Department of Nanotechnology
North Eastern Hill University, Shillong-22

NOTIFICATION

For Ph.D. Entrance Examination in Nanotechnology 2023

The admission/selection in the Ph.D programme for a limited number of seats will be done on the basis of written test of one hour duration (total of 70 marks) followed by a personal interview (PI) (total of 30 mark). Merit list shall be prepared as per NEHU rules: RC-23 clause 2(vi).

The decision of the admission committee in all maters shall be binding and final. Some important dates regarding admission are given herewith:

1. **Date of written test**: 16th Nov., 2023 (Thursday)
2. **Verification of documents**: 16th Nov., 2023 (Thursday) at 9:30am
3. **Mode of Examination**: Physical mode only
4. **Time of written test**: 10.00am to 11.00 pm
5. **Date of personnel interview**: 16th Nov., 2023 (Thursday) (*only qualified in written test will call for interview*)
6. **Time of personnel interview: 3:00 pm onwards.**

***All dates and timing are tentative only.

Note: 1. Only qualified in written test will be call for interview.
2. Those candidate qualified both written and interview will be call for admission for Ph.D. programme 2023-24.

Sd/-

Chairman
Admission Committee (Ph.D.), Department of Nanotechnology.

Syllabus for Ph.D. Nanotechnology Entrance Examination

1. **Structure of Solids, Bonding in solids, Band Theory of Solids**

   Relation Between Lattice Constant and Density, Hexagonal Close Packed(hcp) Structure, Commonly Occurring Crystal Structures, Reciprocal Lattice and Brillouin Zones, Miller Indices, Polymorphism, Grains, Grain Boundaries and Grain Size Determination, Nanostructured Materials, Quasicrystals, Metallic Glasses, Diffraction Techniques, Bonding in condensed Matter, Pauli's Principle, Covalent Bond, Ionic Bond, Born-Haber Cycle, Metallic Bonding, van der Waals Bonding, Mixed Bonding, Correlation between Cohesive Energy, Bulk Modulus and Melting Points, Kronig-Penney One Dimensional Model, Origin of the Energy Bands, Concept of the Hole, Limitations of the Kronig-Penney Model and Application of the Band Structure Results.

2. **Nanobiotechnology**

   Nanoparticles, carbon nanotubes, quantum dots and buckyballs interface with biological macromolecules. Biological perspectives of nanomaterials – impact of nanomaterials in biological processes. Nanotechnology in Agriculture and Food technology - Insecticides development using nanotechnology and Nanofertilizers. Nanotechnology in food processing, food safety and biosecurity, toxin and contaminant detection, Smart packaging.

3. **Numerical Mathematics**:

   Solution of linear and non linear equations, least square method, nymerical solution of initial value problems in ordinary differential equations.

Sd/-

Chairman
Admission Committee (Ph.D.), Department of Nanotechnology.