**COURSE SYLLABUS**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Title**： Nanomaterial characterization | | | | |
| **Credits / Hours** | 3/3 | **Course Number** |  | **□Required ■Elective** |
| **Course Description**  The development of nanotechnology is mainly attributed to the improvement of advanced process technology, atomic-level manipulation technology and nanometer detection technology. Nanotechnology is the study of mesoscopic properties at the atomic and molecular levels, and it needs to rely on sophisticated testing instruments for analysis. The content of this course starts with the overall nanotechnology, and continues to introduce how to detect the force, light, electricity, magnetic properties, equipment and key technologies of various components and nanostructures of materials at the nanometer scale. Prospective nano-detection technology as a look into the future.  Textbook:  1. Advanced Nano-Science Inspection Technology, 2009, ITRC, Chuan Hwa Book Co., LTD. (ISBN：9789868140943)  2.Handout edited by Professors | | | | |
| **Course Topics** | | | | |
| **Topic** | | **Content** | | |
| Introduction | | Properties and structures of Nanomaterials | | |
| Introduction of nano detection | | Nano Size and Units of Measurement. Size, appearance, particle size, film thickness and mechanical properties | | |
| Optical Microscopy | | Near Field Optical Microscopy, Fourier-transform infrared spectroscopy | | |
| Photon beam detection technology | | Optical Microscopy of Optical Wave Properties, differential confocal microscopy, fluorescence spectroscopy | | |
| X-ray detection technology | | X-ray Diffraction Analysis, X light absorption spectroscopy, Small Angle X-ray Scattering Analysis | | |
| Ion beam detection technology | | Secondary ion mass spectrometry, Rutherford backscatter analysis, Medium Energy Ion Scattering Analysis | | |
| Electron beam inspection technology | | Scanning electron microscopy, Transmission electron microscopy, Energy-dispersive X-ray spectroscopy, Electron Energy Loss Spectroscopy | | |
| Probe detection technology | | Scanning tunneling microscopy, Atomic Force Microscopy | | |