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

TANSCHE - **CBC**S With OBE

BACHELOR OF SCIENCE

PROGRAMME CODE - P

COURSE STRUCTURE

(w.e.f. 2023 – 2024 Batch onwards)

Annexure - 12

E.M.G. YADAVA WOMENS 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

TANSCHE – CBCS WITH OBE

COURSE STRUCTURE

(w.e.f. 2023 – 2024 Batch onwards)

Semester	Part	Course Code	Course Title	Teaching HRS (Per Week)	Duration Of Exam (Hrs)	Marks Allotted			Credits
						CIA	SE	Total	
III	I	23OU1TA3	Tamil	6	3	25	75	100	3
	II	23OU2EN3	General English- III	6	3	25	75	100	3
	III	23OUPH31	**Core Course-5:** Mechanics	5	3	25	75	100	5
		23OUPH3P	**Core Course-6:** Practical – III: Electricity	3	3	40	60	100	3
		23OUPHGECH3	**GEC 1:** Allied Chemistry	4	3	25	75	100	3
		23OUPHGECH3P	**GEC 2:** Allied Chemistry Practical-I	2	3	40	60	100	2
	IV	23OUPHSEC31	**SEC 4:** Energy Physics	2	3	25	75	100	2
		23OUPHSEC32	**SEC 5:** Astro Physics	1	3	25	75	100	1
			Environmental studies	1	-	-	-	-	-
		TOTAL		**30**					**22**
IV	I	23OU1TA4	Tamil	6	3	25	75	100	3
	II	23OU2EN4	General English-IV	6	3	25	75	100	3
	III	23OUPH41	**Core Course7:** Optics and Laser Physics	5	3	25	75	100	5
		23OUPH4P	**Core Course8:** Practical – IV: Light	3	3	40	60	100	3
		23OUPHGECH4	**GEC 3:** Allied Chemistry	3	3	25	75	100	3
		23OUPHGECH4P	**GEC 4:** Allied Chemistry Practical-II	2	3	40	60	100	2
	IV	23OUPHSEC41	**SEC 6:** Communication Physics	2	3	25	75	100	2
		23OUPHSEC42	**SEC 7:** Physics for everyday life	2	3	25	75	100	2
		23OU4EV4	Environmental studies	1	3	25	75	100	2
		TOTAL		**30**					**25**

Annexure - 12

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DEPARTMENT OF PHYSICS –UG

TANSCHE – CBCS WITH OBE COURSE STRUCTURE

ALLIED PHYSICS FOR CHEMISTRY

(w.e.f. 2023 – 2024 Batch onwards)

Semester	Part	Course Code	Course Title	Teaching Hrs (Per Week)	Duration Of Exam (Hrs)	Marks Allotted			Credits
						CIA	SE	Total	
III	III	23OUCHGEPH3	**Allied 1:** Allied Physics – I	4	3	25	75	100	3
		23OUCHGEPH3P	**Allied Practical 1:** Allied Practicals-I	2	3	40	60	100	2
IV		23OUCHGEPH4	**Allied 2:** Allied Physics – II	3	3	25	75	100	3
		23OUCHGEPH4P	**Allied Practical 2:** Allied Practicals-II	2	3	40	60	100	2

Department of Physics					Class: II B.Sc			
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
III	Core Course 5:	23OUPH31	Mechanics	5	5	25	75	100

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

Course Objectives:

1. To understand the theory of relativity, Kepler's laws and Realize the basicprinciples behind planetary motion
2. To Acquire the knowledge on the conservation laws.
3. To Apply conservation law and calculate energy of various systems.
4. To Gain knowledge on rigid body dynamics and solve problems based
5. To Appreciate Lagrangian system of mechanics, apply D'Alemberts principle.

Course Content:

Unit I: Laws of Motion: Newton's Laws – forces – equations of motion – frictional force – motion of a particle in a uniform gravitational field – types of everyday forces in Physics. Gravitation: Classical theory of gravitation–Kepler's laws, Newton's law of gravitation – Determination of G by Boy's method–g variation of latitude, depth, altitude-earth density – mass of the Sun – gravitational potential.

Unit II: Conservation Laws of Linear and Angular Momentum: Conservation of linear momentum –center of mass –general elastic collision of particles of different masses – system with variable mass – examples – conservation of angular momentum – torque due to internal forces – torque due to gravity –angular momentum about center of mass.

Unit III: Conservation Laws Of Energy: Introduction –significance of conservation laws – law of conservation of energy concepts of work- power – energy – conservative forces – potential energy and in an electric field– examples –non-conservative forces – general law of conservation of energy.

Unit IV: Rigid Body Dynamics: Translational and rotational motion –angular momentum – moment of inertia – general theorems of moment of inertia –moment of inertia (uniform rod, rectangular lamina, circular disc) – kinetic energy of rotation ––body rolling down an inclined plane.

Unit V: Lagrangian Mechanics: Generalized coordinates – degrees of freedom – constraints

- principle of virtual work and D' Alembert's Principle – Lagrange's equation from D' Alembert's principle – application –simple pendulum – Atwood's machine.

Books for Study:

1. D. S.Mathur and P. S.Hemne, 2000, Mechanics, RevisedEdition, S.Chandand Co.
2. R.Murugeshan, 2004,Theoretical physics, First edition, S.Chand & company,NewDelhi.

Books for Reference:

1. J.C.Upadhyaya, 2019, Classical Mechanics, HimalayaPublishing house, Mumbai.
2. P.DuraiPandian, LaxmiDuraiPandian, MuthamizhJayapragasam,2005, Mechanics, 6th revised edition,S.Chandand Co.
3. Goldstein Herbert, 1980, Classical Mechanics. U.S.A: Addisonand Wesely.
4. Halliday, David and Robert, Resnick, 1995, Physics Vol.I. NewAge, International, Chennai.
5. Halliday, David Robert Resnick and Walker Jearl, 2001,Fundamentals of Physics, John Wiley, New Delhi

Web resources/ E-Books:

1. https://youtu.be/X4_K-XLUIB4
2. https://nptel.ac.in/courses/115103115
3. https://www.youtube.com/watch?v=p075LPq3Eas
4. https://www.youtube.com/watch?v=mH_pS6fruyg
5. https://onlinecourses.nptel.ac.in/noc22_me96/preview
6. https://www.youtube.com/watch?v=tdkFc88FwM
7. https://onlinecourses.nptel.ac.in/noc21_me70/preview

Pedagogy:

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

Rationale for nature of Course

Knowledge and Skill: Study of the Mechanics leads to information which is of practical value to the physicist. It gives us information about the internal forces which act between the constituent parts of the substance. Students who undergo this course are successfully bound to get a better insight and understanding of the subject.

Activities to be given:

1. Enhancing the quality of students to understand the Mechanics.
2. Train the students to understand the theory by conducting the experiments.

Course Learning Outcomes (CLOs):

At the end of the course, the student will be able to:

CLO	Course Learning Outcomes	Knowledge According to Bloom's Taxonomy(upto K level)
CLO1	Understand the Newton's Law of motion, understand general theory of relativity, Kepler's laws and Realize the basic principles behind planetary motion	K1 to K3
CLO2	Acquire the knowledge on the conservation laws	K1 to K3
CLO3	Apply conservation law and calculate energy of various systems, understand and differentiate conservative and non-conservative forces	K1 to K4
CLO4	Gain knowledge on rigid body dynamics and solve problems based on this concept	K1 to K3
CLO5	Appreciate Lagrangian system of mechanics, apply D' Alemberts principle	K1 to K4

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

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

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

LESSON PLAN : TOTAL HOURS(75HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**LAWS OF MOTION:** Newton's Laws – forces – equations of motion – frictional force – motion of a particle in a uniform gravitational field – types of everyday forces in Physics. **Gravitation:** Classical theory of gravitation– Kepler's laws, Newton's law of gravitation – Determination of G by Boy's method–g variation of latitude, depth, altitude-earth density – mass of the Sun – gravitational potential .	15	Chalk and Talk, PPT, group discussion
II	**CONSERVATION LAWS OF LINEAR AND ANGULAR MOMENTUM :**Conservation of linear momentum –center of mass – examples – general elastic collision of particles of different masses – system with variable mass – examples – conservation of angular momentum – torque due to internal forces – torque due to gravity –angular momentum about center of mass.	15	Chalk and Talk, PPT, group discussion
III	**CONSERVATION LAWS OF ENERGY**: Introduction –significance of conservation laws – law of conservation of energy concepts of work- power – energy – conservative forces – potential energy and in an electric field– examples –non-conservative forces – general law of conservation of energy.	15	Chalk and Talk, PPT, group discussion
IV	**RIGID BODY DYNAMICS**: Translational and rotational motion –angular momentum – moment of inertia – general theorems of moment of inertia – moment of inertia (uniform rod, rectangular lamina, circular disc) – kinetic energy of rotation ––body rolling down an inclined plane.	15	Chalk and Talk, PPT, group discussion.
V	**Lagrangian Mechanics:** Generalized coordinates – degrees of freedom – constraints - principle of virtual work and D' Alembert's Principle – Lagrange's equation from D' Alembert's principle – application –simple pendulum – Atwood's machine.	15	Chalk and Talk, PPT, group discussion ,

Course Designer: Mrs. P.Revathi
Mrs. S.Manimozhi

Sem	Category	Course Code	Course Title	Credits	Contact Hours/ Week	CIA	SE	Total
III	Core Course 6:	23OUPH31P	Practical-III Electricity	3	3	40	60	100

List of experiments:(Any eight)

1. Calibration of low range and high range voltmeter using potentiometer.
2. Calibration of ammeter using potentiometer.
3. Measurement of low resistances using potentiometer.
4. Determination of field along the axis of a current carrying circular coil.
5. Determination of earth's magnetic field using field along axis of current carrying coil.
6. Determination of specific resistance of the material of the wire using PO box.
7. Determination of resistance and specific resistance using Carey Foster's bridge.
8. Determination of internal resistance of a cell using potentiometer.
9. Determination of specific conductance of an electrolyte.
10. Determination of e.m.f of thermos-couple using potentiometer
11. Determination of capacitance using Desauty's bridge and B.G./Spot galvanometer/ headphone.
12. Determination of figure of merit of BG or spot galvanometer.
13. Comparison of EMF of two cells using BG.
14. Comparison of capacitance using BG.

Books for Reference:

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. Govinda Rajan, T. Murugaiyan, S. Sundara Rajan (2006),*Practical Physics*, Rochouse & Sons.

Web Resources/ E.Books:

1. https://vvvcollege.org/dbt/LabManual-GeneralPhysics.pdf
2. https://www.youtube.com/watch?v=-BIOiZ1U7UQ
3. https://www.brcmcet.edu.in/downloads/files/n535b898a0f2de.pdf

Pedagogy: Demonstration and Practical sessions.

LESSON PLAN : TOTAL HOURS(45 HRS)

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UNIT	Topics to be Covered	Hours	Mode
I	1. Calibration of low range and high range voltmeter using potentiometer 2. Calibration of ammeter using potentiometer. 3. Measurement of low resistances using potentiometer.	9	Demo & Practical Session
II	4. Determination of field along the axis of a current carrying circular coil. 5. Determination of earth's magnetic field using field along axis of current carrying coil. 6. Determination of specific resistance of the material of the wire using PO box.	9	Demo & Practical Session
III	7. Determination of resistance and specific resistance using Carey Foster's bridge. 8. Determination of internal resistance of a cell using potentiometer. 9. Determination of specific conductance of an electrolyte.	9	Demo & Practical Session
IV	10. Determination of e.m.f of thermo-couple using potentiometer 11. Determination of capacitance using Desauty's bridge and B.G./Spot galvanometer/ headphone. 12. Determination of figure of merit of BG or spot galvanometer.	9	Demo & Practical Session
V	13. Comparison of EMF of two cells using BG. 14. Comparison of capacitance using BG.	9	Demo & Practical Session

Course Designer: Mrs. M.R.Gurulakshmi

Annexure - 12

Department of Physics					Class: II B.Sc			
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
III	Skill Enhancement Course (SEC)	23OUPHSEC31	Energy Physics	2	2	25	75	100

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

Course Objectives:

1. To get the understanding of the conventional and non-conventional energy sources.
2. To study the basic concepts of solar energy and its applications.
3. To understand the origin, nature and applications of wind power.
4. To learn about the various aspects of biomass energy.
5. To Study the importance and applications of ocean energy.

Course Content:

Unit :I Fundamentals of Energy Science: Introduction-Energy sectors- Classification of Energy Resources-Importance of Non–Conventional energy sources-Advantages and Disadvantages of conventional energy sources-Environmental aspects of energy.

Unit :II Solar Energy: Introduction-solar collectors-solar water heater-solar industrial Heating System-Solar refrigeration and air conditioning system-Solar cookers-Solar Furnaces-Solar green house.

Unit :III Wind Energy: Introduction-Origin of winds-Nature of winds-Wind turbine sitting-Major application of wind power-Environmental aspects- Wind energy programme in India.

Unit :IV Biomass Energy: Introduction- Photosynthesis process-Bio fuels-Biomass Resources-Biomass conversion Technologies- Biogas production from waste biomass - Biomass energy programme in India.

Unit : V Ocean Energy: Introduction-Tidal Energy- Origin and Nature of Tidal –Limitations of Tidal energy-Wave Energy- Power in Waves- Ocean thermal Energy- Ocean thermal Energy Conversion Technology.

Books for Study:

1. Khan B.H, Non-conventional energy Resources, Tata McGraw Hill Education Private Limited, New Delhi,2012.

Books for Reference:

1. John Twidelland Tony Weir, Renewable Energy Resources,Taylor and Francis, 2005, 2nd Edn.
2. S.A. Abbasi and Nasema Abbasi, Renewable Energy sources andtheir environmental impact, PHI Learning Pvt. Ltd, 2008.
3. M. P. Agarwal, Solar Energy, S. Chand and Co. Ltd., NewDelhi,1982
4. H. C. Jain, Non-Conventional Sources of Energy, Sterling Publishers,1986.
5. G.D.Rai, Non-Conventional Sources of Energy, KhannaPublishers, 2009, 4th Edn.

Web resources/ E-Books:

1. https://books.google.co.in/books?id=U0d7DhnM0FMC&printsec=copyright&redir_esc=y#v=onepage&q&f=false
2. https://courses.edx.org/c4x/DelftX/ET.3034TU/asset/solar_energy_v1.1.pdf
3. https://news.energysage.com/advantages-and-disadvantages-of-renewable-energy/
4. https://www.toppr.com/guides/physics/sources-of-energy/conventional-sources-of-energy/
5. https://www.nrel.gov/research/re-biomass.html

Pedagogy:

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

Rationale for nature of Course

Employability Oriented: This course is mainly employability and skill development for energy resources in the current scenario.

Activities to be given:

1. Activities having direct bearing on Job creation through the increased production and manufacturing of renewable energy technologies.

2. The activity is mainly perceptive knowledge in the field of energy resources.

Course Learning Outcomes (CLOs):

At the end of the course, the student will be able to:

CLO	Course Learning Outcomes	Knowledge According to Bloom's Taxonomy(upto K level)
CLO1	Get the understanding of the conventional and non-conventionalenergy sources.	K1 to K3
CLO2	Study the basic concepts of solar energy and its applications.	K1 to K3
CLO3	Understand the origin, nature and applications of wind power.	K1 to K4
CLO4	Learn about the various aspects of biomass energy.	K1 to K3
CLO5	Study the importance and applications of ocean energy.	K1 to K4

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

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

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

LESSON PLAN: TOTAL HOURS (30 HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**Fundamentals of Energy Science:** Introduction-Energy sectors- Classification of Energy Resources-Importance of Non–Conventional energy sources-Advantages and Disadvantages of conventional energy sources-Environmental aspects of energy.	6	Chalk and Talk, PPT, group discussion
II	**Solar Energy:** Introduction-solar collectors-solar water heater-solar industrial Heating System-Solar refrigeration and air conditioning system-Solar cookers-Solar Furnaces-Solar green house.	6	Chalk and Talk, PPT, group discussion
III	**Wind Energy:** Introduction-Origin of winds-Nature of winds-Wind turbine sitting-Major application of wind power-Environmental aspects- Wind energy programme in India.	6	Chalk and Talk, PPT, group discussion
IV	**Biomass Energy:** Introduction- Photosynthesis process-Bio fuels-Biomass Resources-Biomass conversion Technologies- Biogas production from waste biomass - Biomass energy programme in India.	6	Chalk and Talk, PPT, group discussion.
V	**Ocean Energy:** Introduction-Tidal Energy- Origin and Nature of Tidal – Limitations of Tidal energy-Wave Energy- Power in Waves- Ocean thermal Energy- Ocean thermal Energy Conversion Technology.	6	Chalk and Talk, PPT, group discussion ,

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

Annexure - 12

Department of Physics						Class: II B.Sc		
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
III	Skill Enhancement Course (SEC)	23OUPHSEC32	Astrophysics	2	1	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented
✔		

Course Objectives:

1. To Understand the concepts of telescope.
2. To Acquire the basic Knowledge of solar system.
3. To Understand the concepts of eclipses.
4. To Study about the classification of galaxies.
5. To Acquire the knowledge about the activities in Astro physics.

Course Content:

UNIT I: TELESCOPES: Optical telescopes – magnifying power, brightness, resolving power - The f/a ratio –Reflecting and refracting telescopes – radio telescopes – Hubble space telescope.

UNIT II: SOLAR SYSTEM: Bode's law of planetary distances – meteors,meteorites, comets, asteroids – Kuiper belt – Oort cloud – detection of gravitational waves – recent advances in astrophysics

UNIT III: ECLIPSES: Eclipses – solar eclipse – total and partial solareclipse – lunar eclipse – total and partial lunar eclipse. **THE SUN:** physical and orbital data –Sun atmosphere – photosphere– solar corona - sunspots - solar flares –solar cycle.

UNIT IV: STELLAR EVOLUTION: H-R diagram – birth & death of low mass, intermediate mass and massive stars – Chandrasekar limit – whitedwarfs – neutron stars – pulsars – black holes – supernovae. **GALAXIES:** classification of galaxies – galaxy clusters –interactions of galaxies- dark matter and super clusters – evolving universe.

UNIT V: ACTIVITIES IN ASTROPHYSICS:

(i) Basic construction of telescope

(ii) Develop models to demonstrate eclipses/planetary motion

(iii) Night sky observation

(iv) Conduct case study pertaining to any topic in this paper

Visit to any one of the National ObservatoriesAny three activities to be done compulsorily.

Book for study:

1. Kumaravelu, Susheela Kumaravelu, (2014) Astronomy, 10th Edition;
2. Michael Zeilik , Stephen Gregory Astronomy And Astrophysics, 4TH Edition.

Books for References:

1. Baidyanath Basu, (2001). An introduction to Astrophysics, Secondprinting, Prentice – Hall of India (P) Ltd, New Delhi
2. K.S.Krishnaswamy, (2002), Astrophysics – a modern perspective,New Age International (P) Ltd, New Delhi.
3. Shylaja, B.S. &Madhusudan, H.R.,(1999), Eclipse: A CelestialShadow Play, Orient BlackSwan,

Web resources/ E-Books:

1. https://letstalkscience.ca/educational-resources/backgrounders/optical-telescopes
2. https://www.txstate-epdc.net/types-of-eclipses-and-how-they-work

Pedagogy:

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

Rationale for nature of Course:

Knowledge and Skill: Study of the astrophysics leads to information which is of practical value to the physicist. It gives us information about the sun and eclipses. Students who undergo this course are successfully bound to get a better insight and understanding of the subject.

Activities to be given:

1. Enhancing the quality of students to understand the eclipses.
2. Train the students to understand about the astrophysics.

Course Learning Outcomes (CLOs):

At the end of the course, the student will be able to:

CLO	Course Learning Outcomes	Knowledge According to Bloom's Taxonomy(upto K level)
CLO1	Explain about the types of telescopes	K1 to K3
CLO2	Explain their knowledge of understanding about solar system	K1 to K3
CLO3	Explain the basic concept of sun and eclipses	K1 to K3
CLO4	Describe about the galaxies and stellar evolution	K1 to K3
CLO5	Gain knowledge about the actives in astrophysics	K1 to K3

Annexure - 12

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

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

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

LESSON PLAN: TOTAL HOURS(15HRS)

UNIT	Details	Hours	Mode
I	**TELESCOPES:** Optical telescopes – magnifying power, brightness, resolving power - The f/a ratio – types of reflecting and refracting telescopes – radio telescopes –Hubble space telescope.	3	Chalk and Talk, PPT, quiz, on the spot test
II	**SOLAR SYSTEM:** Bode's law of planetary distances – meteors, meteorites, comets, asteroids – Kuiper belt – Oort cloud – detection of gravitational waves – recent advances in astrophysics	3	Chalk and Talk, PPT, quiz, on the spot test
III	**ECLIPSES:** Eclipses – solar eclipse – total and partial solar eclipse – lunar eclipse – total and partial lunar eclipse. **THE SUN:** physical and orbital data –Sun atmosphere – photosphere– solar corona - sunspots - solar flares –solar cycle.	3	Chalk and Talk, PPT, quiz, on the spot test
IV	**STELLAR EVOLUTION:** H-R diagram – birth & death of low mass, intermediate mass and massive stars – Chandrasekhar limit – whitedwarfs – neutron stars – pulsars – black holes – supernovae. **GALAXIES:** classification of galaxies – galaxy clusters – interactionsof galaxies, dark matter and super clusters – evolving universe.	3	Chalk and Talk, PPT, quiz on the spot test
V	**ACTIVITIES IN ASTROPHYSICS:** (i) Basic construction of telescope (ii) Develop models to demonstrate eclipses/planetary motion (iii) Night sky observation (iv) Conduct case study pertaining to any topic in this paper Visit to any one of the National ObservatoriesAny three activities to be done compulsorily.	3	Seminar, PPT presentation, Quiz on the Spot test

Course Designer: Mrs. M.R.Gurulakshmi

Annexure - 12

Department of Physics					Class: II B.Sc			
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
IV	Core Course :7	23OUPH41	Optics and Laser Physics	5	5	25	75	100

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

Course Objectives:

1. To provide an in-depth understanding of the basics of various phenomena in geometrical and wave optics.
2. To study the basic concepts of Interference.
3. To understand the nature of diffraction phenomena.
4. To learn about the various aspects of polarization.
5. To Study the working and applications of LASER.

Course Content:

Unit I: Lens and Prisms: Lens: aberrations: spherical aberration, chromatic aberrations– chromatic aberrations methods. **Prism**: dispersion by a prism- angular dispersion – dispersive power – angular and chromatic dispersion– dispersion without deviation- direct vision spectroscope. **Eyepieces:** advantage of an eyepiece over a simple lens – Huygen'sand Ramsden's eyepieces, construction and working –merits and demerits of the eyepiece. **Resolving power:** Rayleigh's criterion for resolution – limit of resolution for the eye – resolving power of Prism.

Unit II: Interference: Interference - Division of wave front- Condition for interference- Techniques of obtaining interference - **Fresnel's biprism**: Experimental arrangement – Interference fringes with white light - interference in thin films due to, (i) reflected light, Condition for maxima and minima (ii) transmitted light – air wedge – Newton's rings - **Interferometers**: Michelson's interferometer (Construction and working) – Applications - determination of the wavelength of a monochromatic source of light.

Unit III: Diffraction: Introduction-Huygens-Fresnel Theory-Rectilinear propagation of Light-Zone Plate- Action of a Zone plate for an incident spherical wave Front-Fresnel and Fraun hoffer types of Diffraction-Diffraction at a circular aperture- Fraun hoffer diffraction at a single slit.

Unit IV: Polarization: Polarization - polarizer and analyzer– optic axis, principal plane - double refraction in calcite crystal - Huygens's explanation of double refraction in uniaxial crystals – Effect of polaraiser on light of different polarizations - quarter wave plate – half wave plate – production and detection of circularly and elliptically polarized lights - Optical activity – Fresnel's explanation - specific rotation - Laurent half shade polarimeter.

Unit V: LASERS: Interaction of Light with matter – spontaneous and stimulated emission – Einstein coefficients and their relations - population inversion – optical pumping - Lasing action – **Types of LASERS**: He-Ne laser (principle and working) – CO_2 laser (principle and working) – laser applications.

Books for Study:

1. Subramanian. N and Brijlal, 2014, Optics, 25thEd, S.Chand and Co.
2. R.Murugeshan, Kiruthiga Sivaprasath, reprint 2016, optics and spectroscopy, revised edition 2014, S.Chand and Co

Books for Reference:

1. Sathya Prakash, 1990,Optics,VII edition, Ratan Prakashan Mandhir,New Delhi.
2. Ajoy Ghatak, 2009,Optics, 4thedition, PHIPvt Ltd, New Delhi.
3. D.Halliday, R.Resnick and J. Walker, 2001, Fundamentals ofPhysics,6th edition, Willey, New York.
4. Jenkins A.Francis and White, 2011, Fundamentals of Optics,4th edition, McGraw Hill Inc., New Delhi.
5. P.R.Sasikumar, 2012, Photonics, PHI Pvt Ltd, New Delhi.
6. V.Rajendran, 2012, Engineering Physics, Tata McGraw Hill.

Web resources/ E-Books:

1. Optics and LASER.docx
2. https://www.youtube.com/watch?v=tL3rNc1G0qQandlist=RDCMUCzwo7UlGkb-8Pr6svxWo-LAandstart_radio=1andt=2472
3. https://science.nasa.gov/ems/
4. https://imagine.gsfc.nasa.gov/educators/gammaraybursts/imagine/index.html
5. http://www.thephysicsmill.com/2014/03/23/sky-blue-lord-rayleigh-sir-raman-scattering/

Pedagogy:

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

Annexure - 12

Rationale for nature of Course

Knowledge and Skill Oriented: To provide an in-depth understanding of the basics of various phenomena in geometrical and wave optics.

Activities to be given:

1. Train the students to understand the concepts of light through lab experiments.
2. Enhancing the quality of students by learning the various applications of LASER in day today life.

Course Learning Outcomes (CLOs):
At the end of the course, the student will be able to:

CLO	Course Learning Outcomes	Knowledge According to Bloom's Taxonomy(upto K level)
CLO1	Outline basic knowledge of methods of rectifying different defects in lenses, articulate technological applications of eyepieces	K1 to K3
CLO2	Discuss the principle of superposition of wave, use these ideas to understand the wave nature of light through working of interferometer	K1 to K3
CLO3	Extend the knowledge about nature of light through diffraction techniques; apply mathematical principles to analyse the optical instruments	K1 to K4
CLO4	Interpret basic formulation of polarization and gain knowledge about polarimeter, appraise its usage in industries	K1 to K3
CLO5	Study the working and applications of LASER.	K1 to K4

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

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

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

Annexure - 12

LESSON PLAN: TOTAL HOURS (75HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**Lens and Prisms: Lens**: aberrations: spherical aberration, chromatic aberrations– chromatic aberrations methods. **Prism**: dispersion by a prism- angular dispersion – dispersive power – angular and chromatic dispersion– dispersion without deviation- direct vision spectroscope. **Eyepieces:** advantage of an eyepiece over a simple lens – Huygen'sand Ramsden's eyepieces, construction and working –merits and demerits of the eyepiece. **Resolving power:** Rayleigh's criterion for resolution – limit of resolution for the eye – resolving power of Prism.	15	Chalk and Talk, PPT, group discussion
II	**Interference:** Interference - Division of wave front- Condition for interference- Techniques of obtaining interference - **Fresnel's biprism**: Experimental arrangement – Interference fringes with white light - interference in thin films due to, (i) reflected light, Condition for maxima and minima (ii) transmitted light – air wedge – Newton's rings - **Interferometers**: Michelson's interferometer (Construction and working) – Applications - determination of the wavelength of a monochromatic source of light.	15	Chalk and Talk, PPT, group discussion
III	**Diffraction:** Introduction-Huygens-Fresnel Theory-Rectilinear propagation of Light-Zone Plate- Action of a Zone plate for an incident spherical wave Front-Fresnel and Fraun hoffer types of Diffraction-Diffraction at a circular aperture- Fraun hoffer diffraction at a single slit.	15	Chalk and Talk, PPT, group discussion
IV	**Polarization:** Polarization - polarizer and analyzer– optic axis, principal plane - double refraction in calcite crystal - Huygens's explanation of double refraction in uniaxial crystals – Effect of polaraiser on light of different polarizations - quarter wave plate – half wave plate – production and detection of circularly and elliptically polarized lights - Optical activity – Fresnel's explanation - specific rotation - Laurent half shade polarimeter.	15	Chalk and Talk, PPT, group discussion.
V	**LASERS:** Interaction of Light with matter – spontaneous and stimulated emission – Einstein coefficients and their relations - population inversion – optical pumping - Lasing action – **Types of LASERS**: He-Ne laser (principle and working) – CO_2 laser (principle and working) – laser applications.	15	Chalk and Talk, PPT, group discussion,

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

Department of Physics					Class: II B.Sc			
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/ Week**	**CIA**	**SE**	**Total**
IV	Core Course-8	23OUPH41P	Practical-IV Light	3	3	40	60	100

List of experiments:

1. Determination of refractive index of prism using spectrometer.
2. Determination of refractive index of liquid using hollow prism and spectrometer
3. Determination of dispersive power of a prism.
4. Determination of radius of curvature of lens by forming Newton's rings.
5. Determination of thickness of a wire using air wedge.
6. Determination of Cauchy's Constants.
7. Determination of resolving power of grating
8. Determination of resolving power of telescope
9. Comparison of intensities using Lummer Brodhum Photometer.
10. Determination of range of motion using Searlesgoniometer.
11. Verification of Newton's formula for a lens separated by a distance.
12. Determination of refractive index of a given liquid by forming liquid lens
13. Determination of refractive index using Laser.
14. Determination of wire using Laser.

Books for Reference:

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/ E.Books:

1. https://www.youtube.com/watch?v=N0lxwqANsd4
2. https://www.youtube.com/watch?v=i2to2axQ4J4
3. https://www.youtube.com/watch?v=b9FdsgepDD0
4. https://www.youtube.com/watch?v=fWhgguWc8rk
5. https://www.youtube.com/watch?v=wFDdV58wBsc

Pedagogy: Demonstration and Practical sessions.

Annexure - 12

LESSON PLAN : TOTAL HOURS(45 HRS)

UNIT	Topics to be Covered	Hours	Mode
I	1. Determination of refractive index of prism using spectrometer. 2. Determination of refractive index of liquid using hollow prism and spectrometer. 3. Determination of dispersive power of a prism.	9	Demo & Practical Session
II	4. Determination of radius of curvature of lens by forming Newton's rings. 5. Determination of thickness of a wire using air wedge. 6. Determination of Cauchy's Constants.	9	Demo & Practical Session
III	7. Determination of resolving power of grating. 8. Determination of resolving power of telescope 9. Comparison of intensities using Lummer Brodhum Photometer.	9	Demo & Practical Session
IV	10. Determination of range of motion using Searlesgoniometer. 11. Verification of Newton's formula for a lens separated by a distance. 12. Determination of refractive index of a given liquid by forming liquid lens	9	Demo & Practical Session
V	15. Determination of refractive index using Laser. 16. Determination of wire using Laser.	9	Demo & Practical Session

Course Designer: Mrs. M.R.Gurulakshmi

Annexure - 12

Department of Physics					Class: II B.Sc			
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
IV	Skill Enhancement Course (SEC)	23OUPHSEC41	Communication Physics	2	2	25	75	100

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

Course Objectives:

1. To understand the concept of radio communication.
2. To Acquire the knowledge of fiber optic communication.
3. To Apply the radar systems in communication.
4. To Gain knowledge on satellite communication.
5. To Appreciate the usage of cellphone.

Course Content:

Unit I: RADIO TRANSMISSION AND RECEPTION: Transmitter – modulation types of modulation – amplitude modulation – limitations of amplitude modulation – frequency modulation – comparison of FM and AM – demodulation– receivers: AM radio receivers – types of AM radio receivers- difference between FM and AM receiver

Unit II: FIBER OPTIC COMMUNICATION: Introduction – basic principle of fiber optics – advantages – construction of optical fiber –classification based on the number of modes of propagation – losses in optical fibers – attenuation–advantages of fiber optic communication

Unit III: RADAR COMMUNICATION: Introduction - basic radar system –radar range – antenna scanning –tracking radar – moving target indicator Doppler effect-MTI principle – CW Doppler radar

Unit IV: SATELLITE COMMUNICATION: Introduction history of satellites – satellite communication system – satellite orbits – basic components of satellite communication system– satellite communication in India.

Unit V: MOBILE COMMUNICATION: Introduction – concept of cell –basic cellular mobile radio system – cellphone – VSAT (very small aperture terminals) modem IPTV (internet protocol television) -Wi-Fi-4G (basic ideas)

Books for Study:

1. V.K.Metha, Principles of Electronics, S. Chand and Co Ltd., 2013.

2. Anokh Singh and Chopra A.K., Principles of communication Engineering, S.Chand and Co, 2013.

Books for Reference:

1. J.S. Chitode, Digital Communications, 2020, Unicorn publications.
2. Senior John. M, Optical Fiber Communications: Principles and Practice, 2009, Pearson Education.

Web resources/ E-Books:

1. https://physicswirelessconnection.wordpress.com/guide-card/a-concept-of-wireless-communications/1-3-elements-of-radio-communication-system/
2. https://www.taitradioacademy.com/lessons/introduction-to-radio-communications-principals/
3. https://www.tutorialspoint.com/satellite_communication/satellite_communication_introduction.htm
4. https://testbook.com/physics/satellite-communication
5. https://www.ntiprit.gov.in/pdf/gsm2g/GSM_Architecture.pdfhttps://www.youtube.com/watch?v=tdkFc88Fw-M

Pedagogy:

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

Rationale for nature of Course

Knowledge and Skill: Students who undergo this course are successfully bound to get a better insight and understanding of communication systems.

Activities to be given:

Enhancing the quality of students to understand the communication systems

Course Learning Outcomes (CLOs):

At the end of the course, the student will be able to:

CLO	Course Learning Outcomes	Knowledge According to Bloom's Taxonomy(upto K level)
CLO1	To understand the concept of radio communication	K1 to K3
CLO2	Acquire the knowledge of fiber optic communication	K1 to K3
CLO3	Apply the radar systems in communication	K1 to K4
CLO4	Gain knowledge on satellite communication	K1 to K3
CLO5	Appreciate the usage of cellphone	K1 to K4

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

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

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

LESSON PLAN : TOTAL HOURS (30HRS)

UNIT	DESCRIPTION	HRS	MODE
I	**RADIO TRANSMISSION AND RECEPTION:** transmitter – modulation types of modulation – amplitude modulation – limitations of amplitude modulation – frequency modulation – comparison of FM and AM – demodulation- essentials in demodulation – receivers: AM radio receivers – types of AM radio receivers – stages of superheterodyne radio receiver, advantages – FM receiver – difference between FM and AM receivers.	6	Chalk and Talk, PPT, group discussion
II	**FIBER OPTIC COMMUNICATION:** introduction – basic principle of fiber optics – advantages – construction of optical fiber – classification based on the refractive index profile – classification based on the number of modes of propagation – losses in optical fibers – attenuation–advantages of fiber optic communication	6	Chalk and Talk, PPT, group discussion
III	**RADAR COMMUNICATION: i**ntroduction - basic radar system –radar range – antenna scanning –pulsed radar system – search radar –tracking radar – moving target indicator Doppler effect-MTI principle – CW Doppler radar	6	Chalk and Talk, PPT, group discussion
IV	**SATELLITE COMMUNICATION:** introduction history of satellites – satellite communication system – satellite orbits – basic components of satellite communication system – commonly used frequency in satellite – communication –multiple access communication – satellite communication in India	6	Chalk and Talk, PPT, group discussion.
V	**MOBILE COMMUNICATION:** introduction – concept of cell –basic cellular mobile radio system – cellphone – facsimile – important features of fax machine – application of facsimile – VSAT (very small aperture terminals) modem IPTV (internet protocol television) -Wi-Fi-4G (basic ideas)	6	Chalk and Talk, PPT, group discussion ,

Course Designer: Mrs.P.Revathi
Mrs.S.Manimozhi

Annexure - 12

Department of Physics						Class: II B.Sc		
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
I	Skill Enhancement Course (SEC)	23OUPHSEC42	Physics For Everyday Life	2	2	25	75	100

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

Course Objectives:

1. To Understand the concepts of mechanical objects.
2. To Acquire the basic Knowledge of optical instruments and laser.
3. To Understand the concepts behind the physics of home appliances.
4. To Study the basic properties of solar energy.
5. To Acquire the knowledge about the Indian physicist and their contributions.

Course Content:

Unit I: **MECHANICAL OBJECTS: s**pring scales – bouncing balls –roller coasters – bicycles –rockets and space travel.

Unit II: **OPTICAL INSTRUMENTS AND LASER:** vision corrective lenses– polaroid glasses – UV protective glass – polaroid camera – color photography – holography and laser.

Unit III: **PHYSICS OF HOME APPLIANCES:** bulb – fan – hair drier –television – air onditioners – microwave ovens – vacuum cleaners

Unit IV: **SOLAR ENERGY:** Solar constant – General applications of solarenergy – Solar water heaters – Solar Photo – voltaic cells – General applications of solar cells.

Unit V: **INDIAN PHYSICIST AND THEIR CONTRIBUTIONS:** C.V.Raman, Homi Jahangir Bhabha, Vikram Sarabhai, Subrahmanyan Chandrasekhar, Venkatraman Ramakrishnan, Dr. APJ Abdul Kalam and their contribution to science and technology.

Books for Study:

1.The Physics in our Daily Lives, Umme Ammara, GugucoolPublishing, Hyderabad,2019.

2.For the love of physics, Walter Lawin, Free Press, New York, 2011.

Books for Reference:

1. Physics in Daily Life, Jo Hermans ,EDP Science,2003 – 2011.

2. Physics in Our Lives, Dr. Hameed A. Khan Prof. Dr. M. M. Qurashi Engr. Tajammul Hussain Mr. Irfan Hayee, Commission on Science and Technology for Sustainable Development in the South, Islamabad, 2005.

Web resources/ E-Books:

1. https://www.ukessays.com/essays/sciences/the-role-of-physics-in-our-daily-lives.php
2. https://en.wikipedia.org/wiki/Physics_of_the_Future
3. https://excerpts.numilog.com/books/9782759807055.pdf

Pedagogy:

Chalk and Talk, PPT, Group discussion, OHP presentations, Quiz, On the spot test, youtube Links, Open book test and Virtual Labs.

Rationale for nature of Course

Knowledge and Skill: Study of the Physics for everyday life leads to information which is of practical value to the physicist. It gives us information about the physics concepts how useful in every day in our life. Students who undergo this course are successfully bound to get a better insight and understanding of the subject.

Activities to be given:

1.Enhancing the quality of students to understand the basic physics concepts behind in everyday life.

2.Train the students to understand the applications of the basic physics concepts behind in everyday life.

Course Learning Outcomes (CLOs):

CLO	Course Learning Outcomes	Knowledge According to Bloom's Taxonomy(upto K level)
CLO1	Understand the concepts of mechanical objects.	K1 to K3
CLO2	Acquire the basic Knowledge of optical instruments and laser.	K1 to K3
CLO3	Understand the concepts behind the physics of home appliances.	K1 to K3
CLO4	Study the basic properties of solar energy.	K1 to K3
CLO5	Acquire the knowledge about the Indian physicist and their contributions	K1 to K3

Annexure - 12

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

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

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

LESSON PLAN: TOTAL HOURS (30 Hrs)

UNIT	DESCRIPTION	Hrs	MODE
I	**MECHANICAL OBJECTS: s**pring scales – bouncing balls –roller coasters – bicycles –rockets and space travel.	6	Chalk and Talk, PPT, quiz, on the spot test
II	**OPTICAL INSTRUMENTS AND LASER:** vision corrective lenses– polaroid glasses – UV protective glass – polaroid camera – color photography – holography and laser.	6	Chalk and Talk, PPT, quiz, on the spot test
III	**PHYSICS OF HOME APPLIANCES:** bulb – fan – hair drier – television – air onditioners – microwave ovens – vacuum cleaners	6	Chalk and Talk, PPT, quiz, on the spot test
IV	**SOLAR ENERGY:** Solar constant – General applications of solar energy – Solar water heaters – Solar Photo – voltaic cells – General applications of solar cells.	6	Chalk and Talk, PPT, quiz on the spot test
V	**INDIAN PHYSICIST AND THEIR CONTRIBUTIONS:** C.V.Raman, Homi Jehangi rBhabha, Vikram Sarabhai, SubrahmanyanChandrasekhar, Venkatraman Ramakrishnan, Dr. APJ Abdul Kalam and their contribution to science and technology.	6	Seminar, PPT presentation, Quiz on the Spot test

Course Designer: Mrs.B.Subha
Mrs. S.Manimozhi

Annexure - 12

Department of Physics						Class: II B.Sc Chemistry		
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
III	Allied 1:	23OUCHGEPH3	Allied Physics – I	3	4	25	75	100

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

Course Objectives:

1. To Understand the concepts of Waves and Ultrasonics.
2. To Acquire the basic Knowledge of Elasticity and viscosity.
3. To Understand the concepts of heat and thermodynamics.
4. To Study the basic contents of electricity and magnetism.
5. To Acquire the knowledge about the digital electronics.

Course Content:

Unit I: Waves, Oscillations And Ultrasonics: laws of transverse vibrations of strings – determination of AC frequency using sonometer (steel wire) – ultrasound – production – piezoelectric method – application of ultrasonics: medical field – Scientific field- industrial field- chemical application.

Unit II: Properties Of Matter: Elasticity: elastic constants – bendingof beam – theory of non-uniform bending – determination of Young's modulus by non-uniform bending – energy stored in a stretched wire –torsion of a wire – determination of rigidity modulus by torsional pendulum. ***Viscosity*:** streamline and turbulent motion – critical velocity – coefficient of viscosity – Poiseuille's method (variable pressure head) – comparison of viscosities (burette method). ***Surface tension*:** definition – molecular Forces – Adhesive, Cohesive – Jaegar's Method.

Unit III: Heat And Thermodynamics: Joule-Kelvin effect – Joule- Thomson porous plug experiment – theory – temperature of inversion– Linde's process of liquefaction of air– importance of cryocoolers – Laws of thermodynamics – Zeroth law- I law of thermodynamics – II and III law of thermodynamics - heat engine – Carnot's cycle – efficiency.

Unit IV: Electricity And Magnetism: potentiometer – principle – measurement of thermo emf using potentiometer – magnetic field due to a current carrying conductor (Oersted's experiment) – Biot-Savart's law – magnetic induction at a point on the axis of a circular coil - peak, average and RMS values of ac current and voltage.

Unit V: Digital Electronics: logic gates - OR, AND, NOT, NAND, NOR logic gates –

universal building blocks (NAND,NOR) – Boolean algebra – Postulates and theorems of Boolean algebra - De Morgan's theorem and its verification.

Books for Study:

1. R.Murugesan (2018), Allied Physics,S. Chand & Co,NewDelhi.

Books for Reference:

1. Resnick Halliday and Walker (2018).Fundamentals of Physics(11th edition),John Willey and Sons, Asia Pvt. Ltd., Singapore.
2. V. R. Khanna and R.S.Bedi (1998), TextbookofSound1st Edn.Kedharnaath Publish &Co, Meerut.
3. N.S.Khare and S.S.Srivastava (1983),Electricity and Magnetism 10th Edn., Atma Ram & Sons, New Delhi.
4. D.R.Khanna and H.R.Gulati (1979).Optics,S. Chand&Co.Ltd. ,New Delhi.
5. V.K.Metha (2004). Principles of electronics 6th Edn. S.Chand and company

Web Resources/ E-Books:

1. https://youtu.be/M_5KYncYNyc
2. https://youtu.be/ljJLJgIvaHY
3. https://youtu.be/7mGqd9HQ_AU
4. https://youtu.be/h5jOAw57OXM
5. https://learningtechnologyofficial.com/category/fluid-mechanics-lab/

Pedagogy:

Chalk and Talk, PPT, group discussion, OHP presentations, quiz, on the spot test and Virtual Labs.

Rationale for nature of Course

Knowledge and Skill: Study of the properties of matter leads to information which is of practical value to the physicist. It gives us information about the thermal properties and digital electronics.

Activities to be given:

1.Enhancing the quality of students to understand the wave oscillation and heat and thermodynamics.

2.Train the students to understand the properties of matter and digital electronics.

Course Learning Outcomes (CLOs):

At the end of the course, the student will be able to:

CLO	Course Learning Outcomes	Knowledge According to Bloom's Taxonomy(upto K level)
CLO1	Understand the concepts of Waves and Ultrasonics	K1 to K3
CLO2	Acquire the basic Knowledge of Elasticity and viscosity	K1 to K3
CLO3	Understand the concepts of heat and thermodynamics.	K1 to K4
CLO4	Study the basic contents of electricity and magnetism	K1 to K3
CLO5	Acquire the knowledge about the digital electronics	K1 to K4

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

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

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

Annexure - 12

LESSON PLAN : TOTAL HOURS(60HRS)

UNIT	DESCRIPTION	Hrs	MODE
I	**Waves, Oscillations And Ultrasonics:** laws of transverse vibrations of strings – determination of AC frequency using sonometer (steel and brass wires) – ultrasound – production – piezoelectric method – application of ultrasonics: medical field – Scientific field- industrial field- chemical application.	12	Chalk and Talk, PPT, quiz, on the spot test
II	**Properties of Matter:** ***Elasticity*****:** elastic constants – bendingof beam – theory of non- uniform bending – determination of Young'smodulus by non-uniform bending – energy stored in a stretched wire –torsion of a wire – determination of rigidity modulus by torsional pendulum. ***Viscosity*****:** streamline and turbulent motion – critical velocity – coefficient of viscosity – Poiseuille's method (variable pressure head) – comparison of viscosities – burette method. ***Surface tension*****:** definition – molecular Forces– Adhesive, Cohesive- Jaegar's method.	12	Chalk and Talk, PPT, quiz, on the spot test
III	**Heat And Thermodynamics:** Joule-Kelvin effect – Joule- Thomson porous plug experiment – theory – temperature of inversion– Linde's process of liquefaction of air– importance of cryocoolers – Laws of thermodynamics – Zeroth law- I law of thermodynamics – II and III law of thermodynamics - heat engine – Carnot's cycle – efficiency.	12	Chalk and Talk, PPT, quiz, on the spot test
IV	**Electricity And Magnetism:** potentiometer – principle – measurement of thermo emf using potentiometer -magnetic field due to a current carrying conductor (Oersted's experiment) – Biot-Savart's law – magnetic induction at a point on the axis of a circular coil – peak, average and RMS values of ac current and voltage.	12	Chalk and Talk, PPT, quiz on the spot test
V	**Digital Electronics:** logic gates - OR, AND, NOT, NAND, NOR logic gates – universal building blocks (NAND,NOR) – Boolean algebra – Postulates and theorems of Boolean algebra - De Morgan's theorem and its verification.	12	Seminar, PPT, Quiz on the Spot test

Course Designer: Mrs.M.R.Gurulakshmi

Annexure - 12

Department of Physics						II B.Sc Chemistry		
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
IV	Allied Practical 1	23OUCHGEPH3P	Allied Practicals-I	2	2	40	60	100

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

List of Experiments: (Any eight)

1. Young's modulus by non-uniform bending using pin and microscope
2. Young's modulus by uniform bending using optic lever, scale and telescope
3. Rigidity modulus by static torsion method.
4. Rigidity modulus by torsional oscillations without mass
5. Surface tension and interfacial Surface tension – drop weight method
6. Comparison of viscosities of two liquids – burette method
7. Specific heat capacity of a liquid – half time
8. correction
9. Verification of laws of transverse vibrations using sonometer
10. Calibration of low range voltmeter using potentiometer
11. Determination of thermo emf using potentiometer
12. Verification of truth tables of basic logic gates using ICs
13. Verification of De Morgan's theorems using logic gate ICs.
14. Use of NAND as universal building block.

Books for Reference:

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/ E-Books:

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: Total Hours (30HRS)

UNIT	Details	No. of Hours	Mode of Teaching
I	1. Young's modulus by non-uniform bending using pin and microscope. 2. Young's modulus by uniform bending using optic lever, scale and telescope. 3. Rigidity modulus by static torsion method.	6	Demo & Practical Session
II	4. Rigidity modulus by torsional oscillations without mass 5. Surface tension and interfacial Surface tension – drop weight method. 6. Comparison of viscosities of two liquids – burette method.	6	Demo & Practical Session
III	7. Specific heat capacity of a liquid – half time correction 8. Verification of laws of transverse vibrations using sonometer. 9. Calibration of low range voltmeter using potentiometer	6	Demo & Practical Session
IV	10. Determination of thermo emf using potentiometer 11. Verification of truth tables of basic logic gates using ICs	6	Demo & Practical Session
V	12. Verification of De Morgan's theorems using logic gate ICs. 13. Use of NAND as universal building block.	6	Demo & Practical Session

Course Designer:
Mrs.M.R.Gurulakshmi

Annexure - 12

Department of Physics						Class: II B.Sc Chemistry		
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
IV	Allied 2	23OUCHGEPH4	Allied Physics – II	3	3	25	75	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented
✔		

Course Objectives:

1. To Understand the concepts of interference.
2. To Acquire the basic Knowledge of atom models.
3. To Understand the concepts of nuclear models.
4. To Study about the special theory of relativity.
5. To Acquire the knowledge about the semiconductor physics.

Course Content

UNIT I : Optics: Interference – interference in thin films –colors of thin films – air wedge – determination of diameter of a thin wire by air wedge – diffraction – introduction – experimental determination of wavelength using transmission grating (normal incidence) – polarization – polarization of light – polarization by reflection - Brewster's law.

UNIT II : Atomic Physics: vector atom model – various quantum numbers – coupling schemes – Pauli's exclusion principle - magnetic dipole moment due to orbital motion of the electron –Zeeman effect – Normal Zeeman effect.

UNIT III : Nuclear Physics: nuclear models – liquid drop model – nuclear energy – mass defect – binding energy- shell model – radioactivity – uses – half life – mean life - radio isotopes and uses– nuclear fission – energy released in fission – chain reaction – critical reaction – critical size- atom bomb – differences between fission and fusion.

UNIT V : Semiconductor Physics: p-n junction diode – forward and reverse biasing – characteristic of diode – Zener diode – characteristic of Zener diode – voltage regulator – full wave bridge rectifier – construction and working – advantages (no mathematical treatment) – Solar cell- Solar Panels – Opto electronics devices- LED.

Books for Study:

1. R.Murugesan (2005), Allied Physics, S.Chand & Co,NewDelhi.

Books for References:

1. Resnick Halliday and Walker (2018), Fundamentals of Physics,11thEdn., John Willey and Sons, Asia Pvt.Ltd., Singapore.
2. D. R. Khanna and H.R. Gulati (1979).Optics,S.Chand & Co.Ltd., New Delhi.
3. A. Beiser (1997) Concepts of Modern Physics, Tata Mc Graw Hill Publication, New Delhi.
4. Thomas L. Floyd (2017), Digital Fundamentals, 11thEdn.,Universal Book Stall, New Delhi.
5. V. K. Metha (2004),Principles of electronics,6thEdn.S.Chandand Company, New Delhi.
6. K.Thangarajand D.Jayaraman (2004), Allied Physics, Popular Book Depot, Chennai.
7. Brijlal and N.Subramanyam (2002), Text book of Optics, S.Chand & Co, New Delhi.

Web resources/E-Books:

1. https://www.berkshire.com/learning-center/delta-p- facemask/
2. https://www.youtube.com/watch?v=QrhxU47gtj4htt
3. https://www.youtube.com/watch?time_continue=318&v=D38BjgUdL5U&feature=emb_logo
4. https://www.youtube.com/watch?v=JrRrp5F-Qu4
5. https://www.validyne.com/blog/leak-test-using-pressure-transducers/

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

Rationale for nature of Course:

Knowledge and Skill: Study of the allied physics-II leads to information which is of practical value to the physicist. It gives us information about the nuclear models ,atom models. Students who undergo this course are successfully bound to get a better insight and understanding of the subject.

Activities to be given:

1. Enhancing the quality of students to understand about the semiconductor device.
2. Train the students to understand the theory by conducting the experiments.

Course Learning Outcomes (CLOs):

At the end of the course, the student will be able to:

CLO	Course Learning Outcomes	Knowledge According to Bloom's Taxonomy(upto K level)
CLO1	Explain the concepts of interference diffraction using principles of Superposition of waves and rephrase the concept of polarizationbased on wave patterns	K1 to K3
CLO2	Outline the basic foundation of different atom models andvarious experiments establishing quantum concepts. Relate theimportance of interpreting improving theoretical models based on observation. Appreciate interdisciplinary nature of science and in solar energy related applications.	K1 to K3
CLO3	Summarize the properties of nuclei, nuclear forces structure of atomic nucleus and nuclear models.Solve problems on delay rate half-life and mean-life. Interpretnuclear processes like fission and fusion. Understand theimportance of nuclear energy, safety measures carried and getour Govt. agencies like DAE guiding the country in the nuclear field.	K1 to K4
CLO4	To describe the basic concepts of relativity like equivalence principle, inertial frames and Lorentz transformation. Extend their knowledge on concepts of relativity and vice versa. Relate this with current research in this field and get an overview ofresearch projects of National and International importance, like LIGO, ICTS, and opportunities available.	K1 to K3
CLO5	Summarize the working of semiconductor devices like junction diode, Zener diode, transistors and practical devices we daily use like USB chargers and EV charging stations	K1 to K4

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

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

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

Annexure - 12

LESSON PLAN: TOTAL HOURS(60 HRS)

UNIT	Details	Hours	Mode
I	**UNIT I : Optics:** Interference – interference in thin films –colors of thin films – air wedge – determination of diameter of a thin wire by air wedge – diffraction – diffraction of light vs sound – normal incidence – experimental determination of wavelength using diffraction grating (no theory) – polarization – polarization by double reflection – Brewster's law – optical activity.	12	Chalk and Talk, PPT, quiz, on the spot test
II	**UNIT II : Atomic Physics:** atom models – Bohr atom model – mass number – atomic number – nucleons – vector atom model – variousquantum numbers – Pauli's exclusion principle – electronic configuration – periodic classification of elements – Bohr magneton – Stark effect –Zeeman effect – Normal Zeeman effect-Splitting.	12	Chalk and Talk, PPT, quiz, on the spot test
III	**UNIT III : Nuclear Physics:** nuclear models – liquid drop model – magic numbers – shell model – nuclear energy – mass defect – binding energy – radioactivity – uses – half life – mean life - radio isotopes and uses –controlled and uncontrolled chain reaction – nuclear fission – energy released in fission – chain reaction – critical reaction – critical size- atom bomb – nuclear reactor –breeder reactor – differences between fission and fusion.	12	Chalk and Talk, PPT, quiz, on the spot test
IV	**UNIT IV : Introduction To Relativity And Gravitational Waves**: Frame of reference – Postulates of special theory of relativity – Galilean transformation equations – Lorentz transformation equations – Derivation – length contraction – time dilation – twin paradox – mass-energy equivalence –introduction on gravitational waves.	12	Chalk and Talk, PPT, quiz on the spot test
V	**UNIT V : Semiconductor Physics:** p-n junction diode – forward and reverse biasing – characteristic of diode – Zener diode – characteristic of Zener diode – voltage regulator – full wave bridge rectifier – construction and working – advantages (no mathematical treatment) - Solar cell- Solar Panels – Opto electronics devices- LED.	12	Seminar, PPT presentation, Quiz on the Spot test

Course Designer:
Mrs.M.R.Gurulakshmi

Annexure - 12

Department of Physics						II B.Sc Chemistry		
Sem	**Category**	**Course Code**	**Course Title**	**Credits**	**Contact Hours / Week**	**CIA**	**SE**	**Total**
IV	Allied Practical 2	23OUCHGEPH4P	Allied Practicals-II	2	2	40	60	100

Nature of the Course		
Knowledge and Skill Oriented	Employability Oriented	Entrepreneurship oriented
✔		

List of Experiments: (Any Eight)

1. Radius of curvature of lens by forming Newton's rings
2. Thickness of a wire using air wedge
3. Wavelength of mercury lines using spectrometer and grating
4. Refractive index of material of the lens by minimum deviation
5. Refractive index of liquid using liquid prism
6. Determination of AC frequency using sonometer
7. Specific resistanceof a wire using PO box
8. Thermal conductivity of poor conductor using Lee's disc
9. Determination of figure of merit table galvanometer
10. Determination of Earth's magnetic field using field along the axis of a coil
11. Characterisation of Zener diode
12. Construction of Zerner/IC regulated power supply
13. Construction of AND, OR, NOT gates using diodes and transistor
14. NOR gate as a universal building block

Books for References:

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.

Web resources/E-Books:

1. https://www.youtube.com/watch?v=jcpnOJHS3TE
2. https://www.youtube.com/watch?v=-0etuKdDu2g
3. https://www.youtube.com/watch?v=9lqwSaIDm2g
4. https://www.youtube.com/watch?v=Z6Nds10n7rs
5. https://www.youtube.com/watch?v=mQM-5o3pBaU

Pedagogy: Demonstration and Practical sessions.

Annexure - 12

LESSON PLAN: TOTAL HOURS(30HRS)

UNIT	Details	Hours	Mode
I	1. Radius of curvature of lens by forming Newton's rings 2. Thickness of a wire using air wedge 3. Wavelength of mercury lines using spectrometer and grating	6	Demo & Practical Session
II	4. Refractive index of material of the lens by minimum deviation 5. Refractive index of liquid using liquid prism 6. Determination of AC frequency using sonometer	6	Demo & Practical Session
III	7. Specific resistance of a wire using PO box 8. Thermal conductivity of poor conductor using Lee's disc 9. Determination of figure of merit table galvanometer	6	Demo & Practical Session
IV	10. Determination of Earth's magnetic field using field along the axis of a coil 11. Characterization of Zener diode 12. Construction of Zerner/IC regulated power supply	6	Demo & Practical Session
V	13. Construction of AND, OR, NOT gates using diodes and transistor 14. NOR gate as a universal building block	6	Demo & Practical Session

Course Designer:
Mrs. M.R.Gurulakshmi