Exchange programme Vrije Universiteit

Vrije Universiteit Amsterdam - Exchange programme Vrije Universiteit - 2022-2023

Exchange

Vrije Universiteit Amsterdam offers many English-taught courses in a variety of subjects, ranging from arts & culture and social sciences, neurosciences and computer science, to economics and business administration.

The International Office is responsible for course approval and course registration for exchange students. For details about course registration, requirements, credits, semesters and so on, please visit the exchange programmes webpages.

Topology

Course Code	X_400416
Credits	6.00
Period	P4+5
Course Level	300
Language Of Tuition	English
Faculty	Faculty of Science
Course Coordinator	dr. T.O. Rot
Examiner	dr. T.O. Rot
Teaching Staff	dr. T.O. Rot
Teaching method(s)	Partial Exam, Lecture, Seminar

Course Objective

At the end of this course:
-the student is familiar with the basic concepts, such as topology, open and closed sets, and continuous functions, and is able to use these to prove some fundamental results;
-the student knows several ways to define a topology on a set and can compare different topologies on the same set;
-the student can determine if a given topological space satisfies certain properties (such as compactness and connectedness);
-the student understands the concept of homotopy of paths and fundamental group of a topological space, and is aware of the importance of these concepts for more advanced subjects, such as algebraic/differential topology
and differential geometry.

Course Content

This course is a first introduction to topology, that is, the mathematical study of the shape of space. The concepts that are introduced in this course are essential in understanding more advanced subjects, such as differential topology, functional analysis, and algebraic topology.

The following topics will be covered during the course:
-general topological spaces;
-topology generated by a basis;
-continuous maps and homeomorphisms;
-connectedness, path-connectedness, local connectedness;
-compactness, local compactness;
-products and quotients;
-homotopy of maps and paths;
-the fundamental group of a topological space;
-covering spaces;
-homotopy equivalence.

If time permits some of the following topics:

- Seifert van Kampen theorem
- Separation axioms
- Complete metric spaces.

Additional Information Teaching Methods

Lectures and tutorials (2+2 hours per week)

Method of Assessment

Method of Assessment

For this course there are hand in exercises, a midterm examination and a final exam which together determine the final grade. The weight of the components towards the final grade will be announced on canvas. There will also be a resit examination for which the hand-in exercises do not contribute to the grade.

Literature

Will be announced on canvas.

Additional Information Target Audience

Bachelor Mathematics, year 2

Recommended background knowledge

-The VU-course Basic concepts of mathematics, in order to be able to write a proof in a clear and structured manner;
-the VU-courses Analysis 1, for experience with convergence and continuity, also in the context of metric spaces;
-the VU-course Group theory (groups, homomorphisms, first isomorphism theorem): this is relevant in particular for the second part of the course, but also for examples and applications throughout the course.