**COURSE SYLLABUS**

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| **Course Title：**Semiconductor-Based Solar Cell Technology |
| **Credits / Hours** | 3/3 | **Course Number** | 15800U | **□Required ■Elective** |
| **Course Description :** To provide practical understanding of semiconductor materials and technologies on the design and development of solar cells. The course will start with a brief overview on the operation principles, followed by the introduction of traditional crystalline silicon solar cells. Then some advance solar cell technologies will be covered, such as thin-film solar cells, concentrator solar cells, organic and dye sensitized cells, and etc. |
| **Course Topics** |
| **Topic** | **Content** |
| Introduction | 1. Review of Semiconductor material properties
2. Principles of solar cell operation
3. Efficiency ;limits and losses in solar cells
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| Crystalline silicon solar cells | 1. Silicon: manufacture and properties
2. Industrial technologies of crystalline silicon solar cells
3. Photovoltaic module construction
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| Thin-film solar cells | 1. Amorphous silicon solar cells
2. Microcrystalline solar cells
3. Cadmium telluride thin-film PV modules
4. Cu(In,Ga)Se2 thin-film solar cells
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| Organic cells | 1. Dye sensitized cells
2. Organic and plastic solar cells
3. Perovskite solar cells
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| Testing Monitoring and Calibration | 1. Standards, calibration and testing of PV modules and soar cells
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