TEACHING POINTS :

- 1) Hysteresis exhibition by ferromagnetic materials.
- 2) hysteresis losses
- 3) Applications of ferromagnetic materials
- 4) soft and hard magnetic materials

**Assignment / Questions: -**

1. What are hysteresis losses in Ferro magnetic materials?
2. What is hysteresis?

**Viva questions:**

- 1 What is hysteresis?
- 2 What is hysteresis losses?
- 3 What are soft and hard magnetic materials?

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### **EXPERIMENT PLAN -11**

Academic Year: 2012-2013

Name of the Program: B.Tech BME/BT/CE/CSE/ECE/EEE/IT/ME

Course/Subject: Engineering physics Laboratory

Course Code: GR11A1007

Dept.: H&BS

Lesson No: 11

Lesson Title: **Determination of dielectric constant.**

Semester: I/II

Year: 1

Section:

Name of the Faculty:

Designation:

Duration of Lesson: **3 hr**

#### INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to understand what is a dielectric and a way to determine dielectric constant.

TEACHING AIDS : PZT material, thermocouple, heater, capacitance meter.

TEACHING POINTS :

- 1) What is a dielectric?
- 2) What is polarization?
- 3) Variation of capacitance with dielectric material?

#### **Assignment / Questions: -**

- 1) What is a dielectric?
- 2) What is polarization?
- 3) Variation of capacitance with dielectric material?

#### **Viva questions:**

- 1) What is a dielectric?
- 2) What is polarization?
- 3) When dielectric slab introduced in between two plates of capacitor how capacitance changes?
- 4) Explain use of various apparatus in this experiment?

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### **EXPERIMENT PLAN -12**

Academic Year: 2012-2013

Name of the Program: B.Tech BME/BT/CE/CSE/ECE/EEE/IT/ME

Course/Subject: Engineering physics Laboratory

Course Code: GR11A1007

Dept.: H&BS

Lesson No: 12

Lesson Title: **laser diode characteristics**

Semester: I/II

Year: 1

Section:

Name of the Faculty:

Designation:

Duration of Lesson: **3 hr**

#### INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to know working, V-I and L-I characteristics of laser diode.

TEACHING AIDS : laser diode kit, patch cards

TEACHING POINTS :

- |  |
|--|
| <ol style="list-style-type: none"><li>1) working of laser diode</li><li>2) basic ideas about semi-conductors</li></ol> |
|--|

#### **Assignment / Questions: -**

- 1) What are n-type and p-type semiconductors?
- 2) Explain the working of a laser diode?

#### **Viva questions:**

- 1) What are n-type and p-type semiconductors?
- 2) Explain the working of a laser diode?
- 3) What do you understand from V-I characteristics of a laser diode?
- 4) What do you understand from L-I characteristics of a laser diode?
- 5) What do you understand from +ve and -ve values of power?
- 6) What type of biasing used in this experiment?

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