**COURSE SYLLABUS**

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| **Course Title**：Material Characterizations |
| **Credits / Hours** | 3/3 | **Course Number** |  | **□Required ■Elective** |
| **Course Description**The goal of this course is to provide graduate students with well understanding on the characteristics of materials. In this course, the fundamental relationships among physical properties of materials will be introduced. In addition, the advanced knowledge of material characterizations is also discussed. Through the learning of this course, advanced concepts of material physical properties and their applications in industries will be thoroughly reviewed. This class is suitable for student to learn professional skills on materials characterizations after graduation.Textbook: 1. Eugene Hecht, Optics, 4th ed., Addison Wesley, 2002.2. Donald A. Neamen, Semiconductor Physics and Devices, 3rd ed., McGraw-Hill, 2003.3. Handout edited by Professors |
| **Course Topics** |
| **Topic** | **Content** |
| Introduction | Introduction to physical properties characterizations of advanced materials |
| X-Ray Reflectivity (XRR) Characterization | Relationships among density, thickness and roughness of thin films |
| Optical Properties and Filters | Introduction of optical filters |
| Color Definition, Color Space, Chromaticity Coordinates, CRI | Relationships of functional color definition and applications |
| Electrical Properties of Thin Films  | Introduction of some critical industrial guidelines |
| Characterizations for Colorful Solar Cells | Characterization and design guidelines of materials applied in colorful solar cells |
| Characterizations for Colored Photodiodes | Characterization and design guidelines of materials applied in colored photodiodes |
| Characterizations for Ceramic Thin-Film Diodes | Characterization and design guidelines of materials applied in ceramic thin-film diodes |
| Characterizations for Colored Hard Coatings | Characterization and design guidelines of materials applied in colored hard coatings |