E.M.G. YADAVA WOMEN'S COLLEGE, MADURAI – 625 014.

(*An Autonomous Institution – Affiliated to Madurai Kamaraj University*)

Re-accredited (**3rd Cycle**) with Grade **A+** & **CGPA 3.51** by NAAC

DEPARTMENT OF PHYSICS

CBCS With OBE

BACHELOR OF SCIENCE

PROGRAMME CODE - I

COURSE STRUCTURE

(w.e.f. 2022 – 2023 Batch onwards)

Annexure-10

E.M.G. YADAVA WOMEN'S COLLEGE, MADURAI -14.

(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
Re –accredited (3rd cycle) with Grade A+ and CGPA 3.51 by NAAC

DEPARTMENT OF PHYSICS-UG
(with Allied Maths and Allied Chemistry)
CBCS with OBE
COURSE STRUCTURE
(w.e.f. 2022-2023 Batch onwards)

Sem	Part	Subject code	Title of the Course	Teaching hrs.(Per week)	Duration of exam (hrs)	Marks allotted			Credits
							S.E	Total	
I	I	**22OU1TA1**	**Part-I** Tamil	6	3	25	75	100	3
	II	**22OU2EN1**	**Part-II** English	6	3	25	75	100	3
	III	**22OUPH11**	**Core:** Mechanics, Properties of Matter and Sound	4	3	25	75	100	4
			Core: Major Practical – I	2	-	-	-	-	-
		22OUPHGEMA1	**GEC**: Mathematics – I Theory of Equations, Trigonometry, Analytical Geometry 3D and vector Calculus	6	3	25	75	100	4
	IV	**22OUPHSE11**	**SEC:** Basic Electronics	2	3	25	75	100	2
		22OUPHSE12	**SEC:** Introduction to MS Office and Internet	2	3	25	75	100	2
		22OUPHID1	**IDC:** Energy Physics	2	3	25	75	100	2
II	I	**22OU1TA2**	**Part-I** Tamil	6	3	25	75	100	3
	II	**22OU2EN2**	**Part-II** English	6	3	25	75	100	3
	III	**22OUPH21**	**Core:** Heat and Thermodynamics	4	3	25	75	100	4
		22OUPH2P	**Core:** Major Practical – I	2	3	40	60	100	3
		22OUPHGEMA2	**GEC:** Mathematics – II Calculus, Differential Equations and Applications	6	3	25	75	100	5
	IV	**22OUPHSE21**	**SEC:** Basic Instrumentation Skill	2	3	25	75	100	2
		22OUPHSE22	**SEC:** Renewable Energy and Energy Harvesting	2	3	25	75	100	2
		22OUPHID2	**IDC:** Astrophysics	2	3	25	75	100	2

III	I	**22OU1TA3**	**Part-I** Tamil	6	3	25	75	100	3
	II	**22OU2EN3**	**Part-II** English	6	3	25	75	100	3
	III	**22OUPH31**	**Core:** Electricity and Electromagnetism	4	3	25	75	100	4
			Core: Major Practical -II	2	-	-	-	-	-
		22OUPHGEMA3	**GEC:** Mathematics – III Algebra and Statistics	6	3	25	75	100	4
		22OUPHGECH3	**GEC:** Chemistry-I Physical Chemistry	4	3	25	75	100	4
			GEC: Practical I- Inorganic Qualitative Analysis	2	-	-	-	-	-
IV	I	**22OU1TA4**	**Part-I** Tamil	6	3	25	75	100	3
	II	**22OU2EN4**	**Part-II** English	6	3	25	75	100	3
	III	**22OUPH41**	**Core:** Optics and Spectroscopy	4	3	25	75	100	4
		22OUPH4P	**Core:** Major Practical – II	2	3	40	60	100	3
		22OUPHGEMA4	**GEC:** Mathematics – IV Linear Programming	6	3	25	75	100	5
		22OUPHGECH4	**GEC** : Chemistry-II Organic and Physical Chemistry	4	3	25	75	100	4
		22OUPHGECH4P	**GEC** : Practical I- Inorganic Qualitative Analysis	2	3	40	60	100	1
V	III	**22OUPH51**	**Core:** Atomic Physics	4	3	25	75	100	4
	III	**22OUPH52**	**Core:** Programming with C	4	3	25	75	100	4
	III		**DSEC –I**	4	3	25	75	100	4
			Core: Major Physics Practical – III	3	-	-	-	-	-
			Core: Major Electronics Practical – IV	3	-	-	-	-	-
			Major Elective –Project	2	-	-	-	-	-
		22OUPHGECH5	**GEC**: Chemistry-III Inorganic Physical and Medicinal Chemistry	4	3	25	75	100	4
			GEC: Practical II- Volumetric Analysis	2	-	-	-	-	-
	IV	**22OUPHSE5**	**SEC:** Opto Electronics	2	3	25	75	100	2
		22OUAECEV5	**AECC:** Environmental Studies	2	3	25	75	100	2
	III	**22OUPH61**	**Core:** Solid State Physics	4	3	25	75	100	4
	III	**22OUPH62**	**Core:** Nuclear Physics	4	3	25	75	100	4

VI	III		**DSEC –II**	4	3	25	75	100	4
		22OUPH61P	**Core:** Major Physics Practical – III	3	3	40	60	100	5
		22OUPH62P	**Core:** Major Electronics Practical – IV	3	3	40	60	100	5
			DSEC -III Project	2	3	20	80	100	3
		22OUPHGECH6	**GEC**: Chemistry-IV Analytical and Inorganic Chemistry	4	3	25	75	100	4
		22OUPHGECH6P	**GEC**: Practical II- Volumetric Analysis	2	3	40	60	100	1
	IV	**22OUPHSE6**	**SEC:** Microprocessor Fundamentals	2	3	25	75	100	2
		22OUAECVE6	**AECC:** Value education	2	3	25	75	100	2
	V	**22OU5NS4/ 22OU5PE4**	Extension Activities NSS/Phy. Education	-	3	25	75	100	1
			Total	180					140

GEC : Generic Elective Course
SEC : Skill Enhancement Course
DSEC : Discipline Specific Elective Course
AECC: Ability Enhancement Compulsory Course
IDC : Inter Disciplinary Course

DSEC: Discipline Specific Elective Course:

Semester V (DSEC I- Choose any one)

1. Analog and Digital Electronics - 22OUPHDSE5A
2. Numerical Methods - 22OUPHDSE5B

Semester VI (DSEC II- Choose any one)

1. Relativity and Quantum Mechanics - 22OUPHDSE6A
2. Nanophysics - 22OUPHDSE6B

DSEC -III Project - 22OUPHDSEPR6

Annexure-10

E.M.G. YADAVA WOMEN'S COLLEGE, MADURAI -14.
(An Autonomous Institution - Affiliated to Madurai Kamaraj University)
Re –accredited (3rd cycle) with Grade A+ and CGPA 3.51 by NAAC

DEPARTMENT OF PHYSICS-UG
Generic Elective Course (For B.Sc Maths and Chemistry)
CBCS with OBE

COURSE STRUCTURE
(w.e.f. 2022-2023 Batch onwards)

Class	Sem	Sub Code	Title of the paper	Teaching hrs(Per week)	Duration Of exam (hrs)	Marks allotted			
						C. A	S.E	Total	Credits
I Maths/ II Chemistry	I/III	**22OUMAGEPH1/ 22OUCHGEPH3**	**GEC**: Physics – I Mechanics and Properties of Matter	4	3	25	75	100	4
			GEC : Physics Practical-I	2	-	-	-	-	-
I Maths/ II Chemistry	II/IV	**22OUMAGEPH2/ 22OUCHGEPH4**	**GEC :**Physics – II Thermal Physics	4	3	25	75	100	4
		22OUMAGEPH2P/ 22OUCHGEPH4P	**GEC :** Physics Practical-I	2	3	40	60	100	1
IIMaths/ III Chemistry	III/V	**22OUMAGEPH3/ 22OUCHGEPH5**	**GEC :**Physics – III Electricity and Electronics	4	3	25	75	100	4
			GEC : Physics Practical-II	2	-	-	-	-	-
II Maths/ III Chemistry	IV/VI	**22OUMAGEPH4/ 22OUCHGEPH6**	**GEC :** Physics – IV Optics	4	3	25	75	100	4
		22OUMAGEPH4P/ 22OUCHGEPH6P	**GEC :** Physics Practical-II	2	3	40	60	100	1

NOTE:

The students are permitted to obtain additional credits (Optional)

1. MOOCs / SWAYAM / NPTEL Courses(Online)
2. Project

Compulsory Courses:

Year	Semester	Nature of Course	Course code	Title of the Course	Hours	Offered to students of
I	I	Add on Course	22PHAOC 22PHAOCP	Fundamentals of Photography Lab inFundamentals of Photography	30	I B.Sc., Physics
II	III&IV	Certificate Course	22PHC 22PHPR	Solar Energy Project in Solar Energy	90	II year students of all other disciplines
III	V	Value Added Course	22PHVAC 22PHVACPR	Mobile Communication Project in Mobile Communication	30	III B.Sc., Physics

Department of Physics				Class: III B.Sc				
Sem	**Course Type**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
V	Core	**22OUPH51**	Atomic Physics	4	4	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship oriented**
✓		

Course Objectives:

1. To gain the knowledge about band theory of solids.
2. To get Adequate knowledge on the mass spectrographs.
3. To Understand the evolution of Different atomic models and their merit and limitations.
4. To learn about the fine structure of spectral lines.
5. To provide an introductory account about the atomic structure and the impact of X-rays.

Course Content:

Unit I: Positive Rays: Discovery-properties- analysis – Thomson's parabola method – Aston's mass spectrograph – Bainbridge's mass spectrograph – Dempster's mass Spectrograph -Mass defect and Packing fraction- Separation of isotopes.

Unit II : Atomic Structure: Alpha particle scattering-Rutherford 's nuclear model-drawbacks-Bohr atom model –Bohr's interpretation of the Hydrogen spectrum-evidences in favour of Bohr's theory-Ritz combination principle- correspondence principle-Sommerfield's relativistic atom model- the vector atom model – Quantum numbers associated with the vector atom model — the Pauli's exclusion principle.

Unit III: Fine Structure of Spectral Lines: Coupling schemes-L-S Coupling- j-j Coupling- magnetic dipole moment due to orbital motion of the electron- due to spin of the electron - Stern and Gerlach experiment- optical spectra- interval rule-fine structure of sodium D line- Zeeman effect- theory and experiment- Larmor's theorem - Anomalous Zeeman effect- Paschen –Bach effect-Stark effect.

Unit IV: X-Rays and Photo Electric Effect: Production of X-rays –absorption of X-rays – X-ray absorption edges- Bragg's law – Bragg's X-ray spectrometer —X-ray spectra- continuous spectra- characteristic spectra-Moseley's law - Compton effect-theory and experimental verification- the powder crystal method-Laue Method.

Unit V: Photo Electric Effect: Introduction – Richarson and Compton

Experiment-Experimental investigations of the Photoelectric effect- Einstein's photoelectric equation-photoelectric cells- photo emissive cells-photovoltaic cells-photoconductive cells-applications of photoelectric cells.

Books for Study:

Modern Physics by R. Murugeshan, KiruthigaSivaprasath, S. Chand & Co., New Delhi(2008).

Unit I:	**Chapter 3**	**3.1-3.8**
Unit II:	**Chapter 4**	**4.1-4.6,4.11-4.13,4.15,4.16**
Unit III:	**Chapter 4**	**4.14,4.18-4.21,4.23-4.28**
Unit IV:	**Chapter 5,25,**	**5.1,5.6,5.9,5.13,25.16-25.18**
Unit V:	**Chapter 6**	**6.1,6.3-6.6**

Books for Reference:

1. Modern Physics by J.H. Hamilton and Yang, McGraw-Hill Publication, (1996).
2. Concepts of Modern Physics by A. Beiser, Tata McGraw-Hill, New Delhi (1997).
3. Fundamentals of Physics by D.Halliday, R.Resnick and J. Walker, Wiley, 6thEdition, New York(2001).
4. Modern Physics by Kenneth S.Krane, John Willey & sons, Canada (1998).

Web Resources:

1. https://en.wikipedia.org/wiki/Atomic_physics
2. https://www.schoolphysics.co.uk/age16-19/Atomic%20physics/Atomic%20structure%20and%20ions/text/Positive_rays/index.html
3. https://en.wikipedia.org/wiki/Atomic_physics
4. https://www.princetoninstruments.com/learn/x-ray-scattering/introduction-to-x-ray-diffraction
5. https://opengeology.org/Mineralogy/12-x-ray-diffraction-and-mineral-analysis/?print=print

E-Book:

1. http://www.gammaexplorer.com/wp-content/uploads/2014/03/Atomic-Physics.pdf
2. https://users.physics.ox.ac.uk/~ewart/Atomic%20Physics%20lecture%20notes%20C%20port.pdf
3. https://www.bdu.ac.in/cde/SLM/M.Sc.%20Physics/II%20Year/Atomic%20%26%20Molecular%20physics%20%28Unit1%2C%20Unit2%29.pdf
4. https://ncert.nic.in/ncerts/l/leph204.pdf

5. https://campbelstudstore.myshopify.com/products/ebook-pdf-current-trends-in-atomic-physics-1st-edition

Pedagogy:

Chalk and Talk, PPT, group discussion , quiz, on the spot test and

Rationale for Nature of the course:

Knowledge and skill: The course is the learning and understanding the fundamental ideas of atomic physics

Activities to be given:

Enhancing the quality of students to understand fundamentals of various atomic models

Course learning Outcomes (CLOs)

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (upto K level)
CLO1	Gain the knowledge about band theory of solids	K1 to K2
CLO2	Get Adequate knowledge on the mass spectrographs	K1 to K2
CLO3	Understand the evolution of Different atomic models and their merit and limitations	K1 to K3
CLO4	Learn about the fine structure of spectral lines	K1 to K3
CLO5	Provide an introductory account about the atomic structure and the impact of X-rays.	K1 to K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	2	3	3	3	3
CLO2	3	3	2	3	3	3
CLO3	2	3	3	3	3	3
CLO4	3	3	3	3	3	3
CLO5	3	3	3	3	3	3

1-Basic Level 2- Intermediate Level 3- Advanced Level

Annexure-10

LESSON PLAN : (60 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**Positive Rays:** Discovery-properties- analysis – Thomson's parabola method – Aston's mass spectrograph – Bainbridge's mass spectrograph – Dempster's mass Spectrograph -Mass defect and Packing fraction- Separation of isotopes.	12	Chalk and Talk, PPT, group discussion
II	**Atomic Structure:** Alpha particle scattering-Rutherford 's nuclear model- drawbacks-Bohr atom model –Bohr's interpretation of the Hydrogen spectrum- evidences in favour of Bohr's theory-Ritz combination principle-correspondence principle-Sommerfield's relativistic atom model- the vector atom model – Quantum numbers associated with the vector atom model — the Pauli's exclusion principle.	12	Chalk and Talk, PPT, group discussion
III	**Fine Structure of Spectral Lines**: Coupling schemes-L-S Coupling- j-j Coupling- magnetic dipole moment due to orbital motion of the electron- due to spin of the electron - Stern and Gerlach experiment-optical spectra- interval rule- fine structure of sodium D line- Zeeman effect- theory and experiment- Larmor's theorem - Anomalous Zeeman effect- Paschen –Bach effect-Stark effect.	12	Chalk and Talk, PPT, group discussion
IV	**X-Rays and Photo Electric Effect:** Production of X-rays –absorption of X-rays – X-ray absorption edges- Bragg's law – Bragg's X-ray spectrometer —X-ray spectra-continuous spectra- characteristic spectra-Moseley's law - Compton effect- theory and experimental verification- the powder crystal method-Laue Method.	12	Chalk and Talk, PPT, group discussion ,
V	**Photo Electric Effect:** Introduction – Richarson and Compton Experiment-Experimental investigations of the Photoelectric effect- Einstein's photoelectric equation-photoelectric cells- photo emissive cells-photovoltaic cells-photoconductive cells-applications of photoelectric cells.	12	Chalk and Talk, PPT, group discussion ,

Course Designer:
Mrs.S.Manimozhi
Mrs.M.R.Gurulakshmi

Department of Physics				Class: III B.Sc				
Sem	**Course Type**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
V	Core	**22OUPH52**	Programming with C	4	4	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship oriented**
✓		

Course Objectives:

1. To learn how to write simple programmes using C language.
2. To Know the basics of operators and expressions used in C Programmes.
3. To get the knowledge about branching and Looping concepts.
4. To study the basics of arrays and functions in C Programmes.
5. To obtain the basic concepts of functions in C programmes.

Course Content:

Unit-I Overview of C: History of C – Importance of C –Basic structure of C Programs - programming style – executing a C Program. **Constants, Variables and Data Types**: Introduction - Character set – C Tokens – Keywords and Identifiers – Constants - Variables- Data Types.

Programs: Adding two numbers - Multiplication of two numbers.

Unit-II Operators and expression: Introduction – Arithmetic operators - Relational operators – Logical operators – assignment operators – increment and decrement operators - Conditional operator – Bitwise operators - arithmetic expressions - evaluation of expressions – Precedence of Arithmetic operators - Mathematical Functions.

Program: Convert a given numbers of days into months and days (Problem 4.1) - Sequence of squares of numbers. (Problem 4.2)

UNIT-III Managing Input and output operations: Introduction – Reading a Character – Writing a Character – Formatted input – Formatted output. **Decision making, branching:** Introduction – Decision making with if statement – simple if statement – The if …else statement – Nesting of if …else statements — The switch statement – The goto Statement. **Decision making and looping**: Introduction - The while statement – The do Statement – The for statement.

Program: Selecting the largest of three numbers (Problem 6.4) - To read and print name of the months (Problem 6.6).

Unit-IV Array: Introduction-one dimensional Arrays-declaration of one dimensional arrays - initialization of one dimensional arrays- two dimensional arrays- initialization of two dimensional arrays- Multi-Dimensional Arrays – Dynamic Arrays.

Program: Transpose of a matrix (Problem 8.7), 3 X 3 matrix multiplication (Problem 8.8).

Unit-V User - define Functions

Introduction – definition of functions – return values and their types – Function Call – Function Declaration – Category of Functions - No Arguments and no return values – Arguments but No Return Values – Arguments with return values – No Arguments but returns values– Nesting of Functions.

Program: Interest calculation programs – (Problem10.1 - No Arguments and no return value, 10.2 – Arguments but no return values)

Books for Study:

1. E.Balagurusamy, Programming in ANSI C, Tata McGraw Hill Company, New Delhi, 8th Edition,2019.

Unit: I	**Chapters 2,3**	**Page No: 17-19, 28 - 31,39-49,58-59**
Unit: II	**Chapter 4**	**Page No: 68- 77, 79- 82, 89**
Unit: III	**Chapter 5,6,7**	**Page No: 100-120,131-141,145- 148, 153 - 154, 171- 185**
Unit: IV	**Chapter 8**	**Page No:212-236**
Unit: V	**Chapter 10,11**	**Page No: 291,295-313**

Reference Books:

1. Brijendra Singh,Data communications and Computer Networks, second edition.
2. Kamthane Ashok.N, (2013),” Programming in C”, 2nd Edition, Pearson Education.
3. Yashvant P. Kanetkar, (2008), “Let us C”, 8th Edition, Infinity science press.
4. Brian W. Kernnigham and Dennis M. Ritchi, The C programming language, 2nd Ed.Prentice-Hall of India Pvt. Ltd.
5. Henry Mullish and Herbert L Cooper, The spirit of C, 15th Ed, Jaico Publishing house.

Web Resources:

1. https://www.freecodecamp.org/news/learn-c-programming-classic-book-dr-chuck/
2. https://karadev.net/uroci/filespdf/files/a%20book%20on%20c.pdf
3. https://www.youtube.com/watch?v=KJgsSFOSQv0
4. https://www.youtube.com/watch?v=0Sg6QHmlFJE
5. https://www.youtube.com/watch?v=EjavYOFoJJ0

E-Book:

1. http://cslabcms.nju.edu.cn/problem_solving/images/c/cc/The_C_Programming_Language_%282nd_Edition_Ritchie_Kernighan%29.pdf
2. https://wwwpersonal.acfr.usyd.edu.au/tbailey/ctext/ctext.pdf
3. http://pdvpmtasgaon.edu.in/uploads/dptcomputer/Let%20us%20c%20-%20yashwantkanetkar.pdf

Pedagogy:

Chalk and Talk, PPT, group discussion, quiz, on the spot test.

Rationale for Nature of the course:

Knowledge and skill: The course enables the students with the understanding of basics of programming language and functional hierarchial decomposition using C programmes.

Activities to be given:

1. Enhancing the quality of students to understand the fundamentals of C programming language.
2. Train the students to improve their problem solving abilities, constructing algorithms and programmes.

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (upto K level)
CLO1	Learn how to write simple programmes using C language.	K1 to K2
CLO2	Know the basics of operators and expressions used in C Programmes.	K1 to K2
CLO3	Get the knowledge about branching and Looping concepts.	K1 to K3
CLO4	Study the basics of arrays and functions in C Programmes.	K1 to K3
CLO5	Obtain the basic concepts of functions in C programmes.	K1 to K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	2	3	3	3	3
CLO2	3	3	2	3	3	3
CLO3	2	3	3	3	3	3
CLO4	3	3	3	3	3	3
CLO5	3	3	3	3	3	3

1-Basic Level 2- Intermediate Level 3- Advanced Level

Annexure-10

LESSON PLAN : (60 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**Overview of C** History of C – Importance of C –Basic structure of C Programs - programming style – executing a C Program. **Constants, Variables and Data Types** Introduction - Character set – C Tokens – Keywords and Identifiers – Constants - Variables- Data Types - Defining symbolic constants. **Programs:** Adding two numbers - Multiplication of two numbers.	12	Chalk and Talk, PPT, group discussion
II	**Operators and expression** Introduction – Arithmetic operators - Relational operators – Logical operators – assignment operators – increment and decrement operators - Conditional operator – Bitwise operators - arithmetic expressions - evaluation of expressions – Precedence of Arithmetic operators - Mathematical Functions. **Program:** Convert a given numbers of days into months and days (Problem 4.1) - Sequence of squares of numbers. (Problem 4.2)	12	Chalk and Talk, PPT, group discussion
III	**Managing Input and output operations** Introduction – Reading a Character – Writing a Character – Formatted input – Formatted output. **Decision making, branching** Introduction – Decision making with if statement – simple if statement – The if …else statement – Nesting of if …else statements — The switch statement – The goto Statement - **Decision making and looping** Introduction - The while statement – The do Statement – The for statement. **Program:** Selecting the largest of three numbers (Problem 6.4) - To read and print name of the months (Problem 6.6).	12	Chalk and Talk, PPT, group discussion
IV	**Array** Introduction-one dimensional Arrays-declaration of one dimensional arrays - initialization of one dimensional arrays- two dimensional arrays- initialization of two dimensional arrays- Multi- Dimensional Arrays – Dynamic Arrays. **Program:** Transpose of a matrix (Problem 8.7), 3 X 3 matrix multiplication (Problem 8.8).	12	Chalk and Talk, PPT, group discussion
V	**User - define Functions** Introduction – definition of functions – return values and their types – Function Call – Function Declaration – Category of Functions - No Arguments and no return values – Arguments but No Return Values – Arguments with return values – No Arguments but returns values– Nesting of Functions. **Program:** Interest calculation programs – (Problem10.1 - No Arguments and no return value, 10.2 – Arguments but no return values)	12	Chalk and Talk, PPT, group discussion

Course Designer:
Ms. E. Chris Monica
Mrs. M. Hemalatha

Department of Physics				Class: III B.Sc				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
V	DSEC - I	**22OUPHDSE5A**	Analog and Digital Electronics	4	4	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship oriented**
✓		

Course Objectives:

1. To study the basic concepts of linear circuit.
2. To comprehend the theory of Transistor amplifiers.
3. To understand the basics knowledge of Operational Amplifier.
4. To know the theory of Digital Fundamentals.
5. To understand the basic concepts of counters and converters.

Course content:

Unit I: Linear circuit analysis and semiconductor diodes

Constant voltage source - constant current source - Maximum power transfer theorem - PN junction theory - V-I characteristics of a PN junction diode - Half wave rectifier – Bridge rectifier- efficiency - filters - Shunt capacitor filter – pi filter - Zener diode - equivalent circuit - voltage regulator - LED - V-I characteristics – advantages - applications - photo diode - characteristics - applications.

Unit II: Transistor Amplifier

Transistor – Transistor connections –Common base connection – Characteristics of Common base connection- Common emitter connection – Characteristics of Common Emitter Connection-Classification of power amplifiers- Class A, Class B and Class C – push pull amplifier

Unit III: Operational Amplifier

Operational Amplifier- schematic symbols of operational amplifier - Inverting amplifier - Non inverting amplifier - Voltage follower- Applications of summing amplifiersv - Adder - Subtractor - Integrator – Differentiator-Comparator (squarewave generator)

Unit IV: Digital Fundamentals

Binary Number Systems –place value - decimal to binary Conversions- binary to decimal conversions- Boolean algebra – Boolean theorems- De – Morgan's theorem -BCD Code –logic gates – three basic logic gates- OR gate – AND gate – NOT gate- Combination of basic logic gates – NAND gate as a Universal gate

Unit V : Counters and Converters

Asynchronous Counters-Synchronous Counters-Decade Counter-Variable Resistor Networks-Binary Ladders-D/A converters-A/D converters.

Text Books:

1. Principles of Electronics by V.K. Mehta, Rohit Mehta S. Chand & Co.(2006). [UNITS: I,II,III,IV]
2. Donald Mavino .A ,Leach .P, Saha Gautam, *Digital Principles and applications*, Tata Mc Graw hill, New Delhi, Sixth Edition, 2002. [UNITS: V]

UNIT I :	**Chapter 1,5,6,7**	**1.9,1.10,1.12,5.14,5.18,6.8,6.13,6.15,6.20,6.21,6.25,6.26,6.27,7.2,7.4,7.6,7.7,7.9,7.10**
UNIT II :	**Chapter 8,12**	**8.1,8.7-8.10, 8.12, 12.6,12.17**
UNIT III :	**Chapter 25**	**25.15,25.16,25.24,25.26,25.27,25.33-25.35,25.37,25.38**
UNIT IV :	**Chapter 26**	**26.3 -26.6,26.9,26.10-26.16, 26.20-26.22**
UNIT V :	**Chapters 10**	**10.1, 10.3, 10.5, 12.1-12.4,12.6**

Reference books:

1. Electronic Devices by Mittal.G.K., G.K. Publishers Pvt. Ltd., (1993).
2. Basic Electronics by B.L. Theraja, S. Chand & Co., (2008).
3. Solid State Electronics by Ambrose and Vincent Devaraj, Meera Publication.
4. Applied Electronics by R.S. Sedha, S. Chand & Co.(1990).
5. Introduction to Integrated Electronics by V.Vijayendran, S.Viswanathan (Printersand Publishers) Pvt. Ltd., Chennai(2005).

Web Resources/ E.Books:

1. https://mrcet.com/downloads/digital_notes/HS/R20/ANALOG%20AND%20DIGITAL%20ELECTRONICS.pdf
2. https://www.freebookcentre.net/electronics-ebooks-download/Analog-and-Digital-Electronics.html
3. https://www.scribd.com/document/471160710/Analog-and-Digital-Electronics
4. https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SPH1216.pdf
5. https://easyengineering.net/digital-electronics-by-godse/

Pedagogy:

Chalk and Talk, PPT, group discussion, quiz, on the spot test and seminar.

Rationale for nature of Course:

Knowledge and skill: This course will enable the students to comprehend the theory, concepts of Electronics.

Activities to be given:

The knowledge of theory acquired by the students will enable them to do the lab experiments.

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (Upto K level)
CLO1	Study the basic concepts of linear circuit.	K1 to K2
CLO2	Comprehend the theory of Transistor amplifiers.	K1 to K2
CLO3	Understand the basics knowledge of Operational Amplifier.	K1 to K3
CLO4	Know the theory of Digital Fundamentals.	K1 to K3
CLO5	Understand the basic concepts of counters and converters.	K1 to K4

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented, Justifying the statement and deriving inferences

Mapping of Course Outcomes (CLOs) with Program Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3	2	3	3	3
CLO2	3	3	3	3	3	3
CLO3	3	3	3	3	3	3
CLO4	3	2	3	3	3	3
CLO5	3	3	3	3	3	3

1. Basic level 2. Intermediate level 3. Advance level

Annexure-10

LESSON PLAN: (60 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**Linear circuit analysis and semiconductor diodes** Constant voltage source - constant current source - Maximum power transfertheorem - PN junction theory - V-I characteristics of a PN junction diode - Half wave rectifier - Bridge rectifier - Efficiency - filters - Shunt capacitor filter – pifilter - Zener diode - equivalent circuit - voltage regulator - LED - V-I characteristics – advantages - applications - photo diode - characteristics - applications.	12	Chalk and Talk, PPT, group discussion.
II	**Transistor Amplifier** Transistor – T r a n s i s t o r connections –Common base connection – Characteristics of Common base connection- Common emitter connection – Characteristics of Common emitter connection- Classification of power amplifiers- Class A, Class B and Class C – push pull amplifier	12	Chalk and Talk, PPT, group discussion
III	**Operational Amplifier** Operational Amplifier- schematic symbols of operational amplifier - Inverting amplifier - Non inverting amplifier - Voltage follower- Applications of summing amplifiersv - Adder - Subtractor - Integrator – Differentiator-Comparator (squarewave generator)	12	Chalk and Talk, PPT.
IV	**Digital Fundamentals** Binary Number Systems –place value - decimal to binary Conversions- binary to decimal conversions- BCD Code – logic gates – three basic logic gates- OR gate – AND gate – NOT gate- Combination of basic logic gates – NAND gate as a Universal gate - Boolean algebra – Boolean theorems- De – Mogran's theorem.	12	Chalk and Talk, group discussion.
V	**Counters and converters** Asynchronous counters-Synchronous counters-Decade counter-Variable resistor networks-Binary ladders-D/A converters-A/D converters.	12	Chalk and Talk, PPT.

Course Designer:
Mrs. P. Revathi
Ms. E.Chris Monica

Department of Physics				Class: III B.Sc				
Sem	**Course Type**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
V	DSEC - I	**22OUPHDSE5B**	Numerical Methods	4	4	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship oriented**
✓		

Course Objectives:

1. To introduce the fundamentals of Solving different kinds of problems occurs in computer applications using Numerical Methods.
2. To study the various numerical methods to solve the Mathematical equations.
3. To know the basic concepts about the interpolation.
4. To obtain the knowledge about differentiation and integration.
5. To know the basic concepts of differential equations

Course Content:

Unit- I Theory of Equations and Root of Equations

Introduction –Formation of Equations – Relation between Roots and Coefficients– Errors in numerical computation method - Order of convergence - Iterative method - Successive approximation method - Bisection method – Method of false position.

Unit- II Simultaneous equations

Newton Raphson method - Gauss elimination method – Gauss Jordan method – Gauss Seidel Iteration method (problems only).

Unit- III Interpolation

Newton's interpolation formulae – Central difference interpolation formula (problems only) – Lagrange's interpolation.

Unit- IV Numerical Differentiation and Integration:

Newton's forward and backward difference formulae – Numerical integration – Trapezoidal rule – Simpson's 1/3 rule (problems only).

Unit- V Differential equations

Numerical solution of ordinary differential equations – Taylor's series method- Euler's method – Runge kutta method (2^{nd} & 4^{th} order) (problems only).

Text Book:

1. Arumugam .S, Thangapandi Issaac .A, Somasundaram .A, *Numerical methods,* Scitech Publications (India) PVT Ltd, Chennai, 2002.

Unit: I	**Chapters**	**1.1-1.3,3.1, 3.2, 3.4**
Unit: II	**Chapters**	**4 .3, 4.4, 4.8**
Unit: III	**Chapters**	**7.1-7.3**
Unit: IV	**Chapters**	**8.1-8.2, 8.5**
Unit: V	**Chapters**	**10.1-10.4**

Reference Books:

1. Kandasamy P, Thilagavathy K Gunarathy K, *Numerical Methods*, S.Chand and Company Ltd, New Delhi, Third Edition. 2003.

2. Dr.Vedamurthy V.N, Dr.Iyengar.N.Ch.S.N , *Numerical Methods*, Vikas Publishing House PVT Ltd, Chennai 2008.

3. Rao V. Dukkipati, Numerical Methods, New Age International (p) Limited, Publishers, New Delhi, First Edition, 2010.

3. Sastry .S.S, *Introductory Methods of Numerical Analysis,* Prentice Hall Of India Private Ltd, New Delhi,2008.

4. Singaravelan, *Numerical Methods*, Meenakshi Agency, Channai, Sixth Edition, 2008.

Web Resources:

1. https://www.scribd.com/doc/202122350/Computer-Oriented-Numerical-Methods-by-V-RajaRaman
2. https://www.scirp.org/(S(lz5mqp453edsnp55rrgjct55))/reference/referencespapers.aspx?referenceid=1682874
3. https://nptel.ac.in/course/122106033/
4. https://nptel.ac.in/course/103106074/
5. https://onlinecourses.nptel.ac.in/noc20_ma33/preview

E-Book:

1. https://nptel.ac.in/course/134449033/
2. https://nptel.ac.in/course/1089766074/
3. https://onlinecourses.in/noc20_ma33/preview

Pedagogy:

Chalk and Talk, PPT, group discussion, quiz, on the spot test.

Rationale for Nature of the course:

Knowledge and skill: The course enables the students with the understanding of basics of Numerical methods.

Activities to be given:

1. Enhancing the quality of students to understand the fundamentals of Numerical differientation.
2. Train the students to improve their problem solving abilities.

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (upto K level)
CLO1	Introduce the fundamentals of solving different kinds of problems occurs in computer applications using numerical methods.	K1 to K2
CLO2	Study the various numerical methods to solve the mathematical equations.	K1 to K2
CLO3	Know the basic concepts about the interpolation.	K1 to K3
CLO4	Obtain the knowledge about differentiation and integration.	K1 to K3
CLO5	Know the basic concepts of differential equations	K1 to K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	2	3	3	3	3
CLO2	3	3	2	3	3	3
CLO3	2	3	3	3	3	3
CLO4	3	3	3	3	3	3
CLO5	3	3	3	3	3	3

1-Basic Level 2- Intermediate Level 3- Advanced Level

LESSON PLAN :

UNIT	DESCRIPTION	HRS	MODE
I	**Theory of Equations and Root of Equations** Introduction –Formation of Equations – Relation between Roots and Coefficients– Errors in numerical computation method - Order of convergence - Iterative method -Successive approximation method - Bisection method – Method of false position.	12	Chalk and Talk, PPT, group discussion
II	**Simultaneous equations** Newton Raphson method - Gauss elimination method – Gauss Jordan method – Gauss Seidel Iteration method (problems only).	12	Chalk and Talk, PPT, group discussion
III	**Interpolation** Newton's interpolation formulae – Central difference interpolation formula (problems only) – Lagrange's interpolation.	12	Chalk and Talk, PPT, group discussion
IV	**Numerical Differentiation and Integration**: Newton's forward and backward difference formulae – Numerical integration – Trapezoidal rule – Simpson's 1/3 rule (problems only).	12	Chalk and Talk, PPT, group discussion
V	**Differential equations** Numerical solution of ordinary differential equations – Taylor's series method- Euler's method – Runge kutta method (2^{nd} & 4^{th} order) (problems only).	12	Chalk and Talk, PPT, group discussion

Department of Physics				Class: III B.Sc				
Sem	**Course Type**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
V & VI	Practical	**22OUPH61P**	Major Physics Practical- III	5	3	40	60	100

List of Experiments (Any Twelve):

1. LCR – Series resonance circuit.
2. LCR – Parallel resonance circuit.
3. Potentiometer – Resistance and specific resistance of the coil.
4. Spectrometer – Cauchy's constant.
5. Spectrometer – Hartmann's formula.
6. Spectrometer – Resolving power of a prism.
7. Potentiometer – E.M.F of the thermocouple.
8. C_1/C_2 – De sauty's bridge.
9. Impedence & power factor – LR circuit. Field along the axis of a solenoid – determination of B & M.
10. B.G. – Absolute capacity of condenser.
11. Comparison of mutual inductance of the coil- spot galvanometer.
12. Program to perform Fibonacci series using C language.
13. Program to perform two dimensional sorting using C language.
14. Check odd or even number using inline function using C language.
15. Finding area of shapes using virtual function using C language.

Reference Books:

1. M.N.Srinivasan, S.Balasubramanian, R.Ranganathan(2007), A Text Book of Practical Physics, Sultan Chand & Sons.

2. Indu Prakash & Ramakrishna(2008), A Text Book of Practical Physics, Kitab Mahal Agencies

3. S.R. GovindaRajan, T. Murugaiyan, S. SundaraRajan(2006), Practical Physics, Rochouse & Sons

Web Resources:

1. http://www.tndte.gov.in/site/wp-content/uploads/2016/08/Engineering-physics.pdf
2. https://www.ugc.ac.in/pdfnews/5512002_B.SC.-PHYSICAL-SCIENCE-_PHYSICS,-CHEMISTRY,-MATHEMATICS_-CB.pdf

3. https://www.academia.edu/34783511/Practical_Physics_for_Degree_Students_Gias_Uddin_and_Shahabuddin
4. https://www.academia.edu/35371782/PHYSICS_LABORATORY_MANUAL_UG_Courses_I_and_II_Semester1.UG course OBE.docx

Pedagogy:

Demonstration and Practical sessions.

Lesson Plan:

UNIT	Topics to be Covered	Hours	Mode
I	1. LCR – Series resonance circuit. 2. LCR – Parallel resonance circuit. 3. Potentiometer – Resistance and specific resistance of the coil.	6	Demo & Practical Session
II	4. 4 Spectrometer – Cauchy's constant. 5. Spectrometer – Hartmann's formula. 6. Spectrometer – Resolving power of a prism.	6	Demo & Practical Session
III	7. Potentiometer – E.M.F of the thermocouple. 8. C_1/C_2 – De sauty's bridge. 9. Impedence & power factor – LR circuit. Field along the axis of a solenoid – determination of B & M.	6	Demo & Practical Session
IV	10. B.G. – Absolute capacity of condenser. 11. Comparison of mutual inductance of the coil- spot galvanometer. 12. Program to perform Fibonacci series using C language.	6	Demo & Practical Session
V	13. Program to perform two dimensional sorting using C language. 14. Check odd or even number using inline function using C language. 15. Finding area of shapes using virtual function using C language.	6	Demo & Practical Session

Course Designer:

Ms.E.Chris Monica
Mrs.M.Hemalatha,

Department of Physics				Class: III B.Sc				
Sem	**Course Type**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
V& VI	Practical	**22OUPH62P**	Major Electronics Practical-IV	5	3	40	60	100

List of Experiments (Any Twelve):

1. Zener diode – Voltage regulation.
2. Hartley's Oscillator – L determination.
3. IC-Logic gates-Truth table of all fundamental gates Verification (AND, OR, NOT, NAND, NOR).
4. De Morgan's Theorems-using IC's
5. AND, OR, NOT-Using discrete components.
6. Dual Power supply – IC 78 and IC 79 series.
7. Monostable multivibrator – IC 555.
8. Op-amp-IC741 – Differentiator and Integrator.
9. Op-amp-IC 741- Adder and Subtractor.
10. Voltage doubler.
11. BCD to Seven segment display.
12. Optoelectronic device- LED and Seven segment display.
13. Microprocessor Programming for Addition.
14. Microprocessor Programming for Subtraction.
15. Microprocessor Programming for Multiplication.

Reference Books:

1. M.N.Srinivasan, S.Balasubramanian, R.Ranganathan(2007), A Text Book of Practical Physics, Sultan Chand & Sons.

2. Indu Prakash & Ramakrishna(2008), A Text Book of Practical Physics, Kitab Mahal Agencies

3. S.R. GovindaRajan, T. Murugaiyan, S. SundaraRajan(2006), Practical Physics, Rochouse & Sons.

Web Resources:

1. http://www.tndte.gov.in/site/wp-content/uploads/2016/08/Engineering-physics.pdf

2. https://www.ugc.ac.in/pdfnews/5512002_B.SC.-PHYSICAL-SCIENCE-_PHYSICS,-CHEMISTRY,-MATHEMATICS_-CB.pdf

3. https://www.academia.edu/34783511/Practical_Physics_for_Degree_Students_Gias_Uddin_and_Shahabuddin

4. https://www.academia.edu/35371782/PHYSICS_LABORATORY_MANUAL_UG_Courses_I_and_II_Semester1.UG course OBE.docx

Pedagogy:

Demonstration and Practical sessions.

Lesson Plan:

UNIT	Topics to be Covered	Hours	Mode
I	1. Zener diode – Voltage regulation. 2. Hartley's Oscillator – L determination. 3. IC-Logic gates-Truth table of all fundamental gates Verification (AND, OR, NOT, NAND, NOR).	6	Demo & Practical Session
II	4. De Morgan's Theorems-using IC's 5. AND, OR, NOT-Using discrete components. 6. Dual Power supply – IC 78 and IC 79 series.	6	Demo & Practical Session
III	7. Monostable multivibrator – IC 555. 8. Op-amp-IC741 – Differentiator and Integrator. 9. Op-amp-IC 741- Adder and Subtractor.	6	Demo & Practical Session
IV	10. Voltage doubler. 11. BCD to Seven segment display. 12. Optoelectronic device- LED and Seven segment display.	6	Demo & Practical Session
V	13. Microprocessor Programming for Addition. 14. Microprocessor Programming for Subtraction. 15. Microprocessor Programming for Multiplication.	6	Demo & Practical Session

Course Designer:
Ms.E.Chris Monica
Mrs.M.Hemalatha

Department of Physics				Class: III B.Sc				
Sem	**Course Type**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
V	SEC	**22OUPHSE5**	**Opto Electronics**	2	2	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship oriented**
✓		

Course Objectives:

1. To give an introductory account of the basic principles of light emitting diode.
2. To understand the principle and working of LASER
3. To gain information about the concepts of photodetector.
4. To obtain the concepts of materials of optoelectronic devices.
5. To study about the optical fibres.

Course Content:

Unit I:

Introduction – LED (Light Emitting Diode) – The processes involved in LEDs – Structure of LED – LED materials- Output power characteristics of LED.

Unit II:

Laser- Laser operation–Spontaneous and stimulated emission–types of lasers – semiconductor laser diode – spatial emission pattern of laser- current vs output power characteristics of laser.

Unit III:

Introduction – Characteristics of Photo detector- PN junction photo detector– PIN photo diode- Avalanche photo diode- Photo transistor.

Unit IV:

Introduction-optical fibres-importance of optical fibres –Total internal reflection-comparison of step and graded index fibres- Application of fibres in communication and Medical field.

Unit V:

Propagation of light in different of media - Propagation of light waves in a optical fibre - basic structure of an optical– Acceptance angle – Numerical aperture (general)- Numerical aperture of a graded index fibre.

Books for Study:

1. Optical fibres and Fibre Optic Communication – Sabir Kumar Sarkar IVRevised Edition 2003.
2. D.C.Agarwal, *Fibre Optic Communication* , S.Chand & Company Pvt. Ltd, New Delhi, Fifth edition, 2002.

Unit: I	**Chapters 9**	**9.1,9.2,9.2.1,9.2.2,9.2.3,9.2.4**
Unit: II	**Chapter 9**	**9.3,9.3.1,9.3.2,9.3.3,9.3.4,9.3.6**
Unit: III	**Chapter 10**	**10.1,10.2,10.6-10.9**
Unit: IV	**Chapter 1**	**1.1-1.3,2.11,2.12**
Unit: V	**Chapter 2**	**2.1-2.6**

Reference Books:

1. Opto Electronics – Wilson & Hawker, Prentice Hall of India 2004. Semiconductor physics and Optoelectronics – P. K. Palanisamy, SCITECHPublication, Chennai 2002.
2. Opto Electronics and fibre optics communication– C.K.sarkar, D.C. SarkaR 2008.
3. Advanced opto electronic devices – D.Dragoman, C.Dragoman sringer edition.
4. Opto Electronic Devices, Advanced stimulation and analysis – Joachim piprek editor
5. Optical Electronics – Ajoy Ghatak, K. Thyagarajan, physics department, indian institute of technology, new delhi, 2012.

Web Resources:

1. https://ia600307.us.archive.org/30/items/OptoelectronicsAnIntroduction/OptoelectronicsAnIntroduction_text.pdf
2. https://download.e-bookshelf.de/download/0003/9374/38/L-G-0003937438-0002447542.pdf
3. https://hithaldia.in/faculty/sas_faculty/Prof_A_B_Maity/Lecture%20Note_EI_503A.pdf
4. https://www.youtube.com/watch?v=WWjldCmRteg
5. https://www.youtube.com/watch?v=J6ES-sW8Eig

E-Book:

1. https://ece.mst.edu/media/academic/ece/documents/coursenotes/ee2200introductiontoelectronicdevices/EE_2200_Lecture_C-2.pdf
2. https://kobita1234.wordpress.com/wp-content/uploads/2016/11/ch-53.pdf
3. https://pdfkeys.com/download/3868554-Optoelectronics-An-Introduction-3rd-Edition.pdf

Pedagogy:

Chalk and Talk, PPT, group discussion , quiz, on the spot test

Rationale for Nature of the course:

Knowledge and skill:

The course is the learning and understanding the fundamentals of fibre optic communication.

Activities to be given:

1. Enhancing the quality of students to understand fundamental magnetic materials.
2. Train the students to solve electromagnetic problems.

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (upto K level)
CLO1	Give an introductory account of the basic principles of light emitting diode.	K1 to K2
CLO2	Understand the principle and working of LASER	K1 to K2
CLO3	Information about the concepts of photodetector.	K1 to K2
CLO4	Obtain the concepts of materials of optoelectronic devices.	K1 to K3
CLO5	Study about the optical fibres.	K1 to K3

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	2	3	3	3	3
CLO2	3	3	2	3	3	3
CLO3	2	3	3	3	3	3
CLO4	3	3	3	3	3	3
CLO5	3	3	3	3	3	3

1-Basic Level 2- Intermediate Level 3- Advanced Level

Annexure-10

LESSON PLAN : (30 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	Introduction – LED (Light Emitting Diode) – The processes involved in LEDs – Structure of LED – LED materials- Output power characteristics of LED.	6	Chalk and Talk, PPT, group discussion
II	Laser- Laser operation–Spontaneous and stimulated emission–types of lasers – semiconductor laser diode – spatial emission pattern of laser- current vs output power characteristics of laser.	6	Chalk and Talk, PPT, group discussion
III	Introduction – Characteristics of Photo detector- PN junction photo detector– PIN photo diode- Avalanche photo diode- Photo transistor.	6	Chalk and Talk, PPT, group discussion
IV	Introduction-optical fibres-importance of optical fibres –Total internal reflection- comparison of step and graded index fibres- Application of fibres in communication and Medical field.	6	Chalk and Talk, PPT, group discussion
V	Propagation of light in different of media - Propagation of light waves in a optical fibre - basic structure of an optical– Acceptance angle – Numerical aperture (general)- Numerical aperture of a graded index fibre.	6	Chalk and Talk, PPT, group discussion

Course Designer:
Mrs. P.Revathi
Ms. E. Chris Monica

Annexure-10

Department of Physics				Class: III B.Sc				
Sem	**Course Type**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
VI	Core	**22OUPH61**	Solid State physics	4	4	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship oriented**
✓		

Course Objectives:

1. To understand constituents, properties and models of nucleus.
2. To give reason for radioactivity and study their properties.
3. To learn about the principles of various particle detectors and accelerators.
4. To acquire knowledge on different types of nuclear reactions and their applications.
5. To know the reason for cosmic rays and their effect on the surface of earth and also understand the classification of elementary particles.

Course Content:

UNIT-I Interatomic force &bonding in solids:

Interatomic force: Introduction – Force between atoms-Cohesion of Atoms and Cohesive energy-calculation of cohesive energy.**Bonding in solids:** Ionic Bonding –Bond energy of NaCl Molecule-Calculation of Lattice energy of Ionic crystal- The Born –Haber cycle –Properties of Ionic solids –Examples of Ionic solids –Covalent bond –Metallic bond – Hydrogen bond.

UNIT-II Crystal physics:

Introduction –Lattice points and space lattice –Unit cells and Lattice parmeters- Crystal systems-Metallic crystal structures for SC, BCC, & FCC structures - Other cubic crystal structure - Miller Indices & important features of Miller Indices.**X-ray diffraction &diffraction method:** Bragg's law –Derivation of Bragg's equation.

UNIT-III Magnetism in solids:

Magnetic Terminology –Types of Magnetism –Dia magnetism -(Langevin's classical theory)-Paramagnetism –(Langevin's classical theory)-Ferro magnetism-Weiss theory-concepts of Domains and Hysteresis- Anti Ferro magnetism-Ferri magnetism.

UNIT-IV Super conductivity:

Introduction –Electrical Resistivity –Perfect Diamagnetism or Meissner Effect – Super currents and Critical Temperature -Type-I –Type-II Superconductors- High Temperature Ceramic Super Conductors-Applications

UNIT-V Semiconductors:

Introduction –Pure or Intrinsic Semiconductors –Impurity or Extrinsic Semiconductor –Drift velocity, Mobility and conductivity of intrinsic semiconductors-Carrier concentration and Fermi level for intrinsic semiconductors- Carrier concentration and Fermi level for extrinsic semiconductors

Text books:

1. Pillai S.O, *Solid state physics*, New Age international (p) Limited, New Delhi, Sixth Edition, 2012. (UNITS-I, II)
2. Puri.R.K, Babbar V.K, *Solid state physics*, S. Chand publications, New Delhi, First Edition, 2010. (UNITS-III, IV, V)

UNIT I :	**Chapter**	**3.1-3.8,3.11-3.14,3.19,3.24**
UNIT II :	**Chapter**	**4.1, 4.2, 4.4, 4.6, 4.15, 4.17-4.19, 5.7, 5.8, 5.12**
UNIT III :	**Chapter**	**8.1-8.3,8.3.1,8.4(8.4.1),8.5(8.5.1,8.5.3),8.6,8.7**
UNIT IV :	**Chapter**	**10.1-10.6,10.6.1,10.6.2,10.13,10.14**
UNIT V :	**Chapter**	**7.1-7.6**

Reference Books:

1. Introduction to Solid State Physics, Kittel, Willey Eastern Ltd (2003).
2. Solid state Physics, Rita John,1st edition, TataMcGraw Hill publishers (2014).
3. Solid State Physics , R L Singhal, Kedarnath Ram Nathand Co., Meerut (2003)
4. Introduction to Solids, Leonid V. Azaroff, 2004, Tata Mc-Graw Hill
5. Solid State Physics, N.W. Ashcroft and N.D. Mermin, 1976, Cengage Learning

Web Resources:

1. http://metal.elte.hu/~groma/Anyagtudomany/kittel.pdf
2. http://www.issp.ac.ru/ebooks/books/open/Introduction%20to%20Modern%20Solid%20State%20Phys.pdf
3. https://www.eng.uc.edu/~beaucag/Classes/AdvancedMaterialsThermodynamics/Heat%20Capacity%20Books/Charles%20Kittel%20-%20Introduction%20to%20Solid%20State%20Physics-Wiley%20(2005).pdf

4. https://books.google.com.et/books?id=9LIit9IXbxoC&printsec=frontcover&source=gbs_atb
5. https://www.e-booksdirectory.com/listing.php?category=403

E-books:

1. Raghavan - Materials science and Engineering, PHI
2. Azaroff - Introduction to solids, TMH
3. S. O. Pillai - Solid State Physics, Narosa publication
4. A.J. Dekker - Solid State Physics, McMillan India Ltd.
5. Elements of Solid State Physics, J.P. Srivastava, 2nd Edition, 2006, Prentice-Hall of India.

Pedagogy:

Chalk and Talk, PPT, group discussion, quiz, on the spot test.

Rationale for Nature of the course:

Knowledge and skill: The students will understand the quantum theory of solids which us used to describe the thermal and electrical properties of a solids.

Activities to be given:

1. Enhancing the quality of students to understand the atomic crystal structure of the soilds
2. Students will be able to determine the crystal structure by analysis of XRD data.
3. Students will be able to evaluate and analyze the electrical and optical properties of solids

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (upto K level)
CLO1	understand constituents, properties and models of nucleus.	K1 to K2
CLO2	give reason for radioactivity and study their properties.	K1 to K2
CLO3	learn about the principles of various particle detectors and accelerators.	K1 to K3
CLO4	acquire knowledge on different types of nuclear reactions and their applications.	K1 to K3
CLO5	know the reason for cosmic rays and their effect on the surface of earth and also understand the classification of elementary particles	K1 to K4

Annexure-10

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	2	3	3	3	3
CLO2	3	3	2	3	3	3
CLO3	2	3	3	3	3	3
CLO4	3	3	3	3	3	3
CLO5	3	3	3	3	3	3

1-Basic Level 2- Intermediate Level 3- Advanced Level

LESSON PLAN: (60 Hrs)

UNIT	DESCRIPTION	HRS	MODE
I	**Interatomic force &bonding in solids:** Introduction – Force between atoms-Cohesion of Atoms and Cohesive energy-calculation of cohesive energy.**Bonding in solids:** Ionic Bonding –Bond energy of NaCl Molecule-Calculation of Lattice energy of Ionic crystal- The Born – Haber cycle –Properties of Ionic solids –Examples of Ionic solids –Covalent bond –Metallic bond –Hydrogen bond.	12	Chalk and Talk, PPT, group discussion
II	**Crystal physics:**Introduction –Lattice points and space lattice –Unit cells and Lattice parmeters-Crystal systems-Metallic crystal structures for SC, BCC, & FCC structures - Other cubic crystal structure - Miller Indices & important features of Miller Indices. **X-ray diffraction &diffraction method:** Bragg's law –Derivation of Bragg's equation.	12	Chalk and Talk, PPT, group discussion
III	**Magnetism in solids:**Magnetic Terminology –Types of Magnetism – Dia magnetism -(Langevin's classical theory)-Paramagnetism – (Langevin's classical theory)-Ferro magnetism-Weiss theory-concepts of Domains and Hysteresis- Anti Ferro magnetism-Ferri magnetism.	12	Chalk and Talk, PPT, group discussion
IV	**Super conductivity:**Introduction –Electrical Resistivity –Perfect Diamagnetism or Meissner Effect – Super currents and Critical Temperature -Type-I –Type-II Superconductors- High temperature Ceramic Super Conductors-Applications	12	Chalk and Talk, PPT, group discussion ,
V	**Semi conductors:**Introduction –Pure or Intrinsic Semiconductors – Impurity or Extrinsic Semiconductor –Drift velocity, Mobility and conductivity of intrinsic semiconductors-Carrier concentration and Fermi level for intrinsic semiconductors- Carrier concentration and Fermi level for extrinsic semiconductors	12	Chalk and Talk, PPT, group discussion ,

Course Designer:
Mrs.S.Manimozhi
Mrs. M.R.Gurulakshmi

Annexure-10

Department of Physics				Class: III B.Sc				
Sem	**Course Type**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
VI	Core	**22OUPH62**	Nuclear physics	4	4	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship oriented**
✓		

Course Objectives:

1. To understand the basic concepts of nuclear physics.
2. To get the knowledge about decay processes.
3. To study the different types of the nuclear reactions.
4. To learn about the functions of nuclear reactors.
5. To gain insight into the underlying interactions between fundamental particles

Course Content:

Unit I: Properties and structure of Nuclei

General properties of nucleus- binding energy – BE/A curve - significance - Nuclear Force and its properties – Nuclear force and Pions - Nuclear models- The Liquid drop model – Shell model.

Unit II: Radio Activity

Introduction – properties of alpha, beta and gamma rays – range of Alpha particles – Geiger and Nuttal experiment –Theory of Alpha decay – Gamow's theory of Alpha decay- The Neutrino theory of Beta decay- Detection of Neutrino – Nuclear isomerism - Internal conversion - Mossabauer effect – Fundamental laws of radio activity - Radio carbon dating.

Unit III: Nuclear Reactions

Nuclear reaction- Q-Value of nuclear reactions – Nuclear reaction kinematics - Nuclear fission – atom bomb - Nuclear reactor- Four factor formula - Nuclear fusion - Hydrogen bomb-stellar burning.

Unit IV: Nuclear Detectors and Particle Accelerators

Introduction - G.M.Counter- Wilson cloud chamber - bubble chamber - scintillation counter – **Accelerators** : cyclotron- synchrocyclotron-betatron-synchrotrons

Unit V: Cosmic Rays and Elementary Particles

Cosmic rays –Introduction - latitude, azimuth and altitude effects- longitudinal effect-north –south effect-seasonal and diurnal changes-primary and secondary cosmic rays- cosmic ray Showers-VanAllen belt- origin of cosmic radiation.

Elementary particles -Introduction-particles and antiparticles-antimatter-the fundamental interaction-elementary particle quantum numbers-conservation laws and symmetry-the quark model.

Books for Study:

1. Atomic and Nuclear Physics by N. Subramanian and Brijlal, Revised by Jivan seshan, S Chand &Co., New Delhi (2010), (Unit I, III)
2. Modern Physics by R. Murugeshan, KiruthigaSivaprasath, S. Chand &Co., New Delhi (2018). (Unit II, IV, V).

Unit I: Chapter 10,12 10.1-10.6, 10.10,10.11, 12.1,12.2

Unit II: Chapter 20 20.1, 20.4, 20.7 , 20.8, 20.10.2, 20.10.3, 20.14 – 20.18, 20.21

Unit III: Chapter 11,12 11.1-11.3, 12.3, 12.6 – 12.8

Unit IV: Chapter 18,19 18.1, 18.6- 18.8, 18.10, 19.3- 19.6

Unit V: Chapter 23,24 23.1 – 23.6, 23.9, 23.10, 24.1 – 24.7

Books for Reference:

1. Modern Physics by J.H. Hamilton and Yang, McGraw-Hill Publication, (1996).
2. Concepts of Modern Physics by A. Beiser, Tata McGraw-Hill, New Delhi (1997).
3. Nuclear Physics by R.R.Roy and B.P.Nigam, New Age International (P) Ltd.,NewDelhi(1997).
4. Fundamentals of Elementary Particle Physics by Longo, McGraw-Hill.
5. Nuclei and Particles by Serge., W.A. Benjamin, USA
6. Elements of Nuclear Physics by ML Pandya and RPS Yadav, Kedarnath Ram Nath,Meerut.

Web Resources:

1. E-Bohttps://www.nuclear-power.com/nuclear-power/nuclear-reactions/q-value-energetics-nuclear-reactions/ok
2. https://www.britannica.com/science/nuclear-fission
3. http://labman.phys.utk.edu/phys222core/modules/m12/nuclear_models.html
4. http://hyperphysics.phy-astr.gsu.edu/hbase/Nuclear/liqdrop.html
5. http://hyperphysics.phy-astr.gsu.edu/hbase/Particles/quark.html

E-books:

1. https://pdfcoffee.com/nuclear-physicsd-c-tayal-pdf-free.html
2. https://www.fulviofrisone.com/attachments/article/446/Krane%20%20Introductory%20Nuclear%20Physics.pdf
3. http://hyperphysics.phy-astr.gsu.edu/hbase/Nuclear/liqdrop.html
4. https://en.wikipedia.org/wiki/Semi-empirical_mass_formula
5. https://byjus.com/physics/nuclear-binding-energy/

Pedagogy:

Chalk and Talk, PPT, group discussion, quiz, on the spot test.

Rationale for Nature of the course:

Knowledge and skill: The course covers the fundamental concepts of elementary particles and nuclear physics.

.**Activities to be given:**

1. Enhancing the quality of students to understand fundamentals of Nuclear physics
2. Train the students to solve problems in nuclear physics.

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (upto K level)
CLO1	Understand the basic concepts of nuclear physics.	K1 to K2
CLO2	Get the knowledge about decay processes.	K1 to K2
CLO3	Study the different types of the nuclear reactions.	K1 to K3
CLO4	Learn about the functions of nuclear reactors.	K1 to K3
CLO5	Gain insight into the underlying interactions between fundamental particles	K1 to K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	2	3	3	3	3
CLO2	3	3	2	3	3	3
CLO3	2	3	3	3	3	3
CLO4	3	3	3	3	3	3
CLO5	3	3	3	3	3	3

1-Basic Level 2- Intermediate Level 3- Advanced Level

Annexure-10

LESSON PLAN: (60 Hrs)

UNIT	DESCRIPTION	HRS	MODE
I	**Properties and structure of Nuclei** General properties of nucleus – binding energy – BE/A curve – significance – Nuclear force and its properties – Nuclear force and pions – Nuclear models – The liquid drop nmodel - Shell model.	12	Chalk and Talk, PPT, group discussion
II	**Radio Activity** Introduction – properties of alpha, beta and gamma rays – range of Alpha particles – Geiger and Nuttal experiment –Theory of Alpha decay – Gamow's theory of Alpha decay- The Neutrino theory of Beta decay- Detection of Neutrino – Nuclear isomerism - Internal conversion - Mossabauer effect – Fundamental laws of radio activity - Radio carbon dating.	12	Chalk and Talk, PPT, group discussion
III	**Nuclear Reactions** Nuclear reaction- Q-Value of nuclear reactions – Nuclear reaction kinematics -Nuclear fission – atom bomb - Nuclear reactor- Four factor formula - Nuclear fusion - Hydrogen bomb- stellar burning.	12	Chalk and Talk, PPT, group discussion
IV	**Nuclear Detectors and Particle Accelerators** Introduction - G.M.Counter- Wilson cloud chamber - bubble chamber - scintillation counter – **Accelerators** : cyclotron- synchrocyclotron-betatron-synchrotrons	12	Chalk and Talk, PPT, group discussion ,
V	**Cosmic Rays and Elementary Particles** **Cosmic rays** –Introduction - latitude, azimuth and altitude effects- longitudinal effect-north – south effect-seasonal and diurnal changes- primary and secondary cosmic rays- cosmic ray Showers-Van Allen belt- origin of cosmic radiation. **Elementary particles** -Introduction-particles and antiparticles-antimatter-the fundamental interaction-elementary particle quantum numbers-conservation laws and symmetry-the quark model.	12	Chalk and Talk, PPT, group discussion ,

Course Designer:
Mrs.S.Manimozhi
Mrs. M.Hemalatha

Annexure-10

Department of Physics				Class: III B.Sc				
Sem	**Course Type**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
VI	DESC - II	**22OUPHDSE6A**	Relativity and Quantum mechanics	4	4	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship oriented**
✓		

Course Objectives:

1. To gain knowledge in the concepts of special and theory of relativity.
2. To evolve ideas about dual nature of matter.
3. To recognize basic terms in quantum mechanics and different. operatormechanism.
4. To apply of schrödinger's equation to micro system.
5. To learn the basic concepts of angular momentum and operators in quantum mechanics.

Course Content

Unit I: Relativity

Introduction - Frames of reference - Galilean transformation - Michelson - Morley experiment -Postulates of special theory of relativity - Lorentz transformation - length Contraction – time dilation - Relativity of simultaneity - addition of velocities - variation of mass with velocity– Mass energy relation - Elementary ideas of general relativity.

Unit II: Wave Nature of Matter

Inadequacy of classical mechanics – Matter Waves - expression of De Brogile's wave length - Wave Packet - Phase and group velocity - Davisson and Germer's experiment - G.P.Thomson's experiment - Heisenberg'suncertainty principle and its consequences.

Unit III: Schrodinger Equation

Basic postulates of quantum mechanics - Schrodinger equation – Time dependent equation – Time independent equation - Eigenvalues and eigen functions - Properties of wave function – Orthogonal wave function – Normalised wave function – Orthonormal function – Requirement of wave function- Probability density.

Unit IV: Solutions of Schrodinger Equation

Free particle solution - Particle in a box - Potential well of finite depth (one dimension) - linear harmonic oscillator - rigid rotator.

Unit V: Operators in Quantum Mechanics

Operator for momentum – Kinetic energy – Total energy - Orbital angular momentum operators – Commutation rules for the components of Orbital angular momentum - separation of three dimensional Schrodinger equation into radial and angular parts - spin – Pauli's spin matrices for electron.

Books for Study:

Modern Physics by R. Murugeshan, KiruthigaSivaprasath, S. Chand & Co., New Delhi (2008).

Unit I: Chapter 1 1.1, 1.2, 1.4, 1.6 – 1.14, 1.16

Unit II: Chapter 7,10 7.1 – 7.3, 7.5 (7.5.1),10.3

Unit III: Chapter 10,8 10.1, 10.2.6,8.1

Unit IV: Chapter 8 8.2 – 8.4, 8.9, 8.11.

Unit V: Chapter 10 10.1.1 – 10.1.3, 10.1.5, 10.2.3 (c), 11.6,11.7

Books for Reference:

1. Modern Physics by J.H. Hamilton and Yang, McGraw-Hill Publication, (1996).
2. Concepts of Modern Physics by A. Beiser, Tata McGraw-Hill, New Delhi (1997).
3. Fundamentals of Physics by D.Halliday, R.Resnick and J. Walker, Wiley,6th Edition, New York(2001).
4. Modern Physics by Kenneth S.Krane, John Willey & sons, Canada (1998).

Web Resources:

1. https://www.classcentral.com/course/youtube-physics-quantum-mechanics-and-application-47583
2. https://www.researchgate.net/publication/328339041_Quantum_mechanics_teaching_resources_from_the_Institute_of_Physics
3. https://www.classcentral.com/course/foundations-quantum-mechanics-56039
4. https://www.classcentral.com/course/edx-quantum-mechanics-for-scientists-and-engineers-1-21196
5. https://quantummechanics.ucsd.edu/ph130a/130_notes/node45.html

E-Book:

1. Quantum-Mechanics-Lokanathan-Ajoy-Ghatak/dp/9351382966
2. Quantum-Mechanics-Fundamentals-S-Rajasekar-ebook/dp/B07L6VG856
3. Textbook-Quantum-Mechanics-K-Saxena-ebook/dp/B07SJZKSM4
4. http://www.freebookcentre.net/Physics/Quantum-Mechanics-Books.html
5. https://www.amazon.in/Quantum-Mechanics-Development-Language-Processing-ebook/dp/B00YTLQ7QM

Pedagogy:

Chalk and Talk, PPT, group discussion, quiz, on the spot test and

Rationale for Nature of the course:

Knowledge and skill:

The course will help to learn the fundamental ideas about quantum mechanics.

Activities to be given:

1. Enhancing the quality of students to understand fundamentals of quantum mechanics.
2. Train the students to solve quantum mechanical problems.

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (upto K level)
CLO1	Gain knowledge in the concepts of special and theory of relativity.	K1 to K2
CLO2	Evolve ideas about dual nature of matter.	K1 to K2
CLO3	Recognize basic terms in quantum mechanics and different. Operatormechanism.	K1 to K3
CLO4	Apply of schrödinger's equation to micro system.	K1 to K3
CLO5	Learn the basic concepts of angular momentum and operators in quantum mechanics.	K1 to K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	2	3	3	3	3
CLO2	3	3	2	3	3	3
CLO3	2	3	3	3	3	3
CLO4	3	3	3	3	3	3
CLO5	3	3	3	3	3	3

1-Basic Level 2- Intermediate Level 3- Advanced Level

LESSON PLAN: (60 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**Relativity** Introduction - Frames of reference - Galilean transformation - Michelson - Morley experiment - Postulates of special theory of relativity - Lorentz transformation - length Contraction – time dilation - Relativity of simultaneity - addition of velocities - variation of mass with velocity– Mass energy relation - Elementary ideas of general relativity.	12	Chalk and Talk, PPT, group discussion.
II	**Wave Nature of Matter** Inadequacy of classical mechanics – Matter Waves - expression of De Brogile's wave length - Wave Packet - Phase and group velocity - Davisson and Germer's experiment - G.P.Thomson's experiment - Heisenberg's uncertainty principle and its consequences.	12	Chalk and Talk, PPT, group discussion.
III	**Schrodinger Equation** Basic postulates of quantum mechanics - Schrodinger equation – Time dependent equation – Time independent equation - Eigenvalues and eigen functions - Properties of wave function – Orthogonal wave function – Normalised wave function – Orthonormal function – Requirement of wave function - Probability density.	12	Chalk and Talk, PPT, group discussion.
IV	**Solutions of Schrodinger Equation** Free particle solution - Particle in a box - Potential well of finite depth (one dimension) - linear harmonic oscillator - rigid rotator.	12	Chalk and Talk, PPT, group discussion.
V	**Operators in Quantum Mechanics** Operator for momentum – Kinetic energy – Total energy - Orbital angular momentum operators – Commutation rules for the components of Orbital angular momentum - separation of three dimensional Schrodinger equation into radial and angular parts - spin – Pauli's spin matrices for electron.	12	Chalk and Talk, PPT, group discussion.

Course Designer:
Mrs.S.Manimozhi
Mrs. M. Hemalatha

Department of Physics				Class: III B.Sc				
Sem	**Course Type**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
VI	DSEC - II	**22OUPHDSE6B**	Nanophysics	4	4	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship oriented**
✓		

Course Objectives:

1. To create the basic knowledge in nano materials.
2. To understand the scientific perspective of nanomaterials.
3. To identify the techniques suitable for nanomaterial synthesis.
4. To know the significance of nanomaterials.
5. To know the basic concepts of nanostructure.

Course Content:

UNIT I: Nanomaterials:

History of Nanotechnology- Nanostructures- synthesis of oxide nano particles- Synthesis of semiconductor nano particles- Synthesis of metallic nano particles

UNIT II: Quantum Hetero structure

Super lattice- preparation of Quantum nanostructure- Quantum well laser- Quantum cascade laser-Quantum wire- Quantum dot- Application of Quantum dots.

UNIT III: Carbon Nanotubes:

Discovery of Nanotubes- Carbon Allotropes- Types of carbon Nanotubes- Graphene sheet to a single walled nanotube- Electronic structure of Carbon Nanotubes- Synthesis of Carbon Nanotube.

UNIT IV :

Nanocrystalline soft material- Permanent magnet material- Theoretical background- Super paramagnetism- Coulomb blockade-Quantum cellular Automata.

UNIT V: Application of Nanotechnology

Chemistry and Environment – Energy applications of nanotechnology- Information and Communication- Heavy industry-Consumer goods- Nanomedicine - Medical application of Nanotechnology

Text Book:

1. Text book of Nanoscience and Nanotechnology – B. S. Moorthy, P. Sankar, Baldev Raj, B. B. Rath and James Murdy University Press – IIM

2. Nanophysics, Sr. Geradin Jayam, Holy Cross College, Nagercoil (2010)

Reference:

1. 'Nanoscience and Nanotechnology: Fundamentals to Frontiers'

2. M.S. Ramachandra Rao, Shubra Singh, Wiley India pvt. Ltd., New Delhi. (2013).

3. 'Nano the Essentials' - T. Pradeep, Tata Mc.Graw Hill company Ltd (2007)

4. '*The Chemistry of Nano materials : Synthesis, Properties and Applications*', Volume 1 C. N. R. Rao, A. Mu¨ller, A. K. Cheetham, , Germany (2004). Edition, 2008.

Web Resources:

1. https://www.nanowerk.com/what_are_synthetic_nanoparticles.php
2. https://www.youtube.com/watch?v=-mp8AtaaYp4
3. https://www.youtube.com/watch?v=Z51R49OOqAA
4. https://www.frontiersin.org/articles/10.3389/fchem.2022.845363/full
5. https://pubs.rsc.org/en/content/articlehtml/2021/ma/d0ma00807a

E-Book:

1. https://web.pdx.edu/~pmoeck/phy381/intro-nanotech.pdf
2. https://www.agc.ac.in/resources/Introduction_to_Nanomaterials_and_Nanotechnology.pdf
3. https://maken.wikiwijs.nl/bestanden/427519/Lesson_7_APPENDIX-2_Article2.pdf
4. http://www.ciando.com/img/books/extract/364220595X_lp.pdf
5. https://onlinelibrary.wiley.com/doi/pdf/10.1002/9783527673919.oth1

Pedagogy:

Chalk and Talk, PPT, group discussion, quiz, on the spot test.

Rationale for Nature of the course:

Knowledge and skill: The course enables the students with the understanding of basics of Nano science and nano technology.

Activities to be given:

Enhancing the quality of students to understand the fundamentals of Nano science

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (upto K level)
CLO1	Create the basic knowledge in nano materials.	K1 to K2
CLO2	Understand the scientific perspective of nanomaterials.	K1 to K2
CLO3	Identify the techniques suitable for nanomaterial synthesis.	K1 to K3
CLO4	Know the significance of nanomaterials.	K1 to K3
CLO5	Know the basic concepts of nanostructure.	K1 to K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	2	3	3	3	3
CLO2	3	3	2	3	3	3
CLO3	2	3	3	3	3	3
CLO4	3	3	3	3	3	3
CLO5	3	3	3	3	3	3

1-Basic Level 2- Intermediate Level 3- Advanced Level

LESSON PLAN :

UNIT	DESCRIPTION	HRS	MODE
I	**Nanomaterials** History of Nanotechnology- Nanostructures- synthesis of oxide nano particles- Synthesis of semiconductor nano particles- Synthesis of metallic nano particles	12	Chalk and Talk, PPT, group discussion
II	**Quantum Hetero structure** Super lattice- preparation of Quantum nanostructure- Quantum well laser- Quantum cascade laser- Quantum wire- Quantum dot- Application of Quantum dots.	12	Chalk and Talk, PPT, group discussion
III	**Carbon Nanotubes** Discovery of Nanotubes- Carbon Allotropes- Types of carbon Nanotubes- Graphene sheet to a single walled nanotube- Electronic structure of Carbon Nanotubes- Synthesis of Carbon Nanotube.	12	Chalk and Talk, PPT, group discussion
IV	Nanocrystalline soft material- Permanent magnet material- Theoretical background- Super paramagnetism- Coulomb blockade-Quantum cellular Automata	12	Chalk and Talk, PPT, group discussion
V	**Application of Nanotechnology** Chemistry and Environment – Energy applications of nanotechnology- Information and Communication- Heavy industry-Consumer goods- Nanomedicine - Medical application of Nanotechnology	12	Chalk and Talk, PPT, group discussion

Annexure-10

Department of Physics				Class: III B.Sc				
Sem	**Course Type**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
VI	SEC	**22OUPHSE6**	Microprocessor Fundamentals	2	2	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship oriented**
✓		

Course Objectives:

1. To know the basic ideas on microprocessor, memory and I/O devices
2. To be familiar with the program ming Techniques.
3. T o know the basic concepts of microprocessor architecture and interfacing.
4. To acquire skills in the programming instruction sets of microprocessor.
5. To apply the programming instructions to perform simple programs usingmicroprocessor.

Course Content:

Unit 1: Architecture:

The 8085 Programming model – Hardware model – registers, flags, ALU– Microprocessor Architecture and its operations – Address bus – Data bus – Control bus- Internal data operations and the 8085 Registers.

Unit 2: Programming Techniques

The 8085 Instruction set – data transfer, arithmetic, logic, branching and machine control group of instructions – Memory - Memory classification.

UNIT 3: Interfacing memory to 8085

Memory interfacing – Memory structure and its requirements – Basic concepts in memory interfacing – address coding – Interfacing circuit – Address decoding and memory address.

Unit 4: Interfacing I/O Ports to 8085

Interfacing input port and output port to 8085 – Peripheral I / O instruction – I / O execution – input interacting - interfacing output displays – LED Display for Binary data – Seven - segment LED display as an output device.

Unit 5: Interrupts

Interrupts in 8085 – RST instruction – Multiple interrupts and priorities – RST 7.5, 6.5 and 5.5 – Programming Interrupt controller – Direct memory access (DMA).

Books for Study:

1. Microprocessor Architecture programming and application with 8085 / 8080A. by R.S.Gaonkar, Wiley Eastern Ltd.(1992).

Unit I: Chapter 2, 3 2.1, 2.1.1, 2.1.2, 3.1, 3.1.1, 3.1.2

Unit II: Chapter 2, 3 2.2.1, 3.2, 3.2.7

Unit III: Chapter 4 4.3, 4.3.1 – 4.3.5

Unit IV: Chapter 5 5.1, 5.1.1, 5.1.5, 5.2, 5.2.1, 5.2.2

Unit V: Chapter 12 12.1, 12.1.1, 12.1.3, 12.2, 12.2.2, 12.4.1, 12.4.2.

Books for Reference:

1. Fundamental of microprocessor 8085 by V. Vijayendran, S.ViswanathanPublishers, Chennai(2003).
2. Fundamentals of Microprocessors and microcomputers by B.Ram - Dhanpat RAI publication.
3. Introduction to microprocessor by AdityaMathur - Tata Mc.Graw Hill Publishing Company Ltd.(1987).
4. Microprocessor and digital system by Dougles V. Hall - 2nd Edition - McGraw Hill Company(1983).

Web Resources:

1. https://www.tutorialspoint.com/microprocessor/microprocessor_8085_architecture.htm
2. https://www.geeksforgeeks.org/architecture-of-8085-microprocessor/
3. https://littleflowercollege.edu.in/upload/e_contents/files/1d029a4415491f528f634cce571c2dba.pdf
4. https://www.geeksforgeeks.org/data-transfer-instructions-8085-microprocessor/
5. https://www.youtube.com/watch?v=eTVL_T3Gjr0

E-books:

1. **https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SEC1310.pdf**
2. **https://fdocuments.in/download/8085-microprocessor-ramesh-gaonkar-pdf**
3. **http://powerunit-ju.com/wp-content/uploads/2018/01/Electronics-book.pdf**
4. **https://www.pdfdrive.com/the-intel-microprocessors-80868088-8018680188-80286-80386-80486-pentium-pentium-pro-d89806753.html.**
5. **https://www.pdfdrive.com/microprocessors-and-microcontrollersarchitecture-of-microprocessors-d51345395.html.**

Pedagogy:

Chalk and Talk, PPT, group discussion, quiz, on the spot test.

Rationale for Nature of the course:

Knowledge and skill: This course develops a good understanding the operation of the microprocessor and explores the working of Microsoft program for several laboratory purposes.

Activities to be given:

1. Composing the microprocessor program to raise the caliber of the students.
2. Train the students to execute microprocessor program.

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (upto K level)
CLO1	Know the basic ideas on microprocessor, memory and I/O devices	K1 to K2
CLO2	Be familiar with the programming Techniques.	K1 to K2
CLO3	Know the basic concepts of microprocessor architecture and interfacing.	K1 to K2
CLO4	Acquire skills in the programming instruction sets of microprocessor.	K1 to K3
CLO5	Apply the programming instructions to perform simple	K1 to K3

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	2	3	3	3	3
CLO2	3	3	2	3	3	3
CLO3	2	3	3	3	3	3
CLO4	3	3	3	3	3	3
CLO5	3	3	3	3	3	3

1-Basic Level 2- Intermediate Level 3- Advanced Level

Annexure-10

LESSON PLAN: (30 Hrs)

UNIT	DESCRIPTION	HRS	MODE
I	**Architecture** The 8085 Programming model – Hardware model – registers, flags, ALU– Microprocessor Architecture and its operations – Address bus – Data bus – Control bus- Internal data operations and the 8085 Registers.	6	Chalk and Talk, PPT, group discussion
II	**Programming Techniques** The 8085 Instruction set – data transfer, arithmetic, logic, branching and machine control group of instructions – Memory - Memory classification.	6	Chalk and Talk, PPT, group discussion
III	**Interfacing memory to 8085** Memory interfacing – Memory structure and its requirements – Basic concepts in memory interfacing – address coding – Interfacing circuit – Address decoding and memory address.	6	Chalk and Talk, PPT, group discussion
IV	**Interfacing I/O Ports to 8085** Interfacing input port and output port to 8085 – Peripheral I / O instruction – I / O execution – input interacting - interfacing output displays – LED Display for Binary data – Seven - segment LED display as an output device.	6	Chalk and Talk, PPT, group discussion ,
V	**Interrupts** Interrupts in 8085 – RST instruction – Multiple interrupts and priorities – RST 7.5, 6.5 and 5.5 – Programming Interrupt controller – Direct memory access (DMA).	6	Chalk and Talk, PPT, group discussion ,

Course Designer:

Mrs.M.R.Gurulakshmi
Mrs. M.Hemalatha

Department of Physics				Class: III B.Sc				
Sem	**Course Type**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
V	Generic Elective Course	**22OUCHGEPH5**	Physics-III Electricity and Electronics	4	4	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship oriented**
✓		

Course Objectives:

1. To understand the basic concepts of electric fields.
2. To acquire the knowledge about the magnetic fields.
3. To understand the properties of semiconductor materials.
4. To study the basic concepts of Transistor.
5. To learn about logic gates.

Course Content:

Unit: I Current , Resistance and Electrical Measurements: Current and current density-Expression for current density-Equation of continuity-Ohm's law and electrical conductivity-Kirchhoff's laws-Application of Kirchhoff's laws to Whetstone's network-Sensitivity of Whetstone's bridge-Carey foster bridge-Potentiometer-Calibration of Ammeter-Calibration of voltmeter.

Unit: II Thermo-Electricity: Seebeck effect- Laws of thermo e.m.f- Measurement of thermo-EMF using potentiometer- Peltier effect- S.G Starling method - Thomson effect-Thermodynamics of Thermocouple-Thermo electric diagrams-Uses of Thermoelectric Diagrams (Determination of emf and Peltier emf).

Unit : III Semiconductor Physics: Semiconductor-Intrinsic semiconductor-Extrinsic semiconductor-n type semiconductor-p type semiconductor-pn junction-properties of pn junction-Appling D.C.Voltage Across pn Junction or Biasing a pn Junction-Current flow in a forward biased pn junction-Volt ampere characteristics of pn junction.

Unit :IV Transistor: Transistor- Transistor action- Transistor symbol-Transistor connections-Common base connection- characteristics of Common base connection - Common emitter connection- characteristics of Common emitter connection -Common collector connection.

Unit : V Logic gates: Decimal to binary conversion-Binary to decimal conversion-Octal number system- OR gate-AND gate-NOT gate-Combination of basic logic gates- NAND Gate as a universal Gate- Boolean Algebra - Boolean theorems – Single variable – Multivariable Boolean theorem- De'Morgans theorems.

Books for study:

1. Murughesan .R, *Electricity and Magnetism*,Sixth Edition, S.Chand And Company Ltd, New Delhi,2006(UNIT-I,II)
2. Mehta V.K, Rohit Mehta Principles of electronics, Eleventh edition, S.Chand and Company Ltd,New ,Delhi 2012(UNIT-III,IV,V)

Unit I	**Chapters**	**6.1-6.4,6.6,7.1,7.2**
Unit II	**Chapters**	**8.1-8.8**
Unit III	**Chapters**	**5.1,5.8-5.11,5.14-5.18**
Unit IV	**Chapters**	**8.1,8.4,8.6-8.10,8.12,8.13**
Unit V	**Chapters**	**26.5-26.8,26.12-26.16,26.21,26.22**

Books for Reference:

1. Duggal B.D, Chhabra C.L., *Fundamentals of Electricity and Magnetism* Built: Paperback & Hardbound 4th (Reprint), 2014.
2. Murugesan.R, *Electricity & magnetism*, S.Chand & Coy, 6thedn New Delhi 2006.
3. Narayanamurthy.M, Nagarathnam.N, *Electricity and magnetism* 4thedn, National publishing co, Meerut.
4. Tayal D.C, *Electricity and Magnetism*, Himalaya Publishing House,New Delhi, 2 edn, 1989.
5. VasudevaD.N, *Fundamentals of Magnetism and Electricity* ,S. Chand & Company Ltd, New Delhi, 5thEdn, 2011.

Web Resources / E.Books:

1. https://byjus.com/physics/seebeck-effect
2. https://isaacphysics.org/concepts/cp_kirchhoffs_laws
3. https://www.toppr.com/ask/content/concept/intrinsic-semiconductor-210417
4. https://rnsinstituteoftechnology.org/wp-content/uploads/2020/04/principles-of-electronics-s-chand-v-k-mehta-rohit-mehta.pdf

Pedagogy:

Chalk and Talk, PPT, group discussion, quiz, on the spot test and

Rationale for Nature of the course:

Knowledge and skill: The course is the learning and understanding the fundamental ideas of electric field, semiconductor materials.

Activities to be given:

1. Enhancing the quality of students to understand fundamentals of electricity.
2. Train the students to know about the logic gates.

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (upto K level)
CLO1	understand the basic concepts of electric fields.	K1 to K2
CLO2	acquire the knowledge about the magnetic fields.	K1 to K2
CLO3	To understand the properties of semiconductor materials.	K1 to K3
CLO4	To study the basic concepts of OP-AMP.	K1 to K3
CLO5	To learn about logic gates.	K1 to K4

Mapping of Course Learning Outcomes (CLOs) with Programme Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	2	3	3	3	3
CLO2	3	3	2	3	3	3
CLO3	2	3	3	3	3	3
CLO4	3	3	3	3	3	3
CLO5	3	3	3	3	3	3

1-Basic Level 2- Intermediate Level 3- Advanced Level

LESSON PLAN : (60 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**Current Resistance and Electrical Measurements** Current and current density-Expression for current density-Equation of continuity-Ohm's law and electrical conductivity-Kirchhoff's laws-Application of Kirchhoff's laws to Whetstone's network-Sensitivity of Whetstone's bridge-Carey foster bridge-Potentiometer-Calibration of Ammeter-Calibration of voltmeter.	12	Chalk and Talk, PPT, group discussion
II	**Thermo-Electricity** Seebeck effect- Laws of thermo e.m.f- Measurement of thermo-EMF using potentiometer- Peltier effect- Thomson effect-Thermodynamics of Thermocouple-Thermo electric diagrams-Uses of Thermoelectric Diagrams (Determination of emf and Peltier emf).	12	Chalk and Talk, PPT, group discussion
III	**Semiconductor Physics:** Semiconductor- Intrinsic semiconductor - Extrinsic semiconductor-n type semiconductor-p type semiconductor-pn junction-properties of pn junction-Appling D.C.Voltage Across pn Junction or Biasing a pn Junction-Current flow in a forward biased pn junction-Volt ampere characteristics of pn junction.	12	Chalk and Talk, PPT, group discussion
IV	**Transistor:**Transistor- Transistor action- Transistor symbol- Transistor connections- Common base connection- characteristics of Common base connection -Common emitter connection- characteristics of Common emitter connection -Common collector connection	12	Chalk and Talk, PPT, group discussion ,
V	**Logic gates:** Decimal to binary Conversion-Binary to decimal conversion-Octal number system- OR gate-AND gate-NOT gate-Combination of basic logic gates- NAND Gate as a universal Gate- Boolean Algebra - Boolean theorems – Single variable – Multivariable Boolean theorem- De'Morgans theorems.	12	Chalk and Talk, PPT, group discussion ,

Course Designer:
Mrs. S.Manimozhi

Department of Physics				Class: III B.Sc Chemistry				
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
VI	Generic Elective Course	**22OUCHGEPH6**	Physics –IV Optics	4	4	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	**Employability Oriented**	**Entrepreneurship oriented**
✓		

Course Objectives:

1. To study the basic concepts of geometrical optics.
2. To comprehend the theory of interference.
3. To understand the basics and the types of Diffraction.
4. To know the theory of Polarization of light.
5. To understand the basic formation of LASER.

Course content:

Unit: I Geometrical optics: Convex lens-Principal Focus and Focal Planes-Refraction through a thin lens- Dispersion of Light - Dispersion through a Prism-Cauchy's Formula- Achromatism in Prisms-Dispersion without Deviation-Direct vision Spectroscope- Spherical aberration in a lens-Chromatic aberration in a lens – Achromatic combination of lenses.

Unit: II Interference: Introduction-Theory of interference fringes – Colours of thin films-Newton's rings-Determination of wavelength of sodium light by Newton's rings – Determination of refractive index of a liquid by Newton's rings- Michelson's interferometer.

Unit: III Diffraction: Introduction-Fresnel's explanation of rectilinear propagation of light-Zone plate- Diffraction at a thin wire-Fraunhofer diffraction at a single slit -Resolving power of telescope-Resolving power of prism- Resolving power of a plane diffraction grating.

Unit: IV Polarisation: Introduction-Polarisation of Light-Polarisation by reflection-Pile of plates-Law of Malus-Double refraction- Huygen's theory of double refraction in uniaxial crystals-Huygen's construction for double refraction in uniaxial crystals- Nicol prism - Quarter wave plate-Half wave plate.

Unit: V LASER: The Einstein Coefficients –Relation between Einstein's A and B coefficients-Population Inversion – The Line shape function – Carbon Dioxide Laser – Dye Laser – Nd: YAG Laser – Resonators – Open resonators - The Quality Factor Q -Properties of Laser Beam – Monochromaticity – Directionality.

Text Books:

1. Murugesan.R ,Kiruthiga sivaprasath, *Optics And Spectroscopy* ,S.Chand& Company Ltd , New Delhi , First edition , Reprint 2013

UNIT I :	**Chapter 1**	**1.1-1.3, 1.7-1.11, 1.16, 1.20**
UNIT II :	**Chapter**	**2.1-2.2, 2.5, 2.8- 2.11**
UNIT III :	**Chapter 3**	**3.1-3.3, 3.9-3.10,3.20,3.23,3.24**
UNIT IV :	**Chapter 4**	**4.1-4.8, 4.12,4.13**
UNIT V :	**Chapter 12**	**12.1 - 12.5**
	Chapter 23	**23.1, 23.4, 23.6 - 23.9**

Reference books:

1. Ajoy Ghatak, *Optics*, 5th edition, Tata McGraw Hill Education Private Limited, New Delhi,2012.

2. Feynman.R, Leighton.R.B and Sands.M- *The Feynman Lectures on Physics*, Vol II Pearson education 2013

3. Halliday.D, Resnick .R and Krane-*Physics volume II*- Wiley India (p)Ltd,New delhi,fifth edition.

4. KhannaDr.H.RGulati.R,*Optics*, Chand & Co, New Delhi, 1979

5. Subrahmanyam Brijlal.N,Avadhanulu.M.N, *Optics*, S.Chand& company Ltd,New Delhi, Twenty Fifth Edition 2012

Web Resources/ E.Books:

1. https://pubs.aip.org/aapt/pte/article-abstract/43/4/254/275167/Web-Resources-for-\Teaching-Introductory-Optics?redirectedFrom=fulltext
2. https://www.khanacademy.org/science/physics/geometric-optics
3. https://www.merriam-webster.com/dictionary/optics
4. https://study.com/academy/lesson/optics-physics-overview-types.html
5. https://www.researchgate.net/publication/243716006_Web_Resources_for_Teaching_Introductory_Optics_Optics_simulations

Pedagogy:

Chalk and Talk, PPT, group discussion, quiz, on the spot test and seminar.

Rationale for nature of Course:

Knowledge and skill: This course will enable the students to comprehend the theory, concepts of optics.

Activities to be given:

The knowledge of theory acquired by the students will enable them to do the lab experiments.

Course learning Outcomes (CLOs):

CLO	Course Outcomes Statement	Knowledge According to Bloom's Taxonomy (Upto K level)
CLO1	Study the basic concepts of geometrical optics.	K1 to K2
CLO2	Comprehend the theory of interference.	K1 to K2
CLO3	Understand the basics and the types of Diffraction.	K1 to K3
CLO4	Know the theory of Polarization of light.	K1 to K3
CLO5	Understand the basic formation of LASER.	K1 to K4

K1- Remembering and recalling facts with specific answers

K2- Basic understanding of facts and stating main ideas with general answers

K3- Application oriented, Justifying the statement and deriving inference

Mapping of Course Outcomes (CLOs) with Program Outcomes (POs)

	PO1	PO2	PO3	PO4	PO5	PO6
CLO1	3	3	2	3	3	3
CLO2	3	3	3	3	3	3
CLO3	3	3	3	3	3	3
CLO4	3	2	3	3	3	3
CLO5	3	3	3	3	3	3

1. Basic level 2. Intermediate level 3. Advance level

LESSON PLAN: (60 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**Geometrical optics** Convex lens-Principal Focus and Focal Planes-Refraction through a thin lens- Dispersion of Light - Dispersion through a Prism-Cauchy's Formula- Achromatism in Prisms-Dispersion without Deviation-Direct vision Spectroscope- Spherical aberration in a lens-Chromatic aberration in a lens - Achromatic combination of lenses.	12	Chalk and Talk, PPT, group discussion.
II	**Interference** Introduction-Theory of interference fringes-Fresnel's Biprism- Colours of thin films-Newton's rings-Determination of wavelength of sodium light by Newton's rings – Determination of refractive index of a liquid by Newton's rings-Michelson's interferometer.	12	Chalk and Talk, PPT, group discussion
III	**Diffraction** Introduction-Fresnel's explanation of rectilinear propagation of light-Zone plate-Diffraction at a thin wire-Fraunhofer diffraction at a single slit- Resolving power of telescope-Resolving power of prism-Resolving power of a plane diffraction grating.	12	Chalk and Talk, PPT.
IV	**Polarisation** Introduction-Polarisation of Light-Polarisation by reflection-Pile of plates-Law of Malus-Double refraction- Huygen's theory of double refraction in uniaxial crystals-Huygen's construction for double refraction in uniaxial crystals- Nicol prism - Quarter wave plate-Half wave plate.	12	Chalk and Talk, group discussion.
V	**LASER** The Einstein Coefficients –Relation between Einstein's A and B coefficients- Population Inversion – The Line shape function – Carbon Dioxide Laser – Dye Laser – Nd: YAG Laser – Resonators – Open resonators - The Quality Factor Q -Properties of Laser Beam – Monochromaticity – Directionality.	12	Chalk and Talk, PPT.

Course Designer:
Mrs. P. Revathi
Ms. E.Chris Monica

Annexure-10

Department of Physics					Class: III B.Sc Chemistry			
Sem	**Course Type**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
V & VI	Practical	**22OUCHGEPH6P**	Physics Practical-II	1	2	40	60	100

List of Experiments (Any Twelve):

1. Mirror galvanometer-voltage and current sensitiveness
2. Series resonance -LCR
3. Air wedge- thickness of wire
4. Dispersive power of a prism –spectrometer
5. Grating- normal incidence-spectrometer
6. Newton's rings determination of radius of curvature
7. Logic gates –AND,OR,NOT,-using discrete components
8. Logic gates-NAND,NOR-using discrete components
9. Verification of De Morgan's theorem using IC's
10. Diode characteristics
11. Zener diode characteristics
12. OP-amp as an adder
13. OP-amp as a subtractor
14. Parallel resonance – LCR
15. Half adder using logic gates Ic's
16. Half subtractor using logic gates Ic's

Reference Books:

1. M.N.Srinivasan, S.Balasubramanian, R.Ranganathan(2007), A Text Book of Practical Physics, Sultan Chand & Sons.
2. Indu Prakash & Ramakrishna(2008), A Text Book of Practical Physics, Kitab Mahal Agencies
3. S.R. GovindaRajan, T. Murugaiyan, S. SundaraRajan(2006), Practical Physics, Rochouse & Sons

Web Resources:

1. http://www.tndte.gov.in/site/wp-content/uploads/2016/08/Engineering-physics.pdf

2. https://www.ugc.ac.in/pdfnews/5512002_B.SC.-PHYSICAL-SCIENCE-_PHYSICS,-CHEMISTRY,-MATHEMATICS_-CB.pdf

3. https://www.academia.edu/34783511/Practical_Physics_for_Degree_Students_Gias_Uddin_and_Shahabuddin

4. https://www.academia.edu/35371782/PHYSICS_LABORATORY_MANUAL_UG_Courses_I_and_II_Semester1.UG course OBE.docx

Pedagogy:

Demonstration and Practical sessions.

Lesson Plan:

UNIT	Topics to be Covered	Hours	Mode
I	1. Mirror galvanometer-voltage and current sensitiveness 2. Series resonance -LCR 3. Air wedge- thickness of wire	6	Demo & Practical Session
II	4. Dispersive power of a prism –spectrometer 5. Grating- normal incidence-spectrometer 6. Newton's rings determination of radius of curvature	6	Demo & Practical Session
III	7. Logic gates –AND,OR,NOT,-using discrete components 8. Logic gates-NAND,NOR-using discrete components 9. Verification of De Morgan's theorem using IC's	6	Demo & Practical Session
IV	10. Diode characteristics 11. Zener diode characteristics 12. OP-amp as an adder	6	Demo & Practical Session
V	13. OP-amp as a subtractor 14. Parallel resonance – LCR 15. Half adder using logic gates Ic's 16. Half subtractor using logic gates Ic's	6	Demo & Practical Session

Course Designer:
Ms.E.Chris Monica
Mrs.M.Hemalatha,