# **B.Sc Physics** AFFILIATED COLLEGES **Program Code: 22C** 2022-2023 Admitted **BHARATHIAR UNIVERSITY** (A State University, Accredited with "A" Grade by NAAC, Ranked 13th among Indian Universities by MHRD-NIRF, World Ranking: Times-801-1000, Shanghai-901-1000, URAP- 982) Coimbatore - 641046, TamilNadu, India

Program	Program Educational Objectives (PEOs)							
On obtain	On obtaining an under graduate degree the students will be able to,							
PEO1	EO1 Have a strong foundation in basic sciences ,mathematics and computational platforms.							
PEO2	Acquire professional and ethical attitude, develop communicative skills, team work spirit, multidisciplinary approach, and an ability to relate and solve scientific/technical issues.							
PEO3	Enter into higher studies leading to post-graduate and research degrees.							
PEO4	Apply and advance the knowledge and skills acquired to become a competent professional in their chosen field.							
PEO5	Serve the society with scientific advancement and actively take part in building a knowledge-based society.							
PEO6	comprehend, analyze ,design and create novel products and solutions for the real- life problems through good scientific and technical knowledge.							
PEO7	Become an entrepreneur who can make and sell scientific products in the market.							
PEO8	Engross in life-long learning to keep themselves abreast of new developments and to face global challenges.							

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Program	Program Specific Outcomes (PSOs)						
After th	After the successful completion of the B.Sc Physics program ,the students are expected to,						
PSO1	PSO1 Realize the role of Physics in day-to-day life.						
PSO2	Communicate explicitly and exchange ideas with regard to the impacts of various components of Physics on the environment and society.						
PSO3	Expertise in various domains of Physics.						
PSO4	Design and develop the skills towards the futuristic needs of the industry/society utilizing both theoretical and practical knowledge acquired in basic Physics.						
PSO5	Identify and access the diverse applications of Physics using mathematical concepts enriching career opportunities.						



Program	Program Outcomes(POs)								
On succe	On successful completion of the B.Sc Physics program, the students will be able to,								
PO1	Understand the basic concepts and significance of various physical phenomena.								
PO2	Transform ideas into action								
PO3	Acquire a wide range of problem-solving skills, both analytical and computational and to apply them.								
PO4	Develop an independent and self-disciplined specialized learning in tune with the changing socio-technological scenario.								
PO5	Get motivated to pursue higher education and research activities in Physics to find professional-level employment.								
PO6	identify, analyze and formulate novel ideas to yield, substantial results in the fields of research utilizing the principles of Physics.								
PO7	Develop creative thinking and innovative tools.								
PO8	Communicate effectively and acquire employability/self-employment.								
PO9	Acquire a broad interdisciplinary knowledge.								
PO10	Update themselves in the current developments and discoveries related to Physics.								



## BHARATHIAR UNIVERSITY:: COIMBATORE 641046 B.Sc PHYSICS Curriculum (Affiliated Colleges)

(For the students admitted during the academic year 2022–23) Scheme of Examination

t I	Course	Title of the Course	Credits	Hours	s/week	Maximum Marks			
Part	Code			Theory	Practical	CIA	CEE	Total	
		FIRST SEMESTER							
I	11T	Language-I	4	6	-	50	50	100	
Ш	12E	English-I	4	6	-	50	50	100	
	13A	Core I – Mechanics, Properties of Matter and sound	4	6	-	50	50	100	
	-	Core Practical I	-	-	3	-	-	-	
	1AA	Allied Mathematics I * (or)	4	7	-	50	50	100	
	1AH	Allied Chemistry I **	3	4	-	30	45	75	
111	-	Allied Chemistry Practical **	1	-	3	-	-	-	
IV	1FA	Environmental Studies #	2	2	-	-	50	50	
		Total	18	6 2				450	
		SECOND SEMESTER	CY C	21		•			
I	21T	Language-II	4	6	-	50	50	100	
П	22E	English-II	2	4	-	25	25	50	
II	2NM <sup>\$</sup>	Effective En <mark>glish: La</mark> nguage Proficiency for Employa <mark>bility</mark>	2	2		25	25	50	
		http://kb.naanmudhalvan.in/Bharathiar_University_(BU)		1	- Andrews	1			
	23A	Core II - Heat and Thermodynamics	4	6		50	50	100	
	23P	Core Practical I	4	15	3 /	50	50	100	
III	2AA	Allied Mathematics II * (or)	4	7		50	50	100	
	2AH	Allied Chemistry II **	3	4	7 -	30	45	75	
	2PH	Allied Chemistry Practical **	2	-	3	25	25	50	
IV	2FB	Value Education - Human Rights #	2	2	-	-	50	50	
		Total	22					550	
		THIRD SEMESTER							
I	31T	Language-III	4	6	-	50	50	100	
П	32E	English-III	4	6	-	50	50	100	
	33A	Core III – Optics	4	4	-	50	50	100	
	-	Core Practical II	-	-	2	-	-	-	
	3AA	Allied Mathematics I * (or)	4	7	-	50	50	100	
Ш	3AH	Allied Chemistry I **	3	4	-	30	45	75	
	-	Allied Chemistry Practical **	-	-	3	-	-	-	
IV	3ZA	Skill Based Subject – Instrumentation I	3	3	-	30	45	75	

3FC							
3FC	Tamil @ / Advanced Tamil # (OR)	2	2			50	50
	Non-major elective - I (Yoga for Human	2	2	-	-	50	50
	Excellence)# / Women's Rights #						
	Total	20					500
	FOURTH SEMESTER	20					500
<i>A</i> 1T		Δ	6	_	50	50	100
					-	-	100
		-	-	_			100
45A	-	-	50	30	100		
/2D		2	_	2	20	15	75
				2			100
		-					75
				2		_	-
4PH	,			3		25	50
4ZB	Skill based subject-Instrumentation-II	2	3	-	25	25	50
	Office Fundamentale Disited Chills for	-					
4NM <sup>3</sup>		2	-	2	25	25	50
	Tamil @ /Advanced Tamil # (or)						
4FE		2	-	-	-	50	50
	Awareness #)						
	Total	26					650
	FIFTH SEMESTER						
53A	Core V – Mathematical Physics	4	4	-	50	50	100
53B	Core VI – Electronics	4	4	-	50	50	100
53C	Core VII – Solid State Physics	4	4	-	50	50	100
53D	Core VIII – Electricity and Magnetism	4	4	-	50	50	100
				2			
-	Core Practical III - Electronics	-	-	2	-	-	-
-	Core Practical IV - Digital and	-	-	2	-	-	-
	Microprocessor						
5EA	Elective – I	4	4	-	50	50	100
-	Practical V - C and C++	-	-	3	-	-	-
5ZC	Skill based Subject - Instrumentation III	3	3	-	30	45	75
	Total	23					575
	SIXTH SEMES	TER					
63A		TER 4	6	-	50	50	100
63A	SIXTH SEMES Core IX – Quantum Mechanics and Relativity		6	-	50	50	100
63A 63B	Core IX – Quantum Mechanics and		6	-	50	50	100
	4NM <sup>\$</sup> IFE 33A 53B 53C 53D - - 5EA -	42E       English-IV         43A       Core IV – Atomic Physics and Spectroscopy         43P       Core Practical II         4AA or       Allied Mathematics II * (or)         4AH       Allied Chemistry II **         4PH       Allied Chemistry Practical **         4ZB       Skill based subject-Instrumentation-II         4NM <sup>\$</sup> Office Fundamentals: Digital Skills for Employability http://kb.naanmudhalvan.in/Bharathiar_University_(BU)         4FE       Tamil @ /Advanced Tamil # (or) Non-Major Elective -II (General Awareness #)         Total         FIFTH SEMESTER         63A       Core V – Mathematical Physics         63B       Core VII – Electronics         63D       Core VIII – Solid State Physics         63D       Core VIII – Electricity and Magnetism         -       Core Practical III - Electronics         -       Core Practical IV - Digital and Microprocessor         6EA       Elective – I         -       Practical V - C and C++	42E       English-IV       4         43A       Core IV – Atomic Physics and Spectroscopy       4         43P       Core Practical II       3         4AA or 4AH       Allied Mathematics II * (or)       4         4AH       Allied Chemistry II **       3         4PH       Allied Chemistry Practical **       2         4ZB       Skill based subject-Instrumentation-II       2         4NM <sup>S</sup> Office Fundamentals: Digital Skills for Employability http://kb.naanmudhalvan.in/Bharathiar_University (BU)       2         IFE       Tamil @ /Advanced Tamil # (or) Non-Major Elective -II (General Awareness #)       2         53A       Core V – Mathematical Physics       4         53B       Core VI – Electronics       4         53D       Core VIII – Solid State Physics       4         -       Core Practical III - Electronics       -         -       Core Practical IV - Digital and Microprocessor       -         5EA       Elective – I       4         -       Practical V - C and C++       -	42EEnglish-IV4643ACore IV – Atomic Physics and Spectroscopy4443PCore Practical II3-4AA orAllied Mathematics II * (or)474AHAllied Chemistry II **344PHAllied Chemistry Practical **2-4ZBSkill based subject-Instrumentation-II234NM <sup>S</sup> Office Fundamentals: Digital Skills for Employability http://kb.naanmudhalvan.in/Bharathiar_University (BU)2-4FETamil @ /Advanced Tamil # (or) Non-Major Elective -II (General Awareness #)2-53ACore VI – Electronics4463BCore VII – Solid State Physics4463DCore VIII – Electricity and Magnetism44-Core Practical III - ElectronicsCore Practical IV - Digital and MicroprocessorCore Practical IV - Digital and MicroprocessorPractical V - C and C++	42EEnglish-IV46-43ACore IV – Atomic Physics and Spectroscopy444-43PCore Practical II3-24AA or Allied Mathematics II * (or) 4AH474Allied Chemistry II **344PHAllied Chemistry Practical **2-34ZBSkill based subject-Instrumentation-II234NM <sup>S</sup> Office Fundamentals: Digital Skills for Employability http://kb.naanmudhalvan.in/Bharathiar_University_(BU)2-2IFETamil @ /Advanced Tamil # (or) Non-Major Elective -II (General Awareness #)2Total2653ACore V – Mathematical Physics44-33BCore VI – Electronics4433DCore VIII – Solid State Physics4433DCore VIII – Electricity and Magnetism44Core Practical III - Electronics2Core Practical IV - Digital and Microprocessor2Practical V - C and C++33	42E       English-IV       4       6       -       50         43A       Core IV – Atomic Physics and Spectroscopy       4       4       4       -       50         43P       Core Practical II       3       -       2       30         4AA or AAH       Allied Mathematics II * (or)       4       7       50         4AH       Allied Chemistry II **       3       4       30         4PH       Allied Chemistry Practical **       2       -       3       25         4ZB       Skill based subject-Instrumentation-II       2       3       -       25         4XM <sup>6</sup> Office Fundamentals: Digital Skills for Employability http://kb.naanmudhalvan.in/Bharathiar_University (BU)       2       -       2       2         4FE       Tamil @ /Advanced Tamil # (or) Non-Major Elective -II (General Awareness #)       2       -       -       -         3GA       Core V – Mathematical Physics       4       4       -       50         3GB       Core VI – Solid State Physics       4       4       -       50         3GA       Core VI – Solid State Physics       4       4       -       50         3GB       Core VII – Solid State Physics       4       4	42E       English-IV       4       6       -       50       50         43A       Core IV – Atomic Physics and Spectroscopy       4       4       4       -       50       50         43P       Core Practical II       3       -       2       30       45         4AA or       Allied Mathematics II * (or)       4       7       50       50         4AH       Allied Chemistry II **       3       4       -       30       45         4PH       Allied Chemistry Practical **       2       -       3       25       25         4ZB       Skill based subject-Instrumentation-II       2       3       -       25       25         4NM <sup>S</sup> Office Fundamentals: Digital Skills for Employability http://kb.naamudhalvan.in/Bharathiar_University_(BU)       2       -       2       25       25         4NM <sup>S</sup> Office Fundamentals: Digital Skills for Employability http://kb.naamudhalvan.in/Bharathiar_University_(BU)       2       -       -       50       50         iFE       Tamil @ /Advanced Tamil # (or) Non-Major Elective -II (General Awareness #)       2       -       -       50       50         i33A       Core VI = Electronics       4       4       -       50 <t< td=""></t<>

Ш	63Q	Core Practical IV - Digital and	3	-	2	30	45	75
		Microprocessor						
111	6EA	Elective – II	4	4	-	50	50	100
Ш	6EB	Elective – III	4	4	-	50	50	100
Ш	63R	Practical V - C and C++	3	-	2	30	45	75
IV	6ZP	Skill based Subject	2	-	2	25	25	50
		Practical –Instrumentation						
		Advanced Platform Technology - (Physics,						
		Electronics, Mathematics, Statistics, Data						
IV	6NM <sup>\$</sup>	Science) - Govt(auto) & Govt (Non-Auto)	2	-	2	25	25	50
		Data Analytics with Advanced Tools - (Physics, Electronics, Mathematics, Statistics, Data Science) - Aided (Non-auto) & SF(Non- Auto						
		http://kb.naanmudhalvan.in/Bharathiar_Universi ty_(BU)						
V	67A	Extension Activities @	2	-	-	-	-	50
		Total	31					775
		Grand Total	140					3500

## 2NM<sup>\$</sup>.4NM<sup>\$</sup>,&6NM<sup>\$</sup>- NAAN MUDALVAN COURSES

### \*For subjects without practical

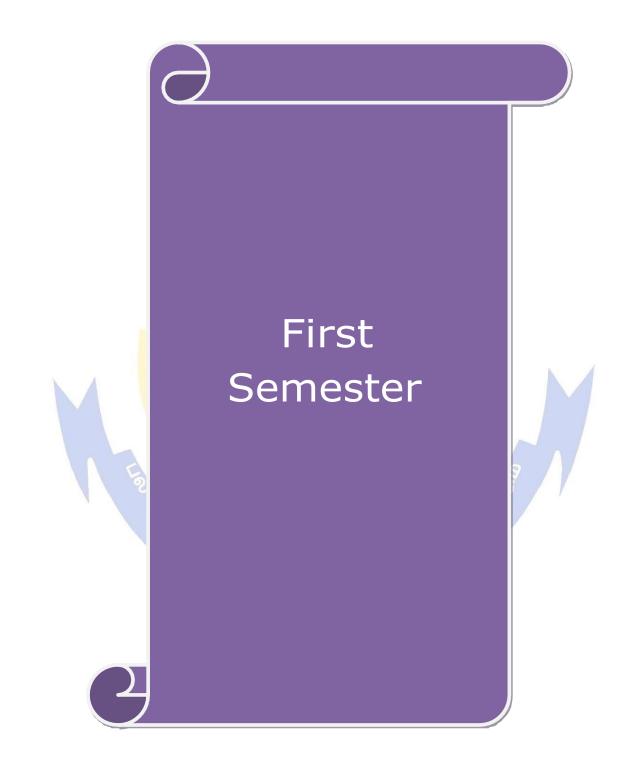
**\*\*** For subjects with practical

@ No University Examinations. Only Continuous Internal Assessment (CIA)#No Continuous Internal Assessment(CIA). Only University Examinations

(Colleges	LIST OF ELECTIVE PAPERS (Colleges can choose any one of the papers from each section as electives)						
Elective – I         A         Principles of Programming Concepts and C Programming							
	B	Energy Physics					
	C Agricultural Physics						
Elective – II A Digital and Microprocessor		Digital and Microprocessor					
	B	Optical Fibers and Fiber Optic Communication Systems					
	С	Bio-Physics					
Elective - III	Α	Object Oriented Programming with C++					
	B	Geo Physics					
	С	Industry Automation & Its Applications (Industry 4.0)					

#### LIST OF VALUE-ADDED COURSES (OPTIONAL) (Only Internal and no external exam – 100 Marks)

- OPTOELECTRONICS
- NON–DESTRUCTIVE TESTING
- BIOMEDICAL INSTRUMENTATION
- MODERN DISPLAY DEVICES AND STORAGE MATERIALS



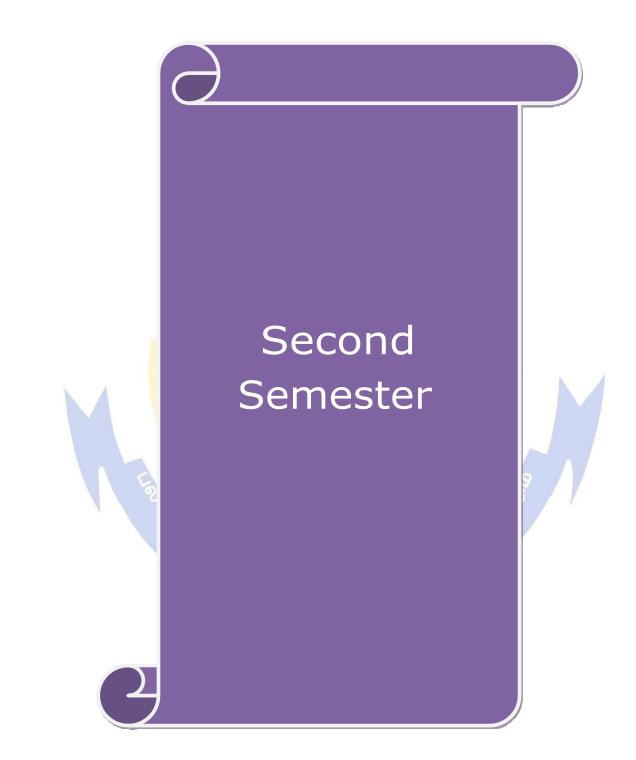
#### SEMESTER I

Core/Elective/SBS       CORE PAPER I         Pre-requisite       The students are expected to know trefundamental properties of matter and sound         Course Objectives:       The students are expected to know trefundamental properties of matter and sound         Course Objectives:       The students are expected to know trefundamental properties of matter and sound         Course Objectives:       The main objectives of this course are to:         1. explore the basic laws governing the behavior of matter in everyday life.       Access the importance of Ultrasonics         3. identify the behavior of simple harmonic waves       Access the importance of Ultrasonics         6       gain a deeper understanding of mechanics and its fundamental concept of properties of matter and recognize their apply various real problems.         4       analyze the universal behavior of wave motion.         5       learning the basic concepts of elasticity, surface tension, Gravitation, various materials.         6       explore the production and application of ultrasonic wave         K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evalue for the ave of friction – Equilibrium of a body on a rough inclined plane to the horizont inclination is greater than the angle of friction.	operties of s.	n		
Pre-requisite       fundamental properties of matter and sound         Course Objectives:       The main objectives of this course are to:         1. explore the basic laws governing the behavior of matter in everyday life.         2. demonstrate practical knowledge and skill in understanding the elastic properties of the behavior of simple harmonic waves         3. identify the behavior of simple harmonic waves         4. access the importance of Ultrasonics         Expected Course Outcomes:         On the successful completion of the course, students will be able to:         1       understand and define the laws involved in mechanics.         2       gain a deeper understanding of mechanics and its fundamental concept         3       understand the concept of properties of matter and recognize their apply various real problems.         4       analyze the universal behavior of wave motion.         5       learning the basic concepts of elasticity, surface tension, Gravitation, v sound and evaluating their values for various materials.         6       explore the production and application of ultrasonic wave         K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluation of friction – Equilibrium of a body on a rough inclined plane to the horizont of friction – Equilibrium of a body on a rough inclined plane to the horizont of friction – Equilibrium of a body on a rough inclined plane to the horizont of friction – Equilibrium of a body on a rough inclined plane to the horizont of friction – Equilibrium of a body on a rough inclined p	operties of s.	n	ds.	1
The main objectives of this course are to:         1. explore the basic laws governing the behavior of matter in everyday life.         2. demonstrate practical knowledge and skill in understanding the elastic properties of simple harmonic waves         3. identify the behavior of simple harmonic waves         4. access the importance of Ultrasonics <b>Expected Course Outcomes:</b> On the successful completion of the course, students will be able to:         1       understand and define the laws involved in mechanics.         2       gain a deeper understanding of mechanics and its fundamental concept         3       understand the concept of properties of matter and recognize their appl various real problems.         4       analyze the universal behavior of wave motion.         5       learning the basic concepts of elasticity, surface tension, Gravitation, v sound and evaluating their values for various materials.         6       explore the production and application of ultrasonic wave         K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluation of ultrasonic wave         Impulse – Impact – Direct and oblique impact – Final velocity and loss of k particle in a vertical circle – friction – Laws of friction – angle of friction of friction – Equilibrium of a body on a rough inclined plane to the horizont	s.	n	K K	
<ol> <li>explore the basic laws governing the behavior of matter in everyday life.</li> <li>demonstrate practical knowledge and skill in understanding the elastic properties of simple harmonic waves</li> <li>access the importance of Ultrasonics</li> </ol> Expected Course Outcomes:           On the successful completion of the course, students will be able to:           1         understand and define the laws involved in mechanics.           2         gain a deeper understanding of mechanics and its fundamental concept           3         understand the concept of properties of matter and recognize their apply various real problems.           4         analyze the universal behavior of wave motion.           5         learning the basic concepts of elasticity, surface tension, Gravitation, v sound and evaluating their values for various materials.           6         explore the production and application of ultrasonic wave           K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluation of ultrasonic wave           Impulse – Impact – Direct and oblique impact – Final velocity and loss of k particle in a vertical circle – friction – Laws of friction – angle of friction of friction – Equilibrium of a body on a rough inclined plane to the horizont	s.	n	K K	
<ul> <li>2. demonstrate practical knowledge and skill in understanding the elastic properties of simple harmonic waves</li> <li>4. access the importance of Ultrasonics</li> <li>Expected Course Outcomes:</li> <li>On the successful completion of the course, students will be able to:</li> <li>1 understand and define the laws involved in mechanics.</li> <li>2 gain a deeper understanding of mechanics and its fundamental concept</li> <li>3 understand the concept of properties of matter and recognize their apply various real problems.</li> <li>4 analyze the universal behavior of wave motion.</li> <li>5 learning the basic concepts of elasticity, surface tension, Gravitation, v sound and evaluating their values for various materials.</li> <li>6 explore the production and application of ultrasonic wave</li> <li>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluation of the production and oblique impact – Final velocity and loss of k particle in a vertical circle – friction – Laws of friction – angle of friction of friction – Equilibrium of a body on a rough inclined plane to the horizont</li> </ul>	s.	n	K K	
<ol> <li>identify the behavior of simple harmonic waves</li> <li>access the importance of Ultrasonics</li> <li>Expected Course Outcomes:         <ul> <li>On the successful completion of the course, students will be able to:                 <ul> <li>understand and define the laws involved in mechanics.</li> <li>gain a deeper understanding of mechanics and its fundamental concept</li></ul></li></ul></li></ol>	s.	n	K K	
<ul> <li>4. access the importance of Ultrasonics</li> <li>Expected Course Outcomes: <ul> <li>On the successful completion of the course, students will be able to:</li> <li>1 understand and define the laws involved in mechanics.</li> </ul> </li> <li>2 gain a deeper understanding of mechanics and its fundamental concept <ul> <li>analyze the universal dehavior of wave motion.</li> </ul> </li> <li>3 understand the concept of properties of matter and recognize their apply various real problems.</li> <li>4 analyze the universal behavior of wave motion.</li> <li>5 learning the basic concepts of elasticity, surface tension, Gravitation, v sound and evaluating their values for various materials.</li> <li>6 explore the production and application of ultrasonic wave</li> <li>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluation of ultrasonic understand loss of k particle in a vertical circle – friction – Laws of friction – angle of friction of friction – Equilibrium of a body on a rough inclined plane to the horizont</li> </ul>	ications in		K	
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On       the successful completion of the course, students will be able to:         1       understand and define the laws involved in mechanics.         2       gain a deeper understanding of mechanics and its fundamental concept         3       understand the concept of properties of matter and recognize their apply various real problems.         4       analyze the universal behavior of wave motion.         5       learning the basic concepts of elasticity, surface tension, Gravitation, v sound and evaluating their values for various materials.         6       explore the production and application of ultrasonic wave         K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluation         Unit:1       Conservation Laws         Impulse – Impact – Direct and oblique impact – Final velocity and loss of k particle in a vertical circle – friction – Laws of friction – angle of friction of friction – Equilibrium of a body on a rough inclined plane to the horizont	ications in		K	
On       the successful completion of the course, students will be able to:         1       understand and define the laws involved in mechanics.         2       gain a deeper understanding of mechanics and its fundamental concept         3       understand the concept of properties of matter and recognize their apply various real problems.         4       analyze the universal behavior of wave motion.         5       learning the basic concepts of elasticity, surface tension, Gravitation, v sound and evaluating their values for various materials.         6       explore the production and application of ultrasonic wave         K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluation         Unit:1       Conservation Laws         Impulse – Impact – Direct and oblique impact – Final velocity and loss of k particle in a vertical circle – friction – Laws of friction – angle of friction of friction – Equilibrium of a body on a rough inclined plane to the horizont	ications in		K	
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<ul> <li>3 understand the concept of properties of matter and recognize their apply various real problems.</li> <li>4 analyze the universal behavior of wave motion.</li> <li>5 learning the basic concepts of elasticity, surface tension, Gravitation, v sound and evaluating their values for various materials.</li> <li>6 explore the production and application of ultrasonic wave</li> <li>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluation</li> <li>Unit:1 Conservation Laws</li> <li>Impulse - Impact - Direct and oblique impact - Final velocity and loss of k particle in a vertical circle - friction - Laws of friction - angle of friction of friction - Equilibrium of a body on a rough inclined plane to the horizont</li> </ul>	ications in		_	2
4       analyze the universal behavior of wave motion.         5       learning the basic concepts of elasticity, surface tension, Gravitation, v sound and evaluating their values for various materials.         6       explore the production and application of ultrasonic wave         K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluation         Unit:1       Conservation Laws         Impulse - Impact - Direct and oblique impact - Final velocity and loss of k particle in a vertical circle - friction - Laws of friction - angle of friction of friction - Equilibrium of a body on a rough inclined plane to the horizont			K	
<ul> <li>learning the basic concepts of elasticity, surface tension, Gravitation, v sound and evaluating their values for various materials.</li> <li>explore the production and application of ultrasonic wave</li> <li>K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluation</li> </ul> Unit:1 Conservation Laws Impulse – Impact – Direct and oblique impact – Final velocity and loss of k particle in a vertical circle – friction – Laws of friction – angle of friction of friction – Equilibrium of a body on a rough inclined plane to the horizont.	iscosity, a			3
sound and evaluating their values for various materials.         6       explore the production and application of ultrasonic wave         K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluation         Unit:1       Conservation Laws         Impulse - Impact - Direct and oblique impact - Final velocity and loss of k particle in a vertical circle - friction - Laws of friction - angle of friction of friction - Equilibrium of a body on a rough inclined plane to the horizont	iscosity, ε		K	4
6       explore the production and application of ultrasonic wave         K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluation         Unit:1       Conservation Laws         Impulse - Impact - Direct and oblique impact - Final velocity and loss of k particle in a vertical circle - friction - Laws of friction - angle of friction of friction - Equilibrium of a body on a rough inclined plane to the horizont		and	K	5
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluation         Unit:1       Conservation Laws         Impulse – Impact – Direct and oblique impact – Final velocity and loss of k particle in a vertical circle – friction – Laws of friction – angle of friction of friction – Equilibrium of a body on a rough inclined plane to the horizont			K	6
Unit:1         Conservation Laws           Impulse – Impact – Direct and oblique impact – Final velocity and loss of k particle in a vertical circle – friction – Laws of friction – angle of friction of friction – Equilibrium of a body on a rough inclined plane to the horizont	ite: K6 - (	Create		
Impulse – Impact – Direct and oblique impact – Final velocity and loss of k particle in a vertical circle – friction – Laws of friction – angle of friction of friction – Equilibrium of a body on a rough inclined plane to the horizont				
particle in a vertical circle – friction – Laws of friction – angle of friction of friction – Equilibrium of a body on a rough inclined plane to the horizont	6 I		18 h	ours
particle in a vertical circle – friction – Laws of friction – angle of friction of friction – Equilibrium of a body on a rough inclined plane to the horizont	inetic ene	rgy –		
inclination is greater than the angle of friction. JIGOU	al and wh	ien th	e	
LOUCATE TO ELEVAIL				
Unit:2 Motion of Rigid Body			18 h	
Moment of inertia – Parallel and perpendicular axes theorem – M.I. of				
Triangular lamina – M. I of a solid sphere about an axis through its C.G. torque and angular momentum – Relation – Kinetic rotation – conservation of				
torque and angular momentum – Keration – Kinetic Totation – conservation (	1 aliguiai	mom	entur	
Unit:3 Gravitation			18 h	ours
Kepler's Laws of planetary motion – Laws of gravitation – Boy's met	nod for C	∃ –Gr		
potential – Gravitational field at a point due to spherical shell – Variat				
altitude and depth. Elasticity: Elastic modulus – Poisson's ratio – re				
Expression for bending moment - determination of Young's modulus by		ind no	on-un	iform
bending - I section girders - Rigidity modulus - Static Torsion - Expre		coupl	e per	unit
twist – Torsional oscillation.				

Unit:4	Surface Tension	16 hours
	l dimension of surface Tension - Excess of Pressure over a cur	
	emperature - Jaeger's Experiment. Viscosity: Definition - Rot	
viscosity of ga	ases, Meyer's Modification of Poiseuille's formula - Rankine's	method for viscosity of
a gas.		
		1
Unit:5	Sound	18 hours
<b>1</b>	onic vibration - Progressive waves - properties - Composition of	
	aves - Properties Melde's Experiment for the frequency of elect	
tuning fork –	Fransverse and longitudinal modes - Ultrasonics - Properties and	application.
Unit:6	Contemporary Issues	2 hours
Expert lectur	es, online seminars - webin <mark>ars</mark>	
	Total Lecture hours	90
Text Book(s		
	s of Matte <mark>r and Acous</mark> tics, R. Murugesan, 2nd Edition, S.Chand	
2 Properties	s of Matter, Brijlal and N.Subrahmanyam, 3rd Edition, S.Chand	& Co. (2005).
Reference B		
	of Properties of Matter, D.S. Mathur, 11th Edition, S.Chand & C	
	ook of Sound, Brijlal N.Subramaniam, Vikas Publishing House	Pvt. Ltd, 2nd edition,
(2010).		
3 A Textbo	ok of Sound, M.N.Srinivasan, Himalaya Publishing house, (199	1).
	a have the	
<b>Related Onl</b>	ine Contents [MOOC, SWAYAM, NPTEL, Websites etc.,]	
	ww.physicstutoronline.co.uk/alevelphysicsnotes/	
2 https://la	testcontents.com/bsc-physics-mechanics-notes/	
	anacademy.org/science/physics/elasticity/surface_tension	
	ites.google.com/brown.edu/lecture-demonstrations/home?auth	nuser=0
	gned By: Mrs.J.Jayachitra.	
	Q (9). (5)	

## தேப்பாரை உயா

Mappi	ng with	Program	nme Ou	tcomes	TE TO E	EVAL				
COs	PO1	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	PO8	PO9	PO10
CO1	S	S	М	М	S	S	S	L	S	S
CO2	S	S	М	М	S	S	S	L	S	S
CO3	S	S	М	L	S	M	L	М	S	М
CO4	S	S	М	М	S	S	S	L	S	М
CO5	S	S	S	S	S	S	S	М	М	S
CO6	М	М	М	L	S	S	М	L	S	S



		SEMESTER II				
Course code	23A	HEAT AND THERMODYNAMICS	L	Т	Р	С
<b>Core/Elective</b>	/SBS	CORE PAPER II	6	0	0	4
Pre-requisite		The students are expected to know the fundamenta concepts of heat and thermodynamics	1 Sylla Vers		2022-23	
Course Object	ctives:	¥				
<ol> <li>investigate</li> <li>substantiat</li> </ol>	the role of the conce	his course are to: f various laws of heat and thermodynamics in our dai epts of heat and thermodynamics experimentally ons of heat engines	ly life			
Expected Cou	Irse Outco	mes:				
		etion of the course, student will be able to:				
		ciples and laws of heat			K2	
		and find experimental verifications for the laws studi	ed		K3	
3 analyze	*	tions of heat and thermodynamics in various areas an		;	K5	
K1 - Rememb	er; <b>K2</b> - U	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - (	Create		
Unit:1	(57	Calorimetry			17 h	ours
of rubber – La law – Raleigh	ee's disc m -Jean's law	Transmission of Heat nt of thermal conductivity – Cylindrical flow of heat ethod for bad conductors. <b>Radiation:</b> Black body – Stefan's law – Experimental Determination of Ste of Stefan's law.	– Wei	n's di	splace	ivity
		Colmbatore G			10.1	
speed distribu	tion of vel- ction of ga	Kinetic Theory of Gases bution of molecular velocities – Experimental ver ocities. Mean free path – transport phenomena – d ses – Vander walls equation – relation between Van	ffusion	– vis	scosity	rium and
Unit:4		Laws of Thermodynamics			18 ho	ours
First law of the process – Wor	rk done in ond law of t	nics – Isothermal and Adiabatic process – gas equa adiabatic expansion of gas – Determination of $\gamma$ by thermodynamics – Carnot's engine- Working – effici	Clemen	t and	n adia Desor	batic
Unit:5		Concept of Entropy			18 ho	ours
entropy – tem Maxwell's the	perature en ermodynam	tropy – Change in entropy in a reversible cycle – ntropy diagram – Entropy of a perfect gas – Therr ical relations – Applications: Joule Thomson effect Clapeyron's equation.	10 dyn	amic	increas variabl	se of

Un	Unit:6 Contemporary Issues 2 h							
Ex	pert lecture	es, online seminars - webinars						
			1					
		Total Lecture hours	90					
Te	xt Book(s)		·					
1	Thermal	Physics, R. Murugesan, S.Chand&Co (2008).						
2		Thermodynamics, Brijlal & N. Subramaniam, S.Chand&Co (200	)7)					
3	Heat – M	I. Narayanamurthi and N. Nagaratnam, National Publishers.						
Re	ference Bo	ooks						
1	Heat and	d Thermodynamics – Zemansky and R.H. Dcltanann, TMH (20)	17)					
2	Heat and	Thermodynamics – D.S. Mathur, S. Chand & Co, Edi (2002	).					
3	Heat and (2003).	l Thermodynamics – Agarwal, Singhal, Sathyaprakash, Kedar	Nath Ramnath and Co.					
Re		ne Conte <mark>nts [MOOC,</mark> SWAYAM, NPTEL, Web <mark>sites etc.]</mark>						
1	https://w	ww.askiitians.com/revision-notes/physics/heat-transfer/						
2	https://w	ww.askiitians.com/revision-notes/physics/kinetic-theory-of-gases	<u>s/</u>					
3		ww.askiitians.com/revision-notes/physics/heat-phenomena/						
4	https://w	ww.askiitians.com/revision-notes/physics/thermodynamics/						
Co	urse Desig	ned By: Dr. P. Sagunthala						

COs	PO1	PO2	ne Outco PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	М	S	S	M	М	М
CO2	S	S	S	S	М	М	М	S	M	S
CO3	M	S	S	S	S	S	S	S	S	S
2-	Suong; N	-iviediun	n; L-Low		Colimbato பாரை TE TO EL	ور الالم EVATE	5AL-C	50		

Page **12** of **91** 

		SEMESTER I & II					
Course code	23P	CORE PRACTICAL I		L	Т	Р	С
		(Examination at the end of Second S	Semester)				
Core/Elective	e/SBS	CORE PRACTICAL		0	0	3	4
Pre-requisite		Should have the fundamental knowled	lge of	Sylla		202	22-23
—		experimental Physics		Versi	on		
Course Obje		:					
5		is course are to: ntal skills in Mechanics and Properties of	of Mottor				
		t the experiments based on Electricity and		m			
•	÷	to apply the experimental techniques in	•		_		
		<u></u>	- F				
Expected Co	urse Outco	mes:					
=		tion of the course, student will be able t	0:				
1 analyze	the concept	s of Viscosity, Surface Tension and You	ung's Modul	us of		K4	
	t substance						
2 explore	the knowle	lge of Spectrometer and other Optical in	nstruments			K5	
		ad applications of Potentiometer, Sonom		tomet	er	K4	
-	junction di		,				
		nderstand; K3 - Apply; K4 - Analyze; K	5 - Evaluate	; <mark>K</mark> 6 -	Creat	te	
			3 12		Å		(
		LIST OF EXPERIMENTS	212			84	Hours
		(Any twelve experiments)	N 3.				
		gravity - Compound Pendulum	101				
		a liquid – Drop Weight Method	A	/			
	-	lary flow method					
		cosities – Capillary Flow Method		A			
		Static Torsion – Scale and Telescope – Non- Uniform bending – Pin and Mice				/	
-		- Uniform bending – Optic lever	loscope	S /			
-		- Cantilever – Dynamic method	Co				
-		- Sonometer	31				
10 5	C X7'1	1 111 C.	59				
11. Refract	ive index o	Solid Prism - Spectrometer					
12. Determ	ination of v	vavelength $\lambda$ - Grating – Minimum devia	ation - Spect	romet	er		
		Prism - (i-d) Curve - Spectrometer					
		iliquid - Hollow prism – Spectrometer					
		- Air Wedge					
	-	er Calibration - Potentiometer					
	-	er Calibration - Potentiometer					
	•	<ul><li>Resonance Column apparatus</li><li>Tan C Position</li></ul>					
		Junction Diode					
20. Charde							
		Contemporary Issues				6	Hours
Online works	hop, Webir	ars on Experimental Physics		I			
	-	· ·					
			Total Practi	ical ho	ours:	-	90

Re	eference Books
1	A textbook of practical Physics, M.N.Srinivasan, S.Balasubramanian, R.Ranganathan, Sultan Chand&Sons(2017)
2	Practical Physics and Electronics, C.C.Ouseph, U.J.Rao, V.Vijayendran, S.Viswanathan Publishers(2007)
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://nptel.ac.in/course.html/physics/experimental physics I, II and III
2	https://nptel.ac.in/courses/115/105/115105110/
3	https://www.youtube.com/playlist?list=PLuiPz6iU5SQ8-rZn_LgLofRX7n8z4tHYK
Co	ourse Designed By: <b>Dr U. Karunanith</b> i

# പെല്ലെങ്ങ്

Mappir	ig with P	rogramm	e Outcon	ies						
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	М	M	M	S	М	L	М	S
CO2	S	S	S	• M	М	М	L	М	S	S
CO3	М	M	S	S	PP N	М	S	S	S	М





#### **SEMESTER III**

		SEMIESTER III	<b>1</b>	1	r 1	
Course code	33A	OPTICS	L	Т	Р	С
Core/Electi	ve/SBS	CORE PAPER III	4	0	0	4
Pre-requisite		The students should acquire knowledge basic properties of light. They should be familiar with the behaviour of light in different mediums.		abus sion	2022-23	
<b>Course Object</b>	ives:					
<ol> <li>provide a g</li> <li>provide ba</li> </ol>	ledge towa good platfo sic knowle	s course are to: rds geometrical and physical optics rm in the field of Optics dge on the behavior of light energy and its propagation f LASER and their applications.	L			
		and an				
Expected Cour	rse Outcon	nes:				
On the success	sful comple	tion of the course, student will be able to:				
1 remember grating	er the beha	vior of light on passing through lens, prism, thin-film a	nd		K1	-
	nd the phe on in <mark>versio</mark>	n <mark>om</mark> ena of light like Interference, diffraction, polariza	tion	and	K2	2
•	doub <mark>le re</mark> fra	he concepts of dispersive power, refractive index, resolv action, specific rotation and optical pumping for differ	0		K4	Ļ
K1 - Rememb	er; K <mark>2 - U</mark>	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; H	K6 - (	Create		
Unit:1		Geometrical Optics			l0 ho	
by a prism - without disper	Cauchy's or chro	berrations in lens - coma - Astigmatism - chromatic al dispersion formula - dispersive power, achromatism i omatic aberrations in a lens - circle of least confusion n of two thin lenses separated by a finite distance.	in pri	sm -	devia	ation
Unit:2		hydrog Interference		1	12 ho	
Fresnel's Bipr thin film – 1 Determination	ism – Inter Newton's of a wave	<b>Physical Optics - Interference</b> ference in thin films due to reflected light – Fringes d rings – Refractive index of the Liquid – Michelse elength of monochromatic light – difference in Wave s – Fabry Perot Interferometer.	on ir	wedg wedg	ge-sha omete	aped er –
Unit:3		Diffraction		1	12 ho	urs
and Construct	tion – con fraction at	rectilinear propagation of light – half-period zone – Z nparison with a convex lens – Fresnel and Fraun a Single light – Diffraction grating – Resolving power	hofer	diffr	actio	
Unit:4		Polarization		]	12 ho	urs
perpendicular	to the crys	ygen's explanationOptic axis in the plane of incital surface – Production and Detection of Plane, Circu Activity – Fresnel's explanation – Specific rotation –	larly	and E	lliptio	

Unit:5	Quantum Optics	12 hours
Light quanta	and their origin - Resonance radiation - Metastable states -	- Population Inverse -
Optical pump	ping - Spontaneous and Stimulated emission - Einstein's coeffi	icient – Ruby, He- Ne,
CO <sub>2</sub> laser – H	Resonant cavities - elements of non-linear optics - second harmo	nic generation-
threshold cor	ndition for laser – Stimulated Raman scattering.	
Unit:6	<b>Contemporary Issues</b>	2 hours
Expert lectur	es, online seminars – webinars	
	Total Lecture hours	60
		00
Text Book(s		
	ok of Optics, Brijlal & Subramaniam, S. Chand Limited (2001)	
2 Modern I	Physics, R Murugesan, S. Chand Publishing, 18th Edition (2017)	
	C C C C C C C C C C C C C C C C C C C	
<b>Reference B</b>	ooks	
1 Optics an	d Spectroscopy, R Murugesan, S. Chand Publishing, 5 <sup>th</sup> Edition	(2013)
2 Optoelect	ronics, Ajoy Kumar Ghatak, K. Thyagarajan, Cambridge Univer	rsity Press (1989).
<b>Related Onl</b>	ine Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
	vww.youtube.com/watch?v=ML7HcZo6IaE	
2 https://w	www.khanacademy.org/science/physics/light-waves/introduction-t	o-light-
-	/polarization-of-light-linear-and-circular	
	ptel.ac.in/courses/104/104/104104085/	
	Lie higger Vorige	
Course Desig	gned By: Dr. K. Selvaraju	
	1 1 2 Constraint &	

Mappi	ng with	Program	nme Out	comes		- 16				/
COs	PO1	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	PO8	<b>PO9</b>	PO10
CO1	S	S	М	М	M	S	М	М	M	S
CO2	S	M	S	M	S	M	М	M	S	S
CO3	М	М	M	S	S	S	S	S	S	S

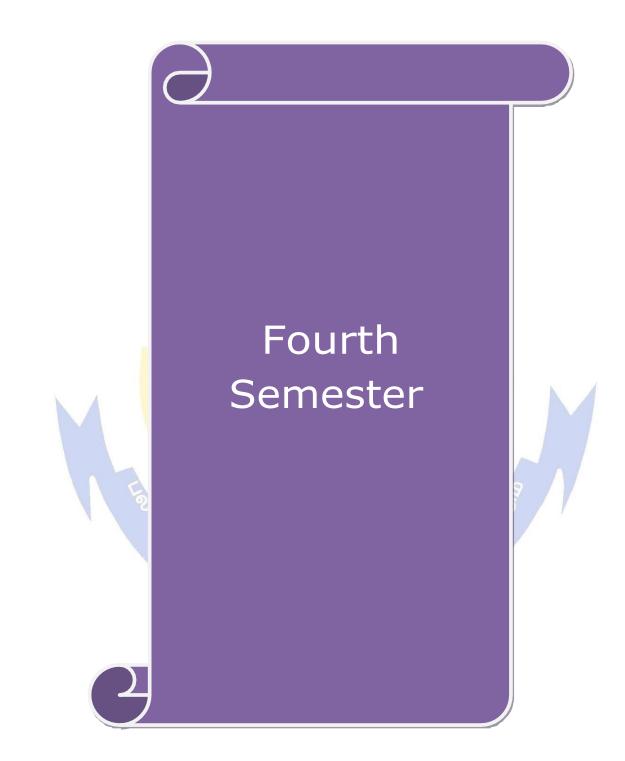
\*S-Strong; M-Medium; L-Low 55 LILITED T 2-111197 EDUCATE TO ELEVATE

## SEMESTER III

				Т		С	
Course code	3ZA	<b>INSTRUMENTATION - I</b>	L	I	Р	C	
Core/Elective/S	SBS	SKILL BASED SUBJECT	3	0	0	3	
Pre-requisite:		Students should know the importance of	Sylla		202	2-23	
		measurement and accuracy	Vers	sion	202	2-23	
Course Object							
The main objec		inciples of measurement devices, their performance	undar	vori		vtorne	
		of error in measurement.		van	Jus e		
		t appropriate standards of measurement and method	s of cal	ibrat	ion.		
		insducer for basic temperature, pressure and flow m					
		· · ·					
Expected Cour							
On the success	sful completion	on of the course, students will be able to:					
1 use the co	oncepts of me	asurement.			K	l	
2 understan	d a typica <mark>l in</mark>	strument design.			K2	2	
3 apply stat	istical error a	nalysis for measurement			K?	3	
4 choose a flow.	transducer/ser	nsor for typical measurement of temperature, pressu	re and		K4	1	
5 evaluate the performance and reliability of measurement devices available in the market.							
	basic measure	ment device.			Ke	5	
6 design a b		erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	<b>K</b> 6 – C	reate	19	5	
6 design a b			<b>K</b> 6 – C	reate	19	5	
6 design a b K1 - Rememb Unit:1	er; <b>K2 - Und</b>	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; Basic Concept of Measurement			7	hours	
6 design a b K1 - Rememb Unit:1 Introduction – S Calibration. Tr Photoconductiv	er; <b>K2 - Und</b> System config ansducers: C	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	of mea Photoel	asurir ectric	7 ng de c effe	hours vices	
6 design a b K1 - Rememb Unit:1 Introduction – S Calibration. Tr Photoconductiv transducers.	er; <b>K2 - Und</b> System config ansducers: C e transducers	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; Basic Concept of Measurement guration – Problem Analysis – Basic Characteristics apacitive transducers – Piezoelectric transducers – I – Ionization transducers – Hall Effect transducers –	of mea Photoel	asurir ectric	7 ng de effe place	hours vices ect – ment	
6 design a b K1 - Rememb Unit:1 Introduction – S Calibration. Tra Photoconductiv transducers. Unit:2	er; <b>K2 - Und</b> System config ansducers: C e transducers <b>Performanc</b>	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; Basic Concept of Measurement guration – Problem Analysis – Basic Characteristics apacitive transducers – Piezoelectric transducers – I – Ionization transducers – Hall Effect transducers - e Characteristics of an Instrumentation system	of mea Photoel - Digita	asurir ectric 1 disj	7 h ng de e effe place 9 h	hours vices ect – ment hours	
6design a bK1 - RemembUnit:1Introduction - SCalibration. Transducers.Unit:2Introduction - S	er; <b>K2 - Und</b> System config ansducers: C e transducers Performanc Generalized 1	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; Basic Concept of Measurement guration – Problem Analysis – Basic Characteristics apacitive transducers – Piezoelectric transducers – – Ionization transducers – Hall Effect transducers - transducers – Hall Effect transducers – e Characteristics of an Instrumentation system measurement – Zero order system – first and secon	of mea Photoel - Digita	asurir ectric 1 disj	7 h ng de e effe place 9 h	hours vices ect – ment hours	
6design a bK1 - RemembUnit:1Introduction - SCalibration. Transducers.Unit:2Introduction - S	er; <b>K2 - Und</b> System config ansducers: C e transducers Performanc Generalized 1	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; Basic Concept of Measurement guration – Problem Analysis – Basic Characteristics apacitive transducers – Piezoelectric transducers – – Ionization transducers – Hall Effect transducers – e Characteristics of an Instrumentation system neasurement – Zero order system – first and secon and testing of dynamic response.	of mea Photoel - Digita	asurir ectric 1 disj	7 h ng de e effe place 9 h	hours vices ct – ment hours	
6design a bK1 - RemembUnit:1Introduction - SCalibration. Transducers.Unit:2Introduction - GUnit:2Introduction - GUnit:3	er; <b>K2 - Und</b> System config <b>ansducers: C</b> e transducers <b>Performanc</b> Generalized 1 Specification	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; Basic Concept of Measurement guration – Problem Analysis – Basic Characteristics apacitive transducers – Piezoelectric transducers – I – Ionization transducers – Hall Effect transducers - transducers – Hall Effect transducers – e Characteristics of an Instrumentation system neasurement – Zero order system – first and secon and testing of dynamic response. Pressure Measurement	of mea Photoel - Digita nd orde	asurir ectric 1 disj r sys	7 ng de e effe place 9 tem 9	hours vices ect – ment hours – Dea	
6design a bK1 - RemembUnit:1Introduction - SCalibration. Tr: Photoconductiv transducers.Unit:2Introduction - bUnit:3Mechanical Production - b	er; <b>K2</b> - Und System config ansducers: C e transducers Performanc Generalized of Specification essure measu essure measu	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; Basic Concept of Measurement guration – Problem Analysis – Basic Characteristics apacitive transducers – Piezoelectric transducers – – Ionization transducers – Hall Effect transducers – e Characteristics of an Instrumentation system measurement – Zero order system – first and secon and testing of dynamic response. Pressure Measurement rement devices – Bourdon tube Pressure gauge – T Pressure measurement – The McLeod gauge – Pir	of mea Photoel Digita ad orde	asurir ectric 1 disj r sys	7 ] ng de e effe place 9 ] tem 9 ] an C	hours vices ect – ment hours – Dea hours auge	
6design a bK1 - RemembUnit:1Introduction - SCalibration. Transducers.Photoconductive transducers.Unit:2Introduction - SUnit:3Mechanical Pro Dead weight te gauge - The KrUnit:4	er; <b>K2</b> - Und System config ansducers: C e transducers <b>Performanc</b> Generalized 1 Specification essure measu ester – Low-I nudsen gauge	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; Basic Concept of Measurement guration – Problem Analysis – Basic Characteristics apacitive transducers – Piezoelectric transducers – – Ionization transducers – Hall Effect transducers – e Characteristics of an Instrumentation system neasurement – Zero order system – first and secon and testing of dynamic response. Pressure Measurement rement devices – Bourdon tube Pressure gauge – T Pressure measurement – The McLeod gauge – Pir Flow Measurement	of mea Photoel Digita ad orde	asurir ectric 1 disj r sys dgem rmal	7 ] 19 de 2 effe place 9 l tem 9 l an C Con 9 l	hours vices cct – ment hours – Dea hours dauge ductin	
6       design a t         K1 - Rememb         Unit:1         Introduction - S         Calibration. Transducers.         Unit:2         Introduction - S         Unit:2         Introduction - S         Unit:3         Mechanical Pro         Dead weight tegauge - The Kn         Unit:4         Positive displace	er; <b>K2</b> - Und System config ansducers: C e transducers: C e transducers: Generalized 1 Specification essure measu ester – Low-I nudsen gauge	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; Basic Concept of Measurement guration – Problem Analysis – Basic Characteristics apacitive transducers – Piezoelectric transducers – I – Ionization transducers – Hall Effect transducers – e Characteristics of an Instrumentation system measurement – Zero order system – first and secon and testing of dynamic response. Pressure Measurement rement devices – Bourdon tube Pressure gauge – T Pressure measurement – The McLeod gauge – Pir	of mea Photoel Digita ad orde	asurir ectric 1 disj r sys dgem rmal	7 ] 19 de 2 effe place 9 l tem 9 l an C Con 9 l	hours vices ect – ment hours – Dea hours dauge ductin	
6       design a t         K1 - Rememb         Unit:1         Introduction - S         Calibration. Transfucers.         Photoconductive transducers.         Unit:2         Introduction - S         Unit:2         Introduction - S         Unit:3         Mechanical Probabilities         Dead weight tegauge - The Kn         Unit:4         Positive displace         - Hot wire and         Unit:5	er; <b>K2</b> - Und System config ansducers: C e transducers: C e transducers: Generalized 1 Specification essure measu ester – Low-I nudsen gauge cement metho d Hot film an	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; Basic Concept of Measurement guration – Problem Analysis – Basic Characteristics apacitive transducers – Piezoelectric transducers – – Ionization transducers – Hall Effect transducers – e Characteristics of an Instrumentation system neasurement – Zero order system – first and secon and testing of dynamic response. Pressure Measurement rement devices – Bourdon tube Pressure gauge – T Pressure measurement – The McLeod gauge – Pir Flow Measurement ds – Flow Obstruction methods – Flow measurement emometers – Magnetic flow meters Measurement of Temperature	of mea Photoel - Digita - Digita ad orde	asurir ectric il dis r sys dgem rmal	7 ] 19 de 19 effe 10 place 9 ] 10 tem 10 place 10	hours vices ect – ment hours auge ductin hours	
6       design a t         K1 - Rememb         Unit:1         Introduction - S         Calibration. Transducers.         Unit:2         Introduction - S         Unit:2         Introduction - S         Unit:2         Introduction - S         Unit:3         Mechanical Problem         Dead weight te         gauge - The Kr         Unit:4         Positive displace         - Hot wire and         Unit:5         Temperature sc	er; <b>K2</b> - Und System config ansducers: C e transducers: C e transducers: C Generalized 1 Specification essure measu ester – Low-I nudsen gauge cement metho d Hot film an ales – The id	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; Basic Concept of Measurement guration – Problem Analysis – Basic Characteristics apacitive transducers – Piezoelectric transducers – – Ionization transducers – Hall Effect transducers – e Characteristics of an Instrumentation system measurement – Zero order system – first and secon and testing of dynamic response. Pressure Measurement rement devices – Bourdon tube Pressure gauge – T Pressure measurement – The McLeod gauge – Pir Pressure measurement – The McLeod gauge – Pir Flow Measurement ds – Flow Obstruction methods – Flow measurement emometers – Magnetic flow meters	of mea Photoel - Digita - Digita ad orde	asurir ectric il dis r sys dgem rmal	7 ] 19 de 19 effe 10 place 9 ] 10 tem 10 place 10	hours vices ect – ment hours auge ductin hours	

Un	nit:6	Contemporary Issues	2 hours
Ex	pert lecture	s, online seminars – webinars	
			Γ
		Total Lecture hours	45
Te	ext Book(s)		
1	McGRaw	ation Devices and Systems, C.S. Rangan, G. R. Sarma and V. S. M Hill, New Delhi (1983)	
2	Experimen	tal Methods for Engineers, J. P. Holman, 7th Edition, McGRaw Hi	ll, New Delhi, (2007)
Re	eference Bo	oks	
1	H. S. Kals	i, Electronic Instrumentation, 3 <sup>rd</sup> edition, Tata McGraw Hill, New	v Delhi (2012)
2	Measurem Internation	ent System Applications and Design, E.O. Doebalin, 5 <sup>th</sup> edi aal, (2007)	tion, McGraw Hill
3	Transduce	rs and Instrumentation, D. V. S. Murthy, 2 <sup>nd</sup> edition, Prentice Hall	of India (2010)
Re		ne Conten <mark>ts [MOOC</mark> , SWAYAM, NPTEL, Web <mark>sites etc.]</mark>	
1		nd dynamic measurement	
2		measurement outu.be/sHmjE21Fp9w	
3	Lecture S Electrica	ture measurement Series on Industrial Automation and Control by Prof. S. Mukhopad Engineering, IIT Kharagpur. http://www.be/As5kzxkyT24	hyay, Department of
4	NPTEL	ww.youtube.com/watch?v=3eYmFjHnQjY&list=PLbRMhDVUMng	<u>zcoKrA4sH-</u>
5	Open cou	urseware- University of Malaysia, Pahang v.ump.edu.my/course/view.php?id=272	5
Co	ourse Design	ned By: Mrs. J.Jayachitra, Dr.L.Priya	
		Bat Brosting on wind all	

			<sup>15</sup> 31 g			- mit	الفاقال			
Mappi	ng with	Program	nme Ou	itcomes	11.0001)	INTE				
COs	PO1	PO2	PO3	PO4	PO5	<b>PO6</b>	PO7	<b>PO8</b>	PO9	PO10
CO1	S	М	М	М	S	М	Μ	L	S	S
CO2	S	S	S	Μ	М	М	Μ	L	S	S
CO3	S	S	S	Μ	S	М	Μ	M	S	S
CO4	S	S	S	S	S	S	Μ	М	S	S
CO5	S	Μ	S	Μ	М	S	S	M	M	М
CO6	Μ	S	S	Μ	М	S	S	S	M	М



### SEMESTER IV

<b>Core/Elective</b>	<b>43</b> A	ATOMIC PHYSICS AND SPECTROSCOPY	L	Т	Р	С
COLE/Elective	/SBS	CORE PAPER IV	4	0	0	4
Pre-requisite		The students should have the awareness on the structure of atoms, photoelectric effect and X rays	Sylla Ver	abus sion	202	2-23
Course Object	ctives:					
<ol> <li>provid</li> <li>learn t</li> </ol>	e a detailed he impact d	his course are to: I study of atom of magnetic fields on spectra of photoelectric cells				
Expected Co	urse Outco	omes:				
		etion of the course, student will be able to:				
1 analyze	various typ	es of spectrographs to study about positive rays			K4	
2 explain	magneto op	otical properties of materials			K5	
3 find applications of photoelectrical cells and X Rays						
K1 - Rememb	er; <mark>K2 - U</mark>	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; 1	<mark>K</mark> 6 - (	Create		
Unit:1		Positive Rays	1		11 h	ours
lefect and pack		tions – Dempster's mass spectrograph –Aston's mass n – polarization of X –rays – scattering of X- rays (Th				
Unit:2 The Bohr ator determination of model– Vector	n model - of critical p atom mod		omsor ns – erfield mode	i's for Exper l's relation	mula) 12 ho iment ativist ouplin	ours al
Unit:2 The Bohr ator determination of model– Vector	n model - of critical p atom mod	n – polarization of X –rays – scattering of X- rays (Th Structure of the Atom - Critical Potentials – Method of excitation of atom potentials by Davison and Goucher's method - Somm lel – Quantum numbers associated with Vector atom	omsor ns – erfield mode	i's for Exper l's relation	mula) 12 ho iment ativist ouplin	ours al
Unit:2 The Bohr ator determination of model– Vector schemes (LS, J. Unit:3	n model - of critical p atom mod J coupling)	n – polarization of X –rays – scattering of X- rays (Th Structure of the Atom Critical Potentials – Method of excitation of ator potentials by Davison and Goucher's method - Somm lel – Quantum numbers associated with Vector atom – Pauli's exclusion principle – Periodic classification Jagneto Optical Properties of Spectrum	ms – erfield of ele	Exper Exper I's relation of the second Experiments	mula) 12 ho iment ativist ouplin 12 ho	ours al ic ig
Unit:2 The Bohr ator determination of model– Vector schemes (LS, J. Unit:3 Magnetic dipo spin – The Ster Zeeman effect Larmor's theor	n model – of critical p atom mod J coupling) Me moment n and Gerl – Experin em – Quar	n – polarization of X –rays – scattering of X- rays (Th Structure of the Atom Critical Potentials – Method of excitation of ator potentials by Davison and Goucher's method - Somm lel – Quantum numbers associated with Vector atom – Pauli's exclusion principle – Periodic classification	omson ns – erfield of ele ole ma he soo ne Zeo	Experies of the second	12 he         iment         ativist         ouplin         12 he         due         line         shift	ours al ic ours ours to - -
Unit:2 The Bohr ator determination of model– Vector schemes (LS, J. Unit:3 Magnetic dipo spin – The Ster Zeeman effect Larmor's theor Zeeman effect	n model - of critical p atom mod J coupling) M le moment n and Gerl – Experin em – Quar – Paschen -	n – polarization of X –rays – scattering of X- rays (Th Structure of the Atom Critical Potentials – Method of excitation of ator Dotentials by Davison and Goucher's method - Somm lel – Quantum numbers associated with Vector atom – Pauli's exclusion principle – Periodic classification Iagneto Optical Properties of Spectrum due to orbital motion of the electron – Magnetic dipc ach experiment – Optical spectra – Fine Structure of the theory – Expression for the nemts – Lorentz classical theory – Expression for the num mechanical explanation of the normal Zeeman endoted	omson ns – erfield of ele ole mo he soo he ze ffect	a's for Exper l's related – comments comments comment dium I eman – Ano	12 h         iment         ativist         ouplin         12 h         due         line         shift         malou         11 h	ss ours al ic ng ours to - 1s ours

Unit	t:5	X-Ray Spectra		12 hours
K-ray	v – Cool	idge tube - Properties - X-ray Spectra - Continuous and	characteristics	X-ray
spect	rum – Me	osley's law (Statement, Explanation and Importance) - Compt	on effect - Exp	ression
for cl	hange of	wavelength - X-ray diffraction-Bragg's law- Bragg's spectro	meter- Powder	crystal
netho	od – Qu	antum theory: The distribution of energy in the spectrum of	of a black body	v – its
result	s - Planc	k's hypothesis – derivation of Planck's law of radiation.		
Unit		Contemporary Issues		2 hours
Exp	ert lectur	es, online seminars - webinars		
			- I	
		Total Lecture hours		60
Tex	t Book(s)			
1	Modern	Physics, Murugesan R. and Kiruthiga Sivaprasath. S. Chand an	d Company, 18	<sup>th</sup> edition
	(2016).	0 <sup>000000000000000000000000000000000000</sup>		
Refe	erence B	ooks		
1	Modern	Physics, Sehgal D.L. Chopra K.L. and Sehgal N.K. Sultan Cha	nd & Sons, 9th e	dition,
	(2004)		,	,
2	Atomic	Physics, R <mark>ajam J</mark> B, S. Chand and Company Ltd, New Delhi, 2	0 <sup>th</sup> edition (2009	<del>)</del> ).
Rela	ated Onli	ine Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1		ww.askiitians.com/revision-notes/physics/atomic-physics/		
2		ptel.ac.in/courses/115/101/115101003/		-
3		ww2.physics.ox.ac.uk/sites/default/files/2011-10-		
		c physics lectures 1 8 09 pdf pdf 18283.pdf		
<b>I</b>				
Cou	rse Desig	ned By: Dr. N. Sasi	19	
		8	S	
	Y	S. THIAD UNIVE	AN AN	
N/	•	ith Programma Outgomas	0	

Mappi	Mapping with Programme Outcomes											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	<b>PO8</b>	PO9	PO10		
CO1	S	Μ	M	М	S	М	М	М	М	S		
CO2	S	M	S	S S	М	M	S	М	М	М		
CO3	М	S	S	S	- Som	S	S	S	S	S		

		SEMESTER III & IV	/				
Course code	43P	CORE PRACTICAL	II	L	Т	Р	С
		(Examination at the end of Four		L	1	Г	U
Core/Elective	e/SBS	CORE PRACTICAL		0	0	2	3
Pre-requisite		Should have the fundamental know	wledge of	Syllab		2022	-23
_		Physics		Versio	n	2022	-25
Course Obje		-					
5		nis course are to:					
		ntal skills in Mechanics and Properti					
		t the experiments based on Electricit to apply the experimental technique		sm			
6. motivate t	the students	to apply the experimental techniques	s in Optics.				
Expected Co	urse Outco	mes:	_				
		etion of the course, student will be ab	le to:				
		of Specific heat capacity and Young		different		K3	
substance		of Specific fleat capacity and Toung	s Modulus of	umerent		КЭ	
		dge of Physical optics using Spectron	neter			K4	
<ul> <li>acquire the knowledge of Physical optics using Spectrometer</li> <li>evaluate principles and applications of Potentiometer, Magnetometer and BG.</li> </ul>							
					7	K5	
KI - Rememb	ber; <b>K</b> 2 - U	nderstand; K3 - Apply; K4 - Analyze	e; K5 - Evaluat	e; Ko - (	reale		
			<b>N23 1101</b>				
		LIST OF EXPERIMENTS				56 ho	ours
1 D: 114	. M. 1.1.	(Any twelve experiments)	1	1			
		- Torsional Pendulum - With & Wit			es		
		<mark>city –</mark> Newton's Law of cooling – Sp vavelength λ - Grating – Normal Inci					
				ometer			
		f Prism - $(i - i')$ curve - Spectrometer		19			
		Cauchy's constants - Spectrometer		G			
-		of Prism - Spectrometer			/		
		f a lens - Newton's rings		6			
-		gnetic moments – Deflection magnet		A positio	n		
		nsity - Field along the axis of a circu					
-		- Cantilever - Depression - Pin and					
		- Koenig's Method - Non-Uniform					
		- Koenig's Method - Uniform bend	ing				
-		e of a wire - Potentiometer					
		couple - Potentiometer					
	-	ange voltmeter - Potentiometer					
-		ficient of Resistance - Thermistor - C	Carey Foster's	Bridge			
		Zener diode					
18. Figure	of Merit –	Charge sensitivity - Ballistic Galvane	ometer				
		utual Inductance - BG					
20. Detern	nination of	High Resistance by leakage- BG					
						4 7	
0.11 1.1	L	Contemporary Issues				4 h	ours
Unline works	nop, Webn	ars on Experimental Physics					
		Total Duo	ctical Hours:				60
		I Otal Pra	cucal flours:				60

Re	ference Books
1	A text book of practical Physics, M.N.Srinivasan, S.Balasubramanian, R.Ranganathan, Sultan Chand&Sons(2017)
2	Practical Physics and Electronics, C.C.Ouseph, U.J.Rao, V.Vijayendran, S.Viswanathan Publishers(2007)
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://nptel.ac.in/course.html/physics/experimental physics I, II and III
2	https://nptel.ac.in/courses/115/105/115105110/
3	https://www.youtube.com/playlist?list=PLuiPz6iU5SQ8-rZn_LgLofRX7n8z4tHYK
Co	ourse Designed By: Dr. U. Karunanithi

Mappi	Mapping with Programme Outcomes											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10		
CO1	S	M	S	S	М	S	М	М	М	S		
CO2	S	М	S	M	S	S	М	L	М	S		
CO3	М	S	S	- S	Ĺ	М	S	S	S	М		



#### SEMESTER IV

		SEMESTER IV				
Course code	4ZB	<b>INSTRUMENTATION II</b>	L	Т	Р	С
Core/Elective	e/SBS	SKILL BASED SUBJECT	3	0	0	2
Pre-requisite		Students should know the importance of	Sylla		2022	-23
		measurements in large scale	Vers	sion	2022	
Course Obje		is course are to:				
·		is course are to: derstand the principles of measurements in industry co	onditio	ne		
		tand the process of vibration sensing	manno	115		
		pollution and sampling techniques				
Expected Co						
	Ĩ	tion of the course, student will be able to:				
1 use ther	mal and nu	clear radiation detectors			K1	
2 understa	and the high	n-temperature process in transient and industrial condi	tions		K2	
3 use adec	quate equip	ment to determine the state of pollution in the environ	ment		K3	
4 design a	and use sim	ple instrumentation for measurement of mechanical pr	operti	es	K4	
5 understa	and the livin	ng conditions in industrial areas	6		K5	
		cepts for the prediction and determination of random			K6	
vibratio						
K1 - Rememb	ber; <b>K2</b> - U	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - (	reate		
TT 14 1			-		01	
Unit:1		Temperature Measurement by Radiation and temperature measurements – Transient response of	thorm	ol avat	9 ho	
		tion – Temperature measurement flow in high-speed f				
-	-	surement: Thermal conductivity measurements – Th				
	-	asurement of Viscosity–Gas diffusion – Calorimetry.		77	•	,
			7			
Unit:2		Force, Torque and Strain Measurements			9 ho	urs
		nce measurements – Elastic elements for force measure			orque	
Measurement	– Stress an	d Strain measurements – Electrical resistance – strain	gauge	s.		
Unit:3		Vibration 1			9 ho	ure
	ation – Sho	ck – Analysing vibration sensing devices – Generalize	d seco	nd or		ui 5
		cement – Absolute velocity and acceleration vibrating				-
•	-	ded strain gauge accelerometers-Piezoelectric acceler		-		
accelerometer	•					
<b>T</b> T <b>1</b> / 4					0.1	
Unit:4		mal and Nuclear Radiation Measurements	afla ati		9 ho	urs
		of thermal radiation – Measurement of emissivity – Re ents – Solar radiation measurements – Detection of N		-		
•		er– Scintillation counter.	ucicai	Taura	.1011 –	
Unit:5	Ai	Pollution Sampling and Measurements			7 ho	urs
		ollution measurements - Air pollution standards - Gen				
Train gas sam	pling techn	iques – Particulate sampling techniques – Sulphur dic	xide r	neasui	remen	ts.

Un	nit:6	Contemporary Issues	2 hours					
Ex	pert lectur	es, online seminars – webinars						
		Total Lecture hours	45					
Te	xt Book(s							
1	Tata Mc	entation Devices and Systems, C.S. Rangan, G. R. Sarma and V. GRaw Hill, New Delhi (1983)						
2	2 Experimental Methods for Engineers, J. P. Holman, 7 <sup>th</sup> Edition, McGRaw Hill, New Delhi (2007)							
Re	ference B	ooks						
1	Internati	ment System Applications and Design, E.O. Doebalin, 5 <sup>th</sup> editio onal (2007)						
2	Transducers and Instrumentation, D. V. S. Murthy, 2 <sup>nd</sup> edition, Prentice Hall of India (2010)							
3	Mechani	cal and Industrial Measurement, R. K. Jain, Khanna Application	as (2013)					
		ine Contents [MOOC, SWAYAM, NPTEL, Websites etc.]						
1		radiation detector www.youtube.com/watch?v=QiOfz1-7uw						
2		Security and Safeguards Education Portal- youtube channel- outu.be/Me7XA2vv4F4						
3	<u>https://cletal.)/</u>	Detector hem.libretexts.org/Bookshelves/General_Chemistry/Book%3A_C 19%3A_Nuclear_Chemistry/19.10%3A_Instruments_for_Radiati s%20the%20most%20common%20instrument,to%20discover%2	on_Detection#:~:text					
4	Air poll		le la					
			5					
Co	ourse Desig	gned By: Mrs. J.Jayachitra, Dr.L.Priya						
		1955 Q						

Mappi	ng with I	Programi	ne Outco	mes	பாரை	2 11/18				
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	L	М	М	М	М	L	М	S
CO2	S	S	L	М	S	S	L	L	L	М
CO3	S	S	S	S	S	S	S	М	S	S
CO4	S	S	М	М	М	S	S	М	L	S
CO5	S	S	S	L	М	S	М	М	S	S
CO6	S	S	S	S	S	S	S	М	S	S



		SEMESTER V		-		
Course code	53A	MATHEMATICAL PHYSICS	L	Т	Р	С
<b>Core/Elective</b>	e/SBS	CORE PAPER V	4	0	0	4
Pre-requisite		Should have the basic knowledge of Mathematics and Mechanics		abus sion	202	2-23
<b>Course Obje</b>	ctives:					
U U		this course are to:				
		to acquire the problem-solving ability				
	<b>A</b>	for the situation of different physical problems.	1:6	-		
3. motivate t	ne studen	ts to apply the mathematical principles in their day-to-da	ay mo	3.		
Expected Co	urse Outo	comes:				
-		letion of the course, student will be able to:				
1 derive I	agrange's	and Hamilton's equations			K2	
		and Hamilton's equations to physical problems			K3	
		nd beta functions and their applications			K3	
•	e e	Matrices and apply them to relevant problems			K4	
		Gauss theorems to suitable physical problems			K5	
		Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K	6 - (	Create		
	,		-			
Unit:1		Classical Mechanics - I		12	2 h	ours
Linear Harmo	nic Oscill	ator, Simple Pendulum and Compound Pendulum.	6		-	
Unit:2	5	Classical Mechanics – II	nie	1	12 h	
of motion- Ph	ysical sign	miltonian function – Hamiltonian Principle – Hamilton's nificance of H – Applications of Hamiltonian equations of Pendulum and Linear Harmonic Oscillator.				
Unit:3		Special Functions			12 h	oure
	n – The I	Beta function – Gamma function – Evaluation of Beta fu	Inctio	n - C		
		aluation of Gamma function – Other forms of Gamma				
		na functions – Problems.				
TT •4 4					10.1	
Unit:4	tion sno	Matrices	ning	to of	10 h	
Conjugate Tra – Orthogonal	anspose of and Unita	cial types of Matrices – Transpose of a Matrix – The Co a Matrix – Symmetric and Anti-symmetric – Hermitian ry Matrices – Properties – Characteristic equation – Roo n of matrices – Cayley–Hamilton theorem –Problems	and	skew	Hermi	tian
Unit:5		Vector Calculus			12 h	ours
$\nabla$ Operator – – Curl of a V	Divergen	ce – Second derivative of Vector functions or fields – Th		.1 ! .		

Ur	nit:6	Contemporary Issues	2 hours						
Ex	pert lecture	es, online seminars - webinars							
		Total Lecture Hours	60						
Te	xt Book(s)								
1	1 Mathematical Physics, B.D. Gupta-Vikas Publishing House, 4th Edition (2006)								
2	2 Classical Mechanics, S.L.Gupta, V. Kumar&H.V.Sharma, PragatiPrakashan (2017)								
Re	ference B	ooks							
1	Mathema	atical Physics, Sathya Prakash, Sultan Chand, 6 <sup>th</sup> edition (2014)							
2	Mathema	atical Physics Rajput, Pragathi Prakasan Pub., (2017)							
3	Mathema	atical Physics, H.K. Dass, S. Chand & Co., Eighth edition (2018)	)						
4	Classical	Mechanics, J.C.Upadhyaya, Himalaya Publishing House(2012)							
Re	lated Onli	ine Contents [MOOC, SWAYAM, NPTEL, Websites etc.]							
1	https://n	ptel.ac.in/course.html/Physics/Introduction to classical mechanic	28						
2	https://n	ptel.ac.in/course.html/Physics/Integrals and vector calculus							
3	https://n	ptel.ac.in/course.html/Physics/Matrix analysis and with application	ions						

Course Designed By: Dr. U. Karunanithi

Mappi	Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	
CO1	S	М	L	M	S	M	М	S	М	М	
CO2	S	S	М	S	М	S	L	M	S	М	
CO3	S	<i></i> %М	M	S	S	M	L	M	S	S	
CO4	S	S	L	М	S	М	M	М	S	S	
CO5	S	S	М	L	М	S	S	M	М	S	



### SEMESTER V

Course code	53B	ELECTRONICS	L	Т	Р	С
<b>Core/Elective</b>	e/SBS	CORE PAPER VI	4	0	0	4
Pre-requisite		Should have the basic knowledge of		abus	202	22-23
-		Semiconducting devices	Vers	sion		
Course Obje		· · · ·				
0		nis course are to: and apply it to various electronic instruments.				
		t the development of electronic instruments.				
U	0	to apply the principles of electronics in their day-to-d	ay life			
			5			
Expected Co	urse Outco	mes:				
On the succes	ssful comple	etion of the course, student will be able to:				
1 differen	tiate betwee	en different types of amplifiers and their applications			K2	
2 design different types of oscillators					K3	
3 apply sv	witching ide	eas to various devices			K3	
4 analyzir	ng the powe	r electronic devices and their uses			K4	
5 design of	operational	amplifier circuits and to analyze their properties			K5	
K1 - Rememb	oer; <b>K2 - U</b>	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	$\mathbf{K6} = 0$	<b>A</b>		
A			170 .	reate;		
	5			create;	4	
amplifiers – Characteristic	Class A pov s of an amp	Amplifiers lifiers: Classification of amplifiers – Transistor amplifier wer amplifier – Push Pull connection – push-pull class lifier. Feedback amplifiers: feedback and related t	iers in	1 casca ower a	<b>2 ho</b> de– F ampli	Powe fier -
Voltage and p amplifiers – C Characteristic	Class A poves of an amp nplifier- Tra	Amplifiers lifiers: Classification of amplifiers – Transistor amplifiver amplifier – Push Pull connection – push-pull class	iers in	1 casca ower a	<b>2 ho</b> de– F ampli	Power fier -
Voltage and p amplifiers – C Characteristic a feedback an follower circu	Class A poves of an amp nplifier- Tra	Amplifiers lifiers: Classification of amplifiers – Transistor amplificer wer amplifier – Push Pull connection – push-pull class lifier. Feedback amplifiers: feedback and related to unsfer gain of an amplifier with feedback- Emitter	iers in	1 casca ower a block	<b>2 ho</b> de– F ampli diagra	Power fier – am of
Voltage and p amplifiers – O Characteristic a feedback an follower circu Unit:2	Class A poy s of an amp nplifier- Tra iit.	Amplifiers         lifiers: Classification of amplifiers – Transistor amplifiver amplifier – Push Pull connection – push-pull classifier. Feedback amplifiers: feedback and related to the state of	iers in ss B P erms-	1 casca ower a block	<b>2 ho</b> de– F ampli diagra <b>11 ho</b>	Powe: fier - am of
Voltage and p amplifiers – C Characteristic a feedback an follower circu Unit:2 Introduction - T Tuned collector Phase shift oso	Class A pov s of an amp nplifier- Tra iit.	Amplifiers lifiers: Classification of amplifiers – Transistor amplificer wer amplifier – Push Pull connection – push-pull class lifier. Feedback amplifiers: feedback and related to unsfer gain of an amplifier with feedback- Emitter	iers in ss B P erms- ot of f	1 casca ower a block feedbaa lator –	2 ho de– F ampli diagra 11 ho ck oso	Power fier – am of ours cillate
Voltage and p amplifiers – C Characteristic a feedback an follower circu Unit:2 Introduction - T Tuned collector Phase shift oso	Class A pov s of an amp nplifier- Tra iit.	Amplifiers         lifiers: Classification of amplifiers – Transistor amplifier         wer amplifier – Push Pull connection – push-pull classifier.         lifier. Feedback amplifiers: feedback and related to the transfer gain of an amplifier with feedback- Emitter         Oscillators         cillators - Fundamental principle of oscillator - Conception - Analysis - Hartley oscillators - Analysis - Colpitt'	iers in ss B P erms- ot of f	1 casca ower a block feedbac lator –	2 ho de– F ampli diagra 11 ho ck oso	Power fier - am of ours cillate lysis
Voltage and p amplifiers – C Characteristic a feedback an follower circu Unit:2 Introduction - T -Tuned collecto Phase shift oso Analysis.	Class A pov s of an amp nplifier- Tra iit. Types of osc or oscillator cillator-Ana	Amplifiers  Iffiers: Classification of amplifiers – Transistor amplifier wer amplifier – Push Pull connection – push-pull class lifier. Feedback amplifiers: feedback and related t unsfer gain of an amplifier with feedback- Emitter  Oscillators  cillators - Fundamental principle of oscillator - Concept - Analysis - Hartley oscillators – Analysis – Colpitt' lysis - Wien bridge oscillator - Analysis - Crystal of	iers in ss B P erms- ot of f s oscil oscillat	1 casca ower a block feedbad lator – tor –	2 ho de – F ampli diagra 11 ho ck oso - Ana 2 ho	Power fier – am of ours cillate lysis urs
Voltage and J amplifiers – C Characteristic a feedback an follower circu Unit:2 Introduction - T Tuned collecto Phase shift oso Analysis. Unit:3 Introduction - – multivibrato	Class A pov s of an amp nplifier- Tra iit. Types of osc or oscillator cillator-Ana switching c ors – types	Amplifiers         lifiers: Classification of amplifiers – Transistor amplifiver amplifier – Push Pull connection – push-pull classifier. Feedback amplifiers: feedback and related transfer gain of an amplifier with feedback- Emitter         Oscillators         Coscillators         cillators - Fundamental principle of oscillator - Concept - Analysis - Hartley oscillators – Analysis – Colpitt'         lysis - Wien bridge oscillator - Analysis - Crystal of the bridge oscillator - Concept - Con	iers in ss B P erms- ot of f s oscil oscillat g actic - trans	1 casca ower a block feedbac lator – cor – 1 n of a	<b>2 ho</b> de – F ampli diagra <b>11 ho</b> ck osc - Ana <b>2 ho</b> a tran	Power fier – am of ours cillato lysis urs sistor
Voltage and J amplifiers – C Characteristic a feedback an follower circu Unit:2 Introduction - T -Tuned collecto Phase shift oso Analysis. Unit:3 Introduction - – multivibrato multivibrator	Class A pov s of an amp nplifier- Tra iit. Types of osc or oscillator cillator-Ana switching c ors – types - Different	Amplifiers         Infiers: Classification of amplifiers – Transistor amplifiers: classification of amplifiers – Transistor amplifiers: amplifier. Feedback amplifiers: feedback and related to the state of an amplifier with feedback - Emitter         Oscillators         Coscillators         Cillators - Fundamental principle of oscillator - Conception - Analysis - Hartley oscillators – Analysis – Colpitt'         Itysis - Wien bridge oscillator - Analysis - Crystal of the state switching circuits         Solid state switching circuits         Circuit - electronic switches - important terms - switching	iers in ss B P erms- ot of f s oscil oscillat g actic - trans	1 casca ower a block feedbac lator – cor – 1 n of a	<b>2 ho</b> de – F ampli diagra <b>11 ho</b> ck osc - Ana <b>2 ho</b> a tran	Power fier – am of ours cillato lysis urs sistor
Voltage and p amplifiers – C Characteristic a feedback an follower circu Unit:2 Introduction - T Tuned collector Phase shift oso Analysis. Unit:3 Introduction - – multivibrator Clamping Circ	Class A pov s of an amp nplifier- Tra iit. Types of osc or oscillator cillator-Ana switching c ors – types - Different	Amplifiers         Ifiers: Classification of amplifiers – Transistor amplifiver amplifier – Push Pull connection – push-pull classifier. Feedback amplifiers: feedback and related to the state gain of an amplifier with feedback - Emitter         Oscillators         Oscillators         Cillators - Fundamental principle of oscillator - Concept - Analysis - Hartley oscillators – Analysis – Colpitt'         Itysis - Wien bridge oscillator - Analysis - Crystal of the state switching circuits         Solid state switching circuits         Circuit - electronic switches - important terms - switching of multivibrators – transistor astable multivibrator – iating circuit - Integrating circuit - Clipping circuits         Circuit - Integrating circuit - Clipping circuits         Cide of a clamper - Positive clamper – negative clamper	iers in ss B P erms- ot of f s oscil oscillat g actic - trans	1 casca ower a block feedbaa lator – for – 1 on of a istor r	2 hor ide – F ampli diagra 11 ho ck oso - Ana 2 hor a tran nonos	Power fier – am of ours cillato lysis urs sistor stable
Voltage and p amplifiers – C Characteristic a feedback an follower circu Unit:2 Introduction - T Tuned collector Phase shift oso Analysis. Unit:3 Introduction - – multivibrator Clamping Circu Unit:4	Class A pov s of an amp nplifier- Tra iit. Types of osc or oscillator cillator-Ana switching c ors – types - Different cuits - basic	Amplifiers         Iffiers: Classification of amplifiers – Transistor amplifiver amplifier – Push Pull connection – push-pull classifier, Feedback amplifiers: feedback and related to ansfer gain of an amplifier with feedback- Emitter         Oscillators         cillators - Fundamental principle of oscillator - Concept - Analysis - Hartley oscillators – Analysis – Colpitt'         lysis - Wien bridge oscillator - Analysis - Crystal of the bridge of t	iers in ss B P erms- ot of f s oscill oscillat g actic - trans - per.	1 casca ower a block feedbad lator – cor – 1 on of a istor r	2 hor de – F ampli diagra 11 ho ck osc Ana 2 hor a tran nonos	Power fier – am of ours cillate lysis urs sistor stable urs
Voltage and p amplifiers – C Characteristic a feedback an follower circu Unit:2 Introduction - T -Tuned collector Phase shift oso Analysis. Unit:3 Introduction - multivibrator Clamping Circo Unit:4 Introduction - p	Class A poy s of an amp nplifier- Tra iit. Types of osc or oscillator cillator-Ana switching c ors – types - Different cuits - basic power electi	Amplifiers         lifiers: Classification of amplifiers – Transistor amplifiers: endback amplifiers: feedback and related to the state of an amplifier with feedback - Emitter         Oscillators         Coscillators         Cillators - Fundamental principle of oscillator - Conception - Analysis - Hartley oscillators – Analysis – Colpitt'         Iysis - Wien bridge oscillator - Analysis - Crystal of the bridge oscillator - Conception - Construction - Operations - Character	iers in ss B P erms- ot of f s oscil oscillat g actic - trans - per.	1 casca ower a block feedbad lator – tor – 1 on of a istor 1	<b>2 ho</b> de – F ampli diagra <b>11 ho</b> ck oso - Ana <b>2 ho</b> a tran nonos	Power fier – am of ours cillato lysis urs sistor stable urs cation
Voltage and p amplifiers – C Characteristic a feedback an follower circu Unit:2 Introduction - T Tuned collecto Phase shift oso Analysis. Unit:3 Introduction - multivibrator Clamping Circ Unit:4 Introduction - p The Diac – Op	Class A pover soft an amportant and a soft an amportant and a soft an amportant and a soft and a so	Amplifiers         Iffiers: Classification of amplifiers – Transistor amplifiver amplifier – Push Pull connection – push-pull classifier, Feedback amplifiers: feedback and related to ansfer gain of an amplifier with feedback- Emitter         Oscillators         cillators - Fundamental principle of oscillator - Concept - Analysis - Hartley oscillators – Analysis – Colpitt'         lysis - Wien bridge oscillator - Analysis - Crystal of the bridge of t	iers in ss B P erms- ot of f s oscil oscillat g actic - trans - per.	1 casca ower a block feedbad lator – tor – 1 on of a istor 1	<b>2 ho</b> de – F ampli diagra <b>11 ho</b> ck oso - Ana <b>2 ho</b> a tran nonos	Power fier - am or ours cillate lysis urs sistor stable urs cation

Unit:	5	Operational Amplifier	11 hours
		mplifier - Basic circuit - Operation - CMRR - Operational amp	
		nbol - Frequency response - Slew rate - Applications - Inverting	g amplifier - Non
invert	ting amp	lifier - Adder - Subtractor - Integrator- Differentiator.	
Unit:		Contemporary Issues	2 hours
Exper	rt lecture	es, online seminars - webinars	
		Total Lecture hours	60
Text	Book(s)		
		ons of Electronics, D Chattopadhyaya & P C Rakshit, Ne	w Age International
		rs, Second Edition (2005)	
2 F	Principle	s of Electronics, V K Mehta, Rohit Mehta, S. Chand Compa	nv. Eleventh revised
	Edition (		5,
Refer	rence B	poks	
1 A	A textbo	ok of Applied Electronics, R S Sedha, S. Chand Company, First	Edition (2010)
2 I	ntegrate	d Electronics, Jacob Millman and Christos C. Halkias, Tata Mo	Graw Hill Publishing
		y, Second edition (2015)	
		ic dev <mark>ices and</mark> Circuits, S. Salivahanan and N. Sureshkumar	, Tata McGraw Hill
F	Publishir	ng Co <mark>mpany, F</mark> ourth edition (2016)	
		ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
		tel.ac.in/course.html/Electronics/Basic electrnics	
_	÷	ww.askiitians.com/revision-notes/physics/solid-and-electronic-dev	vice/
3 <u>k</u>	nttps://nj	otel.ac.in/course.html/electronics/operational amplifier	
Can		and Dru Dr. U. Kommonishi	2
Cours	se Desig	ned By: Dr. U. Karunanithi	

		eg of						(California)		
Mappi	Mapping with Programme Outcomes									
COs	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10
CO1	S	М	E.	M	S	M	59L	S	М	М
CO3	S	S	М	SU	ปทMอบ	2-S-	М	L	S	М
CO3	S	М	M	<b>EDSICA</b>	TE S E	N M	L	М	S	S
CO4	S	S	L	М	S	М	М	М	S	S
CO5	S	S	М	L	М	S	S	М	М	S

#### SEMESTER V

Course code Core/Elective/SBS Pre-requisite	53C	SOLID STATE PHYSICS CORE PAPER VII The students should know the fundamentals on	L 4	Т 0	P 0	C 4	
Pre-requisite			4	0	0	1	
		The students should know the fundamentals on			v	-	
			The students should know the fundamentals on Syllabus				
		kinds of bonds and classification of solids Versio				n 2022-23	
Course Objectives							
The main objectiv							
	•	tructure and properties of solids.					
		and optical properties of solids. netic, electric and dielectric materials and their applie	notion				
		ducting process for the fabrication of new devices.	cation.				
+. understand the s	supercon	ducting process for the fublication of new devices.					
		and the second second second					
Expected Course	Outcom	es:					
-		ion of the course, student will be able to:					
		aterial for a given application based on Fermi level c	oncept		K3		
	analyze the magnetic materials for utilization in varied fields.				K4		
3 design new	design new components or devices using dielectrics and superconductors.				K6		
K1 - Remember; I	K2 - Un	derstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	<b>K6</b> - Ci	reate			
	GT						
Unit:1		Crystallography alline and amorphous solids – Different features o		A.	12 ho		
Unit:2 Classification of s	olids – 1	Bond Theory of Solids Bond theory – Optical properties of solids ng and Pettit's law – Einstein's theory of specific	- Spec				
	<u> </u>	Combatore					
Unit:3		Magnetic Properties of Materials			12 ho	ours	
Ferromagnetism -	- Weiss als – Qu	theory of diamagnetism –Langevin's theory of Paran heory of Ferromagnetism –Nuclear magnetic resonan antum theory of paramagnetism – Cooling by adiaba	nce – F	erroe	lectrici	•	
Unit:4		Free Electron Theory			12 ho	urs	
Thermal conductive effect – Hall volta	vity – V age and	ude Lorentz theory – Explanation of Ohm's law – E Vide-Mann and Franz ratio – Sommerfield model – Hall coefficient – Mobility and Hall angle – Impo on of Hall coefficient.	Schote	ky ef	ductiv fect –	ity – Hall	
Unit:5		Dielectrics and Super Conductivity			12 h	ours	
Dielectrics- Diele molecular polariz	ability rconduct	- Types of polarizability -Superconductivity – P or – Meissner effect – Experimental facts – Isotopes Page <b>32</b> of <b>91</b>	henome	ena –	Atomi	c or	

Unit	t:6	Contemporary Issues					
Expe	ert lectures,	online seminars - webinars					
		Total Lecture hours	60				
Text	t Book(s)						
1	Solid Stat	e Physics Gupta and Kumar, K. Nath & Co. (2018)					
2	Modern P	hysics R Murugesan, S Chand Publishing; Eighteenth edition (2016)					
Refe	erence Book	-S					
1	Introducti	on to Solid State Physics Charles Kittel, Wiley (2019)					
2	Solid Stat	e Physics A J Dekker, Macmillan (2011)					
Rela	ated Online	Contents [MOOC, SWAYAM, NPTEL, Websites etc.]					
1	https://you	utu.be/RImqF8z91fU					
2	https://npt	tel.ac.in/courses/115/105/115105099/					
Cou	rse Designed	1 By: Mr. J.William Charles					

100 Mapping with Programme Outcomes COs **PO1 PO2 PO3 PO4** PO5 **PO6 PO7 PO8** PO9 **PO10** CO1 S Μ S S Μ S S Μ S Μ CO<sub>2</sub> S Μ M S S Μ S M Μ S S S S **CO3** М S S S S S S

Sologiasis Company 2 With Solution

00 00

\*S-Strong; M-Medium; L-Low

Page **33** of **91** 

## SEMESTER V

	1	SEMESTER V				<del></del>
Course code	53D	ELECTRICITY AND MAGNETISM	L	Т	Р	С
Core/Elective/SBS		CORE PAPER VIII	4	0	0	4
Pre-requisite		The students are supposed to have the basic		abus	2022-23	
-		knowledge of electricity and magnetism	Version		2022-20	
Course Object						
The main objec 1. make the		niliar with the laws of electricity and magnetism and	thoir s	orifice	tions	
		rties of electric and magnetic materials	ulen v	cinica	uions	
		skills to construct technically useful devices.				
Expected Cour	se Outcon	nes:				
On the success	sful comple	tion of the course, student will be able to:				
1 define an	nd derive th	ne laws of electricity and magnetism			K2	
2 update th	ne knowled	ge of properties and magnetism			K3	
3 expertise	e the skil <mark>ls</mark>	to manufacture devices			K5	
K1 - Rememb	er; <b>K2</b> - Ur	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - (	Create		
	- A					
Unit:1	Gauss T	heorem and its Applications		1	2 hou	irs
capacitor – effe mica capacitor Unit:2 Electron theory magnetization M magnetic mate	ect of a did – uses of ca M of magnet M; magneti rials and of susceptib	<b>Iagnetic Properties of Materials</b> tism; dia, para, ferromagnetism and their properties c field intensity H; magnetic susceptibility and magn magnetization; magnetic hysteresis – area of the ility: Guoy's method – magnetic circuits –comparison	Ring c	onden 1 etic fie ermeal erisis	ser – <b>2 hou</b> 1d B; bility; 100p;	irs
		SCATE TO GLEVIN				
Unit:3	•	Thermo Electricity			1 hou	
Peltier co-effic Thomson Coef Thomson effect	ient – the ficient – e in the met	thermo e.m.f – Peltier effect; Peltier Co- efficient – rmodynamical consideration of Peltier effect – The m.f generated in a thermocouple taking both Pe als – Thermoelectric power – Application of thermody ectric diagrams and their uses.	omson eltier	n effe effect	ect –	-
Unit:4	Н	lelmholtz Equation of Varying Current		1	1 hou	irs
Growth and decapacitor through resistance (LCF	cay of curr gh a resista R) - torque	ent in an inductive – resistive circuit – charging and ince – growth of charge in a circuit with inductance on a current loop in a magnetic field – Theory of for damping – current and voltage sensitivities.	, capa	arging	g of a	L

Ur	nit:5	Dynamics of Charged Particles	12 hours
		arged particle in a uniform electric field - longitudinal - tran	
		e in alternating electric field - motion of charged particle i	
		l - Motion of charged particle in crossed electric and	
		ic Induction: A conducting rod moving through a uniform	
		eries - inductance in parallel - self-inductance of co-axial cylin	
	ictance of tuber of the second	toroidal coil of rectangular cross-section – self -inductance of ection.	of toroidal coil of
	nit:6	Contemporary Issues	2 hours
Ex	pert lecture	s, online seminars - webinars	
			-
		Total Lecture hours	60
Te	xt Book(s)	ക്കെക്കും	·
1	Electricity (1984)	and Magnetism, Brijlal and Subramaniam, Educational and Ur	niversity Publishers
2	Electricity	and Magnetism, R. Murugesan, S.Chand&Co (2017)	
Re	ference Bo	oks	
1	Electricity	y and Magnetism, D.N. Vasudeva, S.Chand&Co, twelfth editio	n (2007)
2	Electricity	y an <mark>d Magneti</mark> sm, Nagarathanam and Lakshminarayanan,	
I			
Re	lated Onlin	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://w	ww.askiitians.com/revision-notes/physics/current-electricity.	<u>html</u>
2	https://w	ww.askiit <mark>ians.com/revision-notes/physics/electromagnetic-in</mark>	duction-and-
	<u>alternati</u>	ng-current/	
			19
Co	urse Desigr	ned By: Dr. P. Sagunthala and Dr. K.A.Vijayalakshmi	S

Mappi	ng with	Program	mme Ou	itcom <mark>es</mark>	Coimbate	ure -		G		
COs	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	PO10
CO1	S	М	S 🚭	M	М	S	S	M	М	S
CO2	S	М	М	M	S	M	М	S	S	М
CO3	S	S	S	SCA	SU E	S	S	S	S	S

		SEMESTER V				
Course code	5ZC	INSTRUMENTATION III	L	Т	Р	С
Core/Elective	/SBS	SKILL BASED SUBJECT	3	0	0	3
Pre-requisite	e	The students should be able to distinguish between analog and digital measurement and their importance	-	abus sion	2022	2-23
Course Objec	tives:				I	
		f this course are to:				
		to the working of digital and analog techniques used in me	easure	ment	device	es.
		ts to use electronic testing instruments.				
3. introduce	medica	1 instrumentation.				
Ermosted Cor		toomog				
Expected Cou		mpletion of the course, student will be able to:				
		principles of biomedical instruments.			K1	
	-		atia a		K1 K2	
2 enable the electroni		ents to understand the working of basic electromagn	enc a	ina	K2	
		ose electronic components.			K3	
	-	al testing and maintenance of lab equipment.			K4	
•		ple electronic circuits using multimeters and oscilloscopes			K5	
		of Biomedical measurement.			K6	
-		- Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - (	reate	no	
				neute	-	
Unit:1		Data Acquisition and Conversion	-		7 ho	ure
	_ Signa	1 conditioning of the inputs – Single channel data acquis	ition	veten		
	Ű	to Analog converter – Analog to Digital converter.		system	15 – 1	Jala
Unit:2	E	Basic meter movements	10		9 ho	iirc
	gnetic r	noving coil movements – Practical PMMC movements	<u></u> м	loving		
	0	ic vane repulsion type (Moving ion type) – Display device		<u> </u>		type
			/			
Unit:3		Digital Instruments			9 ho	urs
		l Multimeter – Digital panel meters – Digital frequen				
Measurement	of time	- Universal counter - Digital measurement of frequency -	Digit	al Tac	home	ter.
	T	COUCATE TO ELEVAIE				
Unit:4	L .	Oscilloscope			9 ho	
	-	principles – CRT features – Basic principles of signal disp	-			-
		nple CRO – Vertical amplifier – Horizontal deflecting sy	/stem	– De	lay In	ie ir
triggered swee	ср – СК	r connection:				
Unit:5	Biom	edical Instrumentation			9 ho	urs
Basics of Bior	nedical	Instrumentation system – Blood flow measurement – mag	netic b	lood	flow r	ate
		ECG-EEG-EMG -X-ray Imaging and CT scan- MRI scan.				
<b>T</b> I <b>1</b> / /						
Unit:6		emporary Issues			2 ho	urs
Expert lectur	es, omn	ne seminars – webinars				
		Total Lecture hours				45

Te	xt Book(s)
1	Instrumentation Devices and Systems, C.S. Rangan, G. R. Sarma and V. S. Mani, 2 <sup>nd</sup> Edition,
	Tata McGRaw Hill, New Delhi (1983)
2	Electronic Instrumentation, H. S. Kalsi, 3rd edition, Tata McGraw Hill, New Delhi (2012)
3	Electronics in Medicine and Biomedical Instrumentation, N. K. Jog, 2 <sup>nd</sup> Edition, Prentice Hall
	India, New Delhi (2013)
<b>D</b> -	former Desta
Re	ference Books
1	Measurement System Applications and Design, E.O. Doebalin, 5 <sup>th</sup> edition, McGraw Hill International (2007)
2	Transducers and Instrumentation, D. V. S. Murthy, 2 <sup>nd</sup> edition, Prentice Hall of India (2010)
3	Biomedical Instrumentation and Measurements, Leslie Crombwell, Fred.J.Weibell, Trich.A.Pfeiffer, Prentice Hall of India (1997).
	60,000,000,000,000
Re	lated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	PMMC
	https://youtu.be/n1MinLtvnPY
2	NPTEL Play list
	https://www.youtube.com/watch?v=3eYmFjHnQjY&list=PL227ZNwByTlTGq1atJsFst_qnEpt
	<u>18700</u>
3	Biomedical instrumentation- nptel -youtube channel
	https://www.youtube.com/watch?v=f949gpKdCI4&list=PLCDqPRbvMIPCt0pnGB-
	<u>I5ftPSGCMOuDv0</u>
~	to a state of the
Co	urse Designed By: Mrs J.Jayachitra, Dr.L.Priya

Mappi	ng with	Program	nme Out	comes			£7		3	1
COs	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10
CO1	S	L	L	М	S	М	М	М	S	S
CO2	S	S	L	S	S	S	S	M	M	М
CO3	S	S	S	S	S	S	S	Μ	S	S
CO4	S	S	S	M	S	S	M	М	S	М
CO5	S	S	М	M	J Mo IJ	2Fm	M	М	L	М
CO6	S	L	L	M	e so ei	M	L	М	S	S



1. understa	tives:	RELATIVITY CORE PAPER IX The students are expected to have a knowledge of particle nature and wave nature of matter		0 abus sion	0	4
Course Objec The main objec 1. understa					2022	
The main object 1. understa					2022	2-23
1. understa	ctives of th					
		is course are to:				
		re property of matter				
		of uncertainity principle and its applications				
3. apply the	e concept o	of relativity to solve various physical problems				
Expected Cou	rse Outco	mes				
-		tion of the course, student will be able to:				
		dge of wave nature of matter and its experimental veri	ficatio	n	K2	
		erg uncertainity principle and apply it to verify proble			K2 K3	
	nd nuclear		1115 111		KJ	
		behind various physical problems using relativity and	solve		K5	
them						
K1 - Remembe	er; <b>K2</b> - Ui	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - (	Create		
(v <sub>g</sub> ) and phase velocity (v <sub>g</sub> ). Thomson's exp <b>Unit:2</b> Introduction – Momentum – E Illustration – Di	velocity Verification periment. Uncertain Energy and ffraction o – Non-exis	timent – Expression for group velocity – Relation bet         (v <sub>p</sub> ) – Velocity of de Broglie wave – (i)Phase velocity         n of de Broglie relation – Davisson and Germer's experimentaries         Uncertainty Principle         ty Principle – Elementary proof between – D         Time – Physical Significance of Heisenberg's Uncert         f electrons through a slit – Gamma ray microscope that         tence of free electrons in the nucleus – Size and Enert	city (v iments ) oisplac rtainty ought	p) - s - G 1 ement Princ exper	(ii)Gr P 7 hou and iple – iment	urs
state of Hydrog		EDUCATE TO ELEVATE				
Unit:3		Schrödinger's Wave Equation		1	8 hou	ırs
Introduction – Time-dependent function – Ope	t and Tim rators – Ei and Total	ction for a free particle – Schrödinger's one-dimensi e independent – Limitations of wave function – Ne gen function – Eigen Value – Eigen equation – Op Energy – Postulates of Quantum Mechanics – Ort Ehrenfest's theorem – Statement and proof.	ormali erator	vave of zation for M	equati of v Iomen	on – wave itum,
	11001 1					
	11001 1	Spherical Symmetrical systems		1	8 hou	ırs

Unit:5	Relativity	18 hours
Galilean Trans	formation equation – Ether Hypothesis – Michelson-Morley ex	periment – Explanation
	e results – special theory of Relativity – Lorentz transforma	· ·
-	Time dilation – Addition of Velocities – Variation of Mass with	
equivalence.		
-		
Unit:6	Contemporary Issues	2 hours
Expert lecture	es, online seminars - webinars	
	Total Lecture hours	90
Text Book(s)		
1 Elements	s of Quantum Mechanics, Kamal Singh, S.P Singh, S. Chand &	Co. (2005)
2 Quantum	Mechanics, S.P Singh, M. K Bagde, S. Chand & Co., second ed	ition (2004).
3 Modern	Physics, R Murugesan, S .Chand & Co. (2016)	
<b>Reference Bo</b>	ooks	
1 Quantum	1 Mechanics, Sathya Prakash, C.K.Singh, Kedar Nath Ram Nath	n&Co.(1997)
2 Quantum	Mechanics, Schiff, Tata McGraw-Hill, second edition, (1968).	
Related Onli	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
	ww.youtube.com/playlist?list=PLbMVogVj5nJTDMhThY9xu2T	vg0u1RPuxO
· · · · · ·	edium.com/predict/what-is-quantum-mechanics-what-is-theory-c	· · · · · · · · · · · · · · · · · · ·
fdbe87et		
3 https://w	ww.askiitians.com/revision-notes/physics/special-theory-of-relation-	ivity/
Course Desig	ned By: Dr P. Sagunthala	

		5	Mapp	ing with	Program	me Outc	omes	12		-
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	М	М	M	M	М	S	М	М	М
CO2	S	S	S	M	TSEL	S	М	М	S	S
CO3	М	S	S	S	S	S	S	S	S	S

Course code						
	63B	NUCLEAR PHYSICS	L	Т	Р	С
Core/Electi	ve/SBS	CORE PAPER X	6	0	0	4
Pre-requisite		The students should have knowledge of the basic constituents of atoms. They should be familiar with the structure of atoms and nucleus.		labus rsion	202	2-23
<b>Course Object</b>	ives:					
The main object	tives of thi	s course are to:				
1. acquire the	e knowledg	e to understand about nucleus and nucleus structure.				
		rent types of radiation detectors and particle accelerator	rs			
		y phenomenon of nucleus				
process		to analyze the energy released by the nucleus during t wledge of cosmic rays and elementary particles.	he fi	ssion a	and f	usio
J. acquire un	e basic kilo	whedge of cosmic rays and elementary particles.				
Expected Cou	rse Outcon	nes:				
		tion of the course, student will be able to:				
	-	ral properties of Nucleus			K	)
		tion and working of radiation detectors			K4	
		tilizing the behavior of nuclear particles			K	
		nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K	6	Tranta	IX	)
KI - Kememo	CI, <b>KZ</b> - UI	iderstand, K5 - Appry, K4 - Anaryze, K5 - Evaluate, F	10 - 1	cicate	-	
Unit:1		Introduction to the Nucleus				
dipole momer	nt) – Bindi	Icleus (Size, Mass, Density, Charge, Spin, Angular m ng energy – BE/A and stability of Nucleus – Packing – Definition – Properties – Meson theory – Model of	g frac	tum, 1 tion –	Magi · Nu	clear
dipole momer stability – Nu	nt) – Bindin clear forces rop model	ng energy – BE/A and stability of Nucleus – Packing – Definition – Properties – Meson theory – Model of – Semi-Empirical mass formula – The Shell model –	g frac Nuc	ntum, 2 ction – lear St	Mag Nu ructu	netic clear 1re –
dipole momer stability – Nu The Liquid D model –The c	nt) – Bindin clear forces rop model ollective me	ng energy – BE/A and stability of Nucleus – Packing – Definition – Properties – Meson theory – Model of – Semi-Empirical mass formula – The Shell model – odel.	g frac Nuc	ntum, 2 etion – lear St lence 2	Mag - Nu ructu for S	netic clear ure – Shell
dipole momer stability – Nu The Liquid D model –The c <b>Unit:2</b>	nt) – Bindin clear forces rop model ollective me E	ng energy – BE/A and stability of Nucleus – Packing – Definition – Properties – Meson theory – Model of – Semi-Empirical mass formula – The Shell model odel.	g frac Nuc Evic	ntum, 2 ction – lear St lence 2	Mag - Nu ructu for S 8 ho	netic clear ire – Shell <b>ours</b>
dipole momer stability – Nu The Liquid D model –The c Unit:2 Interaction be Gamma ray-Io	nt) – Bindin clear forces rop model ollective ma <u>E</u> etween the onization cl	ng energy – BE/A and stability of Nucleus – Packing – Definition – Properties – Meson theory – Model of – Semi-Empirical mass formula – The Shell model – odel.	g frac Nuc Evic	ntum, 2 etion – lear St lence 2 <b>1</b> – Ele	Mag - Nu ructu for S 8 ho	netic clear ure – Shell ours ns –
dipole momer stability – Nu The Liquid D model –The co <b>Unit:2</b> Interaction be Gamma ray-Io Nuclear emiss	nt) – Bindin clear forces rop model ollective ma <u>E</u> etween the onization cl	ng energy – BE/A and stability of Nucleus – Packing – Definition – Properties – Meson theory – Model of – Semi-Empirical mass formula – The Shell model – odel. Detector and Particle Accelerators energetic particles and matter – Heavy charged part hamber – Solid State detector – GM counter – Wilso r accelerators – Cyclotron – Betatron.	g frac Nuc Evic	ntum, 2 etion – lear St lence 2 <b>1</b> – Ele oud ch	Mag - Nu for S 8 ho ectron	netic clear ire – Shell ours ns – er –
dipole momer stability – Nu The Liquid D model –The co Unit:2 Interaction bo Gamma ray-Io Nuclear emiss Unit:3	nt) – Bindin clear forces rop model ollective mo <u>E</u> etween the onization cl ion – Linea	ng energy – BE/A and stability of Nucleus – Packing – Definition – Properties – Meson theory – Model of – Semi-Empirical mass formula – The Shell model – odel. Detector and Particle Accelerators energetic particles and matter – Heavy charged part hamber – Solid State detector – GM counter – Wilso r accelerators – Cyclotron – Betatron. Radioactivity	g frac Nuc Evic	ntum, 2 etion – lear St lence 2 1 – Ele bud ch	Mag ructu for S 8 ho ctron amb	netic clear ire – Shell ours ns – er –
dipole momen stability – Nu The Liquid D model –The c <b>Unit:2</b> Interaction be Gamma ray-Ie Nuclear emiss <b>Unit:3</b> Natural Radio Alpha particle – determinatio Laws of Radi Half life perio	nt) – Bindin clear forces rop model ollective mo E etween the onization cl ion – Linea pactivity – A – Determi on of Wave ioactivity – od – Mean	ng energy – BE/A and stability of Nucleus – Packing – Definition – Properties – Meson theory – Model of – Semi-Empirical mass formula – The Shell model – odel. Detector and Particle Accelerators energetic particles and matter – Heavy charged part hamber – Solid State detector – GM counter – Wilso r accelerators – Cyclotron – Betatron.	g frac Nuc Evic icles n Clo tion of ive d	tum, 2 tion – lear St lence 2 1 – Ele bud ch 1 of e/m of Beta Gamm lisinteg	Magg Nucructu for S 8 ho ectron amb 8 ho i of a par na ra gratio	netic clear ure – 5hell purs ns – er – purs ticle ys – pon –
dipole momen stability – Nu The Liquid D model –The c <b>Unit:2</b> Interaction be Gamma ray-Ie Nuclear emiss <b>Unit:3</b> Natural Radio Alpha particle – determinatio Laws of Radi Half life perio	nt) – Bindin clear forces rop model ollective mo <u>E</u> etween the onization cl ion – Linea oactivity – A – Determi on of Wave ioactivity – od – Mean – Preparatio	ng energy – BE/A and stability of Nucleus – Packing – Definition – Properties – Meson theory – Model of – Semi-Empirical mass formula – The Shell model – odel. Detector and Particle Accelerators energetic particles and matter – Heavy charged part hamber – Solid State detector – GM counter – Wilso r accelerators – Cyclotron – Betatron. Radioactivity Alpha, Beta and Gamma rays – Properties – Determination of length of Gamma rays (Dumond Spectrometer) – Origin Soddy-Fajan's displacement law – Law of Radioact life period (Definitions, Expression) – Units of Radio	g frac Nuc Evic icles n Clo tion of ive d	tum, 2 tion – lear St lence 2 1 – Ele bud ch of e/m of Beta Gamm lisinteg ity – 2	Magg Nucructu for S 8 ho ectron amb 8 ho i of a par na ra gratio	netic clear ure – Shell ours er – ours ticle ys – on – icial

Unit:5	Cosmic Rays and Elementary Particles	18 hours
Cosmic rays -	- Origin of cosmic rays – Latitude effect – Azimuthal effect –	Attitude effect –
Seasonal, Dia	gonal changes - Primary and Secondary Cosmic rays - casca	de theory of shower -
Pair production	on and Annihilation - Van Allen Belts - Elementary particles -	Introduction –
particles and a	antiparticles – Antimatter – The fundamental interactions – The	Quark model.
		1
Unit:6	Contemporary Issues	2 hours
Expert lecture	es, online seminars – webinars	
	Total Lecture hours	90
Text Book(s)		
1 Modern P	hysics, R Murugesan, S. Chand Publishing, 18th Edition (2017)	).
2 Nuclear P	hysics, D C Tayal, Publish <mark>er Himalaya Pu</mark> blishing House (2009	).
	an a	
Reference Bo	ooks	
1 Concept o	f Modern Physics, Arthur Beiser, McGraw-Hill, (2007).	
2 Introduction	on to Modern Physics, F K Richtmyer Etal, McGraw-Hill; 6th e	edition (1969).
Related Only	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
	otel.ac.in/courses/115/104/115104043/	
	otel.ac.in/courses/115/103/115103101/	
	ww.youtube.com/watch?v=xrk7Mt2fx6Y	
<u>5 <u>intps.//w</u></u>		
Course Desig	ned By: Dr. K. Selvaraju	

Mappi	ng with	Prog <mark>ran</mark>	nme Out	comes	1h	1			9	
COs	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10
CO1	S	M	М	S	М	М	М	S	M	М
CO2	M	S	S	М	L	М	S	M	S	S
CO3	S	M	S	S	S	S	S	S	S	S
*S-Stro	ong; M-N	Aedium;		்தப் EDUCA	பாரை TE TO E	e_uit EVATE	ເອັອໂ			

Page **42** of **91** 

	63P	<b>CORE PRACTICAL III ELECTRONICS</b> (Examination at the end of Sixth Semester)	L	Т	Р	С
<b>Core/Elective</b>	/SBS	CORE PRACTICAL	0	0	2	3
Pre-requisite		Should have the fundamental knowledge of Basic Electronics	Syllab Versio		2022	-23
Course Object	ctives:					
v		nis course are to:				
		les of Basic Electronics into Experimental techniqu	es			
		t different electronic gadgets.				
3. motivate t	he students	to apply the principles of electronics in their day-to	-day life	e.		
	0.4	05500a				
Expected Cou						
	<u>^</u>	etion of the course, student will be able to:			1	
		es of Power supplies, Amplifiers and Oscillators			K4	
2 to analyz and Sola		acteristics of various Electronic devices like BJT, U	JT, LDR	2,	K4	
		dge of the characteristics of an operational amplifie	r		K5	
K1 - Rememb	er: <b>K2 -</b> U	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluat	e: <b>K</b> 6 - (	Create		
	. ,			X		
	1	LIST OF EXPERIMENTS			56 h	ours
		(Any twelve experiments)				
1. Logic C	lates using	diodes and transistor.				
		th Zener voltage regulator				
3. Regulat	ed Power S	Supply - IC				
4. Dual Po	wer Supply					
	or ppr.	y and a state of the state of t				
5. Voltage	Doubler	The second secon	Je la			
5. Voltage	Doubler	ransistor - CE mode	Sel. Oli			
<ol> <li>5. Voltage</li> <li>6. Charact</li> </ol>	Doubler eristics of [	The second secon				
<ol> <li>5. Voltage</li> <li>6. Charact</li> <li>7. Differen</li> <li>8. Clipping</li> </ol>	Doubler eristics of 7 ntiating and g and Clam	Fransistor - CE mode I Integrating Circuits. ping Circuits	- All All All All All All All All All Al			
<ol> <li>Voltage</li> <li>Charact</li> <li>Differer</li> <li>Clipping</li> <li>Single-s</li> </ol>	Doubler eristics of 7 ntiating and g and Clam stage Trans	Fransistor - CE mode	in the second se			
<ol> <li>5. Voltage</li> <li>6. Charact</li> <li>7. Differer</li> <li>8. Clipping</li> <li>9. Single-s</li> <li>10. Emitter</li> </ol>	Doubler eristics of 7 ntiating and g and Clam tage Trans Follower	Fransistor - CE mode I Integrating Circuits. ping Circuits istor Amplifier- R.C. Coupled	TO International			
<ol> <li>5. Voltage</li> <li>6. Charact</li> <li>7. Differen</li> <li>8. Clipping</li> <li>9. Single-s</li> <li>10. Emitten</li> <li>11. Series a</li> </ol>	Doubler eristics of 7 ntiating and g and Clam tage Trans Follower and Paralle	Fransistor - CE mode Integrating Circuits. ping Circuits istor Amplifier- R.C. Coupled I resonance circuits	10 10			
<ol> <li>5. Voltage</li> <li>6. Charact</li> <li>7. Differer</li> <li>8. Clipping</li> <li>9. Single-s</li> <li>10. Emitter</li> <li>11. Series a</li> <li>12. Hartley</li> </ol>	Doubler eristics of 7 nitiating and g and Clam stage Trans Follower and Paraller Oscillator	Transistor - CE mode I Integrating Circuits. ping Circuits istor Amplifier- R.C. Coupled I resonance circuits – Solid State	TO AND			
<ol> <li>5. Voltage</li> <li>6. Charact</li> <li>7. Differer</li> <li>8. Clipping</li> <li>9. Single-s</li> <li>10. Emitter</li> <li>11. Series a</li> <li>12. Hartley</li> <li>13. Colpitt</li> </ol>	Doubler eristics of 7 ntiating and g and Clam tage Trans Follower and Paralle Oscillator 's Oscillator	Transistor - CE mode Integrating Circuits. ping Circuits istor Amplifier- R.C. Coupled I resonance circuits – Solid State r – Solid State	100			
<ol> <li>5. Voltage</li> <li>6. Charact</li> <li>7. Differer</li> <li>8. Clipping</li> <li>9. Single-s</li> <li>10. Emitter</li> <li>11. Series a</li> <li>12. Hartley</li> <li>13. Colpitt</li> <li>14. Square</li> </ol>	Doubler eristics of 7 ntiating and g and Clam tage Trans Follower and Paralle Oscillator 's Oscillator wave gene	Transistor - CE mode I Integrating Circuits. ping Circuits istor Amplifier- R.C. Coupled I resonance circuits – Solid State r – Solid State rator using IC 555 Timer	100 m			
<ol> <li>5. Voltage</li> <li>6. Charact</li> <li>7. Differen</li> <li>8. Clipping</li> <li>9. Single-s</li> <li>10. Emitten</li> <li>11. Series a</li> <li>12. Hartley</li> <li>13. Colpitt</li> <li>14. Square</li> <li>15. Astable</li> </ol>	Doubler eristics of 7 ntiating and g and Clam tage Trans Follower and Paralle Oscillator 's Oscillator wave gene Multivibra	Fransistor - CE mode Integrating Circuits. ping Circuits istor Amplifier- R.C. Coupled I resonance circuits – Solid State r – Solid State rator using IC 555 Timer ator	100 m			
<ol> <li>5. Voltage</li> <li>6. Charact</li> <li>7. Differer</li> <li>8. Clipping</li> <li>9. Single-s</li> <li>10. Emitter</li> <li>11. Series a</li> <li>12. Hartley</li> <li>13. Colpitt</li> <li>14. Square</li> <li>15. Astable</li> <li>16. Study of</li> </ol>	Doubler eristics of 7 ntiating and g and Clam tage Trans Follower and Paralle Oscillator 's Oscillator 's Oscillator wave gene Multivibra of Solar Cel	Fransistor - CE mode Integrating Circuits. ping Circuits istor Amplifier- R.C. Coupled I resonance circuits – Solid State r – Solid State rator using IC 555 Timer ator	100			
<ol> <li>5. Voltage</li> <li>6. Charact</li> <li>7. Differer</li> <li>8. Clipping</li> <li>9. Single-s</li> <li>10. Emitter</li> <li>11. Series a</li> <li>12. Hartley</li> <li>13. Colpitt</li> <li>14. Square</li> <li>15. Astable</li> <li>16. Study o</li> <li>17. Study o</li> </ol>	Doubler eristics of 7 ntiating and g and Clam tage Trans Follower and Paralle Oscillator 's Oscillator 's Oscillator wave gene Multivibra of Solar Cel of LDR	Transistor - CE mode I Integrating Circuits. ping Circuits istor Amplifier- R.C. Coupled I resonance circuits – Solid State r – Solid State rator using IC 555 Timer ator	100 m			
<ol> <li>5. Voltage</li> <li>6. Charact</li> <li>7. Differen</li> <li>8. Clipping</li> <li>9. Single-s</li> <li>10. Emitter</li> <li>11. Series a</li> <li>12. Hartley</li> <li>13. Colpitt</li> <li>14. Square</li> <li>15. Astable</li> <li>16. Study o</li> <li>17. Study o</li> <li>18. Charace</li> </ol>	Doubler eristics of 7 ntiating and g and Clam tage Trans Follower and Paralle Oscillator 's Oscillator 's Oscillator wave gene Multivibra of Solar Cel of LDR teristics of	Transistor - CE mode I Integrating Circuits. ping Circuits istor Amplifier- R.C. Coupled I resonance circuits – Solid State r – Solid State rator using IC 555 Timer ator II	100 m			
<ol> <li>5. Voltage</li> <li>6. Charact</li> <li>7. Differen</li> <li>8. Clipping</li> <li>9. Single-s</li> <li>10. Emitter</li> <li>11. Series a</li> <li>12. Hartley</li> <li>13. Colpitt</li> <li>14. Square</li> <li>15. Astable</li> <li>16. Study of</li> <li>17. Study of</li> <li>18. Charact</li> <li>19. Inverting</li> </ol>	Doubler eristics of 7 ntiating and g and Clam tage Trans Follower and Paraller Oscillator 's Oscillator 's Oscillator 's Oscillator 's Oscillator of Solar Celof Solar Celof LDR teristics of ng and Non	Transistor - CE mode Integrating Circuits. ping Circuits istor Amplifier- R.C. Coupled I resonance circuits – Solid State r – Solid State rator using IC 555 Timer ator II UJT inverting amplifiers - Op-amp (IC 741)	100 m			
<ol> <li>5. Voltage</li> <li>6. Charact</li> <li>7. Differen</li> <li>8. Clipping</li> <li>9. Single-s</li> <li>10. Emitten</li> <li>11. Series a</li> <li>12. Hartley</li> <li>13. Colpitt</li> <li>14. Square</li> <li>15. Astable</li> <li>16. Study of</li> <li>17. Study of</li> <li>18. Charact</li> <li>19. Invertin</li> </ol>	Doubler eristics of 7 ntiating and g and Clam tage Trans Follower and Paraller Oscillator 's Oscillator 's Oscillator 's Oscillator 's Oscillator of Solar Celof Solar Celof LDR teristics of ng and Non	Transistor - CE mode I Integrating Circuits. ping Circuits istor Amplifier- R.C. Coupled I resonance circuits – Solid State r – Solid State rator using IC 555 Timer ator II	100 million			
<ol> <li>5. Voltage</li> <li>6. Charact</li> <li>7. Differen</li> <li>8. Clipping</li> <li>9. Single-s</li> <li>10. Emitter</li> <li>11. Series a</li> <li>12. Hartley</li> <li>13. Colpitt</li> <li>14. Square</li> <li>15. Astable</li> <li>16. Study of</li> <li>17. Study of</li> <li>18. Charact</li> <li>19. Invertin</li> <li>20. Adder</li> </ol>	Doubler eristics of 7 tiating and g and Clam tage Trans Follower and Paralle Oscillator 's Oscillator 's Oscillator 's Oscillator 's Oscillator of Solar Celo of LDR teristics of ng and Non and Subtrac	Fransistor - CE mode Integrating Circuits. ping Circuits istor Amplifier- R.C. Coupled I resonance circuits - Solid State r - Solid State rator using IC 555 Timer ator II UJT inverting amplifiers - Op-amp (IC 741) ctor circuits - Op-amp (IC 741)	-66-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1		<u>4 h</u>	ours
<ol> <li>Voltage</li> <li>Charact</li> <li>Charact</li> <li>Differen</li> <li>Clipping</li> <li>Single-s</li> <li>Emitter</li> <li>Series a</li> <li>Hartley</li> <li>Colpitt</li> <li>Square</li> <li>Astable</li> <li>Study of</li> <li>Charact</li> <li>Invertin</li> <li>Adder</li> </ol>	Doubler eristics of 7 tiating and g and Clam tage Trans Follower and Paralle Oscillator 's Oscillator 's Oscillator 's Oscillator 's Oscillator of Solar Celo of LDR teristics of ng and Non and Subtrac	Fransistor - CE mode Integrating Circuits. ping Circuits istor Amplifier- R.C. Coupled I resonance circuits – Solid State r – Solid State rator using IC 555 Timer ator II UJT inverting amplifiers - Op-amp (IC 741) ctor circuits - Op-amp (IC 741)	100		4 h	ours
<ol> <li>5. Voltage</li> <li>6. Charact</li> <li>7. Differen</li> <li>8. Clipping</li> <li>9. Single-s</li> <li>10. Emitter</li> <li>11. Series a</li> <li>12. Hartley</li> <li>13. Colpitt</li> <li>14. Square</li> <li>15. Astable</li> <li>16. Study o</li> <li>17. Study o</li> <li>18. Charac</li> <li>19. Invertin</li> <li>20. Adder</li> </ol>	Doubler eristics of 7 tiating and g and Clam tage Trans Follower and Paralle Oscillator 's Oscillator 's Oscillator 's Oscillator 's Oscillator of Solar Celo of LDR teristics of ng and Non and Subtrac	Fransistor - CE mode Integrating Circuits. ping Circuits istor Amplifier- R.C. Coupled I resonance circuits - Solid State r - Solid State rator using IC 555 Timer ator II UJT inverting amplifiers - Op-amp (IC 741) ctor circuits - Op-amp (IC 741)			4 h	

Re	eference Books
1	Practical Physics and Electronics, C.C.Ouseph, U.J.Rao, V.Vijayendran, S.Viswanathan Publishers(2007)
2	A text book of practical Physics, M.N.Srinivasan, S.Balasubramanian, R.Ranganathan, Sultan Chand&Sons(2017)
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://www.slideshare.net/mobile/sunilrathore77398/basicanalogelectronics
2	https://www.slideshare.net/mobile/PatruniChidanandaSas/basics-of-electronics-53962342
Co	burse Designed By: Dr. U. Karunanithi

Mappi	ng with I	Program	ne Outco	mes						
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	М	S	S	S	М	L	М	S	М
CO2	S	S	М	S	S	L	М	S	S	S
CO3	М	М	S	S		М	S	S	S	М



		SEMESTER V&VI				
Course code	63Q	DIGITAL AND MICROPROCESSOR	L	Т	Р	С
Course coue	05Q	(Examination at the end of sixth semester)	Ľ	1	1	
<b>Core/Elective</b>	e/SBS	CORE PRACTICAL IV	0	0	-day life. K4 K5 K6	3
Due neguicite		Should have the fundamental knowledge of	Sylla	bus		-23
Pre-requisite		Digital Electronics and Microprocessors	Versi	on		
Course Obje						
		nis course are to:				
	<b>^</b>	ples and applications of Digital Electronics				
		t the development of the Microprocessors. to apply the principles of Digital Electronics in thei	r dav to	dov	lifa	
5. motivate t	ine students	to apply the principles of Digital Electronics in the	i uay–io	—uay	me.	
Expected Co	urse Outco	mes:				
=		etion of the course, student will be able to:				
	—	types of digital circuits and their applications			K4	
-		ons of registers in computers				
		ge of Microprocessor programming				
<b>^</b>		nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate	• K6 (	Tranta		
KI - Kemenn	JCI, <b>K</b> 2 - U	iderstand, KS - Appry, K4 - Anaryze, K5 - Evaluate	, <b>K</b> 0 - (	Itale		
	6	LIST OF EXPERIMENTS		4	6 ha	1180
(Any twel		ents by choosing at least five from each division)			0 110	uis
I. DIGIT						
		h tables of logic gates using IC's:				
		NOT, XOR, NOR and NAND.				
		sal building block- AND, OR, NOT and Ex-OR				
		l building block- AND, OR, NOT and Ex-NOR				
		Morgan's theorem.	10			
		- problem solving	G			
	of RS Flip-H		5	1		
		If Subtractor				
8. Full add		Combatore Co				
	btractor.	Star All				
10. 4 Bit –	Binary Ad	der/ Subtractor using 7483				
II. MICR	OPROCES	SORS SOLUTION 2				
11. 8085 A	ALP for 8 b	it Addition and Subtraction				
12. 8085 A	ALP for 8 b	it addition with carry and subtraction with borrow				
13. 8085 A	ALP for 8 B	tit Multiplication				
14. 8085 A	ALP for 8 B	it Division				
15. 8085 A	ALP for On	e's Complement, Masking off most significant 4 bits	and set	ting b	its.	
16. 8085 A	LP for Two	o's compliment Addition and Subtraction				
17. 8085 A	LP for find	ing the biggest number element in the array and Sun	n of the	eleme	nts in	the
array.			_			
		nging Ascending and Descending order of the given	set of n	umber	rs	
		version of Hexadecimal into Decimal number.				
20. 8085 A	LP for con	version of Hexadecimal into Binary number.			4 7	
Online 1	hore 117 1'	Contemporary Issues			4 ho	urs
Unline works	nop, webin	ars on Experimental Digital Electronics and Microp				
		Total Practi	cal Hou	irs:		60

1	Practical Physics and Electronics, C.C.Ouseph, U.J.Rao, V.Vijayendran, S.Viswanathan Publishers(2007)
2	A text book of practical Physics, M.N.Srinivasan, S.Balasubramanian, R.Ranganathan, Sultan Chand&Sons(2017)
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	http://www.sircrrengg.ac.in/images/Others/CSE/MP-LAB-MANUAL.pdf
2	https://www.youtube.com/playlist?list=PL pGb42kre QXwuaizYb21tSYpoHyXsCQ

Mappi	ng with I	Program	ne Outco	mes	ဓဓမ္မ	68.12				
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	М	S	М	L	S	M	S	М
CO2	S	М	М	S	S	L	S	М	S	S
CO3	S	М	S	M	L	М	М	S	S	М



Course code	63R	-		PROGRA		(110	L	Т	Р	С
		(Exami		the end of si		er)				
Core/Elective	e/SBS		PRA	ACTICAL	V		0	0	2	3
Pre-requisite				damental kı	nowledge of	f C	Sylla		2022	2-23
Course Obje		and C++ ]	Programm	ing			Ver	sion		
The main obj		nis course are	e to:							
Ũ		g concepts in		++						
2. Apply Pro	ogramming	concepts of	C and C++	to various	programs					
3. Write C a	nd C++ pro	grams for Pl	nysics orie	nted proble	ms.					
Expected Co	unco Quitoo	<b>m</b> og <b>i</b>								
On the succes			ourse stu	dent will be	able to:					
		programs in							K3	
	-	mming conc	1		ems				K4	
2	1 0	ons for differ	• V //						K5	
K1 - Rememb						valuate:	K6 -	Creat		
					<i>yze</i> , <b>n</b> e E	varaate,	110	creat		
	G;	I IST OF F								
		LISI OF L	<b>XPERIM</b>	ENTS	3				84 ł	ours
I. PROG 1. Write a 2. Write a should	RAMMINO C program C program state whethe	ents by choo G IN C to convert a that uses fu er the first st	n integer in nctions to ring is less	ast five from in the range compare two s than, equal	1 to 100 in o strings in l or greater	to words put by the	he us secoi	nd stri	ng.	.am
<ol> <li>PROG</li> <li>Write a</li> <li>Write a</li> <li>where t</li> <li>Write a</li> </ol>	RAMMIN( C program state whether C program hey differ. C program C program C program C program C program C program C program C program	ents by choo G IN C to convert a that uses fu er the first st to compare for Matrix a for Matrix a for Matrix a to convert 0 to find resu llel. to calculate to measure	n integer in nctions to ring is less two files p addition multiplicat Celsius Te thant value the refrac the resona	ast five from in the range compare two than, equal printing the ion. mperature in e of the three tive index o ant frequence	I to 100 in yo strings in l or greater character p nto Fahrenh e resistance of the mater y of the LC	to words put by the than the osition v seit Tem s $R_1$ , $R_2$ ial of the CR series	he use secon where perate and I e prise circu	nd stri they ure. R <sub>3</sub> con m. iit.	e proging. ng. are equ	ram Ial and
<ul> <li>I. PROG</li> <li>1. Write a</li> <li>2. Write a</li> <li>3. Write a</li> <li>where t</li> <li>4. Write a</li> <li>5. Write a</li> <li>6. Write a</li> <li>7. Write a</li> <li>8. Write a</li> <li>9. Write a</li> <li>10. Write a</li> <li>momen</li> <li>PROG</li> </ul>	RAMMINO C program state whetho C program hey differ. C program C program	ents by choo G IN C to convert a that uses fu er the first st to compare for Matrix a for Matrix a for Matrix a to convert o to find resu llel. to calculate to calculate to calculate	n integer in nctions to ring is less two files p addition multiplicat Celsius Te tant value the refract the resona De Brogli	ast five from in the range compare tw than, equal printing the ion. mperature in e of the three tive index o int frequenc ie waveleng	1 to 100 in yo strings in l or greater character p nto Fahrenh e resistance of the mater y of the LC th of a mate	to words put by the than the osition v neit Tem as $R_1$ , $R_2$ ial of the CR series erial for	he use secon where perate and I e prise circu the g	nd stri they ure. $R_3 \operatorname{con}$ m. uit. iven v	e progr ng. are equ nected	ram Ial and I in (i)
<ul> <li>I. PROG</li> <li>1. Write a</li> <li>2. Write a</li> <li>3. Write a</li> <li>where t</li> <li>4. Write a</li> <li>5. Write a</li> <li>6. Write a</li> <li>7. Write a</li> <li>8. Write a</li> <li>9. Write a</li> <li>10. Write a</li> <li>momen</li> <li>PROG</li> <li>11. Write a</li> <li>arithme</li> </ul>	RAMMINO C program state whethe C program hey differ. C program C program	ents by choo G IN C to convert a that uses fu er the first st to compare for Matrix a for Matrix a for Matrix a to convert 0 to find resu llel. to calculate to calculate to calculate <b>G IN C++</b> m to read ar	n integer in nctions to ring is less two files p addition multiplicat Celsius Te thant value the refrac the resona De Brogli	ast five from in the range compare two s than, equal printing the ion. mperature in e of the three tive index of int frequency ie waveleng op).	I to 100 in to strings in l or greater character p nto Fahrenh e resistance of the mater y of the LC th of a mate	to words put by the than the osition v s $R_1$ , $R_2$ ial of the cR series erial for oard and	he use secon where peratu and I e prisu circu the g	nd stri they ure. R <sub>3</sub> con m. iit. iven v erform	e proging. are equ nected alue of	ram Ial an I in (i)
<ul> <li>I. PROG</li> <li>1. Write a</li> <li>2. Write a</li> <li>3. Write a</li> <li>3. Write a</li> <li>4. Write a</li> <li>5. Write a</li> <li>6. Write a</li> <li>7. Write a</li> <li>8. Write a</li> <li>9. Write a</li> <li>10. Write a</li> <li>11. Write a</li> <li>arithme</li> <li>12. Write a</li> <li>entered</li> </ul>	RAMMIN( C program state whether C program hey differ. C program C program	ents by choo G IN C to convert a that uses fu er the first st to compare for Matrix a for Matrix a for Matrix a to convert 0 to find resu llel. to calculate to calculate to calculate <b>G IN C++</b> m to read an ons (Use Do m to display e keyboard u	n integer in nctions to ring is less two files p addition multiplicat Celsius Te thant value the refrac the resona De Brogli by two num While loo the name sing Switc	ast five from in the range compare two is than, equal printing the ion. mperature in e of the three tive index of the three tive index of in frequency ie waveleng nbers throug of the day in h – case stat	I to 100 in to strings in l or greater character p nto Fahrenh e resistance of the mater y of the LC th of a mate gh the keyb in a week, c	to words put by the than the osition v s $R_1$ , $R_2$ ial of the cR series erial for oard and	he use secon where peratu and I e prisu circu the g	nd stri they ure. R <sub>3</sub> con m. iit. iven v erform	e proging. are equ nected alue of	ram Ial an I in (i)
<ul> <li>I. PROG</li> <li>1. Write a</li> <li>2. Write a</li> <li>3. Write a</li> <li>where t</li> <li>4. Write a</li> <li>5. Write a</li> <li>6. Write a</li> <li>7. Write a</li> <li>8. Write a</li> <li>9. Write a</li> <li>10. Write a</li> <li>10. Write a</li> <li>anomen</li> <li>PROG</li> <li>11. Write a</li> <li>arithmo</li> <li>12. Write a</li> <li>entered</li> <li>13. Write a</li> </ul>	RAMMINO C program state whether C program hey differ. C program C program	ents by choo G IN C to convert a that uses fu er the first st to compare for Matrix a for Matrix a for Matrix a for Matrix a to convert 0 to find resu llel. to calculate to calculate to calculate <b>G IN C++</b> m to read an ons (Use Do m to display e keyboard us m to perform	n integer in nctions to ring is less two files p addition multiplicat Celsius Te thant value the refrac the resona De Brogli by two num While loo the name sing Switc n Matrix a	ast five from in the range compare two is than, equal printing the ion. mperature in e of the three tive index of the three tive index of in frequency ie waveleng obers throug op). of the day in h - case statddition.	I to 100 in to strings in l or greater character p nto Fahrenh e resistance of the mater y of the LC th of a mate gh the keyb in a week, c	to words put by the than the osition v s $R_1$ , $R_2$ ial of the cR series erial for oard and	he use secon where peratu and I e prisu circu the g	nd stri they ure. R <sub>3</sub> con m. iit. iven v erform	e proging. are equ nected alue of	ram Ial and I in (i)
<ul> <li>I. PROG</li> <li>1. Write a</li> <li>2. Write a</li> <li>3. Write a</li> <li>where t</li> <li>4. Write a</li> <li>5. Write a</li> <li>6. Write a</li> <li>7. Write a</li> <li>8. Write a</li> <li>9. Write a</li> <li>10. Write a</li> <li>10. Write a</li> <li>anomen</li> <li>PROG</li> <li>11. Write a</li> <li>arithma</li> <li>12. Write a</li> <li>anithma</li> <li>13. Write a</li> </ul>	RAMMINO C program state whether C program hey differ. C program C program tum p. RAMMINO C C <sup>++</sup> progra through the C C <sup>++</sup> progra	ents by choo G IN C to convert a that uses fu er the first st to compare for Matrix a for Matrix a for Matrix a for Matrix a to convert C to find resu llel. to calculate to calculate to calculate to calculate <b>G IN C++</b> m to read ar ons (Use Do m to display e keyboard us m to perform m for matrix	n integer in nctions to ring is less two files p addition multiplicat Celsius Te the refrac the refrac the resona De Brogli y two num While loo the name sing Switc n Matrix a t multiplic	ast five from in the range compare two is than, equal printing the ion. mperature in e of the three tive index of it frequency ie waveleng obsers throug op). of the day in h – case stat ddition. ation.	I to 100 in to strings in l or greater character p nto Fahrenh e resistance of the mater y of the LC th of a mate gh the keyb in a week, c	to words put by the than the osition v s $R_1$ , $R_2$ ial of the cR series erial for oard and	he use secon where peratu and I e prisu circu the g	nd stri they ure. R <sub>3</sub> con m. iit. iven v erform	e proging. are equ nected alue of	ram Ial an I in (i)
<ul> <li>I. PROG</li> <li>1. Write a</li> <li>2. Write a should</li> <li>3. Write a where t</li> <li>4. Write a</li> <li>5. Write a</li> <li>6. Write a</li> <li>7. Write a</li> <li>8. Write a</li> <li>9. Write a</li> <li>10. Write a</li> <li>10. Write a</li> <li>11. Write a</li> <li>arithme</li> <li>12. Write a</li> <li>13. Write a</li> <li>14. Write a</li> <li>15. Write a</li> </ul>	RAMMINO C program state whether C program state whether C program C Program	ents by choo G IN C to convert a that uses fu er the first st to compare for Matrix a for Matrix a for Matrix a for Matrix a to convert 0 to find resu llel. to calculate to calculate to calculate <b>G IN C++</b> m to read an ons (Use Do m to display e keyboard us m to perform	sing at lea n integer in nctions to ring is less two files p addition multiplicat Celsius Te thant value the refract the resona De Brogli y two num While loo the name sing Switc n Matrix a c multiplic	ast five from in the range compare two is than, equal printing the ion. mperature in e of the three tive index of the three tive index of in frequency is waveleng obers throug op). of the day is h - case statddition.of a matrix.	I to 100 in to strings in l or greater character p nto Fahrenh e resistance of the mater y of the LC th of a mate gh the keyb in a week, o tement.	to words put by the than the osition v s $R_1$ , $R_2$ ial of the cR series erial for oard and	he use secon where peratu and I e prisu circu the g	nd stri they ure. R <sub>3</sub> con m. iit. iven v erform	e proging. are equ nected alue of	ram Ial an I in (i)

- 18. Write a C<sup>++</sup> program to find the resultant value of three capacitances C<sub>1</sub>, C<sub>2</sub> and C<sub>3</sub> connected in (i) series and (ii) parallel.
- 19. Write a  $C^{++}$  program to measure the resonant frequency of the LCR parallel circuit.
- 20. Write a C<sup>++</sup> program to estimate the half-life period of a radioactive substance for the given value of decay constant  $\lambda$ .

	Contemporary Issues	6 hours
On	line workshop, Webinars on C and C++ programming	
	Total Practical Hours:	90
Re	ference Books	
1	Programming in ANSI C by E. Balagurusamy, Tata McGraw Hill, sixth H	Edition(2012)
2	Object Oriented Programming with C++ by E. Balagurusamy, Tata McGr (2013)	raw Hill, Sixth Edition
	A A A A A A A A A A A A A A A A A A A	
Re	lated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://nptel.ac.in/course.html/computerscience and engineering//C, C++ I	orogramming
2	https://www.geeksforgeeks.org/introduction-to-c-programming-language/	
	15 1. 1. 51 51 6	
~		

Course Designed By: Dr. U. Karunanithi

Mappi	Mapping with Programme Outcomes												
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	<b>PO10</b>			
CO1	S	М	М	S	L	M	S	M	S	М			
CO2	М	S	S	M	S	L	S	M	S	S			
CO3	S	М	S	М	L	М	M	S	S	М			

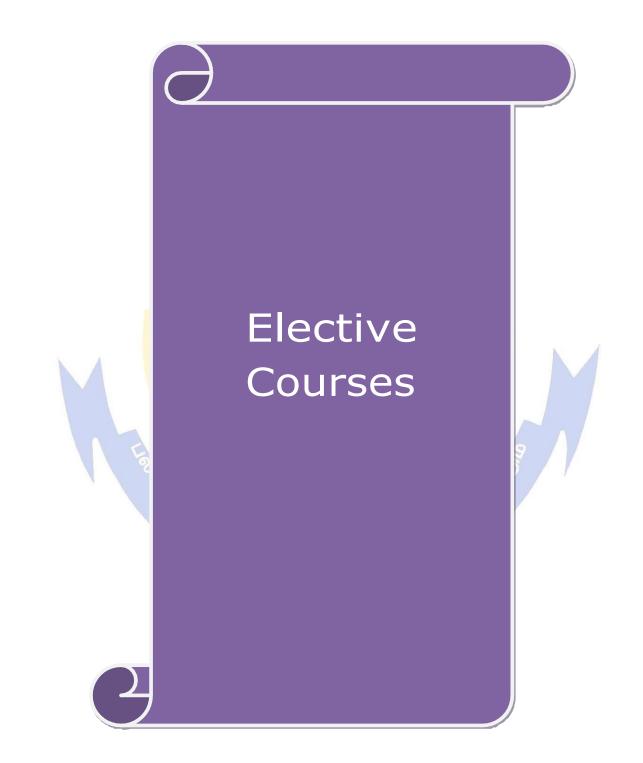
तंब्रेडीर दबार्व

Pre-requisite       Should have the fundamental knowledge in Instrumentation       Syllabus Version       2022-23         Course Objectives:       The main objectives of this course are to:       1.       acquire the knowledge in working with different laboratory instruments.       2.         2. service laboratory instruments like spectrometer, telescope etc.,       3.       examine some of the simple household appliances like iron box, mixie etc. and rectify the problems.       9.         Expected Course Outcomes:       On the successful completion of the course, student will be able to:       K5         1       service and rectify the defects in laboratory instruments       K5	Course code	6ZP	INSTRUMENTATION PRACTICALS	L	Т	Р	С	
Pre-requisite       Instrumentation       Version       2022-23         Course Objectives:       The main objectives of this course are to:       .	<b>Core/Elective</b>	/SBS	SKILL BASED SUBJECT	0	0	2	2	
The main objectives of this course are to:         1. acquire the knowledge in working with different laboratory instruments.         2. service laboratory instruments like spectrometer, telescope etc.,         3. examine some of the simple household appliances like iron box, mixie etc. and rectify the problems.         Expected Course Outcomes:         On the successful completion of the course, student will be able to:         1       service and rectify the defects in laboratory instruments       K5         2       service and rectify the defects in simple house hold devices.       K5         3       device new instruments applying the knowledge of instrumentation.       K6         K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create       42 hours         LIST OF EXPERIMENTS         (Any towelve experiments)       42 hours         1.       Construction and Service of Power supply - 2, 4, 6 Volts         2.       Regulated power supply construction and service - (+5V & - 12V)         3.       Dual power supply construction and service - (+12V) - 0 - (+12V)         3.       Servicing - Telescope         6.       Servicing - Spectrometer         8.       Servicing - Stop clock and Stopwatch TE TO ELEVITE         1.       Servicing - Mixie         13.       Servicing - Mixie <td>Pre-requisite</td> <td></td> <td></td> <td></td> <td></td> <td>2022-2</td> <td>3</td>	Pre-requisite					2022-2	3	
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create         LIST OF EXPERIMENTS (Any twelve experiments)         42 hours         1. Construction and Service of Power supply - 2, 4, 6 Volts         2. Regulated power supply construction and service - (+5V & -12V)         3. Dual power supply construction and service - (+12V) - 0 - (+12V)         4. Regulated power supply construction and service - (+12V & -5V)         5. Servicing - Microscope         6. Servicing - Telescope         7. Servicing - Bectrometer         8. Servicing - Galvanometer,         9. Servicing - Spectrometer         8. Servicing - Mimeter.         1. Servicing - Mometer.         1. Servicing - Mixie         13. Servicing - Mixie         15. Servicing - Mixie         15. Servicing - Mixie         15. Servicing - Mixie         15. Servicing - Mixie         16. Servicing - Mixie         17. Fixing and Service a B.G.         18. Cutting, drilling, polishing and trimming.         19. Servicing - Iron Box         20. Conversion of Galvanometer to an ammeter and voltmeter <th>The main obje1. acquire th2. service lab3. examine sproblems.Expected ConOn the succes1service a</th> <th>ectives of the e knowledg poratory insome of the urse Outco sful complete and rectify</th> <th>his course are to: ge in working with different laboratory instruments. struments like spectrometer, telescope etc., simple household appliances like iron box, mixie etc omes: etion of the course, student will be able to: the defects in laboratory instruments</th> <th></th> <th></th> <th>K5</th> <th></th>	The main obje1. acquire th2. service lab3. examine sproblems.Expected ConOn the succes1service a	ectives of the e knowledg poratory insome of the urse Outco sful complete and rectify	his course are to: ge in working with different laboratory instruments. struments like spectrometer, telescope etc., simple household appliances like iron box, mixie etc omes: etion of the course, student will be able to: the defects in laboratory instruments			K5		
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create         LIST OF EXPERIMENTS (Any twelve experiments)         42 hours         1. Construction and Service of Power supply - 2, 4, 6 Volts         2. Regulated power supply construction and service - (+5V & -12V)         3. Dual power supply construction and service - (+12V) - 0 - (+12V)         4. Regulated power supply construction and service - (+12V & -5V)         5. Servicing - Microscope         6. Servicing - Telescope         7. Servicing - Galvanometer,         9. Servicing - Galvanometer,         9. Servicing - Microscope         1. Servicing - Maneter.         1. Servicing - Maneter.         1. Servicing - Mixie         13. Servicing - Mixie         15. Servicing - Mixie         15. Servicing - Mixie         15. Servicing - Mixie         15. Servicing - Mixie         16. Servicing - Mixie         15. Servicing - Mixie         16. Servicing - Mixie         17. Fixing and servicing a B.G.         18. Cutting, drilling, polishing and trimming. <td colspan<="" td=""><td></td><td>-</td><td></td><td></td><td></td><td></td><td></td></td>	<td></td> <td>-</td> <td></td> <td></td> <td></td> <td></td> <td></td>		-					
LIST OF EXPERIMENTS (Any twelve experiments)       42 hours         1. Construction and Service of Power supply - 2, 4, 6 Volts       8         2. Regulated power supply construction and service - (+5V & -12V)       9         3. Dual power supply construction and service - (+12V) = 0 - (+12V)       9         4. Regulated power supply construction and service - (+12V) = 0 - (+12V)       9         5. Servicing - Microscope       6         6. Servicing - Telescope       7         7. Servicing - Galvanometer       9         8. Servicing - Galvanometer       9         9. Servicing - Mometer       9         10. Servicing - Not cock and Stopwatch       1         11. Servicing - Bipsical Balance       1         14. Servicing - Mixie       1         15. Servicing - Signal Generators       1         17. Fixing and servicing a B.G.       1         18. Cutting, drilling, polishing and trimming.       1         19. Servicing - Iron Box       2         20. Conversion of Galvanometer to an ammeter and voltmeter       3 hours				e: <b>K</b> 6 - (	Create			
(Any twelve experiments)1. Construction and Service of Power supply - 2, 4, 6 Volts2. Regulated power supply construction and service - (+5V & -12V)3. Dual power supply construction and service - (+12V) = 0 - (+12V)4. Regulated power supply construction and service - (+12V & -5V)5. Servicing - Microscope6. Servicing - Telescope7. Servicing - Spectrometer8. Servicing - Galvanometer,9. Servicing - Galvanometer,10. Servicing - Normeter11. Servicing - UPS12. Servicing - Stop clock and Stopwatch13. Servicing - Mixie15. Servicing - Mixie15. Servicing - Mixie16. Servicing - Mixie17. Servicing - Signal Generators17. Fixing and servicing a B.G.18. Cutting, drilling, polishing and trimming.19. Servicing - Iron Box20. Conversion of Galvanometer to an ammeter and voltmeter21. Contemporary Issues23. hours24. Expert lectures, online seminars - webinars				-,		1		
Expert lectures, online seminars - webinars	<ol> <li>Regulate</li> <li>Dual por</li> <li>Regulate</li> <li>Servicin</li> </ol>	ed power su wer supply ed power su g - Microso g - Telesco g - Spectro g - Galvand g - Voltme g - Voltme g - UPS g - Stop cli g - Physica g - Mixie g - Resista g - Signal nd servicin	apply construction and service – (+5V & - 12V) construction and service - (- 12V) – 0 - (+12V) apply construction and service – (+ 12V & - 5V) cope pe meter ometer, ter er. ock and Stopwatch TE TO ELEVINE al Balance nce box and Capacitance box Generators	97Ore				
	19. Servicin	g – Iron Bo	olishing and trimming.					
	19. Servicin 20. Convers	g – Iron Bo ion of Galv	Dishing and trimming. ox vanometer to an ammeter and voltmeter Contemporary Issues	3	hour	5		

Refe	erence Books
1	Laboratory Instrumentation, Mary C. Haven, Gregory A. Tetrault, Jerald R. Schenken, John Wiley & Sons,(1994).
2	Principles and Applications of Laboratory Instrumentation, <u>Sheshadri Narayanan</u> , ASCP Press, (1989).
Rela	ted Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://www.macallister.com/parts-service/maintenance-tips/
2	https://www.youtube.com/playlist?list=PLOU3kcAncZZtRFMLCFMyxEp_JYZIOLkbM
3	https://www.slideshare.net/mobile/selvaprakash549/maintenance-and-repair-strategies
Cour	se Designed By: Dr. U. Karunanithi

Mappi	Mapping with Programme Outcomes												
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10			
CO1	S	S	М	S	M	М	S	М	L	М			
CO2	М	S	M	S	S	L	М	S	М	S			
CO3	S	M	S	М	36	М	M	S	S	М			





### LIST OF ELECTIVE PAPERS SEMESTER V

G (151) (* 16	5EA	PRINCIPLES OF PROGRAMMING CONCEPTS AND C PROGRAMMING	L	Т	Р	С	
Core/Elective/S	SBS	ELECTIVE PAPER – I A	4	0	0	4	
Pre-requisite		The students are expected to procure foundational knowledge on programming concepts and C programming	Sylla Vers		202	2022-23	
<b>Course Object</b>	ives:						
<ol> <li>develop lo</li> <li>solve prob</li> </ol>	gics whicl lems using	is course are to: h will aid in developing programs and applications g functional and object-oriented paradigm us paradigms when programming in a language of diffe	erent p	paradi	gm		
Expected Cour	se Outco	mes:					
		letion of the course, student will be able to:					
		rogramming languages, and justify their own design de	ecision	S	K	2	
e e	-	what paradigm and language are best suited for a new providence of the suited for a ne			K.		
		to solve Physics problems.			Ke	5	
-	-	Inderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - (	Create		-	
	- ,						
Unit:1		Constants, Variables and Data types		1	0 ho	urs	
Unit:2 Arithmetic ope	erators – 1	– assigning values to variables – defining symbolic con Operators and Expressions			2 ho		
	-	rela <mark>tional operators – logical operators – assig</mark> nment op – conditional operators – special operators – arithmetic as. – Precedence of arithmetic operators – type convers	expre	ssion	_	nent	
evaluation of e	expression		expre	ssion	_	nent	
evaluation of o	expression	– conditional operators – special operators – arithmetic is, – Precedence of arithmetic operators – type conver- associativity – mathematical functions.	expre	ssion 1 exp	– ressio	nent on –	
evaluation of a operator preced Unit:3	expression dence and	<ul> <li>– conditional operators – special operators – arithmetic</li> <li>ns. – Precedence of arithmetic operators – type converses</li> <li>associativity – mathematical functions.</li> </ul> Input and Output Operations	expre sion in	ssion 1 expi	- ressic 2 ho	nent on – <b>urs</b>	
evaluation of a operator preced Unit:3 Reading and Simple IF, IF	expression dence and writing c . ELSE, N	– conditional operators – special operators – arithmetic is, – Precedence of arithmetic operators – type conver- associativity – mathematical functions.	expression in king:	ssion n expr 1 IF sta	- ressic 2 ho	nent on – <b>urs</b>	
evaluation of a operator preced Unit:3 Reading and Simple IF, IF	expression dence and writing c . ELSE, N	<ul> <li>– conditional operators – special operators – arithmetic</li> <li>associativity – mathematical functions.</li> <li>Input and Output Operations</li> <li>haracter – formatted input and output – decision mathematical of IF ELSE and ELSE IF Ladder – Switch Statement – For loop.</li> </ul>	expression in king:	ssion n expr 1 IF sta nt –	- ressic 2 ho	nent on – <b>urs</b> ent:	
evaluation of a operator preced Unit:3 Reading and Simple IF, IF operator – go t Unit:4	expression dence and writing c . ELSE, N o stateme	<ul> <li>– conditional operators – special operators – arithmetic operators – type converses associativity – mathematical functions.</li> <li>Input and Output Operations</li> <li>haracter – formatted input and output – decision maillesting of IF ELSE and ELSE IF Ladder – Switch St.</li> </ul>	expression in king:	ssion n expr 1 IF sta nt –	- ressic 2 ho ateme ?: 2 ho	nent on – urs ent: urs	
evaluation of a operator preced Unit:3 Reading and Simple IF, IF operator – go t Unit:4 Introduction – multidimension	writing c . ELSE, N o statement - One d nal arrays	<ul> <li>– conditional operators – special operators – arithmetic</li> <li>ns. – Precedence of arithmetic operators – type converses associativity – mathematical functions.</li> <li>Input and Output Operations</li> <li>haracter – formatted input and output – decision mathematical of IF ELSE and ELSE IF Ladder – Switch Statement – For loop.</li> <li>Arrays</li> </ul>	expression in king: atement	ssion n expr 1 IF sta nt – 1 on t	- cessic 2 ho ateme ?: 2 ho wo a	nent on – urs ent: urs	
evaluation of a operator preced Unit:3 Reading and Simple IF, IF operator – go t Unit:4 Introduction – multidimension terminal – writ	writing c . ELSE, N o statement - One d nal arrays	– conditional operators – special operators – arithmetic     as. – Precedence of arithmetic operators – type converse associativity – mathematical functions.      Input and Output Operations     haracter – formatted input and output – decision mailesting of IF ELSE and ELSE IF Ladder – Switch St nt – while, do – while statement – For loop.      Arrays imensional array – declaration of array – Initia – declaring and initializing string variables – reading s on the screen.	expression in king: atement	ssion n expr 1 IF sta nt – 1 on tv s fror	2 ho ateme ?: 2 ho wo a n	urs and	
evaluation of a operator preced Unit:3 Reading and Simple IF, IF operator – go t Unit:4 Introduction – multidimension terminal – writ	writing c . ELSE, N o statement - One d nal arrays ing string	– conditional operators – special operators – arithmetic is. – Precedence of arithmetic operators – type converse associativity – mathematical functions.	expression in king: atement ting string:	ssion n expr 1 IF sta nt – 1 on tv s fror 1		urs and urs	

Un	it:6	Contemporary Issues	2 hours
Ex	pert lecture	es, online seminars - webinars	
		Total Lecture hours	60
Te	xt Book(s)		
1	Programm	ing in ANSI C, E. Balagurusamy, TMH (2008)	
2	The C Pro	gramming Language, Brian Kernighan, Dennis Ritchie, Prentice Hall,	(1978)
Re	ference Bo	ooks	
1	Programm	ing in C by Ashok N. Kamthane First Indian Print, Pearson (2004).	
2	Computing	g Fundamentals and C Programming, E. Balagurusamy, TMH(2011)	
Re	lated Onli	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://w	ww.programiz.com/c-progr <mark>amming</mark>	
2	https://w	ww.geeksforgeeks.org/c-language-set-1-introduction/	
3	https://be	ginnersbook.com/2014/01/c-tutorial-for-beginners-with-examples/	
Co	urse Desig	ned By: Dr P. Sagunthala and Dr. V. Kalaiselyi	

Course Designed By: Dr P. Sagunthala and Dr. V. Kalaiselvi

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Mappi	ng with	<b>Progran</b>	nme Out	tcomes			2	1		
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	<b>PO8</b>	PO9	PO10
CO1	S	М	S	M	S	М	S	M	S	S
CO2	М	S	М	М	М	М	S	S	M	S
CO3	S	S	S	S	М	S	М	M	S	S

5AL COURS

		SEVIESTER V				
Course code	5EA	ENERGY PHYSICS	L	Т	Р	С
Core/Elective/	SBS	ELECTIVE PAPER - I B	4	0	0	4
Pre-requisite		The students should know the fundamental		abus	202	2-23
		principle of motor and classification of energy	Ver	sion	202	2-23
Course Object						
		nis course are to: etion of electricity.				
	-	cal communication system.				
		omic, molecular energy and thermal energy.				
		inventional energy resources and utilization.				
Expected Cou						
	<u> </u>	etion of the course, student will be able to:			W.	
1 understan	d the heath	ng effect of current and application of it.			K2	
2 select the	correct ma	terial for making a waveguide based on basic optical 1	aws.		K3	
3 understan	d Maxwell	's law of equipartition of energy.			K2	
4 analyze th	ne di <mark>stributi</mark>	ion of energy in the thermal spectrum.			K4	
5 Calculate	effective u	tilization of solar radiation, power in the wind and tida	l ener	rgy	K5	
K1 - Rememb	er; <b>K2 -</b> U1	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; I	K6 - (	Create		
				N	1	
Unit:1		Electrical Energy		1	12 ho	urs
radiation and	Electric Irc	tor – Application of heating effect – Electric heater on – Electric welding and electric furnace – Carbon an Measurement of Electric Power.				
Unit:2	<u>C:</u> 0);	Optical Energy		1	2 ho	irc
	of Light -	Light sources – LED, LASER – optical fibre – Light	prop			
	0	tical laws used in optical fibres – Optical parameter		0		0
-	-	umerical aperture - Types of optical fibres: Based on		-		
		ex profile - Fibre optical communication system - Bloc	k Dia	igram	_	
Source – Tran	smitter – C	Optical fibre – Receiver. TO ELEVANE				
Unit:3		Atomic And Molecular Energy			12 h	ours
	reedom – N	Number of Degrees of Freedom of Mono, Di and T	Tri At			
		partition of Energy – Molar Specific heat capacity at				
·		al Internal Energy and Ratio of Heat capacities i				0
-		ar and Linear type of Tri-atomic gas molecular sys				pour
		nt of saturated and unsaturated vapour Pressure: Regna	ult's	statisti	cal	
method – The	ir character	istics – Graphical Illustration of Gas laws.				
Unit:4		Thermal Energy			12 h	ours
	Total thern	nal Energy density - Spectral Energy density – Spectral	al En			
Emissivity – I	Emissive po	ower – Absorptive power – Reflective power – Kircho on of Kirchoff's Results: Ritche's Experiment. Distribu	ff's L	aw of	radia	tion

thermal spectrum – Lummer and Pringsheim Experiment and its Results – Wien's Displacement Law and Radiation Law – Rayleigh Jean's Law Planck's Radiation Law – Deduction of Wien's Law and Rayleigh – Jean's Law from Planck's law. Solar constant – Temperature of sun – Disappearing filament optical Pyrometer - **Pyrheliometers**: Angstrom Pyroheliometer – Water flow Pyrohelio meter.

Unit:5	Nonconventional Energy	10 hours
Solar Energy	: Solar radiation - Solar radiation outside the earth's atmosphere	e Solar radiation at the
earth's surface	e - Solar Thermal Energy - Solar Thermal devices and system	s: Solar water heater –
Subcomponen	ts of solar water heater - Solar Cooker and its merits and de	emerits. Wind Energy:
Power in the	wind - Types of wind energy systems -Horizontal axis wind 7	Furbine – Vertical axis
wind Turbine.	Ocean Energy: Tidal Energy – Ocean Thermal Energy Conve	rsion (OTEC) –
Closed Cycle	OTEC system – Open Cyc <mark>le OTEC Syste</mark> m.	
	0)6610e ·	
Unit.6	Contemporary Issues	2 hours

Ur	11 <b>t:6</b>	Contemporary Issues 2	hours
Ex	pert lecture	s, online se <mark>minars - webinars</mark>	
		Total Lecture hours	60
Te	ext Book(s)		
1	Renewab (1989)	le Energy Environment and Development - Maheshwar Dayal. Konark Publisher	<b>`</b> \$,
2	Engineeri	ing Physics - I- G. Senthil Kumar, VRB Publishers, (2011)	(

Re	sference Books
1	Solar Energy Utilization - G.D. Rai Khhanna Publishers, (1995)
2	Engineering Physics - II- M. Arumugham, Anuradha Publishers (2010)
	N N N N N N N N N N N N N N N N N N N
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://www.askiitians.com/revision-notes/physics/heat-phenomena/
2	https://www.askiitians.com/revision-notes/physics/thermodynamics/

Course Designed By: Mr. J. Williams Charles

# EDUCATE TO ELEVATE

Mappi	ng with	Program	nme Ou	tcomes						
COs	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10
CO1	S	Μ	S	М	М	S	Μ	М	S	М
CO2	Μ	S	S	S	М	S	S	М	S	М
CO3	S	Μ	Μ	S	S	М	Μ	S	Μ	S
CO4	S	S	Μ	М	Μ	М	Μ	S	S	М
CO5	S	S	S	S	S	S	S	S	S	S

		SEMESTER V		-		
Course code	5EA	AGRICULTURAL PHYSICS	L	Т	Р	С
Core/Elective/	/SBS	Elective Paper I C	4	0	0	4
Pre-requisite	9	Students should possess the fundamental knowledge of agronomy which is described using physical sciences.		abus sion	202	2-23
Course Objec	tives:	F-Journal and the second s				
The main obje	ctives of th	is course are to:				
		bhysical phenomena in agricultural environment.				
Ų		owledge of the student.				
<b>Expected</b> Cou	rse Outcon	mes:				
On the succes	ssful compl	etion of the course, student will be able to:				
		of physics in daily life.			K2	
	0	ical applications into agriculture.			K3	
<u>^</u>	1 2	properties of soil and water.			K4	
K1 - Remem	ber; <b>K2</b> - <mark>U</mark>	Inderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - (	Create		
Unit:1		Soil Physics	1	2 hou	<b>n</b> a	
	mnosition	of soil – physical properties of soil, pore space, bulk of				
water conserva	tion.	a land			-	
Unit:2	E	Water Physics	231	) hour	s	
Water qualitie – water qualit		ll – Ground water – surface water pollution – instrum	entatio	n and	samp	ling
-	9	26				
Unit:3		Electric Power	12 h			
-	-	of A.C. – Average value of A.C. voltage or curre				
-	-	rrent – power consumed in A.C. Circuits – kilo watt istribution of three phase A.C. Three-phase power sys			-	
-		ion of electric power over long distances.	.em	The e	loke	The
	T	· · · · ·				
Unit:4		Hygrometry and Pumps	12 h			1.9
	•	Relative Humidity – Dew point, Daniell's Hy of Regnault's hygrometer – wet and Dry and Bul	0		•	
••	•	p – force pump – Fire engine, inflator (or) compres	• •			
		t pump (or) common air pump.	· - P	r	r	
Unit:5		Solar Collector and Applications	12 h	nire		
	l Iters- Annli	cation of solar air heaters. Solar Drying with various			eating	and
Drying of Ag	ricultural p	or of solar ponds – Solar pumping – Solar pump	and its	meas	ureme	ent –

Ur	iit:6 Contemporary Issues	2 hours
Ex	pert lectures, online seminars - webinars	
	<b>Total Lecture hours</b>	60
Te	xt Book(s)	<b>-</b>
1	The Nature and Properties of Soil, H.O. Buckman, Brady, Macmillan	n, (1967).
2	Soil Physics, H. Kohnke, McGraw-Hill, (1968).	
3	Systematic Hydrology, John C. Rodda, Richard A. Downing,	Frank M. Law, Newnes-
	Butterworths, (1976).	
Re	ference Books	
1	Electricity and Magnetism, R. Murugesan, S.Chand, (2017).	
2	Hydrostatics, A. S. Ramsey, Cambridge University Press, (2017).	
3	Solar energy Utilization, G.D. Rai, Khanna Publisers, (1987).	
Re	lated Online Contents MOOC, SWAYAM, NPTEL, Websites etc	
1	https://www.sciencedirect.com/topics/agricultural-and-biological-sci	-
2	https://www.sciencedirect.com/science/article/pii/S16310713040027	
3	https://www.sciencedirect.com/topics/engineering/solar-energy-appl	
Сс	urse Designed By: Dr P. Sagunthala	ger i i

COs	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	<b>PO10</b>
<b>CO1</b>	S	М	M	Μ	Μ	M	S	Μ	S	Μ
CO2	M	S	S	S	S	S	М	S	М	Μ
CO3	M	S	S	Μ	S	М	S	S	S	S
		a dayman						10		
*S-Stro	ng; M-M	29	L-LOW					Cerlo		

தந்து இந்தப்பாரை கார E

		SEMESTER VI				
Course code	6EA	DIGITAL AND MICROPROCESSOR	L	Т	Р	С
Core/Elective/SB	S	ELECTIVE II A	4	0	0	4
Pre-requisite		The students should have a basic understanding in	Sylla		202	2-23
		functioning of digital circuits and microprocessors	Ver	sion		
Course Objectiv						
The main objecti 1. enable the s		nake use of digital devices and microprocessors				
		pgic circuits and construct the logic circuit for any Bool	ean eo	matio	n	
	-	ge of binary addition		Inniio		
4. understand t	the action o	f flip flops.				
5. learn basic j	programmir	ng with microprocessor 8085.				
Ferrand Course	. <b>Out</b> eense					
Expected Cours		on of the course, student will be able to:				
	-	t the logic circuit for any Boolean equation.			K	2
		t the logic circuit for any boolean equation.			K	
2 apply th	he Karnaug	h Map to simplify Boolean equation and draw a simpli	fied ci	rcuit	K	3
3 underst	and the fun	ction of data processing and arithmetic circuits			K	4
4 underst	and the Mr	emonics and Opcodes in the Microprocessor			K	4
5 develop	o <mark>prog</mark> ramm	ing skills using the basic concepts.			K	5
K1 - Remember	r; <b>K2</b> - Und	lerstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6	5 – Cre	ate		
	E I	Read and the second second				
Unit:1		Logic Circuits		12	hour	S
		peration – OR operation – AND operation – Boolean				1
		laws & Theorems – Basic laws – De Morgan's theo				
		t method – Truth table to Karnaugh Map – Pairs, Que Product of Sum method.	ads an		tets -	-
Kamaugh shipi		rioduct of Sulli method.				
Unit:2	00	Data Processing Circuits		12	hour	S
Multiplexer – D	emultiplexe	er – 1 to 16 decoders – BCD to Decimal decoders - Sev	en seg	ment	deco	der
		or - checkers - Read Only Memory - Programmable a	rraylo	gic. I	Num	ber
		y to Decimal conversion – Decimal to Binary	-	-		
conversion - O The Gray code.	octal numbe	ers - Hexadecimal numbers - The ASCII code - Th	e Exc	ess 3	cod	e –
The Gray code.						
Unit:3		Arithmetic Circuits		1	2	
				h	ours	5
		Subtraction – Unsigned Binary numbers – sign-magnit				
		- 2's complement Arithmetic – Arithmetic building bl				
		RS flip flop – Clocked RS flip flop – D flip flop – Ed ster Slave flip flop – Schmitt trigger	ge trig	gered	l D fl	ıp
10p - JK IIIp IIC	5p – JK Ma	ster Slave hip hop – Schilltt trigger				
Unit:4		Microprocessor and Data Representation		12	hou	rs
	– what is	Microprocessor, 4, 8, 16, 32 – Organization of N	/ icrop			
Microprocessor	Programm	ing - Instruction - Machine and Mnemonic codes - Ma	achine			
Language Prog	ramming -	- High-level Language programming - Representation	on of			

Organization of 8085 – Data and Address buses addressing – The I/O devices – Register in 808         Instruction types – Classification of Instruction – Addressing modes – Programming the 8085 –         Programming concepts– Simple programs with 8085 – addition, subtraction, multiplication, and division.         Unit:6       Contemporary Issues       2 ho         Expert lectures, online seminars - webinars       Total Lecture hours       6         Book(s) for Study       6         1       Digital Principles and Applications – Albert Paul Malvino& Donald P Leach,TMH, Fourth Edition (2006)       6         2       Introduction to Microprocessors, Aditya P Mathur TMH, 6 <sup>th</sup> Edition (2006)       6         Book(s) for Reference       1       Integrated Electronics – Millmann& Halkias, TMH, (2017)       2         4       Microprocessors Architecture Applications and Programming, R.S.Goenkar, Penaram International(1999)       6         8       Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]       1         1       https://www.tutorialspoint.com/microprocessor/microprocessor overview.html       2         2       https://www.geeksforgeeks.org/introduction-of-microprocessor/       1		entation of Real numbers – Conversion of Real numbers.	
Instruction types – Classification of Instruction – Addressing modes – Programming the 8085 – Programming concepts– Simple programs with 8085 – addition, subtraction, multiplication, and division. Unit:6 Contemporary Issues 2 ho Expert lectures, online seminars - webinars Total Lecture hours 6 Book(s) for Study 1 Digital Principles and Applications – Albert Paul Malvino& Donald P Leach,TMH, Fourth Edition (2006) 2 Introduction to Microprocessors, Aditya P Mathur TMH, 6 <sup>th</sup> Edition (2006) Book(s) for Reference 1 Integrated Electronics – Millmann& Halkias, TMH, (2017) 2 Microprocessors Architecture Applications and Programming, R.S.Goenkar, Penaram International(1999) Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.] 1 https://www.tutorialspoint.com/microprocessor/microprocessor/	Unit:5	Programming a Microprocessor	10 hours
Expert lectures, online seminars - webinars       Total Lecture hours       6         Book(s) for Study       1       Digital Principles and Applications – Albert Paul Malvino& Donald P Leach,TMH, Fourth Edition (2006)       2         2       Introduction to Microprocessors, Aditya P Mathur TMH, 6 <sup>th</sup> Edition (2006)       6         Book(s) for Reference       1       Integrated Electronics – Millmann& Halkias, TMH, (2017)         2       Microprocessors Architecture Applications and Programming, R.S.Goenkar, Penaram International(1999)         Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]         1       https://www.tutorialspoint.com/microprocessor/microprocessor/         2       https://www.geeksforgeeks.org/introduction-of-microprocessor/	Instruction types Programming co	- Classification of Instruction - Addressing modes - Programm	ing the 8085 – Th
Total Lecture hours       6         Book(s) for Study       1         1       Digital Principles and Applications – Albert Paul Malvino& Donald P Leach,TMH, Fourth Edition (2006)         2       Introduction to Microprocessors, Aditya P Mathur TMH, 6 <sup>th</sup> Edition (2006)         2       Introduction to Microprocessors, Aditya P Mathur TMH, 6 <sup>th</sup> Edition (2006)         Book(s) for Reference       1         1       Integrated Electronics – Millmann& Halkias, TMH, (2017)         2       Microprocessors Architecture Applications and Programming, R.S.Goenkar, Penaram International(1999)         Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]         1       https://www.tutorialspoint.com/microprocessor/microprocessor_overview.html         2       https://www.geeksforgeeks.org/introduction-of-microprocessor/	Unit:6	Contemporary Issues	2 hour
Book(s) for Study         1       Digital Principles and Applications – Albert Paul Malvino& Donald P Leach,TMH, Fourth Edition (2006)         2       Introduction to Microprocessors, Aditya P Mathur TMH, 6 <sup>th</sup> Edition (2006)         8       Book(s) for Reference         1       Integrated Electronics – Millmann& Halkias, TMH, (2017)         2       Microprocessors Architecture Applications and Programming, R.S.Goenkar, Penaram International(1999)         Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]         1       https://www.tutorialspoint.com/microprocessor/microprocessor         2       https://www.geeksforgeeks.org/introduction-of-microprocessor/	Expert lectures, on	line seminars - webinars	
1       Digital Principles and Applications – Albert Paul Malvino& Donald P Leach,TMH, Fourth Edition (2006)         2       Introduction to Microprocessors, Aditya P Mathur TMH, 6 <sup>th</sup> Edition (2006)         Book(s) for Reference       Integrated Electronics – Millmann& Halkias, TMH, (2017)         2       Microprocessors Architecture Applications and Programming, R.S.Goenkar, Penaram International(1999)         Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]         1       https://www.tutorialspoint.com/microprocessor/microprocessor_overview.html         2       https://www.geeksforgeeks.org/introduction-of-microprocessor/		Total Lecture hours	s 60
Edition (2006)         2       Introduction to Microprocessors, Aditya P Mathur TMH, 6 <sup>th</sup> Edition (2006)         Book(s) for Reference         1       Integrated Electronics – Millmann& Halkias, TMH, (2017)         2       Microprocessors Architecture Applications and Programming, R.S.Goenkar, Penaram International(1999)         Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]         1       https://www.tutorialspoint.com/microprocessor/microprocessor_overview.html         2       https://www.geeksforgeeks.org/introduction-of-microprocessor/	Book(s) for Stu	dy	
2       Microprocessors Architecture Applications and Programming, R.S.Goenkar, Penaram International(1999)         Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]         1       https://www.tutorialspoint.com/microprocessor/microprocessor_overview.html         2       https://www.geeksforgeeks.org/introduction-of-microprocessor/	Edition (2 2 Introduction	006) on to Microprocessors, Aditya P Mathur TMH, 6 <sup>th</sup> Edition (2006)	
International(1999)         Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]         1       https://www.tutorialspoint.com/microprocessor/microprocessor_overview.html         2       https://www.geeksforgeeks.org/introduction-of-microprocessor/	1 Integrated	Electronics – Millmann& Halkias, TMH, (2017)	
1       https://www.tutorialspoint.com/microprocessor/microprocessor overview.html         2       https://www.geeksforgeeks.org/introduction-of-microprocessor/			, Penaram
1       https://www.tutorialspoint.com/microprocessor/microprocessor overview.html         2       https://www.geeksforgeeks.org/introduction-of-microprocessor/			
2 https://www.geeksforgeeks.org/introduction-of-microprocessor/	Related Online (	Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
	1 <u>https://ww</u>	w.tutorialspoint.com/microprocessor/microprocessor overview.htt	<u>nl</u>
Course Designed By: Dr I Chandre Neagensian			
Course Designed by: Di L.Chandra Naagarajan	Course Designe	d By: D <mark>r L.Chandra Naagarajan sa kana kana kana kana kana kana kana</mark>	

Jourse	Jesigneu	Dy. DI			ai ajan				5	/
		S						100		
Маррі	ing with	Progran	nme Out	comes				20		
COs	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	<b>PO10</b>
CO1	S	S	S e	M	S	L	S	М	L	S
CO2	М	S	S	SU	ป แระจาบ	25	М	S	S	L
CO3	S	М	S	MCAT	ह कि ह	M	S	S	М	S
<b>CO4</b>	L	L	М	L	М	S	S	L	S	М
CO5	М	S	М	S	S	М	L	S	S	S

		SEMESTER VI				
Course code	6EA	OPTICAL FIBRES AND FIBRE OPTIC COMMUNICATION SYSTEMS	L	Т	Р	C
Core/Elective/	SBS	ELECTIVE II B	4	0	0	4
Pre-requisite		The students must know the basic optical laws	Syll	abus	20	22-23
_		and properties of optical fibre.	Ver	sion		
Course Object						
5		nis course are to:				
		ation of light waves in an optical fibre.				
		ication and cables.				
÷	•	bre losses and dispersion.	<i>.</i> .			
4. understand	the structu	res of light sources for optical fibre optic communic	ation.			
	0.4					
Expected Cou						
		etion of the course, student will be able to: classification.			V	2
1 understar	ia the libre	classification.			K	.2
2 test the c	ables during	g installation of cable based on cable selection criter	ia.		K	3
		on and dispersion in an optical fibre.			K	4
÷		cy, modulation bandwidth and spectral emission of	light		K	5
sources.						
5 use the k	nowledge to	make varied links and networking.			K	6
		nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate	• K6 - )	Create		
	,		,			
				M	1	
Unit:1 Propagation	of light wa	Fibre Classification ves in an optical fibre – Acceptance angle and Acceptance	ptance of		<b>hou</b> of a f	
Propagation of – Numerical classification	Aperture () – stepped i		propaga	cone o tion.	of a t Fibre	fibre es –
Propagation of – Numerical classification fibre – Compa	Aperture () – stepped i	ves in an optical fibre – Acceptance angle and Acceptance angle and Acceptance angle and Acceptance angle and a graded Index Fibre – Mode of pander fibre – stepped index monomode fibre – Grad app and graded index fibres.	propaga	cone o tion. x mult	of a t Fibre timo	fibre es – de
Propagation of – Numerical classification fibre – Compa Unit:2	Aperture () – stepped in arison of ste	ves in an optical fibre – Acceptance angle and Acceptance angle and Acceptance angle and Acceptance angle and a graded Index Fibre – Mode of pand graded index fibres. Fibre Fabrication and Cables	propaga ed inde	cone of tion. x multing 12	of a f Fibro timo <b>hou</b>	fibre es – de <b>rs</b>
Propagation of – Numerical classification fibre – Compa Unit:2 Classification chemical vap	Aperture ( – stepped in arison of ste of Technic our deposi	ves in an optical fibre – Acceptance angle and Acceptance angle and Acceptance angle and Acceptance angle and a graded Index Fibre – Mode of pander fibre – stepped index monomode fibre – Grad app and graded index fibres.	propaga ed inde racteris	cone c tion. x mult 12 tics – n Fib	of a f Fibratimo timo <b>hou</b> Inte	fibre es – de <b>rs</b> ernal able
Propagation of – Numerical classification fibre – Compa Unit:2 Classification chemical vap construction – criteria.	Aperture ( – stepped in arison of ste of Technic our deposi – losses inc	ves in an optical fibre – Acceptance angle and Acceptance angle and Acceptance angle and Acceptance angle and Acceptance and a graded index fibre – Mode of product fibre – Stepped index monomode fibre – Grad and graded index fibres. Fibre Fabrication and Cables ques – External chemical vapour deposition – Chattion (1 <sup>st</sup> method only) – Characteristics – Phasiling urred during installation of cable – Testing of cable	propaga ed inde racteris	tion. x multi 12 tics – n Fib ble se	of a f Fibre timo <b>hou</b> Inte re c lecti	fibre es – de <b>rs</b> ernal eable on
Propagation of – Numerical classification fibre – Compa Unit:2 Classification chemical vap construction – criteria. Unit:3	Aperture ( – stepped in arison of ste of Technic our deposi – losses inc	ves in an optical fibre – Acceptance angle and Acceptance angle and Acceptance angle and Acceptance angle and a graded index fibre – Mode of product fibre – Stepped index monomode fibre – Grader and graded index fibres. Fibre Fabrication and Cables ques – External chemical vapour deposition – Chattion (1 <sup>st</sup> method only) – Characteristics – Phasil urred during installation of cable – Testing of cable Fibre Losses and Dispersion in Optics	propaga ed inde racteris l syster es – ca	tics – n Fibble se	of a f Fibro timo hou Inte re c lecti	fibre es – de <b>rs</b> ernal eable on
Propagation of – Numerical classification fibre – Compa Unit:2 Classification chemical vap construction – criteria. Unit:3 Attenuation in Radiation ind	Aperture () – stepped in arison of ste of Technic our deposi – losses inc n optic fibr uced losses	ves in an optical fibre – Acceptance angle and a graded index fibre – Mode of product fibre – Stepped index monomode fibre – Grader and graded index fibres. Fibre Fabrication and Cables ques – External chemical vapour deposition – Chattion (1 <sup>st</sup> method only) – Characteristics – Phasilitured during installation of cable – Testing of cable Fibre Losses and Dispersion in Optics re – Rayleigh Scattering losses – Absorption losse – Inherent defect losses – Core and Cladding losses	propaga ed inde racteris l syster es – ca s – Ber ses. Di	tics – n Fib ble se	of a transformed for the fillenge of the fille	Fibre es – de rrs ernal able on urs es – n an
Propagation of – Numerical classification fibre – Compa Unit:2 Classification chemical vap construction – criteria. Unit:3 Attenuation in Radiation ind	Aperture () – stepped in arison of ste of Technic our deposi – losses inc n optic fibr uced losses – Inter-mo	ves in an optical fibre – Acceptance angle and a graded index fibre – Mode of product fibre – stepped index monomode fibre – Grader and graded index fibres. Fibre Fabrication and Cables pues – External chemical vapour deposition – Chattion (1 <sup>st</sup> method only) – Characteristics – Phasilieured during installation of cable – Testing of cable Fibre Losses and Dispersion in Optics re – Rayleigh Scattering losses – Absorption losses and dispersion – Material Chromatic Dispersion –	propaga ed inde racteris l syster es – ca s – Ber ses. Di	tics – n Fib ble se	of a transformed for the fillenge of the fille	Fibre es – de rs ernal able on urs es – n an
Propagation of – Numerical classification fibre – Compa Unit:2 Classification chemical vap construction – criteria. Unit:3 Attenuation in Radiation ind Optical Fibre penalty – Tota Unit:4	Aperture () – stepped in arison of ste of Technic our deposi – losses inc n optic fibr uced losses – Inter-mo al Dispersio	ves in an optical fibre – Acceptance angle and Acceptance NA) – NA of a graded Index Fibre – Mode of product fibre – stepped index monomode fibre – Grader and graded index fibres. Fibre Fabrication and Cables ques – External chemical vapour deposition – Chation (1 <sup>st</sup> method only) – Characteristics – Phasil urred during installation of cable – Testing of cable Fibre Losses and Dispersion in Optics re – Rayleigh Scattering losses – Absorption losse a – Inherent defect losses – Core and Cladding loss dal dispersion – Material Chromatic Dispersion – n delay. Light Sources For Optical Fibres	propaga ed inde racteris l syster es – ca s – Ben ses. Di Dispen	tics – n Fib ble se 12 n Fib ble se 12 nding spersion	hou hou Intere c lecti loss on in Pow	fibre es – de rrs ernal able on urs es – n an er rs
Propagation of – Numerical classification fibre – Compa Unit:2 Classification chemical vap construction – criteria. Unit:3 Attenuation ind Optical Fibre penalty – Tota Unit:4 LED – The	Aperture () – stepped in arison of ste of Technic our deposi – losses inc n optic fibr uced losses – Inter-mo al Dispersio process inv	ves in an optical fibre – Acceptance angle and Acceptance angle and Acceptance angle and Acceptance angle and a graded index fibre – Mode of product fibre – stepped index monomode fibre – Grader and graded index fibres. Fibre Fabrication and Cables ques – External chemical vapour deposition – Chation (1 <sup>st</sup> method only) – Characteristics – Phasil urred during installation of cable – Testing of cable Fibre Losses and Dispersion in Optics re – Rayleigh Scattering losses – Absorption losse a – Inherent defect losses – Core and Cladding loss dal dispersion – Material Chromatic Dispersion – n delay.	propaga ed inde racteris l syster es – ca s – Ben ses. Di Dispen	tics – n Fib ble se 12 n Fib ble se 12 nding spersion	hou hou Intere c lecti loss on in Pow	fibre es – de <b>rs</b> ernal able on <b>urs</b> es – n an er <b>rs</b>
Propagation of – Numerical classification fibre – Compa Unit:2 Classification chemical vap construction – criteria. Unit:3 Attenuation in Radiation ind Optical Fibre penalty – Tota Unit:4 LED – The Modulation b	Aperture () – stepped in arison of ste of Technic our deposi – losses inc n optic fibr uced losses – Inter-mo al Dispersio process inv	ves in an optical fibre – Acceptance angle and Accep NA) – NA of a graded Index Fibre – Mode of p index fibre – stepped index monomode fibre – Grad op and graded index fibres. Fibre Fabrication and Cables ques – External chemical vapour deposition – Cha tion (1 <sup>st</sup> method only) – Characteristics – Phasil urred during installation of cable – Testing of cable Fibre Losses and Dispersion in Optics re – Rayleigh Scattering losses – Absorption losse – Inherent defect losses – Core and Cladding los dal dispersion – Material Chromatic Dispersion – n delay. Light Sources For Optical Fibres rolved in LEDs – Structures of LED – Fibre – ad Spectral Emission of LEDs.	propaga ed inde racteris l syster es – ca s – Ben ses. Di Dispen	tics – n Fib ble se 12 tics – n Fib ble se 12 nding spersion trained	of a t Fibra timo hou Inte re c lecti loss on in Pow hou ing	Fibre es – de rs ernal able on urs es – n an er rs –
Propagation of – Numerical classification fibre – Compa Unit:2 Classification chemical vap construction – criteria. Unit:3 Attenuation ind Optical Fibre penalty – Tota Unit:4 LED – The Modulation b	Aperture () – stepped in arison of ste of Technic our deposi – losses inc n optic fibr uced losses – Inter-mo al Dispersio process inv andwidth ar	ves in an optical fibre – Acceptance angle and Acceptance NA) – NA of a graded Index Fibre – Mode of prindex fibre – stepped index monomode fibre – Grader and graded index fibres. Fibre Fabrication and Cables ques – External chemical vapour deposition – Charition (1 <sup>st</sup> method only) – Characteristics – Phasil urred during installation of cable – Testing of cable Fibre Losses and Dispersion in Optics re – Rayleigh Scattering losses – Absorption losse a – Inherent defect losses – Core and Cladding loss dal dispersion – Material Chromatic Dispersion – n delay. Light Sources For Optical Fibres rolved in LEDs – Structures of LED – Fibre –	propaga ed inde racteris l syster es – ca s – Ber sses. Di Disper	tics – n Fibble sei 12 tics – n Fibble sei 12 nding spersion 10 Coupl	of a t Fibra fimo hou Intere c lecti lecti loss on in Pow hou ing hou	Fibre es – de rrs ernal cable on urs es – n an er <b>rs</b> – <b>Irs</b>

Unit:6	Contemporary Issues	2 hours
Expert le	tures, online seminars - webinars	
		1
	Total Lecture hours	60
Text Bo	k(s)	
Limit	l Fibres and Fibre Optic Communication Systems, Subir Kumar Sa d, (2007)	rkar, S. Chand
2 Fiber	Optics Communication, D.C.Agarwal, S.Chand (2010)	
3 Optic	l fiber Communication, Keiser, McGraw Hill (2010)	
Reference	e Books	
▲	l Fibres and Fibre Optic Communication Systems, R.K.Puri and V. & CO	K.Babbar, S.
2 Introd	action to Fiber Optics, Ajoy Ghatak, K. Thyagarajan, Cambridge (2	2009)
Related	Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1 <u>https:</u>	/nptel.ac.in/courses/115/107/115107095/	
2 <u>https:</u>	/www.youtube.com/playlist?list=PLq-Gm0yRYwTgr7v3HhdrI_Kcc	38369fw-
Course I	esigned By: Mr. J. William Charles	

Mappi	ng with	Program	nme Ou	tcomes	Y	24	311	15		
COs	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	<b>PO10</b>
<b>CO1</b>	S	M	М	S	M	S	М	M	S	S
CO2	М	S	M	M	S	S	S	M	Μ	Μ
CO3	S	M	S	S	М	M	M	M	S	M
<b>CO4</b>	S 5	S	М	М	S	S	S	S	S	S
CO5	S	S	S	M	М	S	S	S	S	S
*S-Stro	ng; M-N	Iedium;	15.81				ند جال	Cerles		
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Course code	6EA	<b>BIO PHYSICS</b>	L	Т	Р	С
Core/Elective	/SBS	ELECTIVE PAPER – II C	4	0	0	4
Pre-requisite	e	The students are expected to have basic knowledge in the area of biophysics.	Sylla Vers		2022-	23
Course Objec						
		s course are to:				
	· ·	s applies to the processes of biology. ify micro-organisms for producing biofuel.				
		in the place of coal and petroleum products for products	cing e	lectri	city	
5. Teplace of		in the place of coal and performing produces for produ	ving (	licetii	ency.	
Expected Cou	rse Outcon	nes:				
		etion of the course, student will be able to:				
1 underst	and interact	ions between various systems of cells.			K2	
2 provide	life-saving	treatment methods like radiation therapy.			K4	
-		nes against infectious diseases.			K6	
		nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; I	K6 - (	Create	:	
	(87)					
Unit:1		Structure of Biomolecules	12	2 hou	rs 🥢	
osmosis - os	mometry -	significance of diffusion. <b>Osmosis:</b> Osmosis - Osmoti osmotic pressure of electrolytes. <b>Filtration:</b> Filtratio Formation of Urine- Principle of dialysis in artificie	n - P	assag	e of f	luio
Unit:3		Kinetics of Molecules II	12 ho	nire		
Adsorption: adsorption of	Gases by	- Factors affecting adsorption - Adsorption of ions by solids - Biological significance of adsorption. Hydro	Solid	ls and	-	ds
Colloids: Ty	pes of collo	of hydrotropy. <b>Precipitation:</b> Precipitation - Bioloids ids - characteristics of colloids - stability of colloids ration of colloids - Biological importance of colloids	logica - Ge	1 sig 1 - E1	nulsio	py nce ns
Colloids: Ty Techniques f Equilibrium. Unit:4	pes of colle for the separ	ids - characteristics of colloids - stability of colloids	logica - Ge – Gib 12 ho	1 sig 1 - E1 b's I <b>ours</b>	nulsio Donnar	py nce ns 1

Unit:5	<b>Bioelectricity and Radiation Biology</b>	12 hours
	ential - Resting membrane potential - Action potential and ner	
	npulse conduction- Recording of nerve impulses by C.R.O - Re-	•
▲	jury potential- Monophasic and diphasic action potentials - I	•
radioactivity A	rtificial or induced radioactivity - Radioactive disintegration - un	nits of Radioactivity.
Unit:6	Contonno y Iamos	2 h auna
	Contemporary Issues	2 hours
Expert lecture	s, online seminars - webinars	
	Total Lecture hours	60
Torrt Doolr(g)	Tour Lecture nouis	00
Text Book(s)	: Principles and Techniques, M.A. Subramanian, MJP Publishe	$r_{0}$ (2015)
	of biophysics, Dr S. Palanichamy, Dr.M. Shanmugave	
Publication		ru, raiaili raiailioulii
Tublication		
Reference Bo	oks	
1 Biophysics	s, S. Thiravia Raj, Saras Publication, (2009).	
2 Basic Biop	physics fo <mark>r Biolog</mark> ist, M. Daniel, Agro-Bios, (1998).	
<b>Related Onlin</b>	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1 <u>https://w</u>	ww.s <mark>cien</mark> cedirect.com/topics/earth-and-planetary-sciences/biophy	vsics
2 <u>https://or</u>	linecourses.nptel.ac.in/noc20_ph02/preview	
C. D.	ned By: Dr. P. Sagunthala	

Course code       6EB       Object Oriented Programming with C++       L       T       P         Core/Elective/SBS       ELECTIVE III A       4       0       0         Pre-requisite       The students are expected to possess fundamental knowledge in object-oriented programming with C++       Version       2022-         Course Objectives:       The students are expected to possess fundamental knowledge for object-oriented features.       2022-         2. learn how to write inline functions for efficiency and performance.       3. learn the syntax and semantics of the C++ programming language.         State and the concept of data abstraction and encapsulation       K2         2       learn how to design C++ classes for code reuse.       K3         3       learn how to design C++ classes for code reuse.       K6         3       learn how to design C++ classes for code reuse.       K6         3       learn how to design C++ classes for code reuse.       K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create         Unit:1       Tokens, Expressions and Control Structures       12 how traitables - derived data types - symbolic constants - type compatibility - declaration variables - dynamical initialization of variables - reference variables - operator in C++ scope resolution operators.         Unit:2       Functions in C++       12 how         Tokens, Expressions and Control Structures			SEMESTER VI				
The students are expected to possess fundamental knowledge in object-oriented programming with C++       Syllabus Version       2022-2         Course Objectives:       The main objectives of this course are to:       1       understand how C++ improves C with object-oriented features.       2       1       understand how C++ improves C with object-oriented features.       2       2       team how to write inline functions for efficiency and performance.       3       1       understand how C++ improves C with object-oriented features.       2       1       understand the concept of data abstraction and encapsulation       K2         2       1       understand the concept of data abstraction and encapsulation       K2       1	Course code	6EB	Object Oriented Programming with C++	L	Т	Р	С
Pre-requisite         knowledge in object-oriented programming with C++         Symanus Version         2022-i           Course Objectives:         The main objectives of this course are to:         . <td>Core/Elective/Sl</td> <td>BS</td> <td>ELECTIVE III A</td> <td>4</td> <td>0</td> <td>0</td> <td>4</td>	Core/Elective/Sl	BS	ELECTIVE III A	4	0	0	4
The main objectives of this course are to:         1. understand how C++ improves C with object-oriented features.         2. learn how to write inline functions for efficiency and performance.         3. learn the syntax and semantics of the C++ programming language.         Expected Course Outcomes:         On the successful completion of the course, student will be able to:         1       understand the concept of data abstraction and encapsulation         K2       learn how to use exception handling in C++ programs.         K3       learn how to use exception handling in C++ programs.         K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create         Unit:1       Tokens, Expressions and Control Structures         12       how to variables - derived data types - symbolic constants - type compatibility - declaration         variables - dynamical initialization of variables - reference variables - operator in C++ scope         resolution operators.         Unit:2       Functions in C++         The main function - function prototyping - call by reference - inline functions-Function overloadi         Making an outside function Inline- Nesting of member functions - C++ program with cla         making an outside function Inline- Nesting of member functions - C++ program with cla         making an outside function Inline- Nesting of member functions - Static Data members - Static         Unit:3	Pre-requisite	Pre-requisite knowledge in object-oriented programming with Version					
1. understand how C++ improves C with object-oriented features.         2. learn how to write inline functions for efficiency and performance.         3. learn the syntax and semantics of the C++ programming language.         Expected Course Outcomes:         On the successful completion of the course, student will be able to:         1       understand the concept of data abstraction and encapsulation       K2         2       learn how to design C++ classes for code reuse.       K6         3       learn how to use exception handling in C++ programs.       K3         K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create       Unit:1         Tokens, Expressions and Control Structures       12 hot         Structure of C++ Program – Tokens – Keywords – Identifiers and constant basic data types – use defined data types – derived data types – symbolic constants – type compatibility – declaration variables – dynamical initialization of variables – reference variables – operator in C++ - scope resolution operators.         Unit:2       Functions in C++       12 hot         The main function – function prototyping – call by reference – inline functions-Function overloadi Math library functions – specifying a class – delining member functions – C++ program with cla making an outside function Inline. Nesting of member functions – Static Data members – Static member functions – Friendly functions.         Unit:3       Constructors       12 hot         Destructors       I2 hot </td <td><b>Course Objectiv</b></td> <td>ves:</td> <td></td> <td></td> <td></td> <td></td> <td></td>	<b>Course Objectiv</b>	ves:					
On the successful completion of the course, student will be able to:       I       understand the concept of data abstraction and encapsulation       K2         1       understand the concept of data abstraction and encapsulation       K2         2       learn how to design C++ classes for code reuse.       K6         3       learn how to use exception handling in C++ programs.       K3         K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create       Unit:1       Tokens, Expressions and Control Structures       12 how         Structure of C++ Program – Tokens – Keywords – Identifiers and constant basic data types – use defined data types – derived data types – symbolic constants – type compatibility – declaration variables – dynamical initialization of variables – reference variables – operator in C++ - scope resolution operators.       12 how         Unit:2       Functions in C++       12 how         The main function – function prototyping – call by reference – inline functions-Function overloadi Math library functions – specifying a class – defining member functions – C++ program with cla making an outside function Inline - Nesting of member functions – C++ program with cla making an outside function Inline - Nesting of member functions – C++ program with cla making an outside function s.       12 how         Unit:3       Constructors       12 how         Constructors – Parameterized constructors – Multiple constructors in a class - Constructors w       Default Arguments – copy constructor – Dynamic Constructors         U	<ol> <li>understand</li> <li>learn how to</li> </ol>	how C++	improves C with object-oriented features. ine functions for efficiency and performance.				
On the successful completion of the course, student will be able to:       1       understand the concept of data abstraction and encapsulation       K2         1       understand the concept of data abstraction and encapsulation       K2         2       learn how to design C++ classes for code reuse.       K6         3       learn how to use exception handling in C++ programs.       K3         K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create       Unit:1       Tokens, Expressions and Control Structures       12 how         Structure of C++ Program – Tokens – Keywords – Identifiers and constant basic data types – use defined data types – derived data types – symbolic constants – type compatibility – declaration variables – dynamical initialization of variables – reference variables – operator in C++ - scope resolution operators.       12 how         Unit:2       Functions in C++       12 how         The main function – function prototyping – call by reference – inline functions-Function overloadi Math library functions.       9 member functions – C++ program with cla making an outside functions.         Unit:3       Constructors       12 how         Constructors       12 how       12 how         Unit:4       Destructors       12 how         Destructors       12 how       12 how         Constructors - Parameterized constructors – Multiple constructors in a class - Constructors w       12 how	Expected Cours	e Outcom	105.				
1       understand the concept of data abstraction and encapsulation       K2         2       learn how to design C++ classes for code reuse.       K6         3       learn how to use exception handling in C++ programs.       K3         K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create       Item in the intervent inte							
2       learn how to design C++ classes for code reuse.       K6         3       learn how to use exception handling in C++ programs.       K3         K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create         Unit:1       Tokens, Expressions and Control Structures         Structure of C++ Program - Tokens - Keywords - Identifiers and constant basic data types - use defined data types - derived data types - symbolic constants - type compatibility - declaration variables - dynamical initialization of variables - reference variables - operator in C++ - scope resolution operators.         Unit:2       Functions in C++       12 how         The main function - function prototyping - call by reference - inline functions-Function overloadi Math library functions - specifying a class - defining member functions - C++ program with clamaking an outside function Inline- Nesting of member functions - Static Data members - Static member functions - Friendly functions.       12 how         Constructors - Parameterized constructors - Multiple constructors in a class - Constructors w Default Arguments - copy constructor - Dynamic Constructors       12 how         Destructors - Defining Operator Overloading - Overloading unary operators - Overloading Binar operators - Rules for overloading operators.       12 how         Unit:5       Inheritance       10 how         Inheritance - Defining derived classes - single Inheritance - Multilevel inheritance - Multipl       10 how         Inheritance - Hierarchical Inheritance       2 how		-				К2	
3       learn how to use exception handling in C++ programs.       K3         K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create         Unit:1       Tokens, Expressions and Control Structures       12 hot         Structure of C++ Program – Tokens – Keywords – Identifiers and constant basic data types – use defined data types – derived data types – symbolic constants – type compatibility – declaration       variables – derived data types – symbolic constants – type compatibility – declaration         variables – dynamical initialization of variables – reference variables – operator in C++ - scope resolution operators.       12 hot         Unit:2       Functions in C++       12 hot         The main function – function prototyping – call by reference – inline functions-Function overloadi Math library functions – specifying a class – defining member functions – C++ program with clas making an outside function Inline- Nesting of member functions – Static Data members – Static member functions – Friendly functions.       12 hot         Constructors – Parameterized constructors – Multiple constructors in a class - Constructors w Default Arguments – copy constructor – Dynamic Constructors       12 hot         Destructors - Defining Operator Overloading – Overloading unary operators – Overloading Binat operators – Rules for overloading operators.       12 hot         Unit:5       Inheritance       10 hot         Inheritance - Defining derived classes – single Inheritance - Multilevel inheritance – Multipl       2 hot         Inheritance - Hierarchical							
K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create         Unit:1       Tokens, Expressions and Control Structures       12 hot         Structure of C++ Program – Tokens – Keywords – Identifiers and constant basic data types – used defined data types – derived data types – symbolic constants – type compatibility – declaration variables – dynamical initialization of variables – reference variables – operator in C++ - scope resolution operators.         Unit:2       Functions in C++       12 hot         The main function – function prototyping – call by reference – inline functions-Function overloadi Math library functions – specifying a class – defining member functions – C++ program with cla making an outside function Inline- Nesting of member functions – Static Data members – Static member functions – Friendly functions.         Unit:3       Constructors       12 hot         Constructors       12 hot       Constructors         Unit:4       Destructors       12 hot         Destructors - Defining Operator Overloading – Overloading unary operators – Overloading Binar operators – Rules for overloading operators.       12 hot         Unit:5       Inheritance       10 hot         Inheritance       Wiltiple Inheritance – Multiple       Multiple         Inheritance       Functions – Static       The make – Constructors – Defining derived classes – single Inheritance – Multiple							
Unit:1       Tokens, Expressions and Control Structures       12 hot         Structure of C++ Program – Tokens – Keywords – Identifiers and constant basic data types – use       defined data types – derived data types – symbolic constants – type compatibility – declaration         variables – dynamical initialization of variables – reference variables – operator in C++ - scope       resolution operators.         Unit:2       Functions in C++       12 hot         The main function – function prototyping – call by reference – inline functions-Function overloadi       Math library functions – specifying a class – defining member functions- C++ program with cla         making an outside function Inline- Nesting of member functions – Static Data members – Static       member - Static Data members – Static         Unit:3       Constructors       12 hot         Constructors – Parameterized constructors – Multiple constructors in a class - Constructors w       Destructors         Unit:4       Destructors       12 hot         Destructors - Defining Operator Overloading – Overloading unary operators – Overloading Binar operators – Rules for overloading operators.       10 hot         Inheritance - Defining derived classes – single Inheritance - Multilevel inheritance – Multipl       10 hot         Inheritance - Hierarchical Inheritance       2 hot         Expert lectures, online seminars - webinars       2 hot				6 Cr	anta	K5	
Structure of C++ Program – Tokens – Keywords – Identifiers and constant basic data types – use defined data types – derived data types – symbolic constants – type compatibility – declaration variables – dynamical initialization of variables – reference variables – operator in C++ - scope resolution operators.         Unit:2       Functions in C++       12 hot         The main function – function prototyping – call by reference – inline functions-Function overloadi Math library functions – specifying a class – defining member functions – C++ program with cla making an outside function Inline- Nesting of member functions – Static Data members – Static member functions – Friendly functions.       12 hot         Unit:3       Constructors       12 hot         Constructors – Parameterized constructors – Multiple constructors in a class - Constructors w       12 hot         Destructors – Dynamic Constructors       12 hot         Unit:4       Destructors       12 hot         Destructors – Rules for overloading operators.       10 hot         Unit:5       Inheritance       10 hot         Inheritance       Hultiple constructors – Multiple inheritance – Multiple       10 hot         Inheritance – Hierarchical Inheritance       2 hot       2 hot         Destructors – Rules for overloading operators.       10 hot       10 hot         Inheritance – Hierarchical Inheritance       Multiple       10 hot         Expert lectures, online seminars - webinars       2 hot <td< td=""><td>KI - Kemember</td><td>i, <b>K</b>2 - 01</td><td>acistanu, KS - Appiy, K4 - Anaryze, K5 - Evaluate, K</td><td><b>0</b> - Cl</td><td>cate</td><td></td><td></td></td<>	KI - Kemember	i, <b>K</b> 2 - 01	acistanu, KS - Appiy, K4 - Anaryze, K5 - Evaluate, K	<b>0</b> - Cl	cate		
Structure of C++ Program – Tokens – Keywords – Identifiers and constant basic data types – use defined data types – derived data types – symbolic constants – type compatibility – declaration variables – dynamical initialization of variables – reference variables – operator in C++ - scope resolution operators.         Unit:2       Functions in C++       12 hot         The main function – function prototyping – call by reference – inline functions-Function overloadi Math library functions – specifying a class – defining member functions – C++ program with cla making an outside function Inline- Nesting of member functions – Static Data members – Static member functions – Friendly functions.       12 hot         Unit:3       Constructors       12 hot         Constructors – Parameterized constructors – Multiple constructors in a class - Constructors w       12 hot         Destructors – Dynamic Constructors       12 hot         Unit:4       Destructors       12 hot         Destructors – Rules for overloading operators.       10 hot         Unit:5       Inheritance       10 hot         Inheritance       Hultiple constructors – Multiple inheritance – Multiple       10 hot         Inheritance – Hierarchical Inheritance       2 hot       2 hot         Destructors – Rules for overloading operators.       10 hot       10 hot         Inheritance – Hierarchical Inheritance       Multiple       10 hot         Expert lectures, online seminars - webinars       2 hot <td< td=""><td>Unit•1</td><td>107</td><td>Tokens Expressions and Control Structures</td><td></td><td></td><td>12 ho</td><td>urs</td></td<>	Unit•1	107	Tokens Expressions and Control Structures			12 ho	urs
defined data types – derived data types – symbolic constants – type compatibility – declaration variables – dynamical initialization of variables – reference variables – operator in C++ - scope resolution operators.         Unit:2       Functions in C++       12 how         The main function – function prototyping – call by reference – inline functions-Function overloadi       Math library functions – specifying a class – defining member functions- C++ program with cla         making an outside function Inline- Nesting of member functions – Static Data members – Static       member functions – Friendly functions.         Unit:3       Constructors       12 how         Constructors – Parameterized constructors – Multiple constructors in a class - Constructors w       Default Arguments – copy constructor – Dynamic Constructors         Unit:4       Destructors       12 how         Destructors - Defining Operator Overloading – Overloading unary operators – Overloading Binar operators – Rules for overloading operators.       10 how         Inheritance - Defining derived classes – single Inheritance - Multilevel inheritance – Multipl       10 how         Inheritance - Hierarchical Inheritance       2 how         Expert lectures, online seminars - webinars       2 how				data			
Unit:3       Constructors       12 hor         Constructors – Parameterized constructors – Multiple constructors in a class - Constructors w       Default Arguments – copy constructor – Dynamic Constructors       In a class - Constructors w         Unit:4       Destructors       12 hor         Destructors - Defining Operator Overloading – Overloading unary operators – Overloading Binar operators – Rules for overloading operators.       10 hor         Unit:5       Inheritance       10 hor         Inheritance - Defining derived classes – single Inheritance - Multiple Inheritance – Multiple Inheritance       2 hor         Unit:6       Contemporary Issues       2 hor         Expert lectures, online seminars - webinars       2 hor	The main function Math library fun making an outsid	ctions – s le functior	ion prototyping – call by reference – inline functions-F specifying a class – defining member functions– C++ 1 Inline- Nesting of member functions – Static Data mer	progr	on ov am w	erload /ith cl	ing
Constructors – Parameterized constructors – Multiple constructors in a class - Constructors w         Default Arguments – copy constructor – Dynamic Constructors         Unit:4       Destructors         Destructors - Defining Operator Overloading – Overloading unary operators – Overloading Binar operators – Rules for overloading operators.         Unit:5       Inheritance         Inheritance - Defining derived classes – single Inheritance - Multilevel inheritance – Multipl Inheritance - Hierarchical Inheritance         Unit:6       Contemporary Issues         2 ho         Expert lectures, online seminars - webinars	member function	s – Frienc	lly functions.	E			
Constructors – Parameterized constructors – Multiple constructors in a class - Constructors w         Default Arguments – copy constructor – Dynamic Constructors         Unit:4       Destructors         Destructors - Defining Operator Overloading – Overloading unary operators – Overloading Binar operators – Rules for overloading operators.         Unit:5       Inheritance         Inheritance - Defining derived classes – single Inheritance - Multiple inheritance – Multiple Inheritance         Unit:6       Contemporary Issues         2 ho         Expert lectures, online seminars - webinars			NOV AND				
Default Arguments – copy constructor – Dynamic Constructors         Unit:4       Destructors       12 hou         Destructors - Defining Operator Overloading – Overloading unary operators – Overloading Binar operators – Rules for overloading operators.       10 hou         Unit:5       Inheritance       10 hou         Inheritance - Defining derived classes – single Inheritance - Multilevel inheritance – Multipl Inheritance - Hierarchical Inheritance       2 hou         Unit:6       Contemporary Issues       2 hou         Expert lectures, online seminars - webinars       10 hou	0 111110						
Destructors - Defining Operator Overloading – Overloading unary operators – Overloading Binar operators – Rules for overloading operators.       Inheritance – Overloading operators.         Unit:5       Inheritance       10 hou         Inheritance - Defining derived classes – single Inheritance - Multilevel inheritance – Multipl       Inheritance – Multipl         Inheritance - Hierarchical Inheritance       2 ho         Expert lectures, online seminars - webinars       10 hou				- Con	struc	tors v	<i>v</i> ith
Unit:5       Inheritance       10 hot         Inheritance - Defining derived classes – single Inheritance - Multilevel inheritance – Multipl       Inheritance – Multipl         Inheritance - Hierarchical Inheritance       Contemporary Issues       2 ho         Expert lectures, online seminars - webinars       Inheritance       10 hot	Unit:4		Destructors			12 ho	urs
Inheritance - Defining derived classes – single Inheritance - Multiple         Inheritance - Hierarchical Inheritance         Unit:6       Contemporary Issues       2 ho         Expert lectures, online seminars - webinars				Overlo	ading	g Bina	ry
Inheritance - Defining derived classes – single Inheritance - Multiple         Inheritance - Hierarchical Inheritance         Unit:6       Contemporary Issues       2 ho         Expert lectures, online seminars - webinars	Unit:5		Inheritance			10 ho	urs
Expert lectures, online seminars - webinars				ritance	e – N	Multip	le
Expert lectures, online seminars - webinars	Unit:6		Contemporary Issues			2 ho	ours
Total Lecture hours		online sem					
Total Lecture hours							()
			1 otal Lecture nours				60

Tex	t Book(s)
1	Object Oriented Programming with C++, E. Balagurusamy, TMH Publications (2019).
2	Programming with C++, John R. Hubbard, TMH Publications, (2002).
Ref	erence Books
1	The C++ Programming Language, Bjarne Stroustrup, Addison – Wesley, (1985).
2	Programming: Principles and Practice Using C++, Bjarne Stroustrup, Addison- Wesley
	Professional, (2008)
Rela	ated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://www.programiz.com/c-programming
2	https://www.geeksforgeeks.org/c-language-set-1-introduction/
3	https://beginnersbook.com/2014/01/c-tutorial-for-beginners-with-examples/
Cou	rse Designed By: Dr P. Sagunthala and Dr. V. Kalaiselvi

Mappi	ng with	Progran	nme Out	tcomes			100	7		
COs	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	<b>PO9</b>	PO10
CO1	S	M	M	S	M	M	S	М	М	М
CO2	S	S	S	S	S	М	S	М	М	М
CO3	М	S	S	S	S A	S	S	S	S	М

இந்தப்பாரை உயர்த்திட EDUCATE TO

\*S-Strong; M-Medium; L-Low

3153

Course code	6EB	<b>GEOPHYSICS</b> L	,	Т	Р	С
Core/Elective/S	SBS	ELECTIVE PAPER – III B 4		0	0	4
Pre-requisite		KNOW/PODE IN THE HEIO OF NATURAL SCIENCE		bus ion	2022	2-23
Course Object	ives:					
<ol> <li>study the p</li> <li>study varie</li> </ol>	physical propus feature	is course are to: operties of earth and how it works. s of earth using gravity, magnetic, electrical and seismic m cal parameters of the geothermal field.	etł	nods.		
Expected Cour	rse Outcor	nes:				
-		etion of the course, student will be able to:				
1 study the	e genesis a	nd the propagation of seismic waves in geological material	s.		K2	
· · ·	fferent tech ce rapidly.	niques to solve complex problems and evaluate large areas	<b>S O</b>	f	K5	
3 do mode	eling <mark>and c</mark> a	alculations using computers.			K6	
K1 - Rememb	er; <mark>K2 - U</mark>	nderstand; <b>K3 - App</b> ly; <b>K4</b> - Analyze; <mark>K5</mark> - Evaluate; <mark>K6</mark> -	C	reate		
				10.		
TT		C. involven			10 1	
		Seismology y –P waves, S waves, their velocities - Time distance ffect of boundaries - Major discontinuities and resulting j				the
Introduction – location of epid waves - Derivat Unit:2	centers - E tion of prop	y –P waves, S waves, their velocities - Time distance ffect of boundaries - Major discontinuities and resulting porties from the velocities. Surface Waves and Seismometry		ase o	and	the mic
Introduction – location of epic waves - Derivat Unit:2 Surface waves	centers - E tion of prop Rayleigh	y –P waves, S waves, their velocities - Time distance ffect of boundaries - Major discontinuities and resulting porties from the velocities. Surface Waves and Seismometry waves and Love waves - Study of earth by surface waves.	pha	ase o	and f seis	the mic
Introduction – location of epic waves - Derivat Unit:2 Surface waves	centers - E tion of prop Rayleigh	y –P waves, S waves, their velocities - Time distance and resulting porties from the velocities. Surface Waves and Seismometry	pha	ase o	and f seis	the mic
Introduction – location of epic waves - Derivat Unit:2 Surface waves	centers - E tion of prop Rayleigh	y –P waves, S waves, their velocities - Time distance ffect of boundaries - Major discontinuities and resulting porties from the velocities. Surface Waves and Seismometry waves and Love waves - Study of earth by surface waves.	pha	ase o	and f seis	the mic
Introduction – location of epid waves - Derivat Unit:2 Surface waves: Seismometry: Unit:3 Earthquakes: I Gravity: The p	centers - E ion of prop Rayleigh Horizontal Focus, mag otential (L	y –P waves, S waves, their velocities - Time distance and resulting poerties from the velocities. Surface Waves and Seismometry waves and Love waves - Study of earth by surface waves. seismograph and seismography equation – Strain seismograph	rap	ase o	and f seis 12 ho	the mic
Introduction – location of epic waves - Derivat Unit:2 Surface waves Seismometry: Unit:3 Earthquakes: I Gravity: The p measurements of Unit:4	centers - E ion of prop Rayleigh Horizontal Focus, mag otential (L of gravity - Geoma	y –P waves, S waves, their velocities - Time distance ffect of boundaries - Major discontinuities and resulting porties from the velocities. Surface Waves and Seismometry waves and Love waves - Study of earth by surface waves. seismograph and seismography equation – Strain seismograph Earthquakes and Gravity gnitude, frequency - Detection and prediction. aplace's equation and Poisson's equation) - Absolute and re Hammond Faller method - Worden gravimeter. agnetism and Internal Structure of the Earth	rap	ase o	and f seis 12 ho 12 ho 12 ho	the mic ours
Introduction – location of epic waves - Derivat Unit:2 Surface waves Seismometry: Unit:3 Earthquakes: Gravity: The p measurements of Unit:4	centers - E ion of prop Rayleigh Horizontal Focus, mag otential (L of gravity - Geoma	y –P waves, S waves, their velocities - Time distance ffect of boundaries - Major discontinuities and resulting poerties from the velocities. Surface Waves and Seismometry waves and Love waves - Study of earth by surface waves. seismograph and seismography equation – Strain seismograph Earthquakes and Gravity gnitude, frequency - Detection and prediction. aplace's equation and Poisson's equation) - Absolute and reference Hammond Faller method - Worden gravimeter.	rap	ase o	and f seis 12 ho 12 ho 12 ho	the mic burs
Introduction – location of epic waves - Derivat Unit:2 Surface waves Seismometry: Unit:3 Earthquakes: 1 Gravity: The p measurements of Unit:4 Geomagnetism magnetometers, magnetism - Ca	centers - E ion of prop Rayleigh Horizontal Focus, mag otential (L of gravity - <b>Geoma</b> : Fundama , proton pr auses of th	y –P waves, S waves, their velocities - Time distance ffect of boundaries - Major discontinuities and resulting porties from the velocities. Surface Waves and Seismometry waves and Love waves - Study of earth by surface waves. seismograph and seismography equation – Strain seismograph Earthquakes and Gravity gnitude, frequency - Detection and prediction. aplace's equation and Poisson's equation) - Absolute and re Hammond Faller method - Worden gravimeter. agnetism and Internal Structure of the Earth		ase o	and f seis 12 ho 12 ho induc of ea The	burs burs burs burs tion rth's core
Introduction – location of epic waves - Derivat Unit:2 Surface waves: Seismometry: Unit:3 Earthquakes: I Gravity: The p measurements of Unit:4 Geomagnetism magnetometers, magnetism - Ca variation of me earth.	centers - E ion of prop Rayleigh Horizontal Focus, mag otential (L of gravity - Geoma : Fundame , proton pre auses of the chanical pre-	y –P waves, S waves, their velocities - Time distance ffect of boundaries - Major discontinuities and resulting porties from the velocities. Surface Waves and Seismometry waves and Love waves - Study of earth by surface waves. seismograph and seismography equation – Strain seismograph Earthquakes and Gravity gnitude, frequency - Detection and prediction. aplace's equation and Poisson's equation) - Absolute and reference Hammond Faller method - Worden gravimeter. Agnetism and Internal Structure of the Earth ental equations - Measurements: method of Gauss, sature ecession magnetometers, alkali vapour magnetometers - The main field -Dynamo theories. Internal structure of the roperties with depth - Materials and equation of state of the state of the state of the state of the state of the state of the state of the roperties with depth - Materials and equation of state of the state of th		ase o	and f seis 12 ho 12 ho induc of ea The ior of	the mic
Introduction – location of epic waves - Derivat Unit:2 Surface waves: Seismometry: Unit:3 Earthquakes: 1 Gravity: The p measurements of Unit:4 Geomagnetism magnetometers. magnetism - Ca variation of me earth.	centers - E ion of prop Rayleigh Horizontal Focus, mag otential (L of gravity - Geoma : Fundame, proton pre auses of the chanical p	y –P waves, S waves, their velocities - Time distance ffect of boundaries - Major discontinuities and resulting porties from the velocities. Surface Waves and Seismometry waves and Love waves - Study of earth by surface waves. seismograph and seismography equation – Strain seismograph Earthquakes and Gravity gnitude, frequency - Detection and prediction. aplace's equation and Poisson's equation) - Absolute and reference Hammond Faller method - Worden gravimeter. agnetism and Internal Structure of the Earth ental equations - Measurements: method of Gauss, satu ecession magnetometers, alkali vapour magnetometers - The main field -Dynamo theories. Internal structure of the roperties with depth - Materials and equation of state of the Geochronology and Geothermal Physics	pha rap elat heo he	ase o	and f seis 12 ho 12 ho induc of ea The ior of 12 ho	the mic ours ours ours tion rth's core the ours ours ours on the ours ours ours ours ours ours ours ours
Introduction – location of epic waves - Derivat Unit:2 Surface waves: Seismometry: Unit:3 Earthquakes: I Gravity: The p measurements of Unit:4 Geomagnetism magnetometers, magnetism - Ca variation of me earth. Unit:5 Geochronology	centers - E ion of prop Rayleigh Horizontal Focus, mag otential (L of gravity - Geoma : Fundame , proton pr auses of th chanical pr G y: Radioact	y –P waves, S waves, their velocities - Time distance ffect of boundaries - Major discontinuities and resulting porties from the velocities. Surface Waves and Seismometry waves and Love waves - Study of earth by surface waves. seismograph and seismography equation – Strain seismograph Earthquakes and Gravity gnitude, frequency - Detection and prediction. aplace's equation and Poisson's equation) - Absolute and reference Hammond Faller method - Worden gravimeter. Agnetism and Internal Structure of the Earth ental equations - Measurements: method of Gauss, sature ecession magnetometers, alkali vapour magnetometers - The main field -Dynamo theories. Internal structure of the roperties with depth - Materials and equation of state of the state of the state of the state of the state of the state of the state of the roperties with depth - Materials and equation of state of the state of th	rap elar ura he he	ase of the second secon	and f seis 12 ho 12 ho induc of ea The ior of 12 ho eolog	the mic mic ours ours tior rth's core the

Uni	it:6	Contemporary Issues	2 hours
Exp	pert lectures.	online seminars - webinars	
		Total Lecture hours	60
Tex	xt Book(s)		
	Introduction (1971).	To Geophysics Mantle Core And Crust, G. D. Garland, Philadel	phia, W.B.Saunders,
2	Physics of t	he Earth and Planets, A. H. Cook, McMillan, (1973).	
Ref	ference Boo	ks	
	Fundamenta (1997).	ls of Geophysics, <u>William Lowrie</u> , <u>Andreas Fichtner</u> , Cambridge	University Press,
2	Exploration Media, (20	n Geophysics, <u>Mamdouh R. Gadallah</u> , <u>Ray Fisher</u> , Springer Sc 08).	ience & Business
Rel	lated Online	e Conte <mark>nts [MOOC</mark> , SWAYAM, NPTEL, Websites etc.]	
1	https://npte	el.ac.in/content/storage2/courses/105101083/download/lec5.pdf	
2	https://ww	w.youtu <mark>be.com/</mark> playlist?list=PLfk0Dfh13pBPXtgn8BT-dpkfaWMF	RusJwI
Cou	urse Designe	ed By: Dr. P. Sagunthala	

				44						
Mapping with Programme Outcomes										
COs	<b>PO1</b>	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	PO8	PO9	<b>PO10</b>
CO1	S	M	M	S	М	S	M	M	S	M
CO2	М	S	M	S	S	М	M	S	М	S
CO3	M	S	S	М	S	S	S	S	М	S

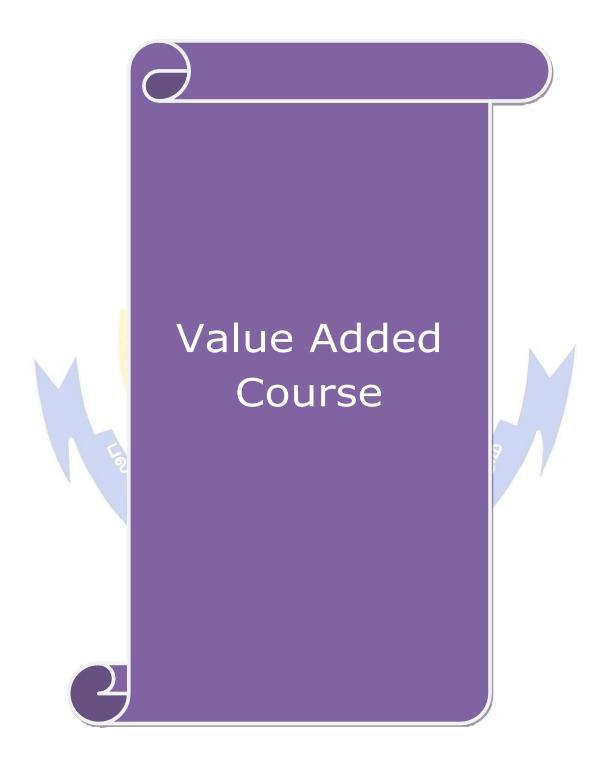


Course code	6EB	INDUSTRY AUTOMATION & ITS APPLICATIONS (INDUSTRY 4.0)	L	Т	Р	С		
Core/Elective/SBS		Elective Paper III C	4	0	0	4		
Pre-requisit	e	The students are expected to know the fundamental concepts about windows, internet and their application.	Syllabus Version		2022-23			
<b>Course Obje</b>	ctives:							
The main obje	ectives of this of	course are to:						
1. explore th	e idea of office	e maintenance using computers.						
	· ·	tical skills in using internet and Google apps.						
÷		nings and get awareness regarding hacking.						
<u> </u>	urse Outcome							
	•	on of the course, students will be able to:						
1 understa	and the basics of	of windows and internet of things.			K1			
2 be awar	e of ethical Ha	cking.			K2			
3 practice	Google apps a	and recognize their applications in day-to-day life			K4			
K1 - Remen	iber; K2 - Und	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - (	Create				
	460							
Unit:1		Windows			12 ho	urs		
UNIT-I: De	finition of Op	erating System, Functions of OS, and types of OS	. Des	sktop	icons	and		
their function	ns: My comput	er, My documents, My Network Place, Recycle Bin	ı. File	s. Fol	der. L	ocal		
	-	e, Pen Drive, SD Card. Basics of Networks: LAN,						
		Connection-oriented and connectionless services, I						
Unit:2		Ethical Hacking			12 ho	urs		
Introduction	to Ethical H	lacking – Hacker and Cracker. Fundamentals o	f Cor	nputer	· Frau	ıd -		
		– Malware Threats: Viruses and Worms, Trojan						
		tivity Ports: PS/2 keyboard and mouse port, USE						
		DMI p <mark>ort, VGA port, display p</mark> ort, USB A-Type, U	ISB B	-Type	, USE	6 C-		
	A Mini and mi	cro port, Type B Micro.			12 ho			
5								
		characteristics of IOT, IOT in everyday life, Intern						
		tem, Smart signals in cities and location sharing,						
		evelopment of India in IOT: Solar Plant System, A		-	•			
		v, IOT in Wireless Devices. Challenges in IOT: B	ig Dat	a Mai	nagem	ent,		
Connectivity	challenges	Google Apps for Education			10 h			
Unit:4	ala Daga Cag				12 ho	Jurs		
Basics of Goo	igle Docs, Goo	gle Sheets, Google Slides, Google Drive.						
Unit:5		Google Applications			10 ho	urs		
		Google Calendar, Google Contacts, and Google Me						
	Applications:	WhatsApp, Telegram, Facebook, Twitter, YouTub	e, Inst	agran		ours		
Unit:6 Contemporary Issues								
Expert lectures, online seminars - webinars								
		Total Lecture hours				60		
		Total Dectare nours				50		

Te	ext Book(s)							
1	Quick Course in Microsoft Office- Joyce Cox & Polly Urban, GOLGOTIA Publications							
2	Internet of Things-A hands on Approach, Arshdeep Bahga, Vijay Madisetti, Universities press							
3	Ethical Hacking: A Beginners Guide to Learning the World of Ethical Hacking, Lakshay Eshan, Shockwave Publishing (2018)							
4	The Google Apps Guidebook: Lesson, Activities and Projects Created by Students for Teachers Paperback, Kern Kelley, Tech Sherpas, (August 2, 2016)							
Re	Reference Books							
1	PC Software for Windows Made Simple, R.K. Taxali, Tata McGrawHill Publishing Company, (1998).							
2	Internet of Things, Srinivasa K.G., Siddesh G.M., Hanumantha Raju R., Cengage Learning India Pvt. Ltd (2018)							
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]							
1	Google Docs: <u>https://www.youtube.com/watch?v=xJiUTXGv3PE&amp;vl=en</u>							
2	Google Sheet : <u>https://www.youtube.com/watch?v=FIkZ1sPmKNw</u>							
3	Google Calendar and Google Meet : https://youtu.be/PKuBtQuFa-8							
4	IOT : <u>https://www.youtube.com/watch?v=UrwbeOIIc68</u>							
	burse Designed By: <b>Dr. S. Prasath</b> , Coordinator, E-learning cell, Nandha Arts & Science ollege, Erode							

				410	-					
Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	<b>PO10</b>
<b>CO1</b>	S	S	М	М	S	S	S	L	S	S
CO2	S	S	M	M	S	S	S	L	S	S
CO3	S	S	М	L	S	М	L	M	S	М





#### VALUE ADDED COURSE I

Value added course	<b>OPTOELECTRONICS</b>	L	Т	Р	С
value added course	OI TOELECTROINED	30	0	0	4
Pre-requisite	Students are expected to possess some basic knowledge in the field of Semiconductor technology.	Syllal Versi		2022	2-23
<b>Course Objectives:</b>		1			
The main objectives of	f this course are to:				
1. understand the op	tical process in a semiconductor.				
2. understand the badevices.	asic optoelectronics devices-LED, OLED, photodetecto	or and	photov	oltaic	
	ecent trends in optoelectronics.				
<b>Expected Course Out</b>					
On the successful cor	n <mark>pletion of the course, student will be able to:</mark>				
1 describe basic devices.	laws and phenomena that define behaviour of opti-	oelectro	onic	K1	
2 describe the dev	velopment and application of optoelectronic systems			K2	
3 interpret the acc	uired data and measured results.			K4	
K1 - Remember; K2	- Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate	<mark>; K</mark> 6 -	Create		
	A CARLES AND A CARLES				
	Module:1	2 ho	urs		
Electron - hole pair	formation and recombination, absorption in semicondu	ctor dir	ect an	d indi	rect
bandgap semiconduct					
E	Module:2	2 ho	urs		
Effect of electric field	d on absorption, Franz-Keldysh effect in semiconductors	S.S			
	Module:3	2 ho	urs		
Light Emitting Diod	es — Materials for light emitting diodes, Principle	e of a	ction	of LE	ED,
expression for light p	power in terms of photon energy, homo structured LE	D and	Hetero	o junc	tion
LED, drawbacks of he					
	Module:4 LILITSON 2	2 ho			
Types of LED struct structure.	ures-planar, dome type, surface emitter, edge emitt	er, sup	er lun	ninesc	ent
	Module:5	2 ho			
Performance characteristics	eristics of LED—Optical output power-current characte s.	ristics,	forwa	d curi	rent
	Module:6	2 ho			
	eristics of LED-Optical output power-current character				
voltage characteristic time, reliability,	s, Modulation bandwidth, power bandwidth product, I	Lifetime	e, Rise	e time/	fall
	Module:7	2 ho			
Internal quantum efficient	ciency, advantages / disadvantages of using LED. Nume			IS	
	Module:8	2 ho			
Organic light emittin efficiency, multilayer	ng diodes (OLED), The principle of OLED, chara OLED.	acteriza	tion,	structu	ire,

Module:9	2 hours
Important parameters of photodetectors, Detector responsivity, spectral resp	onse range, response
time, quantum efficiency, capacitance, noise characteristics.	
Module:10	2 hours
Absorption of radiation—absorption coefficient, mention of expression fo wavelength cut off, direct and indirect absorption T.	r photocurrent, long
Module:11	2 hours
Types of photodiodes—Junction photodiodes, pin diode, avalanche photodetectors; Comparison of different detectors, Photomultiplier tubes.	photodiodes, CCD
Module:12	2 hours
Phototransistors—characteristics. Photoconductive detectors—expression for Numerical problems.	photoconductive gain.
Module:13	2 hours
Solar cell—IV characteristics, efficiency, materials	
Module:14	2 hours
Organic photovoltaic diodes (OPVD)—fundamental process, exciton dissociation	absorption, exciton
Module:15	2 hours
Charge transport, charge collection, characterization. numerical problems Total Lecture hours	30
Text Book(s)	× 4
1 Fibre Optics Communications, Harold Kolimbiris, Prentice Hall, (2004).	
2 Optical Fibre Communications, Keiser G, McGraw Hill, (2000).	
Listration Varia	
Reference Books	
1 Fibre Optic Communication, Agarwal D C, Wheeler Publications, (1996)	
2 Optical Communication, Katiyar S, S K Kataria and Sons, (2010).	Ĩ.
3 Optoelectronics and Photonics: Principles and Practices, Kasap S O, Pear	rson, (2013).
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1 <u>https://nptel.ac.in/courses/115/102/115102026/</u>	
2 <u>https://moodle.usth.edu.vn/course/view.php?id=362#section-1</u>	
3 <u>https://www.classcentral.com/course/swayam-semiconductor-optoelectron</u>	<u>1cs-10043</u>
Course designed by: Dr. S. Krishnaveni	

#### VALUE ADDED COURSE II

		L	Т	Р	С		
Value added course	NON – DESTRUCTIVE TESTING	30	0	0	4		
Pre-requisite	Students should be aware of some fundamental principles of non – destructive testing and thermography.	Syllabus Version 2022-2					
<b>Course Objectives:</b>							
<ol> <li>industries to produ</li> <li>acquire knowledg</li> <li>principles to ident</li> </ol>	entals of NDT and its applications which will be used uce flawless components. e about different types of Non-Destructive testing method ify defects in various products produced in industries. tand various Non-Destructive evaluations, testing method	ds and a	pply 1	those			
<b>Expected Course Out</b>	tcomes:						
On the successful con	npletion of the course, student will be able to:						
1 understand the applications.	magnetic testing methods and interpretation of r	esults :	and	K2			
	application of Thermography, eddy current testing coustic emission testing.	<mark>g</mark> meth	od,	K3			
	instrumentation of various Radiography and testing scopy, Xerography, Computed Radiography and Compu	-	ues	K5			
	- Understand; <b>K3</b> - Apply; <b>K4</b> - Analyze; <b>K5</b> - Evaluate	e; K6– (	Create	e			
	Module:1	2 ho	urs				
Introduction of mate testing methods.	rials testing -Classification of materials tests – Overv			lestruc	tive		
	Module:2	2hou	irs				
Various NDT method	ls- selection of NDT methods-Visual Inspection.	1					
	Module:3	2hou	irs				
Introduction-principle	e-types of visual testing- Experiments used in visual ins			licatio	ns.		
FF	Module:4	2 ho	• •				
Liquid Penetrant Test	ing – Principles - Testing Process - penetrant materials						
	Module:5	2 ho	urs				
Penetrant testing met	hods- Interpretation of results- Applications.	1					
	Module:6	2 ho	urs				
Magnetic Particle T indications Applica	esting- Magnetic testing methods-Interpretation and tion of Magnetic particle Inspection.	d evalu	uation	of	test		
	Module:7	2 ho	urs				
Thermography principality of the second seco	ples- Contact and non-contact inspection methods-Tectages and limitation.	chnique	s for	apply	ing		

Module:8	2 hours
Infrared radiation and infrared detectors-Generation of eddy currents, Prope	
	·
Module:9	2 hours
Eddy current sensing elements, Probes, Instrumentation, Types of arrange	gement, Applications,
advantages, Limitations, Interpretation/Evaluation.	
Module:10	2 hours
Ultrasonic and acoustic emission testing - Basics of ultrasonic waves- Prir ultrasonic testing- Testing methods.	icipie- Equipment for
Module:11	2 hours
Ultrasonic transducers- Mode of displays- Application.	
Module:12	2 hours
Introduction- Basic principle- Instrumentation of acoustic emission testing-	Modes- Four channel
data acquisition- Applications.	
Module:13	2 hours
Radiography testing - Principle-Equipment of Radiography Testing-film an types and use of filters and screens.	d filmless techniques-
Module:14	2 hours
Characteristics of films -graininess, density, speed, contrast-characteristic	curves- Radiographic
techniques.	
Module:15	2 hours
Fluoroscopy- Xerography-Computed Radiography- Computed Tomography.	
Total Lecture hours	30
	30
Text Book(s)	There in Noroco
1 Practical Non-Destructive Testing, Baldev Raj, T.Jayakumar, M.7 Publishing House, (2014).	Гhavasimuthu, Narosa
2 Non-Destructive Testing Techniques, Ravi Prakash, New Age Internationa	al Publishers, (2010).
2 12 Sec	S /
Reference Books	9
1 Handbook of Non-destructive evaluation, Charles, J. Hellier, McGr (2001).	aw Hill Professional,
2 Introduction to Non-destructive testing: a training guide, Paul E Mix, Wi	ley, 2nd Edition
New Jersey, (2005).	
EDUCATE TO ELEVATE	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1 https://nptel.ac.in/courses/113/106/113106070/	
Correct designed by DM Correct and Dr. V. Correct V	
Course designed by: Dr. D.M.Suresh and Dr. K Saravana Kumar	

#### VALUE ADDED COURSE III

	VALUE ADDED COURSE III			-	r
Value added course	<b>BIOMEDICAL INSTRUMENTATION</b>	L	Т	Р	C
		30	30 0 Syllabus		4
Pre-requisite	Students are expected to have some basic knowledge in the field of physiology, operations and instruments used in medical field.	Syllab Versio		2022-23	
Course Objectives:					
The main objectives of the 1. understand the work 2. find applications of	nis course are to: king principles of Biomedical Instruments. various biomedical instruments. ge of electronics on various biomedical instruments.				
Europeted Course Outer	0.660				
Expected Course Outco					
	letion of the course, student will be able to:				
current passage ar	instrumentation against radiation, physiological eff	ects due	to	K1	
2 analyze the theory	of Bio-telemetry, its problems and uses.			K4	
	nces in biomedical instrumentation such as lasers i an, ultrasonic imaging, MRI and biofeedback instrum		-	K5	
<u>^</u>	Jnderstand; K3 - Apply; K4 - Analyze; K5 - Evaluat			e	
	Module:1	2 ho	irs		
Physiological Assist De	evices: -Introduction – pacemakers – pacemaker batt		u15		
T Hystological Assist D	evices. Infoduction pacemakers pacemaker bat	erres.			
	Module:2	2 ho	urs	1	
Artificial heart valves -	nerve and muscle stimulators.	19		/	
	Module:3	2 ho	urs		
Heart-lung machine – k		2 10	uis		
Theart-fully machine – K	Module:4	2 ho	1180		
Operation theatre age	uipment: Introduction – surgical diathermy – v			maath	
machine.	<b>urpinent:</b> Introduction – surgical diamentity – v	entilator	5 - 3	anestne	esta
machine.	Module:544 Incost 2-44012	2 ho	irc		
Cardiac output massura	ments – pulmonary function analyzers – gas analyze		ul 5		
Cardiae Output measure					
	Module:6	<b>2 ho</b>	urs		
Blood gas analyzers – o	oxymeters – elements of intensive care monitoring.				
	Module:7	2 ho	urs		
<b>Bio-Telemetry:</b> Elemer	nts of bio-telemetry system.				
	Module:8	2 ho	urs		
Design of a bio-telemet	ry system – radio telemetry system.				
<b>B</b> 11 1 1 1 1 1	Module:9	2 ho	urs		
Problems in implant tele	emetry – uses of bio-telemetry.				
	Module:10	2 ho	urs		
Safety instrumentation	Introduction – radiation safety instrumentation.				
	Module:11	2 ho			
Physiological effects du	e to 50 Hz current passage – electrical accidents in h	nospitals.			

Module:12	2 hours
Devices to protect against electrical hazards – hospital architecture.	·
Module:13	2 hours
Advances in bio-medical instrumentation: Introduction – computers in medicine.	medicine – lasers in
Module:14	2 hours
Endoscopes – cryogenic surgery – CT scan – ultrasonic imaging.	·
Module:15	2 hours
MRI – biofeedback instrumentation – biomaterials.	
Total Lecture hours	30
	50
Text Book(s)	
1 Biomedical instrumentation, M. Arumugam, AnuradhaPublicatios, (2009)	
2 Introduction to biomedical electronics, Joseph Dubovy, Tata McGraw Hil	l Company (1978).
Reference Books	
1 Biomedical Instrumentation and Measurements, Leslie Cromwell, Fred A. Pfeiffer, Measurements Prentice Hall of India (1997).	J. Weibell And Erich
2 Handbook of biomedical instruments, Khandpur, R.S, Tata McGraw Hil	ll Company (2003).
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1 https://nptel.ac.in/courses/108/105/108105101/	
2 https://onlinecourses.nptel.ac.in/noc20_ee41/preview	
3 https://www.classcentral.com/course/bioengineering-20126	
a hupber in a statistic of the official grant of the 20120	
Course designed by: Dr. P. Sagunthala and Dr. K Saravana Kumar	
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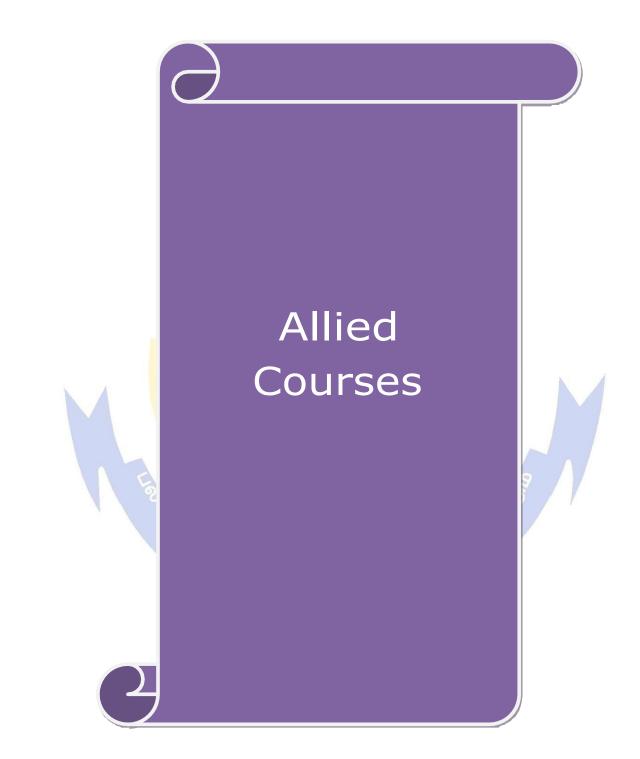
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#### VALUE ADDED COURSE IV

Value added course	MODERN DISPLAY DEVICES AND	L	Т	Р	С
value auteu course	STORAGE MATERIALS	30	0	0	4
	Students are expected to know some basic	Syllab	115		
Pre-requisite	concepts of display devices, storage materials	Versio		2022	2-23
~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	and their usage.	v er bro	<b>, 11</b>		
Course Objectives:					
The main objectives of thi		atomogo	motor	<b>a</b> 1a	
	bout different types of electronic devices and some ion process which will be used in industries.	storage	materi	ais.	
	onic and optoelectronic devices using suitable mater	iale			
5. create various creetto	and optoelectronic devices using suitable mater	lais.			
Expected Course Outcon	magi				
-	etion of the course, student will be able to:				
*	erformances which are necessary to appropriately	v salact	an	K	1
LCD in clinical situ		y select	all		1
	n in visual or tactile form.			K	2
3 apply these concepts for electronic visual displays.					
	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluat	e: K6 -	Create	K	
				-	
	Module:1	2	hour	s	
Selection of materials	for different devices: Selection Criteria-	Operatin	σ P	rame	ters.
	inctional Requirements-Cost consideration.	operation	8 10		
	Module:2	2	hours	6	
Engineering Requirement	ts-Types of Materials-Examples of selection criteria	a.		1	
2	Module:3	2	hours	5	
Modern Engineering ma	aterials: Metallic Glasses-Structure-Preparation-Pro	perties-	Applic	cation	s.
ಲ್ಟ					
	Module:4	2	hours	5	
· · · ·	Introduction-Structural Changes-General Charact	eristics-	Chara	cteriz	atior
Techniques-Commercial					
	Module:5		hours	5	
IC Packaging Materials.	Introduction-IC packing-Package type-Package mat	terials.			
	Module:6		hours	5	
Display Devices: Introdu	uction-Electroluminescence process- LED materials				
	Module:7	2	hours	5	
Fabrication of LED - Ap	plications - Active and passive display devices.				
	Module:8		hours		1 5 5
Limit and 1 The C		splay sy	stems	2 – 1 N –	LEL
	General features of liquid crystals-liquid crystal di	spidy sy		)- I I <b>I</b> -	
	rystal display) - merits and Demerits.				
(twisted nematic liquid c	rystal display) - merits and Demerits. Module:9	2	hours	5	
(twisted nematic liquid cr Magnetic Data Storage	rystal display) - merits and Demerits.	2	hours	5	
(twisted nematic liquid c	rystal display) - merits and Demerits. Module:9	2 parame	hours	8 Mer	

Module:11	2 hours
Flexible disc storage systems-Floppy disks- Magnetic Tapes and drives-Magnetic	ic Bubble materials
Module:12	2 hours
Rare earth garnets-Magnetic Bubble memories - Charge Couple devices - Applic	cations.
Module:13	2 hours
<b>Optical Data Storage Devices:</b> Principle-Disc data storage- Structure and op CD-ROM.	perating principle of
Module:14	2 hours
Magneto-optical storage system (recording and reading) - Data storage and retri	eval methods.
Module:15	2 hours
Holography data storage-principle-storing and retrieving digital data-Applications	s of Holography.
Total Lecture hours	30
Text Book(s)	
1 Semiconductor Physics and Optoelectronics, V.Rajendran, J.Hemalatha, M. Vikas Publishing House PVT Ltd, (2003).	Stalin Mano Gibson,
2 A Text book of Material Science, K.G.Aswani, S. Chand & Company ltd, (2	001).
15 1 · 12 · 1 · 5 · 1 · 6	
Reference Books	
1 Material science, O.P.Khanna, Dhanpat Rai Publications, (2004).	
2 Semiconductor Physics and Optoelectronics, M.Arumugam, Anuradha Age	ncies,(2003).
Pelated Online Contents MOOC SWAVAM NETEL Websites etc.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1 https://www.slideshare.net/mobile/thesaifeye/material-handling-storage-syste	em
2 https://www.slideshare.net/mobile/jerinmartin/display-devices-44886026	
Course designed by: Dr. D.M.Suresh and Dr. K Saravana kumar	3





### ALLIED PHYSICS PAPERS FOR B. Sc., MATHS / CHEMISTRY 2021-2022 BATCH AND ONWARDS

#### **SEMESTER I /III**

		SEMESTER I /III				
Course code	1AF/ 3AF	ALLIED PHYSICS-I	L	Т	Р	С
Allied Paper			4	0	0	4
Pre-requisite		The students are expected to know the fundamental of properties of matter, heat and electricity.	Syllat Versi			
Course Obje	ctives:					
1. understand 2. acquire the	the behavi skill of so	his course are to: our of matter in everyday life. lving related problems. roperties of matter, electricity and magnetism.				
Expected Cor	urse Outc	omes:				
-		etion of the course, student will be able to:				
1 understa	and the law	's involved in gravitation and elasticity.			K2	
2 update t	he knowle	dge on heat and thermodynamics, sound and spectrosco	py.		K3	
various	real proble				K4	
	oer; <b>K2 -</b> U	Inderstand; K3 - Apply; K4 - Analyse; K5 - Evaluate; F	<b>X6 -</b> C			
Unit: I		Properties of Matter law of Gravitation - Determination of G by Boy's r			2 ho	
	on-uniforr	ots – bending of beams – depression of cantilever- De n bending methods – Torsion in a wire – Determination Heat, Thermodynamics and Sound		gidity		ulus
	2					
Vanderwaal's – K-Onnes me	constants ethod – pro	of state-critical constants of a gas-derivation of critical of – Joule-Thomson effect – Porous plug experiment –lico operties of liquid Helium I and II. troduction - Properties - Production – Piezoelectric methods Atomic Physics	quefac	tion o	of heli	ium s.
X-Rays: Intro	oduction -	Properties - Principle - Production - Coolidge tub	e – E	Bragg'	's law	/ _
derivation — Applications.	Powder c	rystal method – Moseley's law and its importance – C	Compto	on sca	atterin	ıg —
Unit: IV		Electricity		1	12 hou	urs
		principle - construction - theory - figure of merit - c				
		on of galvanometer into ammeter and voltmeter – mea				
EMF and resist loss and application	• •	ootentiometer – Electromagnetic induction – Transform	ners: T	Theory	, ene	rgy
Unit: V		Magnetism			10 ho	urs
Relation between	en – B, H	aterials: Magnetic induction $B - Magnetisation M - Magnetic and M - Magnetic susceptibility - Magnetic permeatic materials - Curie temperature - Energy loss due to$	oility -	- Pro	pertie	
		curves – magnetic circuit.	nyster	<b>C</b> 010		

Un	it: VI	Contemporary Issues	2 hours
Ex	pert lecture	es, online seminars - webinars	·
		Total Lecture hours	60
Te	xt Book(s)		
1	Propertie (2017).	es of Matter and Acoustics, R. Murugesan, 2nd Edition, S. Chan-	d & Co., Ltd. Reprint
2		Physics, R. Murugesan, Kiruthiga Sivaprasath, Twelfth Revised Reprint (2006).	d Edition, S. Chand&
3	Heat and	l Thermodynamics, Brijlal N.subramaniyam, S. Chand & Co. Lt	d, Reprint (2006).
4	Electricit	ty and Magnetism, R. Murugesan ,Revised edition, S. Chand &	Co., Reprint (2014)
Re	ference B	ooks	
1		ermodynamics and Satistical Physics, Brijlal N. Subramaniyam, Revised edition (2007).	P.S.Hemme, S. Chand
2	Thermoo (2015)	lynamics and Statistical Physics, Agrawal Prakash, PragatiF	Prakashan, 27 <sup>th</sup> edition
Re	lated Onli	ne Conten <mark>ts [MO</mark> OC, SWAYAM, NPTEL, Websites etc.]	
1	https://w	ww.physicstutoronline.co.uk/alevelphysicsnotes/	
2	https://w	ww.askiitians.com/revision-notes/physics/atomic-physics/	
3		anacademy.org/science/physics/elasticity/surface tension	
4	https://si	tes.google.com/brown.edu/lecture-demonstrations/home?authuse	r=0
Co	urse Desig	ned By: Dr. P. Sagunthala, Dr. P. Yasotha	
		- Contraction	

Mapping with Programme Outcomes										
COs	<b>PO1</b>	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	PO8	PO9	PO10
CO1	S	M	М	М	S	S	S	Lã	S	S
CO2	S	S	М	S	L	М	S	М	M	S
CO3	М	S	S	L	S	М	L	S M	S	М
*S-S	Strong; M	-Medium	5551 6	் த்தப்ப EDUCAT	oimbaior பாரை E TO EL	2_UITA EVATE	SAL C			

Page **81** of **91** 

#### **SEMESTER II / IV**

Course code	2AF/	ALLIED PHYSICS-II	L	Т	Р	С			
Allied paper	4AF		4	0	0	4			
Pre-requisite		The students are expected to learn the fundamentals of Nuclear Physics, Lasers, Semiconductors and electronics.			-	2-23			
Course Obje	ctives:			I					
The main obj	ectives of	this course are to:							
		e diverse applications of Physics.							
		physics concepts and problem-solving skills							
3. expertise in	n various d	omains of Physics							
	0.1								
Expected Co									
		letion of the course, student will be able to:							
		ge on basic concepts of photoelectric effect and fission idea of wave mechanics.	n, fus	ion	K1				
2 Understand the features of Nuclear forces, photoelectric cells, semiconductor K2									
		undamental concepts.							
		ncept of Laser properties and digital electronics and expl	ore th	leir	K4				
	ions in re <mark>a</mark>								
K1 - Remem	oer; <b>K<mark>2</mark> - U</b>	Jnderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; I	X6 - (	Create					
		Troutleon port							
Unit: I		Modern Physics		1	l2 ho	ırs			
of Einstein's Wave mech	photoelect anics: De	aws of photo electric effect – Einstein's photoelectric en ric equation by Millikan's experiment – photo electric Broglie matter waves – determination of De Bro De Broglie matter wave by G.P.Thomson experiment.	cells	– app	olicati	ons.			
Unit: II	1	Nuclear Physics	1	-	11 ho	urs			
Characteristic	s of nucle	ar forces – nuclear structure by liquid drop model – Bin	nding	energ	y – m	ass			
		ators - cyclotron and betatron -nuclear fission: definition							
		n bomb – nuclear fusion: definition – source of Stellar	energ	gy – ł	Iydro	gen			
	ntary parti	cles – Leptons, Mesons and Baryons							
Unit: III		Laser Physics			11 ho	ırs			
• •		- Coherence length and time – spontaneous and induced							
population in	version _				um n				
		metastable state – conditions for laser actions – Ruby l							
laser – applic	ations of	metastable state – conditions for laser actions – Ruby lasers – Raman effect – Raman shift – stokes and anti-							
laser – applic Raman Spect	ations of	asers - Raman effect - Raman shift - stokes and anti-		s lines	8 – La	aser			
laser – applic Raman Spectr <b>Unit: IV</b>	ations of a cometer.	lasers – Raman effect – Raman shift – stokes and anti- Semiconductor Physics	-stoke	s lines	s – La 12 hor	user urs			
laser – applic Raman Spectr <b>Unit: IV</b> Volt – Ampe	eations of cometer.	lasers – Raman effect – Raman shift – stokes and anti-         Semiconductor Physics         eristics of P-N junction Diode – Zener diode – application	-stoke ions c	s lines	s – La 1 <b>2 ho</b> er dio	urs des			
laser – applic Raman Spectr <b>Unit: IV</b> Volt – Ampe – photodiode	re Charact	lasers – Raman effect – Raman shift – stokes and anti-         Semiconductor Physics         eristics of P-N junction Diode – Zener diode – application         ble of LED– Frequency Modulation and Amplitude model	-stoke ions c modul	s lines	s – La 1 <b>2 ho</b> r er dio – b	urs des asic			
laser – applic Raman Spectr <b>Unit: IV</b> Volt – Ampe – photodiode principle of a	ations of cometer. re Charact – princij ntennas –	lasers – Raman effect – Raman shift – stokes and anti-         Semiconductor Physics         eristics of P-N junction Diode – Zener diode – applicat         ble of LED– Frequency Modulation and Amplitude         block diagram of Superheterodyne receiver – block diag	-stoke ions c modul	s lines	s – La 1 <b>2 ho</b> r er dio – b	urs des asic			
laser – applic Raman Spectr <b>Unit: IV</b> Volt – Ampe – photodiode principle of a	ations of cometer. re Charact – princij ntennas –	lasers – Raman effect – Raman shift – stokes and anti-         Semiconductor Physics         eristics of P-N junction Diode – Zener diode – application         ble of LED– Frequency Modulation and Amplitude model	-stoke ions c modul	s lines of Zen lation of mor	s – La 1 <b>2 ho</b> r er dio – b	urs des asic ome			
laser – applic Raman Spectr Unit: IV Volt – Ampe – photodiode principle of a TV receiver – Unit: V	ations of cometer. re Charact – princij ntennas – basic prin	lasers – Raman effect – Raman shift – stokes and anti-         Semiconductor Physics         eristics of P-N junction Diode – Zener diode – applicat         ble of LED– Frequency Modulation and Amplitude         block diagram of Superheterodyne receiver – block diag         ciples and applications of RADAR	-stoke ions c modul gram (	s lines of Zen lation of more	s - La 12 house er dio $- bhochrow12 house$	urs des asic ome			

	•	decimal – conversion of decimal to binary – binary addition and s NAND and NOR as universal logic gates – Demorgan's theorems –	
appli	ications o	f Demorgan's theorems – Half adder and full adder circuits.	C
Unit	t: VI	Contemporary Issues	2 hours
Expe	ert lecture	s, online seminars – webinars	
		Total Lecture hours	60
Text	t Book(s)		
1	Modern I	Physics, R.Murugesan, Kiruthiga Sivaprasath, Twelfth Revised Edition	on, S. Chand &
	Co. Ltd.,	Reprint (2006)	
2	Principle	s of Electronics, V.K. Metha , Reprint, S.Chand& Co (2000)	
Refe	erence Bo	oks	
1	A Text B	ook of electronics, R.S Sedha, S.Chand& Co. Ltd. Reprint (2008).	
2	Modern ]	Physics,Sehgal.Choppa, Sehgal,S.Chand& Co	
Rela	ated Onli	ne Conten <mark>ts [MOOC, SWAYAM, NPTEL, Websites etc.]</mark>	
1	https://w	ww.askiitians.com/revision-notes/physics/atomic-physics/	
2	https://w	ww.askiitians.com/revision-notes/physics/nuclear-physics/	
3	https://w	ww.askiitians.com/revision-notes/physics/solid-and-electronic-device/	/
Cour	rse Desig	ned By: Dr. P. Sagunthala and Dr. P. Yasotha	

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10
CO1	S	S	M	М	S	S	S	L	S	S
CO2	S	M	S	М	М	S	S	L	М	S
CO3	M	S	М	L	S	М	L	M	S	М

### SEMESTER I&II / SEMESTER III&IV

					1 1	
Course co	le 2PF/4PF	ALLIED PHYSICS PRACTICAL	L	Т	Р	С
Allied P	actical	(Examination at the end of II/ IV semester)	0	0	2	3
Due ve e	Should have the fundamental knowledge of	Syllabus		2022	22	
Pre-req	Pre-requisite         Should have the fundamental knowledge of Basic Experiments in physics         Synabus Version					
Course	Objectives:					
	objectives of the					
		of Experimental techniques and apply it				
	•	t different light and optical properties.				
		to apply the principles of physics in their day-to-da	y life.			
-	Course Outcon					
On the s	ccessful complet	ion of the cours <mark>e, student will</mark> be able to:				
1 att	in skill to unders	tand the usage of basic laws and theories to determ	ine vario	ous	K3	
pro	perties of the ma	terials given.				
2 ana	lyze the characte	ristics of various diodes and construct power supply	у.		K4	
3 acc	uire the knowled	ge of the potentiometer and apply it for various exp	eriment	s.	K5	
<b>K1</b> - Re	nember; <b>K2</b> - Un	derstand; K3 - Apply; K4 - Analyze; K5 - Evaluate	; K6 - (	Create		
	I	IST OF EXPERIMENTS			56 ho	ours
		(Any twelve experiments)				
1. Accel	ration due to gra	vity-Compound pendulum method				
2. Mome	nt of inertia – To	rsional pendulum method			1	
3. Young	's modulu <mark>s - Un</mark> i	form bending - Optic lever method				
4. Youn	g's modulu <mark>s - No</mark>	n-uniform bending - Pin and microscope				
5. Rigid	ty modulus <mark>– Sta</mark>	tic torsion method.				
6. Frequ	ency of A.C - So	nometer				
7. Thern	al conductivity -	Lee's disc method.				
8. Refra	tive index of a s	olid prism – Spectrometer	19			
		iquid prism – Spectrometer	S	/ /		
10. (i-d)	curve - solid pris	m - Spectrometer	5			
11. Wav	length of spectra	l lines – Grating - Minimum deviation - Spectrome	ter			
12. Radi	s of curvature of	lens - Newton's rings method.				
13. Visc	sity of highly vis	scous liquid – Stoke's method.				
14. Surfa	ce tension - Drop	weight method				
15. Low	range voltmeter	calibration - Potentiometer				
16. Low	range ammeter c	alibration - Potentiometer ELEVATE				
17. Cons	ruction of IC reg	gulated power supply				
	cteristics of PN					
	cteristics of Zen					
20. Veri		bles of logic gates- AND, OR and NOT	1			
0.1		Contemporary Issues			4 h	ours
Unline v	orksnop, webina	rs on Experimental Electronics Total Prac	Haal IIa			<u></u>
Referen	e Books			urs:		60
1 Pract	cal Physics and there (2007)	Electronics, C.C.Ouseph, U.J.Rao, V.Vijayendran,	S.Viswa	natha	n	
	ners (7007)					

#### Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

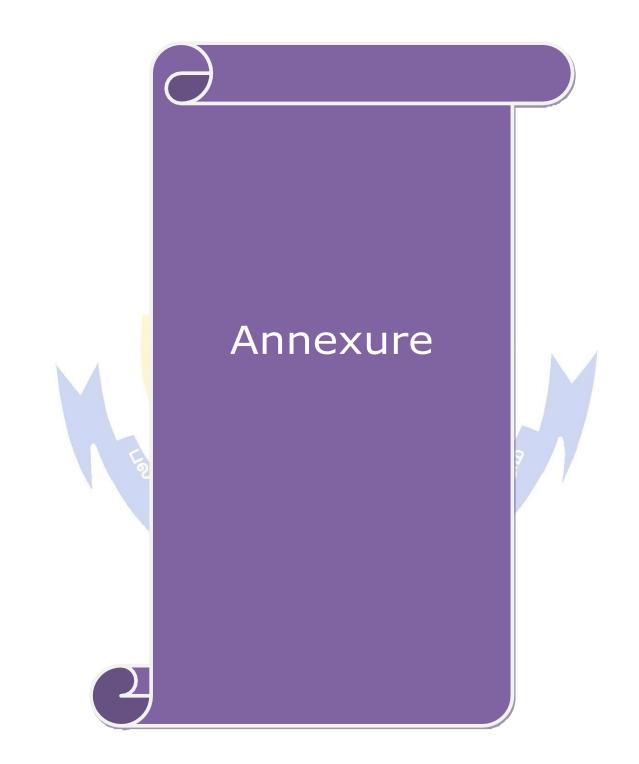
- 1 <u>https://nptel.ac.in/courses/115/105/115105110/</u>
- 2 <u>https://www.youtube.com/playlist?list=PLuiPz6iU5SQ8-rZn\_LgLofRX7n8z4tHYK</u>
- 3 <u>https://www.slideshare.net/mobile/sunilrathore77398/basicanalogelectronics</u>

Course Designed By: Dr. P. Sagunthala and Dr. P. Yasotha

Mappi	Mapping with Programme Outcomes									
COs	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10
CO1	S	М	S	S	S	М	L	М	S	М
CO2	S	S	М	S	S	L	М	S	S	S
CO3	М	М	S	S	L	М	S	S	S	М

\*S-Strong; M-Medium; L-Low





B. Sc. PHYSICS

Syllabus (With effect from 2022 – 23)

Program Code: 22C

DEPARTMENT OF PHYSICS Bharathiar University (A State University, Accredited with "A" Grade by NAAC and 13<sup>th</sup> Rank among Indian Universities by MHRD-NIRF) Coimbatore 641 046, INDIA

Page **87** of **91** 

#### MARKS DISTRIBUTION (EXTERNAL(CEE) AND INTERNAL (CIA))

Max.	Comprehensive External Examinations (CEE)Continuous Internal Assessments (CIA)		External Examinations		External Examinations Assessments		Overall Passing Minimum
Marks	Max. Marks	Passing Minimum	Max. Marks	Passing Minimum	(Internal + External)		
100	50	20	50	15	40		
75	45	18	30	9	30		

#### L THEORY(Core/ Elective/ Allied Papers)

Distribution of marks for CIA for Core/ Elective/ Allied Theory Papers (Each student should attend at least one test)

S. No	Component	Allotment of Internal Assessment marks for a maximum of		
	Alter and	50	30	
1	Tests (average of two tests of 2 hours each)	15	10	
2	End semester model test (3 hours)	15	10	
3-50	Assignments- 2 No.s/ Quiz/ Group discussion	10	5	
4	Seminar	5		
5	Attendance	5	5	

Max.	Comprehensive Control External Examinations (CEE)		Asse	ous Internal ssments CIA)	Overall Passing Minimum	
Marks	Max. Marks	Passing Minimum	Max. Marks	Passing Minimum	(Internal + External)	
100	50	20	50	15	40	
75	45	18	30	9	30	
50	25	10	25	7.5	20	

### 3. கிந்தப்பாரை உயர்க் II DDACTICAL (Core/ Flective/ Allied Practical)

S. No	Component	Assessi	nent of Inte nent marks naximum of 30	ks for a	
1	Record	15	10	10	
2	Tests: One best test out of two tests	30	15	10	
3	Attendance (Minimum 10 experiments to be completed)	5	5	5	

#### A. Distribution of marks for CIA for Core/ Elective/ Allied Practical (Each student should attend at least one test)

#### Sector Streets

#### B. Distribution of marks for CEE for Core/ Elective/ Allied Practical

S. No	Component	Allotment of Comprehensive External Examination marks for a maximum of				
		50	45	25		
1	Record	5	5	5		
2	Formula, Circuit diagram, Tabular column and etc.,	15	15	7		
3	Observation	20	15	8		
4	Calculation	5	5	3		
5	Result	5	5	2		

#### Distribution of marks for attendance

216001-2

Attendance	Marks
90% and above	5
Between 85 and 90%	.4.5
Between 80 and 85%	3
Between 75 and 80%	INTE 2
Between 70 and 75%	1

#### **QUESTION PAPER PATTERN**

The following question paper patterns shall be followed for OBE pattern syllabi for the candidates admitted from the academic year 2021-22 wherever applicable otherwise provided in syllabi itself.

	Maximum 50 Marks – wherever applicable						
SECTION A	Multiple choice questions with four options	10*1=10	10 questions – 2 from each unit				
SECTION B	Short answer questions of either / or type	5*3=15	5 questions – 1 from each unit				
SECTION C	Essay-type questions of either / or type	5*5=25	5 questions – 1 from each unit				

	Maximum	45 Marks	- wherever applicable
SECTION A	Multiple choice questions with four options	10*1=10	10 questions $-2$ from each unit
SECTION B	Short answer questions of either / or type	5*2=10	5 questions – 1 from each unit
SECTION C	Essay-type questions of either / or type	5*5=25	5 questions – 1 from each unit

The General Awareness paper to have multiple-choice questions (with four options) to be evaluated by using OMR. For other courses in Part IV namely, Environmental Studies, Value Education – Human Rights, Yoga for Human Excellence and Women's Rights the question paper pattern should be 5 out of 10. E

கிந்தப்பாரை உயர்த்? EDUCATE TO ELEVATE

# **B.Sc Physics**

# Syllabus

### AFFILIATED COLLEGES

# ProgramCode: 22C

### 2021–2022 Admitted



### **BHARATHIAR UNIVERSITY**

(A State University, Accredited with "A" Grade by NAAC, Ranked 13<sup>th</sup> among Indian Universities by MHRD-NIRF, World Ranking: Times-801-1000, Shanghai-901-1000, URAP- 982)

Coimbatore - 641046, TamilNadu, India

Program	Program Educational Objectives (PEOs)							
On obtain	ing an under graduate degree the students will be able to,							
PEO1	Have a strong foundation in basic sciences ,mathematics and computational platforms.							
PEO2	Acquire professional and ethical attitude, develop communicative skills, team work spirit, multidisciplinary approach, and an ability to relate and solve scientific/technical issues.							
PEO3	Enter into higher studies leading to post-graduate and research degrees.							
PEO4	Apply and advance the knowledge and skills acquired to become a competent professional in their chosen field.							
PEO5	Serve the society with scientific advancement and actively take part in building a knowledge-based society.							
PEO6	comprehend, analyze ,design and create novel products and solutions for the real- life problems through good scientific and technical knowledge.							
PEO7	Become an entrepreneur who can make and sell scientific products in the market.							
PEO8	Engross in life-long learning to keep themselves abreast of new developments and to face global challenges.							

ALCOND

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இந்தப்பாரை

Program	Program Specific Outcomes (PSOs)							
After th	e successful completion of the B.Sc Physics program, the students are expected to,							
PSO1	Realize the role of Physics in day-to-day life.							
PSO2	Communicate explicitly and exchange ideas with regard to the impacts of various components of Physics on the environment and society.							
PSO3	Expertise in various domains of Physics.							
PSO4	Design and develop the skills towards the futuristic needs of the industry/society utilizing both theoretical and practical knowledge acquired in basic Physics.							
PSO5	Identify and access the diverse applications of Physics using mathematical concepts enriching career opportunities.							



Program	Program Outcomes(POs)							
On succe	On successful completion of the B.Sc Physics program ,the students will be able to,							
PO1	Understand the basic concepts and significance of various physical phenomena.							
PO2	Transform ideas into action							
PO3	Acquire a wide range of problem-solving skills, both analytical and computational and to apply them.							
PO4	Develop an independent and self-disciplined specialized learning in tune with the changing socio-technological scenario.							
PO5	Get motivated to pursue higher education and research activities in Physics to find professional-level employment.							
PO6	identify, analyze and formulate novel ideas to yield, substantial results in the fields of research utilizing the principles of Physics.							
PO7	Develop creative thinking and innovative tools.							
PO8	Communicate effectively and acquire employability/self-employment.							
PO9	Acquire a broad interdisciplinary knowledge.							
PO10	Update themselves in the current developments and discoveries related to Physics.							



### **BHARATHIAR UNIVERSITY:: COIMBATORE 641046**

**B.Sc PHYSICS Curriculum (Affiliated Colleges)** 

(For the students admitted during the academic year 2021–22) Scheme of Examination

Part		Title of the Course Credits Hours/we		s/week	Marks			
	Code		Theory Pra		Practical	CIA	CEE	Total
		FIRST SEMESTER				•		
Ι	11T	Language-I	4	6	-	50	50	100
Ш	12E	English-I	4	6	-	50	50	100
Ш	13A	Core I – Mechanics, Properties of Matter	4	6	-	50	50	100
		and sound						
Ш	-	Core Practical I	-	-	3	-	-	-
Ш	1AA	Allied Mathematics I * (or)	4	7	-	50	50	100
	1AH	Allied Chemistry I **	3	4	-	30	45	75
	-	Allied Chemistry Practical **	-	-	3	-	-	-
IV	1FA	Environmental Studies #	2	2	-	-	50	50
	•	Total	18					450
		SECOND SEMESTER	N/C	0 3				
Ι	21T	Language-II	4	6	-	50	50	100
Ш	22E	English-II	4	6	-	50	50	100
Ш	23A	Core II - Heat and Thermodynamics	4	6		50	50	100
Ш	23P	Core Practical I	4	1 - 9	3	50	50	100
Ш	2AA	Allied Mathematics II * (or)	4	7	miliano	50	50	100
Ш	2AH	Allied Chemistry II **	3	4	7	30	45	75
ш	2PH	Allied Chemistry Practical **	2	1	3 /	25	25	50
IV	2FB	Value Education - Human Rights #	2	2	-	-	50	50
		Total	22	and the second second				550
		THIRD SEMESTER	Las de las					
Ι	31T	Language-III	4	6	-	50	50	100
Ш	32E	English-III	4	6	-	50	50	100
Ш	33A	Core III – Optics	4	4	-	50	50	100
Ш	-	Core Practical II	-	-	2	-	-	-
Ш	3AA	Allied Mathematics I * (or)	4	7	-	50	50	100
Ш	3AH	Allied Chemistry I **	3	4	-	30	45	75
Ш	-	Allied Chemistry Practical **	-	-	3	-	-	-
IV	3ZA	Skill Based Subject – Instrumentation 1	3	3	-	30	45	75

		Tamil @ / Advanced Tamil # (OR)						
IV	3FC	Non-major elective - I (Yoga for Human	2	2	-	_	50	50
IV	510	Excellence)# / Women's Rights #	2	2	_	_	50	50
		Total	20					500
		FOURTH SEMESTER						
Ι	41T	Language-IV	4	6	-	50	50	100
П	42E	English-IV	4	6	-	50	50	100
	43A	Core IV – Atomic Physics	4	4	-	50	50	100
		and Spectroscopy						
Ш	43P	Core Practical II	3	-	2	30	45	75
111	4AA or	Allied Mathematics II * (or)	4	7		50	50	100
	4AH	Allied Chemistry II **	3	4		30	45	75
	4PH	Allied Chemistry Practical **	2	-	3	25	25	50
IV	4ZB	Skill based subject-Instrumentation-II	2	3	-	25	25	50
IV	4NM <sup>\$</sup>	Office Fundamentals: Digital Skills for	2	2	-	25	25	50
		Employability http://kb.naanmudhalvan.in/Bharathiar University (BU)						
		Tamil @ /Advanced Tamil # (or)						
IV	4FE	Non-Major Elective -II (General	2	2	-	-	50	50
		Awareness #)						
		Total	26					650
		FIFTH SEMESTER			Γ			
	53A	Core V – Mathematical Physics	4	4	-	50	50	100
	53B	Core VI – Electronics	4	4	-	50	50	100
	53C	Core VII – Solid State Physics	4	4	-	50	50	100
111	53D	Core VIII – Electricity and Magnetism	4	4	-	50	50	100
III	-	Core Practical III - Electronics	-	-	2	-	-	-
	-	Core Practical IV - Digital and	-	-	2	-	-	-
		Microprocessor						
	5EA	Elective – I	4	4	-	50	50	100
	-	Practical V - C and C++	-	-	3	-	-	-
IV	5ZC	Skill based Subject - Instrumentation III	3	3	-	30	45	75
		Total	23				1	575
-		SIXTH SEMES	STER					
III	63A	Core IX – Quantum Mechanics and Relativity	4	6	-	50	50	100
	63B	Core X - Nuclear Physics	4	6	-	50	50	100
	63P	Core Practical III - Electronics	3	-	2	30	45	75
	63Q	Core Practical IV - Digital and	3	-	2	30	45	75
	-	Microprocessor						
	6EA	Elective – II	4	4	-	50	50	100

111	6EB	Elective – III	4	4	-	50	50	100
III	63R	Practical V - C and C++	3	-	2	30	45	75
IV	6ZP	Skill based Subject Practical –Instrumentation	2	-	2	25	25	50
IV	6NM <sup>\$</sup>	Advanced Platform Technology - (Physics, Electronics, Mathematics, Statistics, Data Science) - Govt(auto) & Govt (Non-Auto) Data Analytics with Advanced Tools - (Physics, Electronics, Mathematics, Statistics, Data Science) - Aided (Non-auto) & SF(Non- Auto http://kb.naanmudhalvan.in/Bharathiar_Universi ty (BU)	2	-	2	25	25	50
V	67A	Extension Activities @	2	-	-	-	-	50
		Total	31					775
		Grand Total	140					3500

#### 2NM<sup>\$</sup>.4NM<sup>\$</sup>,&6NM<sup>\$</sup>- NAAN MUDALVAN COURSES

\*For subjects without practical

**\*\*** For subjects with practical

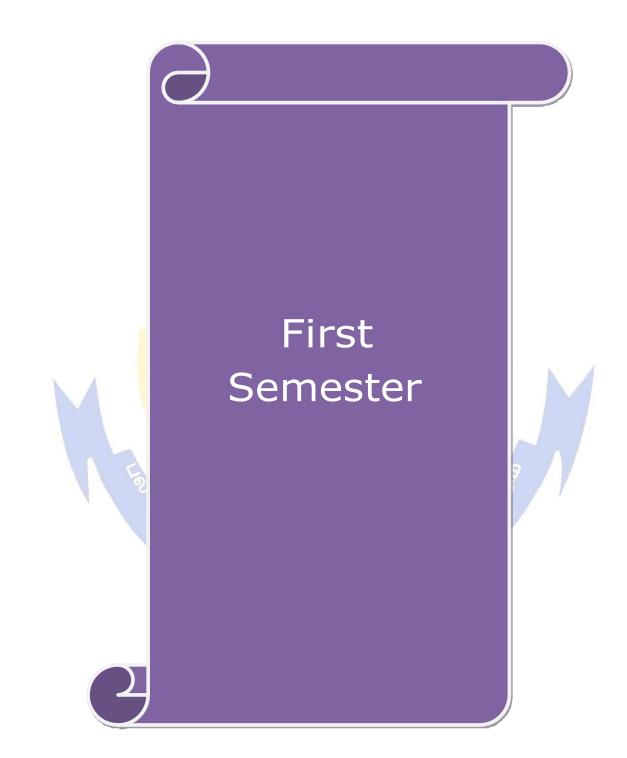
@ No University Examinations. Only Continuous Internal Assessment (CIA)#No Continuous Internal Assessment(CIA). Only University Examinations

(Colleges	LIST OF ELECTIVE PAPERS (Colleges can choose any one of the papers from each section as electives)					
Elective – I	Elective – I A Principles of Programming Concepts and C Programming					
	B	Energy Physics				
	С	Agricultural Physics				
Elective – II	Α	Digital and Microprocessor				
	B	Optical Fibers and Fiber Optic Communication Systems				
	С	Bio-Physics				
Elective - III	Α	Object Oriented Programming with C++				
	B	Geo Physics				
	С	Industry Automation & Its Applications (Industry 4.0)				

#### LIST OF VALUE-ADDED COURSES (OPTIONAL)

(Only Internal and no external exam – 100 Marks)

- OPTOELECTRONICS
- NON–DESTRUCTIVE TESTING
- BIOMEDICAL INSTRUMENTATION
- MODERN DISPLAY DEVICES AND STORAGE MATERIALS



#### SEMESTER I

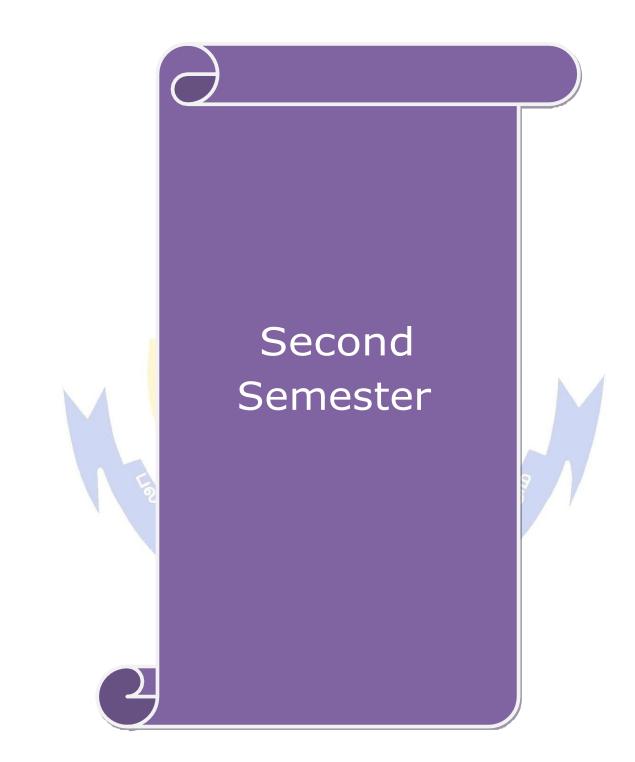
Course code	13A	MECHANICS, PROPERTIES OF MATTER AND SOUND	L	Т	Р	С
Core/Elective/	SBS	CORE PAPER I	6	0	0	4
Pre-requisite	Syllabus Version 2021-22					
<b>Course Object</b>	ives:					
2. demonstrate	basic laws go practical kno behavior of	overning the behavior of matter in everyday life. owledge and skill in understanding the elastic proper simple harmonic waves	ties o	f soli	ds.	
Expected Cou	rse Outcome	s				
-		on of the course, students will be able to:				
	-	the laws involved in mechanics.			K	1
2 gain a de	eper understa	nding of mechanics and its fundamental concepts.			K	2
3 understan	-	of properties of matter and recognize their application	ons ir		K	3
	A	ehavior of wave motion.			K	4
sound and	l evaluating t	epts of elasticity, surface tension, Gravitation, viscos heir values for various materials.	sity, a	nd	K	
6 explore th	ne production	and application of ultrasonic wave	6		K	б
K1 - Rememb	er; <b>K2</b> - Und	<mark>erstand; K3 - Apply; K4 - Analyze; K5 - Eval</mark> uate; F	<u> </u>	Create		
	6			1		
Unit:1	80	Conservation Laws nd oblique impact – Final velocity and loss of kinetic				ours
particle in a ve of friction – Ec inclination is gr Unit:2 Moment of ine Triangular lam	rtical circle – uilibrium of a eater than the rtia – Parall- ina – M. I of	friction – Laws of friction – angle of friction – res a body on a rough inclined plane to the horizontal ar e angle of friction. <b>ITGOU</b> Motion of Rigid Body el and perpendicular axes theorem – M.I. of rect a solid sphere about an axis through its C.G. – Co m – Relation – Kinetic rotation – conservation of an	ultant d wh angul	ar La	tion <b>18 h</b> amina endu	– cone ours a and lum –
						. <u> </u>
Unit:3		Gravitation				ours
potential – G altitude and Expression fo	ravitational fi depth. <b>Elasti</b> r bending mo ection girders	y motion – Laws of gravitation – Boy's method eld at a point due to spherical shell – Variation <b>city:</b> Elastic modulus – Poisson's ratio – relatio ment – determination of Young's modulus by unifo s – Rigidity modulus – Static Torsion – Expression h.	of 'g n bet orm a	' wit ween nd no	h lat the n-un	itude, em – iform

Unit:4	Surface Tension	16 hours				
Definition and	dimension of surface Tension - Excess of Pressure over a cur	ved surface – Variation				
of S.T. with te	emperature - Jaeger's Experiment. Viscosity: Definition - Rot	ation viscometer-				
viscosity of ga	ses, Meyer's Modification of Poiseuille's formula - Rankine's	method for viscosity of				
a gas.						
Unit:5	Sound	18 hours				
	nic vibration - Progressive waves - properties - Composition of					
– stationary wa	ves - Properties Melde's Experiment for the frequency of elect	rically maintained				
tuning fork – T	ransverse and longitudinal modes - Ultrasonics - Properties and	application.				
Unit:6	Contemporary Issues	2 hours				
Expert lecture	s, online seminars - webinars					
	லக்கிடிக					
	Total Lecture hours	90				
Text Book(s)						
1 Properties	of Matter and Acoustics, R. Murugesan, 2nd Edition, S.Chand	& Co. Ltd. (2017).				
2 Properties	of Matter, Brijlal and N.Subrahmanyam, 3rd Edition, S.Chand	& Co. (2005).				
Reference Bo	ooks					
1 Elements	of Properties of Matter, D.S. Mathur, 11th Edition, S.Chand & (	<mark>Co.</mark> , (2010).				
2 A text bo	ok of Sound, Brijlal N.Subramaniam, Vikas Publishing House	Pvt. Ltd, 2nd edition,				
(2010).						
3 A Textboo	ok of S <mark>ound, M.N.Srinivasan, Himalaya Publishing house, (19</mark> 9	1).				
	e anti-					
Related Onli	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.,]	9				
	ww.physicstutoronline.co.uk/alevelphysicsnotes/	G				
-	estcontents.com/bsc-physics-mechanics-notes/	5				
	nacademy.org/science/physics/elasticity/surface_tension					
4 https://sites.google.com/brown.edu/lecture-demonstrations/home?authuser=0						
Course Desig	ned By: Mrs.J.Jayachitra.					

### கித்தப்பாரை உயர்ந்ஜ

Mappi	ng with	Program	nme Ou	tcomes	te to e	Javana				
COs	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	Μ	Μ	S	S	S	L	S	S
CO2	S	S	М	М	S	S	S	L	S	S
CO3	S	S	М	L	S	Μ	L	M	S	М
CO4	S	S	Μ	Μ	S	S	S	L	S	М
CO5	S	S	S	S	S	S	S	М	М	S
CO6	М	М	М	L	S	S	М	L	S	S

\*S-Strong; M-Medium; L-Low



		SEMESTER II					
Course code	23A	HEAT AND THERMODYNAMICS	L	Т	Р	С	
<b>Core/Elective</b>	/SBS	CORE PAPER II	6	0	0	4	
Pre-requisiteThe students are expected to know the fundamental concepts of heat and thermodynamicsSyllabus Version						2021-22	
Course Object	ctives:				1		
<ol> <li>investigate</li> <li>substantiat</li> </ol>	e the role of te the conce	his course are to: f various laws of heat and thermodynamics in our daily epts of heat and thermodynamics experimentally ns of heat engines	life				
Expected Cou	urse Outco	mes:					
-		tion of the course, student will be able to:					
1 realize v	arious prin	ciples and laws of heat			K2		
2 derive ex	xpressions	and find experimental verifications for the laws studied	1		K3		
	the application the problem the	tions of heat and thermodynamics in various areas and ns.	solve	;	K5		
K1 - Rememb	er; <b>K2</b> - U	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; l	K6 - (	Create			
Unit:1	67	Calorimetry law of cooling – specific heat of a liquid calendar an			17 h		
of rubber – Lo law – Raleigh	ee's disc m -Jean's law	Transmission of Heat nt of thermal conductivity – Cylindrical flow of heat – ethod for bad conductors. <b>Radiation:</b> Black body – – Stefan's law – Experimental Determination of Stefa of Stefan's law.	Wei	n's di	splace	tivity	
		Coimbatore					
speed distribu	tion of vel action of ga	Kinetic Theory of Gases bution of molecular velocities – Experimental verificocities. Mean free path – transport phenomena – diffuses – Vander walls equation – relation between Vander	fusion	– vis	scosity	rium anc	
Unit:4		Laws of Thermodynamics			18 ho	ours	
First law of th process – Wor	rk done in and law of t	nics – Isothermal and Adiabatic process – gas equatic adiabatic expansion of gas – Determination of $\gamma$ by C thermodynamics – Carnot's engine- Working – efficien	lemen	t and	n adia Desor	batic	
Unit:5		Concept of Entropy			18 ho	ours	
entropy – tem Maxwell's the	perature en ermodynam	tropy – Change in entropy in a reversible cycle – Prentropy diagram – Entropy of a perfect gas – Thermonical relations – Applications: Joule Thomson effect – Clapeyron's equation.	o dyn	amic	variab		

Ur	Unit:6 Contemporary Issues 2 hou							
Ex	Expert lectures, online seminars - webinars							
		Total Lecture hours	90					
Te	ext Book(s)							
1	Thermal	Physics, R. Murugesan, S.Chand&Co (2008).						
2		Thermodynamics, Brijlal & N. Subramaniam, S.Chand&Co (200	)7)					
3	Heat – M	I. Narayanamurthi and N. Nagaratnam, National Publishers.						
Re	eference Bo	ooks						
1	Heat and	1 Thermodynamics – Zemansky and R.H. Dcltanann, TMH (20)	17)					
2	Heat and	Thermodynamics – D.S. Mathur, S. Chand & Co, Edi (2002	).					
3	Heat and (2003).	l Thermodynamics – Agarwal, Singhal, Sathyaprakash, Kedar	Nath Ramnath and Co.					
Re	elated Onli	ne Conte <mark>nts [MOOC</mark> , SWAYAM, NPTEL, Web <mark>sites etc.]</mark>						
1	https://w	ww.askiitians.com/revision-notes/physics/heat-transfer/						
2	https://w	ww.askiitians.com/revision-notes/physics/kinetic-theory-of-gases	<u>s/</u>					
3		ww.askiitians.com/revision-notes/physics/heat-phenomena/						
4	https://w	ww.askiitians.com/revision-notes/physics/thermodynamics/						
Co	ourse Desig	ned By: Dr. P. Sagunthala						

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	S	S	М	S	S	M	М	М
CO2	S	S	S	S	М	М	М	SS	M	S
CO3	M	S	S	S	S	S	S	S	S	S
*S-Strong; M-Medium; L-Low										

Page **12** of **91** 

		SEMESTER I & II							
Course code	23P	CORE PRACTICAL I	L	Т	Р	С			
		(Examination at the end of Second Semester)							
Core/Elective	e/SBS	CORE PRACTICAL	0	0	3	4			
Pre-requisite		•	Should have the fundamental knowledge of Syllabus						
		experimental Physics	Versi	on	2021-22				
Course Obje									
v		his course are to:							
	<b>•</b>	ental skills in Mechanics and Properties of Matter at the experiments based on Electricity and Magne	tion						
		to apply the experimental techniques in Optics and							
5. motivate (		to uppry the experimental techniques in optics a		•					
Expected Co	urse Outco	omes:							
		etion of the course, student will be able to:							
	Ĩ	ts of Viscosity, Surface Tension and Young's Mo	dulus of		K4				
	t substance								
2 explore	the knowle	dge of Spectrometer and other Optical instrument	S		K5				
		nd applications of Potentiometer, Sonometer, Ma		er	K4				
	junction di		5	••					
	0	nderstand; K3 - Apply; K4 - Analyze; K5 - Evalu	ate; K6 -	Crea	te				
				Å		(			
		LIST OF EXPERIMENTS			84	Hours			
		(Any twelve experiments)							
1. Acceler	ation due t	o gravity - Compound Pendulum							
		f a liquid – Drop Weight Method							
		llary flow method							
		scosities – Capillary Flow Method							
		- Static Torsion - Scale and Telescope	2		/				
•	5.473	- Non- Uniform bending - Pin and Microscope	E.						
		– Uniform bending – Optic lever – Cantilever – Dynamic method	3 /						
•		- Sonometer							
-	-	ator - Melde's Strings							
11 Refract	ive index o	f Solid Prism - Spectrometer							
12 Determ	ination of y	wavelength $\lambda$ - Grating – Minimum deviation - Sp	ectromet	er					
		f Prism - (i-d) Curve - Spectrometer	cettoniet	01					
		f liquid - Hollow prism – Spectrometer							
		- Air Wedge							
		ter Calibration - Potentiometer							
	•	ter Calibration - Potentiometer							
	-	d - Resonance Column apparatus							
		t – Tan C Position							
20. Charact	teristics of	a Junction Diode							
		Containing the second			-	<u>.</u>			
Online works	hon Wahir	Contemporary Issues ars on Experimental Physics			0	Hours			
Unine works	nop, webli								
		Total Pre	actical be	)IIFS:		9(			
		Total Pra	actical he	ours:					

Re	Reference Books								
1	A textbook of practical Physics, M.N.Srinivasan, S.Balasubramanian, R.Ranganathan, Sultan Chand&Sons(2017)								
2	2 Practical Physics and Electronics, C.C.Ouseph, U.J.Rao, V.Vijayendran, S.Viswanathan Publishers(2007)								
Re	Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]								
1	1 https://nptel.ac.in/course.html/physics/experimental physics I, II and III								
2	https://nptel.ac.in/courses/115/105/115105110/								
3	https://www.youtube.com/playlist?list=PLuiPz6iU5SQ8-rZn LgLofRX7n8z4tHYK								
Co	Course Designed By: Dr U. Karunanithi								

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	М	M	M	S	М	L	М	S
CO2	S	S	S	• M	M	М	L	М	S	S
CO3	М	M	S	S	- P	М	S	S	S	М

\*S-Strong; M-Medium; L-Low





#### **SEMESTER III**

		SEMESTER III	1	1	<del></del>	
Course code	33A	OPTICS	L	Т	Р	С
Core/Electi	ve/SBS	CORE PAPER III	4	0	0	4
Pre-requisite		The students should acquire knowledge basic properties of light. They should be familiar with the behaviour of light in different mediums.		abus sion	202	21-22
Course Object	tives:	6			<u> </u>	
The main object		s course are to:				
•	•	rds geometrical and physical optics				
L .	0 1	rm in the field of Optics				
-		dge on the behavior of light energy and its propagation	l			
4. inspire the	concepts o	f LASER and their applications.				
Expected Cou	rse Outcor	nes:				
<u> </u>		tion of the course, student will be able to:				
	er the beha	vior of light on passing through lens, prism, thin-film a	ind		K1	
		n <mark>ome</mark> na of light like Interference, diffraction, polariza	tion	and	K2	2
	on inversio				IZ /	
		he concepts of dispersive power, refractive index, resolve		X	K4	ł
material		action, specific rotation and optical pumping for differ	ent			
		nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; I	<u> 76 – (</u>	Create		
	,					
Unit:1		Geometrical Optics			10 ho	urs
by a prism -	Cauchy's	berrations in lens - coma - Astigmatism - chromatic al dispersion formula - dispersive power, achromatism omatic aberrations in a lens - circle of least confusion	in pri	sm -	devia	ation
		n of two thin lenses separated by a finite distance.				
	1 9	2. Colmbatore				
Unit:2		hysical Optics - Interference			12 ho	
		ference in thin films due to reflected light - Fringes d				
		ings – Refractive index of the Liquid – Michels				
		elength of monochromatic light – difference in Wave a – Fabry Perot Interferometer.	lengu	i betv	veen	two
Unit:3		Diffraction		-	12 ho	urs
		rectilinear propagation of light - half-period zone - Z				
		nparison with a convex lens – Fresnel and Fraun				n –
		a Single light – Diffraction grating – Resolving power	& D19	spersiv	ve/	
power of Grat	ing.					
Unit:4		Polarization		1	12 ho	urs
	ction – Hu	ygen's explanationOptic axis in the plane of inc	idenco			
perpendicular	to the crys	tal surface – Production and Detection of Plane, Circu Activity – Fresnel's explanation – Specific rotation –	larly	and E	lliptic	

Unit:5	Quantum Optics	12 hours
Light quanta	and their origin - Resonance radiation - Metastable states -	- Population Inverse –
Optical pump	bing - Spontaneous and Stimulated emission - Einstein's coeffi	cient - Ruby, He- Ne,
CO <sub>2</sub> laser – H	Resonant cavities - elements of non-linear optics - second harmo	nic generation-
threshold con	dition for laser – Stimulated Raman scattering.	
Unit:6	Contemporary Issues	2 hours
Expert lectur	es, online seminars – webinars	
	Total Lecture hours	60
Text Book(s		
	ok of Optics, Brijlal & Subramaniam, S. Chand Limited (2001)	
2 Modern F	Physics, R Murugesan, S. Chand Publishing, 18th Edition (2017)	
	္ကရာမာရာမ်ားန်းနဲ့ ကျောက်မာမာန်းနဲ့	
<b>Reference B</b>	ooks	
1 Optics an	d Spectroscopy, R Murugesan, S. Chand Publishing, 5 <sup>th</sup> Edition	(2013)
2 Optoelect	ronics, Ajoy Kumar Ghatak, K. Thyagarajan, Cambridge Univer	rsity Press (1989).
<b>Related Onl</b>	ine Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1 <u>https://w</u>	ww.youtube.com/watch?v=ML7HcZo6IaE	
2 <u>https://w</u>	ww.khanacademy.org/science/physics/light-waves/introduction-t	o-light-
waves/v	/polarization-of-light-linear-and-circular	
3 <u>https://n</u>	ptel.ac.in/courses/104/104/104104085/	
	Luchiges Voug	
Course Desig	ned By: Dr. K. Selvaraju	
	the construction of the	
		No.

Mappi	Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	PO8	PO9	PO10	
CO1	S	S	М	М	М	S	М	М	M	S	
CO2	S	M	S	М	S	M	М	M	S	S	
CO3	М	М	M	S	S	S	S	S	S	S	

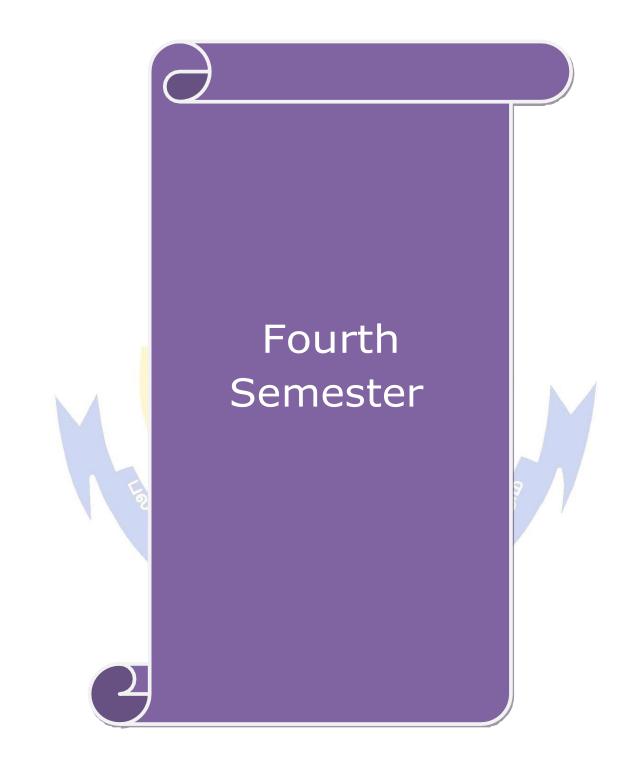
\*S-Strong; M-Medium; L-Low 555 LILITED T 2-111197 EDUCATE TO ELEVATE

### SEMESTER III

	27.4		-	-	-			
Course code	3ZA	INSTRUMENTATION - I	L	Т	Р	С		
Core/Elective/S	SBS	SKILL BASED SUBJECT	3	0	0	3		
<b>Pre-requisite:</b>		Students should know the importance of measurement and accuracy	Sylla Vers		202	1-22		
Course Objecti	ives·	measurement and accuracy	vers	51011				
The main object		course are to:						
		inciples of measurement devices, their performan	ce under	vario	ous e	xterna		
		of error in measurement.						
		t appropriate standards of measurement and metho			ion.			
3. select an a	ppropriate tra	ansducer for basic temperature, pressure and flow	measurer	nent.				
Expected Cour	se Autcome	g.						
		on of the course, students will be able to:						
	oncepts of me				K			
		strument design.			K			
	V I	inalysis for measurement			K			
		nsor for typical measurement of temperature, press	sure and		K4			
flow.	li alisuucei/sei	isor for typical measurement of temperature, pres			K-	t		
	he pe <mark>rforman</mark>	ce and reliability of measurement devices available	e in the		Kć	5		
market.								
market.	10 miles			A				
	oasic measure	ement device.			Ke	5		
6 design a b		ement device. erstand; <b>K3 -</b> Apply; <b>K4 -</b> Analyze; <b>K5 -</b> Evaluate	; <b>K</b> 6 – C	reate	1000	5		
6 design a b K1 - Remember			; <b>K6</b> – C	reate				
6 design a b K1 - Remember Unit:1	er; <b>K2</b> - Und	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate Basic Concept of Measurement			7	hours		
6 design a b K1 - Remember Unit:1 Introduction – S	er; <b>K2 - U</b> nd System config	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate Basic Concept of Measurement guration – Problem Analysis – Basic Characteristic	cs of mea	surir	<b>7</b> ] ng de	hours vices		
6 design a b <b>K1</b> - Remember <b>Unit:1</b> Introduction – S Calibration. <b>Tra</b>	er; <b>K2 - Und</b> System config ansducers: C	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate Basic Concept of Measurement guration – Problem Analysis – Basic Characteristic apacitive transducers – Piezoelectric transducers -	cs of mea - Photoel	usurir ectric	7 ng de effe	hours vices		
6 design a b K1 - Remember Unit:1 Introduction – S Calibration. Tra Photoconductive	er; <b>K2 - Und</b> System config ansducers: C	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate Basic Concept of Measurement guration – Problem Analysis – Basic Characteristic	cs of mea - Photoel	usurir ectric	7 ng de effe	hours vices		
6 design a b <b>K1</b> - Remember <b>Unit:1</b> Introduction – S Calibration. <b>Tra</b> Photoconductive	er; <b>K2 - Und</b> System config ansducers: C	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate Basic Concept of Measurement guration – Problem Analysis – Basic Characteristic apacitive transducers – Piezoelectric transducers -	cs of mea - Photoel	usurir ectric	7 ng de effe	hours vices		
6 design a b <b>K1</b> - Remember <b>Unit:1</b> Introduction – S Calibration. <b>Tra</b> Photoconductive	er; <b>K2 - Und</b> System config ansducers: C e transducers	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate Basic Concept of Measurement guration – Problem Analysis – Basic Characteristic apacitive transducers – Piezoelectric transducers – Ionization transducers – Hall Effect transducers	cs of mea - Photoel – Digita	usurir ectric	7 ng de e effe place	hours vices cct – ment		
6 design a b K1 - Remember Unit:1 Introduction – S Calibration. Tra Photoconductive transducers.	er; <b>K2 - Und</b> System config ansducers: C e transducers <b>Performanc</b>	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate Basic Concept of Measurement guration – Problem Analysis – Basic Characteristic apacitive transducers – Piezoelectric transducers -	cs of mea - Photoel - Digita	asurir ectric 1 disj	7 ng de e effe place 9	hours vices ect – ment hours		
6design a bK1 - RememberUnit:1Introduction - SCalibration. TraPhotoconductive rransducers.Unit:2Introduction - G	er; <b>K2 - Und</b> System config ansducers: C e transducers Performanc Generalized 1	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate Basic Concept of Measurement guration – Problem Analysis – Basic Characteristic apacitive transducers – Piezoelectric transducers – – Ionization transducers – Hall Effect transducers e Characteristics of an Instrumentation system	cs of mea - Photoel - Digita	asurir ectric 1 disj	7 ng de e effe place 9	hours vices ect – ment hours		
6 design a b <b>K1</b> - Remember <b>Unit:1</b> Introduction – S Calibration. <b>Tra</b> Photoconductive ransducers. <b>Unit:2</b> Introduction – C ime element –	er; <b>K2 - Und</b> System config ansducers: C e transducers Performanc Generalized 1	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate Basic Concept of Measurement guration – Problem Analysis – Basic Characteristic apacitive transducers – Piezoelectric transducers – Ionization transducers – Hall Effect transducers e Characteristics of an Instrumentation system measurement – Zero order system – first and sec and testing of dynamic response.	cs of mea - Photoel - Digita	asurir ectric 1 disj	7 ng de e effe place 9 tem -	hours vices cct – ment hours – Dea		
6design a bK1 - RememberUnit:1Introduction - SCalibration. TraPhotoconductive transducers.Unit:2Introduction - Qtime element -Unit:3	er; <b>K2</b> - Und System config ansducers: C e transducers Performanc Generalized 1 Specification	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate Basic Concept of Measurement guration – Problem Analysis – Basic Characteristic apacitive transducers – Piezoelectric transducers – Ionization transducers – Hall Effect transducers e Characteristics of an Instrumentation system measurement – Zero order system – first and sec and testing of dynamic response. Pressure Measurement	cs of mea - Photoel - Digita	nsurir ectric 1 disj r sys	7 ng de e effe place 9 tem - 9	hours vices cct – ment hours – Dea hours		
6design a bK1 - RememberUnit:1Introduction - SCalibration. Transducers.Unit:2Introduction - CUnit:3Mechanical Press	er; <b>K2 - Und</b> System config ansducers: C e transducers <b>Performanc</b> Generalized 1 Specification essure measu	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate Basic Concept of Measurement guration – Problem Analysis – Basic Characteristic apacitive transducers – Piezoelectric transducers – Ionization transducers – Hall Effect transducers e Characteristics of an Instrumentation system measurement – Zero order system – first and sec and testing of dynamic response. Pressure Measurement rement devices – Bourdon tube Pressure gauge –	cs of mea - Photoel - Digita - Digita - Digita - Digita - Digita - Digita - Digita - Digita	nsurir ectric 1 disj r sys	7 1 1 1 1 1 1 1 1 1 1 1 1 1	hours vices cct – ment hours auge		
6       design a b         K1 - Remember         Unit:1         Introduction - S         Calibration. Tra         Photoconductive         transducers.         Unit:2         Introduction - G         time element - G         Unit:3         Mechanical Pred         Dead weight te	er; <b>K2</b> - Und System config ansducers: C e transducers Performanc Generalized 1 Specification essure measu essure measu	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate Basic Concept of Measurement guration – Problem Analysis – Basic Characteristic apacitive transducers – Piezoelectric transducers – Ionization transducers – Hall Effect transducers e Characteristics of an Instrumentation system measurement – Zero order system – first and sec and testing of dynamic response. Pressure Measurement rement devices – Bourdon tube Pressure gauge – Pressure measurement – The McLeod gauge – P	cs of mea - Photoel - Digita - Digita - Digita - Digita - Digita - Digita - Digita - Digita	nsurir ectric 1 disj r sys	7 1 1 1 1 1 1 1 1 1 1 1 1 1	hours vices cct – ment hours auge		
6       design a b         K1 - Remember         Unit:1         Introduction - S         Calibration. Tra         Photoconductive         ransducers.         Unit:2         Introduction - G         ime element - G         Unit:3         Mechanical Prec         Dead weight te	er; <b>K2</b> - Und System config ansducers: C e transducers Performanc Generalized 1 Specification essure measu essure measu	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate Basic Concept of Measurement guration – Problem Analysis – Basic Characteristic apacitive transducers – Piezoelectric transducers – Ionization transducers – Hall Effect transducers e Characteristics of an Instrumentation system measurement – Zero order system – first and sec and testing of dynamic response. Pressure Measurement rement devices – Bourdon tube Pressure gauge – Pressure measurement – The McLeod gauge – P	cs of mea - Photoel - Digita - Digita - Digita - Digita - Digita - Digita - Digita - Digita	nsurir ectric 1 disj r sys	7 1 1 1 1 1 1 1 1 1 1 1 1 1	hours vices cct – ment hours auge		
6       design a b         K1 - Remember         Unit:1         Introduction - S         Calibration. Tra         Photoconductive         transducers.         Unit:2         Introduction - G         time element - G         Unit:3         Mechanical Pred         Dead weight te	er; <b>K2</b> - Und System config ansducers: C e transducers Performanc Generalized 1 Specification essure measu essure measu	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate Basic Concept of Measurement guration – Problem Analysis – Basic Characteristic apacitive transducers – Piezoelectric transducers – Ionization transducers – Hall Effect transducers e Characteristics of an Instrumentation system measurement – Zero order system – first and sec and testing of dynamic response. Pressure Measurement rement devices – Bourdon tube Pressure gauge – Pressure measurement – The McLeod gauge – P	cs of mea - Photoel - Digita - Digita - Digita - Digita - Digita - Digita - Digita - Digita	nsurir ectric 1 disj r sys	7 1 1 1 1 1 1 1 1 1 1 1 1 1	hours vices cct – ment hours - Dea hours ductin		
6       design a b         K1 - Remember         Unit:1         Introduction - S         Calibration. Transducers.         Unit:2         Introduction - G         time element - G         Unit:3         Mechanical Pred         Dead weight tegauge - The Kr         Unit:4	er; <b>K2</b> - Und System config ansducers: C e transducers <b>Performanc</b> Generalized 1 Specification essure measu ester – Low-I nudsen gauge	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate Basic Concept of Measurement guration – Problem Analysis – Basic Characteristic apacitive transducers – Piezoelectric transducers – Ionization transducers – Hall Effect transducers e Characteristics of an Instrumentation system measurement – Zero order system – first and sec and testing of dynamic response. Pressure Measurement rement devices – Bourdon tube Pressure gauge – Pressure measurement – The McLeod gauge – P	cs of mea - Photoel - Digita ond orde The Brid irani the	asurir ectric 1 disj r sys dgem rmal	7 ] 19 de 19 effe 10 ce 9 ] 10 ce 10 c	hours vices act – ment hours auge ductin hours		
6       design a b         K1 - Remember         Unit:1         Introduction - S         Calibration. Tra         Photoconductive         transducers.         Unit:2         Introduction - G         time element - G         Unit:3         Mechanical Prepared weight tegauge - The Kr         Unit:4         Positive displace	er; <b>K2</b> - Und System config ansducers: C e transducers: Performanc Generalized 1 Specification essure measu ester – Low-I nudsen gauge ement metho	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate Basic Concept of Measurement guration – Problem Analysis – Basic Characteristic apacitive transducers – Piezoelectric transducers – Ionization transducers – Hall Effect transducers e Characteristics of an Instrumentation system measurement – Zero order system – first and sec and testing of dynamic response. Pressure Measurement rement devices – Bourdon tube Pressure gauge – Pressure measurement – The McLeod gauge – P Flow Measurement	cs of mea - Photoel - Digita ond orde The Brid irani the	asurir ectric 1 disj r sys dgem rmal	7 ] 19 de 19 effe 10 ce 9 ] 10 ce 10 c	hours vices act – ment hours auge ductir		
6       design a b         K1 - Remember         Unit:1         Introduction - S         Calibration. Transducers.         Unit:2         Introduction - G         introduction - G         ime element - G         Unit:3         Mechanical Pred         Dead weight tegauge - The Kr         Unit:4         Positive displac         - Hot wire and	er; <b>K2</b> - Und System config ansducers: C e transducers: Performanc Generalized 1 Specification essure measu ester – Low-I nudsen gauge ement metho	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate Basic Concept of Measurement guration – Problem Analysis – Basic Characteristic apacitive transducers – Piezoelectric transducers – Ionization transducers – Hall Effect transducers e Characteristics of an Instrumentation system measurement – Zero order system – first and sec and testing of dynamic response. Pressure Measurement rement devices – Bourdon tube Pressure gauge – Pressure measurement – The McLeod gauge – P Flow Measurement ds – Flow Obstruction methods – Flow measurem emometers – Magnetic flow meters	cs of mea - Photoel - Digita ond orde The Brid irani the	asurir ectric 1 disj r sys dgem rmal	7 ] 19 de 2 effe 5 lace 9 ] 1 tem 9 ] 2 an C Con 9 ] 1 ffects	hours vices act – ment hours auge ductir		
6       design a b         K1 - Remember         Unit:1         Introduction - S         Calibration. Transducers.         Unit:2         Introduction - G         time element - G         Unit:3         Mechanical Precent         Dead weight tegauge - The Kr         Unit:4         Positive displac         - Hot wire and         Unit:5	er; <b>K2</b> - Und System config ansducers: C e transducers: Performanc Generalized 1 Specification essure measu ester – Low-I nudsen gauge ement metho d Hot film an	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate Basic Concept of Measurement guration – Problem Analysis – Basic Characteristic apacitive transducers – Piezoelectric transducers – Ionization transducers – Hall Effect transducers e Characteristics of an Instrumentation system measurement – Zero order system – first and sec and testing of dynamic response. Pressure Measurement rement devices – Bourdon tube Pressure gauge – Pressure measurement – The McLeod gauge – P Flow Measurement ds – Flow Obstruction methods – Flow measurem emometers – Magnetic flow meters Measurement of Temperature	cs of mea - Photoel - Digita ond orde The Brid irani the ent by dr	asurir ectric 1 disp r sys dgem rmal	7 ] 19 de 19 effe 10 place 9 ] 10 tem 9 ] 10 no 10 cond 10 fects 9 ]	hours vices act – ment hours - Dea hours ductin		
6       design a b         K1 - Remember         Unit:1         Introduction - S         Calibration. Transducers.         Unit:2         Introduction - G         Introduction - G <td>er; <b>K2</b> - Und System config ansducers: C e transducers: C e transducers: C Generalized 1 Specification essure measu ester – Low-I nudsen gauge ement metho d Hot film an ales – The id</td> <td>erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate Basic Concept of Measurement guration – Problem Analysis – Basic Characteristic apacitive transducers – Piezoelectric transducers – Ionization transducers – Hall Effect transducers e Characteristics of an Instrumentation system measurement – Zero order system – first and sec and testing of dynamic response. Pressure Measurement rement devices – Bourdon tube Pressure gauge – Pressure measurement – The McLeod gauge – P Flow Measurement ds – Flow Obstruction methods – Flow measurem emometers – Magnetic flow meters</td> <td>cs of mea - Photoel - Digita ond orde The Brid irani the ent by dr</td> <td>asurir ectric 1 disp r sys dgem rmal</td> <td>7 ] 19 de 19 effe 10 place 9 ] 10 tem 9 ] 10 no 10 cond 10 fects 9 ]</td> <td>hours vices act – ment hours auge ductin hours</td>	er; <b>K2</b> - Und System config ansducers: C e transducers: C e transducers: C Generalized 1 Specification essure measu ester – Low-I nudsen gauge ement metho d Hot film an ales – The id	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate Basic Concept of Measurement guration – Problem Analysis – Basic Characteristic apacitive transducers – Piezoelectric transducers – Ionization transducers – Hall Effect transducers e Characteristics of an Instrumentation system measurement – Zero order system – first and sec and testing of dynamic response. Pressure Measurement rement devices – Bourdon tube Pressure gauge – Pressure measurement – The McLeod gauge – P Flow Measurement ds – Flow Obstruction methods – Flow measurem emometers – Magnetic flow meters	cs of mea - Photoel - Digita ond orde The Brid irani the ent by dr	asurir ectric 1 disp r sys dgem rmal	7 ] 19 de 19 effe 10 place 9 ] 10 tem 9 ] 10 no 10 cond 10 fects 9 ]	hours vices act – ment hours auge ductin hours		

Un	Unit:6Contemporary Issues2 hours								
Exj	pert lecture	s, online seminars – webinars							
		Total Lecture hours	45						
Te	xt Book(s)								
1	McGRaw	ation Devices and Systems, C.S. Rangan, G. R. Sarma and V. S. M Hill, New Delhi (1983)							
2	Experimen	tal Methods for Engineers, J. P. Holman, 7th Edition, McGRaw Hi	ll, New Delhi, (2007)						
D	e D	1							
Rei	ference Bo								
1									
2	Measurement System Applications and Design, E.O. Doebalin, 5 <sup>th</sup> edition, McGraw Hill International, (2007)								
3	Transduce	rs and Instrumentation, D. V. S. Murthy, 2 <sup>nd</sup> edition, Prentice Hall	of India (2010)						
Re	lated Onlin	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]							
1	Static ar	d dynamic measurement							
	https://yo	outu.be/DFdTRPUwK_I							
2		measurement							
		outu.be/sHmjE21Fp9w							
3		ure measurement	. 1						
		eries on Industrial Automation and Control by Prof. S. Mukhopad	hyay, Department of						
		Engineering, IIT Kharagpur.							
4		utu.be/As5kzxkyT24							
4	NPTEL	www.wowthba.com/watch?w-2cVmEillaOiV&list_DLhDMhDVUM.co	Wr A AsII						
	zvbNVSI	ww.youtube.com/watch?v=3eYmFjHnQjY&list=PLbRMhDVUMng	CONTA4SH-						
5		urseware- University of Malaysia, Pahang	2						
5		v.ump.edu.my/course/view.php?id=272							
	1110111001								
Co	urse Desigi	ned By: Mrs. J.Jayachitra, Dr.L.Priya							
		155 S							
		a with Programme OutoShild (60) 2- WITSP							

Mappi	Mapping with Programme Outcomes												
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	<b>PO8</b>	<b>PO9</b>	PO10			
CO1	S	М	Μ	Μ	S	Μ	М	L	S	S			
CO2	S	S	S	М	М	М	М	L	S	S			
CO3	S	S	S	М	S	Μ	М	Μ	S	S			
CO4	S	S	S	S	S	S	M	M	S	S			
CO5	S	М	S	M	М	S	S	M	М	М			
CO6	М	S	S	M	М	S	S	S	М	М			



## SEMESTER IV

~ ~ ~	<b>43</b> A	ATOMIC PHYSICS AND SPECTROSCOPY	L	Т	Р	С
Core/Elective	/SBS	CORE PAPER IV	4	0	0	4
Pre-requisite		The students should have the awareness on the structure of atoms, photoelectric effect and X rays	Sylla Vers		202	1-22
Course Objec	ctives:					
		is course are to:				
		l study of atom				
	·	of magnetic fields on spectra				
3. study t	ne concept	of photoelectric cells				
Expected Cou	urse Outco	mes:				
=		etion of the course, student will be able to:				
	-	es of spectrographs to study about positive rays			K4	
	• •	otical properties of materials			K5	
<b>^</b>	0	photoelectrical cells and X Rays			K3	
		nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - (	Create		
	- , -			×.	1	
Unit:1		Positive Rays			11 h	ours
	C5 Linnu	tions – Dempster's mass spectrograph – Aston's mass	spectr	ograph	n- mas	y ss
defect and pack         Unit:2         The Bohr atom         determination or         model- Vector	n model – of critical p atom mod	tions – Dempster's mass spectrograph –Aston's mass n – polarization of X –rays – scattering of X- rays (The Structure of the Atom Critical Potentials – Method of excitation of ato potentials by Davison and Goucher's method - Somm lel – Quantum numbers associated with Vector atom – Pauli's exclusion principle – Periodic classification	ms – ms – nerfield	Experies relation of the second secon	mula) 12 ho iment ativist ouplin	ours al ic
defect and pack         Unit:2         The Bohr atom         determination of         model-	n model – of critical p atom mod	<ul> <li>polarization of X –rays – scattering of X- rays (The Structure of the Atom</li> <li>Critical Potentials – Method of excitation of atopotentials by Davison and Goucher's method - Sommel – Quantum numbers associated with Vector atom</li> </ul>	ms – ms – nerfield	Experies relation of the second secon	mula) 12 ho iment ativist ouplin	ours al
defect and pack Unit:2 The Bohr atom determination of model– Vector schemes (LS, J. Unit:3	ing fraction n model – of critical p atom mod J coupling) M	h – polarization of X –rays – scattering of X- rays (The Structure of the Atom Critical Potentials – Method of excitation of ator botentials by Davison and Goucher's method - Somm lel – Quantum numbers associated with Vector ator – Pauli's exclusion principle – Periodic classification lagneto Optical Properties of Spectrum	ms – ms – nerfield n mode of ele	Exper Exper I's relation Experiments	mula) 12 ha iment ativist ouplin 12 ha	ours al ic g
defect and pack Unit:2 The Bohr atom determination of model– Vector schemes (LS, J. Unit:3 Magnetic dipol spin – The Ster Zeeman effect Larmor's theore	ing fraction n model – of critical p atom mod J coupling) Le moment n and Gerl – Experin em – Quar	n – polarization of X –rays – scattering of X- rays (The Structure of the Atom Critical Potentials – Method of excitation of ato potentials by Davison and Goucher's method - Sommel – Quantum numbers associated with Vector atom – Pauli's exclusion principle – Periodic classification	ms – merfield n mode of ele ole me the soo	Experies for Experies of the second s	mula) 12 ha iment ativist puplin 12 ha due o line shift	biss burs al ic bg burs to - -
defect and pack Unit:2 The Bohr atom determination of model– Vector schemes (LS, J. Unit:3 Magnetic dipol spin – The Ster Zeeman effect Larmor's theore Zeeman effect - Unit:4	ing fraction n model – of critical p atom mod J coupling) Le moment n and Gerl – Experin em – Quar – Paschen –	n – polarization of X –rays – scattering of X- rays (The Structure of the Atom Critical Potentials – Method of excitation of ator potentials by Davison and Goucher's method - Sommelel – Quantum numbers associated with Vector atom – Pauli's exclusion principle – Periodic classification           Image: Comparison of the text of text	iomsor ms – nerfield of ele ole mo the soc he Zec	Experies of the second	mula) 12 ha iment ativist ouplin 12 ha due ) line shift malou 11 ha	ours al ic g ours to – is ours

Uni		X-Ray Spectra		12 hours
K-ra	y – Cool	idge tube - Properties - X-ray Spectra - Continuous and	characteristics	X-ray
		osley's law (Statement, Explanation and Importance) - Compt		
for c	change of	wavelength - X-ray diffraction-Bragg's law- Bragg's spectro	meter- Powder	crystal
neth	iod – Qu	antum theory: The distribution of energy in the spectrum of	of a black body	– its
esul	ts - Planc	k's hypothesis – derivation of Planck's law of radiation.		
Uni		Contemporary Issues		2 hours
Exp	pert lectur	es, online seminars - webinars		
		Total Lecture hours		60
Tex	t Book(s			
1	Modern	Physics, Murugesan R. and Kiruthiga Sivaprasath. S. Chand an	d Company, 18 <sup>t</sup>	<sup>h</sup> edition
	(2016).	ംഗത്തില്കും		
		60°°		
Ref	ference <b>B</b>	ooks		
1	Modern (2004)	Physics, Sehgal D.L. Chopra K.L. and Sehgal N.K. Sultan Cha	nd & Sons, 9 <sup>th</sup> e	dition,
2	· · ·	Physics, Rajam J B, S. Chand and Company Ltd, New Delhi, 2	Oth adition (2000	))
2	Atomic	r nysies, Rajani y D, S. Chand and Company Eld, New Denn, 2		·).
Rel		ine Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		1
1	https://w	ww.askiitians.com/revision-notes/physics/atomic-physics/		
2	https://n	ptel.ac.in/courses/115/101/115101003/		
3		ww2.physics.ox.ac.uk/sites/default/files/2011-10-		
	<u>19/atom</u>	ic_physics_lectures_1_8_09_pdf_pdf_18283.pdf		
Coi	irse Desig	ned By: Dr. N. Sasi	23	
		8	S	
	1		2	

Mapping with Programme Outcomes											
COs	PO1	PO2	PO3	PO4	PO5	<b>PO6</b>	PO7	<b>PO8</b>	PO9	PO10	
CO1	S	Μ	M	М	S	М	М	М	М	S	
CO2	S	M	S	S	М	M	S	М	М	М	
CO3	М	S	S	S	Som	S	S	S	S	S	

		SEMESTER III & IV				
Course code	43P	CORE PRACTICAL II	L	Т	Р	С
		(Examination at the end of Fourth Semester)	L	1		
Core/Elective	e/SBS	CORE PRACTICAL	0	0	2	3
Pre-requisite		Should have the fundamental knowledge of	Syllab		2021	_22
_		Physics	Versio	n	2021	-44
Course Obje						
		his course are to:				
		ental skills in Mechanics and Properties of Matter				
•	•	at the experiments based on Electricity and Magn	etism			
6. motivate	the students	s to apply the experimental techniques in Optics.				
Expected Co	urse Outco	nmes•				
		etion of the course, student will be able to:				
			f different		<b>V</b> 2	
1 apply the substance		of Specific heat capacity and Young's Modulus	of different		K3	
		edge of Physical optics using Spectrometer			K4	
1		and applications of Potentiometer, Magnetometer	r and BG		K5	
		Inderstand; K3 - Apply; K4 - Analyze; K5 - Eval		Croote		
KI - Kelhelin	ber; <b>K</b> 2 - U	nderstand, K5 - Appry, K4 - Anaryze, K5 - Eva	uale; <b>K</b> o -	Create	•	
					5(1	
× 4		LIST OF EXPERIMENTS	a l		56 h	ours
1 D' ' I'	M 11	(Any twelve experiments)				
<b>.</b> .		- Torsional Pendulum - With & Without symmetry		es		
-	-	city – Newton's Law of cooling – Spherical Calc				
		wavelength $\lambda$ - Grating – Normal Incidence - Spe	ctrometer			
		of Prism - $(i - i')$ curve - Spectrometer	0			
		Cauchy's constants - Spectrometer	(G			
		of Prism - Spectrometer		/ /		
		of a lens - Newton's rings	C .			
		agnetic moments – Deflection magnetometer – Ta	in A positio	on		
		ensity - Field along the axis of a circular coil				
		- Cantilever - Depression - Pin and Microscope				
- -		s – Koenig's Method – Non-Uniform bending				
-		s – Koenig's Method – Uniform bending				
-		e of a wire - Potentiometer				
		couple - Potentiometer				
	-	range voltmeter - Potentiometer				
-		fficient of Resistance - Thermistor - Carey Foster	's Bridge			
		Zener diode				
-		Charge sensitivity - Ballistic Galvanometer				
•		lutual Inductance - BG				
20. Determ	nination of	High Resistance by leakage- BG				
		Contemporary Issues			1 հ	ours
Online works	hon Webir	Contemporary Issues nars on Experimental Physics	<u> </u>		41	Jura
Sinne works		hars on Experimental Thysics				
		Total Practical Hour	s:			6
			I			

Re	Reference Books									
1	A text book of practical Physics, M.N.Srinivasan, S.Balasubramanian, R.Ranganathan, Sultan Chand&Sons(2017)									
2	Practical Physics and Electronics, C.C.Ouseph, U.J.Rao, V.Vijayendran, S.Viswanathan Publishers(2007)									
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]									
1	https://nptel.ac.in/course.html/physics/experimental physics I, II and III									
2	https://nptel.ac.in/courses/115/105/115105110/									
3	https://www.youtube.com/playlist?list=PLuiPz6iU5SQ8-rZn LgLofRX7n8z4tHYK									
Co	ourse Designed By: Dr. U. Karunanithi									

Mappi	Mapping with Programme Outcomes											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10		
CO1	S	М	S	S	M	S	М	М	М	S		
CO2	S	М	S	M	S	S	М	L	М	S		
CO3	М	S	S	• S	Ĺ	М	S	S	S	М		



#### SEMESTER IV

	1	SEMESTER IV						
Course code	4ZB	<b>INSTRUMENTATION II</b>	L	Т	Р	С		
Core/Elective	e/SBS	SKILL BASED SUBJECT	3	0	0	2		
Pre-requisite		Students should know the importance of		abus	202	21-22		
_		measurements in large scale	Ver	sion	202	11-22		
Course Obje								
		his course are to:	nditio					
		derstand the principles of measurements in industry co tand the process of vibration sensing	nanio	IIS				
		pollution and sampling techniques						
o. sereet upp	iopiiate all	ponution and sampling cooliniques						
Expected Cor	urse Outco	mes:						
_		tion of the course, student will be able to:						
1 use ther	mal and nu	clear radiation detectors			K1			
2 understand the high-temperature process in transient and industrial conditions								
	-	ment to determine the state of pollution in the environ			K3			
		ple instrumentation for measurement of mechanical pr		es	K4			
		ng conditions in industrial areas			K5			
		ncepts for the prediction and determination of random	-		K6			
vibration		hopes for the prediction and determination of function			110			
K1 - Rememb	oer; K2 - U	n <mark>de</mark> rstand; <b>K3 - App</b> ly; <b>K4 - Analyze</b> ; <mark>K5</mark> - Evaluate; 1	K6 - (	Create				
	2							
Unit:1		Temperature Measurement by Radiation			9 hou	urs		
		nd temperature measurements – Transient response of						
·	-	tion – Temperature measurement flow in high-speed f.						
	-	surement: Thermal conductivity measurements – The	ermal	condu	ctivity	1		
of inquities and	gases – me	easurement of Viscosity–Gas diffusion – Calorimetry.	9,					
Unit:2	C.	Force, Torque and Strain Measurements			9 ho	urs		
		nce measurements – Elastic elements for force measur	ement	s - Tc				
		d Strain measurements – Electrical resistance – strain			1			
		a Alt						
Unit:3		Vibration			9 ho	urs		
		ck – Analysing vibration sensing devices – Generalized						
•	·	cement – Absolute velocity and acceleration vibrating		0		-		
•		ded strain gauge accelerometers-Piezoelectric accelero	omete	rs- Dig	gital			
accelerometer	•							
Unit:4	Ther	mal and Nuclear Radiation Measurements			9 ho	urs		
		of thermal radiation – Measurement of emissivity – Re	eflecti	vity an				
		ents – Solar radiation measurements – Detection of Nu						
•		er– Scintillation counter.						
	1							
Unit:5		r Pollution Sampling and Measurements		•	7 ho			
		ollution measurements – Air pollution standards – Gen						
Train gas sam	ipiing techn	iques – Particulate sampling techniques – Sulphur dio	xiae r	neasur	ement	.s.		

Un	nit:6	Contemporary Issues	2 hours
Ex	pert lectur	es, online seminars – webinars	
		Total Lecture hours	45
Te	xt Book(s)		
1	Tata Mc	entation Devices and Systems, C.S. Rangan, G. R. Sarma and V. GRaw Hill, New Delhi (1983)	
2	Experim (2007)	ental Methods for Engineers, J. P. Holman, 7 <sup>th</sup> Edition, McGRav	w Hill, New Delhi
Re	eference B	ooks	
1	Internati	ment System Applications and Design, E.O. Doebalin, 5 <sup>th</sup> edition onal (2007)	
2	Transdu	cers and Instrumentation, D. V. S. Murthy, 2 <sup>nd</sup> edition, Prentice 1	Hall of India (2010)
3	Mechani	cal and Industrial Measurement, R. K. Jain, Khanna Application	s (2013)
Re		ine Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1		radiation detector	
2	Nuclear	Security and Safeguards Education Portal- youtube channel- outu.be/Me7XA2vv4F4	
3	<u>https://c</u> etal.)/	Detector hem.libretexts.org/Bookshelves/General_Chemistry/Book%3A_C 19%3A_Nuclear_Chemistry/19.10%3A_Instruments_for_Radiation s%20the%20most%20common%20instrument.to%20discover%20	on_Detection#:~:text
4	Air pollu http://we	ution eb.iyte.edu.tr/~serifeyalcin/lectures/chem201/cn_8.pdf	
			Š
Co	ourse Desig	gned By: Mrs. J.Jayachitra, Dr.L.Priya	
		State of the state	

Mappi	Mapping with Programme Outcomes SLILITGON 2-												
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10			
CO1	S	L	L	М	М	М	М	L	М	S			
CO2	S	S	L	М	S	S	L	L	L	М			
CO3	S	S	S	S	S	S	S	М	S	S			
CO4	S	S	М	М	М	S	S	М	L	S			
CO5	S	S	S	L	М	S	M	М	S	S			
CO6	S	S	S	S	S	S	S	М	S	S			



		SEMESTER V				
Course code	53A	MATHEMATICAL PHYSICS	L	Т	P	С
Core/Elective	e/SBS	CORE PAPER V	4	0	0	4
Pre-requisite	1	Should have the basic knowledge of Mathematics and Mechanics		llabus rsion	20	21-22
Course Obje						
<ol> <li>enable the</li> <li>apply the</li> <li>motivate the</li> </ol>	e students t equations the student	this course are to: to acquire the problem-solving ability for the situation of different physical problems. s to apply the mathematical principles in their day–to–da	y life	2.		
Expected Co		letion of the course, student will be able to:				
	-	and Hamilton's equations			K	)
		and Hamilton's equations to physical problems			K2 K2	
		d beta functions and their applications			K.	
•		Matrices and apply them to relevant problems			K. K4	
-		Gauss theorems to suitable physical problems			K <sup>2</sup>	
11 5				1 (	Λ.	)
KI - Rememi	oer; <b>K2 -</b> (	Jnderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K	. <b>6</b> - C	reate		
Unit:1		Classical Mechanics - I	1	12	- ho	
Unit:2 Phase S of motion- Ph	pace – Ha ysical sigr	tor, Simple Pendulum and Compound Pendulum. Classical Mechanics – II miltonian function – Hamiltonian Principle – Hamilton's ificance of H – Applications of Hamiltonian equations of Pendulum and Linear Harmonic Oscillator.		onical e	quati	
i chidululli, ex	Shipound I					
Unit:3		Special Functions		1	2 ha	ours
of Beta funct	tion – Eva	Beta function – Gamma function – Evaluation of Beta fu luation of Gamma function – Other forms of Gamma na functions – Problems.				
Unit:4		Matrices		1	0 ha	ours
	tion – spe	cial types of Matrices – Transpose of a Matrix – The Con	njuga			
Conjugate Tra – Orthogonal	anspose of and Unita	a Matrix – Symmetric and Anti-symmetric – Hermitian ry Matrices – Properties – Characteristic equation – Root of matrices – Cayley–Hamilton theorem –Problems	and s	skew He	rmit	ian
Unit:5		Vector Calculus			12 h	ours
– Curl of a V – Curl of Co	ector – Lin onservative	ce – Second derivative of Vector functions or fields – Th ne Integral – Line Integral of a Vector field around an in field – Surface Integral – Volume Integral (without d it's proof - Simple problems – Stoke's theorem an	nfinit proł	esimal r plem) –	ectar Gai	ngle 1ss's

Un	it:6	Contemporary Issues	2 hours
Ex	pert lectures	, online seminars - webinars	
		Total Lecture Hours	60
Te	xt Book(s)		
1	Mathemat	ical Physics, B.D. Gupta-Vikas Publishing House, 4th Edition (2006)	
2	Classical 1	Mechanics, S.L.Gupta, V. Kumar&H.V.Sharma, PragatiPrakashan (20	17)
Re	ference Boo	oks	
1	Mathemat	ical Physics, Sathya Prakash, Sultan Chand, 6 <sup>th</sup> edition (2014)	
2	Mathemat	ical Physics Rajput, Pragathi Prakasan Pub., (2017)	
3	Mathemat	ical Physics, H.K. Dass, S. Chand & Co., Eighth edition (2018)	
4	Classical	Mechanics, J.C.Upadhyaya, Himalaya Publishing House(2012)	
Re		e Conten <mark>ts [MOOC</mark> , SWAYAM, NPTEL, Websites etc.]	
1		tel.ac.in/course.html/Physics/Introduction to classical mechanics	
2		tel.ac.in/course.html/Physics/Integrals and vector calculus	
3	https://np	tel.ac.in/course.html/Physics/Matrix analysis and with applications	

Course Designed By: Dr. U. Karunanithi

Mappi	Mapping with Programme Outcomes												
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10			
CO1	S	M	L	M	S	M	М	S	М	М			
CO2	S	S	М	S	М	S	L	M	S	М			
CO3	S	<u>%</u> М	M	S	S	M	L	M	S	S			
CO4	S	S	L	М	S	М	M	М	S	S			
CO5	S	S	М	L	М	S	S	M	М	S			



# SEMESTER V

Course code	53B	ELECTRONICS	L	Т	Р	С		
Core/Elective	e/SBS	CORE PAPER VI	4	0	0	4		
Pre-requisite		Should have the basic knowledge of	Sylla		2021	-22		
-		Semiconducting devices	Versi	on				
Course Obje		·· · · · · · · · · · · · · · · · · · ·						
		nis course are to: and apply it to various electronic instruments.						
		t the development of electronic instruments.						
0	U	to apply the principles of electronics in their day-to-	day life					
Expected Co	urse Outco	mes:						
On the succes	sful comple	etion of the course, student will be able to:						
1 differentiate between different types of amplifiers and their applications								
2 design different types of oscillators								
3 apply sv	vitching id <mark>e</mark>	eas to various devices			K3			
4 analyzin	ig the powe	r electronic devices and their uses			K4			
5 design of	pera <mark>tional</mark> a	amplifier circuits and to analyze their properties			K5			
K1 - Rememb	oer; K2 - U	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	<mark>, K</mark> 6 –	Create	;			
	5							
Unit:1		Amplifiers		12	2 hour	S		
Power amplif	iers – Clas	<b>plifiers:</b> Classification of amplifiers – Transistor a is A power amplifier – Push Pull connection – pu cs of an amplifier. <b>Feedback amplifiers:</b> feedbac	sh-pull	class	B Po	wer		
Power amplif amplifier – C	iers – Clas haracteristic of a feedb		sh-pull k and	class relate	B Po ed ter	wer		
Power amplif amplifier – C block diagram follower circu	iers – Clas haracteristic of a feedb	s A power amplifier – Push Pull connection – pu cs of an amplifier. <b>Feedback amplifiers:</b> feedbac ack amplifier- Transfer gain of an amplifier with fee	sh-pull k and	class relate Emitte	B Po ed ter er	wer ms-		
Power amplif amplifier – C block diagram follower circu Unit:2	iers – Clas haracteristi 1 of a feedb it.	s A power amplifier – Push Pull connection – pu cs of an amplifier. Feedback amplifiers: feedbac ack amplifier- Transfer gain of an amplifier with fee Oscillators	sh-pull k and dback-	class relate Emitte	B Po ed ter er 1 hou	rs		
Power amplif amplifier – C block diagram follower circu Unit:2 Introduction - oscillator -Tune	iers – Clas haracteristi n of a feedb it. Types of ed collector	s A power amplifier – Push Pull connection – pu cs of an amplifier. <b>Feedback amplifiers:</b> feedbac ack amplifier- Transfer gain of an amplifier with fee	sh-pull k and dback- Conce s – Colj	class relate Emitte 1 pt of pitt's	B Po ed ter er 1 houn f feed oscilla	wer ms- rs lback tor –		
Power amplif amplifier – C block diagram follower circu Unit:2 Introduction - oscillator -Tune Analysis - Pha Analysis.	iers – Clas haracteristi n of a feedb it. Types of ed collector	A power amplifier – Push Pull connection – pu cs of an amplifier. Feedback amplifiers: feedbac ack amplifier- Transfer gain of an amplifier with fee Oscillators oscillators - Fundamental principle of oscillator - oscillator - Analysis - Hartley oscillators – Analysis cillator-Analysis - Wien bridge oscillator - Analysis	sh-pull k and dback- Conce s – Colj	class relate Emitte 1 ept of pitt's of ystal c	B Po ed ter er 1 hou feed oscillat	rs lback tor –		
Power amplif amplifier – C block diagram follower circu Unit:2 Introduction - oscillator -Tune Analysis - Pha Analysis. Unit:3	iers – Clas haracteristi n of a feedb it. Types of ed collector ase shift ose	Solid state switching circuits	sh-pull k and dback- Conce s – Colj s - Cry	class relate Emitte 1. ppt of pitt's vstal c	B Po ed ter er 1 hou feed oscilla sscillat	rms- rs lback tor – s		
Power amplif amplifier – C block diagram follower circu Unit:2 Introduction - oscillator -Tune Analysis - Pha Analysis. Unit:3 Introduction -	iers – Clas haracteristi n of a feedb it. Types of ed collector use shift os	A power amplifier – Push Pull connection – pu cs of an amplifier. Feedback amplifiers: feedbac ack amplifier- Transfer gain of an amplifier with fee Oscillators oscillators - Fundamental principle of oscillator - oscillator - Analysis - Hartley oscillators – Analysis cillator-Analysis - Wien bridge oscillator - Analysis cillator-Analysis - Wien bridge oscillator - Analysis cillator - Analysis - Wien bridge oscillator - Analysis	sh-pull k and dback- Conce s – Col s – Col s – Cry witchin	class relate Emitte I pitt's vstal c I I g act:	B Po ed ter er 1 hour 5 feed oscillat 2 hour ion o	rs lback tor – or –		
Power amplif amplifier – C block diagram follower circu Unit:2 Introduction - oscillator -Tune Analysis - Pha Analysis. Unit:3 Introduction - transistor – m monostable m	iers – Clas characteristi n of a feedb it. Types of ed collector use shift os switching nultivibrato nultivibrator	A power amplifier – Push Pull connection – pu cs of an amplifier. Feedback amplifiers: feedbac ack amplifier- Transfer gain of an amplifier with fee Oscillators oscillators - Fundamental principle of oscillator - oscillator - Analysis - Hartley oscillators – Analysis cillator-Analysis - Wien bridge oscillator - Analysis cillator-Analysis - Wien bridge oscillator - Analysis cillator - Analysis - Wien bridge oscillator - Analysis	sh-pull k and dback- Conce s – Col s – Col s – Cry witchin ltivibra	class relate Emitte I ppt of pitt's vstal o I I I g acti tor –	B Po ed ter er 1 hour feed oscillat scillat 2 hour ion o transi	rs lback tor – or –		
Power amplif amplifier – C block diagram follower circu Unit:2 Introduction - oscillator -Tune Analysis - Pha Analysis. Unit:3 Introduction - transistor – m monostable m	iers – Clas characteristi n of a feedb it. Types of ed collector use shift os switching nultivibrato nultivibrator	A power amplifier – Push Pull connection – pu cs of an amplifier. Feedback amplifiers: feedbac ack amplifier- Transfer gain of an amplifier with fee Oscillators oscillators - Fundamental principle of oscillator - oscillator - Analysis - Hartley oscillators – Analysis cillator-Analysis - Wien bridge oscillator - Analysis cillator-Analysis - Wien bridge oscillator - Analysis Concernence of the second second second second Solid state switching circuits circuit- electronic switches - important terms - s rs – types of multivibrators –transistor astable mu	sh-pull k and dback- Conce s – Col s – Col s – Cry witchin ltivibra	class relate Emitte I ppt of pitt's vstal o I I I g acti tor –	B Po ed ter er 1 hour feed oscillat scillat 2 hour ion o transi	rs lback tor – s f a		
Power amplif amplifier – C block diagram follower circu Unit:2 Introduction - oscillator -Tum Analysis - Pha Analysis. Unit:3 Introduction – transistor – m monostable m Clamping Circ	iers – Clas characteristi n of a feedb it. Types of ed collector use shift os switching nultivibrato nultivibrator	Solid state switching circuits Solid state switching circuits circuit- electronic switches - important terms - s rs – types of multivibrators – transistor astable mu circuit- Differentiating circuit - Integrating circuit - Clip e idea of a clamper- Positive clamper – negative clam	sh-pull k and dback- Conce s – Col s – Col s – Cry witchin ltivibra	class relate Emitte I pitt's vstal co ig act tor – ircuits	B Po ed ter er <b>1 houn</b> F feed oscillat <b>2 hour</b> ion o transi s –	rs black tor – or – s f a stor		
Power amplif amplifier – C block diagram follower circu Unit:2 Introduction - oscillator -Tune Analysis - Pha Analysis. Unit:3 Introduction - transistor – m monostable m	iers – Clas characteristi n of a feedb it. Types of ed collector use shift os switching nultivibrato nultivibrator	Solid state switching circuits Solid state switching circuits Circuit- electronic switches - important terms - s rs - types of multivibrators - transistor astable mu circuit- electronic switches - important terms - s rs - types of multivibrators - transistor astable mu circuit - Differentiating circuit - Integrating circuit - Clip cidea of a clamper- Positive clamper - negative clam	sh-pull k and dback- Conce s – Col s – Col s – Cry witchin ltivibra	class relate Emitte I pitt's vstal co ig act tor – ircuits	B Po ed ter er 1 hour feed oscillat scillat 2 hour ion o transi	rs black tor – or – s f a stor		
Power amplif amplifier – C block diagram follower circu Unit:2 Introduction - oscillator -Tune Analysis - Pha Analysis. Unit:3 Introduction - transistor – m monostable m Clamping Circe Unit:4	iers – Clas characteristi n of a feedb it. Types of ed collector use shift os switching nultivibrator cuits - basic	A power amplifier – Push Pull connection – pu cs of an amplifier. Feedback amplifiers: feedbac ack amplifier- Transfer gain of an amplifier with fee Oscillators oscillators - Fundamental principle of oscillator - oscillator - Analysis - Hartley oscillators – Analysis cillator - Analysis - Wien bridge oscillator - Analysis cillator-Analysis - Wien bridge oscillator - Analysis cillator - Analysis - Wien bridge oscillator - Analysis circuit- electronic switches - important terms - s rs – types of multivibrators –transistor astable mu c - Differentiating circuit - Integrating circuit - Clip cidea of a clamper- Positive clamper – negative clam Power Electronics	sh-pull k and dback- Conce s – Colj s - Cry witchin ltivibra oping c per.	class relate Emitte I pt of pitt's of vstal of I g act: tor – ircuits	B Po ed ter er 1 hour 5 feed oscillat 2 hour ion o transi 5 – 2 hour	rs black tor - or - s f a stor s		
Power amplif amplifier – C block diagram follower circu Unit:2 Introduction - oscillator -Tune Analysis - Pha Analysis. Unit:3 Introduction - transistor – n monostable m Clamping Circu Unit:4 Introduction -	iers – Clas characteristi o of a feedb it. Types of ed collector ase shift ose - switching nultivibrator cuits - basic	Solid state switching circuits Solid state switching circuits Circuit- electronic switches - important terms - s rs - types of multivibrators - transistor astable mu circuit- electronic switches - important terms - s rs - types of multivibrators - transistor astable mu circuit - Differentiating circuit - Integrating circuit - Clip cidea of a clamper- Positive clamper - negative clam	sh-pull k and dback- Conce s – Col s – Col s – Cry witchin ltivibra oping co per.	class relate Emitte Interpret of pitt's of vistal construction Interpret of Vistal construction Int	B Po ed ter er <b>1 houn</b> F feed oscillat <b>2 hour</b> ion o transi s – <b>2 hour</b>	wer ms- rs lback tor - or - s f a stor s s cs		
Power amplif amplifier – C block diagram follower circu Unit:2 Introduction - oscillator -Tune Analysis - Pha Analysis - Pha Analysis. Unit:3 Introduction - transistor – n monostable m Clamping Circ Unit:4 Introduction - Applications. T Unijunction tra	iers – Clas characteristi n of a feedb it. Types of ed collector ase shift ose switching nultivibrator cuits - basic power ele The Diac - nsistor – C	Solid state switching circuits Solid state switching circuits Circuit- electronic switches - important terms - s rs - types of multivibrators - transistor astable multi- circuit- electronic switches - important terms - s rs - types of multivibrators - transistor astable multi- circuit- electronic switches - important terms - s rs - types of multivibrators - transistor astable multi- circuit- electronic switches - important terms - s rs - types of multivibrators - transistor astable multi- circuit- electronic switches - important terms - s rs - types of multivibrators - transistor astable multi- circuit - Differentiating circuit - Integrating circuit - Clip cidea of a clamper- Positive clamper - negative clamper Electronics ectronics - The Triac - Construction - Operatio - Operations - Applications of Diac - Lamp dim onstruction - Operations - equivalent circuit of UJT	sh-pull k and dback- Conce s – Colj s –	class relate Emitte I pt of pitt's o vstal o vstal o I I g act: tor – ircuits I I Charac heat cterist	B Po ed ter er <b>1 houn</b> F feed oscillat S cillat <b>2 hour</b> ion o transi S - <b>2 hour</b> cteristic contrics of	s s cs cs cs s cs s cs s cs cs s cs s		
Power amplif amplifier – C block diagram follower circu Unit:2 Introduction - oscillator -Tune Analysis - Pha Analysis - Pha Analysis. Unit:3 Introduction - transistor – n monostable m Clamping Circ Unit:4 Introduction - Applications. T Unijunction tra	iers – Clas characteristi n of a feedb it. Types of ed collector ase shift ose switching nultivibrator cuits - basic power ele The Diac - nsistor – C	Solid state switching circuits Solid state switching circuits Circuit- electronic switches - important terms - s rs - types of multivibrators - transistor astable mu circuit- electronic switches - inportant terms - s rs - types of multivibrators - transistor astable mu circuit- electronic switches - inportant terms - s circuit- electronic switches - inportant terms - s circuit- electronic switches - inportant terms - s stra - types of multivibrators - transistor astable mu circuit- electronic switches - inportant terms - s stra - types of multivibrators - transistor astable mu circuit - Differentiating circuit - Integrating circuit - Clip circuit - Differentiating circuit - Integrating circuit - Clip circuit - Differentiating circuit - Integrating circuit - Clip circuit - Applications of Diac - Lamp din	sh-pull k and dback- Conce s – Colj s –	class relate Emitte I pt of pitt's o vstal o vstal o I I g act: tor – ircuits I I Charac heat cterist	B Po ed ter er <b>1 houn</b> F feed oscillat S cillat <b>2 hour</b> ion o transi S - <b>2 hour</b> cteristic contrics of	rs lbac tor or - s f a stor s cs oller UJJ		

Unit:5	<b>Operational Amplifier</b>	11 hours
	amplifier - Basic circuit - Operation - CMRR - Operational ampl	
- Circuit s	ymbol - Frequency response - Slew rate - Applications - Inverting	g amplifier - Non
inverting an	nplifier - Adder - Subtractor - Integrator- Differentiator.	
Unit:6	Contemporary Issues	2 hours
Expert lect	ures, online seminars - webinars	
	Total Lecture hours	60
		00
Text Book		
	ations of Electronics, D Chattopadhyaya & P C Rakshit, New	w Age International
	hers, Second Edition (2005)	
-	bles of Electronics, V K Mehta, Rohit Mehta, S. Chand Compar	ny, Eleventh revised
Edition	n (2015)	
Reference	Books	
1 A text	book of Applied Electronics, R S Sedha, S. Chand Company, First l	Edition (2010)
2 Integra	ted Electronics, Jacob Millman and Christos C. Halkias, Tata Mc	Graw Hill Publishing
	any, Second edition (2015)	
3 Electro	onic devices and Circuits, S. Salivahanan and N. Sureshkumar,	Tata McGraw Hill
Publis	hing Company, Fourth edition (2016)	
	nline Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1 <u>https://</u>	nptel.ac.in/course.html/Electronics/Basic electrnics	
2 <u>https:/</u>	/www.askiitians.com/revision-notes/physics/solid-and-electronic-dev	ice/
3 <u>https:/</u>	/nptel.ac.in/course.html/electronics/operational amplifier	
	and the second second	
Course Des	igned By: Dr. U. Karunanithi	

Mappi	ng with I	Program	ne Outco	mes		-	6	S /		
COs	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10
CO1	S	M	E	M	S	M	5∂L	S	М	М
CO3	S	S	М	SU	JTM of	25	М	L	S	М
CO3	S	М	М	EDS/CA	TE TS EL	M	L	М	S	S
CO4	S	S	L	М	S	М	М	М	S	S
CO5	S	S	М	L	М	S	S	М	М	S

AD UNN S

\*S-Strong; M-Medium; L-Low

.

#### SEMESTER V

Course code	53C	SOLID STATE PHYSICS	L	Т	Р	С
Core/Elective/SB	S	CORE PAPER VII	4	0	0	4
Pre-requisite		The students should know the fundamentals on	Sylla		2021	-22
		kinds of bonds and classification of solids	Vers	ion	2021	- 2 2
Course Objective						
The main objecti		tructure and properties of solids.				
	•	<i>i</i> and optical properties of solids.				
	•	netic, electric and dielectric materials and their applic	cation.			
		ducting process for the fabrication of new devices.				
	•					
		-3E-510				
<b>Expected</b> Course						
		ion of the course, student will be able to:				
	Ū.	naterial for a given application based on Fermi level c	oncept		K3	
	Ũ	etic materials for utilization in varied fields.			K4	
Ű	-	onents or devices using dielectrics and superconducto			K6	
K1 - Remember;	K2 - Un	derstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	<mark>K6</mark> - C	reate		
TT •4 4	677				10.1	
Unit:1		Crystallography		A.	12 h	
lattice – Basis – – Miller indices	Crystal s – Elemer	alline and amorphous solids – Different features o tructure – Unit cell – Number of lattice points per ur nts of Symmetry – Structure of KCl and NaCl cryst onstant and density- Crystal structure (sc; hcp; fcc; bo	nit cell- al – At	Brav	ais lat	tices
lattice – Basis – – Miller indices Atomic radius – Unit:2 Classification of	Crystal s – Elemen Lattice co solids – 1	tructure – Unit cell – Number of lattice points per ur nts of Symmetry – Structure of KCl and NaCl cryst	nit cell- al – At cc.) – Spec	Brav comic	ais lat Packi 10 ho neat	tices ng – <b>Durs</b>
lattice – Basis – – Miller indices Atomic radius – Unit:2 Classification of capacity of solid levels.	Crystal s – Elemen Lattice co solids – 1	tructure – Unit cell – Number of lattice points per un nts of Symmetry – Structure of KCl and NaCl cryst onstant and density- Crystal structure (sc; hcp; fcc; bo Bond Theory of Solids Basics of Bond theory – Optical properties of solids ong and Pettit's law – Einstein's theory of specific	nit cell- al – At cc.) – Spec	Brav comic	ais lat Packi 10 ho neat ls – F	tices ng – <b>Durs</b> ermi
lattice – Basis – – Miller indices Atomic radius – Unit:2 Classification of capacity of solid levels. Unit:3	Crystal s – Elemen Lattice co solids – I ls – Dulc	tructure – Unit cell – Number of lattice points per un nts of Symmetry – Structure of KCl and NaCl cryst onstant and density- Crystal structure (sc; hcp; fcc; bo Bond Theory of Solids Basics of Bond theory – Optical properties of solids ong and Pettit's law – Einstein's theory of specific Magnetic Properties of Materials	hit cell- al – At cc.) – Spec heat of	Brav comic	ais lat Packi 10 ho neat ls – F 12 ho	tices ng – <b>Durs</b> ermi
lattice – Basis – – Miller indices Atomic radius – Unit:2 Classification of capacity of solid levels. Unit:3 Introduction – La Ferromagnetism	Crystal s – Elemen Lattice co solids – I ls – Dulc angevin's – Weiss stals – Qu	tructure – Unit cell – Number of lattice points per un nts of Symmetry – Structure of KCl and NaCl cryst onstant and density- Crystal structure (sc; hcp; fcc; bo Bond Theory of Solids Basics of Bond theory – Optical properties of solids ong and Pettit's law – Einstein's theory of specific	hit cell- al – At cc.) Spec heat of magnetince – F	Brav omic ific 1 solic ism – čerroe	ais lat Packi 10 ho heat ls – F 12 ho lectric	tices ng – <b>Durs</b> ermi <b>Durs</b> ity –
lattice – Basis – – Miller indices Atomic radius – Unit:2 Classification of capacity of solid levels. Unit:3 Introduction – La Ferromagnetism Ferroelectric crys	Crystal s – Elemen Lattice co solids – I ls – Dulc angevin's – Weiss stals – Qu	tructure – Unit cell – Number of lattice points per units of Symmetry – Structure of KCl and NaCl cryst constant and density- Crystal structure (sc; hcp; fcc; book Bond Theory of Solids Basics of Bond theory – Optical properties of solids ong and Pettit's law – Einstein's theory of specific Magnetic Properties of Materials theory of diamagnetism –Langevin's theory of Paran theory of Ferromagnetism –Nuclear magnetic resonant	hit cell- al – At cc.) Spec heat of magnetince – F	Brav omic ific 1 solic ism – čerroe	ais lat Packi 10 ho heat ls – F 12 ho lectric	tices ng – <b>ours</b> ermi ours ity – n of
lattice – Basis – – Miller indices Atomic radius – Unit:2 Classification of capacity of solic levels. Unit:3 Introduction – La Ferromagnetism Ferroelectric crys a paramagnetic so Unit:4 Free electron the	Crystal s – Elemen Lattice co solids – I ls – Dulc angevin's – Weiss stals – Qu alt.	tructure – Unit cell – Number of lattice points per units of Symmetry – Structure of KCl and NaCl cryst onstant and density- Crystal structure (sc; hcp; fcc; bo Bond Theory of Solids Basics of Bond theory – Optical properties of solids ong and Pettit's law – Einstein's theory of specific Magnetic Properties of Materials theory of diamagnetism –Langevin's theory of Paran theory of Ferromagnetism –Nuclear magnetic resonan uantum theory of paramagnetism – Cooling by adiaba Free Electron Theory ude Lorentz theory – Explanation of Ohm's law – E	hit cell- al – At cc.) – Spec heat of magnetince – F tic den	Brav comic ific 1 solic ism – Verroe nagne	ais lat Packi 10 ho neat ls – F 12 ho ductiv	ity – normality – nof
lattice – Basis – – Miller indices Atomic radius – Unit:2 Classification of capacity of solid levels. Unit:3 Introduction – La Ferromagnetism Ferroelectric crys a paramagnetic so Unit:4 Free electron the Thermal conduct	Crystal s – Elemen Lattice co solids – I ls – Dulo angevin's – Weiss stals – Qualt. sory – Dr ivity – V	tructure – Unit cell – Number of lattice points per units of Symmetry – Structure of KCl and NaCl cryst onstant and density- Crystal structure (sc; hcp; fcc; bo Bond Theory of Solids Basics of Bond theory – Optical properties of solids ong and Pettit's law – Einstein's theory of specific Magnetic Properties of Materials theory of diamagnetism –Langevin's theory of Paran theory of Ferromagnetism –Nuclear magnetic resonan uantum theory of paramagnetism – Cooling by adiaba Free Electron Theory ude Lorentz theory – Explanation of Ohm's law – E Vide-Mann and Franz ratio – Sommerfield model –	hit cell- al – At cc.) – Spec heat of magneti nce – F tic den – Electrica Schotc	Brav comic comic ific 1 solic ism – čerroe nagne	ais lat Packi 10 ho neat ls – F 12 ho lectric tizatio	ity – n of n of n of n of hall
lattice – Basis – – Miller indices Atomic radius – Unit:2 Classification of capacity of solid levels. Unit:3 Introduction – La Ferromagnetism Ferroelectric crys a paramagnetic so Unit:4 Free electron the Thermal conduct effect – Hall voi	Crystal s – Element Lattice construction solids – Dulc solids – Dulc angevin's – Weiss stals – Quant stals – Quant st	tructure – Unit cell – Number of lattice points per units of Symmetry – Structure of KCl and NaCl cryst onstant and density- Crystal structure (sc; hcp; fcc; book and density- Cook and density- Cook and franz ratio – Sommerfield model – Hall coefficient – Mobility and Hall angle – Impo	hit cell- al – At cc.) – Spec heat of magneti nce – F tic den – Electrica Schotc	Brav comic comic ific 1 solic ism – čerroe nagne	ais lat Packi 10 ho neat ls – F 12 ho lectric tizatio	ity – n of n of n of n of hall
lattice – Basis – – Miller indices Atomic radius – Unit:2 Classification of capacity of solid levels. Unit:3 Introduction – La Ferromagnetism Ferroelectric crys a paramagnetic so Unit:4 Free electron the Thermal conduct effect – Hall voi	Crystal s – Element Lattice construction solids – Dulc solids – Dulc angevin's – Weiss stals – Quant stals – Quant st	tructure – Unit cell – Number of lattice points per units of Symmetry – Structure of KCl and NaCl cryst onstant and density- Crystal structure (sc; hcp; fcc; bo Bond Theory of Solids Basics of Bond theory – Optical properties of solids ong and Pettit's law – Einstein's theory of specific Magnetic Properties of Materials theory of diamagnetism –Langevin's theory of Paran theory of Ferromagnetism –Nuclear magnetic resonan uantum theory of paramagnetism – Cooling by adiaba Free Electron Theory ude Lorentz theory – Explanation of Ohm's law – E Vide-Mann and Franz ratio – Sommerfield model –	hit cell- al – At cc.) – Spec heat of magneti nce – F tic den – Electrica Schotc	Brav comic comic ific 1 solic ism – čerroe nagne	ais lat Packi 10 ho neat ls – F 12 ho lectric tizatio	ity – n of n of n of n of hall
lattice – Basis – – Miller indices Atomic radius – Unit:2 Classification of capacity of solid levels. Unit:3 Introduction – La Ferromagnetism Ferroelectric crys a paramagnetic so Unit:4 Free electron the Thermal conduct effect – Hall vo Experimental det	Crystal s – Element Lattice construction solids – Dulc solids – Dulc angevin's – Weiss stals – Quant stals – Quant st	tructure – Unit cell – Number of lattice points per units of Symmetry – Structure of KCl and NaCl cryst onstant and density- Crystal structure (sc; hcp; fcc; bother in the structure (sc; hcp; fcc; bother in the structure) and the structure of Solids Basics of Bond theory – Optical properties of solids ong and Pettit's law – Einstein's theory of specific Magnetic Properties of Materials theory of diamagnetism –Langevin's theory of Parameter theory of Ferromagnetism –Nuclear magnetic resonant uantum theory of paramagnetism – Cooling by adiaba Free Electron Theory ude Lorentz theory – Explanation of Ohm's law – E Vide-Mann and Franz ratio – Sommerfield model – Hall coefficient – Mobility and Hall angle – Impo on of Hall coefficient.	hit cell- al – At cc.) – Spec heat of magneti nce – F tic den – Electrica Schotc	Brav comic comic ific 1 solic ism – čerroe nagne	ais lat Packi 10 ho heat ls – F 12 ho ductiv fect – all effe	ity – nors ity – nof ours ity – hall ect –
lattice – Basis – – Miller indices Atomic radius – Unit:2 Classification of capacity of solid levels. Unit:3 Introduction – La Ferromagnetism Ferroelectric crys a paramagnetic s Unit:4 Free electron the Thermal conduct effect – Hall vo Experimental det Unit:5	Crystal s – Element Lattice construction solids – I solids – Dulconstruction angevin's – Weiss stals – Quant stals – Q	tructure – Unit cell – Number of lattice points per units of Symmetry – Structure of KCl and NaCl cryst constant and density- Crystal structure (sc; hcp; fcc; bother in the structure (sc; hcp; fcc; bother in the structure) and Pettit's law – Optical properties of solids ong and Pettit's law – Einstein's theory of specific Magnetic Properties of Materials theory of diamagnetism –Langevin's theory of Parameter resonant theory of Ferromagnetism –Nuclear magnetic resonant uantum theory of paramagnetism – Cooling by adiaba Free Electron Theory ude Lorentz theory – Explanation of Ohm's law – E Vide-Mann and Franz ratio – Sommerfield model – Hall coefficient – Mobility and Hall angle – Impo on of Hall coefficient.	hit cell- al – At cc.) Spec heat of magnetince – F tic den	Brav comic comic ific 1 ific 1 solic ism – cerroe nagne	ais lat Packi 10 ho heat ls $- F$ 12 ho lectric: tizatio 12 ho ductiv fect $-$ all effe	ity – nors ity – nof ity – Hall ect –
lattice – Basis – – Miller indices Atomic radius – Unit:2 Classification of capacity of solic levels. Unit:3 Introduction – La Ferromagnetism Ferroelectric crys a paramagnetic so Unit:4 Free electron the Thermal conduct effect – Hall vo Experimental det Unit:5 Dielectrics- Diel molecular polari	Crystal s – Element Lattice co solids – I solids – Dulc angevin's – Weiss stals – Qualt. Fory – Dr ivity – V Itage and eerminatic lectric co izability erconduct	tructure – Unit cell – Number of lattice points per units of Symmetry – Structure of KCl and NaCl cryst onstant and density- Crystal structure (sc; hcp; fcc; bother in the structure (sc; hcp; fcc; bother in the structure) and the structure of Solids Basics of Bond theory – Optical properties of solids ong and Pettit's law – Einstein's theory of specific Magnetic Properties of Materials theory of diamagnetism –Langevin's theory of Parameter theory of Ferromagnetism –Nuclear magnetic resonant uantum theory of paramagnetism – Cooling by adiaba Free Electron Theory ude Lorentz theory – Explanation of Ohm's law – E Vide-Mann and Franz ratio – Sommerfield model – Hall coefficient – Mobility and Hall angle – Impo on of Hall coefficient.	hit cell- al – At cc.) - Spec heat of magneting nce – F tic den - Electrica Schotc rtance	Brav omic omic ific f solic ific f solic issm – erroe nagne	ais lat Packi 10 ha heat ls - F 12 ha lectric: tizatio 12 ha ductiv fect - all effe 12 h	ours ours ermi ity – n of ours ity – Hall ext – ours c or

Unit	:6	Contemporary Issues	2 hours
Expe	rt lectures,	online seminars - webinars	
		Total Lecture hours	60
Text	Book(s)		
1	Solid State	e Physics Gupta and Kumar, K. Nath & Co. (2018)	
2	Modern P	hysics R Murugesan, S Chand Publishing; Eighteenth edition (2016)	
	•		
Refe	rence Book	S	
1	Introduction	on to Solid State Physics Charles Kittel, Wiley (2019)	
2	Solid State	e Physics A J Dekker, Macmillan (2011)	
Relat	ted Online	Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://you	itu.be/RImqF8z91fU	
2	https://npt	el.ac.in/courses/115/105/115105099/	
Cour	se Designed	By: Mr. J. William Charles	

Course Designed By: Mr. J. William Charles

Mappi	Mapping wit <mark>h Progra</mark> mme Outcomes												
COs	PO1	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	PO8	PO9	PO10			
CO1	S	S	М	S	S	S	M	M	S	М			
CO2	М	M	S	S	М	S	S	M	М	S			
CO3	М	S	S	S	S	S	S	S	S	S			

Comparing 2 ministers

## SEMESTER V

		SEMESTER V			1	
Course code	53D	ELECTRICITY AND MAGNETISM	L	Т	Р	С
Core/Elective/S	SBS	CORE PAPER VIII	4	0	0	4
Pre-requisite		The students are supposed to have the basic	Syll	abus	202	1_22
		knowledge of electricity and magnetism	Ver	sion	202	1-22
Course Object						
The main objec						
		miliar with the laws of electricity and magnetism and	their v	verifica	ations	
		rties of electric and magnetic materials				
3. acquire exp	perimental	skills to construct technically useful devices.				
Expected Cour	rea Autaan	2002				
_		tion of the course, student will be able to:				
		ne laws of electricity and magnetism			K2	
		ge of properties and magnetism			K2 K3	
· F · · · · ·						
_		to manufacture devices	V	<b>~</b> ,	K5	
KI - Rememb	er; <b>K</b> 2 - Ui	nderstand; <b>K3</b> - Apply; <b>K4</b> - Analyze; <b>K5</b> - Evaluate;	K0 - (	reate		
TI	CT			1	<u> </u>	
Unit:1		heorem and its Applications ons of Gauss theorem: Electric intensity at a point	1 .		2 hou	
	<b>.</b> .				•	
A	•	at a point near an infinite charged conductor - Elec				
point between	two <mark>para</mark> lle	l plane charged conductors - Electric intensity at a	point	outsid	e two	1
parallel plane	charged c	onductors - Energy stored per unit volume of a	n ele	ctric	field.	
	-	- principle of a capacitor – capacitance of a spherical				
		bhere earthed – cylindrical capacitor – capacity of				
		electric – capacitors in series and parallel – Guard-I	king c	onden	ser –	
mica capacitor	– uses of ca	apacitors.	3			
Unit:2	91	lagnetic Properties of Materials	2/	1	2 hou	irc
	1 4 7 P 10	tism; dia, para, ferromagnetism and their properties	mogno			
		c field intensity H; magnetic susceptibility and magn				
magnetic mate	rials and	magnetization; magnetic hysteresis - area of the	hyst	erisis	loop;	
determination of	of susceptib	ility: Guoy's method - magnetic circuits -comparison	of ele	ctrical	l	
circuit with ma	-					
	<u> </u>	ADUCATE TO ELEVATE				
Unit:3		Thermo Electricity		1	1 hou	ırs
Seebeck effect	– Laws of	thermo e.m.f - Peltier effect; Peltier Co- efficient -	- deter	minati	ion of	2
Peltier co-effic	ient – the	rmodynamical consideration of Peltier effect – Th	omso	n effe	ect –	-
		e.m.f generated in a thermocouple taking both Po				
					and	Ļ
		als - Thermoelectric power - Application of thermody	/namic	es to		
Thermocouple -	– Thermoel	ectric diagrams and their uses.				
Unit:4	H	lelmholtz Equation of Varying Current		1	1 hou	irc
		ent in an inductive – resistive circuit – charging and	disch			
	•	÷ ÷			-	
		ance – growth of charge in a circuit with inductance			e and	•
		on a current loop in a magnetic field – Theory of	Ballist	1C		
Galvanometer -	- correction	for damping – current and voltage sensitivities.				

Ur	nit:5	Dynamics of Charged Particles	12 hours
Mo	tion of a ch	narged particle in a uniform electric field – longitudinal – tran	nsverse – motion of
		e in alternating electric field - motion of charged particle i	
		l - Motion of charged particle in crossed electric and	
		ic Induction: A conducting rod moving through a uniform	
		eries - inductance in parallel - self-inductance of co-axial cylin	
indu	ictance of	toroidal coil of rectangular cross-section - self -inductance of	of toroidal coil of
circ	ular cross se	ection.	
	nit:6	Contemporary Issues	2 hours
Ex	pert lecture	s, online seminars - webinars	
		Total Lecture hours	60
Te	xt Book(s)	ക്കാക്കും	
1	•	and Magnetism, Brijlal and Subramaniam, Educational and Ur	niversity Publishers
	(1984)		
2	Electricity	and Magnetism, R. Murugesan, S.Chand&Co (2017)	
Re	ference Bo	oks	
1	Electricit	y and Magnetism, D.N. Vasudeva, S.Chand&Co, twelfth editio	<mark>n</mark> (2007)
2	Electricit	y an <mark>d Magnet</mark> ism, Nagarathanam and Lakshminar <mark>aya</mark> nan,	7
Re		ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://w	ww.askiitians.com/revision-notes/physics/current-electricity.	<u>html</u>
2		ww.askiitians.com/revision-notes/physics/electromagnetic-in	duction-and-
	<u>alternati</u>	ng-current/	
			2
Co	ourse Design	ned By: Dr. P. Sagunthala and Dr. K.A.Vijayalakshmi	S

Mappi	ng with	Program	mme Ou	itcom <mark>es</mark>	Coimbaik	see -		Con la constante da la constan		
COs	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	<b>PO8</b>	PO9	PO10
CO1	S	Μ	S 🍕	M	М	S	S	M	Μ	S
CO2	S	М	М	M	S	M	M	S	S	М
CO3	S	S	S	S	SU E	S	S	S	S	S

		SEMESTER V				
Course code	5ZC	INSTRUMENTATION III	L	Т	Р	С
Core/Elective/	/SBS	SKILL BASED SUBJECT	3	0	0	3
Pre-requisite	•	The students should be able to distinguish between	-	abus	2021	-22
		analog and digital measurement and their importance	Ver	sion		
Course Objec		2.11				
		f this course are to:			1.	
		to the working of digital and analog techniques used in m	easure	ment	aevice	S.
		ts to use electronic testing instruments. l instrumentation.				
5. Introduce	meuica	i instrumentation.				
Expected Cou	irse Ou	tcomes:				
		mpletion of the course, student will be able to:				
		principles of biomedical instruments.			K1	
	-	ents to understand the working of basic electromagn	otio a	nd	K1 K2	
electroni			enc a	ina	K2	
		ose electronic components.			K3	
	-	al testing and maintenance of lab equipment.			K4	
,		ple electronic circuits using multimeters and oscilloscope	2		K5	
		of Biomedical measurement.	<i>.</i>		K6	
-		- Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	V6 (	-		
Unit:1		Data Acquisition and Conversion	_		7 ho	1186
	<u> </u>			-	-	
		l conditioning of the inputs – Single channel data acquis to Analog converter – Analog to Digital converter.	sition s	systen	ns – 1	Jata
	Digital	to Analog converter - Analog to Digital converter.		- ^		
Unit:2	6	Basic meter movements	R.	/ /	9 ho	urs
	gnetic r	noving coil movements – Practical PMMC movements	<u>— м</u>	loving	ion	type
		ic vane repulsion type (Moving ion type) – Display device				<b>J</b> I
		Colmbature	/			
Unit:3		Digital Instruments			9 ho	urs
		l Multimeter – Digital panel meters – Digital frequen				
Measurement of	of time	- Universal counter - Digital measurement of frequency -	- Digit	al Tac	chome	ter.
<b>T</b> T <b>1</b> / 4	1	-OUCATE TO ELEVATE			0.1	
Unit:4	<u> </u>	Oscilloscope		51	9 ho	
	-	principles – CRT features – Basic principles of signal disp	•			-
of oscilloscope triggered swee		nple CRO – Vertical amplifier – Horizontal deflecting s	ystem	– De	lay III	ie in
inggered swee	p-CK	r connection.				
Unit:5	Biom	edical Instrumentation			9 ho	urs
Basics of Bion	nedical	Instrumentation system – Blood flow measurement – mag	netic t	lood	flow r	ate
		ECG-EEG-EMG -X-ray Imaging and CT scan- MRI scan.				
<b>T</b> T <b>1</b> 4 <b>4</b>						
Unit:6		emporary Issues			2 ho	ours
Expert lecture	es, oniir	ne seminars – webinars				
		Total Lecture hours				45
						45

Те	ext Book(s)
1	Instrumentation Devices and Systems, C.S. Rangan, G. R. Sarma and V. S. Mani, 2 <sup>nd</sup> Edition,
	Tata McGRaw Hill, New Delhi (1983)
2	Electronic Instrumentation, H. S. Kalsi, 3 <sup>rd</sup> edition, Tata McGraw Hill, New Delhi (2012)
3	Electronics in Medicine and Biomedical Instrumentation, N. K. Jog, 2 <sup>nd</sup> Edition, Prentice Hall
	India, New Delhi (2013)
Re	eference Books
1	Measurement System Applications and Design, E.O. Doebalin, 5 <sup>th</sup> edition, McGraw Hill
	International (2007)
2	Transducers and Instrumentation, D. V. S. Murthy, 2 <sup>nd</sup> edition, Prentice Hall of India (2010)
3	Biomedical Instrumentation and Measurements, Leslie Crombwell, Fred.J.Weibell,
5	Trich.A.Pfeiffer, Prentice Hall of India (1997).
	60,000,000,000
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	PMMC
	https://youtu.be/n1MinLtvnPY
2	NPTEL Play list
	https://www.youtube.com/watch?v=3eYmFjHnQjY&list=PL227ZNwByTITGq1atJsFst_qnEpt
	<u>18700</u>
3	Biomedical instrumentation- nptel -youtube channel
	https://www.youtube.com/watch?v=f949gpKdCI4&list=PLCDqPRbvMlPCt0pnGB-
	15ftPSGCMOuDv0
~	and the second state of th
Co	ourse Designed By: Mrs J.Jayachitra, Dr.L.Priya

Mappii	ng with	Program	me Out	comes	1112		62	1	1	1
COs	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10
CO1	S	L	L	М	S	M	М	М	S	S
CO2	S	S	L	S	S	S	S	M	M	М
CO3	S	S	SS	S	S	S	S	Μ	S	S
<b>CO4</b>	S	S	S S	Μ	S	S	M	М	S	М
CO5	S	S	М	M	JIM0 I	2F	М	М	L	М
CO6	S	L	L	M	E SO E	M	L	М	S	S



## SEMESTER – VI

Course code	63A	QUANTUM MECHANICS AND RELATIVITY	L	Т	Р	С
Core/Elective	/SBS	CORE PAPER IX	6	0	0	4
Pre-requisite		The students are expected to have a knowledge of particle nature and wave nature of matter		abus sion	2021	1-22
Course Objec	tives:	-				
The main obje	ctives of th	is course are to:				
		ve property of matter				
	0	of uncertainity principle and its applications				
3. apply th	e concept o	of relativity to solve various physical problems				
	0.1					
Expected Cou						
	Ĩ	tion of the course, student will be able to:				
-		dge of wave nature of matter and its experimental verif			K2	
	nd Heisenb nd nuclear	erg uncertainity principle and apply it to verify proble. Physics	ms in		K3	
		behind various physical problems using relativity and	solve		K5	
	or: <b>K2</b> U	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; H	Z6 (	Tranta		
		iderstand, No Apply, NI Analyze, No Dialatte, I	10 0	noute		
velocity – Ana	alytical trea	Wave Properties of Mattere wavelength – Phase velocity – Expression for Phaatment – Expression for group velocity – Relation betw $(v_p)$ – Velocity of de Broglie wave – (i)Phase velocity	ween	locity group	velo	oup city
velocity – Ana (v <sub>g</sub> ) and phase velocity (v <sub>g</sub> ). Thomson's ex	alytical trea e velocity Verification	e wavelength – Phase velocity – Expression for Pha timent – Expression for group velocity – Relation betw $(v_p)$ – Velocity of de Broglie wave – (i)Phase veloc n of de Broglie relation – Davisson and Germer's experi	ween ity (v	locity group (p) – s – G	– Gr velo (ii)Gr P	oup city oup
velocity – Ana (v <sub>g</sub> ) and phase velocity (v <sub>g</sub> ). Thomson's ex <b>Unit:2</b>	alytical trea e velocity Verification periment.	e wavelength – Phase velocity – Expression for Pha atment – Expression for group velocity – Relation betw (v <sub>p</sub> ) – Velocity of de Broglie wave – (i)Phase veloc n of de Broglie relation – Davisson and Germer's experi	ween ity (v iments	locity group $(p_p) - (G_1)$ $(s - G_2)$	– Gr velo (ii)Gr P	oup city oup urs
velocity – Ana (vg) and phase velocity (vg). Thomson's ex Unit:2 Introduction – Momentum – E Illustration – Di	alytical trea e velocity Verification periment. Uncertain Energy and iffraction o – Non-exis	e wavelength – Phase velocity – Expression for Pha timent – Expression for group velocity – Relation betw $(v_p)$ – Velocity of de Broglie wave – (i)Phase veloc n of de Broglie relation – Davisson and Germer's experi	ween ity (v iments isplac tainty ought	locity group (p) = - s = G $(1)$ ement Princ exper	- Gr velo (ii)Gr P 17 hor and iple - iment	oup city oup urs
velocity – Ana (v <sub>g</sub> ) and phase velocity (v <sub>g</sub> ). Thomson's ex <b>Unit:2</b> Introduction – Momentum – H Illustration – Di – Applications	alytical trea e velocity Verification periment. Uncertain Energy and iffraction o – Non-exis	e wavelength – Phase velocity – Expression for Pha timent – Expression for group velocity – Relation betw (v <sub>p</sub> ) – Velocity of de Broglie wave – (i)Phase veloc n of de Broglie relation – Davisson and Germer's experi Uncertainty Principle ty Principle – Elementary proof between – D Time – Physical Significance of Heisenberg's Uncer f electrons through a slit – Gamma ray microscope the	ween ity (v iments isplac tainty ought	locity group p) - s - G	- Gr velo (ii)Gr P 17 hor and iple - iment	oup city oup urs l
velocity – Ana (v <sub>g</sub> ) and phase velocity (v <sub>g</sub> ). Thomson's ex <b>Unit:2</b> Introduction – Momentum – E Illustration – D – Applications state of Hydrog <b>Unit:3</b> Introduction – Time-dependent function – Ope Kinetic Energy	Alytical treater velocity Verification periment. Uncertain Energy and iffraction of Non-existing en atom. Wave func- t and Tim rators – Et and Total	e wavelength – Phase velocity – Expression for Pha atment – Expression for group velocity – Relation betw (v <sub>p</sub> ) – Velocity of de Broglie wave – (i)Phase veloc n of de Broglie relation – Davisson and Germer's experi- <u>Uncertainty Principle</u> ty Principle – Elementary proof between – D Time – Physical Significance of Heisenberg's Uncer f electrons through a slit – Gamma ray microscope the stence of free electrons in the nucleus – Size and Ener	ween ity (v iments isplac tainty ought gy in onal v ormali erator	locity group p) - s - G ement Princ exper the g	- Gr velo (ii)Gr P <b>17 hou</b> and iple - iment round <b>18 hou</b> equati	oup city oup urs l urs on – wave itum,
velocity – Ana (v <sub>g</sub> ) and phase velocity (v <sub>g</sub> ). Thomson's ex <b>Unit:2</b> Introduction – Momentum – E Illustration – D – Applications state of Hydrog <b>Unit:3</b> Introduction – Time-dependent function – Ope Kinetic Energy	Alytical treater velocity Verification periment. Uncertain Energy and iffraction of Non-existing en atom. Wave func- t and Tim rators – Et and Total	e wavelength – Phase velocity – Expression for Pha atment – Expression for group velocity – Relation betv (v <sub>p</sub> ) – Velocity of de Broglie wave – (i)Phase veloc n of de Broglie relation – Davisson and Germer's experi Uncertainty Principle ty Principle – Elementary proof between – D Time – Physical Significance of Heisenberg's Uncer of electrons through a slit – Gamma ray microscope the stence of free electrons in the nucleus – Size and Ener Schrödinger's Wave Equation etion for a free particle – Schrödinger's one-dimension e independent – Limitations of wave function – No igen function – Eigen Value – Eigen equation – Ope l Energy – Postulates of Quantum Mechanics – Orthology	ween ity (v iments isplac tainty ought gy in onal v ormali erator	locity group p) - s - G	- Gr velo (ii)Gr P <b>17 hou</b> and iple - iment round <b>18 hou</b> equati	oup city oup urs l - - wave itum, ergy

T.I.	nit:5 Relativity	18 hou	
	lilean Transformation equation – Ether Hypothesis	• • •	
	the Negative results - special theory of Relativity		-
	ntraction - Time dilation - Addition of Velocities -	- Variation of Mass with velocity – Mass ener	gy
equi	iivalence.		
Ur	nit:6 Contemporary Issu	sues 2 hour	rs
Ex	xpert lectures, online seminars - webinars		
		Total Lecture hours   9	90
Te	ext Book(s)	· · ·	
1	Elements of Quantum Mechanics, Kamal Singh,	S.P Singh, S. Chand & Co. (2005)	
2	Quantum Mechanics, S.P Singh, M. K Bagde, S. C	Chand & Co., second edition (2004).	
3	Modern Physics, R Murugesan, S .Chand & Co.	(2016)	
		~ ~ ~ ~	
Re	eference Books	9 m	
1	Quantum Mechanics, Sathya Prakash, C.K.Singh	h, Kedar Nath Ram Nath&Co.(1997)	
2	Quantum Mechanics, Schiff, Tata McGraw-Hill,	, second edition, (1968).	
Re	elated Online C <mark>ontents [MOOC, SWAYAM, NP</mark>	PTEL, We <mark>bsit</mark> es etc.]	
1	https://www.youtube.com/playlist?list=PLbMVog	gVj5nJTDMhThY9xu2Tvg0u1RPuxO	
2	https://medium.com/predict/what-is-quantum-medictractur-quantum-medictractur-quantum-medictractur-quantum-medictractur-quantum-medictractur-quantum-medictractur-quantum-medictractur-quantum-medictractur-quantum-medictractur-quantum-medictractur-quantum-medictractur-quantum-medictractur-quantum-medictractur-quantum-medictractur-quantum-medictractur-quantum-medictractur-quantum-medictractur-quantum-medictractur-quantum-medictractur-quantum-medictractur-quantum-quantum-medictractur-quantum-medictractur-quantum-medictractur-quantum-medictractur-quantum-medictractur-quantum-quantum-medictractur-quantum-qua	echanics-what-is-theory-of-relativity-	
	fdbe87eb9c79		
3	https://www.askiitians.com/revision-notes/physics	cs/special-theory-of-relativity/	
Co	ourse Designed By: Dr P. Sagunthala		

		9	Mapp	ing with	Program	me Outc	omes	13		
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	М	М	M	M	М	S	М	М	М
CO2	S	S	S	MAL	IS -	S	М	М	S	S
CO3	М	S	S	S	S	S	S	S	S	S

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### SEMESTER VI

		SEMESTER VI	-			
Course code	63B	NUCLEAR PHYSICS	L	Т	P	С
Core/Electiv	ve/SBS	CORE PAPER X	6	0	0	4
Pre-requisite		The students should have knowledge of the basic constituents of atoms. They should be familiar with the structure of atoms and nucleus.		abus sion	202	21-22
<b>Course Object</b>	ives:					
The main objec		s course are to:				
	v	e to understand about nucleus and nucleus structure.				
		rent types of radiation detectors and particle accelerate	rs			
•		y phenomenon of nucleus				
process		to analyze the energy released by the nucleus during	the fi	ssion	and f	usion
5. acquire the	e basic kno	wledge of cosmic rays and elementary particles.				
Expected Cour	se Auteon					
		etion of the course, student will be able to:				
		ral properties of Nucleus			K	<u>ר</u>
		tion and working of radiation detectors			K4	
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	tilizing the behavior of nuclear particles			K	5
K1 - Rememb	er; <b>K2 -</b> Ui	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; I	<u> 16 – (</u>	Create	1	
Unit:1		Introduction to the Nucleus			16 ho	
stability – Nuc	clear forces rop model	ng energy – BE/A and stability of Nucleus – Packin – Definition – Properties – Meson theory – Model or – Semi-Empirical mass formula – The Shell model - odel.	Nuc	lear S	tructi	ure –
	9					
Unit:2		Detector and Particle Accelerators			18 ha	
Gamma ray-Io	onization cl	energetic particles and matter – Heavy charged par namber – Solid State detector – GM counter – Wilso r accelerators – Cyclotron – Betatron.				
Unit:3		Radioactivity			18 ha	lire
	activity _ 4	Alpha, Beta and Gamma rays – Properties – Determina	tion 4			Juis
Alpha particle – determinatio Laws of Radi Half life perio	– Determin on of Wave oactivity – od – Mean	nation of Charge of Alpha particle – Determination of length of Gamma rays (Dumond Spectrometer) – Orig Soddy-Fajan's displacement law – Law of Radioac life period (Definitions, Expression) – Units of Radio on of radio elements – Application of radio isotopes.	e/m of in of tive of	of Bet Gamr lisinte	a par na ra gratio	ys – on –
Unit:4		Nuclear Fission and Fusion Reactions			18 ha	nire
Nuclear fission Chain reaction Atom Bomb –	n – Energ n – Multipl Nuclear re	y released in Fission – Bohr and Wheeler's theory ication factor – Critical size – Natural Uranium an eactor – Nuclear fusion – Source of Stellar energy – Ca Hydrogen bomb – Controlled thermonuclear reactions.	nd cha	iclear ain re	fissi actic	on – ons –

Unit:5	Cosmic Rays and Elementary Particles	18 hours
Cosmic rays -	- Origin of cosmic rays – Latitude effect – Azimuthal effect – A	Attitude effect –
Seasonal, Dia	gonal changes - Primary and Secondary Cosmic rays - casca	de theory of shower -
Pair production	on and Annihilation - Van Allen Belts - Elementary particles -	Introduction –
particles and a	antiparticles – Antimatter – The fundamental interactions – The	Quark model.
Unit:6	Contemporary Issues	2 hours
Expert lecture	es, online seminars – webinars	
		1
	Total Lecture hours	90
Text Book(s)		
1 Modern P	hysics, R Murugesan, S. Chand Publishing, 18th Edition (2017)	
2 Nuclear P	hysics, D C Tayal, Publish <mark>er Himalaya Publishing H</mark> ouse (2009	).
	an a	
Reference Bo	ooks	
1 Concept o	f Modern Physics, Arthur Beiser, McGraw-Hill, (2007).	
	on to Modern Physics, F K Richtmyer Etal, McGraw-Hill; 6th e	dition (1969).
Deleted Only	na Cantanta IMOOC SWAVAM NEEL Websites at a	
	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
· · ·	<u>btel.ac.in/courses/115/104/115104043/</u>	
	<u>btel.ac.in/courses/115/103/115103101/</u>	
3 <u>https://w</u>	ww.youtube.com/watch?v=xrk7Mt2fx6Y	
C	and Day Day V. Calasta in	
Course Desig	ned By: Dr. K. Selvaraju	

C	~ /			PO4	PO5	PO6	<b>PO7</b>	PO8	<b>PO9</b>	PO10
S	S	Μ	М	S	М	М	М	S	M	М
M	M	Solo	S	М	L	M	S	M	S	S
S	S	M	S	S	S	S	S	S	S	S
	S	М	S		S		~	CA M	S	-

Page **42** of **91** 

## SEMESTER V&VI

	63P	<b>CORE PRACTICAL III ELECTRONICS</b> (Examination at the end of Sixth Semester)	L	Т	Р	C
Core/Elective	e/SBS	CORE PRACTICAL	0	0	2	3
Pre-requisite		Should have the fundamental knowledge of Basic Electronics	Syllab Versio		2021	1 - 22
<b>Course Obje</b>						
		is course are to:				
		les of Basic Electronics into Experimental techniqu	es			
÷	•	t different electronic gadgets.	1 1.0			
3. motivate t	he students	to apply the principles of electronics in their day-t	o-day lif	e.		
Expected Co	urso Autoo	mage				
		tion of the course, student will be able to:				
		es of Power supplies, Amplifiers and Oscillators			K4	
-						
2 to analy and Sola		acteristics of various Electronic devices like BJT, U	JI, LDR	,	K4	
		dge of the characteristics of an operational amplifie	r		K5	
*		nderstand; K3 - Apply; K4 - Analyze; K5 - Evalua		Tranta		
KI - Kemenie	<i>i</i> , <b>i</b>	iderstand, KS - Appry, K4 - Anaryze, K5 - Evalua	ic, <b>IX</b> 0 - v		1	
	-	LIST OF EXPERIMENTS			56 h	oure
		(Any twelve experiments)			30 1	ioui s
1. Logic C	Gates using	diodes and transistor.				
	0					
	rectifier wit	h Zener voltage regulator				
2. Bridge	rectifier wit ed Power S	h Zener voltage regulator				
<ol> <li>Bridge</li> <li>Regulat</li> </ol>		h Zener voltage regulator upply - IC	16			
<ol> <li>Bridge</li> <li>Regulat</li> <li>Dual Po</li> <li>Voltage</li> </ol>	ed Power S ower Supply Doubler	ch Zener voltage regulator upply - IC	<sup>n</sup> G <sub>lb</sub>			
<ol> <li>Bridge</li> <li>Regulat</li> <li>Dual Po</li> <li>Voltage</li> <li>Charact</li> </ol>	ed Power S ower Supply Doubler eristics of 7	ch Zener voltage regulator upply - IC // Fransistor - CE mode	and Old			
<ol> <li>Bridge</li> <li>Regulat</li> <li>Dual Po</li> <li>Voltage</li> <li>Charact</li> <li>Different</li> </ol>	ed Power S ower Supply Doubler eristics of 5 ntiating and	ch Zener voltage regulator pupply - IC Fransistor - CE mode Integrating Circuits.				
<ol> <li>Bridge</li> <li>Regulat</li> <li>Dual Po</li> <li>Voltage</li> <li>Charact</li> <li>Different</li> <li>Clippin</li> </ol>	ed Power S ower Supply Doubler eristics of 7 ntiating and g and Clam	th Zener voltage regulator hupply - IC Transistor - CE mode Integrating Circuits. ping Circuits	and the second			
<ol> <li>Bridge</li> <li>Regulat</li> <li>Dual Pe</li> <li>Voltage</li> <li>Charact</li> <li>Different</li> <li>Clippin</li> <li>Single-st</li> </ol>	ed Power S ower Supply Doubler ceristics of C ntiating and g and Clam stage Trans	ch Zener voltage regulator pupply - IC Fransistor - CE mode Integrating Circuits.	979. 999.			
<ol> <li>Bridge</li> <li>Regulat</li> <li>Dual Po</li> <li>Voltage</li> <li>Charact</li> <li>Charact</li> <li>Different</li> <li>Clippin</li> <li>Single-st</li> <li>Emitted</li> </ol>	ed Power S ower Supply Doubler eristics of 7 ntiating and g and Clam stage Trans r Follower	h Zener voltage regulator hupply - IC Transistor - CE mode Integrating Circuits. ping Circuits istor Amplifier- R.C. Coupled	07(9). (9)			
<ol> <li>Bridge</li> <li>Regulat</li> <li>Dual Po</li> <li>Voltage</li> <li>Charact</li> <li>Charact</li> <li>Different</li> <li>Clippin</li> <li>Single-s</li> <li>Emitte</li> <li>Series</li> </ol>	ed Power S ower Supply Doubler eristics of 7 ntiating and g and Clam stage Trans r Follower and Parallel	h Zener voltage regulator hupply - IC Transistor - CE mode Integrating Circuits. ping Circuits istor Amplifier- R.C. Coupled	on Ore			
<ol> <li>Bridge</li> <li>Regulat</li> <li>Dual Pe</li> <li>Voltage</li> <li>Charact</li> <li>Charact</li> <li>Different</li> <li>Clippin</li> <li>Single-st</li> <li>Emitted</li> <li>Series</li> <li>Hartley</li> </ol>	ed Power Supply bower Supply boubler ceristics of C ntiating and g and Clam stage Trans r Follower and Parallel / Oscillator	Transistor - CE mode Integrating Circuits. ping Circuits istor Amplifier- R.C. Coupled	97(9)-69-69-69-69-69-69-69-69-69-69-69-69-69-			
<ol> <li>Bridge</li> <li>Regulat</li> <li>Dual Po</li> <li>Voltage</li> <li>Charact</li> <li>Charact</li> <li>Different</li> <li>Clippin</li> <li>Single-st</li> <li>Emitted</li> <li>Series</li> <li>Hartley</li> <li>Colpitt</li> </ol>	ed Power S ower Supply Doubler eristics of C ntiating and g and Clam stage Trans: r Follower and Parallel / Oscillator 's Oscillato	Transistor - CE mode Integrating Circuits. ping Circuits istor Amplifier- R.C. Coupled I resonance circuits – Solid State r – Solid State	970) 100			
<ol> <li>Bridge</li> <li>Regulat</li> <li>Dual Pe</li> <li>Voltage</li> <li>Charact</li> <li>Charact</li> <li>Different</li> <li>Clippin</li> <li>Single-st</li> <li>Emitte</li> <li>Series</li> <li>Hartley</li> <li>Colpitt</li> <li>Square</li> </ol>	ed Power S ower Supply Doubler eristics of 7 ntiating and g and Clam stage Trans r Follower and Paraller / Oscillator 's Oscillato wave gene	Transistor - CE mode Integrating Circuits. ping Circuits istor Amplifier- R.C. Coupled I resonance circuits – Solid State r – Solid State rator using IC 555 Timer	OLD IN			
<ol> <li>Bridge</li> <li>Regulat</li> <li>Dual Pe</li> <li>Voltage</li> <li>Charact</li> <li>Charact</li> <li>Different</li> <li>Clippin</li> <li>Single-st</li> <li>Emitted</li> <li>Series</li> <li>Hartley</li> <li>Colpitt</li> <li>Square</li> <li>Astable</li> </ol>	ed Power S ower Supply e Doubler eristics of 7 ntiating and g and Clam stage Trans r Follower and Parallel / Oscillator 's Oscillator wave gene e Multivibra	h Zener voltage regulator hupply - IC Transistor - CE mode Integrating Circuits. ping Circuits istor Amplifier- R.C. Coupled I resonance circuits – Solid State r – Solid State rator using IC 555 Timer ator	07(9)-09-01			
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Re	Reference Books									
1	Practical Physics and Electronics, C.C.Ouseph, U.J.Rao, V.Vijayendran, S.Viswanathan Publishers(2007)									
2	A text book of practical Physics, M.N.Srinivasan, S.Balasubramanian, R.Ranganathan, Sultan Chand&Sons(2017)									
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]									
1	https://www.slideshare.net/mobile/sunilrathore77398/basicanalogelectronics									
2	https://www.slideshare.net/mobile/PatruniChidanandaSas/basics-of-electronics-53962342									
Co	purse Designed By: Dr. U. Karunanithi									

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	М	S	S	S	М	L	Μ	S	М
CO2	S	S	М	S	S	L	М	S	S	S
CO3	М	М	S	S	L	М	S	S	S	М



		SEMESTER	R V&VI				
Course code	63Q	DIGITAL AND MIC		L	Т	Р	С
course coue	00 Q	(Examination at the end	of sixth semester)	E	-	•	U
Core/Elective	e/SBS	CORE PRA	CTICAL IV	0	0	2	3
Pre-requisite	9	Should have the fundame		Syllab Versio		2021	-22
Course Obje		Digital Electronics and M	Ancroprocessors	v ersio	11		
ů.		is course are to:					
5		ples and applications of Dig	vital Electronics				
		t the development of the M					
U	U	to apply the principles of L		heir day-to	day	life.	
Expected Co							
On the succes	ssful comple	etio <mark>n of the cour</mark> se, student	will be able to:				
1 analyze t	he different	types of digital circuits and	l their applications			K4	
2 realize th	ne applica <mark>tic</mark>	ons of registers in computers	5			K5	
3 update th	ne knowledg	e of Microprocessor progra	mming			K6	
		nderstand; K3 - Apply; K4		ate; K6 - (	Create		
	-						
	(67)	LIST OF EXPERIMENT	S		5	56 hou	urs
(Any twe	lve experim	ents by choosing at least fi	<b>ve</b> from each division)	)	X		
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i. veinte		NOT, XOR, NOR and NAI					
2. NAND	OR, AND, as a univer	NOT, XOR, NOR and NAI sal building block- AND, C	ND. DR, NOT and Ex-OR	<b>7</b>			
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<ol> <li>NAND</li> <li>NOR a</li> <li>Verific</li> <li>Boolea</li> <li>Study o</li> <li>Half ac</li> <li>Full ad</li> </ol>	OR, AND, as a universa ation of De n Algebra – of RS Flip-F lder and Ha der	NOT, XOR, NOR and NAI sal building block- AND, O l building block- AND, OR Morgan's theorem. - problem solving Flop.	ND. DR, NOT and Ex-OR	99 99 99 99			
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<ol> <li>NAND</li> <li>NOR a</li> <li>NOR a</li> <li>Verific</li> <li>Boolea</li> <li>Study o</li> <li>Half ad</li> <li>Full ad</li> <li>Full su</li> <li>4 Bit -</li> <li>MICR</li> <li>8085 A</li> </ol>	OR, AND, as a universa ation of De n Algebra - of RS Flip-F lder and Ha der ubtractor. - Binary Ad <b>OPROCES</b> ALP for 8 b ALP for 7 we LP for 7 we LP for 1 ma LP for arra LP for con	NOT, XOR, NOR and NAN sal building block- AND, OR Morgan's theorem. - problem solving Flop. If Subtractor der/ Subtractor using 7483 SORS it Addition and Subtraction it addition with carry and su it Multiplication it Division e's Complement, Masking of o's complement Addition an ing the biggest number elem nging Ascending and Descee version of Hexadecimal into	ND. OR, NOT and Ex-OR A, NOT and Ex-NOR A Decimal number. NOT and Ex-NOR A Decimal number.	bits and set	eleme	nts in	the
<ol> <li>NAND</li> <li>NOR a</li> <li>NOR a</li> <li>Verific</li> <li>Boolea</li> <li>Study o</li> <li>Half ad</li> <li>Full ad</li> <li>Full su</li> <li>4 Bit -</li> <li>MICR</li> <li>8085 A</li> </ol>	OR, AND, as a universa ation of De n Algebra - of RS Flip-F lder and Ha der ubtractor. - Binary Ad <b>OPROCES</b> ALP for 8 b ALP for 7 we LP for 7 we LP for 1 ma LP for arra LP for con	NOT, XOR, NOR and NAN sal building block- AND, OR l building block- AND, OR Morgan's theorem. - problem solving Flop. If Subtractor der/ Subtractor using 7483 SORS it Addition and Subtraction it addition with carry and su it Multiplication it Division e's Complement, Masking of o's complement, Masking of o's complement Addition an ing the biggest number elem nging Ascending and Descee version of Hexadecimal into version of Hexadecimal into	ND. OR, NOT and Ex-OR A, NOT and Ex-NOR A Decimal number. NOT and Ex-NOR A Decimal number.	bits and set	eleme	nts in	
<ol> <li>NAND</li> <li>NOR a</li> <li>Verific</li> <li>Boolea</li> <li>Study o</li> <li>Full ad</li> <li>Full ad</li> <li>Full su</li> <li>4 Bit -</li> <li>HAIF ad</li> <li>Full Su</li> <li>4 Bit -</li> <li>MICR</li> <li>8085 A</li> </ol>	OR, AND, as a universa ation of De n Algebra – of RS Flip-F lder and Ha der abtractor. – Binary Ad <b>OPROCES</b> ALP for 8 b ALP for 7 wo LP for 1 ma LP for 1 ma LP for con aLP for con	NOT, XOR, NOR and NAN sal building block- AND, OR Morgan's theorem. - problem solving Flop. If Subtractor der/ Subtractor using 7483 SORS it Addition and Subtraction it addition with carry and su it Multiplication it Division e's Complement, Masking of o's complement Addition an ing the biggest number elem nging Ascending and Descee version of Hexadecimal into	ND. DR, NOT and Ex-OR A, NOT and Ex-NOR A, NOT and Ex-NOR A A A A A A A A A A A A A A A A A A A	bits and set Sum of the ren set of n	eleme umber	nts in <sup>.</sup> s	

Publishers(2007)         2       A text book of practical Physics, M.N.Srinivasan, S.Balasubramanian, R.Ranganathan, Chand&Sons(2017)         Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]         1       http://www.sircrrengg.ac.in/images/Others/CSE/MP-LAB-MANUAL.pdf	an
	ı, Sultan
1 http://www.sircrrengg.ac.in/images/Others/CSE/MP-LAB-MANUAL.pdf	
2 <u>https://www.youtube.com/playlist?list=PL_pGb42kre_QXwuaizYb21tSYpoHyXsCQ</u>	

Mappi	Mapping with Programme Outcomes											
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10		
CO1	S	S	М	S	М	L	S	M	S	М		
CO2	S	М	М	S	S	L	S	М	S	S		
CO3	S	М	S	M	L	М	M	S	S	М		



		SEMESTER V&VI			
Course code	63R	C AND C++ PROGRAMMING	L T	Р	C
course coue	051	(Examination at the end of sixth semester)		-	C
Core/Elective	e/SBS	PRACTICAL V 0	) 0	2	3
Pre-requisite			yllabus /ersion	2021	l - 22
Course Obje	ctives:				
The main obje	ectives of th	nis course are to:			
1. Develop F	Programmin	g concepts in C and C++			
· · ·	• •	concepts of C and C++ to various programs			
3. Write C a	nd C++ pro	pgrams for Physics oriented problems.			
Expected Co	urso Outoo	most			
		etion of the course, student will be able to:			
	*	programs in C and C++		K3	
		mming concepts for Physics problems		K4	
	· •	ons for different Mathematical problems		K5	
		nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6	<b>6</b> - Creat		
	, <b>112</b> - 01	iderstand, KS - Apply, K4 - Analyze, K5 - Evaluate, K		.0	
	6	LIST OF EXPERIMENTS		84 h	ours
(Any twel		ents by choosing at least five from each division)	À		louis
I. PROG	RAMMINO				
1. Write a	C program	to convert an integer in the range 1 to 100 into words.			
		that uses functions to compare two strings input by the	user Th	e progr	am
		er the first string is less than, equal or greater than the sec			um
		to compare two files printing the character position whe			al and
	hey differ.	to compare two mes printing the character position with	ore they		ai aii
	-				
	o program	for Matrix addition			
	C program	for Matrix addition			
		for Matrix multiplication.	rature.		
7. WINCA	C program	n for Matrix multiplication. In to convert Celsius Temperature into Fahrenheit Temper		/	in (i)
	C program	n for Matrix multiplication. n to convert Celsius Temperature into Fahrenheit Temper n to find resultant value of the three resistances R <sub>1</sub> , R <sub>2</sub> an		/	in (i)
series a	C program C program nd (ii) para	n for Matrix multiplication. In to convert Celsius Temperature into Fahrenheit Temper In to find resultant value of the three resistances R <sub>1</sub> , R <sub>2</sub> an Illel.	$d R_3 con$	/	in (i)
series a 8. Write a	C program C program nd (ii) para C program	n for Matrix multiplication. n to convert Celsius Temperature into Fahrenheit Temper n to find resultant value of the three resistances R <sub>1</sub> , R <sub>2</sub> an	id R <sub>3</sub> con rism.	/	in (i)
series a 8. Write a 9. Write a	C program C program nd (ii) para C program C program	to for Matrix multiplication. In to convert Celsius Temperature into Fahrenheit Temper to find resultant value of the three resistances $R_1$ , $R_2$ an allel. In to calculate the refractive index of the material of the particular sector.	id R₃ con rism. rcuit.	inected	
series a 8. Write a 9. Write a	C program C program nd (ii) para C program C program C program	for Matrix multiplication. In to convert Celsius Temperature into Fahrenheit Temper to find resultant value of the three resistances $R_1$ , $R_2$ an allel. In to calculate the refractive index of the material of the pr to measure the resonant frequency of the LCR series circ	id R₃ con rism. rcuit.	inected	
series a 8. Write a 9. Write a 10. Write a momen	C program C program nd (ii) para C program C program C program	a for Matrix multiplication. a to convert Celsius Temperature into Fahrenheit Temper a to find resultant value of the three resistances $R_1$ , $R_2$ and allel. a to calculate the refractive index of the material of the pr a to measure the resonant frequency of the LCR series cin a to calculate De Broglie wavelength of a material for the	id R₃ con rism. rcuit.	inected	
series a 8. Write a 9. Write a 10. Write a momen <b>PROG</b> 11. Write a	C program C program nd (ii) para C program C program C program tum p. <b>RAMMINO</b> C <sup>++</sup> program	a for Matrix multiplication. a to convert Celsius Temperature into Fahrenheit Temper to find resultant value of the three resistances $R_1$ , $R_2$ an allel. a to calculate the refractive index of the material of the pr to measure the resonant frequency of the LCR series cir to calculate De Broglie wavelength of a material for the <b>G IN C++</b> um to read any two numbers through the keyboard and to	id R <sub>3</sub> con rism. rcuit. e given v	unected value of	
series a 8. Write a 9. Write a 10. Write a momen <b>PROG</b> 11. Write a arithme	C program C program nd (ii) para C program C program C program tum p. <b>RAMMINO</b> C <sup>++</sup> progra	for Matrix multiplication. a to convert Celsius Temperature into Fahrenheit Temper to find resultant value of the three resistances $R_1$ , $R_2$ an allel. a to calculate the refractive index of the material of the pr to measure the resonant frequency of the LCR series cir to calculate De Broglie wavelength of a material for the <b>G IN C++</b> am to read any two numbers through the keyboard and to ons (Use Do While loop).	id R <sub>3</sub> con rism. rcuit. e given v	nected value of	e
series a 8. Write a 9. Write a 10. Write a momen <b>PROG</b> 11. Write a arithme 12. Write a	C program C program nd (ii) para C program C program C program tum p. <b>RAMMINO</b> C <sup>++</sup> progra etic operatio C <sup>++</sup> progra	a for Matrix multiplication. a to convert Celsius Temperature into Fahrenheit Temper to find resultant value of the three resistances $R_1$ , $R_2$ an allel. a to calculate the refractive index of the material of the pr to measure the resonant frequency of the LCR series cir to calculate De Broglie wavelength of a material for the <b>G IN C++</b> um to read any two numbers through the keyboard and to	id R <sub>3</sub> con rism. rcuit. e given v	nected value of	e
series a 8. Write a 9. Write a 10. Write a momen <b>PROG</b> 11. Write a arithme 12. Write a entered 13. Write a	C program C program nd (ii) para C program C program C program tum p. <b>RAMMINO</b> C <sup>++</sup> progra through the C <sup>++</sup> progra	a for Matrix multiplication. a to convert Celsius Temperature into Fahrenheit Temper to find resultant value of the three resistances $R_1$ , $R_2$ and allel. a to calculate the refractive index of the material of the pro- to measure the resonant frequency of the LCR series cir- to calculate De Broglie wavelength of a material for the <b>G IN C++</b> um to read any two numbers through the keyboard and to cons (Use Do While loop). um to display the name of the day in a week, depending use the keyboard using Switch – case statement. um to perform Matrix addition.	id R <sub>3</sub> con rism. rcuit. e given v	nected value of	e
series a 8. Write a 9. Write a 10. Write a momen <b>PROG</b> 11. Write a arithme 12. Write a entered 13. Write a 14. Write a	C program C program nd (ii) para C program C program C program tum p. <b>RAMMINO</b> C <sup>++</sup> progra etic operatio C <sup>++</sup> progra through the C <sup>++</sup> progra	a for Matrix multiplication. a to convert Celsius Temperature into Fahrenheit Temper to find resultant value of the three resistances $R_1$ , $R_2$ and allel. a to calculate the refractive index of the material of the pro- to measure the resonant frequency of the LCR series cin- to calculate De Broglie wavelength of a material for the <b>G IN C++</b> am to read any two numbers through the keyboard and to cons (Use Do While loop). am to display the name of the day in a week, depending use keyboard using Switch – case statement. am to perform Matrix addition. am for matrix multiplication.	id R <sub>3</sub> con rism. rcuit. e given v	nected value of	e
series a 8. Write a 9. Write a 10. Write a momen <b>PROG</b> 11. Write a arithme 12. Write a entered 13. Write a 14. Write a 15. Write a	C program C program nd (ii) para C program C program C program tum p. <b>RAMMINO</b> C <sup>++</sup> progra etic operatio C <sup>++</sup> progra through the C <sup>++</sup> progra C <sup>++</sup> progra C <sup>++</sup> progra	<ul> <li>a for Matrix multiplication.</li> <li>a to convert Celsius Temperature into Fahrenheit Temperatoria to find resultant value of the three resistances R<sub>1</sub>, R<sub>2</sub> and the second second</li></ul>	id R <sub>3</sub> con rism. rcuit. e given v	nected value of	e
series a 8. Write a 9. Write a 10. Write a momen <b>PROG</b> 11. Write a arithme 12. Write a entered 13. Write a 14. Write a 15. Write a 16. Write a	C program C program nd (ii) para C program C program C program tum p. <b>RAMMINO</b> C <sup>++</sup> progra through the C <sup>++</sup> progra C <sup>++</sup> progra C <sup>++</sup> progra C <sup>++</sup> progra C <sup>++</sup> progra	a for Matrix multiplication. In to convert Celsius Temperature into Fahrenheit Temper to find resultant value of the three resistances $R_1$ , $R_2$ and allel. It to calculate the refractive index of the material of the pro- to measure the resonant frequency of the LCR series cir- to calculate De Broglie wavelength of a material for the <b>G IN C++</b> Im to read any two numbers through the keyboard and to cons (Use Do While loop). Im to display the name of the day in a week, depending use the keyboard using Switch – case statement. Im to perform Matrix addition. Im to find the inverse of a matrix. Im to find the modulus of the given number.	id R <sub>3</sub> con rism. rcuit. e given v o perform upon the	anected value of n simple numbe	e
series a 8. Write a 9. Write a 10. Write a momen <b>PROG</b> 11. Write a arithme 12. Write a entered 13. Write a 14. Write a 15. Write a 16. Write a 17. Write a	C program C program nd (ii) para C program C program C program tum p. <b>RAMMINO</b> C <sup>++</sup> progra through the C <sup>++</sup> progra C <sup>++</sup> progra C <sup>++</sup> progra C <sup>++</sup> progra C <sup>++</sup> progra	h for Matrix multiplication. In to convert Celsius Temperature into Fahrenheit Temper to find resultant value of the three resistances $R_1$ , $R_2$ and allel. It to calculate the refractive index of the material of the pro- to measure the resonant frequency of the LCR series cir- to calculate De Broglie wavelength of a material for the <b>G IN C++</b> Im to read any two numbers through the keyboard and to cons (Use Do While loop). Im to display the name of the day in a week, depending use the keyboard using Switch – case statement. Im to perform Matrix addition. Im to find the inverse of a matrix. Im to find the inverse of a matrix. Im to find the modulus of the given number. Im to compare two files printing the character position w	id R <sub>3</sub> con rism. rcuit. e given v o perform upon the	anected value of n simple numbe	e

- 18. Write a  $C^{++}$  program to find the resultant value of three capacitances  $C_1$ ,  $C_2$  and  $C_3$  connected in (i) series and (ii) parallel.
- Write a C<sup>++</sup> program to measure the resonant frequency of the LCR parallel circuit.
   Write a C<sup>++</sup> program to estimate the half-life period of a radioactive substance for the given value of decay constant  $\lambda$ .

	Contemporary Issues	6 hours
On	line workshop, Webinars on C and C++ programming	
	Total Practical Hours:	90
Re	ference Books	
1	Programming in ANSI C by E. Balagurusamy, Tata McGraw Hill, sixth	Edition(2012)
2	Object Oriented Programming with C++ by E. Balagurusamy, Tata McG (2013)	raw Hill, Sixth Edition
	a a a a a a a a a a a a a a a a a a a	
Re	lated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://nptel.ac.in/course.html/computerscience and engineering//C, C++	programming
2	https://www.geeksforgeeks.org/introduction-to-c-programming-language/	
. <u> </u>	5 1. 12. 51 8	
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Course Designed By: Dr. U. Karunanithi

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	М	S	L	М	S	М	S	М
CO2	М	S	S	M	S	L	S	M	S	S
CO3	S	М	S	М	L	М	M	S	S	М

तंत्रज्ञा- ६०७



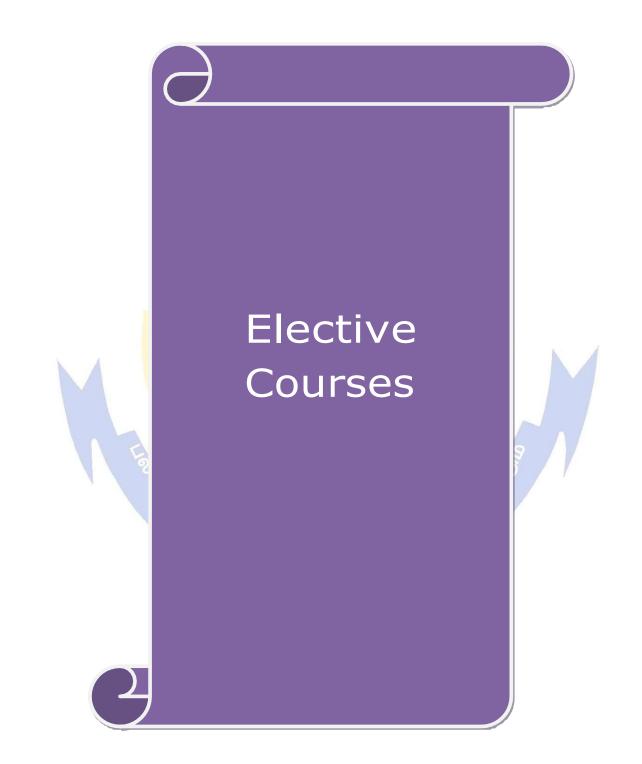
## SEMESTER VI

Course code	6ZP	INSTRUMENTATION PRACTICALS			Р	С
<b>Core/Elective</b>	/SBS	SKILL BASED SUBJECT	0	0	2	2
Pre-requisite		Should have the fundamental knowledge in Instrumentation	Syllab Versio		2021 -	22
Course Obje		•				
v		his course are to:				
-		ge in working with different laboratory instruments.				
		struments like spectrometer, telescope etc., simple household appliances like iron box, mixie etc	and ra	otify t	ha	
problems.		simple nousehold apphalees like non box, mixie et	c. and re	ciffy t	iic	
procreme		000000ga/2				
Expected Co	urse Outco	omes:				
	-	etion of the course, student will be able to:				
1 service a	and rectify	the defects in laboratory instruments			K5	
	-	the defects in simple house hold devices.			K5	
3 device r	iew instrun	nents applying the knowledge of instrumentation.			K6	
K1 - Rememb	er; <b>K2</b> - U	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate	<mark>e; K</mark> 6 - (	Create		
		LIST OF EXPERIMENTS		4	42 ho	urs
1. Construc	tion and S	(Any twelve experiments) ervice of Power supply - 2, 4, 6 Volts				
		apply construction and service – (+5V & - 12V)				
		construction and service $-(-12V) = 0 - (+12V)$				
		apply construction and service $-(+12V) = 0 - (+12V)$	10			
	g - Microso		<u>S</u>			
	g - Telesco		5	1		
	g - Spectro	meter				
	g - Galvan	ometer. Coimbatore				
	g - Voltme	ter				
10. Servicin	0	er. abstinger				
11. Servicin	g - UPS					
12. Servicin	g – Stop cl	ock and Stopwatch TE TO ELEVALE				
13. Servicin	g – Physica	al Balance				
14. Servicin	-					
		nce box and Capacitance box				
16. Servicin		Generators				
17. Fixing a	nd servicin					
		g a B.G.				
	drilling, po	g a B.G. blishing and trimming.				
19. Servicin	drilling, po g – Iron Bo	g a B.G. blishing and trimming.				
19. Servicin	drilling, po g – Iron Bo	g a B.G. olishing and trimming.				
19. Servicin 20. Convers	drilling, po g – Iron Bo ion of Galv	g a B.G. olishing and trimming. ox vanometer to an ammeter and voltmeter Contemporary Issues	3	hours	5	
19. Servicin 20. Convers	drilling, po g – Iron Bo ion of Galv	g a B.G. olishing and trimming. ox vanometer to an ammeter and voltmeter		hours	5	45

Refe	erence Books
1	Laboratory Instrumentation, Mary C. Haven, Gregory A. Tetrault, Jerald R. Schenken, John Wiley & Sons,(1994).
2	Principles and Applications of Laboratory Instrumentation, <u>Sheshadri Narayanan</u> , ASCP Press, (1989).
Rela	tted Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://www.macallister.com/parts-service/maintenance-tips/
2	https://www.youtube.com/playlist?list=PLOU3kcAncZZtRFMLCFMyxEp_JYZIOLkbM
3	https://www.slideshare.net/mobile/selvaprakash549/maintenance-and-repair-strategies
Cour	se Designed By: Dr. U. Karunanithi

Mappi	Mapping with Programme Outcomes											
COs	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10		
CO1	S	S	М	S	M	М	S	М	L	М		
CO2	М	S	M	S	S	L	М	S	М	S		
CO3	S	M	S	М	36	М	M	S	S	М		





## LIST OF ELECTIVE PAPERS SEMESTER V

Course code	CONCEPTS AND C PROGRAMMING				Р	С
Core/Elective/	SBS	ELECTIVE PAPER – I A	4	0	0	4
Pre-requisite		The students are expected to procure foundational knowledge on programming concepts and C programming		labus rsion	20	21-22
<b>Course Object</b>	ives:					
<ol> <li>develop lo</li> <li>solve prob</li> </ol>	gics whicl lems using	is course are to: h will aid in developing programs and applications g functional and object-oriented paradigm us paradigms when programming in a language of diffe	erent j	paradig	m	
Expected Cou	rse Outco	mes				
_		letion of the course, student will be able to:				
		programming languages, and justify their own design de	cisio	18	K	2
•	-	vhat paradigm and language are best suited for a new p				.5
-		to solve Physics problems.	00101			.6
-	-	Jnderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - (	Create		.0
	, <b>112</b> C	filderstand, Ko Appry, Kt Anaryze, Ko Evaluate,	ixo v	create	4	
Unit:1 Introduction –	- character	Constants, Variables and Data types sets – constants – keywords – identifiers – variab	les –		) ho ypes	
declaration of	variables	– assigning values to variables – defining symbolic cor	istants	5.		
		2 contraction of the	6			
Unit:2	2	Operators and Expressions	5		2 ho	
-		relational operators – logical operators – assignment operators				nent
	-	s – conditional operators – special operators – arithmetic is. – Precedence of arithmetic operators – type conver	. <b>-</b>			m _
		associativity – mathematical functions.			-5510	- 11
Unit:3		Input and Output Operations		1	2 ho	urs
Simple IF, IF.	ELSE, N	haracter – formatted input and output – decision ma lesting of IF ELSE and ELSE IF Ladder – Switch St nt – while, do – while statement – For loop.				ent:
Unit:4		Arrays		1	2 ho	urs
	- One d	imensional array – declaration of array – Initia	ting			
		- declaring and initializing string variables - reading	•			
terminal – wri	ting string	s on the screen.				
Unit:5		User Defined Functions		1	2 ho	urs
Need for user	defined fi	inctions – A multifunction program – The form of C F	unotic	D		DN
inced for user		metions in manufaction program the form of C i	unctic	ons - R	ETU	ININ
		Calling a function - Call by Value - Call by Reference-			ETU	IX IN

Un	it:6	Contemporary Issues	2 hours
Ex	pert lecture	s, online seminars - webinars	
		Total Lecture hours	60
Te	xt Book(s)		
1	Programm	ing in ANSI C, E. Balagurusamy, TMH (2008)	
2	The C Pro	gramming Language, Brian Kernighan, Dennis Ritchie, Prentice Hall,	(1978)
Re	ference Bo	ooks	
1	Programm	ing in C by Ashok N. Kamthane First Indian Print, Pearson (2004).	
2	Computing	g Fundamentals and C Programming, E. Balagurusamy, TMH(2011)	
Re	lated Onli	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://w	ww.programiz.com/c-progr <mark>amming</mark>	
2	https://w	ww.geeksforgeeks.org/c-language-set-1-introduction/	
3	https://be	ginnersbook.com/2014/01/c-tutorial-for-beginners-with-examples/	
Co	urse Desig	ned By: Dr P. Sagunthala and Dr. V. Kalaiselvi	

# Course Designed By: Dr P. Sagunthala and Dr. V. Kalaiselvi

3153

# 36

Mappi	ng with	<b>Progran</b>	<mark>1</mark> me Out	comes				5		
COs	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	<b>PO9</b>	PO10
CO1	S	М	S	М	S	М	S	М	S	S
CO2	М	S	М	М	М	М	S	S	M	S
CO3	S	S	S	S	М	S	М	M	S	S

\*S-Strong; M-Medium; L-Low

5.51L Colons

# SEMESTER V

		SEMESTER V	<del></del>	1		
Course code	5EA	ENERGY PHYSICS	L	Т	Р	С
Core/Elective/	SBS	ELECTIVE PAPER - I B	4	0	0	4
Pre-requisite		The students should know the fundamental	Sylla		2021	-22
Course Object		principle of motor and classification of energy	Vers	sion		
, v		his course are to:				
		ction of electricity.				
	<b>.</b>	cal communication system.				
		omic, molecular energy and thermal energy.				
		onventional energy resources and utilization.				
Expected Cou						
		etion of the course, student will be able to:			IZ/	<u></u>
1 understan	d the heath	ng effect of current and application of it.			Kź	2
2 select the	correct ma	terial for making a waveguide based on basic optical la	aws.		Ka	3
3 understan	ıd Maxwe <mark>ll</mark>	's law of equipartition of energy.			K2	2
4 analyze th	ne di <mark>stribut</mark>	ion of energy in the thermal spectrum.			K4	ł
5 Calculate	effective u	tilization of solar radiation, power in the wind and tida	l ener	gy	K.	5
K1 - Rememb	er; K2 - U	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; I	X6 - (	Create		
Unit:1		Electrical Energy			12 ho	ours
Principle of p	roduction o	f A.C. – A.C generators – D.C generators – D.C Motor	rs. He	at de	velop	ed in
		or – Application of heating effect – Electric heater				
		on – Electric welding and electric furnace – Carbon ar	с — Е	lectri	c Lar	np –
Efficiency of a	a Lamp – N	Aeasurement of Electric Power.	5			
11	<u>e</u>				101	
Unit:2	CI II	Optical Energy			12 ho	
		- Light sources – LED, LASER – optical fibre – Light				
<b>.</b>	-	tical laws used in optical fibres – Optical parameter		-		
-	-	umerical aperture – Types of optical fibres: Based on				er of
		ex profile – Fibre optical communication system – Bloc Optical fibre – Receiver.		Igram	l —	
Source - Train		phear nore - Receiver.				
Unit:3		Atomic And Molecular Energy			12 h	ours
Degrees of fr	eedom – 1	Number of Degrees of Freedom of Mono, Di and T	ri At	omic	syste	em –
Maxwell's La	w of equip	artition of Energy - Molar Specific heat capacity at	consta	ant v	olume	and
constant press	sure – Tot	al Internal Energy and Ratio of Heat capacities i	n ma	onoat	omic	gas,
Diatomic gas,	, Non-Line	ar and Linear type of Tri-atomic gas molecular syst	tem.G	as ar	nd Va	pour
Distinction – I	Measureme	nt of saturated and unsaturated vapour Pressure: Regna	ult's	statis	tical	
method – The	ir character	istics - Graphical Illustration of Gas laws.				
TI		Thousal Enoug-			101	
Unit:4	Total thar	Thermal Energy	ol Em	incire		ours
		nal Energy density - Spectral Energy density – Spectrower – Absorptive power – Reflective power – Kircho			-	
		on of Kirchoff's Results: Ritche's Experiment. Distribu				
and its proof	, ernieun(	a of themenon of resource, renone of Dappenniona, Distribu				

thermal spectrum – Lummer and Pringsheim Experiment and its Results – Wien's Displacement Law and Radiation Law – Rayleigh Jean's Law Planck's Radiation Law – Deduction of Wien's Law and Rayleigh – Jean's Law from Planck's law. Solar constant – Temperature of sun – Disappearing filament optical Pyrometer - **Pyrheliometers**: Angstrom Pyroheliometer – Water flow Pyrohelio meter.

Unit:5	Nonconventional Energy	10 hours						
Solar Energy	Solar Energy: Solar radiation – Solar radiation outside the earth's atmosphere Solar radiation at the							
earth's surface	e - Solar Thermal Energy - Solar Thermal devices and system	s: Solar water heater –						
Subcomponen	ts of solar water heater - Solar Cooker and its merits and de	emerits. Wind Energy:						
Power in the	wind - Types of wind energy systems -Horizontal axis wind	Furbine – Vertical axis						
wind Turbine.	Ocean Energy: Tidal Energy – Ocean Thermal Energy Conve	rsion (OTEC) –						
Closed Cycle	Closed Cycle OTEC system – Open Cycle OTEC System.							
	の時間10~							
I I-nite (	Contonen anomy Issues	2 h						

Te	ext Book(s)
1	Renewable Energy Environment and Development - Maheshwar Dayal. Konark Publishers, (1989)
2	Engineering Physics - I- G. Senthil Kumar, VRB Publishers, (2011)

Re	ference Books
1	Solar Energy Utilization - G.D. Rai Khhanna Publishers, (1995)
2	Engineering Physics - II- M. Arumugham, Anuradha Publishers (2010)
	8
Re	lated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://www.askiitians.com/revision-notes/physics/heat-phenomena/
2	https://www.askiitians.com/revision-notes/physics/thermodynamics/
1	

Course Designed By: Mr. J. Williams Charles

# EDUCATE TO ELEVATE

Mapping with Programme Outcomes											
COs	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	<b>PO8</b>	PO9	PO10	
CO1	S	М	S	М	М	S	Μ	М	S	М	
CO2	М	S	S	S	Μ	S	S	М	S	М	
CO3	S	Μ	Μ	S	S	M	Μ	S	М	S	
CO4	S	S	М	М	М	M	M	S	S	М	
CO5	S	S	S	S	S	S	S	S	S	S	

\*S-Strong; M-Medium; L-Low

# SEMESTER V

	•	SEMESTER V		-	1		
Course code	5EA	AGRICULTURAL PHYSICS	L	Т	Р	С	
Core/Elective/	/SBS	Elective Paper I C	4	0	0	4	
Pre-requisite	quisiteStudents should possess the fundamental knowledge of agronomy which is described using physical sciences.Syllabus Version					2021-22	
Course Objec	tives:						
The main obje	ctives of thi	s course are to:					
1. have know	wledge of p	hysical phenomena in agricultural environment.					
		g in the field of farming.					
3. improve p	practical kno	owledge of the student.					
Expected Cou	ursa Autoor	nos					
		etion of the course, student will be able to:					
		of physics in daily life.			K2		
2 introduce	e technolo <mark>gi</mark>	cal applications into agriculture.			K3		
3 explore t	he physical	properties of soil and water.			K4		
K1 - Remem	ber; <b>K2</b> - <mark>U</mark>	nderstand; K3 - Apply; K4 - Analyze; K5 - Evalu	iate; K6 - (	Create	;		
Unit:1		Soil Physics	1	2 hou	rc		
		f soil – physical properties of soil, pore space, bu					
Unit:2		Water Physics		) hou			
Water qualitie – water qualit		1 – Ground water – surface water pollution – inst	rumentatio	n and	samp	lıng	
TI:4.2		Electric Power	12 h				
Unit:3	ana du ati an	of A.C. – Average value of A.C. voltage or c				f	
-	-	of A.C. – Average value of A.C. voltage of c	urrent – F	C.IVI.S.			
alternating vo	лаче ог сш			$\Lambda C$	gener	ator	
-	-	rent - power consumed in A.C. Circuits - kilo v	vatt hour –		-		
- Three-phase	e A.C. – Di	rent – power consumed in A.C. Circuits – kilo v stribution of three phase A.C. Three-phase power	vatt hour –		-		
- Three-phase	e A.C. – Di	rent - power consumed in A.C. Circuits - kilo v	vatt hour –		-		
- Three-phase	e A.C. – Di	rent – power consumed in A.C. Circuits – kilo v stribution of three phase A.C. Three-phase power	vatt hour –	The cl	-		
<ul> <li>Three-phase</li> <li>transformer –</li> <li>Unit:4</li> <li>Absolute Hu</li> </ul>	e A.C. – Di Transmissie midity –	rent – power consumed in A.C. Circuits – kilo v stribution of three phase A.C. Three-phase power on of electric power over long distances. Hygrometry and Pumps Relative Humidity – Dew point, Daniell's	vatt hour – system – 12 h Hygrome	The closed	hoke-	The ult's	
<ul> <li>Three-phase transformer</li> <li>Unit:4</li> <li>Absolute Hu hygrometer.</li> </ul>	e A.C. – Di Transmissio umidity – Advantages	rent – power consumed in A.C. Circuits – kilo v stribution of three phase A.C. Three-phase power on of electric power over long distances. Hygrometry and Pumps Relative Humidity – Dew point, Daniell's of Regnault's hygrometer – wet and Dry and	vatt hour – system – <b>12 h</b> Hygrome Bulb hyg	The closed	hoke- Regna er. W	The ult's Vater	
<ul> <li>Three-phase transformer –</li> <li>Unit:4</li> <li>Absolute Hu hygrometer.</li> <li>pumps – com</li> </ul>	e A.C. – Di Transmissio umidity – Advantages	rent – power consumed in A.C. Circuits – kilo v stribution of three phase A.C. Three-phase power on of electric power over long distances. Hygrometry and Pumps Relative Humidity – Dew point, Daniell's of Regnault's hygrometer – wet and Dry and – force pump – Fire engine, inflator (or) com	vatt hour – system – <b>12 h</b> Hygrome Bulb hyg	The closed	hoke- Regna er. W	The ult's Vater	
<ul> <li>Three-phase transformer –</li> <li>Unit:4</li> <li>Absolute Hu hygrometer.</li> <li>pumps – com</li> </ul>	e A.C. – Di Transmissio umidity – Advantages	rent – power consumed in A.C. Circuits – kilo v stribution of three phase A.C. Three-phase power on of electric power over long distances. Hygrometry and Pumps Relative Humidity – Dew point, Daniell's of Regnault's hygrometer – wet and Dry and	vatt hour – system – <b>12 h</b> Hygrome Bulb hyg	The closed	hoke- Regna er. W	The ult's Vater	
<ul> <li>Three-phase transformer –</li> <li>Unit:4</li> <li>Absolute Hu hygrometer. pumps – com</li> </ul>	e A.C. – Di Transmissio umidity – Advantages	rent – power consumed in A.C. Circuits – kilo v stribution of three phase A.C. Three-phase power on of electric power over long distances. Hygrometry and Pumps Relative Humidity – Dew point, Daniell's of Regnault's hygrometer – wet and Dry and – force pump – Fire engine, inflator (or) com	vatt hour – system – <b>12 h</b> Hygrome Bulb hyg	The cl ours ter, 1 romet ump -	hoke- Regna er. W	The ult's Vater	
<ul> <li>Three-phase transformer –</li> <li>Unit:4</li> <li>Absolute Huthygrometer.</li> <li>pumps – conafter n stroke</li> <li>Unit:5</li> </ul>	e A.C. – Di Transmissio umidity – Advantages nmon pump s – Exhaust	rent – power consumed in A.C. Circuits – kilo v stribution of three phase A.C. Three-phase power on of electric power over long distances. Hygrometry and Pumps Relative Humidity – Dew point, Daniell's of Regnault's hygrometer – wet and Dry and – force pump – Fire engine, inflator (or) com pump (or) common air pump.	vatt hour – system – 12 h Hygrome Bulb hyg pression p	ours ter, 1 romet ump -	hoke- Regna er. W - pres	The ult's <sup>7</sup> ater sure	

Unit:6	Contemporary Issues	2 hours
Expert le	tures, online seminars - webinars	
	Total Lecture hours	60
Text Bo	k(s)	
1 The	ature and Properties of Soil, H.O. Buckman, Brady, Macmillan, (1	967).
2 Soil	hysics, H. Kohnke, McGraw-Hill, (1968).	
	natic Hydrology, John C. Rodda, Richard A. Downing, Fra	ank M. Law, Newnes-
Butte	worths, (1976).	
Referen	e Books	
1 Elect	city and Magnetism, R. Murugesan, S.Chand, (2017).	
2 Hyc	ostatics, A. S. Ramsey, Cambridge University Press, (2017).	
3 Sola	energy Utilization, G.D. Rai, Khanna Publisers, (1987).	
I		
Related	Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
	://www.sciencedirect.com/topics/agricultural-and-biological-scienc	es/soil-physics
·	://www.sciencedirect.com/science/article/pii/S1631071304002780	
3 http	://www.sciencedirect.com/topics/engineering/solar-energy-applicat	ion

Course Designed By: Dr P. Sagunthala

Mappi	Mapping with Programme Outcomes											
COs	PO1	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10		
<b>CO1</b>	S	М	M	M	М	M	S	Μ	S	Μ		
CO2	M	S	S	S	S	S	М	S	М	M		
CO3	M	S	S	М	S	М	S	S	S	S		

குழ்து இந்தப்பாரை காடு யாத்திட வேல

\*S-Strong; M-Medium; L-Low

# SEMESTER VI

~ .		SEMESTER VI	-		-	
Course code	6EA	DIGITAL AND MICROPROCESSOR	L	Т	Р	С
Core/Elective/SB	S	ELECTIVE II A	4	0	0	4
Pre-requisite		The students should have a basic understanding in	Sylla		2021	-22
~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~		functioning of digital circuits and microprocessors	Vers	ion		
Course Objectiv						
The main objectiv						
		nake use of digital devices and microprocessors gic circuits and construct the logic circuit for any Bool	ann ac	mati	n	
	•	e of binary addition	ean eg	luan	Л	
4. understand t	-	-				
		g with microprocessor 8085.				
*		and the second sec				
<b>Expected Course</b>	e Outcome	s:				
On the successful	ıl completi	on of the course, student will be able to:				
1 draw an	d con <mark>struct</mark>	the logic circuit for any Boolean equation.			ŀ	K2
		h Map to simplify Boolean equation and draw a simpli	fied ci	rcuit		X3
		ction of data processing and arithmetic circuits				K4
4 understa	an <mark>d the Mn</mark>	emonics and Opcodes in the Microprocessor			ł	<b>X</b> 4
5 develop	programm	ing skills using the basic concepts.			ŀ	Χ5
K1 - Remember	; <mark>K2</mark> - Und	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6	– Cre	eate		
		Real Provention State			12	
Unit:1		Logic Circuits			hour	
-		peration – OR operation – AND operation – Boolean	-			
		aws & Theorems – Basic laws – De Morgan's theorem				
		t method – Truth table to Karnaugh Map – Pairs, Qua	ads an	d Oc	tets	-
Karnaugh simph	ration - r	Product of Sum method.				
Unit:2	00	Data Processing Circuits		12	hour	rs
	Demultiplex	er – 1 to 16 decoders – BCD to Decimal decoders	- Seve			
-		ty generator – checkers – Read Only Memory – Prog			-	
		nd codes: Binary to Decimal conversion - Decimal				•
conversion – Oc	ctal number	rs - Hexadecimal numbers - The ASCII code - The	Exces	s 3 c	code	_
The Gray code.						
			1			
Unit:3		Arithmetic Circuits			12	
Dinamy addition	Dinomy	ubtraction Unsigned Dingry numbers sign magnit	uda m		hour	
-	-	Subtraction – Unsigned Binary numbers – sign-magnit – 2's complement Arithmetic – Arithmetic building bl				
		RS flip flop – Clocked RS flip flop – D flip flop – Edg				
		ster Slave flip flop – Schmitt trigger	50 115	5010		mp
	<b>r</b> · · · ·	I I I I I I I I I I I I I I I I I I I				
Unit:4		Microprocessor and Data Representation		12	hou	rs
	– what is	Microprocessor, 4, 8, 16, 32 – Organization of M	licrop			
		ng - Instruction - Machine and Mnemonic codes - Ma				
Assembly Lang	uage Prog	ramming – High-level Language programming – R	eprese	entati	on d	of

<b>TT A ( B</b>	sentation of Real numbers – Conversion of Real numbers.	
Unit:5	Programming a Microprocessor	10 hours
Organization o	f 8085 - Data and Address buses addressing - The I/O devices	- Register in 8085
Instruction type	es - Classification of Instruction - Addressing modes - Programm	ning the 8085 – Th
	concepts-Simple programs with 8085 - addition, subtraction, mu	ltiplication, and
division.		
Unit:6	Contemporary Issues	2 hour
	nline seminars - webinars	2 11001
2xpert lectures, c	Total Lecture hou	rs 60
Book(s) for St		
.,	rinciples and Applications – Albert Paul Malvino& Donald P Lea	och TMH Fourth
Edition (		
2 Introduct	ion to Mic <mark>roprocessors, Aditya P Mathur TMH, 6<sup>th</sup> Editi</mark> on (2006	5)
Book(s) for R	eference	
. ,	eference Electronics – Millmann& Halkias, TMH, (2017)	
1Integrated2Micropro		ar, Penaram
1Integrated2Micropro	Electronics – Millmann& Halkias, TMH, (2017) cessors Architecture Applications and Programming, R.S.Goenka	ar, Penaram
1     Integrated       2     Micropro       Internation	Electronics – Millmann& Halkias, TMH, (2017) cessors Architecture Applications and Programming, R.S.Goenka	ar, Penaram
1       Integrated         2       Micropro         Internation       Internation         Related Online	Electronics – Millmann& Halkias, TMH, (2017) cessors Architecture Applications and Programming, R.S.Goenka onal(1999)	
1     Integrated       2     Micropro       1     Internation         Related Online       1     https://w	Electronics – Millmann& Halkias, TMH, (2017) cessors Architecture Applications and Programming, R.S.Goenka onal(1999) Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1Integrated2Micropro Internatio2Micropro InternatioRelated Online1https://w2https://w	Electronics – Millmann& Halkias, TMH, (2017) cessors Architecture Applications and Programming, R.S.Goenka onal(1999) Contents [MOOC, SWAYAM, NPTEL, Websites etc.] ww.tutorialspoint.com/microprocessor/microprocessor_overview.h	

Mappi	ng with	Progran	nme Out	comes		-		60		
COs	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	PO9	PO10
CO1	S	S	S g	M	S	L	5 S	М	L	S
CO2	М	S	S	250	ปทรอบ	25	M	S	S	L
CO3	S	М	S	MCAT	ह कि हा	M	S	S	М	S
CO4	L	L	М	L	М	S	S	L	S	М
CO5	М	S	М	S	S	М	L	S	S	S

\*S-Strong; M-Medium; L-Low

		SEMESTER VI						
Course code	6EA	OPTICAL FIBRES AND FIBRE OPTIC	L	Т	Р	С		
		COMMUNICATION SYSTEMS						
Core/Elective/	SBS	ELECTIVE II B	4	0	0	4		
Pre-requisite		The students must know the basic optical laws and properties of optical fibre.	Sylla Vers		202	21-22		
Course Object								
·		nis course are to:						
		ation of light waves in an optical fibre.						
		ication and cables.						
		re losses and dispersion. res of light so <mark>urces for optica</mark> l fibre optic communica	tion					
4. understand	the structu	res of light sources for optical fibre optic communica	uion.					
E	0-4							
Expected Cou								
On the successful completion of the course, student will be able to:								
	1 understand the fibre classification. K2							
		on and dispersion in an optical fibre.			K	4		
4 calculate sources.	the efficier	cy, modulation bandwidth and spectral emission of l	ight		K	5		
5 use the k	nowledge to	make varied links and networking.	_		K	6		
		nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate	K6 -	Crea	te			
			, 110	lica				
Unit:1		Fibre		12	hour	•6		
C III C I	- X	Classification		A.	noui	5		
Propagation of	of light wa	<mark>aves in an optical fibre – Acceptance angle an</mark> d Ac	ceptan	ce co	ne o	of a		
		ure (NA) – NA of a graded Index Fibre – Mode of pr						
		ndex fibre – stepped index monomode fibre – Grade ep and graded index fibres.	d inde	x mu	ltim	ode		
		Colimbatore						
Unit:2		Fibre Fabrication and Cables		12	houi	*S		
		ues – External chemical vapour deposition – Chara						
		tion (1 <sup>st</sup> method only) - Characteristics - Phasil						
construction -	- losses inc	urred during installation of cable – Testing of cable	CO 00	ble s	elect	ion		
	105505 110	unce during instantion of cubic resting of cubic	s - ca					
criteria.	105505 110	uncer curring instantiation of cubic Testing of cubic	.s – ca					
Unit:3		Fibre Losses and Dispersion in Optics			2 ho			
Unit:3 Attenuation in	n optic fibr	Fibre Losses and Dispersion in Optics e – Rayleigh Scattering losses – Absorption losses	– Bend	ling	losse	es –		
Unit:3 Attenuation in Radiation ind	n optic fibr uced losses	Fibre Losses and Dispersion in Optics e – Rayleigh Scattering losses – Absorption losses – Inherent defect losses – Core and Cladding losse	– Beno es. Disj	ling persio	losse on in	es – an		
Unit:3 Attenuation in Radiation ind Optical Fibre	n optic fibr uced losses – Inter-mo	Fibre Losses and Dispersion in Optics e – Rayleigh Scattering losses – Absorption losses – Inherent defect losses – Core and Cladding losse dal dispersion – Material Chromatic Dispersion –	– Beno es. Disj	ling persio	losse on in	es – an		
Unit:3 Attenuation in Radiation ind	n optic fibr uced losses – Inter-mo	Fibre Losses and Dispersion in Optics e – Rayleigh Scattering losses – Absorption losses – Inherent defect losses – Core and Cladding losse dal dispersion – Material Chromatic Dispersion –	– Beno es. Disj	ling persio	losse on in	es – an		
Unit:3 Attenuation in Radiation ind Optical Fibre	n optic fibr uced losses – Inter-mo	Fibre Losses and Dispersion in Optics e – Rayleigh Scattering losses – Absorption losses – Inherent defect losses – Core and Cladding losse dal dispersion – Material Chromatic Dispersion –	– Beno es. Disj	ding persion	losse on in	es – an ver		
Unit:3 Attenuation in Radiation ind Optical Fibre penalty – Tota Unit:4	n optic fibr uced losses – Inter-mo al Dispersic	Fibre Losses and Dispersion in Optics e – Rayleigh Scattering losses – Absorption losses – Inherent defect losses – Core and Cladding losse dal dispersion – Material Chromatic Dispersion – n delay.	– Benc s. Disp Disper	ding persion rsion	losse on in Pov D hou	es – an ver		
Unit:3 Attenuation in Radiation ind Optical Fibre penalty – Tota Unit:4 LED – The	n optic fibr uced losses – Inter-mo al Dispersic	Fibre Losses and Dispersion in Optics e – Rayleigh Scattering losses – Absorption losses – Inherent defect losses – Core and Cladding losse dal dispersion – Material Chromatic Dispersion – on delay. Light Sources For Optical Fibres	– Benc s. Disp Disper	ding persion rsion	losse on in Pov D hou	es – an ver		
Unit:3 Attenuation in Radiation ind Optical Fibre penalty – Tota Unit:4 LED – The	n optic fibr uced losses – Inter-mo al Dispersic	Fibre Losses and Dispersion in Optics         e – Rayleigh Scattering losses – Absorption losses         – Inherent defect losses – Core and Cladding losse         dal dispersion – Material Chromatic Dispersion –         on delay.         Light Sources For Optical Fibres         volved in LEDs – Structures of LED – Fibre –	– Benc s. Disp Disper	ling persion rsion 10 Cou	losse on in Pov D hou	es – an ver <b>urs</b> –		

Introduction -	Video	Link	Satellite	Link –	Computer	Link –	Nuclear	Reaction	Link	_
Community Ar	ntenna T	elevis	ion – Swi	tched Sta	r CATV – 1	Networki	ng			

	•		
	nit:6	Contemporary Issues	2 hours
Ex	pert lecture	s, online seminars - webinars	
		Total Lecture hours	60
Τe	ext Book(s)		
1	Optical Fi Limited, (	bres and Fibre Optic Communication Systems, Subir Kumar Sa 2007)	rkar, S. Chand
2	Fiber Opti	cs Communication, D.C.Agarwal, S.Chand (2010)	
3	Optical fit	per Communication, Keiser, McGraw Hill (2010)	
Re	eference Bo	oks	
1	Optical Fi Chand &	bres and Fibre Optic Communication Systems, R.K.Puri and V.	K.Babbar, S.
2	Introductio	on to Fiber Optics, Ajoy Ghatak, K. Thyagarajan, Cambridge (2	2009)
Re	elated Onli	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://npt	el.ac.in/courses/115/107/115107095/	
2	https://ww	w.youtube.com/playlist?list=PLq-Gm0yRYwTgr7v3HhdrI_Kcc.	38369fw-
Co	ourse Design	ned By: Mr. J. William Charles	

Course Designed	By: Mr.	J. W	illiam	Charles	
	- 10		1	1-	

COs	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	М	S	M	S	М	M	S	S
CO2	М	S	M	M	S	S	S	M	Μ	M
CO3	S	М	S	S	М	M	M	M	S	M
CO4	S 5	S	М	М	S	S	S	S	S	S
CO5	S	S	S	M	М	S	S	S	S	S
5-2110	ng; M-N	recium;		Discussion		tore (j 2_U) LEVATE	ாத்திட	Cole		

# SEMESTER VI

Course code	6EA	<b>BIO PHYSICS</b>	L	Т	Р	С
Core/Elective/	SBS	ELECTIVE PAPER – II C	4	0	0	4
Pre-requisite		The students are expected to have basic knowledge in the area of biophysics.		abus sion	202	1-22
Course Object						
		s course are to:				
		s applies to the processes of biology.				
		fy micro-organisms for producing biofuel.		1	•	
3. replace bi	o-electricity	in the place of coal and petroleum products for produ	cing e	electric	city.	
Expected Cou	rse Outcor	165.				
_		tion of the course, student will be able to:				
		ons between various systems of cells.			K2	
		treatment methods like radiation therapy.			K4	
I · · · · ·	Ű	nes against infectious diseases.				
				<b>~</b> ,	K6	
KI - Rememb	ber; <b>K2 - U</b>	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; I	<u> 10 - (</u>	reate		
TT •4 1			10			
Unit:1		Structure of Biomolecules cture - Hydrogen atom - Bonds between atoms and m		2 hour		
electrolytes - osmosis - osi	Biological nometry -	ing diffusion - Simple diffusion – Fick's law of diffusion - Simple diffusion – Fick's law of diffusion. <b>Osmosis:</b> Osmosis - Osmoti osmotic pressure of electrolytes. <b>Filtration:</b> Filtration Formation of Urine- Principle of dialysis in artificia	c pres n - P	ssure · assage	· Law e of f	s of luid
11		Visiting of Malagular H	10 h			
Unit:3	A 1 (*	Kinetics of Molecules II	12 ho		<del>.</del>	1
adsorption of Biological in	Gases by	- Factors affecting adsorption - Adsorption of ions by solids - Biological significance of adsorption. <b>Hydro</b> of hydrotropy. <b>Precipitation:</b> Precipitation - Biol	otropy	v: Hyd	lrotroj	
		ids - characteristics of colloids - stability of colloids ation of colloids - Biological importance of colloids	- Ge	1 - En	nulsio	nce. ns -
Techniques for	or the separ	ids - characteristics of colloids - stability of colloids	- Ge	l - En b's D	nulsio	nce. ns -

Unit:5	<b>Bioelectricity and Radiation Biology</b>	12 hours
	ential - Resting membrane potential - Action potential and ner	
	npulse conduction- Recording of nerve impulses by C.R.O - Re	-
	jury potential- Monophasic and diphasic action potentials - F	
radioactivity A	rtificial or induced radioactivity - Radioactive disintegration - un	nits of Radioactivity.
Unit:6	Contemporary Issues	2 hours
Expert lecture	s, online seminars - webinars	
	Total Lecture hours	60
Text Book(s)		
1 Biophysics	: Principles and Techniques, M.A. Subramanian, MJP Publishe	rs, (2015).
2 Principles Publication	of biophysics, Dr S. Palanichamy, Dr.M. Shanmugave ns, (1996).	elu, Palani Paramount
<b>Reference Bo</b>	oks	
1 Biophysics	s, S. Thiravia Raj, Saras Publication, (2009).	
2 Basic Biop	physics for Biologist, M. Daniel, Agro-Bios, (1998).	
	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1 <u>https://ww</u>	ww.sciencedirect.com/topics/earth-and-planetary-sciences/biophy	vsics
2 <u>https://on</u>	linecourses.nptel.ac.in/noc20_ph02/preview	
Course Design	ned By: Dr. P. Sagunthala	

1 PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	<b>PO9</b>	PO10
М	М	М	S	М	M	M	S	М
S	S	М	S	S	S	M	S	S
S	S	S	S	S	М	S	S	S
	S	S S	S S M	S S M S	S S M S S	S S M S S S	S S M S S M	S S M S S M S

-

a -		SEMESTER VI				
Course code	6EB	Object Oriented Programming with C++	L	Т	Р	C
Core/Elective/SE	BS	ELECTIVE III A	4	0	0	4
Pre-requisite		The students are expected to possess fundamental knowledge in object-oriented programming with C++		abus sion	202	1-22
<b>Course Objectiv</b>	es:					
2. learn how to	now C++ : write inl	s course are to: improves C with object-oriented features. ine functions for efficiency and performance. emantics of the C++ programming language.				
Expected Course	e Outcom	195.				
		tion of the course, student will be able to:				
1	-	ncept of data abstraction and encapsulation			K2	
		n C++ classes for code reuse.			K6	
		exception handling in C++ programs.	K			
		derstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K	6 - Cre	eate	no	
KI - Kemember	, 112 - 01	activation, KS - Apply, K4 - Analyze, KS - Evaluate, K	0-01			
Unit:1	677	Tokens, Expressions and Control Structures		1	2 ho	urs
resolution operate		ialization of variables – reference variables – operato			scope	
Math library fun making an outsid	ctions – s e function	Functions in C++ ion prototyping – call by reference – inline functions-F specifying a class – defining member functions– C++ Inline- Nesting of member functions – Static Data mer ily functions.	progr	on ove am w	ith cl	ing
The main function Math library fun- making an outsid	ctions – s e function	ion prototyping – call by reference – inline functions-F specifying a class – defining member functions– C++ I Inline- Nesting of member functions – Static Data mer	progr	on ove am w	rload ith cl	ing ·
The main function Math library fun making an outsid	ctions – s e function	ion prototyping – call by reference – inline functions-F specifying a class – defining member functions– C++ I Inline- Nesting of member functions – Static Data mer	progr	on ove am w – Stat	rload ith cl	ing ass
The main function Math library fun- making an outsid member functions Unit:3 Constructors – P	ctions – s e function s – Friend Parameteriz	ion prototyping – call by reference – inline functions-F specifying a class – defining member functions– C++ Inline- Nesting of member functions – Static Data mer ly functions.	progr nbers	on ove am w – Stat	rload ith cl ic 12 ho	ing ass <b>urs</b>
The main function Math library fun- making an outsid member functions Unit:3 Constructors – P	ctions – s e function s – Friend Parameteriz	ion prototyping – call by reference – inline functions-F specifying a class – defining member functions– C++ Inline- Nesting of member functions – Static Data mer ly functions.	progr nbers	on ove am w – Stat	rload ith cl ic 12 ho	ing ass <b>urs</b> /ith
The main function Math library fun- making an outsid member functions Unit:3 Constructors – P Default Argumen Unit:4 Destructors - De	ctions – s e function s – Friend carameteriz tts – copy fining Op	ion prototyping – call by reference – inline functions-F specifying a class – defining member functions- C++ Inline- Nesting of member functions – Static Data mer ly functions. Constructors zed constructors – Multiple constructors in a class constructor – Dynamic Constructors Destructors erator Overloading – Overloading unary operators – O	progr nbers - Con	on ove am w – Stat	rload ith cl ic l <b>2 ho</b> ors w	urs urs urs
The main function Math library fun- making an outsid member functions Unit:3 Constructors – P Default Argumen Unit:4 Destructors - Desoperators – Rules	ctions – s e function s – Friend carameteriz tts – copy fining Op	ion prototyping – call by reference – inline functions-F specifying a class – defining member functions – C++ 1 Inline- Nesting of member functions – Static Data mer ly functions. Constructors zed constructors – Multiple constructors in a class constructor – Dynamic Constructors Destructors erator Overloading – Overloading unary operators – G oading operators.	progr nbers - Con	on ove am w – Stat	rload ith cl ic I <mark>2 ho</mark> ors w I <mark>2 ho</mark> Bina	urs vith urs ry
The main function Math library fun- making an outsid member functions Unit:3 Constructors – P Default Argumen Unit:4 Destructors - Des operators – Rules Unit:5 Inheritance - Des	ctions – s e function s – Friend Parameteriz tts – copy fining Op s for overl fining den	ion prototyping – call by reference – inline functions-F specifying a class – defining member functions- C++ Inline- Nesting of member functions – Static Data mer ly functions. Constructors Zed constructors – Multiple constructors in a class constructor – Dynamic Constructors Destructors erator Overloading – Overloading unary operators – C oading operators. Inheritance rived classes – single Inheritance - Multilevel inheritance	progr nbers - Con Overlo	on ove am w – Stat	rload ith cl ic l <b>2 ho</b> ors w l <b>2 ho</b> Bina	urs vith urs urs
The main function Math library fun- making an outsid member functions Unit:3 Constructors – P Default Argumen Unit:4 Destructors - De operators – Rules Unit:5	ctions – s e function s – Friend Parameteriz tts – copy fining Op s for overl fining den	ion prototyping – call by reference – inline functions-F specifying a class – defining member functions – C++ Inline- Nesting of member functions – Static Data mer ly functions. Constructors – Static Data mer ly functions. Constructors zed constructors – Multiple constructors in a class constructor – Dynamic Constructors Destructors erator Overloading – Overloading unary operators – O oading operators. Inheritance rived classes – single Inheritance - Multilevel inheritance	progr nbers - Con Overlo	on ove am w – Stat	rload ith cl ic I2 ho ors w I2 ho Bina I0 ho Iultip	urs urs vith urs ry urs le
The main function Math library fun- making an outsid member functions Unit:3 Constructors – P Default Argumen Unit:4 Destructors - Der operators – Rules Unit:5 Inheritance - Der Inheritance - Hier	ctions – s e function s – Friend Parameteriz tits – copy fining Op s for overl fining den rarchical 1	ion prototyping – call by reference – inline functions-F specifying a class – defining member functions – C++ Inline- Nesting of member functions – Static Data mer ly functions. Constructors Zed constructors – Multiple constructors in a class constructor – Dynamic Constructors Destructors erator Overloading – Overloading unary operators – C oading operators. Inheritance rived classes – single Inheritance - Multilevel inheritance Contemporary Issues	progr nbers - Con Overlo	on ove am w – Stat	rload ith cl ic l <b>2 ho</b> ors w l <b>2 ho</b> Bina	urs with urs urs le
The main function Math library fun- making an outsid member functions Unit:3 Constructors – P Default Argumen Unit:4 Destructors - Der operators – Rules Unit:5 Inheritance - Der Inheritance - Hier Unit:6	ctions – s e function s – Friend Parameteriz tits – copy fining Op s for overl fining den rarchical 1	ion prototyping – call by reference – inline functions-F specifying a class – defining member functions – C++ Inline- Nesting of member functions – Static Data mer ly functions. Constructors Zed constructors – Multiple constructors in a class constructor – Dynamic Constructors Destructors erator Overloading – Overloading unary operators – C oading operators. Inheritance rived classes – single Inheritance - Multilevel inheritance Contemporary Issues	progr nbers - Con Overlo	on ove am w – Stat	rload ith cl ic I2 ho ors w I2 ho Bina I0 ho Iultip	urs vith urs le

Tex	t Book(s)
1	Object Oriented Programming with C++, E. Balagurusamy, TMH Publications (2019).
2	Programming with C++, John R. Hubbard, TMH Publications, (2002).
Refe	erence Books
1	The C++ Programming Language, Bjarne Stroustrup, Addison – Wesley, (1985).
2	Programming: Principles and Practice Using C++, Bjarne Stroustrup, Addison- Wesley
	Professional, (2008)
Rela	ated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	https://www.programiz.com/c-programming
2	https://www.geeksforgeeks.org/c-language-set-1-introduction/
3	https://beginnersbook.com/2014/01/c-tutorial-for-beginners-with-examples/
Cou	rse Designed By: Dr P. Sagunthala and Dr. V. Kalaiselvi

Mappi	ng with	Progran	ıme Out	comes			100	-		
COs	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	<b>PO7</b>	PO8	<b>PO9</b>	PO10
CO1	S	M	М	S	M	M	S	М	М	М
CO2	S	S	S	S	S	М	S	М	М	М
CO3	М	S	S	S	S	S	S	S	S	М

பாத்திட வே

\*S-Strong; M-Medium; L-Low

Page **66** of **91** 

# SEMESTER VI

Course code	6EB	GEOPHYSICS	L	Т	Р	С
Core/Elective/	SBS	ELECTIVE PAPER – III B	4	0	0	4
Pre-requisite		Students are expected to have fundamental knowledge in the field of natural science concerned with the physical properties of Earth.			202	1-22
Course Object	ives:		4       0         Syllabu       Version         Normalized stress       Normalized stress         ance curve       Intervalue         and relative       Intervalue         a			
		s course are to:				
		operties of earth and how it works.				
		s of earth using gravity, magnetic, electrical and seism	ic met	thods.		
3. understand	all physic	al parameters of the geothermal field.				
	0.1	100 00 cores 50 co 10				
Expected Cou						
	-	tion of the course, student will be able to:				
	0	nd the propagation of seismic waves in geological mat			K2	
	fferent tech ce rapidly.	niques to solve complex problems and evaluate large	areas	of	K5	
3 do mode	eling <mark>and c</mark> a	ulculations using computers.			K6	
K1 - Rememb	er; <mark>K2 - U</mark>	nderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - (	Create	1	
		A MARKEN BL MI				
Unit:1		Seismology	1		10 ho	ours
waves - Derivat	tion of prop	Surface Waves and Seismometry	9		12 ho	
	·Rayleigh	waves and Love waves - Study of earth by surface wa	Vec		12 110	Jurs
		seismograph and seismography equation – Strain seis		ph.		
<u> </u>		Coimbatore	8-	<b>r</b>		
Unit:3		Earthquakes and Gravity			12 ho	ours
Gravity: The p	otential (La	nitude, frequency - Detection and prediction. aplace's equation and Poisson's equation) - Absolute and Hammond Faller method - Worden gravimeter.	nd rela	ative		
Unit:4	Geoma	gnetism and Internal Structure of the Earth			12 ho	ours
magnetometers magnetism - C	a: Fundame , proton pre auses of th	ental equations - Measurements: method of Gauss, ecession magnetometers, alkali vapour magnetometers e main field -Dynamo theories. <b>Internal structure of</b> coperties with depth - Materials and equation of state	- Th f <b>the</b> o	eories e <b>arth</b> :	of ea	rth's core
Unit:5		eochronology and Geothermal Physics			12 ho	
Geochronology time scale - Th	y: Radioact	ivity of the earth - Radioactive dating of rocks and	mine	rals C	leolog	ical

Unit:6	Contemporary Issues	2 hours
Expert	lectures, online seminars - webinars	
	Total Lecture hours	60
Text B	ook(s)	
1 Intr (19)	oduction To Geophysics Mantle Core And Crust, G. D. Garland, Phila 71).	idelphia, W.B.Saunders,
2 Phy	sics of the Earth and Planets, A. H. Cook, McMillan, (1973).	
Refere	ice Books	
1 Fun (199	damentals of Geophysics, <u>William Lowrie, Andreas Fichtner</u> , Cambrid 97).	lge University Press,
	ploration Geophysics, <u>Mamdouh R. Gadallah</u> , <u>Ray Fisher</u> , Springer edia, (2008).	Science & Business
Related	l Online Conte <mark>nts [MOOC</mark> , SWAYAM, NPTEL, Websites etc.]	
1 <u>ht</u>	<u>ps://nptel.ac.in/content/storage2/courses/105101083/download/lec5.</u> pdf	
2 htt	ps://www.youtub <mark>e.com/</mark> playlist?list=PLfk0Dfh13pBPXtgn8B <mark>T-dpkf</mark> aW	√MRusJwI
Course	Designed By: Dr. P. Sagunthala	

Mappi	ng with	Program	nme Ou	tcomes	-	11.1	24	N.		
COs	<b>PO1</b>	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	PO8	<b>PO9</b>	<b>PO10</b>
<b>CO1</b>	S	М	M	S	М	S	M	M	S	M
CO2	М	S	M	S	S	М	M	S	М	S
CO3	M	S	S	М	S	S	S	S	М	S

\*S-Strong; M-Medium; L-Low



# SEMESTER VI

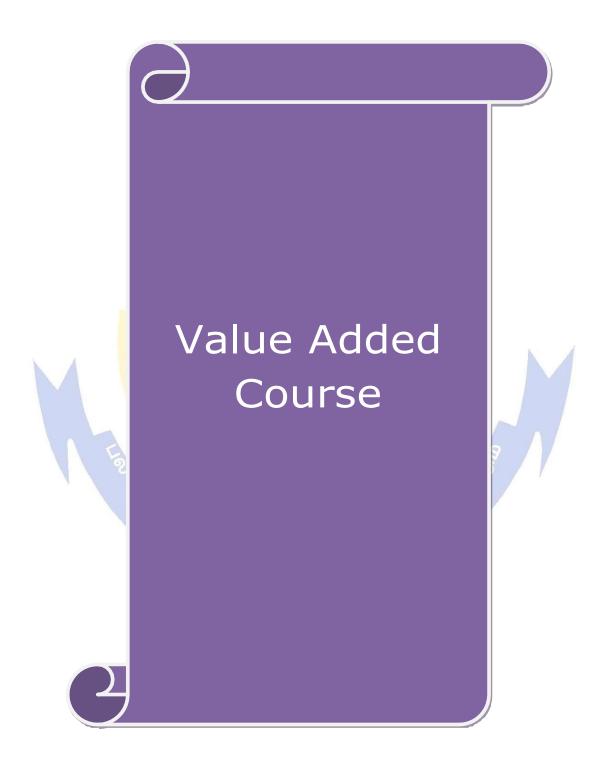
	6EB	INDUSTRY AUTOMATION & ITS APPLICATIONS (INDUSTRY 4.0)	L	Т	Р	С
Core/Elective/S	SBS	Elective Paper III C	4	0	0	4
Pre-requisite		The students are expected to know the fundamental concepts about windows, internet and their application.	-	abus sion	2021	1-22
<b>Course Object</b>			•			
<ol> <li>2. discuss and</li> <li>3. identify the</li> </ol>	idea of office develop prac internet of th	e maintenance using computers. tical skills in <mark>using internet</mark> and Google apps. ings and get awareness regarding hacking.				
On the success		on of the course, students will be able to:				
					<b>V</b> 1	
	of ethical Ha	of windows and internet of things.			K1 K2	
<b>^</b>	0 11	nd recognize their applications in day-to-day life		<u>a</u> .	K4	
KI - Rememb	er; <b>K2</b> - Und	erstand; K3 - Apply; K4 - Analyze; K5 - Evaluate;	K6 - (	Create		
<b>T</b> T •4 1	-161				101	
Unit:1		Windows erating System, Functions of OS, and types of OS			12 ho	
		e, Pen Drive, SD Card. Basics of Networks: LAN, Connection-oriented and connectionless services, D Ethical Hacking		E-ma		rs
	to Ethical H	acking – Hacker and Cracker. Fundamentals of	C			uis
			c Con	nputer	Frau	ıd -
serial port, par	ures. <b>Connec</b> rallel port, H	– Malware Threats: Viruses and Worms, Trojans tivity Ports: PS/2 keyboard and mouse port, USB DMI port, VGA port, display port, USB A-Type, U	s, Spy OTG	ware, , Eth	Malv ernet j	ware
serial port, par Type, Type A <b>Unit:3</b>	ures. <b>Connec</b> rallel port, H Mini and mi	<ul> <li>Malware Threats: Viruses and Worms, Trojans tivity Ports: PS/2 keyboard and mouse port, USB DMI port, VGA port, display port, USB A-Type, U port, Type B Micro.</li> <li>Internet of Things</li> </ul>	s, Spy OTG SB B	ware, , Etho -Type	Malvernet p , USB 12 ho	ware port, C-
serial port, par Type, Type A Unit:3 Introduction, I Applications: radar, IOT in IOT in health	ures. <b>Connec</b> rallel port, H <u>Mini and mid</u> Definition & Satellite sys education. De care industry	<ul> <li>Malware Threats: Viruses and Worms, Trojans tivity Ports: PS/2 keyboard and mouse port, USB DMI port, VGA port, display port, USB A-Type, U pro port, Type B Micro.</li> </ul>	s, Spy OTG SB B et of e smart	ware, , Etho -Type everyth t sate nip can	Malvernet p , USB 12 ho ning. I Illites rd system	ware port, C- urs IOT and tem,
serial port, par Type, Type A Unit:3 Introduction, I Applications: radar, IOT in a	ures. <b>Connec</b> rallel port, H <u>Mini and mid</u> Definition & Satellite sys education. De care industry	<ul> <li>Malware Threats: Viruses and Worms, Trojans tivity Ports: PS/2 keyboard and mouse port, USB DMI port, VGA port, display port, USB A-Type, U pro port, Type B Micro.</li> <li>Internet of Things</li> <li>characteristics of IOT, IOT in everyday life, Internet em, Smart signals in cities and location sharing, evelopment of India in IOT: Solar Plant System, AT</li> </ul>	s, Spy OTG SB B et of e smart	ware, , Etho -Type everyth t sate nip can	Malvernet p , USB 12 ho ning. I Illites rd system	ware port, C- <b>urs</b> <b>IOT</b> and tem, ent,
serial port, par Type, Type A Unit:3 Introduction, I Applications: radar, IOT in IOT in health Connectivity c Unit:4	ures. <b>Connec</b> rallel port, H Mini and mid Definition & Satellite sys education. Do care industry challenges	<ul> <li>Malware Threats: Viruses and Worms, Trojans tivity Ports: PS/2 keyboard and mouse port, USB DMI port, VGA port, display port, USB A-Type, U pro port, Type B Micro.</li> <li>Internet of Things</li> <li>characteristics of IOT, IOT in everyday life, Internet and location sharing, evelopment of India in IOT: Solar Plant System, AT, IOT in Wireless Devices. Challenges in IOT: Bis</li> </ul>	s, Spy OTG SB B et of e smart	ware, , Etho -Type everyth t sate nip can	Malvernet p ernet p , USB 12 ho ning. 1 Ilites rd system nagem	ware port, C- <b>urs</b> <b>IOT</b> and tem, ent,
serial port, par Type, Type A Unit:3 Introduction, I Applications: radar, IOT in IOT in health Connectivity c Unit:4	ures. <b>Connec</b> rallel port, H Mini and mid Definition & Satellite sys education. Do care industry challenges	<ul> <li>Malware Threats: Viruses and Worms, Trojans tivity Ports: PS/2 keyboard and mouse port, USB DMI port, VGA port, display port, USB A-Type, U cro port, Type B Micro.</li> <li>Internet of Things</li> <li>characteristics of IOT, IOT in everyday life, Internet tem, Smart signals in cities and location sharing, evelopment of India in IOT: Solar Plant System, AT, IOT in Wireless Devices. Challenges in IOT: Bi</li> <li>Google Apps for Education</li> </ul>	s, Spy OTG SB B et of e smart	ware, , Ethe -Type everyth t sate nip can a Man	Malvernet p ernet p , USB 12 ho ning. 1 Ilites rd system nagem	ware port, C- <b>urs</b> <b>IOT</b> and tem, ent,
serial port, par Type, Type A Unit:3 Introduction, I Applications: radar, IOT in IOT in health Connectivity c Unit:4 Basics of Goog Unit:5 Basics of Goog	ures. <b>Connec</b> rallel port, H Mini and mid Definition & Satellite sys education. Do care industry challenges le Docs, Goo	<ul> <li>Malware Threats: Viruses and Worms, Trojans tivity Ports: PS/2 keyboard and mouse port, USB DMI port, VGA port, display port, USB A-Type, U pro port, Type B Micro.</li> <li>Internet of Things</li> <li>characteristics of IOT, IOT in everyday life, Internet term, Smart signals in cities and location sharing, evelopment of India in IOT: Solar Plant System, AT, IOT in Wireless Devices. Challenges in IOT: Bi</li> <li>Google Apps for Education</li> <li>gle Sheets, Google Slides, Google Drive.</li> </ul>	s, Spy OTG SB B et of e smart TM ch g Dat	ware, a, Ethe -Type everyth t sate hip can a Man	Malvernet p ernet p , USB 12 ho hing. 1 llites rd syst hagem 12 ho 10 ho	ware port, C- <b>urs</b> <b>IOT</b> and tem, ent,
serial port, par Type, Type A Unit:3 Introduction, I Applications: radar, IOT in IOT in health Connectivity c Unit:4 Basics of Goog Social Media A Unit:6	ures. <b>Connec</b> rallel port, H Mini and mid Definition & Satellite sys education. De care industry challenges le Docs, Goo le Play store, <b>Applications:</b>	<ul> <li>Malware Threats: Viruses and Worms, Trojans tivity Ports: PS/2 keyboard and mouse port, USB DMI port, VGA port, display port, USB A-Type, U pro port, Type B Micro.</li> <li>Internet of Things</li> <li>characteristics of IOT, IOT in everyday life, Internet arem, Smart signals in cities and location sharing, evelopment of India in IOT: Solar Plant System, AT, IOT in Wireless Devices. Challenges in IOT: Bis</li> <li>Google Apps for Education</li> <li>gle Sheets, Google Slides, Google Drive.</li> <li>Google Calendar, Google Contacts, and Google Met WhatsApp, Telegram, Facebook, Twitter, YouTube Contemporary Issues</li> </ul>	s, Spy OTG SB B et of e smart TM ch g Dat	ware, a, Ethe -Type everyth t sate hip can a Man	Malvernet p ernet p , USB 12 ho hing. 1 llites rd syst hagem 12 ho 10 ho	ware port, C- UTS IOT and tem, ent, OUTS UTS
serial port, par Type, Type A Unit:3 Introduction, I Applications: radar, IOT in IOT in health Connectivity c Unit:4 Basics of Goog Social Media A Unit:6	ures. <b>Connec</b> rallel port, H Mini and mid Definition & Satellite sys education. De care industry challenges le Docs, Goo le Play store, <b>Applications:</b>	<ul> <li>Malware Threats: Viruses and Worms, Trojans tivity Ports: PS/2 keyboard and mouse port, USB DMI port, VGA port, display port, USB A-Type, U pro port, Type B Micro.</li> <li>Internet of Things</li> <li>characteristics of IOT, IOT in everyday life, Internet term, Smart signals in cities and location sharing, evelopment of India in IOT: Solar Plant System, AT, IOT in Wireless Devices. Challenges in IOT: Bis</li> <li>Google Apps for Education</li> <li>gle Sheets, Google Slides, Google Drive.</li> <li>Google Calendar, Google Contacts, and Google Met WhatsApp, Telegram, Facebook, Twitter, YouTube</li> </ul>	s, Spy OTG SB B et of e smart TM ch g Dat	ware, a, Ethe -Type everyth t sate hip can a Man	Malvernet p rnet p , USB 12 ho ning. 1 llites rd syst nagem 12 ho 10 ho	ware port, C- UTS IOT and tem, ent, OUTS UTS

Te	ext Book(s)
1	Quick Course in Microsoft Office- Joyce Cox & Polly Urban, GOLGOTIA Publications
2	Internet of Things-A hands on Approach, Arshdeep Bahga, Vijay Madisetti, Universities press
3	Ethical Hacking: A Beginners Guide to Learning the World of Ethical Hacking, Lakshay Eshan,
	Shockwave Publishing (2018)
4	The Google Apps Guidebook: Lesson, Activities and Projects Created by Students for Teachers
	Paperback, Kern Kelley, Tech Sherpas, (August 2, 2016)
Re	eference Books
1	DC Saftware for Windows Made Simple D.K. Tonali Tata McCrawdill Dublishing Company
1	PC Software for Windows Made Simple, R.K. Taxali, Tata McGrawHill Publishing Company,
	(1998).
2	Internet of Things, Srinivasa K.G., Siddesh G.M., Hanumantha Raju R., Cengage Learning India
	Pvt. Ltd (2018)
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]
1	Google Docs: <u>https://www.youtube.com/watch?v=xJiUTXGv3PE&amp;vl=en</u>
2	Google Sheet : <u>https://www.youtube.com/watch?v=FIkZ1sPmKNw</u>
3	Google Calendar and Google Meet : <u>https://youtu.be/PKuBtQuFa-8</u>
4	IOT : <u>https://www.youtube.com/watch?v=UrwbeOIIc68</u>
Co	ourse Designed By: Dr. S. Prasath, Coordinator, E-learning cell, Nandha Arts & Science
Co	ollege, Erode

Mappi	ng with	Program	nme Ou	tcomes	-	11	21			
COs	PO1	PO2	PO3	PO4	PO5	<b>PO6</b>	<b>PO7</b>	PO8	PO9	<b>PO10</b>
<b>CO1</b>	S	S	М	М	S	S	S	L	S	S
CO2	S	S	M	M	S	S	S	L	S	S
CO3	S	S	М	L	S	М	L	M	S	М

\*S-Strong; M-Medium; L-Low





# VALUE ADDED COURSE I

Value added course	OPTOELECTRONICS	L	Т	Р	С
value auteu course	OI TOELECTRONICS	30	0	0	4
Pre-requisite	Students are expected to possess some basic knowledge in the field of Semiconductor technology.	Syllab Versio		2021-	22
Course Objectives:					
The main objectives of	f this course are to:				
1. understand the op	tical process in a semiconductor.				
2. understand the ba	asic optoelectronics devices-LED, OLED, photodetect	or and	photo	voltaic	
devices.	and the second		_		
3. be familiar with r	ecent trends in optoelectronics.				
<b>Expected Course Out</b>	tcomes:				
On the successful cor	npletion of the course, student will be able to:				
1 describe basic	laws and phenomena that define behaviour of op	toelectro	onic	K1	
devices.	US 147 MOLEN NOR 51				
2 describe the dev	velopment and application of optoelectronic systems			K2	
3 interpret the acc	quired data and measured results.			K4	
-	- Understand; K3 - Apply; K4 - Analyze; K5 - Evaluat	e; K6 -	Create	2	
	Module:1	2 ho	urs		
Electron - hole pair	formation and recombination, absorption in semicondu			d indi	rect
bandgap semiconduct					
E	Module:2	2 ho	urs		
Effect of electric field	d on absorption, Franz-Keldysh effect in semiconductor	s.S	/ /		
	Module:3	2 ho	urs		
Light Emitting Diod	es — Materials for light emitting diodes, Principl			of LF	ED.
	power in terms of photon energy, homo structured LI				
LED, drawbacks of he				J	
,	Module:4 Lit Incont 2-Million	2 ho	urs		
Types of LED struct	tures-planar, dome type, surface emitter, edge emit	ter, sup	er lu	minesc	ent
structure.					
	Module:5	2 ho	urs		
Performance characte	eristics of LED-Optical output power-current character	eristics,	forwa	rd cur	rent
voltage characteristics					
	Module:6	2 ho			
	eristics of LED—Optical output power-current character				
-	s, Modulation bandwidth, power bandwidth product,	Lifetime	e, Rise	e time	'fall
time, reliability,					
T ( 1 ) CC	Module:7	2 ho			
Internal quantum efficience	ciency, advantages / disadvantages of using LED. Num	_		ns	
<u>A 1114 181</u>	Module:8	2 ho			
0	ng diodes (OLED), The principle of OLED, char	acteriza	tion,	structu	ıre,
efficiency, multilayer	ULED.				

	2 hours
Important parameters of photodetectors, Detector responsivity, spectral resp	onse range, response
time, quantum efficiency, capacitance, noise characteristics.	
Module:10	2 hours
Absorption of radiation—absorption coefficient, mention of expression for wavelength cut off, direct and indirect absorption T.	r photocurrent, long
Module:11	2 hours
Types of photodiodes—Junction photodiodes, pin diode, avalanche photodetectors; Comparison of different detectors, Photomultiplier tubes.	photodiodes, CCD
Module:12	2 hours
Phototransistors—characteristics. Photoconductive detectors—expression for Numerical problems.	photoconductive gain.
Module:13	2 hours
Solar cell—IV characteristics, efficiency, materials	
Module:14	2 hours
Organic photovoltaic diodes (OPVD)—fundamental process, exciton dissociation	absorption, exciton
Module:15	2 hours
Charge transport, charge collection, characterization. numerical problems Total Lecture hours	30
Text Book(s)	
Text BOOK(S)	
1 Fibre Optics Communications, Harold Kolimbiris, Prentice Hall, (2004).	
1 Fibre Optics Communications, Harold Kolimbiris, Prentice Hall, (2004).	
1 Fibre Optics Communications, Harold Kolimbiris, Prentice Hall, (2004).	
1       Fibre Optics Communications, Harold Kolimbiris, Prentice Hall, (2004).         2       Optical Fibre Communications, Keiser G, McGraw Hill, (2000).         Reference Books	
<ol> <li>Fibre Optics Communications, Harold Kolimbiris, Prentice Hall, (2004).</li> <li>Optical Fibre Communications, Keiser G, McGraw Hill, (2000).</li> <li>Reference Books</li> </ol>	
<ol> <li>Fibre Optics Communications, Harold Kolimbiris, Prentice Hall, (2004).</li> <li>Optical Fibre Communications, Keiser G, McGraw Hill, (2000).</li> <li>Reference Books</li> <li>Fibre Optic Communication, Agarwal D C, Wheeler Publications, (1996)</li> </ol>	Ğ
<ol> <li>Fibre Optics Communications, Harold Kolimbiris, Prentice Hall, (2004).</li> <li>Optical Fibre Communications, Keiser G, McGraw Hill, (2000).</li> <li>Reference Books         <ul> <li>Fibre Optic Communication, Agarwal D C, Wheeler Publications, (1996)</li> <li>Optical Communication, Katiyar S, S K Kataria and Sons, (2010).</li> <li>Optoelectronics and Photonics: Principles and Practices, Kasap S O, Pear</li> </ul> </li> </ol>	Ğ
<ol> <li>Fibre Optics Communications, Harold Kolimbiris, Prentice Hall, (2004).</li> <li>Optical Fibre Communications, Keiser G, McGraw Hill, (2000).</li> <li>Reference Books         <ul> <li>Fibre Optic Communication, Agarwal D C, Wheeler Publications, (1996)</li> <li>Optical Communication, Katiyar S, S K Kataria and Sons, (2010).</li> <li>Optoelectronics and Photonics: Principles and Practices, Kasap S O, Pear</li> </ul> </li> <li>Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]</li> </ol>	Ğ
<ol> <li>Fibre Optics Communications, Harold Kolimbiris, Prentice Hall, (2004).</li> <li>Optical Fibre Communications, Keiser G, McGraw Hill, (2000).</li> <li>Reference Books</li> <li>Fibre Optic Communication, Agarwal D C, Wheeler Publications, (1996)</li> <li>Optical Communication, Katiyar S, S K Kataria and Sons, (2010).</li> <li>Optoelectronics and Photonics: Principles and Practices, Kasap S O, Pear</li> <li>Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]</li> <li>https://nptel.ac.in/courses/115/102/115102026/</li> </ol>	Ğ
1       Fibre Optics Communications, Harold Kolimbiris, Prentice Hall, (2004).         2       Optical Fibre Communications, Keiser G, McGraw Hill, (2000).         Reference Books         1       Fibre Optic Communication, Agarwal D C, Wheeler Publications, (1996)         2       Optical Communication, Katiyar S, S K Kataria and Sons, (2010).         3       Optoelectronics and Photonics: Principles and Practices, Kasap S O, Pear         Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]         1       https://nptel.ac.in/courses/115/102/115102026/         2       https://moodle.usth.edu.vn/course/view.php?id=362#section-1	son, (2013).
<ol> <li>Fibre Optics Communications, Harold Kolimbiris, Prentice Hall, (2004).</li> <li>Optical Fibre Communications, Keiser G, McGraw Hill, (2000).</li> <li>Reference Books</li> <li>Fibre Optic Communication, Agarwal D C, Wheeler Publications, (1996)</li> <li>Optical Communication, Katiyar S, S K Kataria and Sons, (2010).</li> <li>Optoelectronics and Photonics: Principles and Practices, Kasap S O, Pear</li> <li>Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]</li> <li>https://nptel.ac.in/courses/115/102/115102026/</li> </ol>	son, (2013).

# VALUE ADDED COURSE II

		L	Т	Р	С
Value added course	NON – DESTRUCTIVE TESTING	30	0	0	4
Pre-requisite	Students should be aware of some fundamental principles of non – destructive testing and thermography.	Syllab Versio		202	1-22
<b>Course Objectives:</b>					
The main objectives of	this course are to:				
	entals of NDT and its applications which will be used	for sol	ving p	problei	ns ir
	ace flawless components.				
	e about different types of Non-Destructive testing method	ds and a	upply t	those	
	ify defects in various products produced in industries.				
	tand various Non-Destructive evaluations, testing method	ls, theor	ries ar	nd their	r
industrial applicat	ions.				
E					
Expected Course Out	npletion of the course, student will be able to:				
		1.	1	TZ O	
applications.	magnetic testing methods and interpretation of re			K2	
	application of Thermography, eddy current testing coustic emission testing.	g meth	iod,	K3	
	instrumentation of various Radiography and testing copy, Xerography, Computed Radiography and Comput		ues	K5	
	- Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate	e; K6– (	Create	e	
		8			
Inter hertigen of mode	Module:1	<b>2 ho</b>		1 4	4
testing methods.	rials testing -Classification of materials tests – Overv	iew of	non-c	lestruc	tive
	Module:2	2hou	ırs		
Various NDT method	ls- selection of NDT methods-Visual Inspection.	1			
	Module:3	2hou	ırs		
Introduction-principle	e-types of visual testing- Experiments used in visual insp			licatio	ns.
I I I	Module:4	2 ho			
Liquid Penetrant Test	ing - Principles - Testing Process - penetrant materials			•	
	Module:5	2 ho	urs		
Penetrant testing met	hods- Interpretation of results- Applications.				
	Module:6	2 ho	urs		
	esting- Magnetic testing methods-Interpretation and tion of Magnetic particle Inspection.	d eval	uation	of	test
	Module:7	2 ho	urs		
Thermography princip liquid crystals-Advan	ples- Contact and non-contact inspection methods-Tec			apply	ring

Module:8	2 hours
Infrared radiation and infrared detectors-Generation of eddy currents, Prope	
Module:9	2 hours
Eddy current sensing elements, Probes, Instrumentation, Types of arrang	gement, Applications,
advantages, Limitations, Interpretation/Evaluation.	
Module:10	2 hours
Ultrasonic and acoustic emission testing - Basics of ultrasonic waves- Prinultrasonic testing- Testing methods.	ciple- Equipment for
Module:11	2 hours
Ultrasonic transducers- Mode of displays- Application.	2 110015
Module:12	2 hours
Introduction- Basic principle- Instrumentation of acoustic emission testing-	
data acquisition- Applications.	
Module:13	2 hours
Radiography testing - Principle-Equipment of Radiography Testing-film an	d filmless techniques-
types and use of filters and screens.	
Module:14	2 hours
Characteristics of films -graininess, density, speed, contrast-characteristic	curves- Radiographic
techniques.	
Module:15	2 hours
Fluoroscopy- Xerography-Computed Radiography- Computed Tomography.	
Total Lecture hours	30
	50
Text Book(s)         1       Practical Non-Destructive Testing, Baldev Raj, T.Jayakumar, M.T.	Thavasimuthu, Narosa
Publishing House, (2014).	i navasiniuunu, Marosa
2 Non-Destructive Testing Techniques, Ravi Prakash, New Age Internationa	al Publishers, (2010).
Reference Books	8
1 Handbook of Non-destructive evaluation, Charles, J. Hellier, McGr	aw Hill Professional.
	/
2 Introduction to Non-destructive testing: a training guide, Paul E Mix, Wi	ley, 2nd Edition
New Jersey, (2005).	
EDUGATE TO ELEVATE	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1 https://nptel.ac.in/courses/113/106/113106070/	
Course designed by: Dr. D.M.Suresh and Dr. K Saravana Kumar	

# VALUE ADDED COURSE III

	VALUE ADDED COURSE III	-1			1
Value added course	<b>BIOMEDICAL INSTRUMENTATION</b>	L	Т	Р	С
		30	0	0	4
Pre-requisite	Students are expected to have some basic knowledge in the field of physiology, operations and instruments used in medical field.	Syllab Versio		2021-22	
Course Objectives:					
The main objectives of the 1. understand the work 2. find applications of	nis course are to: ting principles of Biomedical Instruments. various biomedical instruments. ge of electronics on various biomedical instruments.				
	05500				
Expected Course Outco					
*	letion of the course, student will be able to:				
5 5	instrumentation against radiation, physiological effort	ects due	to	K1	
2 analyze the theory	of Bio-telemetry, its problems and uses.			K4	
	nces in biomedical instrumentation such as lasers i an, ultrasonic imaging, MRI and biofeedback instrum			K5	
<u> </u>	Jnderstand; K3 - Apply; K4 - Analyze; K5 - Evaluat			e	
		- , -			
	Module:1	2 ho	urs		
Physiological Assist De	evices: -Introduction – pacemakers – pacemaker batt				
	Module:2	2 ho	urs		
Artificial heart valves -	nerve and muscle stimulators.	12			
	Module:3	2 ho	urs		
Heart-lung machine - k	idney machine.	8° /			
	Module:4	2 ho	urs		
<b>Operation theatre equ</b> machine.	uipment: Introduction – surgical diathermy – v			anesthe	esia
	Module:5 JUIT FOUT 2-4	2 ho	urs		
Cardiac output measure	ments – pulmonary function analyzers – gas analyzer				
Ĩ	Module:6	2 ho	IRC		
Blood gas analyzers - o		2 110	ul 5		
Dioou gas analyzers 0	symptons – elements of intensive care monitoring				
6	xymeters – elements of intensive care monitoring. Module:7	2 ho	irs		
	Module:7	2 ho	urs		
	Module:7 nts of bio-telemetry system.	•			
Bio-Telemetry: Elemen	Module:7 nts of bio-telemetry system. Module:8	2 ho			
Bio-Telemetry: Elemen	Module:7 nts of bio-telemetry system. Module:8 ry system – radio telemetry system.	2 ho	ours		
<b>Bio-Telemetry:</b> Element Design of a bio-telemetr	Module:7 hts of bio-telemetry system. Module:8 ry system – radio telemetry system. Module:9	•	ours		
<b>Bio-Telemetry:</b> Element Design of a bio-telemetr	Module:7 nts of bio-telemetry system. Module:8 ry system – radio telemetry system.	2 ho	ours		
<b>Bio-Telemetry:</b> Element Design of a bio-telemetr Problems in implant tele	Module:7 hts of bio-telemetry system. Module:8 ry system – radio telemetry system. Module:9 emetry – uses of bio-telemetry.	2 ho	ours		
<b>Bio-Telemetry:</b> Element Design of a bio-telemetr Problems in implant tele	Module:7 hts of bio-telemetry system. Module:8 ry system – radio telemetry system. Module:9 emetry – uses of bio-telemetry. Module:10	2 ho	ours ours urs		

Module:12	2 hours
Devices to protect against electrical hazards – hospital architecture.	
Module:13	2 hours
Advances in bio-medical instrumentation: Introduction – computers in medicine.	medicine – lasers in
Module:14	2 hours
Endoscopes – cryogenic surgery – CT scan – ultrasonic imaging.	•
Module:15	2 hours
MRI – biofeedback instrumentation – biomaterials.	
Total Lecture hours	30
Text Book(s)	
1 Biomedical instrumentation, M. Arumugam, AnuradhaPublicatios, (2009)	
2 Introduction to biomedical electronics, Joseph Dubovy, Tata McGraw Hill	l Company (1978).
Reference Books	
1 Biomedical Instrumentation and Measurements, Leslie Cromwell, Fred	J. Weibell And Erich
A. Pfeiffer, Measurements Prentice Hall of India (1997).	
2 Handbook of biomedical instruments, Khandpur, R.S, Tata McGraw Hil	<mark>l C</mark> ompany (2003).
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1 https://nptel.ac.in/courses/108/105/108105101/	
2 https://onlinecourses.nptel.ac.in/noc20_ee41/preview	
3 https://www.classcentral.com/course/bioengineering-20126	
Course designed by: Dr. P. Sagunthala and Dr. K Saravana Kumar	
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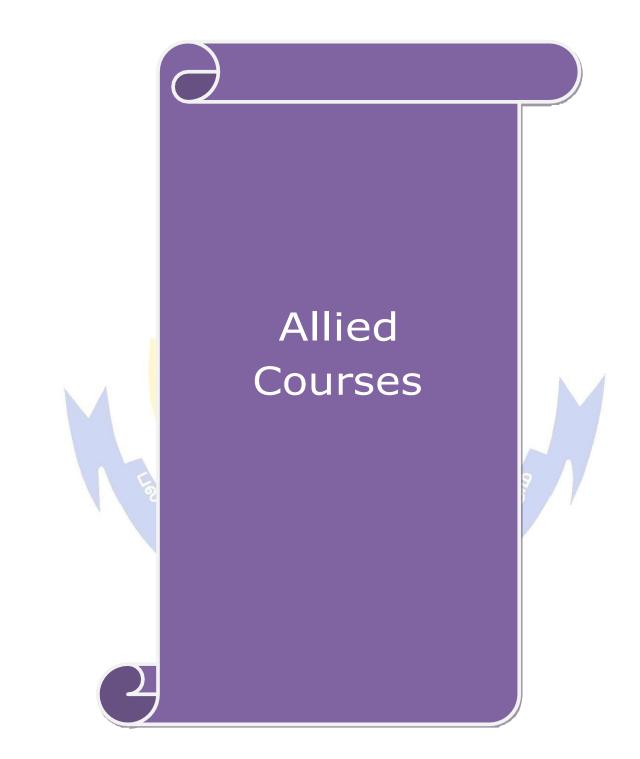
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# VALUE ADDED COURSE IV

Value added course	MODERN DISPLAY DEVICES AND	L	Т	Р	С
Tanue auter course	STORAGE MATERIALS	30	0	0	4
Pre-requisite	Students are expected to know some basic concepts of display devices, storage materials and their usage.	Syllab Versio	2021	-22	
Course Objectives:					
2. understand the select	is course are to: bout different types of electronic devices and some ion process which will be used in industries. onic and optoelectronic devices using suitable mater	-	materi	als.	
	0550				
Expected Course Outcor					
-	etion of the course, student will be able to:			-	
1 evaluate display p LCD in clinical situ	erformances which are necessary to appropriately uations.	y select	an	K	1
•	n in visual or tactile form.			K	2
3 apply these concep	ts for electronic visual displays.			K	4
K1 - Remember; K2 - U	i <mark>nde</mark> rstand; <b>K3</b> - Apply; <b>K4</b> - Analyze; <b>K5</b> - Evaluat	e; <b>K</b> 6 -	Create	e	
Selection of materials	Module:1 for different devices: Selection Criteria-	2 Operatin	hour		
Engineering Requiremen	Module:2 ts-Types of Materials-Examples of selection criteria		hours	5	
2	Module:3	2	hours	5	
Modern Engineering ma	aterials: Metallic Glasses-Structure-Preparation-Pro	operties-	Applic	cation	s.
	Module:4	2	hours	6	
Shape memory alloys- Techniques-Commercial	Introduction-Structural Changes-General Charact SMAs-Applications.	eristics-(	Chara	cteriz	atior
	Module:5	2	hours	5	
IC Packaging Materials.	Introduction-IC packing-Package type-Package man	terials.			
	Module:6	2	hours	5	
Display Devices: Introdu	uction-Electroluminescence process- LED materials	•			
	Module:7	2	hours	5	
Fabrication of LED - Ap	plications - Active and passive display devices.				
τ''1 / 1 m /	Module:8		hours		1
	General features of liquid crystals-liquid crystal di rystal display) - merits and Demerits.				LED
	Module:9		hours		
Magnetic Data Storage concepts	e Devices: Basics of magnetic materials and their	<u> </u>			nory
		-			
	Module:10 devices-magnetic Disc Memories	2	hours	5	

	Module:11	2 hours
Fl	exible disc storage systems-Floppy disks- Magnetic Tapes and drives-Magneti	c Bubble materials
	Module:12	2 hours
Rar	e earth garnets-Magnetic Bubble memories - Charge Couple devices - Applic	ations.
	Module:13	2 hours
-	<b>Detical Data Storage Devices:</b> Principle-Disc data storage- Structure and op D-ROM.	erating principle of
	Module:14	2 hours
Μ	agneto-optical storage system (recording and reading) - Data storage and retrie	eval methods.
	Module:15	2 hours
Hol	ography data storage-principle-storing and retrieving digital data-Applications	of Holography.
	Total Lecture hours	30
Te	xt Book(s)	
1	Semiconductor Physics and Optoelectronics, V.Rajendran, J.Hemalatha, M.S. Vikas Publishing House PVT Ltd, (2003).	Stalin Mano Gibson,
2	A Text book of Material Science, K.G.Aswani, S. Chand & Company ltd, (20	001).
	5	
Re	ference Books	
1	Material science, O.P.Khanna, Dhanpat Rai Publications, (2004).	
2	Semiconductor Physics and Optoelectronics, M.Arumugam, Anuradha Age	ncies,(2003).
Re	elated Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	https://www.slideshare.net/mobile/thesaifeye/material-handling-storage-syste	em
2	https://www.slideshare.net/mobile/jerinmartin/display-devices-44886026	
	and the second second	
Co	ourse designed by: Dr. D.M.Suresh and Dr. K Saravana kumar	3
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# ALLIED PHYSICS PAPERS FOR B. Sc., MATHS / CHEMISTRY 2021-2022 BATCH AND ONWARDS

#### **SEMESTER I /III**

		SEMESTER 1/III				
Course code	1AF/ 3AF	ALLIED PHYSICS-I	L	Т	Р	С
Allied Paper			4	0	0	4
Pre-requisite			Syllab Versio		2021-22	
Course Object	ctives:					
<ol> <li>1. understand</li> <li>2. acquire the</li> </ol>	the behavi skill of so	his course are to: our of matter in everyday life. lving related problems. roperties of matter, electricity and magnetism.				
Expected Cor	urse Outc	omes:				
-		etion of the course, student will be able to:				
1 understa	and the law	's involved in gravitation and elasticity.			K2	
2 update t	he knowle	dge on heat and thermodynamics, sound and spectrosco	py.		K3	
various	real <mark>prob</mark> le				K4	
	oer; <b>K2 - U</b>	I <mark>nde</mark> rstand; <b>K3 - Apply; K4 - Analys</b> e; <b>K5 -</b> Evaluate; <b>K</b>	<b>X6 - C</b> i		4	
Unit: I		Properties of Matter law of Gravitation - Determination of G by Boy's r		10 II	12 hor	
uniform and n by torsion pen	on-uniforr	ots – bending of beams – depression of cantilever- De n bending methods – Torsion in a wire – Determination		gidity	modu	ulus
Unit: II	2	Heat, Thermodynamics and Sound			12 ho	
Vanderwaal's – K-Onnes me Sound: Ultras Unit: III X-Rays: Intro derivation —	constants ethod – pro sonics – Int oduction –	of state-critical constants of a gas-derivation of critical of – Joule-Thomson effect – Porous plug experiment –lice operties of liquid Helium I and II. troduction - Properties - Production – Piezoelectric meth Atomic Physics Properties – Principle – Production – Coolidge tub systal method – Moseley's law and its importance – Co	quefact hod - a be - E	tion o applic Bragg'	of heli ations 12ho s law	um  <b>urs</b> 7 —
Applications. Unit: IV		Electricity		1	12 ho	116
	nometer	principle – construction – theory – figure of merit – c	urront			
sensitiveness -	Conversion tance by p	principle – construction – theory – figure of ment – c on of galvanometer into ammeter and voltmeter – mea potentiometer – Electromagnetic induction – Transform	surem	ent of	f The	rmo
Unit: V		Magnetism			10 ho	
Relation betwee dia, para and fe	en – B, H erromagnet	aterials: Magnetic induction $B$ – Magnetisation $M$ – Magnetic susceptibility – Magnetic permeab ic materials – Curie temperature – Energy loss due to curves – magnetic circuit.	oility -	- Proj	pertie	

Unit: VIContemporary Issues2 hours									
Expert lectures, online seminars - webinars									
			1						
Total Lecture hours60									
Te	xt Book(s)								
1	Propertie (2017).	s of Matter and Acoustics, R. Murugesan, 2nd Edition, S. Chan-	d & Co., Ltd. Reprint						
2		Physics, R. Murugesan, Kiruthiga Sivaprasath, Twelfth Revised Reprint (2006).	l Edition, S. Chand&						
3	Heat and	Thermodynamics, Brijlal N.subramaniyam, S. Chand & Co. Lt	d, Reprint (2006).						
4	4 Electricity and Magnetism, R. Murugesan ,Revised edition, S. Chand & Co., Reprint (2014)								
Re	eference Bo	ooks							
1		ermodynamics and Satistical Physics, Brijlal N. Subramaniyam, and evised edition (2007).	P.S.Hemme, S. Chand						
2	Thermoo (2015)	lynamics and Statistical Physics, Agrawal Prakash, PragatiF	Prakashan, 27 <sup>th</sup> edition						
Re	lated Onli	ne Contents [MOOC, SWAYAM, NPTEL, Websites etc.]							
1	https://w	ww.physicstutoronline.co.uk/alevelphysicsnotes/							
2	https://www.askiitians.com/revision-notes/physics/atomic-physics/								
3	www.khanacademy.org/science/physics/elasticity/surface_tension								
4	4 https://sites.google.com/brown.edu/lecture-demonstrations/home?authuser=0								
Co	ourse Desig	ned By: Dr. P. Sagunthala, Dr. P. Yasotha							

Mapping with Programme Outcomes										
COs	<b>PO1</b>	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	M	М	М	S	S	S	La	S	S
CO2	S	S	М	S	L	М	S	М	M	S
CO3 M S S L S M L M S M										
*S-5	Strong; M	-Medium	; L-Low	த்தப்ப EDUCAT	simbator பாரை E TO EL	2_UIR EVATE	apple Co			

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# **SEMESTER II / IV**

Course code	2AF/ 4AF	ALLIED PHYSICS-II	L	Т	Р	С
Allied paper			4	0	0	4
Pre-requisite		The students are expected to learn the fundamentals of Nuclear Physics, Lasers, Semiconductors and electronics.	Syllal Vers		20	21-22
Course Obje	ctives:					
The main obje	ectives of	this course are to:				
		e diverse applications of Physics.				
		physics concepts and problem-solving skills				
3. expertise in	various d	omains of Physics				
	<b>a</b>	6010-02-00				
Expected Co						
	-	letion of the course, student will be able to:			1	
		e on basic concepts of photoelectric effect and fission idea of wave mechanics.	, fusio	n	K	1
		eatures of Nuclear forces, photoelectric cells, semico indamental concepts.	nducto	r	K	2
Ų	ize th <mark>e co</mark> r ions in rea	cept of Laser properties and digital electronics and exploit 1 life.	ore thei	r	K	4
		Jnderstand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K	<b>6</b> - Cro	eate		
		Trouveron hards				
Unit: I		Modern Physics			12 h	ours
Einstein's pho mechanics: D	otoelectric De Broglie	aws of photo electric effect – Einstein's photoelectric eq equation by Millikan's experiment – photo electric cells matter waves – determination of De Broglie wavelength ve by G.P.Thomson experiment.	s – app	olicati	ons.	Wave
Unit: II		Nuclear Physics			11 h	ours
defect – partie – chain reacti	cle acceler on – atom	ar forces – nuclear structure by liquid drop model – Bin ators – cyclotron and betatron –nuclear fission: definition bomb – nuclear fusion: definition – source of Stellar cles – Leptons, Mesons and Baryons	n – en	ergy	relea	sed
Unit: III	F	Laser Physics		1	1 ho	urs
Purity of spec	tral lines -	- Coherence length and time – spontaneous and induced	emissio	ons –	popu	lation
inversion – m	netastable	state – conditions for laser actions – Ruby laser – Heliu	ım–nec	on <sup>2</sup>		
laser – applic	ations of 1	asers - Raman effect - Raman shift - stokes and anti-s	stokes	lines	– La	aser
Raman Spectr	ometer.					
Unit: IV		Semiconductor Physics			2 ho	
		eristics of P-N junction Diode – Zener diode – application				
		e of LED- Frequency Modulation and Amplitude modula				
		ram of Superheterodyne receiver – block diagram of mon	ochron	ne T∖	reco	eiver –
· ·	es and app	lications of RADAR		~		
Unit: V		Digital Electronics	- 4 -		2 ho	urs
-		Steps in fabrication of Monolithic IC's – General applic nputers – organization of digital computers – number sy				ion

of bin	ary into decimal – conversion of decimal to binary – binary addition	and subtraction – Basic
	gates – NAND and NOR as universal logic gates – Demorgan's theory	
	ations of Demorgan's theorems – Half adder and full adder circuits.	
Unit:	-	2 hours
Expert	t lectures, online seminars – webinars	· ·
	Total Lecture hours	60
Text <b>H</b>	Book(s)	1
1 M	Iodern Physics, R.Murugesan, Kiruthiga Sivaprasath, Twelfth Revised	l Edition, S. Chand &
С	Co. Ltd., Reprint (2006)	
2 P1	rinciples of Electronics, V.K. Metha , Reprint, S.Chand& Co (2000)	
-		
Refere	ence Books	
1 A	Text Book of electronics, R.S Sedha, S.Chand& Co. Ltd. Reprint (20	008).
2 M	Iodern Physics, Sehgal. Choppa, Sehgal, S. Chand& Co	
Relate	ed Online Conten <mark>ts [MOOC, SWAYAM, NPTEL, Websites etc.]</mark>	
1 <u>h</u>	ttps://www.askiitians.com/revision-notes/physics/atomic-physics/	
2 <u>h</u> t	ttps://www.askiitians.com/revision-notes/physics/nuclear-physics/	
3 <u>h</u>	ttps://www.askiitians.com/revision-notes/physics/solid-and-electronic-	device/
Course	e Designed By: Dr. P. Sagunthala and Dr. P. Yasotha	

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	M	S	S	S	L	S	S
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# SEMESTER I&II / SEMESTER III&IV

Allied Practical       (Examination at the end of II/ IV semester)       0       0       2         Pre-requisite       Should have the fundamental knowledge of Basic Experiments in physics       Syllabus       20         Course Objectives:       The main objectives of this course are to:       1       Understand the basics of Experimental techniques and apply it       2         3       Gain knowledge about different light and optical properties.       3       Motivate the students to apply the principles of physics in their day-to-day life.         Expected Course Outcomes:       0       1       attain skill to understand the usage of basic laws and theories to determine various properties of the materials given.       Pro-gravious experiments.       F         2       analyze the characteristics of various diodes and construct power supply.       K       F         3       acquire the knowledge of the potentiometer and apply it for various experiments.       F         K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create       LST OF EXPERIMENTS (Any twelve experiments)       56         1.       Acceleration due to gravity-Compound pendulum method       3.       Young's modulus - Uniform bending - Optic lever method       4.         4.       Young's modulus - Spectrometer       P.       F       F       F         7.       Thermal conductivity - Lee's disc method.       8				SEMESTER I&II / SEMESTER III&IV	<del></del>	<del></del>	<u>г г</u>	
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Pre-requisite         Basic Experiments in physics         Version         20           Course Objectives:         The main objectives of this course are to:         1.         Understand the basics of Experimental techniques and apply it         2.           Gain knowledge about different light and optical properties.         3.         Motivate the students to apply the principles of physics in their day-to-day life.           Expected Course Outcomes:         0n the successful completion of the course, student will be able to:         1           1         attain skill to understand the usage of basic laws and theories to determine various properties of the materials given.         1           2         analyze the characteristics of various diodes and construct power supply.         1           3         acquire the knowledge of the potentiometer and apply it for various experiments.         1           K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze; K5 - Evaluate; K6 - Create         1           LIST OF EXPERIMENTS (Any twelve experiments)         56           .         Any twelve experiments)         56           .         Any twelve experimente         56           .         Static torsion method.         56           .         Arguing's modulus - Static torsion method.         56           .         Frequency of A.C - Sonometer         7.           7. Therma	Allied ]	Pract	ical	(Examination at the end of II/ IV semester)	0	0	2	3
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<ul> <li>10. (i-d) curve - solid prism - Spectrometer</li> <li>11. Wavelength of spectral lines - Grating - Minimum deviation - Spectrometer</li> <li>12. Radius of curvature of lens - Newton's rings method.</li> <li>13. Viscosity of highly viscous liquid - Stoke's method.</li> <li>14. Surface tension - Drop weight method</li> <li>15. Low range voltmeter calibration - Potentiometer</li> <li>16. Low range ammeter calibration - Potentiometer</li> <li>17. Construction of IC regulated power supply</li> <li>18. Characteristics of PN Junction diode</li> <li>19. Characteristics of Zener diode</li> <li>20. Verification of truth tables of logic gates- AND, OR and NOT</li> <li>Contemporary Issues</li> <li>Online workshop, Webinars on Experimental Electronics</li> </ul>	8. Refr	ractive	index of a so	lid prism – Spectrometer	19			
<ul> <li>11. Wavelength of spectral lines – Grating - Minimum deviation - Spectrometer</li> <li>12. Radius of curvature of lens - Newton's rings method.</li> <li>13. Viscosity of highly viscous liquid – Stoke's method.</li> <li>14. Surface tension - Drop weight method</li> <li>15. Low range voltmeter calibration - Potentiometer</li> <li>16. Low range ammeter calibration - Potentiometer</li> <li>17. Construction of IC regulated power supply</li> <li>18. Characteristics of PN Junction diode</li> <li>19. Characteristics of Zener diode</li> <li>20. Verification of truth tables of logic gates- AND, OR and NOT</li> <li>Contemporary Issues</li> <li>Online workshop, Webinars on Experimental Electronics</li> </ul>	9. Refr	ractive	e index of a lic	uid prism – Spectrometer	G	/ /		
<ul> <li>12. Radius of curvature of lens - Newton's rings method.</li> <li>13. Viscosity of highly viscous liquid – Stoke's method.</li> <li>14. Surface tension - Drop weight method</li> <li>15. Low range voltmeter calibration - Potentiometer</li> <li>16. Low range ammeter calibration - Potentiometer</li> <li>17. Construction of IC regulated power supply</li> <li>18. Characteristics of PN Junction diode</li> <li>19. Characteristics of Zener diode</li> <li>20. Verification of truth tables of logic gates- AND, OR and NOT</li> <li>Contemporary Issues</li> <li>Online workshop, Webinars on Experimental Electronics</li> </ul>	10. (i-d)	l) curv	ve - solid prism	1 - Spectrometer	5			
<ul> <li>13. Viscosity of highly viscous liquid – Stoke's method.</li> <li>14. Surface tension - Drop weight method</li> <li>15. Low range voltmeter calibration - Potentiometer</li> <li>16. Low range ammeter calibration - Potentiometer</li> <li>17. Construction of IC regulated power supply</li> <li>18. Characteristics of PN Junction diode</li> <li>19. Characteristics of Zener diode</li> <li>20. Verification of truth tables of logic gates- AND, OR and NOT</li> <li>20. Verification of truth tables of logic gates- AND, OR and NOT</li> <li>20. Online workshop, Webinars on Experimental Electronics</li> <li>21. Total Practical Hours:</li> </ul>	11. Wa	velen	gth of spectral	lines – Grating - Minimum deviation - Spectromet	ter			
14. Surface tension - Drop weight method         15. Low range voltmeter calibration - Potentiometer         16. Low range ammeter calibration - Potentiometer         17. Construction of IC regulated power supply         18. Characteristics of PN Junction diode         19. Characteristics of Zener diode         20. Verification of truth tables of logic gates- AND, OR and NOT         Contemporary Issues         Online workshop, Webinars on Experimental Electronics         Total Practical Hours:         Reference Books	12. Rad	dius o	f curvature of	lens - Newton's rings method.				
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18. Characteristics of PN Junction diode         19. Characteristics of Zener diode         20. Verification of truth tables of logic gates- AND, OR and NOT         Contemporary Issues         0nline workshop, Webinars on Experimental Electronics         Total Practical Hours:         Reference Books			-					
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20. Verification of truth tables of logic gates- AND, OR and NOT       4         Contemporary Issues       4         Online workshop, Webinars on Experimental Electronics       4         Total Practical Hours:         Reference Books								
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Reference Books	Juline	WORK	shop, webinar	*	Haal Ha			60
	Referei	nce B	ooks		JCal HO	urs:		60
1 Practical Physics and Electronics, C.C.Ouseph, U.J.Rao, V.Vijayendran, S.Viswanathan Publishers (2007)				lectronics, C.C.Ouseph, U.J.Rao, V.Vijayendran, S	S.Viswa	nathai	n	
<ul> <li>A text book of practical Physics, M.N.Srinivasan, S.Balasubramanian, R.Ranganathan, Su Chand&amp;Sons (2017)</li> </ul>	2 A t	text b	ook of practica	l Physics, M.N.Srinivasan, S.Balasubramanian, R.	Rangana	athan,	Sulta	n

# Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

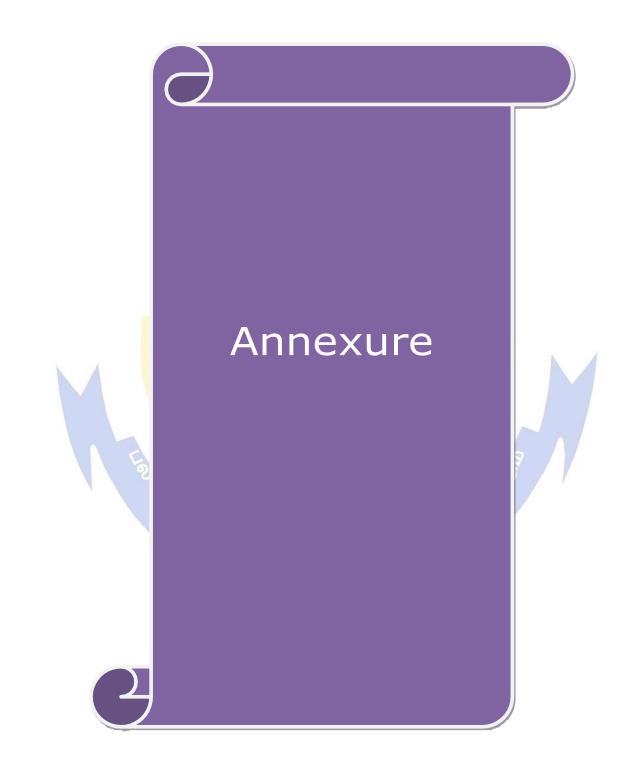
- 1 https://nptel.ac.in/courses/115/105/115105110/
- 2 <u>https://www.youtube.com/playlist?list=PLuiPz6iU5SQ8-rZn\_LgLofRX7n8z4tHYK</u>
- 3 <u>https://www.slideshare.net/mobile/sunilrathore77398/basicanalogelectronics</u>

Course Designed By: Dr. P. Sagunthala and Dr. P. Yasotha

Mapping with Programme Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	М	S	S	S	М	L	М	S	М
CO2	S	S	М	S	S	L	М	S	S	S
CO3	М	М	S	S	L	М	S	S	S	М

\*S-Strong; M-Medium; L-Low





## B. Sc. PHYSICS

Syllabus (With effect from 2021 – 22)

Program Code: 22C



DEPARTMENT OF PHYSICS Bharathiar University (A State University, Accredited with "A" Grade by NAAC and 13<sup>th</sup> Rank among Indian Universities by MHRD-NIRF) Coimbatore 641 046, INDIA

#### MARKS DISTRIBUTION (EXTERNAL(CEE) AND INTERNAL (CIA))

Max.	External	rehensive Examinations CEE)	Continu	ious Internal essments (CIA)	Overall Passing Minimum
Marks	Max. Marks	Passing Minimum	Max. Marks	Passing Minimum	(Internal + External)
100	50	20	50	15	40
75	45	18	30	9	30

#### I. THEORY(Core/ Elective/ Allied Papers)

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### Distribution of marks for CIA for Core/ Elective/ Allied Theory Papers(Each student should attend at least one test)

S. No	Component	Allotment of Internal Assessment marks for a maximum of	
		50	30
1	Tests (average of two tests of 2 hours each)	15	10
2	End semester model test (3 hours)	15	10
3	Assignments- 2 No.s/ Quiz/ Group discussion	10	
4	Seminar	5 6	-
5	Attendance	5	5



#### II. PRACTICAL (Core/ Elective/ Allied Practical)

Max.	External I	rehensive Examinations CEE)	Continuous Internal Assessments (CIA)		Overall Passing Minimum	
Marks	Max. Marks	Passing Minimum	Max. Marks	x. Passing (Inter		
100	50	20	50	15	40	
75	45	18	30	9	30	
50	25	10	25	7.5	20	

S. No	Component	Allotment of Internal Assessment marks for a maximum of			
		50	30	25	
1	Record	15	10	10	
2	Tests: One best test out of two tests	30	15	10	
3	Attendance (Minimum 10 experiments to be completed)	5	5	5	

#### A. Distribution of marks for CIA for Core/ Elective/ Allied Practical (Each student should attend at least one test)

#### waangesi:

# B. Distribution of marks for CEE for Core/ Elective/ Allied Practical

S. No	Component	Allotment of Comprehensive External Examination marks for a maximum of			
		<b>50 45</b> 25			
1	Record	5	5	5	
2	Formula, Circuit diagram, Tabular column and etc.,	15	15	7	
3	Observation	20	15	8	
4	Calculation	5	5	3	
5	Result	5	5	2	

Distribution	of	marks	for	attendance

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Attendance	Marks
90% and above	5
Between 85 and 90%	4.5
Between 80 and 85%	3
Between 75 and 80%	INTE 2
Between 70 and 75%	1

#### **QUESTION PAPER PATTERN**

The following question paper patterns shall be followed for OBE pattern syllabi for the candidates admitted from the academic year 2021-22 wherever applicable otherwise provided in syllabi itself.

Maximum 50 Marks – wherever applicable				
SECTION A	Multiple choice questions with four options	10*1=10	10 questions – 2 from each unit	
SECTION B	Short answer questions of either / or type	5*3=15	5 questions – 1 from each unit	
SECTION C	Essay-type questions of either / or type	5*5=25	5 questions – 1 from each unit	

	Maximum 45 Marks	- wherever applicable
SECTION A	Multiple choice questions 10*1=10 with four options	10 questions $-2$ from each unit
SECTION B	Short answer questions of 5*2=10 either / or type	5 questions $-1$ from each unit
SECTION C	Essay-type questions of either / or type	5 questions – 1 from each unit

The General Awareness paper to have multiple-choice questions (with four options) to be evaluated by using OMR. For other courses in Part IV namely, Environmental Studies, Value Education – Human Rights, Yoga for Human Excellence and Women's Rights the question paper pattern should be 5 out of 10. Each question carries 10 marks.