

## MS ISEE Study Track: Bioenergy, Course Table: 2015/2016

1. **Year KTH:** Department of Energy Technology/Division of Heat and Power Technology: Reza Fakhrai
2. **Year Aalto University:** School of Engineering/Department of Energy Technology: prof. Martti Larmi

### Course table

| 1. Semester                                       | 2. Semester  | 3. Semester  | 4. Semester      |
|---|--|--|------------------|
| <b>KTH</b>  |  | <b>Aalto University</b>  |                  |
|   |  | <b>Bioenergy in Transport:</b>   |                  |
| Introduction to Energy Technology, MJ1402, 3 ECTS | Computational Methods in Energy Technology, MJ2424, 6 ECTS   | Internal Combustion Engine Technology, Kul-14.4100, 5 ECTS               | Thesis , 30 ECTS |
| Renewable Energy Technology, MJ2411, 6 ECTS       | Energy Management, MJ2410, 6 ECTS                            | Transport Biofuels, Combustion and Emission Control, Kul-14.4700, 5 ECTS |                  |
| Sustainable Power Generation, MJ2405, 9 ECTS      | Renewable Energy Technology, Advanced course, MJ2412, 6 ECTS | Introduction to Biorefineries and Biofuels, KE-40.4120, 5 ECTS           |                  |
| Sustainable Energy Utilization, MJ2407, 9 ECTS    | Applied heat and power technology, MJ2426, 6 ECTS            | Energy Systems for Communities, Ene-59.4301, 5 ECTS                      |                  |
| Energy and Environment, MJ2413, 6 ECTS            |  | Foreign language studies, Kie-98., 3 ECTS                                |                  |
|   | Elective course from list 1                                  | Elective courses from list 2   |                  |
| <b>= 33 ECTC</b>                                  | <b>= 30 ECTS</b>   | <b>= 30 ECTS</b>   |                  |

| 1. Semester                                       | 2. Semester  | 3. Semester   | 4. Semester      |
|---|--|---|------------------|
| <b>KTH</b>  |  | <b>Aalto University</b>   |                  |
|   |  | <b>Power generation from biomass:</b>                                 |                  |
| Introduction to Energy Technology, MJ1402, 3 ECTS | Computational Methods in Energy Technology, MJ2424, 6 ECTS   | Combustion and Gasification Technology, Ene-47.5123, 6 ECTS           | Thesis , 30 ECTS |
| Renewable Energy Technology, MJ2411, 6 ECTS       | Energy Management, MJ2410, 6 ECTS                            | Power generation from Biomass II b, Ene-47.4112, 3 ECTS               |                  |
| Sustainable Power Generation, MJ2405, 9 ECTS      | Renewable Energy Technology, Advanced course, MJ2412, 6 ECTS | Process-Integration, Simulation and Optimization, Ene-47.5130, 3 ECTS |                  |
| Sustainable Energy Utilization, MJ2407, , 9 ECTS  | Applied heat and power technology, MJ2426, 6 ECTS            | Waste to Energy, Ene-47.4114, 3 ECTS                                  |                  |
| Energy and Environment, MJ2413, 6 ECTS            |  | Project in New Energy Technologies, Ene-47.4150, 5 ECTS               |                  |
|   |  | Introduction to Biorefineries and Biofuels, KE-40.4120, 5 ECTS        |                  |
|   |  | Foreign language studies, Kie-98., 3 ECTS                             |                  |
|   | Elective course list1  | Elective course list2   |                  |
| <b>= 33 ECTC</b>                                  | <b>= 30 ECTS</b>   | <b>= 30 ECTS</b>  | <b>= 30 ECTS</b> |

## Elective course list 1

- *MJ2438 Modeling of Energy Systems – Heat and Power Generation, 6 ECTS*
- *MJ2470 Climate Change Mitigation Tools, 6 ECTS*
- *MJ2473 Energy Policy Design, 6 ECTS*

## Elective course list 2

### Elective courses for Bioenergy in Transport module:

- *Kie-98.1320 Writing for Master's Students, 3-5 ECTS*
- *Kie-98.1310 Introduction to Academic Communication for Master's programs in English, 3 ECTS*
- *Kie-98.1115 Persuasive Communication, 3 ECTS*
- *Kie-98.1114 Communicating Technology, 3 ECTS*
- *Kie-98.1410 Industrial Communications, 3-5 ECTS*
- *Ene-47.5123 Combustion and Gasification Technology P, 6 ECTS*
- *Ene-47.4112 Power generation from Biomass II b, 3 ECTS*
- *Ene-47.5130 Process-Integration, Simulation and Optimization, 3 ECTS*
- *Ene-59.4301 Energy Systems for Communities, 5 ECTS*
- *Ene-59.4310 Special Course in Energy for Communities, 5 ECTS*
- *Tfy-56.4311 New Energy Sources, 5 ECTS*
- *Puu-0.5000 Economics of Forest Products Industry, 4 ECTS*

### Elective courses for Power generation from biomass module:

- *Kie-98.1320 Writing for Master's Students, 3-5 ECTS*
- *Kie-98.1310 Introduction to Academic Communication for Master's programs in English, 3 ECTS*
- *Kie-98.1115 Persuasive Communication, 3 ECTS*
- *Kie-98.1114 Communicating Technology, 3 ECTS*
- *Kie-98.1410 Industrial Communications, 3-5 ECTS*
- *Ene-47.4110 Power Generation from Biomass I, 3 ECTS*
- *Ene-47.4113 Measurements in Power Plants, 3 ECTS*
- *Ene-47.5131 Life-Cycle Assessment and Environmental Auditing 3 ECTS*

## Research areas for projects / master thesis

| <b>Responsible professor, 2. year university, department</b>                    | <b>Second supervisor, 1. year, university, department</b> | <b>Research area</b>  |
|---|---|---|
| <i>prof. Martti Larmi, Aalto University, department of Energy Technology</i>    | <i>Possible second supervisor, university, department</i> | <i>Biofuel production and combustion</i>  |
| <i>prof. Mika Järvinen, Aalto University, department of Energy Technology</i>   | <i>Possible second supervisor, university, department</i> | <i>Combustion and gasification, fuel spraying and modeling</i>  |
| <i>prof. Risto Lahdelma, Aalto University, department of Energy Technology</i>  | <i>Possible second supervisor, university, department</i> | <i>Energy: Modeling, simulation and optimization</i>  |
| <i>Prof. Markku Lampinen, Aalto University, department of Energy Technology</i> | <i>Possible second supervisor, university, department</i> | <i>hydrogen and fuel cell technologies, CFD and various problems concerning heat- and mass transfer</i> |