



COURSE SYLLABUS

Forskningsmetodik med inriktning mot ingenjörsvetenskap

Research Methodology with emphasis on Engineering Science

7,5 ECTS credit points (7,5 högskolepoäng)

Course code: MT2521

Educational level: Second cycle

Course level: A1F

Field of education: Technology

Subject group: Mechanical Engineering

Subject area: Mechanical Engineering

Version: 13

Applies from: 2013-07-01

Approved: 2013-04-30

Replaces course syllabus approved: 2011-06-17

1 Course title and credit points

The course is titled Research Methodology with emphasis on Engineering Science/Forskningsmetodik med inriktning mot ingenjörsvetenskap and awards 7,5 ECTS credits. One credit point (högskolepoäng) corresponds to one credit point in the European Credit Transfer System (ECTS).

2 Decision and approval

This course is established by Department of Mechanical Engineering 2013-04-30. The course syllabus was revised by School of Engineering and applies from 2013-07-01.

Reg.no: BTH 4.1.1-0345-2013.

Replaces MT2511.

3 Objectives

The goal of the course is to give a fundamental introduction to modern approach to science, particularly to nature and engineering sciences. The course gives also an insight on history and philosophy of science and how the scientific methods could be applied in electrical and mechanical engineering. After the course the students should be able to carry on research projects and write a scientific report.

4 Content

PART 1: Theory, 2.5 ECTS credits

- History of science. A way from experience facts to experimentalism and bring up questions at issues as observations, experimental attempt, induction and deduction.
- Modern theory of science: falsificationism, Kuhn's paradigm, Lakato's research programmes, Feyerabend's anarchistic theory of science, subjective Bayesians, and new experimentalism.
- Principle of scientific methods.
- How to organise and write thesis/scientific report
- Legal and ethical aspects of research.

- Modern search tools for scientific sources.

PART 2: Project/Seminar, 5 ECTS credits

- Approaching research problem - a research question and hypothesis
- Validation and verification of research hypothesis
- Content of research report
- Using journal and conference templates
- Presenting and disputing of research results
- Reviewing of the research reports.
- Project management – project plan, milestones and deliveries
- Team work management

5 Aims and learning outcomes

After the course the students should be able to:

- have understanding for fundamental concept and theory concerning modern paradigm in science, special in natural and engineering sciences
- have a knowledge in scientific history and philosophy
- apply scientific methods within engineering
- write, present and dispute scientific papers and reports
- analyse, review and oppose scientific papers and reports
- use search tools and sources to base the research on scientific content
- cooperate within a project group and apply project management tools.

6 Generic skills

7 Learning and teaching

The teaching comprises lectures, group assignments and seminars.

Education and its contents will in extent be aimed against needs that arise at practice of the engineer trade.

English

8 Assessment and grading

Examination of the course

Code	Module	Credit	Grade
1310	Written examination	2.5 ECTS	A-F
1320	Project	5 ECTS	G-U

The course will be graded A Excellent, B Very good, C Good, D Satisfactory, E Sufficient, FX Fail, supplementation required, F Fail. Examinations can happen continuously during the course, by test at the end of the course or through a combination of these two forms.

Examinations can be oral and/or written.

In order to get grade 3 or higher the student has to show clearly that the faith spirit objectives been achieved.

If grade Fx are given, the student may after consultation with the course coordinator / examiner get an opportunity to within 6 weeks complement to grade E for the specific course element.

9 Course evaluation

The course coordinator is responsible for systematically gathering feedback from the students in course evaluations and making sure that the results of these feed back into the development of the course.

10 Prerequisites

Completed studies of at least 180 credits in the field of technology.

11 Field of education and subject area

The course is part of the field of education and is included in the subject area Mechanical Engineering. The course can also be included in the subject area Electrical Engineering.

12 Restrictions regarding degree

The course cannot form part of a degree with another course, the content of which completely or partly corresponds with the contents of this course.

13 Course literature and other teaching material**Compulsory literature:**

A.F. Chalmers: *What is this Thing Called Science?* ISBN 0-87220-452-9.

Compendia (provided by a teacher)

Internet

Data basis

Complementary literature:

A.F. Chalmers. *Vad är vetenskap egentligen? Om väsen och status hos vetenskapen och dess metoder.* ISBN-10: 9157804257.

Graziano, A.M., Raulin, M.L. *Research Methods. A Process on Inquiry.* ISBN 0-205-51221-6.

Samir Okasa. *Philosophy of Science; A Very Short Introduction.* ISBN 978-0-19-280283-5.

Wayne C Booth, Gregory G Colomb, Joseph M Williams: *Craft of Research.* ISBN 9780226065663.

Wayne C Booth, Gregory G Colomb, Joseph M Williams. *Forskning och skrivande: konsten att skriva enkelt och effektivt.* ISBN 9789144032276.

