Basic concepts required to understand Nanomaterials:

Surface to Volume Ration, Crystal Structures, Bragg's Law, Miller Indices and Miller Planes.

Introduction to Nanomaterials, Applications

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Dr. Suhail A. A. R. Sayyed

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Ahmednagar College

B.P.H.E. Society's Ahmednagar College, Ahmednagar Department of Physics Bridge Course for MSc 1 PHCT:122 Atoms and Molecules Attendance (2022-2023)

Course Instructor: Dr. R. V. Late

Aim: We are happy to introduce the Bridge Course for M.Sc. Physics 1 for Course PHY122 Atoms and Molecules students. This course is a sincere attempt to follow the maxims of teaching as well as develop a 'constructivist' approach to enhance the quality of learning. The present curriculum has been structured so as to bridge the credibility gap that exists between what is taught and what students learn from previous B.Sc. class. The said course is divided into **5 lectures** to be conducted at start of the first year of M.Sc. The course syllabus is as follows

Syllabus

different atomic models by comparing results of various experiments, constituents of atomic nuclei, electromagnetic and atomic forces, particle nature of light, Basic terminology involved in quantum mechanics, dual nature of matter and dual nature of light.

Photo:



B.P.H.E. Society's Ahmednagar College, Ahmednagar Department of Physics Bridge Course for MSc 1 PHCT:122 Atoms and Molecules Attendance (2022-2023)

-----B.P.H.E. Society's Ahmednagar College, Ahmednagar **Department of Physics** Bridge Course for MSc 1 PHCT:122 Atoms and Molecules Attendance (2022-2023) 51312 61312 12/2/ 213/23 23/23 Name of Students Sr. No. Right Vif diff. HUS White . 1 Ealre Mommater unlas P Tedhe Ashwin Shridtor Freily Feelly Freily Freiling Freiling Freiling 2 3 Phapale Briyanka Popal Broad Broad Broad Broad There The 4 Brile Brile Brile Brile Brile Brile Sumit Sahoo 5 0 52 52 Thambe - Sound A. A A A 6 B 23 Sanap Abbijest Kundlik Herent Herent Herent Herents Horney 7 Lazalt Bora Hemant Ashok Shinde pooja Mandkuman to de porte finde, Finde, Finde, Finde 8 Shelle JESNALWA . Walks 9 Nirmala Valiba Shelke 10 12 13 14 15 16 18 19 20 21 22 23 24 25 26 27 Course T. Instructor 1 R.V. Latin = 119:29.

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Department of Physics Bridge Course M.Sc. I: (2022-23) Syllabus: Quantum mechanics remedial course

- 1. Diagnostic test 1
- 2. Origin of quantum mechanics
- 3. De-Broglie hypothesis and Heisenberg's uncertainty principal
- 4. Schrodinger's time dependent and time independent equations
- 5. Ehrenfest theorem
- 6. Applications of Schrondinger's equations
- 7. Operators in quantum mechanics
- 8. Spherical symmetrical problems in quantum mechanics
- 9. Properties of Hermitian operators
- 10. Diagnostic test 2

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Signature of teacher Prof. Shelke P. B.

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Atmednagar College

Basic concepts in mathematical methods in Physics: Real numbers, complex numbers, operations and properties of complex numbers,

Legendre, Hermite, Laguerre polynomials and Bessel functions. (Differential Equations, Generating functions, Rodrigue's formula, and properties)

General Curvilinear Co-ordinate system. Gradient, Divergence, Curl, and Laplacian operator in Cartesian, Spherical polar, and cylindrical co-ordinate systems.

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Dr. Suhail A. A. R. Sayyed

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Basic concepts required to understand Nanomaterials:

Surface to Volume Ration, Crystal Structures, Bragg's Law, Miller Indices and Miller Planes.

Introduction to Nanomaterials, Applications

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Dr. Suhail A. A. R. Sayyed

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Ahmednagar College

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Dr. Suhail A. A. R. Sayyed

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B.P.H.E. Society's Ahmednagar College, Ahmednagar Department of Physics

Bridge Course for F.Y.B.Sc. Physics (2022-2023) Sem 1 Course Instructor: Dr. R. V. Late Aim:

We are happy to introduce the Bridge Course for **F.Y.B.Sc. Physics paper 1 Mechanics & Properties of Matter PHY 111** students. This course is a sincere attempt to follow the maxims of teaching as well as develop a 'constructivist' approach to enhance the quality of learning. The present curriculum has been structured so as to bridge the credibility gap that exists between what is taught and what students learn from previous HSC class. The said course is divided into **5 lectures** to be conducted at start of the first year of B.Sc. The course syllabus is as follows

Syllabus:

Basic Terminology in Physics: Various physical quantities in Physics, Types: Fundamental and derived quantities, Units and different system of units.

Dimensional analysis: use of dimension analysis to check correctness of physical equations, to establish the relation between related physical quantities, to find conversion factors between the units of the same physical quantity in two different sets of units.

Errors: types of errors in measurement of physical quantities and estimate them, Identify the order of magnitude of a given quantity and the significant figures in them.

Basic Mathematics in Physics I: Distinguish between scalar and vector quantities, Perform addition, subtraction and multiplication (scalar and vector product) of vectors, components of vectors.

Basic Mathematics in Physics II: obtain derivatives and integrals of simple functions and use of calculators in Physics.

Photos:











Attendance Report:



Lunde

Course Instructor R V Late

Department of Physics Ahmednagar College Ahmednagar

Bridge course for F. Y. B. Sc. Physics paper II PHY-112 Physics Principles and Applications Academic Year 2022-23

Syllabus:

Revision of Dot and Cross Product of vectors, Concept of unit vector, Methodology to find unit vector, Revision of Thomson's Atomic model, Drawbacks of Thomson's Atomic model, Revision of Rutherford's atomic model, difficulties with Rutherford's atomic model, concept of Atomic Spectra, Study of Hydrogen spectrum, Bohr's atomic model, Radii of orbits, Energy of electrons.

Learning Outcomes:

- To understand difference between Dot and Cross product of vectors.
- To find unit vector for any given vector.
- To understand strengths and drawbacks of different atomic models such as Thomson's Atomic model, Rutherford's atomic model and Bohr's atomic model.

Time Table

Sr. No.	Date	Time
1	6-9-22	12.30-1.20 pm
2	7-9-22	12.30-1.20 pm
3	14-9-22	12.30-1.20 pm
4	19-9-22	12.30-1.20 pm



Photographs:









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Y. B. Sawane

Variational principle and its applications to problems like shortest distance, brachistochrone, geodesics etc. Lagrangian and Hamiltonian equations of motion - derivation using Hamilton's principle of least action and their applications to various problems. Hamiltonian for a charged particle. Properties of kinetic energy function. Time-dependence of total energy (theorem on total energy). Symmetry and conservation laws (energy and momentum). Gauge function for Lagrangian. Invariance under Galilean transformation. Canonical transformations and their applications. Canonical transformations of the free particle Hamiltonian. Liouville's theroem. Area conservation properties of canonical flows. Poisson Brackets. Jacobi-Poisson theorem on Poisson Brackets. Invariance of Poisson brackets under canonical transformations. Dirac's formulation of generalized Hamiltonian.

Lagragian formulation of motion under central forces. Kepler problem. Stability of orbits. Motion of satellites. Rotating frames of reference. Coriolis force, banking of rivers, Foucault's pendulum, and tides.

Moment of inertia tensor. Euler angles. Euler equation of motion for rigid body motion. Symmetric top. Small oscillations. System of couple oscillators. Normal modes and normal coordinates.

2022-23

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Photograph of Bridge Course Class



Dr. S.D. Ralegankar

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Dr. P. B. Shelke



Ahmednagar College, Ahmedangar Department of Physics Physics of Semiconductor Devices (PHOTD2) Bridge Course

Classification of materials as per the electrical conductivity, Introduction to semiconductor, Origin of band gap in semiconductor, Types of semiconductor, Intrinsic semiconductor, Extrinsic semiconductor, PN-Junction, depletion layer, role of depletion layer, I-V characteristics of PN junction, introduction to Transistor, types of transistor, symbols of transistor, working of transistor, IV characteristics of transistor.



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Ahmednagar College

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Head Department of Physica Ahmednagar College

Kalyan B. Chavan Chu Teacher





M.Sc (PHYSICS) PHCT-113 Electronics Bridge Course Syllabus 2022-23

Rectifier: concept, types and applications. Diode, Triode. Introduction to power supply.

Introduction to Operational Amplifier, Characteristics of Op-Amp, Configurations, Applications. **Timer:** basic timer circuit, block diagram of timer, applications of timer. **Oscillator:** Basics of oscillator, **Combinational logic:** Logic identities, SOP, POS, minterm, maxterm, mapping, introduction to 7 segment display, its type. **Counter:** Def, **types**, 2 & 3 bit counters working, Difference between counter types. **Shift register:** Def, types. **Data converter:** Need of data conversion.



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Basic concepts in mathematical methods in Physics: Real numbers, complex numbers, operations and properties of complex numbers,

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General Curvilinear Co-ordinate system. Gradient, Divergence, Curl, and Laplacian operator in Cartesian, Spherical polar, and cylindrical co-ordinate systems.

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Signature of teacher

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Dr. Suhail A. A. R. Sayyed

Signature of Head

