Biofuels for Transportation

Programme course

6 credits

Biofuels for Transportation

TKMJ31

Valid from: 2019 Spring semester

Determined by
Board of Studies for Mechanical Engineering and Design

Date determined
2018-08-31

Main field of study
Energy and Environmental Engineering, Mechanical Engineering

Course level
Second cycle

Advancement level
A1N

Course offered for
- Master's Programme in Mechanical Engineering
- Master's Programme in Sustainability Engineering and Management
- Design and Product Development, M Sc in Engineering
- Industrial Engineering and Management - International, M Sc in Engineering
- Industrial Engineering and Management, M Sc in Engineering
- Chemical Biology, M Sc in Engineering
- Mechanical Engineering, M Sc in Engineering
- Engineering Biology, M Sc in Engineering
- Energy-Environment-Management M Sc in Engineering

Specific information
The course is not available for exchange students

Entry requirements
Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites
Courses: Large Technical Systems and Environment, Environmental Technology or equivalent.

Intended learning outcomes

Through this course, "Biofuels for Transportation", students will learn about the characteristics of and challenges for the production and use of biofuels. The course will review the raw materials, production processes, application in vehicles, environmental impacts and the perspectives of different actors on the sustainability of biofuels. Upon completion of the course, students will be:

- Aware of how established and emerging biofuels are produced and used;
- Able to evaluate environmental impacts from material and energy flows in the life-cycle of biofuels;
- Aware of the required technologies, infrastructures, and contextual factors for the use of biofuels;
- Acquainted with the perspectives of different actors and contexts for sustainable production and use of biofuels;
- Able to reflect upon how cooperation between different actors can lead to higher resource efficiency; for example through better integration of material and energy flows;
- Acquainted with business dimensions related to biofuel production

Course content

The course will consist of many aspects concerning biofuels production, development, and use. The content is diverse and relies on the theoretical and practical experience of experts from both the academia and the industry. Through lectures, seminars, study visits, and practical assignments students will learn more about:

- Feedstocks for biofuel production
- Production processes for biofuels
- Vehicles and infrastructural requirements for biofuels
- Environmental, economic and social aspects related to biofuel production and use
- Drivers and conditions for biofuel development and markets

Teaching and working methods

The course consists of the following components:

- Lectures
- Guest lectures from industry and other research institutions
- Study visits to biofuel production facilities
- Practical exercises and project work
- Take home examination

Examination

PRA1	Approved project assignments and approved seminars	3 credits	U, G
UPG1	At-home examination	3 credits	U, 3, 4, 5

Grades

Four-grade scale, LiU, U, 3, 4, 5

Other information

Supplementary courses: Industrial Ecology, Management Systems and Sustainability, Resource Efficient Products and Enviromental Systems Analysis - Project Course.

Department

Institutionen för ekonomisk och industriell utveckling

Director of Studies or equivalent

Carina Sundberg

Examiner

Roozbeh Feiz

Course website and other links

Education components

Preliminary scheduled hours: 92 h
Recommended self-study hours: 68 h

Course literature

Books

(2004) *Biofuels for Transport. An International Perspective* Paris : OECD Publishing, 2004.
ISBN: 9789264015135
This book is published in 2004, so some of the information may be outdated. However, it contains useful information about the technical basics of biofuel production from several types of biomass (particularly chapter 2).
https://www.cti2000.it/Bionett/All-2004-004%20IEA%20biofuels%20report.pdf
Dominik Rutz & Rainer Janssen, (2008) *Biofuel Technology Handbook*
http://www.isibang.ac.in/~library/onlinerz/resources/Biofuel_Technology_Handbook_version2_
European Commission, (2015) *The impact of biofuels on transport and the environment, and their connection with agricultural development in Europe*
ISBN: 9789282363294
The book is ordered by European Commission and provides an overview of biofuels production and consumption and of related policies worldwide. It also contains analysis and discussion of key aspects affecting the overall sustainability of biofuels; including their impact on agricultural markets, emissions from indirect land-use change, and greenhouse gas emissions.
http://dx.doi.org/10.2861/775

Common rules

Course syllabus

A syllabus has been established for each course. The syllabus specifies the aim and contents of the course, and the prior knowledge that a student must have in order to be able to benefit from the course.

Timetabling

Courses are timetabled after a decision has been made for this course concerning its assignment to a timetable module. A central timetable is not drawn up for courses with fewer than five participants. Most project courses do not have a central timetable.

Interrupting a course

The vice-chancellor's decision concerning regulations for registration, deregistration and reporting results (Dnr LiU-2015-01241) states that interruptions in study are to be recorded in Ladok. Thus, all students who do not participate in a course for which they have registered must record the interruption, such that the registration on the course can be removed. Deregistration from a course is carried out using a web-based form: www.lith.liu.se/for-studenter/kurskomplettering?l=sv.

Cancelled courses

Courses with few participants (fewer than 10) may be cancelled or organised in a manner that differs from that stated in the course syllabus. The board of studies is to deliberate and decide whether a course is to be cancelled or changed from the course syllabus.

Regulations relating to examinations and examiners

Details are given in a decision in the university's rule book: http://styrdokument.liu.se/Regelsamling/VisaBeslut/622678.

Forms of examination

Examination

Written and oral examinations are held at least three times a year: once immediately after the end of the course, once in August, and once (usually) in one of the re-examination periods. Examinations held at other times are to follow a decision of the board of studies.

Principles for examination scheduling for courses that follow the study periods:

- courses given in VT1 are examined for the first time in March, with re-

examination in June and August
- courses given in VT2 are examined for the first time in May, with re-examination in August and October
- courses given in HT1 are examined for the first time in October, with re-examination in January and August
- courses given in HT2 are examined for the first time in January, with re-examination at Easter and in August.

The examination schedule is based on the structure of timetable modules, but there may be deviations from this, mainly in the case of courses that are studied and examined for several programmes and in lower grades (i.e. 1 and 2).

- Examinations for courses that the board of studies has decided are to be held in alternate years are held only three times during the year in which the course is given.
- Examinations for courses that are cancelled or rescheduled such that they are not given in one or several years are held three times during the year that immediately follows the course, with examination scheduling that corresponds to the scheduling that was in force before the course was cancelled or rescheduled.
- If teaching is no longer given for a course, three examination occurrences are held during the immediately subsequent year, while examinations are at the same time held for any replacement course that is given, or alternatively in association with other re-examination opportunities. Furthermore, an examination is held on one further occasion during the next subsequent year, unless the board of studies determines otherwise.
- If a course is given during several periods of the year (for programmes, or on different occasions for different programmes) the board or boards of studies determine together the scheduling and frequency of re-examination occasions.

Registration for examination

In order to take an examination, a student must register in advance at the Student Portal during the registration period, which opens 30 days before the date of the examination and closes 10 days before it. Candidates are informed of the location of the examination by email, four days in advance. Students who have not registered for an examination run the risk of being refused admittance to the examination, if space is not available.

Symbols used in the examination registration system:

** denotes that the examination is being given for the penultimate time.

* denotes that the examination is being given for the last time.

Code of conduct for students during examinations

Details are given in a decision in the university's rule book:
http://styrdokument.liu.se/Regelsamling/VisaBeslut/622682.

Retakes for higher grade

Students at the Institute of Technology at LiU have the right to retake written examinations and computer-based examinations in an attempt to achieve a higher grade. This is valid for all examination components with code “TEN” and "DAT". The same right may not be exercised for other examination components, unless otherwise specified in the course syllabus.

Retakes of other forms of examination

Regulations concerning retakes of other forms of examination than written examinations and computer-based examinations are given in the LiU regulations for examinations and examiners, http://styrdokument.liu.se/Regelsamling/VisaBeslut/622678.

Plagiarism

For examinations that involve the writing of reports, in cases in which it can be assumed that the student has had access to other sources (such as during project work, writing essays, etc.), the material submitted must be prepared in accordance with principles for acceptable practice when referring to sources (references or quotations for which the source is specified) when the text, images, ideas, data, etc. of other people are used. It is also to be made clear whether the author has reused his or her own text, images, ideas, data, etc. from previous examinations.

A failure to specify such sources may be regarded as attempted deception during examination.

Attempts to cheat

In the event of a suspected attempt by a student to cheat during an examination, or when study performance is to be assessed as specified in Chapter 10 of the Higher Education Ordinance, the examiner is to report this to the disciplinary board of the university. Possible consequences for the student are suspension from study and a formal warning. More information is available at https://www.student.liu.se/studenttjanster/lagar-regler-rattigheter?l=sv.

Grades

The grades that are preferably to be used are Fail (U), Pass (3), Pass not without distinction (4) and Pass with distinction (5). Courses under the auspices of the faculty board of the Faculty of Science and Engineering (Institute of Technology) are to be given special attention in this regard.

1. Grades U, 3, 4, 5 are to be awarded for courses that have written examinations.
2. Grades Fail (U) and Pass (G) may be awarded for courses with a large degree of practical components such as laboratory work, project work and group work.

Examination components

1. Grades U, 3, 4, 5 are to be awarded for written examinations (TEN).
2. Grades Fail (U) and Pass (G) are to be used for undergraduate projects and other independent work.

3. Examination components for which the grades Fail (U) and Pass (G) may be awarded are laboratory work (LAB), project work (PRA), preparatory written examination (KTR), oral examination (MUN), computer-based examination (DAT), home assignment (HEM), and assignment (UPG).
4. Students receive grades either Fail (U) or Pass (G) for other examination components in which the examination criteria are satisfied principally through active attendance such as other examination (ANN), tutorial group (BAS) or examination item (MOM).

The examination results for a student are reported at the relevant department.

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.