



**Aggarwal College Ballabgarh**

**LESSON PLAN**  
**18 WEEKS (JAN-MAY)-2025**

**NAME OF ASSISTANT PROFESSOR: Dr. Devender**

| <b>CLASS: M.Sc. (Physics) final year</b>  |                  | <b>SEMESTER: IV</b>  | <b>SECTION:A</b> |
|---|------------------|--|------------------|
| <b>SUBJECT: Physics of Nano Materials</b> |                  |  |                  |
| <b>WEEK</b>                               | <b>DATE</b>      | <b>TOPICS</b>  |                  |
| <b>1</b>                                  | <b>6-1-2025</b>  | <b>Holiday</b>   |                  |
|   | <b>7-1-2025</b>  | <b>Interference of light</b>   |                  |
|   | <b>8-1-2025</b>  | <b>Types of Interference</b>   |                  |
| <b>2</b>                                  | <b>12-1-2025</b> | <b>S. U. N. D. A. Y.</b>   |                  |
|   | <b>13-1-2025</b> | <b>Interference by division of amplitude</b>                               |                  |
|   | <b>18-1-2025</b> | <b>Color of thin films</b>   |                  |
|   | <b>15-1-2025</b> | <b>Wedge shaped film</b>   |                  |
| <b>3</b>                                  | <b>19-1-2025</b> | <b>S. U. N. D. A. Y.</b>   |                  |
|   | <b>20-1-2025</b> | <b>Newton rings</b>  |                  |
|   | <b>21-1-2025</b> | <b>Application of Newton rings experiment</b>                              |                  |
|   | <b>22-1-2025</b> | <b>Michelson Interferometer</b>  |                  |
| <b>4</b>                                  | <b>26-1-2025</b> | <b>S. U. N. D. A. Y.</b>   |                  |
|   | <b>27-1-2025</b> | <b>Michelson Interferometer: Standardization of Meter</b>                  |                  |
|   | <b>28-1-2025</b> | <b>Application of Michelson Interferometer to determine the wavwlength</b> |                  |
|   | <b>29-1-2025</b> | <b>Fresnel's diffraction</b>   |                  |
| <b>5</b>                                  | <b>2-2-2025</b>  | <b>S. U. N. D. A. Y.</b>   |                  |
|   | <b>3-2-2025</b>  | <b>Half Period zones</b>   |                  |

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|    | 4-2-2025  | Zone plate                         |
|    | 5-2-2025  | Diffraction at a straight edge     |
| 6  | 9-2-2025  | S. U. N. D. A. Y.                  |
|    | 10-2-2025 | Diffraction from rectangular slit  |
|    | 11-2-2025 | Diffraction from circular aperture |
|    | 12-2-2025 | Holiday                            |
| 7  | 16-2-2025 | S. U. N. D. A. Y.                  |
|    | 17-2-2025 | Class Test - I                     |
|    | 18-2-2025 | Fraunhofer's diffraction           |
|    | 19-2-2025 | Diffraction at a single slit       |
| 8  | 23-2-2025 | S. U. N. D. A. Y.                  |
|    | 24-2-2025 | Diffraction pattern from two slits |
|    | 25-2-2025 | Plane transmission grating         |
|    | 26-2-2025 | Holiday                            |
| 9  | 2-3-2025  | S. U. N. D. A. Y.                  |
|    | 3-3-2025  | Dispersive power of grating        |
|    | 4-3-2025  | Limit of resolution                |
|    | 5-3-2025  | Rayleigh's criteria                |
|    | 9-3-2025  | S. U. N. D. A. Y.                  |
| 10 | 10-3-2025 | Holi Vacations                     |
|    | 11-3-2025 | Holi Vacations                     |
|    | 12-3-2025 | Holi Vacations                     |
|    | 16-3-2025 | S. U. N. D. A. Y.                  |
| 11 | 17-3-2025 | Resolving power of telescope       |

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|    | 18-3-2025 | Resolving power of grating                     |
|    | 19-3-2025 | Problems from Unit I & II                      |
|    | 23-3-2025 | <b>S. U. N. D. A. Y.</b>                       |
| 12 | 24-3-2025 | Numerical problems on Interference of light    |
|    | 25-3-2025 | Numerical problems on diffraction of light     |
|    | 26-3-2025 | Polarization of light                          |
|    | 30-3-2025 | <b>S. U. N. D. A. Y.</b>                       |
| 13 | 31-3-2025 | <b>Holiday</b>                                 |
|    | 1-4-2025  | Polarized & unpolarized light                  |
|    | 2-4-2025  | Polarization by reflection                     |
|    | 6-4-2025  | <b>S. U. N. D. A. Y.</b>                       |
| 14 | 7-4-2025  | Polarization by refraction                     |
|    | 8-4-2025  | Polarization by scattering                     |
|    | 9-4-2025  | Malus Law                                      |
|    | 13-4-2025 | <b>S. U. N. D. A. Y.</b>                       |
| 15 | 14-4-2025 | <b>Holiday</b>                                 |
|    | 15-4-2025 | Double refraction                              |
|    | 16-4-2025 | Huygen's Principle                             |
|    | 20-4-2025 | <b>S. U. N. D. A. Y.</b>                       |
| 16 | 21-4-2025 | Huygen's theory of double refraction           |
|    | 22-4-2025 | Double refraction theory for normal incidence  |
|    | 23-4-2025 | Double refraction theory for oblique incidence |
|    | 27-4-2025 | <b>S. U. N. D. A. Y.</b>                       |
| 17 | 28-4-2025 | Nicole Prism and analysis of polarized light   |

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|    | 29-4-2025 | Holiday           |
|    | 30-4-2025 | Holiday           |
|    | 4-5-2025  | S. U. N. D. A. Y. |
| 18 | 5-5-2025  | Polarimeters      |



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| <b>CLASS: M.Sc. (Physics) final year</b>  |                  | <b>SEMESTER: IV</b>   | <b>SECTION:A</b> |
|---|------------------|---|------------------|
| <b>SUBJECT: Physics of Nano Materials</b> |                  |   |                  |
| <b>WEEK</b>                               | <b>DATE</b>      | <b>TOPICS</b>   |                  |
| <b>1</b>                                  | <b>6-1-2025</b>  | <b>Holiday</b>  |                  |
|   | <b>7-1-2025</b>  | <b>Introduction &amp; Assumptions of free electron theory</b> |                  |
|   | <b>8-1-2025</b>  | <b>Consequences of free electron theory</b>                   |                  |
|   | <b>9-1-2025</b>  | <b>Drawbacks of free electron theory</b>                      |                  |
| <b>2</b>                                  | <b>12-1-2025</b> | <b>S. U. N. D. A. Y.</b>                                      |                  |
|   | <b>13-1-2025</b> | <b>Kronig Penny Model</b>                                     |                  |
|   | <b>18-1-2025</b> | <b>Bloch theorem</b>  |                  |
|   | <b>15-1-2025</b> | <b>Formation of Energy bands in solids</b>                    |                  |
|   | <b>16-1-2025</b> | <b>E – K diagram</b>  |                  |
| <b>3</b>                                  | <b>19-1-2025</b> | <b>S. U. N. D. A. Y.</b>                                      |                  |
|   | <b>20-1-2025</b> | <b>Effective mass</b>   |                  |
|   | <b>21-1-2025</b> | <b>Concept of holes</b>                                       |                  |
|   | <b>22-1-2025</b> | <b>Density of states in 3D</b>                                |                  |
|   | <b>23-1-2025</b> | <b>Density of states in 2D</b>                                |                  |
| <b>4</b>                                  | <b>26-1-2025</b> | <b>S. U. N. D. A. Y.</b>                                      |                  |
|   | <b>27-1-2025</b> | <b>Density of states in 1D</b>                                |                  |
|   | <b>28-1-2025</b> | <b>Density of states in 0D &amp; comparison with others</b>   |                  |

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|---|-----------|---|
|   | 29-1-2025 | Density of energy states in bands                 |
|   | 30-1-2025 | Variation of density of states with energy        |
| 5 | 2-2-2025  | <b>S. U. N. D. A. Y.</b>                          |
|   | 3-2-2025  | Variation of density of states with band gap      |
|   | 4-2-2025  | Variation of density of states with crystal size  |
|   | 5-2-2025  | Quantum dots                                      |
|   | 6-2-2025  | Frankel Excitons                                  |
| 6 | 9-2-2025  | <b>S. U. N. D. A. Y.</b>                          |
|   | 10-2-2025 | Doubts & questions from previous years (Unit - I) |
|   | 11-2-2025 | Bulk & Nano Materials                             |
|   | 12-2-2025 | <b>Holiday</b>                                    |
|   | 13-2-2025 | Class Test - I                                    |
| 7 | 16-2-2025 | <b>S. U. N. D. A. Y.</b>                          |
|   | 17-2-2025 | Quantum Confinement                               |
|   | 18-2-2025 | Electronic confinement in two dimensions          |
|   | 19-2-2025 | Electronic confinement in three dimensions        |
|   | 20-2-2025 | Infinite square well approximation                |
| 8 | 23-2-2025 | <b>S. U. N. D. A. Y.</b>                          |
|   | 24-2-2025 | Energy eigenvalues & Eigen function for 1, 2, 3D  |
|   | 25-2-2025 | Examples of other low dimensional systems         |
|   | 26-2-2025 | <b>Holiday</b>                                    |
|   | 27-2-2025 | Quantum well structures                           |
| 9 | 2-3-2025  | <b>S. U. N. D. A. Y.</b>                          |
|   | 3-3-2025  | Formation of Quantum wells                        |

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|    | 4-3-2025  | Double Hetero-structure                                 |
|    | 5-3-2025  | Al Ga As Quantum well structure                         |
|    | 6-3-2025  | Absorption processes in quantum wells                   |
|    | 9-3-2025  | S. U. N. D. A. Y.                                       |
| 10 | 10-3-2025 | Holi Vacations  |
|    | 11-3-2025 | Holi Vacations  |
|    | 12-3-2025 | Holi Vacations  |
|    | 13-3-2025 | Holi Vacations  |
|    | 16-3-2025 | S.U. N. D. A. Y.  |
| 11 | 17-3-2025 | Direct & Indirect bandgap semiconductors                |
|    | 18-3-2025 | Ballistic & diffusive transmission through quantum wire |
|    | 19-3-2025 | Quantum wire: density of states & Eigen functions       |
|    | 20-3-2025 | Hereto junction LED's                                   |
|    | 23-3-2025 | S. U. N. D. A. Y.                                       |
| 12 | 24-3-2025 | Quantum well LASER                                      |
|    | 25-3-2025 | Quantum dot LASER                                       |
|    | 26-3-2025 | Coulomb blockade in nano capacitors                     |
|    | 27-3-2025 | Coulomb blockade in Quantum dots                        |
|    | 30-3-2025 | S. U. N. D. A. Y.                                       |
| 13 | 31-3-2025 | Holiday   |
|    | 1-4-2025  | Single Electron transistor                              |
|    | 2-4-2025  | Bottom up & Top down techniques                         |
|    | 3-4-2025  | Sol Gel Process & Epitaxial growth of nanoparticles     |
|    | 6-4-2025  | S. U. N. D. A. Y.                                       |

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| 14 | 7-4-2025  | Ball Milling   |
|    | 8-4-2025  | Electrochemical deposition   |
|    | 9-4-2025  | Lithography & Molecular Beam Epitaxy                                   |
|    | 10-4-2025 | Holiday  |
|    | 13-4-2025 | S. U. N. D. A. Y.  |
| 15 | 14-4-2025 | Holiday  |
|    | 15-4-2025 | MOCVD & Ion Beam deposition  |
|    | 16-4-2025 | Chemical Bath deposition technique                                     |
|    | 17-4-2025 | Capping technique's & their role                                       |
|    | 20-4-2025 | S. U. N. D. A. Y.  |
| 16 | 21-4-2025 | Class Test – II / House Exam   |
|    | 22-4-2025 | XRD spectra of Bulk & Nano materials                                   |
|    | 23-4-2025 | Scherer's equation & it's drawbacks                                    |
|    | 24-4-2025 | Determination of particle size & strain using XRD                      |
|    | 27-4-2025 | S. U. N. D. A. Y.  |
| 17 | 28-4-2025 | TEM: Principle & sample preparation & Modes of operation & application |
|    | 29-4-2025 | Holiday  |
|    | 30-4-2025 | Holiday  |
|    | 1-5-2025  | PL spectra: Basic Principle & instrumentation Shift in PL peaks        |
|    | 4-5-2025  | S. U. N. D. A. Y.  |
| 18 | 5-5-2025  | Variation in Raman Spectra of Nanomaterials with particle size         |





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| <b>CLASS: M.Sc. (Physics) final year</b>  |                  | <b>SEMESTER: IV</b>   | <b>SECTION:A</b> |
|---|------------------|---|------------------|
| <b>SUBJECT: Physics of Nano Materials</b> |                  |   |                  |
| <b>WEEK</b>                               | <b>DATE</b>      | <b>TOPICS</b>   |                  |
| <b>1</b>                                  | <b>6-1-2025</b>  | <b>Holiday</b>  |                  |
|   | <b>7-1-2025</b>  | <b>Laser characteristics: Spontaneous and Stimulated Emission</b> |                  |
|   | <b>8-1-2025</b>  | <b>Laser characteristics: Absorption</b>                          |                  |
|   | <b>9-1-2025</b>  | <b>Einstein Coefficients</b>                                      |                  |
| <b>2</b>                                  | <b>12-1-2025</b> | <b>S. U. N. D. A. Y.</b>  |                  |
|   | <b>13-1-2025</b> | <b>Relation Between Einstein Coefficients</b>                     |                  |
|   | <b>18-1-2025</b> | <b>Laser Idea</b>   |                  |
|   | <b>15-1-2025</b> | <b>Threshold condition for laser oscillations</b>                 |                  |
|   | <b>16-1-2025</b> | <b>Pumping Schemes</b>  |                  |
| <b>3</b>                                  | <b>19-1-2025</b> | <b>S. U. N. D. A. Y.</b>  |                  |
|   | <b>20-1-2025</b> | <b>Properties of Laser Beams</b>                                  |                  |
|   | <b>21-1-2025</b> | <b>Mono-chromaticity &amp; Coherence</b>                          |                  |
|   | <b>22-1-2025</b> | <b>Directionality of LASER beams</b>                              |                  |
|   | <b>23-1-2025</b> | <b>Brightness of LASER beams</b>                                  |                  |
| <b>4</b>                                  | <b>26-1-2025</b> | <b>S. U. N. D. A. Y.</b>  |                  |
|   | <b>27-1-2025</b> | <b>Radiation Trapping Superradiance</b>                           |                  |
|   | <b>28-1-2025</b> | <b>Super fluorescence</b>   |                  |

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|   | 29-1-2025 | Amplified Spontaneous Emission                   |
|   | 30-1-2025 | Non-radiative delay                              |
| 5 | 2-2-2025  | S. U. N. D. A. Y.                                |
|   | 3-2-2025  | Pumping process                                  |
|   | 4-2-2025  | Optical pumping                                  |
|   | 5-2-2025  | Pumping efficiency in Optical pumping            |
|   | 6-2-2025  | Electrical pumping                               |
| 6 | 9-2-2025  | S. U. N. D. A. Y.                                |
|   | 10-2-2025 | Pumping efficiency in Electrical pumping         |
|   | 11-2-2025 | Passive Optical Resonators                       |
|   | 12-2-2025 | Holiday  |
|   | 13-2-2025 | Class Test - I                                   |
| 7 | 16-2-2025 | S. U. N. D. A. Y.                                |
|   | 17-2-2025 | Types of Resonators                              |
|   | 18-2-2025 | Stability Diagram                                |
|   | 19-2-2025 | Different types of losses in optical Resonators  |
|   | 20-2-2025 | Rate Equations                                   |
| 8 | 23-2-2025 | S. U. N. D. A. Y.                                |
|   | 24-2-2025 | Three & Four-level Laser                         |
|   | 25-2-2025 | Methods of Q-switching & Electro optical shutter |
|   | 26-2-2025 | Holiday  |
|   | 27-2-2025 | Kerr effect & Pockel effect in KDP crystal       |
| 9 | 2-3-2025  | S. U. N. D. A. Y.                                |
|   | 3-3-2025  | Acousto - optic Q-switches                       |

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|----|-----------|---|
|    | 4-3-2025  | Mode locking  |
|    | 5-3-2025  | Theory of mode locking  |
|    | 6-3-2025  | Methods of mode locking (active & passive)                                    |
|    | 9-3-2025  | S. U. N. D. A. Y.   |
| 10 | 10-3-2025 | Holi Vacations  |
|    | 11-3-2025 | Holi Vacations  |
|    | 12-3-2025 | Holi Vacations  |
|    | 13-3-2025 | Holi Vacations  |
|    | 16-3-2025 | S.U. N. D. A. Y.  |
| 11 | 17-3-2025 | Principle & working of various types of Solid State Lasers                    |
|    | 18-3-2025 | Characteristics & Energy level diagram of various types of Solid State Lasers |
|    | 19-3-2025 | Ruby Laser  |
|    | 20-3-2025 | Neodymium laser   |
|    | 23-3-2025 | S. U. N. D. A. Y.   |
| 12 | 24-3-2025 | Neutral Atom Gas Laser  |
|    | 25-3-2025 | Helium Neon Laser   |
|    | 26-3-2025 | Nitrogen Laser  |
|    | 27-3-2025 | Dye-Laser   |
|    | 30-3-2025 | S. U. N. D. A. Y.   |
| 13 | 31-3-2025 | Holiday   |
|    | 1-4-2025  | Semiconductor Laser   |
|    | 2-4-2025  | Two-photon photo-electric effect  |
|    | 3-4-2025  | Three-photon photo-electric effect  |
|    | 6-4-2025  | S. U. N. D. A. Y.   |

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| 14 | 7-4-2025  | Multiphoton photo-electric effect           |
|    | 8-4-2025  | Raman Scattering                            |
|    | 9-4-2025  | Stimulated Raman Effect                     |
|    | 10-4-2025 | Holiday                                     |
|    | 13-4-2025 | S. U. N. D. A. Y.                           |
| 15 | 14-4-2025 | Holiday                                     |
|    | 15-4-2025 | Class Test - II/ House Exam                 |
|    | 16-4-2025 | Applications of Lasers: Physics & Chemistry |
|    | 17-4-2025 | Applications of Lasers: Biology & Medicine  |
|    | 20-4-2025 | S. U. N. D. A. Y.                           |
| 16 | 21-4-2025 | Lasers: working Material                    |
|    | 22-4-2025 | Lasers in optical communication             |
|    | 23-4-2025 | Lasers in Thermonuclear Fusion              |
|    | 24-4-2025 | Lasers Holography                           |
|    | 27-4-2025 | S. U. N. D. A. Y.                           |
| 17 | 28-4-2025 | Uses of Laser in Military                   |
|    | 29-4-2025 | Holiday                                     |
|    | 30-4-2025 | Holiday                                     |
|    | 1-5-2025  | Problems from Unit - IV                     |
|    | 4-5-2025  | S. U. N. D. A. Y.                           |
| 18 | 5-5-2025  | Discussion on previous year question papers |



# Aggarwal College Ballabgarh

## LESSON PLAN 17 WEEKS (JAN-APRIL)-2025

Name of Faculty: Dr. Devender  
Designation/ Department: Physics

CLASS: B.Sc. (H) Chem - II

SEMESTER: IV

SECTION: A

SUBJECT: Optional Physics

| Week |           |                                    |
|------|-----------|------------------------------------|
| 1    | 9-1-2025  | Computer Organization              |
|      | 12-1-2025 | S. U. N. D. A. Y.                  |
| 2    | 16-1-2025 | Construction of memory units       |
|      | 19-1-2025 | S. U. N. D. A. Y.                  |
| 3    | 23-1-2025 | Binary Representation              |
|      | 26-1-2025 | REPUBLIC DAY /S. U. N. D. A. Y.    |
| 4    | 30-1-2025 | Algorithm & its characteristics    |
|      | 2-2-2025  | S. U. N. D. A. Y/BASANT PANCHAMI   |
| 5    | 6-2-2025  | Algorithm development              |
|      | 9-2-2025  | S. U. N. D. A. Y                   |
| 6    | 13-2-2025 | Advantage of writing Algorithm     |
|      | 16-2-2025 | S. U. N. D. A. Y.                  |
| 7    | 20-2-2025 | Flow charts & their interpretation |
|      | 23-2-2025 | S. U. N. D. A. Y.                  |
| 8    | 27-2-2025 | Class Test - I                     |
|      | 2-3-2025  | S. U. N. D. A. Y.                  |

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| 9  | 6-3-2025   | Introduction to Fortron & Fortron Variables                                  |
|    | 9-3-2025   | S. U. N. D. A. Y.  |
| 10 | 13-3-2025  | Integer & floating point expressions, Executable & non-executable statements |
|    | 16-03-2025 | S. U. N. D. A. Y.  |
| 11 | 20-3-2025  | Arithmetic statements & Operations used in Fortron                           |
|    | 23-3-2025  | S. U. N. D. A. Y.  |
| 12 | 27-3-2025  | IF, Do and GO TO statements  |
|    | 30-3-2025  | S. U. N. D. A. Y.  |
| 13 | 3-4-2025   | Linear & Multi-dimensional array   |
|    | 6-4-2025   | S. U. N. D. A. Y.  |
| 14 | 10-4-2025  | HOLIDAY: MAHAVIR JAYANTI   |
|    | 13-4-2025  | S. U. N. D. A. Y.  |
| 15 | 17-4-2025  | Function Subprogram  |
|    | 20-4-2025  | S. U. N. D. A. Y.  |
| 16 | 24-4-2025  | Class Test – II  |
|    | 27-4-2025  | S. U. N. D. A. Y.  |
| 17 | 01-05-2025 | Problems from Unit & Revision  |
|    | 04-05-2025 | S. U. N. D. A. Y.  |