

M040	Obligatory - Year 5	History of Mathematics	L+P+S (2+0+0) + (2+0+0)	ECTS 3+3
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Course objectives. Students will learn about development of main mathematical ideas through history. In this way, knowing of many examples is obtained for future work of teachers of mathematics, as well as for their general culture. One will also be informed about connection of mathematics with other fields and social development, and previous acquainted materials are additionally established.

Course prerequisites. The materials from previous years of mathematical study.

Course contents.

Winter semester

Historic periods up to Renaissance are studied in chronological order.

1. Beginning of mathematics: Egyptian mathematics and Sumerian-Babylonian mathematics.
2. Ancient Greek mathematics: period before Euclid, during Euclid and after Euclid; mathematics in the Roman state.
3. Mathematics of non-European peoples: India, China.
4. Mathematics in the Middle Age: Arabian and European mathematics in the Middle Age.
5. Period of Renaissance: development of mathematical symbols, development of algebra, discovery of logarithms, applications of mathematics in physics, astronomy and arts.

Summer semester

Early Modern Age is studied according to the development of certain branches of mathematics.

1. Development of mathematical analysis after Renaissance: precursors, discovery and further development of infinitesimal calculus, series, continuity; complex numbers.
2. Development of the probability theory: the birth and development down to axiomatization.
3. Development of geometry after Renaissance: the discovery of projective and analytical geometry, non-Euclidean geometry. Formation of topology.
4. Development of algebra after Renaissance: formation of group theory, matrix theory, vector spaces, fundamental theorem of algebra.
5. Development of number theory in Early Modern Age.
6. Formation of set theory.

Expected learning outcomes.

After passing the examination, students are expected to:

- demonstrate knowledge of development of mathematics through history;
- place used mathematical cognition in its historical mathematical context;
- use interesting historical mathematical examples in their work;
- inform pupils and persons from their professional and social vicinity about appropriate mathematical ideas through history;
- apply known historical data in order to illustrate connections of mathematics with other scientific and professional fields;
- use mathematical ideas from the past in solving contemporary mathematical problems.

Teaching methods and student assessment. Lectures are obligatory. During academic year, students can write a seminar and hold a related presentation on a given topic in agreement with the teacher. This affects the final mark. Students may take mid-term exams which are not obligatory. Mid-term exam 1 covers winter semester topics and it is taken within the winter examination period in February. Mid-term exam 2 covers summer semester topics and and it is taken within the summer examination period in June. Acceptable mid-term exam scores partly or completely replace the oral examination.

Can the course be taught in English: Yes.

Basic literature:

1. F. M. Brueckler, Povijest matematike I, Odjel za matematiku Sveučilišta J. J. Strossmayera u Osijeku, 2007.
2. F. M. Brueckler, Povijest matematike II, Odjel za matematiku Sveučilišta J. J. Strossmayera u Osijeku, 2010.

Recommended literature:

1. Ž. Dadić: Razvoj matematike. Ideje i metode egzaktnih znanosti u njihovu povijesnom razvoju, Školska knjiga, Zagreb, 1975.
2. Z. Šikić, Kako je stvarana novovjekovna matematika, Školska knjiga Zagreb, 1989.
3. Š. Znam i dr., Pogled u povijest matematike, Tehnička knjiga Zagreb, 1989.
4. D. E. Smith: History of Mathematics - Vol. I, Dover, New York, 1958.
5. D. E. Smith: History of Mathematics - Vol. II, Dover, New York, 1953.
6. S. Anglin, J. Lambek: The Heritage of Thales, Springer Verlag, Berlin, 1995.

The MacTutor History of Mathematics Archives, <http://www-groups.dcs.st-and.ac.uk/~history/>