FIRST-YEAR OF MASTER OF SCIENCE IN PHYSICS REVISED SYLLABUS ACCORDING TO CBCS NEP2020

COURSE TITLE:-Elective I
SEMESTER – I
W.E.F. 2023-2024

RECOMMENDED BY THE BOARD OF STUDIES IN PHYSICS
AND
APPROVED BY THE ACADEMIC COUNCIL

Devrukh Shikshan Prasarak Mandal's
Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh. Tal.Sangmeshwar, Dist. Ratnagiri-415804, Maharashtra, India

Academic Council Item No: **03 dated 8 July 2023**

Name of the Implementing Institute	:	Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh. Tal. Sangmeshwar, Dist. Ratnagiri-415804,
Name of the Parent University	:	University of Mumbai
Name of the Programme	:	Master of Science
Name of the Department	:	Physics
Name of the Class	:	First Year
Semester	:	First
No. of Credits	:	02
Title of the Course	:	Crystal Physics
Course Code	:	S505PHT
Name of the Vertical in adherence to NEP 2020	:	Elective I
Eligibility for Admission	:	BSc in Physics
Passing Marks	:	40%
Mode of Assessment	:	Formative and Summative
Level	:	PG
Pattern of Marks Distribution for SEE and CIA	:	60:40
Status	:	NEP-CBCS
To be implemented from Academic Year	:	2023-2024

Syllabus for First Year of Master of Science in Physics

(With effect from the academic year 2023-2024)

SEMESTER - I **Paper No–Physics Paper– IV**

Course Title: Crystal Physics **No. of Credits - 02**

Type of Vertical: Elective I **COURSE CODE: S505PHT**

Learning Outcomes Based on BLOOM's Taxonomy:

After completing the course, the learner will be able to…

Course Learning Outcome No.	Blooms Taxonomy	Course Learning Outcome
CLO-01	Understand	Understand the basics of x-ray diffraction and role of reciprocal lattice and Brillouin Zones
CLO-02	Understand	Understand the relation of lattice vibration and thermal conductivity
CLO-03	Understand	Understand various magnetic phenomenon and their relation to atomic structures
CLO-04	Apply	Solve numerical problems related to the topics in the course

Syllabus for First Year of Master of Science in Physics

(With effect from the academic year 2023-2024)

SEMESTER - I **Paper No–Physics Paper–IV**

Course Title: Crystal Physics **No. of Credits - 02**

Type of Vertical: Elective I **COURSE CODE: S505PHT**

COURSE CONTENT			
Module No.	**Content**	**Credits**	**No. of Lectures**
1	**Diffraction of Waves by Crystals and Reciprocal Lattice** Bragg law, Scattered Wave Amplitude – Fourier analysis, Reciprocal Lattice Vectors, Diffraction Conditions, Brillouin Zones, Reciprocal Lattice to SC, BCC & FCC lattice. Interference of Waves, Atomic Form Factor, Elastic Scattering by crystal, Ewald Construction, Structure Factor, Temperature Dependence of the Reflection Lines, Experimental Techniques (Laue Method, Rotating Crystal Method, Powder Method) Scattering from Surfaces, Elastic Scattering by amorphous solids.	**01**	**15**
2	**Lattice Vibrations and thermal properties:** Vibrations of Monoatomic Lattice, normal mode frequencies, dispersion relation. Lattice with two atoms per unit cell, normal mode frequencies, dispersion relation., Quanization of lattice vibrations, phonon momentum, Inelastic scattering of neutrons by phonons, Surface vibrations, Inelastic Neutron scattering. Anharmonic Crystal Interaction. Thermal conductivity – Lattice Thermal Resistivity, Umklapp Process, Imperfections	**01**	**15**
	Total	**02**	**30**

Reference Books:-

1. Charles Kittel “Introduction to Solid State Physics”, 7th edition John Wiley & sons.
2. J. Richard Christman “Fundamentals of Solid State Physics” John Wiley & sons
3. M.A.Wahab “Solid State Physics –Structure and properties of Materials” Narosa -1999.
4. M. Ali Omar “Elementary Solid State Physics” Addison Wesley (LPE)
5. H.Ibach and H.Luth 3rd edition “Solid State Physics – An Introduction to Principles of Materials Science” Springer International Edition (2004)

Access to the Course

The course is available for all the students admitted for Master of Science in Physics.

Methods of Assessment

The assessment pattern would be 60:40, 60% for Semester End Examination (SEE) and 40% for Continuous Internal Assessment (CIA). The structure of the SEE and CIA would be as recommended by the Board of Studies and approved by the Board of Examination and the Academic Council of the college.

Pattern of Evaluation

The Examination/Evaluation pattern shall be framed by the Board of Examination with its final approval from the Academic Council of the College.