**Government College for Women, Bawani Khera (Bhiwani)**

**Department of Physics**

**Academic Year: 2023-24**

Paper Title: **Semiconducting Device (20UPHY 401)**

**Marks Allotted: 50**

 **External Examination: 40**

 **Internal Assessment: 10**

**Objective of Teaching the Paper:** Upon successful completion, students will have the knowledge and skills to:

1. Explain the fundamental principles of nanotechnology and their application to biomedical engineering.
2. Apply engineering and physics concepts to the nano-scale and non-continuum domain.
3. Identify and compare state-of-the-art nanofabrication methods and perform a critical analysis of the research literature.
4. Design processing conditions to engineer functional nanomaterials.
5. Evaluate current constraints, such as regulatory, ethical, political, social and economical, encountered when solving problems in living systems.
6. Apply and transfer interdisciplinary systems engineering approaches to the field of bioand nanotechnology projects.
7. Discuss and evaluate state-of-the-art characterization methods for nanomaterials, and determine nanomaterial safety and handling methods required during characterization.

Mode of Transaction for the Paper:

* Lectures
* Discussion
* Assignments

**Teaching Plan for the Academic session 2023-24**

**B.Sc. 2nd Year, Semester 4th**

**Teacher:**

**Dr. Sumit Chauhan, Assistant Professor, Physics,** **sumit9253174175@gmail.com**

**Contact: 9253174175**

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| **Lesson Plan for The Month Feb 2024 to May 2024** | **Subject: Semiconducting Device** |
| **Name Of the Teacher: Dr. Sumit Chauhan** | **Class: BSc 4th Sem** |
| 01-02-2024 To 03-02-2024 | P and N types semiconductor, Barrier formation of PN Junction Diode,  |
| 05-02-2024 To 10-02-2024 | Qualitative idea of current flow mechanism of forward and reverse biased diode. |
| 12-02-2024 To 17-02-2024 | Drift and diffusion current in PN junction and its characteristics, static and dynamics resistance.  |
| 19-02-2024 To 23-02-2024 | Applications of PN junction diode as half wave rectifier. Full wave rectifier. Calculation of ripple factor and rectification efficiency. |
| 26-02-2024 To 02-03-2024 | BJT, NPN and PNP transistor, Characteristics of CB, CE and CC configurations. Active, cutoff, and saturation region. Current gain α and β. |
| 04-03-2024 To 09-03-2024 | Assignment 1 and Unit Test |
| 11-03-2024 To 16-03-2024 | Load line analysis of transistors, DC load line and Q point, h parameter and equivalent circuit. |
| 18-03-2024 To 22-03-2024 | Introduction of FET, JFET and MOSFET and their V-I characteristics. |
| 23-03-2024 To 31-03-2024 |  **Break (Holi)** |
| 01-04-2024 To 06-04-2024 | Comparison of FET and BJT, BJT amplifier biasing circuit, voltage divider and bias circuit for CE amplifier, bias stabilization. |
| 08-04-2024 To 12-04-2024 | Class A, B and C amplifier, RC coupled amplifier and its frequency response. Feedback in amplifier, positive and negative feedback in amplifiers. Advantage of negative feedback in amplifiers. |
| 15-04-2024 To 20-04-2024 | Introduction of sinusoidal oscillators, Hartley, Colpitts and Wein bridge, Operational amplifiers, Characteristics of an ideal and practical OP amplifier,  |
| 22-04-2024 To 27-04-2024 | Open and closed loop gain of inverting and non-inverting op amplifier. |
| 29-04-2024 To 30-04-2024 | CMRR, Application of OP Amp, (i) summing (ii) Differentiator (iii) integrator |

Dr. Sumit Chauhan

Assistant Professor in Physics

GCW Bawani Khera

**Government College for Women, Bawani Khera (Bhiwani)**

**Department of Physics**

**Academic Year: 2023-24**

Paper Title: **Mechanics II (20UPHY 201)**

**Marks Allotted: 50**

 **External Examination: 40**

 **Internal Assessment: 10**

**Objective of Teaching the Paper:** Upon successful completion, students will have the knowledge and skills to:

1. Explain the fundamental principles of nanotechnology and their application to biomedical engineering.
2. Apply engineering and physics concepts to the nano-scale and non-continuum domain.
3. Identify and compare state-of-the-art nanofabrication methods and perform a critical analysis of the research literature.
4. Design processing conditions to engineer functional nanomaterials.
5. Evaluate current constraints, such as regulatory, ethical, political, social and economical, encountered when solving problems in living systems.
6. Apply and transfer interdisciplinary systems engineering approaches to the field of bioand nanotechnology projects.
7. Discuss and evaluate state-of-the-art characterization methods for nanomaterials, and determine nanomaterial safety and handling methods required during characterization.

Mode of Transaction for the Paper:

* Lectures
* Discussion
* Assignments

**Teaching Plan for the Academic session 2023-24**

**B.Sc. Ist Year, Semester 2nd**

**Teacher:**

**Dr. Sumit Chauhan, Assistant Professor, Physics,** **sumit9253174175@gmail.com**

**Contact: 9253174175**

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| **Lesson Plan for The Month Feb 2024 to May 2024** | **Subject: Mechanics II** |
| **Name Of the Teacher: Dr. Sumit Chauhan** | **Class: BSc 2nd Sem** |
| 01-02-2024 To 03-02-2024 | Degrees of freedom, constrained and its classification, Generalised coordinates |
| 05-02-2024 To 10-02-2024 | Principal of virtual work, D’Alembert principle, simple and compound pendulum, Atwood’s machine. |
| 12-02-2024 To 17-02-2024 | Hamilton’s Principle and derivation of Lagrange’s from Hamilton equation. |
| 19-02-2024 To 23-02-2024 | Reference systems, inertial frames, Gallilean invariance andConservation laws, Newtonian relativity principle, Michelson - Morley experiment, |
| 26-02-2024 To 02-03-2024 | Lorentz transformations length contraction, time dilation, velocity |
| 04-03-2024 To 09-03-2024 | Relative velocity addition theorem, variation of mass with velocity and mass energy equivalence. Massless particle. |
| 11-03-2024 To 16-03-2024 | Doppler effect, Transport of energy and momentum, |
| 18-03-2024 To 22-03-2024 | Hooke’s law, stress and strain diagram, Elastic constants and theirrelations, Poisson’s ratio, |
| 23-03-2024 To 31-03-2024 |  **Break (Holi)** |
| 01-04-2024 To 06-04-2024 | Work done in stretching and work done in twisting a wire,  |
| 08-04-2024 To 12-04-2024 | Twisting couple of a cylinder, |
| 15-04-2024 To 20-04-2024 | Assignment and Unit Test.  |
| 22-04-2024 To 27-04-2024 | Determination of rigidity modulus by static torsion- Torsional Pendulum, |
| 29-04-2024 To 30-04-2024 | Determination of rigidity modulus and moment of inertia- q η and σ by Searles methods. |

Dr. Sumit Chauhan

Assistant Professor in Physics

GCW Bawani Khera

**Government College for Women, Bawani Khera (Bhiwani)**

**Department of Physics**

**Academic Year: 2023-24**

Paper Title: **Waves and Electrodynamics (20UPHY 202)**

**Marks Allotted: 50**

 **External Examination: 40**

 **Internal Assessment: 10**

**Objective of Teaching the Paper:** Upon successful completion, students will have the knowledge and skills to:

1. Explain the fundamental principles of nanotechnology and their application to biomedical engineering.
2. Apply engineering and physics concepts to the nano-scale and non-continuum domain.
3. Identify and compare state-of-the-art nanofabrication methods and perform a critical analysis of the research literature.
4. Design processing conditions to engineer functional nanomaterials.
5. Evaluate current constraints, such as regulatory, ethical, political, social and economical, encountered when solving problems in living systems.
6. Apply and transfer interdisciplinary systems engineering approaches to the field of bio and nanotechnology projects.
7. Discuss and evaluate state-of-the-art characterization methods for nanomaterials, and determine nanomaterial safety and handling methods required during characterization.

Mode of Transaction for the Paper:

* Lectures
* Discussion
* Assignments

**Teaching Plan for the Academic session 2023-24**

**B.Sc. Ist Year, Semester 2nd**

**Teacher:**

**Dr. Sumit Chauhan, Assistant Professor, Physics,** **sumit9253174175@gmail.com**

**Contact: 9253174175**

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| **Lesson Plan for The Month Feb 2024 to May 2024** | **Subject: Waves and Electrodynamics** |
| **Name Of the Teacher: Dr. Sumit Chauhan** | **Class: BSc 2nd Sem** |
| 01-02-2024 To 03-02-2024 | Superposition of two collinear Harmonic oscillations, linearity and superposition principle, (1) Oscillation have equal frequencies and (2) Oscillation have different frequencies  |
| 05-02-2024 To 10-02-2024 | Superposition of two perpendicular Harmonic oscillations |
| 12-02-2024 To 17-02-2024 | Graphical and analytical, methods, Lissajous figures with equal and unequal frequency and their uses, |
| 19-02-2024 To 23-02-2024 | The string as a force oscillator, velocity of transverse vibration of stretched string, reflection and transmission of waves on a string at a boundary, |
| 26-02-2024 To 02-03-2024 | Assignment and Unit Test. |
| 04-03-2024 To 09-03-2024 | Reflections and transmission energy, faraday law of electromagnetic induction, Lenz’s law, Transverse waves on a string, tunneling and standing waves on a string, normal modes of a string, |
| 11-03-2024 To 16-03-2024 | Self and mutual inductance, L of single coil, M of two coil, energy stored in a magnetic field. |
| 18-03-2024 To 22-03-2024 | Equation of continuity of current, displacement current, maxwell equation in vacuum and medium,  |
| 23-03-2024 To 31-03-2024 |  **Break (Holi)** |
| 01-04-2024 To 06-04-2024 | Poynting vector, energy density in electromagnetic field, electromagnetic waves passing through vacuum and isotropic dielectric medium. |
| 08-04-2024 To 12-04-2024 | Waves equation, solution of waves equation, particle and wave velocity, intensity of waves.  |
| 15-04-2024 To 20-04-2024 | Superposition principle, group velocity, phase velocity, definition of property of wave front. |
| 22-04-2024 To 27-04-2024 | Huygen’s principle, longitudinal waves, velocity of longitudinal waves in a fluid in a pipe,  |
| 29-04-2024 To 30-04-2024 | Newton’s formula for velocity of sound, Laplace correction, reflections and transmission of sound waves at a boundary. |

 Dr. Sumit Chauhan

Assistant Professor in Physics

GCW Bawani Khera