**Study programme(s)**: Mathematics (MA)

**Level**: master

**Course title:** Semigroups (MA-16)

**Lecturer:** Igor V. Dolinka

**Status**: elective

**ECTS**: 5

**Requirements**: none

**Learning objectives**

To introduce students to the semigroup theory, which is the study of sets with one associative binary operation defined on them. In the process, the common aims and concerns of abstract algebra will be emphasised and illustrated by drawing comparisons between the semigroups, groups and rings.

**Learning outcomes**

Students are expected to:
- be familiar with the most important examples of semigroups and be able to perform calculations in them;
- understand the basic structure theory of semigroups;
- use the above knowledge in proving further results about semigroups and analysing examples.

**Syllabus**

The definitions and basic properties of semigroups, sub-semigroups, equivalence relations, congruences and homomorphisms, idempotents, regularity, inverses, Green's equivalences and Green's structure theory. Transformation semigroups. Free semigroups. Completely simple semigroups and the Rees-Suschkewitch Theorem. Inverse semigroups and the Vagner-Preston Theorem. Various other special classes of semigroups.

**Literature**


1. J. M. Howie, Fundamentals of Semigroup Theory, Oxford University Press, New York, 1995.
2. A. H. Clifford, G. M. Preston, Algebraic Theory of Semigroups Vol. I, AMS, Providence, 1961.
3. S. Bogdanović, M. Ćirić, Polugrupe, Prosveta, Niš, 1993.


| **Weekly teaching load** | | | | Other: 0 |
|---|---|---|---|---|
| Lectures: 3 | Exercises: 1 | Other forms of teaching: 0 | Student research: 0 | |

**Teaching methodology**

Lectures are presented using classical teaching methods and supported by beamer presentations. Exercises are used to practice and analyse typical problems and their solutions. The ability of application of theoretical knowledge is checked through independent solving of exercises on two colloquia. The final exam is oral and a student is supposed to demonstrate general understanding of the presented theoretical material.

**Grading (maximum number of points 100)**

| **Pre-exam obligations** | **points** | **Final exam** | **points** |
|---|---|---|---|
| Colloquia | **50** | Oral exam | **50** |