बिरसा मुंडा ट्रायबल युनिवर्सिटी
Birsa Munda Tribal University

राजपिपला, जि. नर्मदा Rajpipla, Dist. Narmada
Established by Tribal Development Department, Govt. of Gujarat

School of Science
B.Sc. (Zoology) Programme

Subject Code & Name: - BS01MDZOO2: Physical Optics & Modern Physics

Teaching and Evaluation Scheme:

Teaching Scheme				Examination Scheme			
Credits				Component Weightage			
				CCE		SEE	
L	T	P	Total	TH	PWE	TH	PWE
3	0	1	4	37.5%	12.5%	37.5%	12.5%

Programme Name	B.Sc. (Zoology)
Semester	I
Course Code	BS01MDZOO2
Course Title	Physical Optics & Modern Physics
Course Content Type(Th./Pr.)	Theory + Practical
Course Credit	3+1
Sessions+ Lab. Per Week	3+2
Total Teaching/Lab. Hours	45 Hours + 30 Practical Hours
* 2 Laboratory = 1 Session	

Learning Objectives

1. Students will able to learn various phenomenon of light, focal length of thin lens, thin film interference, Newton's ring formation and wedge shape interference.
2. Learn about X-ray production, Bragg's formula, X-ray characteristics and X-ray uses in real world application, Crompton effect and pair production.

Prerequisites (if any)

12th Science passed with Physics subject.

Learning Outcomes

On the Completion of this course, students will able to:

1. The Student will get the overview of core concepts in the field of electricity and magnetism.
2. Able to apply the theoretical knowledge of these fields to analyze and solve the problems of day to day life.
3. Learn the basic necessary mathematics tools to solve electromagnetism problems.

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Detailed Contents

UNIT	TOPIC/SUB-TOPIC	TEACHING HOURS
I	**Light** ➢ Huygen's Principle, Properties of Light, Refractive index, Optical Path , Fermat's Principle of least time , ➢ Deviation by a thin lens, Power, Equivalent focal length of two lenses , Cardinal Points, Cardinal points of a coaxial system of two thin lenses –focal length of the system ➢ Thick lens equation , Combination of two thick lenses – Extended object at infinity , Application of lens combination (Topics relevant problems)	15
II	**Interference in Thin films** ➢ Review of interference: introduction, Young's experiment, coherence, conditions for interference, Interference in thin films, interference due to reflected light (thin films), interference due to transmitted light(thin film), fringes produced by a wedge shaped thin film, Newton's rings, determination of wavelength of Sodium light using Newton's ring. (Topics relevant problems)	15
III	**X-Rays** ➢ Black body radiation, Photo electric effect, What is light, X-Rays, X-Ray production, X-Rays Characteristics, X-Ray Diffraction, Compton effect, Pair Production, photons and Gravity	15

Unit-IV-Practical(s)	**(30)**
1. η by dynamic method 2. M.I. of Disc using Torsional pendulum. 3. Prove the parallel axis theorem. 4. Prove the perpendicular axis theorem. 5. Determination of "g" using Bar Pendulum. 6. Newton's ring 7. Poisson's ratio of a rubber. 8. Cardinal Points of the lens system.	

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Text Book(s)
1. Unit 1 & 2: A text book of Optics by Brijlal & Subramaniyam, 23rd Edition, S. Chand Publication 2. Unit 3 : Concepts of Physics by Arthur Beiser, Willey Publication
Reference Books
1. Modern Physics by Kennth S. Krane, 3rd Edition, John Wiley & Sons, INC. 2. Modern Physics by Murugeshan, 18th Edition, S.Chand. 3. Modern Physics by Paul A. Tipler, Ralph A. Llewellyn, W. H. Freeman and Company, New York. 4. Principle of Optics by B.K. Mathur, Gopal Printing 5. Optics by Ajoy Ghatak, Mc. Graw Hill 6. B.Sc. Practical Physics by Harnam Singh and Dr. P.S. Hemne, S. Chand & Co. Ltd., New Delhi (2000). 7. An Advanced Course in Practical Physics by D. Chatopdhyay, P.C. Rakshit, New Central Book Agency Pvt. Ltd (1990). 8. Advanced Practical Physics by M S Chauhan and S P Singh, Pragati Prakashan, Meerut (1984).
Web Resources
1. https://phys.libretexts.org 2. https://archive.nptel.ac.in/courses/115/107/115107131/ 3. https://www.youtube.com/watch?v=vxh0yjw4Z8I 4. https://www.youtube.com/watch?v=z-Z1FYbgjLo 5.https://eng.libretexts.org/Bookshelves/Materials_Science/Supplemental_Modules_(Materials_Science)/Electronic_Properties/Compton_Effect

L:: Lecture, **T::** Tutorial , **P::**Practical

CCE:: Continuous and Comprehensive Evaluation

(CCE Theory includes Mid Semester Examination, Assignment, MCQ quizzes, Seminar, Reflective notes, class participation, case analysis and presentation, slip tests (announced/ surprised), attendance etc. or any combination of these)

PWE:: Practical Work Examination

(PWE includes Laboratory practical work, project work, viva simulation exercise work etc.)

SEE:: Semester End Evaluation