MMA201   Representation Theory, 7.5 credits

Representationsteori, 7,5 högskolepoäng

Second Cycle

Confirmation

This course syllabus was confirmed by Department of Mathematical Sciences on 2018-12-20 to be valid from 2019-09-02, autumn semester of 2019.

Field of education: Science 100%
Department: Department of Mathematical Sciences

Position in the educational system

The course can be part of the following programme: 1) Mathematical Sciences, Master's Programme (N2MAT)

Main field of studies	*Specialization*
Mathematics	A1N, Second cycle, has only first-cycle course/s as entry requirements

Entry requirements

General entry requirements and the equivalent of 90 hec in mathematics including the course MMG500 Algebraic Structures.

Learning outcomes

On successful completion of the course the student will be able to:

- perform calculations in tensor algebra and Grassmann algebra,
- classify all abelian groups of a given order,
- compute the Jordan canonical form, as well as the primary and rational canonical forms, of a linear operator, and relate canonical forms to the eigenspace decomposition,
- use character tables to find fundamental properties of a finite group and of its representations.

Course content
- Theory of modules over rings.
- Classification of finitely generated modules over principal ideal domains.
- Applications to the classification of finitely generated abelian groups, and to canonical forms for linear operators.
- Tensor products of modules over commutative rings, including symmetric and antisymmetric tensor products.
- Representation theory of finite groups.
- Character tables.
- The Peter-Weyl theorem.
- Representation theory of the symmetric group.
- Introduction to representations of compact groups.

Form of teaching

Language of instruction: English

Assessment
There will be a written examination at the end of the course. During the course, there may be optional assignments that give bonus points on the exam. Examples of such assignments are small written tests, labs, and oral or written presentations. Information about this is found on the course home page.

If a student, who has failed the same examined component twice, wishes to change examiner before the next examination, a written application shall be sent to the department responsible for the course and shall be granted unless there are special reasons to the contrary (Chapter 6, Section 22 of Higher Education Ordinance).

Grades
The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U).

Course evaluation
The course is evaluated with an anonymous questionnaire and/or a discussion with the student representatives. The results of and possible changes to the course will be shared with students who participated in the evaluation and students who are starting the course.

Additional information

For a list of course literature, see:
https://www.chalmers.se/sv/institutioner/math/utbildning/grundutbildning-goteborgs-universitet/kurslitteratur/Sidor/Kurslitteratur-i-matematik.aspx