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| **Course Name** | Materials for Energy Conversion and Storage | | | | | |
| **Course Code** | MatE 6450 | | | | | |
| **ECTS** | 6 | | | | | |
| **Status** | Elective | | | | | |
| **Weekly workload** | Lecture | Tutorial | Laboratory | | Project work | Home study |
| 3 | 3 | 1 | | 1 | 5 |
| **Course Objective** | This course focuses on energy and materials for the conversion of natural resources into usable energy. Special focus is given to solar energy and its conversion. Materials for electrochemical energy storages such as batteries and supercapacitors will be discussed as well. | | | | | |
| **Course description:** | * Energy, Types of energy, and Environment * Semiconductors * PN-Junction * Solar Cell Operation and Solar cell design principles * Electrochemical energy storages (research works are presented in detail here) * Materials in Solar Photovoltaics (different types of solar cells from different materials) and in fuel cells will be discussed by students in the form of project. The materials for solar cell and fuel cell application are but not limited to wide bandgap semiconductors, oxides, carbon-based nanostructures, advanced ceramics, chalcogenide nanostructures, and flexible organic electronics nanomaterials. | | | | | |
| **Semester:** | Year I Semester II | | | | | |
| **Prerequisite:** | None | | | | | |
| **Reference:** | 1. Principles-of-electronic-materials-and-devices 2. Principles of Energy Conversion, 2nd ed, A. Culp, Jr. | | | | | |
| **Teaching Methodology and assessment strategy** | Lecture / Tutorial | | | | | |
| Exercise / Assignment | | | | | |
| Laboratory | | | | | |
| **Assessment / Evaluation** | Individual assignment / exercise | | | 10% | | |
| Project | | | 20% | | |
| Mid-term examination | | | 20% | | |
| Final examination | | | 50% | | |
| **Attendance requirement** | Minimum of 75% of lecture | | | | | |

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