**COURSE SYLLABUS**

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| **Course Title**：Optoelectronic Materials Characteristics Analysis | | | | |
| **Credits/Hours** | 3 /3 | **Course Number** | 158042 | **□Required ■Elective** |
| Course Description  This course covers the fundamental aspects of optoelectronic materials, bulk crystal and epitaxial growths, characterization methods, optoelectronic devices and materials, and solar cells. | | | | |
| **Topics** | | | | |
| **Topic** | | **Content** | | |
| Fundamental aspects of optoelectronic materials | | 1. Semiconductor fundamentals  2. Electrical Conduction in Metals and Semiconductors  3. Optical Properties of Electronic Materials:  Fundamentals and Characterization | | |
| Growths and characterizations | | 1. Bulk crystal and epitaxial growths.  2. Characterizations: Structural characterization, surface chemical analysis, electrical characterization of semiconductor materials and devices. | | |
| Materials for optoelectronics | | 1. III-V compounds  2. Group III Nitrides, III-V Nitride Semiconductors  3. II-IV Semiconductors  4. Transparent Conductive Oxides | | |
| Optoelectronic Devices and Materials | | 1. Introduction to optoelectronic devices  2. Light-Emitting Diodes  3. Semiconductor Lasers | | |
| Solar Cells | | 1. Introduction  2. Crystalline and amorphous silicon solar cells  3. CdTe Thin-Film Solar Cells  4. CuInGaSe2 (CIGS2) Thin-Film Solar Cells | | |