



ESTD : 2007



Sri Indu Institute of Engineering and Technology (Autonomous)

(Formerly RVR Institute of Engineering & Technology)

An Autonomous Institution Under UGC

NAAC Accredited. Recognized Under 2(f) of UGC Act 1956

Approved by AICTE, New Delhi, & Affiliated to JNTUH, Hyderabad.

JNTUH CODE: X3

EAMCET CODE: INDI

COURSE FILE

ON

APPLIED PHYSICS LAB

Course Code - AP105BS

I B. Tech Semester-I

A.Y.2022-2023

Prepared by

M. JANAI AH

Asst. Professor

Head of the Department
Department of H&S
SRI INDU INSTITUTE OF ENGG & TECH
Sheriguda(VIII) Ibrahimpatnam (M) R.R. Dist-501 510

PRINCIPAL
Sri Indu Institute of Engineering & Tech.
Sheriguda(VIII), Ibrahimpatnam
R.R. Dist. Telangana-501 510.



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JNTUH CODE: X3

Name of the Physical laboratory:	APPLIED PHYSICS LAB
Course code	AP105BS
Room No	B-201&D-106
Name of the lab in charge	B. SANTHI
Name of the faculty in charge	M. JANAI AH

Index of Lab File

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INSTITUTE VISION & MISSION

Vision:

To become a premier institute of academic excellence by providing the world class education that transforms individuals into high intellectuals, by evolving them as empathetic and responsible citizens through continuous improvement.

Mission:

- **IM1:** To offer outcome-based education and enhancement of technical and practical skills.
- **IM2:** To Continuous assess of teaching-learning process through institute-industry collaboration.
- **IM3:** To be a Centre of excellence for innovative and emerging fields in technology development with state-of-art facilities to faculty and students' fraternity.
- **IM4:** To Create an enterprising environment to ensure culture, ethics and social responsibility among the stakeholders.


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Website: <https://siiet.ac.in/>



PROGRAM OUTCOMES

- PO1: ENGINEERING KNOWLEDGE:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2: PROBLEM ANALYSIS:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3: DESIGN/DEVELOPMENT OF SOLUTIONS:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- PO4: CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO5: MODERN TOOL USAGE:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- PO6: THE ENGINEER AND SOCIETY:** Apply reasoning informed by the contextual knowledge to associate, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- PO7: ENVIRONMENT AND SUSTAINABILITY:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO8: ETHICS:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- PO9: INDIVIDUAL AND TEAM WORK:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO10: COMMUNICATION:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, give and receive clear instructions.
- PO11: PROJECT MANAGEMENT AND FINANCE:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO12: LIFE-LONG LEARNING:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change


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SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY
B. Tech. in ARTIFICIAL INTELLIGENCE AND DATA SCIENCE
COURSE STRUCTURE, I YEAR SYLLABUS
(BR22 Regulations)

Applicable from Academic Year: 2022-23 Batch

I Year I Semester

S. No.	Course Code	Course Title	L	T	P	Credits
1.	MA101BS	Matrices and Calculus	3	1	0	4
2.	AP102BS	Applied Physics	3	1	0	4
3.	CS102ES	C Programming for Engineers	3	0	0	3
4.	ME102ES	Engineering Workshop	0	1	3	2.5
5.	EN104HS	English for Skill Enhancement	2	0	0	2
6.	EC101ES	Elements of Electronics and Communication Engineering	0	0	2	1
7.	AP105BS	Applied Physics Laboratory	0	0	3	1.5
8.	EN107HS	English Language and Communication Skills Laboratory	0	0	2	1
9.	CS105ES	C Programming for Engineers Laboratory	0	0	2	1
10.	*MC101ES	Environmental Science	3	0	0	0
11.		Induction Programme				
		Total	14	3	12	20

I Year II Semester

S. No.	Course Code	Course Title	L	T	P	Credits
1.	MA201BS	Ordinary Differential Equations and Vector Calculus	3	1	0	4
2.	CH203BS	Engineering Chemistry	3	1	0	4
3.	ME201ES	Computer Aided Engineering Graphics	1	0	4	3
4.	EE201ES	Basic Electrical Engineering	2	0	0	2
5.	EC201ES	Electronic Devices and Circuits	2	0	0	2
6.	CS202ES	Applied Python Programming Laboratory	0	1	2	2
7.	CH206BS	Engineering Chemistry Laboratory	0	0	2	1
8.	EE202ES	Basic Electrical Engineering Laboratory	0	0	2	1
9.	EC202ES	Electronic Devices and Circuits Laboratory	0	0	2	1
		Total	11	3	12	20

APPLIED PHYSICS LABORATORY

(Course Code: AP105BS)

B. Tech. I Year I Sem.

L	T	P	C
0	0	3	1.5

Course Objectives: The objectives of this course for the student to

1. Capable of handling instruments related to the Hall effect and photoelectric effect
Experiments and their measurements.
2. Understand the characteristics of various devices such as PN junction diode, Zener diode, BJT, LED, solar cell, lasers and optical fiber and measurement of energy gap and Resistivity of semiconductor materials.
3. Able to measure the characteristics of dielectric constant of a given material.
4. Study the behavior of B-H curve of ferromagnetic materials.
5. Understanding the method of least squares fitting.

Course Outcomes: The students will be able to:

1. Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment.
2. Appreciate quantum physics in semiconductor devices and opto electronics.
3. Gain the knowledge of applications of dielectric constant.
4. Understand the variation of magnetic field and behavior of hysteresis curve.
5. Carried out data analysis.

LIST OF EXPERIMENTS:

1. Determination of work function and Planck's constant using photoelectric effect.
2. Determination of Hall co-efficient and carrier concentration of a given semiconductor.
3. Characteristics of series and parallel LCR circuits.
4. V-I characteristics of a p-n junction diode and Zener diode
5. Input and output characteristics of BJT (CE, CB & CC configurations)
6. a) V-I and L-I characteristics of light emitting diode (LED)
b) V-I Characteristics of solar cell
7. Determination of Energy gap of a semiconductor.
8. Determination of the resistivity of semiconductor by two probe method.
9. Study B-H curve of a magnetic material.
10. Determination of dielectric constant of a given material
11. a) Determination of the beam divergence of the given LASER beam
b) Determination of Acceptance Angle and Numerical Aperture of an optical fiber.
12. Understanding the method of least squares – torsional pendulum as an example.

Note: Any 8 experiments are to be performed.

REFERENCE BOOK:

1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- S Chand Publishers 2017

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A.Y: 2022-23

SEMESTERS: I

CLASS: AI&DS

Course Outcomes

After completing this course, the student will be able to:

- C117.1** Demonstrate Photoelectric Effect and Determine the work Function and planks constant. (Understanding)L2
- C117.2** Analyzing the properties of semiconductor materials. (Analyzing)L4
- C117.3** Illustrate the characteristics of semiconductors devices. (Understanding)L2
- C117.4** Construct LCR and RC circuit and evaluate their characteristics (Applying)L3
- C117.5** Find the properties of Laser and Optical fiber. (Remembering) L1
- C117.6** Explain the properties of least squares, Dielectric and magnetic materials. (Evaluating) L5

Mapping of course outcomes with program outcomes:

High -3 Medium -2 Low-1

PO/CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO 12	PSO1	PSO2
C117.1	3	2	-	-	-	-	-	-	-	-	-	1	-	-
C117.2	3	2	-	-	-	-	-	-	-	-	-	1	-	-
C117.3	3	2	-	-	-	-	-	-	-	-	-	1	-	-
C117.4	3	2	-	-	-	-	-	-	-	-	-	1	-	-
C117.5	3	2	-	-	-	-	-	-	-	-	-	1	-	-
C117.6	3	2	-	-	-	-	-	-	-	-	-	1	-	-
AVE	3	2	-	-	-	-	-	-	-	-	-	1	-	-

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MAPPING OF EXPERIMENT OUTCOMES WITH CO/PO'S/PSO

EXPERIMENT OBJECTIVES	EXPERIMENT OUTCOMES	CO	PO'S
To determine the work function “ W_0 ” of a metal.	The student determines the work function in a given material using photoelectric effect	C117.1	PO1, PO2, PO12
1. To determine the Hall voltage developed across the sample material. 2. To calculate the Hall coefficient and the carrier concentration of the sample material	The student determines the hall voltage across the given sample and calculates the hall coefficient	C117.2	PO1, PO2, PO12
To study the frequency response and to find resonant frequency of L-C-R series and parallel Circuits.	The student studies the frequency and to find resonant frequency of L-C-R series and parallel circuits.	C117.4	PO1, PO2, PO12
To draw the characteristics of Zener diode	The student draws the characteristics of junction and Zener diodes	C117.3	PO1, PO2, PO12
Observe the i/p and o/p characteristics of BJT (CE, CB and CC)	The student observes the characteristics of BJT (CE, CB and CC)	C117.3	PO1, PO2, PO12
1. To Plot the V/I characteristics of Solar Cell 2. To study the volt-ampere characteristics of a given LED source	The student can able to plot the V/I characteristics of Solar Cell, LED	C117.3	PO1, PO2, PO12
To determine the energy gap of a junction diode	The student will be able to evaluate the energy gap between two allowed bands for isolated atoms and recognizing the resistivity of Semiconductor varies with temperature.	C117.2	PO1, PO2, PO12

To determine the resistivity of semiconductor by twoprobe method	The student will determine the resistivityof semiconductor by two probe method.	C117.2	PO1, PO2, PO12
To study B-H of a magnetic material	The student will study B-H of a magnetic material	C117.6	PO1, PO2, PO12
To determine the dielectric constant of a given material	The student will determine the dielectricconstant	C117.6	PO1, PO2, PO12
To determine the beam divergence of the given LASER beam and Numerical Aperture of anoptical fiber	The student will Determines the wave length of laser sourceusing single slit diffraction grating.	C117.5	PO1, PO2, PO12
Understanding the method of Least squares – torsional pen	The student Understanding Least squares – torsional	C117.6	PO1, PO2, PO12
To study the Charging and Discharging of a Capacitor	The student studies theCharging and Discharging of a Capacitor/Condenser	C117.5	PO1, PO2, PO12



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Class: AI & DS

Semester: I **W.E.F:** 14-11-2022

LH:- D-210

	I 9:40- 10:30	II 10:30 - 11:20	III 11:20- 12:10	12:10- 12.45	IV 12.45- 1.35	V 1.35- 2.25	VI 2.25- 3.15	VII 3.15-4.00
MON	EWS/ELCS LAB			L U N C H	AP	PPS	M&C	PPS(T)/AP(T)
TUE	ENG	ES	M&C		PPS	AP	ES	ENG(T)/M&C(T)
WED	ECSE	PPS	ES		AP	M&C	ENG	AP(T)/PPS(T)
THU	PPS LAB				ECSE	AP	ENG	M&C(T)/ENG(T)
FRI	ENG	PPS	M&C		AP LAB			ECSE(T)
SAT	PPS	AP	M&C		EWS/ELCS LAB			LIB

Course Code	Course Name	Name of the Faculty	Course Code	Course Name	Name of the Faculty
MA101BS	Matrices and Calculus	V.SUJATHA	ME102ES	Engineering Workshop	B.SRINU NAIK/A.MALLESH
AP102BS	Applied Physics	R.YADAGIRI RAO	AP105BS	Applied Physics -Lab	P.SRINIVASA CHARY /M.MANISHA/ R.YADAGIRI RAO /M.JANAIAH
CS103ES	Programming for Problem Solving	G.KALYANI	CS107ES	Programming for Problem Solving Lab	G.KALYANI /U.NARESH
EN104HS	English for Skill Enhancement	G.VENKAT REDDY	EN107HS	English Language and Communication Skills Lab	G.VENKAT REDDY/S.SWAPNA
CS106ES	Elements of Computer Science & Engineering	J.PUJITHA	MC101ES	Environmental Science	O.SUBHASHINI

[Signature]
Class In-Charge

Ch. Saitha
Time Table Coordinator



[Signature]
Head of The Department
Dr. R. YADAGIRI RAO
 M.Sc., B.Ed., M.Tech(CSE), Ph.D.
 Head of the Department
 Department of H&S
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X3

BR22

Year & Semester: I-I

Branch: AI&DS

Subject Name: Applied Physics Lab

Faculty Name: M Janaiah

EXTERNAL EXAM QUESTION PAPER

1. Determine the dielectric constant of a given material.
2. Plot the V –I Characteristics of Solar Cell.
3. Determine the work function of given metal by using photoelectric effect.
4. Plot the V –I Characteristics of LED.
5. Determine the energy gap of a given semiconductor.
6. Determine the beam divergence of the given LASER light.
7. Determine the acceptance angle and numerical aperture of an optical fiber.
8. Find Hall coefficient and carrier concentration of a given semiconductor.
9. Derive the values of i) Resonance Frequency ii) Band width iii) Quality Factor of the given LCR circuit.
10. Find Rigidity modulus of given wire using Torsional Pendulum.



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AP Lab External Time Table Examination Branch

A.Y.: 2022-23

SEM-I

DATE	Day	Branch	Session	HT. No	Total No of Students
10-3-2023	FRIDAY	AI&ML-A	FN	22X31A6601TO 22X31A6650	50
10-3-2023	FRIDAY	AI&ML-B	AN	22X31A6651TO 22X31A6697	47
11-3-2023	SATURDAY	AI&DS	FN	22X31A7201TO 22X31A7264	64
11-3-2023	SATURDAY	IOT	AN	22X31A6901TO 22X31A6963	63
13-3-2023	MONDAY	ECE	FN	22X31A0401 TO 22X31A0464	64
13-3-2023	MONDAY	CIVIL	FN	22X31A0101 TO 22X31A0103	3

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AP Lab External Time Table

Examination Branch

A.Y.: 2022-23

SEM-I

Date	Day	Branch	Session	HT. No	Total No of Students	Remarks	
						Internal Examiner	External Examiner
10-3-2023	FRIDAY	AI&ML-A	FN	22X31A6601 TO 22X31A6650	50	M.JANAIAH (9291513934)	Mr.M.Venkateswarlu (9490189395)
10-3-2023	FRIDAY	AI&ML-B	AN	22X31A6651 TO 22X31A6697	47	M.JANAIAH (9291513934)	Mr.M.Venkateswarlu (9490189395)
11-3-2023	SATURDAY	AI&DS	FN	22X31A7201 TO 22X31A7264	64	M.JANAIAH (9291513934)	Dr.B.Rajinikanth (7893092879)
11-3-2023	SATURDAY	IOT	AN	22X31A6901 TO 22X31A6963	63	P. SRINIVASA CHARY (9848662600)	Dr.B. Rajinikanth (7893092879)
13-3-2023	MONDAY	ECE	FN	22X31A0401 TO 22X31A0464	64	B. SANTHI (9493978954)	Dr B.Narasimha (9952583969)
13-3-2023	MONDAY	CIVIL	FN	22X31A0101 TO 22X31A0103	3	B. SANTHI (9493978954)	Dr B.Narasimha (9952583969)

FN: 9.40 am to 12.25 pm

AN: 1.00 pm to 4.00 pm


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Department of H&S

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DEPARTMENT OF HUMANITIES AND SCIENCES

Lab Occupancy Time Table for AY 2022-2023

Class: IB. Tech

Semester: I

W.E.F-14-11-2022

LH: B-201

Period/ Day	1	2	3	12:10- 12:45	4	5	6	7
	9:40- 10:30	10:30-11:20	11:20- 12:10		12.45-1.35	1:35- 2.25	2:25- 3:15	3:15-4:00
Monday	MAINTAINANCE			L U N C H				
Tuesday					AIML-B(BATCH-II)			
Wednesday	IOT(BATCH-II)							
Thursday	ECE(BATCH-II)				CIVIL			
Friday					AIDS(BATCH-II)			
Saturday	AIML-A(BATCH-II)				MAINTAINANCE			


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DEPARTMENT OF HUMANITIES AND SCIENCES

Lab Occupancy Time Table for AY 2022-2023

Class: IB. Tech

Semester: I

W.E.F-14-11-2022

LH: D-106

Period/ Day	1	2	3	12:10- 12:45	4	5	6	7
	9:40- 10:30	10:30- 11:20	11:20- 12:10		12:45- 1.35	1:35- 2.25	2:25- 3:15	3:15- 4:00
Monday	MAINTAINANCE			L U N C H				
Tuesday					AIML-B(BATCH-I)			
Wednesday	IOT(BATCH-I)							
Thursday	ECE(BATCH-I)							
Friday					AIDS(BATCH-I)			
Saturday	AIML-A(BATCH-I)				MAINTAINANCE			

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(M), Ranga Reddy Dist., Telangana – 501 510 Website:

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APPLIED PHYSICS LAB

Course: B. Tech. I Year

SUB CODE: AP105BS

Do's

1. Conduct in a responsible manner at all times in the laboratory.
2. Keep the work area clean, neat and free of any unnecessary objects.
3. Read the description, procedure and precautions of the experiment in the lab manual.
4. Place all sensitive electronic equipment safely on experimental table.
5. Before using the equipment, one must read the labels and instructions carefully.
6. Set up and use the equipment as directed by the lab instructor.
7. Circuit connections are to be done only in power off mode.
8. Checkout the circuit connections before switching on the power.
9. Increase the power readings from minimum to maximum.
10. All procedures and experimental data should be recorded in the lab observation notebook.
11. Switch of the power in the circuit after completion of the experiment.
12. Any failure / break-down of equipment must be reported to the instructor.
13. Return the material properly after the completing the experiment.
14. Replace the materials in proper place after work.
15. Be careful when handling optical items like prisms, gratings etc.

Don't s

1. Do not wear loose clothing and do not hold any conducting materials in contact with skin when the power is on.
2. Do not touch any equipment or other materials in the laboratory area until instructed by instructor.
3. Do not modify or damage the laboratory equipment in any way unless the modification is directed by the instructor.
4. Do not handle electrical equipment and connections with wet hands.
5. Do not try to connect power in to the circuit without proper understanding of the circuit diagram.
6. Do not look directly into laser source.
7. Do not short any battery box or power supply, it may damage retina in your eye.
8. Never switch on the power button of the circuit until it has been approved by instruction



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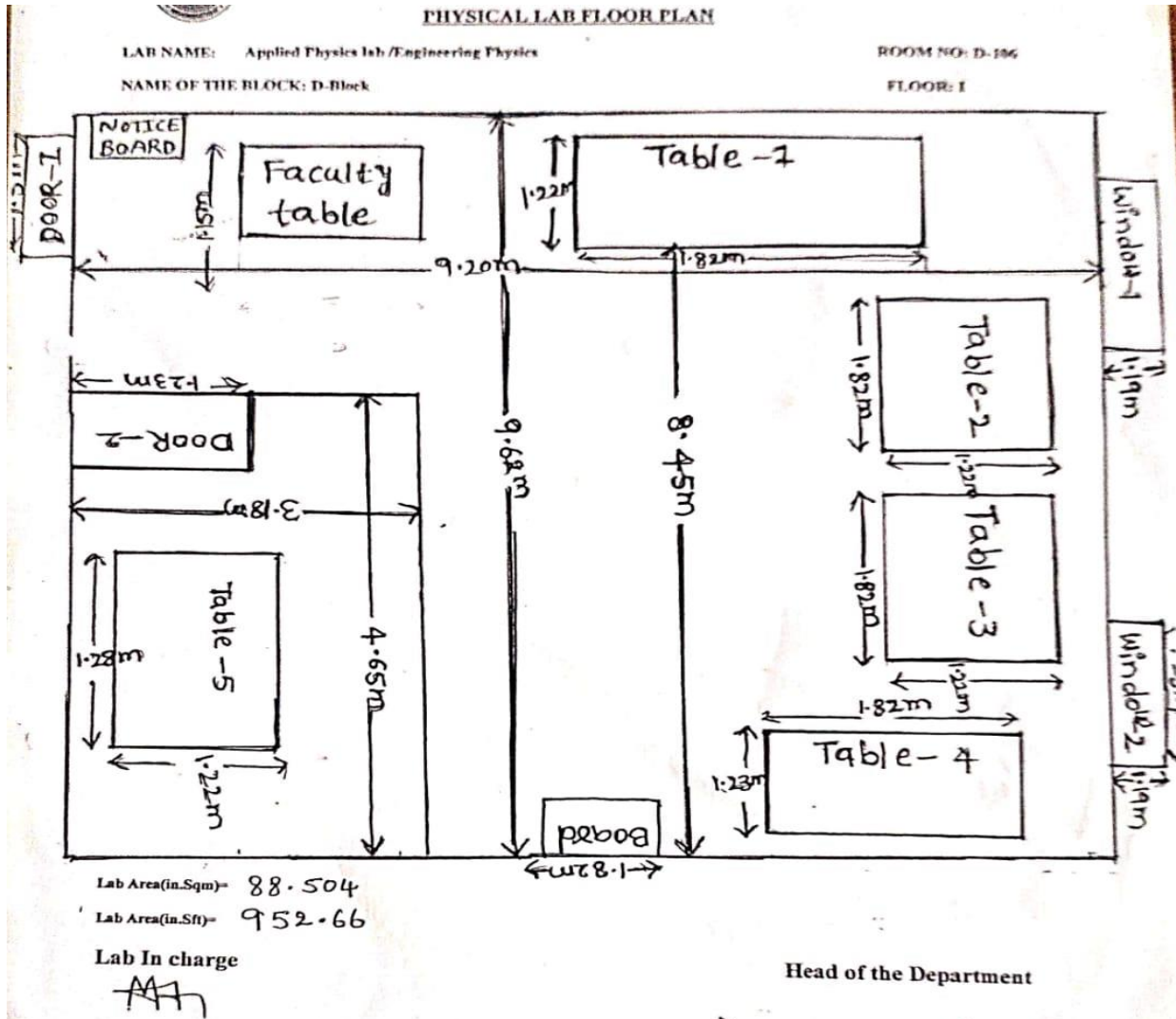
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Khalsa Ibrahimpatnam, Sheriguda (V), Ibrahimpatnam (M), Ranga Reddy Dist., Telangana – 501 510

Website: <https://siiet.ac.in/>

APPLIED PHYSICS LAB - 1 FLOOR PLAN





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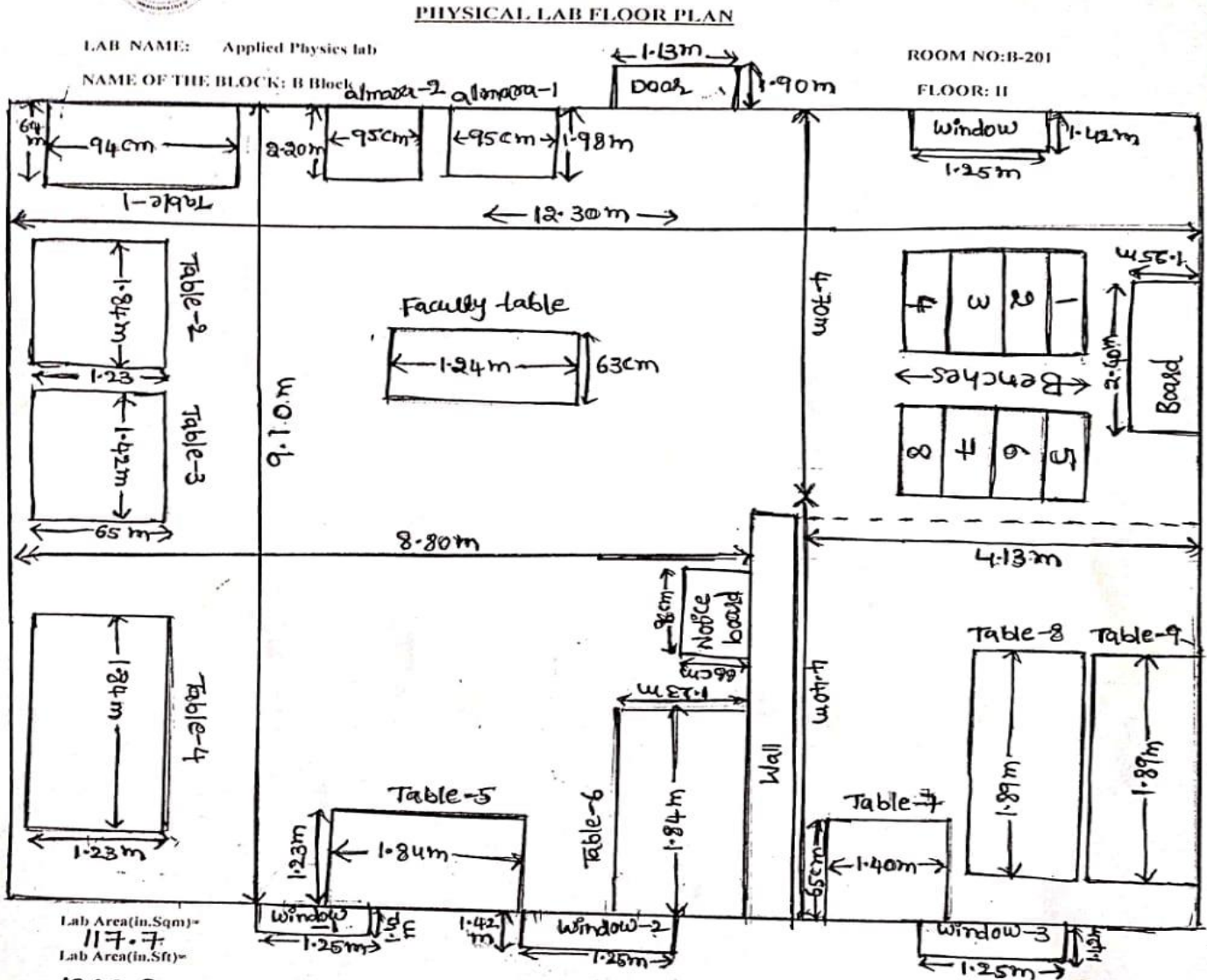
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APPLIED PHYSICS LAB - 2 FLOOR PLAN



Lab Area (in Sqm) = 117.7
 Lab Area (in Sft) = 1266.9

Lab Incharge
[Signature]

Head of the Department

[Signature]



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Lab manual link

[https://drive.google.com/file/d/1UTyWcm6bNeIw5qa_7CrdjE7PxMdQmHJ/view?
u sp=sharing](https://drive.google.com/file/d/1UTyWcm6bNeIw5qa_7CrdjE7PxMdQmHJ/view?u sp=sharing)

Target set by the faculty / HoD	6.00	6.00	6.00			
Number of students performed above the target	64	59	62			
Number of students attempted	64	64	64			
Percentage of students scored more than target	100%	92%	97%			

CO Mapping with Exam Questions:

CO - 1	y	y	Y
CO - 2	y	y	Y
CO - 3	y	y	Y
CO - 4			
CO - 5			
CO - 6			

CO Attainment based on Exam Questions:

CO - 1	100%	100%	97%
CO - 2	100%	100%	97%
CO - 3	100%	100%	97%
CO - 4			
CO - 5			
CO - 6			

CO	Intrnal practical	E+E+R	OverallI	Level	Attainment Level	
CO-1	100%	97%	98%	3	1	40%
CO-2	100%	97%	98%	3	2	50%
CO-3	100%	97%	98%	3	3	60%
CO-4						
CO-5						
CO-6						

Attainment (Internal 1 Examination) =

3

Target set by the faculty / HoD	6.00	6.00	6.00	6.00			
Number of students performed above the target	64	40	63	64			
Number of students attempted	64	64	64	64			
Percentage of students scored more than target	100%	63%	98%	100%			

CO Mapping with Exam Questions:

CO - 1							
CO - 2							
CO - 3							
CO - 4	y	y	Y	y			
CO - 5	y	y	Y	y			
CO - 6	y	y	Y	y			

CO Attainment based on Exam Questions:

CO - 1							
CO - 2							
CO - 3							
CO - 4	100%	63%	98%	98%			
CO - 5	100%	63%	98%	98%			
CO - 6	100%	63%	98%	98%			

CO	Intrnal practical	E+E+R	ppt	Overall	Level	Attainment Level	
CO-1						1	40%
CO-2						2	50%
CO-3						3	60%
CO-4	81%	98%	98%	93%	3		
CO-5	81%	98%	98%	93%	3		
CO-6	81%	98%	98%	93%	3		
Attainment (Internal 2 Examination) =					3		

SRI INDU INSTITUTE OF ENGINEERING AND TECHNOLOGY



Department of Humanities and Sciences

Course Outcome Attainment

Name of the faculty: M JAHAI AH	Academic Year: 2022 - 23
Branch & Section: AI&DS	Year / Semester: I/I
Lab Course Name: APPLIED PHYSICS	

Course Outcomes	1st Internal Exam	2nd Internal Exam	Internal Exam	University Exam	Attainment Level
CO1	3.00		3.00	2.00	2.70
CO2	3.00		3.00	2.00	2.70
CO3	3.00		3.00	2.00	2.70
CO4		3.00	3.00	2.00	2.70
CO5		3.00	3.00	2.00	2.70
CO6		3.00	3.00	2.00	2.70
Internal & University Attainment:			3.00	2.00	
Weightage			70%	30%	
CO Attainment for the course (Internal, University)			2.10	0.60	
CO Attainment for the course (Direct Method)			2.70		

Overall course attainment level	2.70
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