DEPARTMENT OF

HUMANITIES & BASIC SCIENCES

COURSE FILE

Branch: AIDS   **Class: B.Tech- I Year-I sem**

Subject: APPLIED PHYSICS   **Code: R22APH1112**

Academic Year: 2022-2023   **Regulation: R22**

Core/Elective/H&S: H&S   **Credits: 4**

Prepared By

Name: Ramu S / Dr. P.Anand

Designation: Assistant Professor

Verified By:

Head of the Department:

Name: Shilaja N

Verified by IQAC Co-ordinator

Sri Indu College of Engineering & Technology

Sheriguda (V)/ R.R.Dist

INSTITUTION VISION

To be a premier Institution in Engineering & Technology and Management with competency/ values and social consciousness.

INSTITUTION MISSION

IM$_1$ Provide high quality academic programs/ training activities and research facilities.

IM$_2$ Promote continuous Industry-Institute interaction for employability/ Entrepreneurship/ leadership and research aptitude among stakeholders.

IM$_3$ Contribute to the economical and technological development of the region/ state and nation.

PRINCIPAL

<u>DEPARTMENT VISION</u>

To be a technology, adaptive center for computing by grooming the students as top notch professionals.

<u>DEPARTMENT MISSION</u>

The Department has following Missions:

DM1: To offer quality education in computing.

DM2: To provide an environment that enables overall development of all the stakeholders.

DM3: To impart training on emerging technologies

DM4: To encourage participation of stakeholders in Research and Development.

Head of the Department (AIDS)

Department of Artificial intelligence and Data Science

PROGRAM OUTCOMES (POs) & PROGRAM SPECIFIC OUTCOMES (PSOs)

PO	Description
PO 1	**Engineering Knowledge**: Apply the knowledge of mathematics/ science/ engineering fundamentals/ and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem Analysis:** Identify/ formulate/ review research literature/ and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics/ natural sciences/ and engineering sciences.
PO 3	**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.
PO 4	**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.
PO 5	**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.
PO 6	**The engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal/ health/ safety/ legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**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.
PO 8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
PO 9	**Individual and team work:** Function effectively as an individual/ and as a member or leader in diverse teams/ and in multidisciplinary settings.
PO 10	**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/ and give and receive clear instructions.
PO 11	**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.
PO 12	**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
Program Specific Outcomes	
PSO 1	**Basic Electronic and communications knowledge:** Apply basic knowledge related to electronic circuits/ VLSI/ communication systems/ signal processing and embedded systems to solve engineering/societal problems.
PSO 2	**Design Methods:** Design/ verify and authenticate electronic functional elements for different applications/ with skills to interpret and communicate results.
PSO 3	**Experimentation & Communications:** Engineering and management concepts are used to analyze specifications and prototype electronic experiments/projects either independently or in teams.

Head of the Department (AIDS)

Program Educational Objectives (PEOs)

Program: B. Tech – Artificial intelligence and Data Science

PEO 1:   **Higher Degrees & Professional Employment:** Graduates with ability to pursue career in core industries or higher studies in reputed institution.

PEO 2:   **Domain Knowledge:** Graduates with ability to apply professional knowledge/skills to design and develop product or process.

PEO 3:   **Engineering Career:** Graduates with excellence in Electronics and Communication Engineering along with effective   inter-personnel skills.

PEO 4:   **Lifelong Learning:** Graduates equipped with skills in recent technologies and be receptive to attain professional competence through life-long learning.

Head of the Department (AIDS)

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY
(An Autonomous Institution under UGC, New Delhi)

B.Tech. - I Year – I Semester

L	T	P	C
3	1	0	4

(R22APH1112) APPLIED PHYSICS

Course Objectives: The objectives of this course for the student are to:
1. Understand the basic principles of quantum physics and band theory of solids.
2. Understand the underlying mechanism involved in construction and working principles of various semiconductor devices.
3. Study the fundamental concepts related to the dielectric, magnetic and energy materials.
4. Identify the importance of nano scale, quantum confinement and various fabrication techniques.
5. Study the characteristics of lasers and optical fibres.

Course Outcomes: At the end of the course the student will be able to:
1. Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids.
2. Identify the role of semiconductor devices in science and engineering Applications.
3. Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.
4. Appreciate the features and applications of Nano materials.
5. Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.
6. Understand the relation between various parameters or variables.

UNIT - I: QUANTUM PHYSICS AND SOLIDS
Quantum Mechanics: Introduction to quantum physics, blackbody radiation – Stefan-Boltzmann's law, Wien's and Rayleigh-Jean's law, Planck's radiation law - photoelectric effect – de Broglie concept of matter waves - Davisson and Germer experiment –Heisenberg uncertainty principle – Physical significance of the wave function – time independent Schrodinger wave equation - particle in one dimensional potential box.
Solids: Symmetry in solids, free electron theory (Drude & Lorentz, Summerfield) - Fermi-Dirac distribution - Bloch's theorem -Kronig-Penney model – E-K diagram- effective mass of electron-origin of energy bands- classification of solids.

UNIT - II: SEMICONDUCTORS AND DEVICES
Intrinsic and extrinsic semiconductors – Hall effect - direct and indirect band gap semiconductors - construction, principle of operation and characteristics of P-N Junction diode, Zener diode and bipolar junction transistor (BJT) – Operation of PNP and NPN Transistors. LED, PIN diode, avalanche photo diode (APD) and solar cells, their structure, materials, working principle and characteristics.

UNIT - III: DIELECTRIC, MAGNETIC AND ENERGY MATERIALS
Dielectric Materials: Basic definitions- types of polarizations (qualitative) - ferroelectric, piezoelectric, and Pyro electric materials – applications – liquid crystal displays (LCD) and crystal oscillators.
Magnetic Materials: Introduction-Hysteresis-soft and hard magnetic materials - magneto striction, magneto resistance - applications - bubble memory devices, magnetic field sensors and multi ferroics.
Energy Materials: Conductivity of liquid and solid electrolytes (qualitative) - super ionic conductors - materials and electrolytes for super capacitors - rechargeable ion batteries, solid fuel cells.

UNIT - IV: NANOTECHNOLOGY

Introduction, Nano scale, quantum confinement, surface to volume ratio, bottom-up fabrication: sol-gel, precipitation, combustion methods. Top-down fabrication: ball milling - physical vapor deposition (PVD) - chemical vapor deposition (CVD). Characterization techniques - XRD, SEM &TEM. Applications of nano materials.

UNIT - V: LASER AND FIBER OPTICS

Lasers: Laser beam characteristics-three quantum processes(Stimulated absorption, spontaneous emission and stimulated emission) -Einstein coefficients and their relations- lasing action - pumping methods- ruby laser, He-Ne laser, CO_2 laser, - semiconductor laser-applications of laser.

Fiber Optics: Introduction to optical fiber- advantages of optical Fibers - total internal reflection- construction of optical fiber - acceptance angle - numerical aperture- classification of optical fibers- losses in optical fiber - optical fiber for communication system - applications.

TEXT BOOKS:

1. M. N. Avadhanulu, P.G. Kshirsagar & TVS Arun Murthy" A Text book of Engineering Physics"- S. Chand Publications, 11th Edition 2019.
2. Engineering Physics by Shatendra Sharma and Jyotsna Sharma, Pearson Publication,2019
3. Semiconductor Physics and Devices- Basic Principle – Donald A, Neamen, Mc Graw Hill, 4th Edition,2021.
4. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning, 2nd Edition,2022.
5. Essentials of Nanoscience & Nanotechnology by Narasimha Reddy Katta, Typical Creatives NANO DIGEST, 1st Edition, 2021.

REFERENCE BOOKS:

1. Quantum Physics, H.C. Verma, TBS Publication, 2nd Edition 2012.
2. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley &Sons,11th Edition, 2018.
3. Introduction to Solid State Physics, Charles Kittel, Wiley Eastern, 2019.
4. Elementary Solid State Physics, S.L. Gupta and V. Kumar, Pragathi Prakashan, 2019.
5. A.K. Bhandhopadhya - Nano Materials, New Age International, 1st Edition, 2007.
6. Energy Materials a Short Introduction to Functional Materials for Energy Conversion and Storage Aliaksandr S. Bandarenka, CRC Press Taylor & Francis Group Energy Materials Taylor & Francis Group, 1st Edition, 2022.

Course Objectives:

• Students will demonstrate skills in scientific inquiry/ problem solving and laboratory techniques.

• Students will be able to demonstrate competency and understanding of the concepts found in Quantum Mechanics/ Fiber optics and lasers/ Semiconductor physics and Electromagnetic theory and a broad base of knowledge in physics.

• The graduates will be able to solve non-traditional problems that potentially draw on knowledge in multiple areas of physics.

• To study applications in engineering like memory devices/ transformer core and Electromagnetic machinery.

COs Mapping with POs & PSOs

SUB Name: APPLIED PHYSICS (C112)

SUB CODE: R22APH1112

Course out comes (COs):

Course outcomes	Statements
C112.1	Understand physical world from fundamental point of view by the concepts of Quantum mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids. (L3-Applying)
C112.2	Identify the role of semiconductor devices in science and engineering Applications. (L3-Applying)
C112.3	Explore the fundamental properties of dielectric, magnetic materials and energy for theirapplications. (L4-Analyzig)
C112.4	Appreciate the features and applications of Nano materials. (L3-Applyig))
C112.5	Understand various aspects of Lasers and Optical fiber and their applications in diverse fields. (L4-Analyzing)
C112.6	Understand the relation between various parameters or variables. (L5-Evaluating)

Course Articulation Matrix:

CO	Program Outcomes												Program Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C122.1	3	2	1	2	1	-	-	-	-	1	-	-	-	-	-
C122.2	2	2	-	3	1	2	-	-	-	2	1	2	2	2	-
C122.3	2	2	-	2	1	-	-	-	-	-	-	2	2	-	-
C122.4	1	2	1	3	3	-	-	-	-	-	1	2	2	2	-
C122.5	1	2	1	3	2	1	-	-	-	-	1	2	2	2	-
C122.6	1	1	-	-	-	-	-	-	-	-	-	1	1	-	-
C122	1.7	1.8	0.5	2.1	1.3	0.5	-	-	-	0.5	0.5	1.5	1.5	1	-

SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY
(An Autonomous Institution under UGC, New Delhi)
Recognized under 2(f) and 12(B) of UGC Act 1956
NBA Accredited, Approved by AICTE and Permanently affiliated to JNTUH
Sheriguda (V), Ibrahimpatnam, R.R.Dist, Hyderabad - 501 510

D4

BR-22

Lr.No.SICET/AUTO/DAE/BR-22/Academic Cal./655/2022   Date: 27.10.2022

I B.TECH. ACADEMIC CALENDAR
ACADEMIC YEAR : 2022-2023

Dr.G. SURESH,
Principal,

To,
All the HODs
Sir,

Sub: SICET (Autonomous) - Academic & Evaluation - Academic Calendar for **I B.Tech - I & II Semester** for the academic year **2022-23** – Reg.

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The approved Academic Calendar for **I B.Tech – I & II Semester** for the academic year **2022-23** is given below:

I SEMESTER

S.NO.	EVENT	PERIOD	DURATION
1.	Induction & Orientation Programme	03.11.2022	
2.	1st Spell of Instructions for covering First Two and a half Units	03.11.2022 – 28.12.2022	8 Weeks
3.	I Mid Examinations	29.12.2022 – 04.01.2023	1 Week
4.	Submission of I Mid Term Examination Marks to the Autonomous Section on or before	10.01.2023	
5.	2nd Spell of Instructions for covering Remaining Two and a half Units	05.01.2023 – 02.03.2023	8 Weeks
6.	II Mid Examinations	03.03.2023 – 09.03.2023	1 Week
7.	Preparation & Practical Examinations and Remidial Mid Test (RMT)	10.03.2023 – 16.03.2023	1 Week
8.	Submission of II Mid Term Examination Marks Marks to the Autonomous Section on or before	16.03.2023	
9.	I Semester End Examinations	17.03.2023 – 01.04.2023	2 Weeks

Commencement of Class-Work for I B.Tech - II Semester 03.04.2023

II SEMESTER

S.NO.	EVENT	PERIOD	DURATION
1.	Commencement of II Sem Class Work	03.04.2023	
2.	1st Spell of Instructions for covering First Two and a half Units (Including Summer Vacation)	03.04.2023 – 10.06.2023	10 Weeks
	Summer Vacation	15.05.2023 – 27.05.2023	2 Weeks
3.	I Mid Examinations	12.06.2023 – 17.06.2023	1 Week
4.	Submission of I Mid Term Examination Marks to the Autonomous Section on or before	23.06.2023	
5.	2nd Spell of Instructions for covering Remaining Two and a half Units	19.06.2023 – 12.08.2023	8 Weeks
6.	II Mid Examinations	14.08.2023 – 19.08.2023	1 Week
7.	Preparation & Practical Examinations and Remidial Mid Test (RMT)	21.08.2023 – 26.08.2023	1 Week
8.	Submission of II Mid Term Examination Marks Marks to the Autonomous Section on or before	26.08.2023	
9.	II Semester End Examinations	28.08.2023 – 09.09.2023	2 Weeks

Commencement of Class Work for II B.Tech – I Semester - 11.09.2023

ACE   CE   DEAN   PRINCIPAL

Copy to all the Heads of the Depts. and AO.

CONTROLLER OF EXAMINATIONS
Sri Indu College of Engineering & Technology
(An Autonomous Institution under JNTUH)
Sheriguda (V), Ibrahimpatnam, R.R. Dist-501510.

DIRECTOR
(Academic Audit)
Sri Indu College of Engineering & Technology
Sheriguda, IBP, R.R. Dist-501510.

PRINCIPAL
Sri Indu College of Engineering & Technology
(An Autonomous Institution Under JNTUH)
Sheriguda (V), Ibrahimpatnam, R.R. Dist-501510.

SRI INDU COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)
DEPARTMENT OF HUMANITIES & SCIENCES
DEPARTMENT CALENDAR – 2022-2023 (I B.Tech – I SEMESTER)

DAYS	NOV	November-22	DEC	December-22	JAN	January-23	FEB	February-23	MAR	March-23	APR	April-23
DAYS						JANUARY -23					1	I SEMESTER END EXAMINATIONS
SUNDAY					1	NEW YEAR/ HOLIDAY					2	HOLIDAY
MONDAY		NOVEMBER -22			2	MID I EXAM					3	COMMENCEMENT OF II SEMESTER CLASSES- I MID
TUESDAY	1				3	MID I EXAM		FEBRUARY - 23		MARCH - 23	4	BABU JAGJEEVAN RAM B'DAY
WEDNESDAY	2			DECEMBER - 22	4	MID I EXAM	1		1		5	
THURSDAY	3	INDUCTION & ORIENTATION PROGRAM I SEMESTER CLASSES- I MID	1		5	I SEMESTER CLASSES- II MID	2		2		6	
FRIDAY	4		2		6		3		3	MID II EXAM	7	GOOD FRIDAY
SATURDAY	5		3		7		4		4	MID II EXAM	8	
SUNDAY	6	HOLIDAY	4	HOLIDAY	8	HOLIDAY	5	HOLIDAY	5	HOLIDAY	9	HOLIDAY
MONDAY	7	INDUCTION & ORIENTATION PROGRAM I SEMESTER CLASSES- I MID	5		9		6		6	MID II EXAM	10	
TUESDAY	8		6		10		7		7	MID II EXAM	11	
WEDNESDAY	9		7		11		8		8	HOLI	12	
THURSDAY	10		8		12		9		9	MID II EXAM	13	
FRIDAY	11		9		13		10		10	PREPARATION & LAB END EXAMINATIONS	14	AMBEDKAR JAYANTHI
SATURDAY	12		10		14	BHOGI/ HOLIDAY	11		11		15	
SUNDAY	13	HOLIDAY	11	HOLIDAY	15	PONGAL/ HOLIDAY	12	HOLIDAY	12	HOLIDAY	16	HOLIDAY
MONDAY	14		12		16	KANUMA/ HOLIDAY	13		13	PREPARATION & LAB END EXAMINATIONS	17	
TUESDAY	15		13		17		14		14		18	
WEDNESDAY	16		14		18		15		15		19	
THURSDAY	17		15		19		16		16		20	
FRIDAY	18		16		20		17		17	I SEMESTER END EXAMINATIONS	21	
SATURDAY	19		17		21		18	SIVARATHRI/ HOLIDAY	18		22	RAMZAN
SUNDAY	20	HOLIDAY	18	HOLIDAY	22	HOLIDAY	19	HOLIDAY	19	HOLIDAY	23	HOLIDAY
MONDAY	21		19		23		20		20	I SEMESTER END EXAMINATIONS	24	
TUESDAY	22		20		24		21		21		25	
WEDNESDAY	23		21		25		22		22	UGADI	26	
THURSDAY	24		22		26	REPUBLIC DAY	23		23		27	
FRIDAY	25		23		27		24		24	I SEMESTER END EXAMINATIONS	28	
SATURDAY	26		24		28		25		25		29	
SUNDAY	27	HOLIDAY	25	X-MAS	29	HOLIDAY	26	HOLIDAY	26	HOLIDAY	30	HOLIDAY
MONDAY	28		26	BOXING DAY/ HOLIDAY	30		27		27	I SEMESTER END EXAMINATIONS		
TUESDAY	29		27		31		28		28			
WEDNESDAY	30		28						29			
THURSDAY			29						30	SRI RAMA NAVAMI		
FRIDAY			30	MID I EXAM					31	I SEMESTER END EXAMINATIONS		
SATURDAY			31	MID I EXAM								

Sri Indu College of Engineering & Technology :: Sheriguda (V)/ R.R.Dist

Department of Artificial intelligence and Data Science

1ˢᵗ B.Tech 1ˢᵗ Semester AIDS-A – TIME TABLE 2022-23

ROOM NO: F-301

w.e.f: 10-11-2022

Time/Day	9:40am-10:30am I	10:30-11:20am II	11:20-12:10pm III	L U N C H	12:40-01:45pm IV	1:45-2:50pm V	2:50-4:00pm VI
MON	M&C	ESE	AP		←	EWS	→
TUE	PPS	AP	COUNS		EWS	AP	ESE
WED	←	AP LAB	→		M&C	AP	PPS
THU	←	ELCS LAB	→		M&C	PPS	ESE
FRI	←	PPS LAB	→		M&C	PPS	AP
SAT	M&C	PPS	ESE		←	Elements of CSE	→

COURSE CODE	COURSE NAME	FACULTY NAME
M&C	Matrices And Calculus	S Praveen Kumar
AP	Applied Physics	S Ramu
PPS	Programming for Problem Solving	
EWS	Engineering Workshop	Md Ghouse
ESE	English for Skill Enhancement	K Sai Kumar
Elements of CSE	Elements of Computer Science & Engineering	Dr.Adeline Johnsana.J .S
AP LAB	Applied Physics Laboratory	S Ramu
PPS LAB	Programming for Problem Solving Laboratory	
ELCS LAB	English Language and Communication Skills Laboratory	K Sai Kumar
COUNS	Counseling	

CLASS COORDINATOR: S Praveen Kumar   **TIME TABLE INCHARGE: S Ramu**

Head of the Department   **Principal**

Sri Indu College of Engineering & Technology :: Sheriguda (V)/ R.R.Dist
Department of Artificial intelligence and Data Science

1st B.Tech 1st Semester AIDS-B - TIME TABLE 2021-22

ROOM NO: F-302

w.e.f: 10-11-2022

Time/Day	9:40am-10:30am I	10:30-11:20am II	11:20-12:10pm III	LUNCH	12:40-01:45pm IV	1:45-2:50pm V	2:50-4:00pm VI
MON	← PPS LAB →			L U N C H	AP	PPS	M&C
TUE	ESE	M&C	PPS		← AP LAB →		
WED	PPS	ESE	M&C		← Elements of CSE →		
THU	AP	ESE	M&C		← ELCS LAB →		
FRI	← EWS →				PPS	AP	COUNS
SAT	ESE	AP	AP		M&C	PPS	EWS

COURSE CODE	COURSE NAME	FACULTY NAME
M&C	Matrices And Calculus	S Praveen Kumar
AP	Applied Physics	Dr P Anand
PPS	Programming for Problem Solving	
EWS	Engineering Workshop	Md Ghouse
ESE	English for Skill Enhancement	JD Beaulah
Elements of CSE	Elements of Computer Science & Engineering	Dr.Adeline Johnsana.J .S
AP LAB	Applied Physics Laboratory	Dr P Anand
PPS LAB	Programming for Problem Solving Laboratory	
ELCS LAB	English Language and Communication Skills Laboratory	JD Beaulah
COUNS	Counseling	
CLASS COORDINATOR: S Praveen Kumar		TIME TABLE INCHARGE: S Ramu

Head of the Department   Principal

Sri Indu College of Engineering & Technology :: Sheriguda (V)/ R.R.Dist

Department of Artificial intelligence and Data Science

1st **B.Tech 1st Semester AIDS-A – TIME TABLE 2021-22**

INDIVIDUAL TIME TABLE: Ramu S

Time/Day	9:40am-10:30am I	10:30-11:20am II	11:20-12:10pm III	L U N C H	12:40-01:45pm IV	1:45-2:50pm V	2:50-4:00pm VI
MON			AP				
TUE		AP				AP	
WED	←	AP LAB	→			AP	
THU							
FRI							AP
SAT							

Head of the Department   **Principal**

Sri Indu College of Engineering & Technology :: Sheriguda (V)/ R.R.Dist
Department of Artificial intelligence and Data Science

1st B.Tech 1st Semester AIDS-B - TIME TABLE 2021-22

INDIVIDUAL TIME TABLE: Dr P Anand

Time/Day	9:40am-10:30am I	10:30-11:20am II	11:20-12:10pm III	L U N C H	12:40-01:45pm IV	1:45-2:50pm V	2:50-4:00pm VI
MON					AP		
TUE					←	AP LAB	→
WED							
THU	AP						
FRI						AP	
SAT		AP	AP				

Head of the Department   **Principal**

Sub. Code & Title	R22APH1112 & APPLIED PHYSICS	
Academic Year: 2022-23	**Year/Sem./Section**	**I/I – AI&DS-A/B**
Faculty Name & **Designation**	S Ramu / Dr P Anand & Assist Proff	

Unit/ Item No.	Topic (s)	Book Reference	Page (s) From	Page (s) To	Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
				UNIT – I				
I	**QUANTUM PHYSICS & SOLIDS**					**18**		
1.1	**Quantum Mechanics:** Introduction to quantum physics/ Black body radiation	T1	1	2	Black Board	1		CO1/L2
1.2	Stefan-Boltzmann's law	T1	2	3	Black Board	1		CO1/L2
1.3	Wien's and Rayleigh-Jean's law	T1	3	4	Black Board			CO1/L2
1.4	Planck's radiation law	T1	4	8	Black Board	2		CO1/L5
1.5	Photoelectric effect and Einstein photo electric equation	T1	9	11	Black Board	2		CO1/L3
1.6	de-Broglie's hypothesis, Wave-particle duality Davisson and Germer experiment	T1	12	17	Black Board	1		CO1/L2
1.7	Heisenberg's Uncertainty principle, Born's interpretation of the wave function	T1	18	26	Black Board	1		CO1/L2
1.8	Schrodinger's time independent wave equation	T1	26	28	Black Board	1		CO1/L5
1.9	Particle in one dimensional box.	T1	28	33	Black Board	1		CO1/L5
1.10	Solids: Symmetry in solids	T1	34	35	Black board	1		CO1/L2
1.11	Free electro theory (Drude&Loretz, Sommerfeld)	T1	38	45	Black board	2		CO1/L5
1.12	Fermi-Dirac distribution	T1	48	50	Black board	1		CO1/L4
1.13	Bloch theorem	T1	54	55	Black board			CO1/L3
1.14	Kronig-Penney model	T1	55	56	Black board	2		CO1/L5
1.15	E-K diagram	T1	56	57	Black board	1		CO1/L4
1.16	Effective mass of an electron	T1	57	58	Black board			CO1/L3
1.17	Origin of energy bands	T1	58	59	Black board	1		CO1/L3
1.18	Classification of solids	T1	59	61	Black board			CO1/L2
	Review	**Signature of the HOD/Coordinator**						

Unit/ Item No.	Topic (s)	Book Reference	Page (s)		Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
					UNIT –II			
II	**SEMICONDUCORS AND DEVICES**					**12**		
2.1	**Semiconductor Physics:** Intrinsic semiconductors	T1	70	72	Black board	1		CO2/L2
2.2	Extrinsic semiconductors	T1	81	86	Black board	2		CO2/L2
2.3	Hall Effect	T1	95	100	Black board	1		CO2/L3
2.4	Direct and indirect band gap semiconductors	T1	101	102	Black board			CO2/L4
2.5	Construction, principle of operation and characteristics of P-N junction diode	T1	102	110	Black board	1		CO2/L5
2.6	Construction, principle of operation and characteristics of Zener diode	T1	110	111	Black board	1		CO2/L2
2.7	Construction, principle of operation and characteristics of Bipolar Junction Transistor (BJT)	T1	111	112	Black board	2		CO2/L2
2.8	Operation of NPN and PNP transistors	T1	112	115	Black board			CO2/L4
2.9	Structure, materials, working principle and characteristics of Light emitting diode	T1	118	120	Black board	1		CO2/L2
2.10	Structure, materials, working principle and characteristics of PIN diode	T1	121	122	Black board	1		CO2/L3
2.11	Structure, materials, working principle and characteristics of Avalanche photo diode	T1	123	124	Black board	1		CO2/L2
2.12	Structure, materials, working principle and characteristics of Solar cell	T1	125	128	Black board	1		CO2/L2
	Review	**Signature of the HOD/Coordinator**						
					UNIT- III			
III	**DIELECTRIC, MAGNETIC AND ENERGY MATERIALS**					**16**		
3.1	Dielectric Materials: Basic definitions- types of polarizations (qualitative)	T1	140	144	Black board	1		CO3/L3
3.2	ferroelectric, piezoelectric, and Pyro electric materials – applications	T1	145	152	Black board	1		CO3/L3
3.3	liquid crystal displays (LCD)	T1	153	155	Black board	1		CO3/L3
3.4	Crystal oscillators.	T1	156	159	Black board	1		CO3/L3
3.5	Magnetic Materials: Introduction	T1	160	164	Black board	1		CO3/L2
3.6	Hysteresis-soft and hard magnetic materials	T1	167	172	Black board	1		CO3/L3
3.7	Magneto striction,magneto resistance	T1	173	176	Black board	1		CO3/L2
3.8	Applications - bubble memory devices, magnetic field sensors and multi ferroics.	T1	177	185	Black board	2		CO3/L2
3.9	Energy Materials: Conductivity of liquid and solid electrolytes (qualitative)	T1	186	189	Black board	2		CO3/L4

Unit/ Item No.	Topic (s)	Book Reference	Page (s) From	To	Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
					UNIT – I			
3.10	Super ionic conductors	T1	189	190	Black board	1		CO3/L2
3.11	Materials and electrolytes for super capacitors	T1	190	193	Black board	2		CO3/L2
3.12	Rechargeable ion batteries	T1	194	197	Black board	1		CO3/L2
3.13	Solid fuel cells	T1	198	203	Black board	1		CO3/L2
	Review	**Signature of the HOD/Coordinator**						
				UNIT-IV				
IV	**NANOTECHNOLOGY**					10		
4.1	Introduction, Nano scale, quantum confinement, surface to volume ratio	T1	214	217	Black board	1		CO4/L2
4.2	Bottom-up fabrication: sol-gel, precipitation, combustion methods.	T1	218	222	Black board	2		CO4/L3
4.3	Top-down fabrication: ball milling - physical vapor deposition (PVD)	T1	223	223	Black board	2		CO4/L3
4.4	Chemical vapor deposition (CVD)	T1	224	225	Black board	1		CO4/L3
4.5	Characterization techniques - TEM	T1	226	227	Black board	1		CO4/L2
4.7	Characterization techniques - SEM	T1	228	229	Black board	1		CO4/L2
4.8	Characterization techniques - XRD	T1	229	229	Black board	1		CO4/L2
4.9	Applications of nano materials	T1	229	232	Black board	1		CO4/L2
	Review	**Signature of the HOD/Coordinator**						
				UNIT-V				
V	**ELECTROMAGNETISM & MAGNETIC PROPERTIES OF MATERIALS**					12		
5.1	**Lasers:** Laser beam characteristics	T1	237	237	Black board	1		CO5/L2
5.2	Three quantum processes(Stimulated absorption, spontaneous emission and stimulated emission) -Einstein coefficients and their relations	T1	238	242	Black board	1		CO5/L3
5.3	lasing action - pumping methods	T1	245	251	Black board	1		CO5/L2
5.4	Types of Lasers: Ruby laser	T1	251	252	Black board	1		CO5/L2
5.5	He-Ne laser	T1	254	256	Black board	1		CO5/L2
5.6	Carbon dioxide (CO_2) laser	T1	256	259		1		CO5/L2
5.7	semiconductor laser, Applications of lasers in various fields	T1	261	265	Black board	1		CO5/L2
5.8	**Fiber Optics:** Introduction - construction ,advantages - total internal reflection	T1	266	271	Black board	1		CO5/L3

Unit/ Item No.	Topic (s)	Book Reference	Page (s) From	To	Teaching Methodology	Proposed No. of Periods	Actual Date of Handled	CO/RBT
			UNIT – I					
5.9	Acceptance angle - numerical aperture	T1	271	275	Black board	1		CO5/L5
5.10	Classification of optical fibers	T1	276	281	Black board	1		CO5/L4
5.11	losses in optical fiber	T1	282	285	Black board	1		CO5/L2
5.12	Optical fiber as communication system, applications.	T1	286	288	Black board	1		CO5/L2
	Review		Signature of the HOD/Coordinator					

TEXT BOOKS:

1. M. N. Avadhanulu, P.G. Kshirsagar & TVS Arun Murthy‖ A Text book of Engineering Physics‖-
   S. Chand Publications, 11th Edition 2019.
2. Engineering Physics by Shatendra Sharma and Jyotsna Sharma, Pearson Publication,2019
3. Semiconductor Physics and Devices- Basic Principle – Donald A, Neamen, Mc Graw Hill,4th Edition,2021.
4. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning, 2nd Edition,2022.
5. Essentials of Nano science & Nanotechnology by Narasimha Reddy Katta, Typical Creatives NANO DIGEST, 1st Edition, 2021.

REFERENCE BOOKS:

1. Quantum Physics, H.C. Verma, TBS Publication, 2nd Edition 2012.
2. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley &Sons,11th Edition, 2018.
3. Introduction to Solid State Physics, Charles Kittel, Wiley Eastern, 2019.
4. Elementary Solid State Physics, S.L. Gupta and V. Kumar, Pragathi Prakashan, 2019.
5. A.K. Bhandhopadhya - Nano Materials, New Age International, 1st Edition, 2007.
6. Energy Materials a Short Introduction to Functional Materials for Energy Conversion and Storage Aliaksandr S. Bandarenka, CRC Press Taylor & Francis Group Energy Materials Taylor & Francis Group, 1st Edition, 2022.

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(College Logo)
SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY
IBRAHIMPATNAM</td>
<td colspan="2" align="center">SRI INDU COLLEGE OF ENGG & TECH
LESSON PLAN
(Regulation :R22)
Department of Artificial intelligence and Data Science</td>
<td>Prepared on
Rev1:</td>
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<tr>
<td>Sub. Code & Title</td>
<td colspan="2">R22APH1112 & APPLIED PHYSICS</td>
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<td>Academic Year: 2022-23</td>
<td>Year/Sem./Section</td>
<td>I/I –AI&DS-A/B</td>
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<td>Faculty Name &
Designation</td>
<td colspan="2">S Ramu / Dr P Anand & Assist Proff</td>
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</table>

Weblinks

1. http://www.people.fas.harvard.edu/~djmorin/waves/quantum.pdf
2. https://chem.libretexts.org/Bookshelves/Physical_and_Theoretical_Chemistry_Textbook_Maps/Map%3A_Physical_Chemistry_(McQuarrie_and_Simon)/01%3A_The_Dawn_of_the_Quantum_Theory/1.3%3A_Photoelectric_Effect_Explained_with_Quantum_Hypothesis
3. https://phys.libretexts.org/Bookshelves/University_Physics/Book%3A_University_Physics_(OpenStax)/Map%3A_University_Physics_III_-_Optics_and_Modern_Physics_(OpenStax)/6%3A_Photons_and_Matter_Waves/6.3%3A_The_Compton_Effect
4. https://nptel.ac.in/courses/122101002/downloads/lec-25.pdf
5. http://www3.imperial.ac.uk/pls/portallive/docs/1/2475915.PDF
6. http://www.optique-ingenieur.org/en/courses/OPI_ang_M05_C02/co/Contenu_04.html
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9. file:///C:/Users/sri%20indu/Downloads/190_Sample-Chapter.pdf
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12. https://www.toppr.com/guides/physics/semiconductor-electronics-materials-device-and-simple-circuits/special-purpose-p-n-junction-diode/

<table>
<tr><td colspan="3">SRI INDU COLLEGE OF ENGG & TECH
LESSON PLAN
(Regulation :R22)
Department of Artificial intelligence and Data Science</td><td>Prepared on
Rev1:</td></tr>
<tr><td colspan="2">Sub. Code & Title</td><td colspan="2">R22APH1112 & APPLIED PHYSICS</td></tr>
<tr><td colspan="2">Academic Year: 2022-23</td><td>Year/Sem./Section</td><td>AI&DS-A/B</td></tr>
<tr><td colspan="2">Faculty Name & Designation</td><td colspan="2">S Ramu / Dr P Anand & Assist Proff</td></tr>
</table>

Content beyond the Syllabus

S.No	Topics	Proposed Actions	Date	Resource Person/Mode	POs	PSOs
1	GP Thomson Experiment	Seminar		Guest lecture/ Virtual class	PO1	PSO1
2	Electron microscope Method	PPT		Guest lecture/ Virtual class	PO1	PSO1
3	Applications of Heisenberg's uncertainty principle	Seminar		Guest lecture/ Virtual class	PO2	PSO1
4	Full wave & Half wave Rectifiers	PPT		Guest lecture/ Virtual class	PO2,PO5	PSO2,PSO3
5	Superconductivity	Seminar		Guest lecture/ Virtual class	PO2	PSO2,PSO3
6	Carbon Nano tubes	PPT		Guest lecture/ Virtual class	PO2	PSO2,PSO3

TUTORIAL LESSON PLAN:

S.No	TOPIC TO BE COVERED	TEACHING AIDS	BOOKS	Proposed No. of Periods
1	de-Broglie's hypothesis/ Wave-particle duality/ Davisson and Germer experiment	Black Board	T – 2	1
2	Photoelectric effect and Einstein photo electric equation	Black Board	T – 2	1
3	Compton effect and expression for Compton shift	Black Board	T – 2	1
4	Schrodinger's time independent wave equation	Black Board	T – 2	1
5	Particle in one dimensional box.	Black Board	T – 3	1
6	Density of Holes in Intrinsic semiconductor	Black Board	T – 3	1
7	P-type Semiconductor	Black Board	T – 1	1
8	Hall Effect	Black Board	T – 1	1
9	Bipolar Junction Transistor (BJT): Construction/ Principle of operation	Black Board	T – 1	1
10	P-N Junction diode and Zener diode	Black Board	T – 1	1
11	Solar cell: structure/ Materials/ working principle and characteristics	Black Board	T – 1	1
12	Avalanche Photo Diode and PIN Diode - structure/ Materials/ working principle and characteristics	Black Board	R-2	1
13	Ruby laser/ He-Ne laser/ Applications of lasers in various fields	Black Board	T-1	1
14	Acceptance angle/ Acceptance cone and Numerical aperture	Black Board	T-1	1
	TOTAL			**15**

Sri Indu College of Engineering & Technology :: Sheriguda (V)/ R.R.Dist

Department of Artificial intelligence and Data Science

<u>Web References</u>

13. http://www.people.fas.harvard.edu/~djmorin/waves/quantum.pdf
14. https://chem.libretexts.org/Bookshelves/Physical_and_Theoretical_Chemistry_Textbook_Maps/Map%3A_Physical_Chemistry_(McQuarrie_and_Simon)/01%3A_The_Dawn_of_the_Quantum_Theory/1.3%3A_Photoelectric_Effect_Explained_with_Quantum_Hypothesis
15. https://phys.libretexts.org/Bookshelves/University_Physics/Book%3A_University_Physics_(OpenStax)/Map%3A_University_Physics_III_-_Optics_and_Modern_Physics_(OpenStax)/6%3A_Photons_and_Matter_Waves/6.3%3A_The_Compton_Effect
16. https://nptel.ac.in/courses/122101002/downloads/lec-25.pdf
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18. http://www.optique-ingenieur.org/en/courses/OPI_ang_M05_C02/co/Contenu_04.html
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20. https://www.allaboutcircuits.com/technical-articles/an-introduction-to-optoelectronics/
21. file:///C:/Users/sri%20indu/Downloads/190_Sample-Chapter.pdf
22. http://gn.dronacharya.info/ECE2Dept/Downloads/question_papers/ISem/Engg-Physics/UNIT-II/Dielectric-Magnetic-Properties.pdf
23. https://allbtechblog.files.wordpress.com/2016/08/dielectrics-lecture-notes.pdf
24. https://www.toppr.com/guides/physics/semiconductor-electronics-materials-device-and-simple-circuits/special-purpose-p-n-junction-diode/

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Department of Artificial intelligence and Data Science

List of Power point presentations / Videos

1. Semiconductors. https://www.toppr.com/guides/physics/semiconductor-electronics-materials-device-and-simple-circuits/special-purpose-p-n-junction-diode/
2. Dielectric Properties of materials. https://allbtechblog.files.wordpress.com/2016/08/dielectrics-lecture-notes.pdf
3. Magnetic Properties of materials. http://gn.dronacharya.info/ECE2Dept/Downloads/question_papers/ISem/Engg-Physics/UNIT-II/Dielectric-Magnetic-Properties.pdf
4. https://www.slideshare.net/preraktrivedi7/maxwells-equation-66910089
5. https://www.slideshare.net/SatheesPhysics/hysteresis-57949883
6. https://www.slideshare.net/patelnilay3/magnetic-materials-42183977
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8. https://www.slideshare.net/engrabsarkazmi1/photodetectors-46504354
9. https://www.slideshare.net/omkara12/optoelectronics-45103368
10. https://www.slideshare.net/SiddharthPanda1/opto-electronics-devices
11. https://www.slideshare.net/MDObaidullahAlFaruk/the-compton-effect-83261561

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SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY

(An Autonomous Institution under UGC/ New Delhi) - Recognized under 2(f) and 12(B) of UGC Act 1956

I B.Tech. I Semester (Regular & Suppl.) End Examinations/ April – 2022.

(R20EAP1201) APPLIED PHYSICS

13 /04/2022   **(For AIDS)**   **Day- 2 (FN)**

Duration: 3 Hrs   **Maximum Marks: 70M**

Blooms Taxonomy : (L1-Remembering/ L2-Understanding/ L3-Applying/ L4-Analyzing/ L5-Evaluating

and L6-Creating).

Course Outcomes : CO.

Section – A

*Answer **All** the following questions.*   *(5Qx4M =20M)*

1. What are the de Broglie matter waves?   L1   CO1

2. Write differences between intrinsic and extrinsic semiconductors.   L4   CO2

3. Define radiative and non-radiative recombination mechanism in semiconductors.   L1   CO3

4. Write down the applications of lasers.   L2   CO4

5. State and define polarization in dielectrics.   L1   CO5

Section – B

Answer any *FIVE* questions choosing one from each unit.   *(5Qx10M =50M)*

UNIT - I

6. Describe in detail/ with a neat diagram/ Davison and Germer experiment to show that particles behave like waves.   L1   CO1

OR

7. Show that the energies of a particle in a one dimensional box are quantized.   L2   CO1

UNIT - II

8. Explain the construction and principle of operation of a Bipolar Junction Transistor.   L2   CO2

<div align="center">OR</div>

9. Derive the drift and diffusion currents in a semiconductor.   L4   CO2

<div align="center">**UNIT - III**</div>

10. Explain the structure/ materials/ working principle and characteristics of an Avalanche Photo Diode.   L5   CO3

<div align="center">OR</div>

11. Describe the structure/ materials/ characteristics and figures of merit of a semiconductor laser.   L2   CO3

<div align="center">**UNIT - IV**</div>

12. Describe the principle and working of Carbon dioxide laser with energy level diagram.   L6   CO4

<div align="center">OR</div>

13. What are different losses in optical fibers? And write brief note on each.   L4   CO4

<div align="center">**UNIT - V**</div>

14. Deduce Claussius-Mossotti equation in case of solid dielectrics.   L4   CO5

<div align="center">OR</div>

15. Explain the domain theory of ferromagnetism with a note on hysteresis curve.   L5   CO6

I B.Tech - I Semester - I Mid Term Examination, December – 2022
(R22APH1112) APPLIED PHYSICS
(For CIVIL, MECH., ECE, AI&ML, AI&DS & IoT)

Duration: 2 Hrs   Dt: 30-12-2022, Day-1 (AN)   Max Marks: 30M

Part – A

Answer *All* multiple choice questions.   **Marks: 10Qx1/2M = 5M**
* (L1-Remembering, L2-Understanding, L3-Applying, L4-Analyzing, L5-Evaluating, and L6-Creating.)

		*Blooms Taxonomy Levels	Course Outcomes
1.	The wave function of the particle lies in which region in a one dimensional potential box? A) $x > 0$ B) $L < x < 0$ C) $0 < X < L$ D) $x > L$. [ ]	II	CO1
2.	Fermi-Dirac statistics is for the _____. [ ] A) Distinguishable particles B) Symmetrical Particles C) Particles with half integral spin D) Particles with integral spin.	II	CO1
3.	The effective mass of a charge carrier. [ ] A) Is inversely proportional to the curvature of E-K curve, B) Is positive near the bottom of the conduction band, C) Is negative near the top of the valance band, D) All of the above.	IV	CO1
4.	According to Kronig-Penney model the width of the allowed energy band is. [ ] A) Constant B) Increase with increasing αa C) Decrease with increasing αa D) None.	II	CO1
5.	Dopant for N-type semiconductor. [ ] A) Should be a pentavalent impurity, B) Should be a trivalent impurity, C) Either a or b, D) Depends on the number of valance electrons in the host atom.	III	CO2
6.	When a pentavalent impurity is added to a pure semiconductor, it becomes. [ ] A) An insulator B) An intrinsic semiconductor C) p-type semiconductor D) n-type semiconductor.	III	CO2
7.	In an intrinsic semiconductor, the number of free electrons. [ ] A) Equals the number of holes B) Is greater than the number of holes C) Is less than the number of holes D) None of the above.	II	CO2
8.	A light emitting diode is _____ . [ ] A) Heavily doped B) Lightly doped C) Intrinsic semiconductor D) Zener diode.	II	CO2
9.	By which properties, the orientation of molecules in layer of liquid crystal can be changed? [ ] A) Magnetic Field B) Electric Field C) Electromagnetic filed D) Gallois field.	II	CO3
10.	Electro-optical effect is produced in _____. [ ] A) LED B) LCD C) OFC D) OLED.	II	CO3

Answer *All* fill in the blank questions.   **Marks: 6Qx1/2M = 3M**

11.	The average distance travelled by an electron between two successive collisions is called _____.	II	CO1
12.	The complex variable is used to locate the state of a particle in space is known as_____.	II	CO1
13.	The radiations emitted by black body is called as _____.	II	CO1
14.	During forward bias, the PIN diode acts as _____.	II	CO2
15.	_____ biasing of the LED is operating.	II	CO2
16.	The phenomenon of spontaneous polarization is called as _____.	II	CO3

P.T.O.

Answer _All_ Match the following questions.   Marks: 2Qx1M = 2M

17. Match the following: II   CO1

a) $\Delta E \, \Delta t \geq h/4\pi$	i) De-Broglie wavelength of an electron
b) $\lambda = 12.26/\sqrt{V}$	ii) Uncertainity principle
c) 6.625×10^{-34} J-s	iii) Photo current is zero
d) At Stopping potential	iv) Planck's constant

18. Match the following: IV   CO2

a) Zener diode	i) Forward bias
b) At T=0 K, in an intrinisic semiconductor	ii) Reverse bias
c) Emitter-Base junction	iii) N-type semiconductor
d) R_H is negative	iv) $E_f = (E_c + E_v)/2$

Part – B

Answer any _FOUR_ questions.   Marks: 4Qx5M = 20M

19. Illustrate Davisson-Germer experiment which supports the existence of matter waves.   II   CO1
20. Explain Bloch theorem for electrons in a periodic potential.   III   CO1
21. Derive Eigen values and Eigen functions for a particle in an infinite square well potential   II   CO6
     box.
22. Write a short note on Solar cell.   II   CO2
23. Distinguish between direct band gap and indirect band gap semiconductors.   IV   CO2
24. What are Piezoelectric materials and their applications?   II   CO3

*****

CO & BT mapping for Internal Question papers

I Mid Examination

Question no.	Course outcome mapping	Bloom's Taxonomy level mapping
1	C112.1	L2- Understanding
2	C112.1	L1- Remembering
3	C112.2	L4-Analyzing
4	C112.2	L1- Remembering
5	C112.3	L1- Remembering
6	C112.1	L2- Understanding
7	C112.1	L2- Understanding
8	C112.2	L5- Evaluating
9	C112.2	L2- Understanding
10	C112.2	L2- Understanding
11	C112.3	L2- Understanding

Remembering: 3M (8.57%); Understanding: 26M (74.28%); Evaluating: 5M (14.28%);

Analyzing – 1M (2.85%);

Remembering	8.57%
Understanding	74.28%
Evaluating	14.28%
Analyzing	2.85%
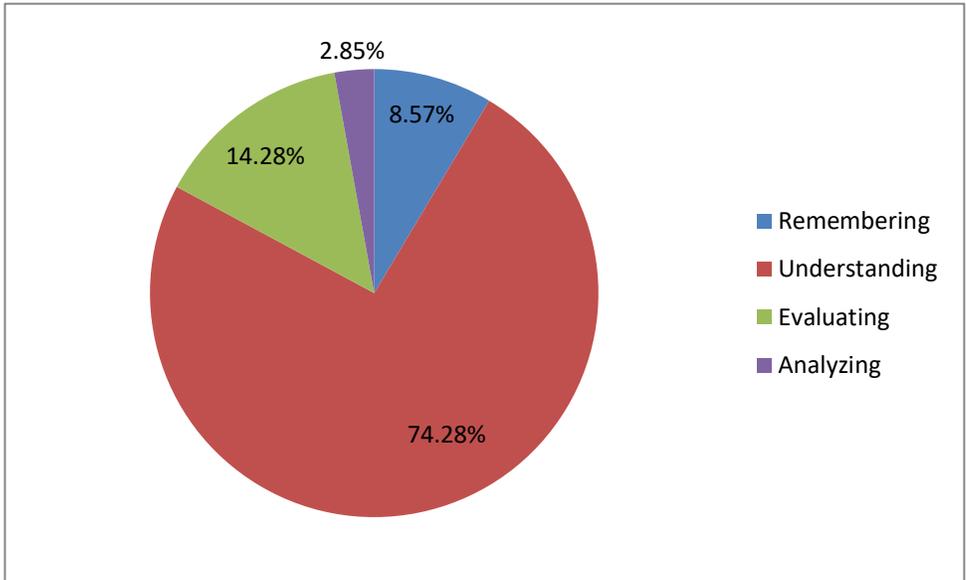
Course outcomes	percentage
C112.1	34.28%
C112.2	48.57%
C112.3	2.85%
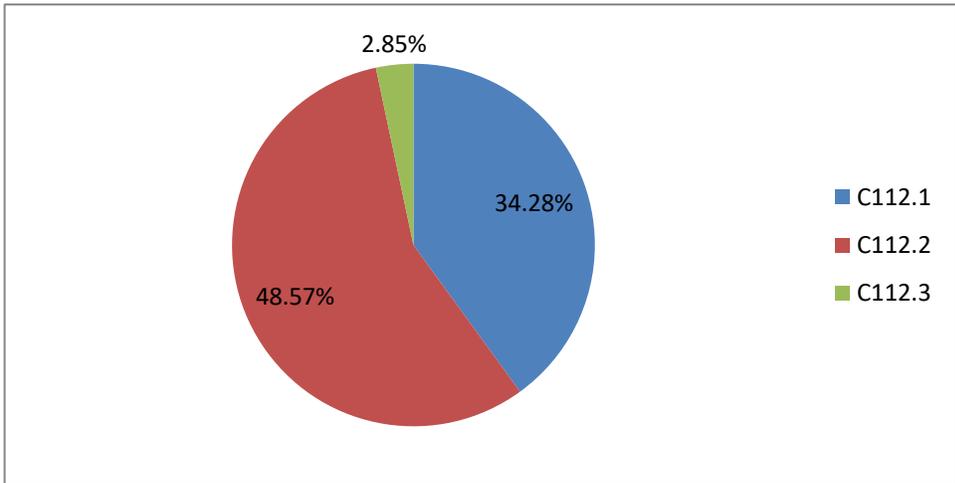
Faculty Signature

BR-22   ⊙ **SRI INDU COLLEGE OF ENGINEERING & TECHNOLOGY**   **D4**

I B.Tech - I Semester - II Mid Term Examination, March – 2022

(R22APH1112) APPLIED PHYSICS

(For CIVIL, MECH., ECE, AI&ML, AI&DS & IoT)

<u>Duration: 2 Hrs</u>   Dt: 03-03-2023, Day-1 (AN)   <u>Max Marks: 30M</u>

Part – A

Answer <u>*All*</u> **multiple choice questions.**   **Marks: 10Qx1/2M = 5M**

* (L1-Remembering, L2-Understanding, L3-Applying, L4-Analyzing, L5-Evaluating, and L6-Creating.)

		*Blooms Taxonomy Levels	Course Outcomes

1. Dielectric constant is mathematically equal to which of the following?   [ ]   I   CO3
   A) Relative permittivity   B) Loss factor
   C) Polarization   D) Relative permeability.

2. All Ferro electric materials are.   [ ]   II   CO3
   A) Piezo electrics   B) Pyro electrics   C) Para electrics   D) All of the above.

3. Nanomaterials are the materials with at least one dimension measuring less than.   [ ]   II   CO4
   A) 1 nm   B) 10 nm   C) 100 nm   D) 1000 nm.

4. Which of the following is an example of Bottom Up approach?   [ ]   II   CO4
   A) Attrition   B) Colloidal dispersion   C) Milling   D) Etching.

5. Nanotechnology was brought into day light by delivering lectures by: [ ]   II   CO4
   A) Feymann   B) Einstein   C) Newton   D) Max Planck.

6. Which of the following methods can be used to produce nano-powders of oxides?   [ ]   III   CO4
   A) Plasma arching   B) Sol-gel technique
   C) Chemical vapor deposition   D) Mechanical crushing.

7. In the population inversion.   [ ]   II   CO5
   A) The number of electrons in higher energy state is more than the ground state
   B) The number of electrons in lower energy state is more than higher energy state
   C) The number of electrons in higher and lower energy state are same
   D) None of them.

8. The material in which population inversion can take place is called.   [ ]   I   CO5
   A) Active medium   B) Passive medium
   C) Gaseous medium   D) Vapor medium.

9. Pulsed laser light is produced from a.   [ ]   II   CO5
   A) Ruby laser   B) CO2 laser   C) Semiconductor laser   D) He-Ne laser.

10. The main principle of optical fiber is.   [ ]   III   CO5
    A) Total internal reflection   B) Total internal refraction
    C) Total internal dispersion   D) None of the above.

Answer <u>*All*</u> **fill in the blank questions.**   **Marks: 6Qx1/2M = 3M**

11. Crystal oscillator does not require any _____ other than the crystal itself.   II   CO3

12. SEM stands for _____   II   CO4

13. Chemical solution deposition is also known as _____   II   CO4

14. Sol-gel method is _____ approach   I   CO4

15. Coherence means _____   II   CO5

16. The output wavelength of emission from Ruby laser is _____ A^0 II   CO5

P.T.O.

Answer _All_ Match the following questions.   **Marks: 2Qx1M = 2M**

17. Match the following: II   CO4

a) SEM	i) Bragg's law
b) TEM	ii) 1-1000 nm
c) DNA	iii) 0.2 nm
d) XRD analysis based on	iv) <1nm

18. Match the following: II   CO5

a) Core	i) $n_1 < n_2$
b) Cladding	ii) $(n_1 - n_2) / n_1$
c) Refractive index change Δ	iii) $\sqrt{n_1^2 - n_2^2}$
d) Numerical Aperture	iv) $n_1 > n_2$.

Part – B

Answer any _FOUR_ questions.   **Marks: 4Qx5M = 20M**

19. Explain the construction and working of Liquid crystal displays (LCDs).   II   CO3
20. What are Crystal oscillators? Write the advantages, disadvantages and applications of   IV   CO3
    crystal oscillators.
21. Explain Top-Down fabrication techniques in the fabrication of nano materials.   III   CO4
22. Explain XRD technique with the block diagram.   II   CO4
23. Explain Precipitation method of synthesis of nano particles.   III   CO4
24. How lasing action is achieved in He- Ne gas laser? Explain.   II   CO5

*****

CO & BT mapping for Internal Question papers

II Mid Examination

Question no.	Course outcome mapping	Bloom's Taxonomy level mapping
1	C112.1	L2- Understanding
2	C112.2	L1- Remembering
3	C112.3	L1- Remembering
4	C112.4	L2- Understanding
5	C112.5	L1- Remembering
6	C112.1	L2- Understanding
7	C112.1	L4 - Analyzing
8	C112.2	L2- Understanding
9	C112.2	L5 - Applying
10	C112.3	L4 - Analyzing
11	C112.3	L5 - Evaluating

Remembering: 3M (8.57%); Understanding: 12M (34.28%); Applying: 5M (14.28%)/
Analyzing:10M (28.57%)/ Evaluating: 5M (14.28%)

Remembering	8.57%
Understanding	34.28%
Applying	14.28%
Analyzing	28.57%
Evaluating	14.28%
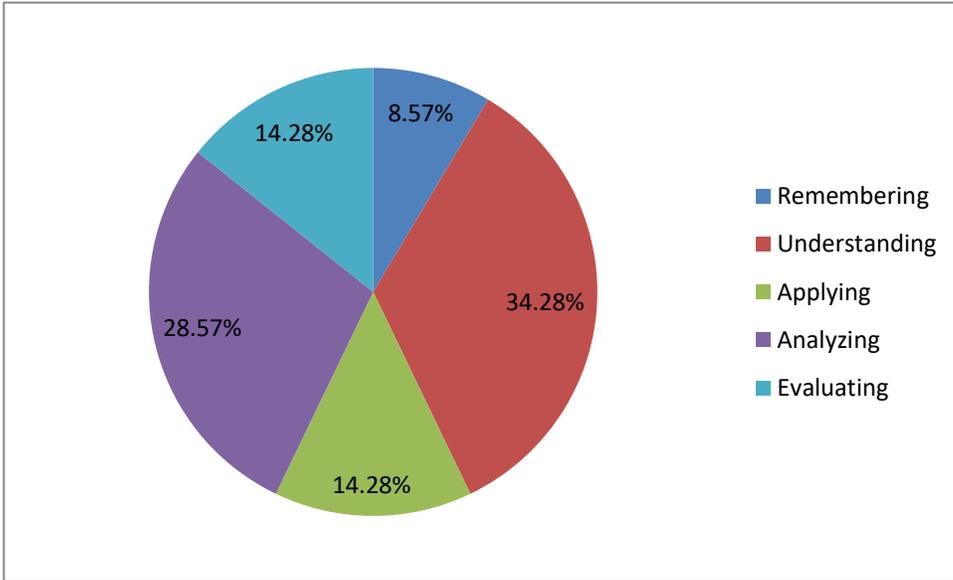
Faculty Signature

Assignment – I

1. Illustrate Davisson-Germer experiment which supports the existence of matter waves.
2. Define Photo electric effect. Explain Einstein's photoelectric equation.
3. Explain the principle and construction of BJT.
4. Deduce an expression for majority charge carriers in p-type semiconductor.
5. Explain working principle of Solar cell. Draw and explain V-I characteristics of a solar cell.

Question no.	Course outcome mapping	Bloom's Taxonomy level mapping
1	C112.1	L3- Applying
2	C112.1	L2- Understanding
3	C112.2	L2- Understanding
4	C112.2	L5- Evaluating
5	C112.3	L2- Understanding

Understanding: 15M (60%)/ Applying: 5M (20%)/ Evaluating: 5M (20%)

Understanding	60%
Applying	20%
Evaluating	20%
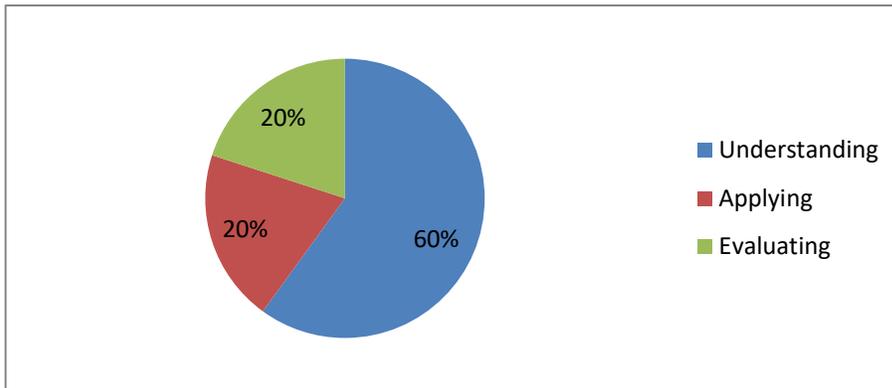
Course Outcome	percentage
C112.1	40%
C112.2	40%
C112.3	20%
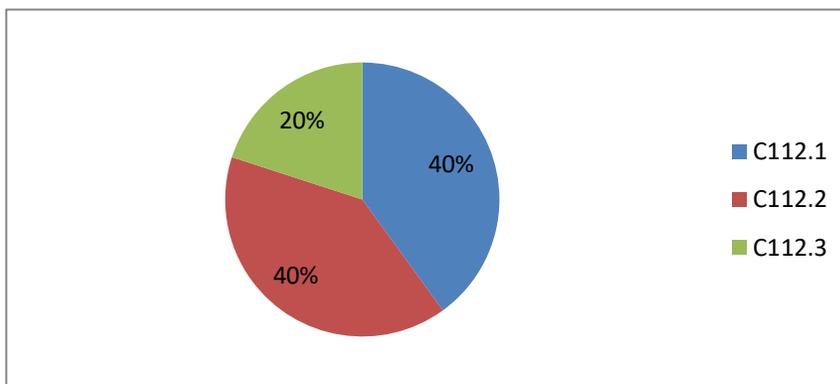
Assignment – II

1. Explain construction and discuss I-V characteristics of Avalanche photo diode.
2. Deduce an expression for Numerical aperture of an Optical fiber.
3. Explain the principle of lasing action and Ruby laser with energy level diagram
4. What is LCD explain consrution and working of LCD.

5. Construction and working of Crystal Oscilator.

Question no.	Course outcome mapping	Bloom's Taxonomy level mapping
1	C112.3	L2- Understanding
2	C112.4	L3 - Applying
3	C112.4	L2- Understanding
4	C112.5	L5- Evaluating
5	C112.5	L5- Evaluating

Understanding: 10M (40%)/ Applying: 5M (20%)/ Evaluating: 10M (40%)

Understanding	40%
Applying	20%
Evaluating	40%
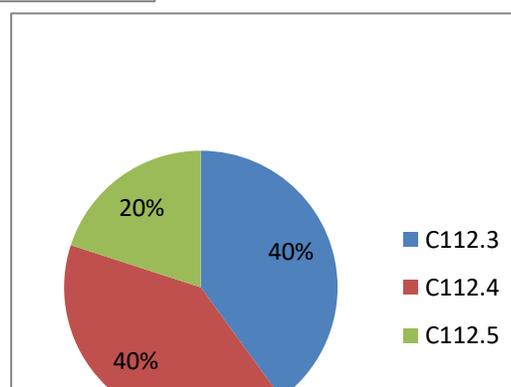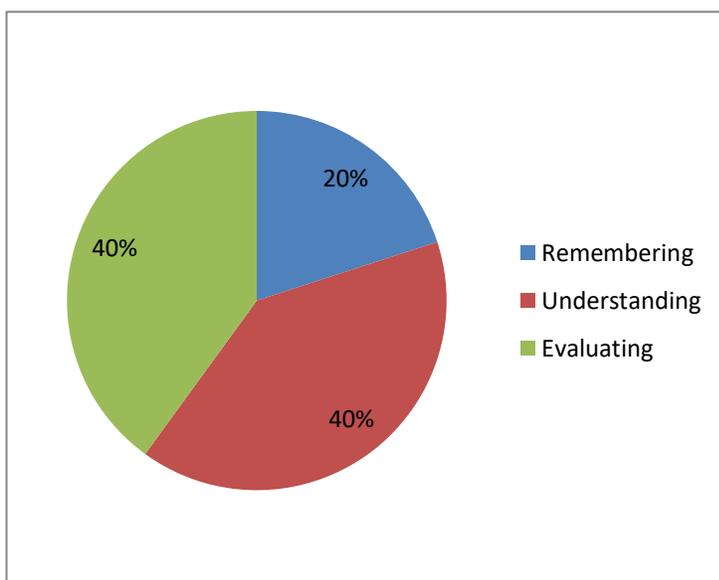
Course Outcome	percentage
C112.3	40%
C112.4	40%
C112.5	20%

Faculty Signature

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D4

Name: K.Vaishnavi   Course: B-Tech   Year/Branch: 1st/AI4DS   13

Subject: Applied Physics Date: 3/3/13   Examination: Mid-II

H.T. No: 2 2 D 4 1 A 7 1 5 0   **MID - I/II EVALUATION**   **30 MARKS**

PART-A											PART-B		TOTAL MARKS	
A1 - MCQ'S: (10 x 0.5 = 5M)					**A2-FILL IN THE BLANKS** 6 x 0.5 = 3M			**A3-MATCHING** 2 x 1 = 2M			**MAX MARKS 20**		**PART-A**	7
Q.NO	1	2	3	4	5	Q.NO	11	12	13	Q.NO	17	18	**PART-B**	6
MARKS	0.5	0.5	0	0.5	0.5	MARKS	0	0.5	0	MARKS	1	1	**A+B**	13
Q.NO	6	7	8	9	10	Q.NO	14	15	16	0.25 for a match		19		
MARKS	0.5	0.5	0.5	0.5	0.5	MARKS	0	0	0			20		
TOTAL OF A1 = 4 1/2						TOTAL OF A2 = 1/2			TOTAL OF A3 = 2		21	1		

PART A TOTAL A1 + A2 + A3 = 7

Q.NO	MARKS
19	
20	
21	1
22	
23	
24	5
TOT	6

Faculty Signature

Controller of Examinations

PART - B

PA 1 = 1
2 = 3
3 = 3

24) Helium - Neon laser

Helium Neon laser is a 3 layer laser. it is very usefull

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D4

Name : B.Sai

Course : B.tech

Year/Branch : 1/A14 CSCA | 16

Subject : Applied Physics   Date : 03/03/23   Examination : II MID/I Sem | **30 MARKS**

H.T. No. 2 2 D 4 1 A 4 2 0 5   **MID - I/II EVALUATION**

PART-A											PART-B		TOTAL MARKS	
A1 - MCQ'S: (10 x 0.5 = 5M)					A2-FILL IN THE BLANKS 6 x 0.5 = 3M			A3-MATCHING 2 x 1 = 2M			MAX MARKS 20		PART-A	8
Q.NO	1	2	3	4	5	Q.NO 11 12 15		Q.NO 17 18			Q.NO	MARKS	PART-B	8
MARKS	05	05	0	05	0	MARKS 0.5 05 0		MARKS 1 1			19		A+B	16
Q.NO	6	7	8	9	10	Q.NO 14 15 16		0.25 for a match			20			
MARKS	0.5	05	0.5	05	05	MARKS 05 0 05					21	2		
TOTAL OF A1 = 4						TOTAL OF A2 = 2		TOTAL OF A3 = 2			22	2		
						PART A TOTAL A1 + A2 + A3 = 8					23	1	Faculty Signature	
Controller of Examinations											24	3		
											TOT	8		

PA 1 × 1.5
2 × 3.0
3 × 3.5

PART - B

24

91. Top-Down fabrication :- The fabrication of nano materials of a particles which is convert the nanomaterial into a nano particles through the process of breaking the material in to the parts in the process fabrication of top down. it is and making parts in small size they are convert into like nano parts nano parts are known as the parts which we can't see through eyes this is the process of top down fabrication.

→ nano material

fabrication {

nano material particles

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D4

Name : G. Maheshwari   Course : B-Tech   Year/Branch : AI&DS   29.

Subject : Applied physics   Date : 03·03·03   Examination : 1st sem, II mid exam   **30 MARKS**

H.T. No: 2 8 D 4 1 A 7 3 3 6   **MID - I/II EVALUATION**

PART-A												PART-B		TOTAL MARKS	
A1 - MCQ'S (10 x 0.5 = 5M)					A2-FILL IN THE BLANKS 6 x 0.5 = 3M			A3-MATCHING 2 x 1 = 2M				MAX MARKS 20		PART-A	9
												Q.NO	MARKS	PART-B	20
Q.NO	1	2	3	4	5	Q.NO	11	12	13	Q.NO	17	18	19		A+B	29
MARKS	0.5	0.5	0	0.5	0.5	MARKS	0.5	0.5	0.5	MARKS			20			
Q.NO	6	7	8	9	10	Q.NO	14	15	16	0.25 for a match			21	5		
MARKS	0.5	0	0.5	0.5	0.5	MARKS	0.5	0.5	0.5				22	5	Faculty Signature	
TOTAL OF A1 = 4						TOTAL OF A2 = 3			TOTAL OF A3 = 2			23	5		
						PART A TOTAL A1 + A2 + A3 = 9						24	5		
												TOT	20		

Controller of Examinations

Answers :°

ppi = 1·5
pa2 = 4
3 = 4

24 As Helium & Neon laser :

Helium and Neon laser is a laser invented by
A. Javan in 1961. Helium and
Neon, laser are nothing but it is a
gases of Laser. Helium & Neon laser
are 4 level typed laser and the
it is gas laser. its source of energy is
is produced by the RF oscillator &
its pumping method & discharge electric
field & it is arranged in oscillator
it is known as Helium & Neon laser

After 1st mid results the analysis made to identify the weak and advanced learners to assign different tasks.

The students who got < 60% of our mid or internal evaluation are identified as weak learners as given below12 <mark>students</mark> are identified/ for them **Remedial classes** were conducted.

S.No.	Student roll number
1	22D41A7218
2	22D41A7272
3	22D41A7273
4	22D41A7281
5	22D41A7286
6	22D41A72A7
7	22D41A72A8
8	22D41A72B4
9	22D41A72B8
10	22D41A72B9
11	22D41A7269
12	22D41A7270

Faculty Signature

Sri Indu College of Engineering & Technology :: Sheriguda (V)/ R.R.Dist

Department of Artificial intelligence and Data Science

Advance learners-seminar book: Internal marks above 25/ the students are identified as the advanced learners. For them seminars / ppts / small project works were assigned.

S.No	Date	Roll. No.	Name of the Student	Seminar/PPT/project Topic name	Signature of the student	Remarks	Sign
1	4/9/2018	22D41A7218	Arun	Photo electric effect			
6	30/10/2018	22D41A7265	MADHINI VISHAL REDDY	LED characteristics			
7	12/10/2018	22D41A7279	MYSORE SRIDHAR	Solar cell			
8	16/10/2018	22D41A7293	PARNE NIHARIKA	Lasing action and Ruby laser			
9	19/10/2018	22D41A7296	PONNALA SHIVACHARAN	Optical fiber principle and types of optical fibers			
10	22/10/2018	22D41A72A5	SARANGI BHAVYA	Davission –Germer experiment			
11	22/10/2018	22D41A72C8	Y sarvanthi	Magnetic bubble memory			

Faculty Signature

Sri Indu College of Engineering & Technology :: Sheriguda (V), R.R.Dist

Department of Artificial intelligence and Data Science

Course Outcome Assessment

Course :		AIDS		AY:	2022-23
CLASS:		I B.Tech		SEM:	1st Semester

S.No	Roll Number	1st Internal Exam(CIE)	2nd Internal Exam(CIE)	University Exam(SEE)
	Max Marks	40	40	60
1	22D41A7201	24	19	15
2	22D41A7202	26	26	6
3	22D41A7203	25	19	11
4	22D41A7204	A	0	ab
5	22D41A7205	20	21	11
6	22D41A7206	31	32	29
7	22D41A7207	17	23	41
8	22D41A7208	27	30	47
9	22D41A7209	23	25	26
10	22D41A7210	20	30	12
11	22D41A7211	29	31	38
12	22D41A7212	22	26	31
13	22D41A7213	29	30	47
14	22D41A7214	30	23	15
15	22D41A7215	18	27	7
16	22D41A7216	17	23	12
17	22D41A7217	21	19	9
18	22D41A7218	15	5	21
19	22D41A7219	23	17	11
20	22D41A7220	28	21	22
21	22D41A7221	16	18	12
22	22D41A7222	29	33	22
23	22D41A7223	24	21	15
24	22D41A7224	26	28	35
25	22D41A7225	25	23	43
26	22D41A7226	20	22	26
27	22D41A7227	23	23	25
28	22D41A7228	22	24	31
29	22D41A7229	16	18	12
30	22D41A7230	24	25	31
31	22D41A7231	28	30	54

32	22D41A7232	30	28	49
33	22D41A7233	20	24	37
34	22D41A7234	26	23	12
35	22D41A7235	30	33	54
36	22D41A7236	28	32	55
37	22D41A7237	20	30	27
38	22D41A7238	29	34	56
39	22D41A7239	23	23	32
40	22D41A7240	24	29	29
41	22D41A7241	21	25	25
42	22D41A7242	17	19	2
43	22D41A7243	22	21	12
44	22D41A7244	19	25	35
45	22D41A7245	20	24	37
46	22D41A7246	22	22	31
47	22D41A7247	25	30	46
48	22D41A7248	25	21	32
49	22D41A7249	15	24	21
50	22D41A7250	26	18	44
51	22D41A7251	21	23	44
52	22D41A7252	26	25	13
53	22D41A7253	18	19	10
54	22D41A7254	17	23	25
55	22D41A7255	24	22	21
56	22D41A7256	15	26	27
57	22D41A7257	26	30	57
58	22D41A7258	25	23	40
59	22D41A7259	28	27	37
60	22D41A7260	27	25	26
61	22D41A7261	26	22	34
62	22D41A7262	22	18	21
63	22D41A7263	19	20	2
64	22D41A7264	25	27	23
65	22D41A7265	21	20	30
66	22D41A7266	14	5	ab
67	22D41A7267	18	19	37
68	22D41A7268	18	19	34
69	22D41A7269	14	15	15
70	22D41A7270	14	16	6
71	22D41A7271	17	21	52
72	22D41A7272	14	14	6
73	22D41A7273	14	14	14
74	22D41A7274	21	18	45
75	22D41A7275	15	17	45
76	22D41A7276	16	19	31
77	22D41A7277	22	21	44
78	22D41A7278	15	15	5
79	22D41A7279	30	23	41

80	22D41A7280	15	14	30
81	22D41A7281	10	17	10
82	22D41A7282	14	17	15
83	22D41A7283	14	19	28
84	22D41A7284	16	13	14
85	22D41A7285	15	15	26
86	22D41A7286	15	12	4
87	22D41A7287	15	15	22
88	22D41A7288	16	16	21
89	22D41A7289	18	21	25
90	22D41A7290	14	15	7
91	22D41A7291	18	23	14
92	22D41A7292	16	14	21
93	22D41A7293	19	24	39
94	22D41A7294	19	23	44
95	22D41A7295	16	21	16
96	22D41A7296	24	28	21
97	22D41A7297	15	14	13
98	22D41A7298	16	14	12
99	22D41A7299	14	16	21
100	22D41A72A0	16	16	28
101	22D41A72A1	18	19	29
102	22D41A72A2	19	20	26
103	22D41A72A3	15	16	13
104	22D41A72A4	16	19	26
105	22D41A72A5	19	27	36
106	22D41A72A6	22	18	22
107	22D41A72A7	15	13	12
108	22D41A72A8	16	11	6
109	22D41A72A9	16	17	22
110	22D41A72B0	19	20	22
111	22D41A72B1	16	17	28
112	22D41A72B2	25	21	24
113	22D41A72B3	19	17	30
114	22D41A72B4	14	14	23
115	22D41A72B5	15	15	12
116	22D41A72B6	15	16	14
117	22D41A72B7	14	19	40
118	22D41A72B8	11	16	28
119	22D41A72B9	10	17	25
120	22D41A72C0	17	17	37
121	22D41A72C1	16	16	30
122	22D41A72C2	14	15	22
123	22D41A72C3	15	19	31
124	22D41A72C4	22	27	42
125	22D41A72C5	14	15	21
126	22D41A72C6	21	23	28
127	22D41A72C7	20	16	26

128	22D41A72C8	34	31	41
Students scored more than 60%marks		36	38	32
Total no. of students registered for exam		126		
% of Marks		28	30	25

Rubric for Attainment Level			
		Level	Criterion
Low		1	<49% students
Moderate		2	50-69% students
High		3	>70% students

			1st mid	2nd mid	End Exam				
Course Attainment Level				OVERALL	set target level Attainment status	attainment status			
		CO1	2		1	1.50	2.60 NA	NA	
		CO2	2		1	1.50	2.50 NA	NA	
		CO3	2	2	1	1.67	2.83 NA	NA	
		CO4	2	2	1	1.67	2.66 NA	NA	
		CO5		2	1	1.50	2.83 NA	NA	
		CO6		2	1	1.50	3.00 NA	NA	
						1.56			
Overall Course Attainment Level	1.56								

Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
C112.1	3	2	1	2	1	-	-	-	-	1	-	-	-	-	-
C112.2	2	2	-	3	1	2	-	-	-	2	1	2	2	2	-
C112.3	2	2	-	2	1	-	-	-	-	-	-	2	2	-	-
C112.4	1	2	1	3	3	-	-	-	-	-	1	2	2	2	-
C112.5	1	2	1	3	2	1	-	-	-	-	1	2	2	2	-
C112.6	1	1	-	-	-	-	-	-	-	-	-	1	1	-	-
C112	1.7	1.8	0.5	2.1	1.3	0.5	-	-	-	0.5	0.5	1.5	1.5	1	-

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Department of Artificial intelligence and Data Science

Program Outcome Assessment

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1.5	1.5	1.5	-	1.5	-	-	-	-	-	-	-
CO2	1.5	1.5	1.5	-	1.5	-	-	-	-	-	-	-
CO3	1.67	1.67	1.67	-	1.67	-	-	-	-	-	-	-
CO4	1.67	1.67	1.67	-	1.67	-	-	-	-	-	-	-
CO5	1.5	1.5	1.5	-	1.5	-	-	-	-	-	-	-
CO6	1.5	1.5	1.5	-	1.5	-	-	-	-	-	-	-
OVER ALL	1.56	1.56	1.56	-	1.56	-	-	-	-	-	-	-
TARGET	3		3	2.7	-	3	-	-	-	-	-	-	-
STATUS	NA	NA		NA		NA						

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	1	2	1	-	-	-	-	1	-	-	-	-	-
CO2	2	2	-	3	1	2	-	-	-	2	1	2	2	2	-
CO3	2	2	-	2	1	-	-	-	-	-	-	2	2	-	-
CO4	1	2	1	3	3	-	-	-	-	-	1	2	2	2	-
CO5	1	2	1	3	2	1	-	-	-	-	1	2	2	2	-
CO6	1	1	-	-	-	-	-	-	-	-	-	1	1	-	-
OVER ALL															
TARGET															
STATUS															

Programme Specific Outcome Assessment

	CO1	CO2	CO3	CO4	CO5	CO6	OVER ALL		
PSO1	1.50	1.50	1.67	1.67	1.50	1.50	1.56	3.00	NA
PSO2	1.50	1.50	1.67	1.67	1.50	1.50	1.56	3.00	NA
PSO3	1.50	1.50	1.67	1.67	1.50	1.50	1.56	3.00	NA
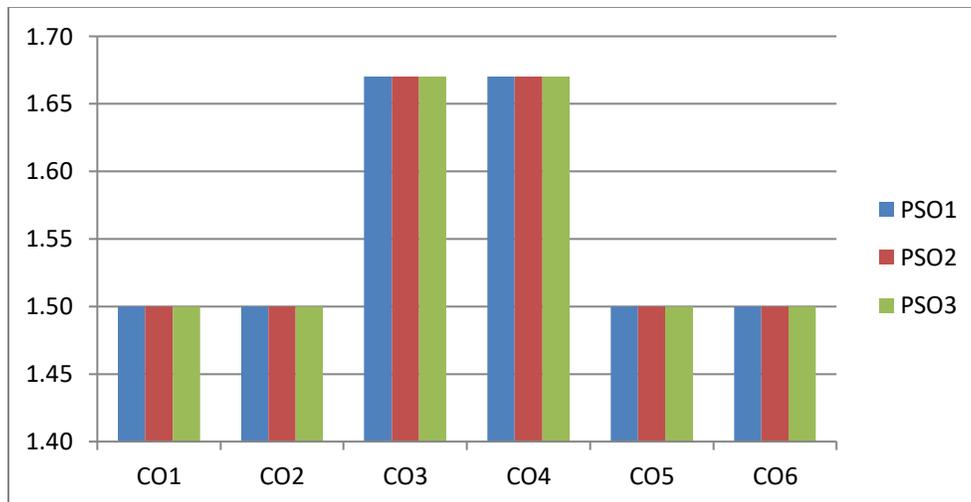
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Course Improvements Based on Assessment

Course : EC AY: 2018-189
CLASS: I B.Tech SEM: 1st semester

Course Attainment Level		1st mid	2nd mid	End Exam	OVERALL	set target level	attainment status
		2	3	1	OVERALL	set target level	attainment status
CO1		2		1	**1.50**	2.86	NA
CO2		2		1	**1.50**	3.00	NA
CO3		2	2	1	**1.67**	3.00	NA
CO4		2	2	1	**1.67**	2.86	NA
CO5			2	1	**1.50**	3.00	NA
CO6			2	1	**1.50**	3.00	NA
					1.56		

Overall Course Attainment Level **1.56**

Best Performing Course Outcome CO3
Least Performing Course Outcome CO5
Observations/ Reasons for Low attainment :

1	Additional Content was not covered.
2	Some Tutorials were not implemented.

Corrective measures/Action items:

1	More basics for filters required.
2	Tutorial Plan Sheet should be improved.

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