Schedule for Semester V,

Course title: Nanomaterials and Solid State Chemistry (June 2018 onwards)

Course code: CHE-V. E-10

Schedule for Semester III:

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| **Lecture Sr. No.** | **Unit** | **Subunit** | **References** | **Remarks (if appl.)** |
| 01. | **Unit 1**: Introduction and Properties of Nanomaterials | Fundamentals: Technology and History |  |  |
| 02. |  | Classification of Nanomaterials  |  |  |
| 03. |  | Properties of Nanomaterials:Optical, Catalytic, Surface Area |  |  |
| 04. |  | Properties of Nanomaterials:Electronic, Mechanical |  |  |
| 05.  |  | Properties of Nanomaterials:Magnetic |  |  |
| 06. |  | Tutorial |  |  |
| 07 |  | Test No. 1: Written test  |  |  |
| 08. | **Unit 2:** Synthesis and Characterization of Nanomaterials | Synthesis methods (with at least 1 example): Chemical Methods : Sol-gel, hydrothermal |  |  |
| 09. |  | Synthesis methods (with at least 1 example): Sonochemical, Microwave, Precursor |  |  |
| 10. |  | Top down and bottom up |  |  |
|  |  |  |  |  |
| 11. |  | Synthesis methods : Physical Methods: Mechanical, Method based on evaporation |  |  |
| 11. |  | Physical Methods: Sputter deposition, Chemical vapour deposition |  |  |
| 13. |  | Biological Methods: Microorganism, Plant extract |  |  |
| 13. |  | Tutorial |  |  |
| 14.  |  | Test No. 2: MCQ |  |  |
| 15. |  | Characterization Techniques: Electron Microscopic Techniques (SEM/TEM)Diffraction Techniques |  |  |
| 16. |  | Characterization Techniques: Spectroscopic (UV-Visible, Magnetic measurements), BET surface area |  |  |
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| 17.  | **Unit 3:** Applications of Nanomaterials | Application in Energy, Automobiles, Sports, Textiles |  |  |
| 18. |  | Application in Cosmetics, Medicines, Space, Defence,  |  |  |
| 19. |  | Application in Engineering and Catalytic, Toxicity of Nanomaterials |  |  |
| 20 |  | Tutorial |  |  |
| 21. |  | Test No.3: Assignment Submission, Review and feedback |  |  |
| 22. |  | Quick Recap and Revision |  |  |
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Text Book for the course:

1. Inorganic Chemistry, *Atkins P, Overton T , Rourke J, Weller M and Armstrong ,* Oxford University Press

Reference Books:

1. Nanochemistry: Principles and Practices , *Kulkarni SK,* Capital Publishers
2. Introduction to Nanotechnology, *Poole CP and Owens FJ ,* John-Wiley and Sons
3. Introduction to Nanotechnology, *Rao MB and Reddy KK ,* Campus Books International