

MS ISEE Study Track: Solar Cell Systems and Materials

Course Table: 2015/2016

1. **Year DTU:** Department of Energy Conversion and Storage, Suren Gevorgyan
2. **Year NTNU:** Faculty of Natural Science and Technology, Department for Material Science and Engineering Gabriella Tranell

Course table

| 1. Semester | 2. Semester | 3. Semester | 4. Semester |
|---|--|--|---|
| <i>Technical University of Denmark (DTU)</i> Search the course number (i.e.46220) | | <i>Norwegian University of Science and Technology (NTNU)</i> | |
| <i>Modelling and Analysis of Sustainable Energy Systems Modelling using Operations Research, 42002 5 ECTS</i> | <i>Chose 30 ECTS of Elective courses list 1 (Physics line) or 2 (Materials line)</i> | <i>Elective course list 3 (Physics line) or Elective course list 4 (Materials line) 7.5 ECTS</i> | <i>TFY xxxx or TMT xxxx MSc Project , 30 ECTS</i> |
| <i>Energy Economics, Markets and Policies, 42003, 10 ECTS</i> | | <i>Elective course list 3 (Physics line) or Elective course list 4 (Materials line) 7.5 ECTS</i> | |
| <i>Feasibility Studies and System Assessment of Energy Technologies, 42004, 5 ECTS</i> | | <i>TFY xxxx or TMT xxxx Semester project, 15 ECTS</i> | |
| <i>Analytical Imaging of Energy Materials, 47311, 5 ECTS</i> | | | |
| <i>Light emitting diodes and photovoltaics for energy applications, 34540, 5 ECTS</i> | | | |
| = 30 ECTC | = 30 ECTS | = 30 ECTS | = 30 ECTS |

Elective course list 1 - Physics line, DTU

- Advanced Solid State Physics, 10305, 5 ECTS
- Nanophotonics, 34051, 10 ECTS
- Solar heating systems, 11117, 10 ECTS
- Electronic Structure Methods in Material Physics, Chemistry and Biology, 10304, 10 ECTS

Elective course list 2 - Materials line, DTU

- Applied Inorganic Chemistry, 47303, 5 ECTS
- Electrochemistry, 47305, 5 ECTS
- Catalysis and Sustainable Chemistry, 26510, 10 ECTS
- Emerging Energy Technologies, 31778, 5 ECTS
- Solid Oxide Fuel Cells and Electrolysis, 47306, 5 ECTS
- Ceramic Science and Engineering, 47304, 10 ECTS
- Material Physics, Chemistry and Biology, 10302, 10 ECTS

Elective course list 3 - Physics line, NTNU

Depending on background, one can for example choose:

- **Fall:** TFE4145 Semiconductor Physics and Electronic Devices, Introduction 7.5 ECTS
- **Fall:** TFY4300 Energy and environmental Physics 7.5 ECTS
- **Fall:** FY3114 Functional Materials 7.5 ECT
- **Fall:** TFY4255 Materials Physics 7.5 ECT
- **Fall:** TMT4322 Solar Cells and Photovoltaic Nanostructures 7.5 ECTS

Elective course list 4 – Materials direction NTNU

- **Fall:** TMT4330 Resources, energy and environment 7.5 ECTS
- **Fall:** TMT4326 Refining and Recycling of Metals 7.5 ECTS
- **Fall:** TMT4322 Solar Cells and Photovoltaic Nanostructures 7.5 ECTS

Research areas for projects / master thesis

| NTNU, Responsible prof., department | DTU, Second supervisor, department | Research area Topic (P= Physics line, M=Materials line) |
|--|---|---|
| Gabriella Tranell Merete Tangstad <i>Department of Material Science and Engineering</i> | <i>Possible second supervisor, university, department (someone in chemical engineering)</i> | <u>Si feedstock (M)</u> <i>Si production and SoG-Si Refining</i> |
| Marisa Di Sabatino Lundberg Lars Arnberg Eivind Johannes Øvrelid <i>Department of Material Science and Engineering</i> | <i>Possible second supervisor, university, department</i> | <u>Crystallization (M)</u> <i>Material properties Characterization Wafering</i> |
| Mari-Ann Einarssrud Fride Vullum-Bruer <i>Department of Material Science and Engineering</i> | <i>Possible second supervisor, university, department</i> | <u>Wet chemistry/sol gel (M)</u> <i>TCO, nanoparticles Intermediate band materials</i> |
| Turid W. Reenaas Ursula Gibson Randi Holmestad Ton Helvoort Morten Kildemo Mikael Lindgren Ingve Simonsen, <i>Department of Physics</i> | <i>Possible second supervisor, university, department</i> | <u>Thin film/third generation solar cells (P)</u> <i>Intermediate band solar cells Thin film/Intermediate band solar cells TEM characterization TEM characterization Optical characterization Optical characterization Modeling light/matter interaction</i> |
| Bjørn-Ove Fimland Helge Weman <i>Department of Electronics and Telecommunications</i> | <i>Possible second supervisor, university, department</i> | <u>III-V solar cells (P)</u> <i>Nanowire and intermediate band solar cells Nanowire solar cells</i> |