MS ISEE Study Track: Heat and Power Engineering,
Course Table: 2016/2017

1. **Year University of Iceland:** Faculty of Mechanical Engineering, Industrial Engineering and Computers Science, Halldór Pálsson
2. **Year Chalmers University of Technology:** Dept. of Energy and Environment, David Pallarès

**Study track focus and goal:**

This track meets the challenge set global warming and depletion of fossil fuel resources by providing state-of-the-art education in advanced technologies and systems for efficient, clean and competitive conversion, distribution and use of electricity, heating and cooling.

Training is provided in the use of optimization and modelling tools for design and planning on the technical plant level, including state-of-the-art technologies, at the same time that necessary knowledge on energy systems is given in order to gain perspective.

**Learning outcomes:**

- Students become skilled in analysis, optimization and design of combined heat and power plants and industrial heat processes, acquiring also state-of-the-art knowledge on technologies for fuel conversion with reduced or zero CO₂ emissions (biomass and waste conversion, Carbon Capture and Storage technologies).

- By acquiring complementary knowledge on an energy systems level, students are trained to approach problem-solving in an interdisciplinary way.

- Students are prepared for a professional career within the energy industry and power generation companies.
## Course table

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<tr>
<td>University of Iceland</td>
<td>Chalmers University of Technology</td>
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<tr>
<td>Environmental Engineering, UMV117F, 7.5 ECTS</td>
<td>Computerized Fluid Dynamics, VÉL215F, 7.5 ECTS</td>
<td>Industrial Energy Systems, KVM013, 7.5 ECTS</td>
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<tr>
<td>Elective courses from list 1</td>
<td>Elective courses from list 2</td>
<td>Elective courses from list 3</td>
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<td>= 30 ECTS</td>
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### Elective course list 1
- Energy Economics, Energy Policy and Sustainable Development, UAU112F, 10 ECTS
- System Dynamics Modelling, IDN115F, 7.5 ECTS
- Sustainable Development, Environmental Policy and Recourse Management, UAU101F, 6 ECTS
- Corrosion, VÉL501M, 6 ECTS (only in odd numbered years)
- Finite Element Analysis, VÉL103M, 6 ECTS
- Environmental Impact Assessment 1, UMV101M, 6 ECTS

### Elective course list 2
- Hydropower Plants, UMV213F, 7.5 ECTS (only in even number of years)
- Advanced Environmental Fluid Transport Processes, UMV241F, 7.5 ECTS (Only odd number of years)
- Sustainable Energy Options, UAU213M, 6 ECTS
- Life-cycle Analysis, UAU215F, 6 ECTS

### Elective course list 3
- Introduction to nuclear reactors, TIF215, 7.5 ECTS
- Sustainable Electric Power Systems, ENM125, 7.5 ECTS
- Turbomachinery, TME210, 7.5 ECTS
- Sustainable Energy Futures, FFR170, 7.5 ECTS
- Computational fluid dynamics (CFD), MTF072, 7.5 ECTS
- Multiphase flow, TME160, 7.5 ECTS
- Gas turbine technology, MTF171, 7.5 ECTS
- Sustainable power production and transportation ENM095, 7.5 ECTS
### Research areas for projects / master thesis

<table>
<thead>
<tr>
<th>First supervisor, 2. year university, department</th>
<th>Second supervisor, 1. year, university, department</th>
<th>Research area</th>
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<tr>
<td>Prof. Filip Johnsson, Chalmers University, Energy and Environment</td>
<td>To be announced</td>
<td>Fluidized bed processes</td>
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<tr>
<td>David Pallarès, Chalmers University, Energy and Environment</td>
<td>To be announced</td>
<td>Fluidized bed processes</td>
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<tr>
<td>Fredrik Norrmann</td>
<td>To be announced</td>
<td>Oxyfuel combustion, flue gas treatment</td>
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<tr>
<td>Mathias Gourdon</td>
<td>To be announced</td>
<td>Optimization of industrial energy use</td>
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<tr>
<td>Magnus Rydén</td>
<td>To be announced</td>
<td>Chemical looping combustion</td>
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### Degree requirements for admission process

A BSc degree corresponding to a minimum 180 ECTS credits in the following fields:

| Mechanical Eng., Chemical Eng., Chemistry, Physics |

Applicants that are enrolled in an integrated five year degree with no bachelor level:

| Mechanical Eng., Chemical Eng., Chemistry, Physics |

A BEng in ... Engineering is accepted for start at ...

| Any technical degree |

Applicants with a BEng in ..., or a BSc or BEng in ..., will be considered on an individual basis.

| Any technical degree |

The applicant’s qualifications must include a strong working knowledge of mathematics and ..., and applicants must document that they have fulfilled the following minimum requirements:

- Mathematics: 21.5 ECTS including linear algebra, calculus and differential equations.
- Thermodynamics: 6 ECTS.
- Mass and/or heat transfer: 6 ECTS
- Fluid mechanics: min. 5 ECTS

Students without this qualification must be prepared to complete their curriculum during the first year.

Moreover, the applicant must have sufficient qualifications within elementary programming using e.g. MATLAB or a similar programming language.

Applicants with a Polytechnic (FI), Högskoleingenjör (SE) and Diplomingeniør (DK) degree may be expected to do extra course work to qualify for the programme.