COURSE DESCRIPTION CARD - SYLLABUS

Course name
History of mathematics [S1MNT1>POH-HM]

Course

Field of study
Mathematics of Modern Technologies

Year/Semester
4/7

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture
15

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

1,00

Coordinators

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Lecturers

Prerequisites

The participant knows higher mathematics to the extent taught in the first six semesters of mathematics studies.

Course objective

Reflection on the development of mathematics (shown chronologically and thematically) and on the importance of mathematics in the development of civilization.

Course-related learning outcomes

Knowledge:
• knows and understands the impact of social and civilization changes on the lifestyle of society [K_W12(P6S_WG)].

Skills:
• is able to present issues in the form of a presentation or a report using data visualization / computer graphics using specialized terminology (without neglecting the vocabulary, e.g. in English), she/he demonstrates an understanding of the development process of mathematical concepts and methods,

in conjunction with logic, philosophy, physics and sciences engineering [K_U10(P6S_UW)];
• is able to perceive non-technical aspects, inter alia environmental / economic / ethical / legal, when formulating and solving engineering problems [K_U10(P6S_UW)].

Social competences:
• is ready to fulfil his/her social role as a graduate of a technical university, including communicating popular scientific content to the public and identifying and solving basic problems concerning the field of study and promoting mathematics as a basis for analytical reasoning and precise formulation of correct conclusions [K_K01(P6S_KK)].
• is ready open for further education due to the awareness of the limitations of his own knowledge, she/he is aware that mathematics is an important element of general culture and an indispensable factor in the development of civilization, including techniques [K_K03(P6S_KO)];
• isreadytoactappropriatelyandfulfilhis/herobligationsinthesocialenvironment[K_K03(P6S_KO)];
• isreadytoactcreativelyandentrepreneurially/thinkforthepublicinterestandinitiateit[K_K04(P6S_KR)];
• is ready to act ethically / respect intellectual property in his/her own actions and inspire others to follow professional ethics [K_K05(P6S_KR)].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures: each participant of the course prepares a (doc or ppt) file discussing a selected topic from the history of mathematics, next presents it; this presentation is rated (on a scale form 2 to5) and is made available by the teacher to the other course participants.

Programme content

Update: 01.06.2023r.
Lectures:
• Notches and incisions, drawings and ornaments - the beginnings of numbers, arithmetic and geometry;
• Mathematics in ancient Mesopotamia, Egypt, India and China, as well as in America and Oceania;
• Greek period
• Hellenic period
• Islamic mathematics
• Middle Ages
• 16th century
• 17th century
• 18th century
• XIX century
• The 20th century
• Promotion of achievements through awards

Course topics

Update: 01.06.2023r.
Lectures:
• Notches and incisions, drawings and ornaments - the beginnings of numbers, arithmetic and geometry;
• Mathematics in ancient Mesopotamia, Egypt, India and China, as well as in America and Oceania;
• Greek period (Thales, Pythagoras, Zeno of Elea, Plato);
• Hellenic period (Euclid, Archimedes, Menelaus, Diophantus, Apollonius of Perga);
• Islamic mathematics (al-Charizmi, al-Karaji, al-Tussi);
• Middle Ages (Fibonacci, Oresme, Regiomontanus);
• 16th century (Dürer, Tartaglia, Cardano, L. Ferrari);
• 17th century (Napier, Galileo, Descartes, P. de Fermat, B. Pascal, I. Newton, G. Leibniz);
• 18th century (Jacob and Johann Bernoulli, Euler, Lambert, Lagrange, Laplace, Legendre);
• XIX century (Fourier, Gauss, Cauchy, Lobaczewski, Abel, Bolyai, Jacobi, Hamilton, Galois, Boole, Weierstrass, Cayley, Riemann, Cantor, Klein, Poincaré, Peano, Hilbert);
• The 20th century (Whitehead, Minkowski, Russell, Hardy, Ramanujan, von Neumann, Gödel, Weil, Turing, Erdös, E. Lorenz, Grothendieck, Nash, Appel and Haken, Cohen, Conway, Matijasiewicz, Wiles, Perelman);
• Promotion of achievements through such awards as Fields medals (1936 and every 4 years since 1950),

Wolfae awards (since 1978), Nevallina (since 1982, since 2019 called Abacus prize), Poincaré (since 1997), Ostrowski (every 2 years since 1989), Abel (since 2003), Ramanujan (since 2005), Gauss (every 4 years since 2006).

Teaching methods

Lectures: lecture given with slide presentations and essays prepared by the audience.

Bibliography

Basic:
• M. Kordos - Wykłady z historii matematyki, Script 2005;
• C.A. Pickover - The math book. From Pythagoras to the 57th dimension, 250 milestones in the history of mathematics, Sterling 2009;
• J. Stillwell - Mathematics and its history, Springer 2010 (3rd ed.);
• D.J. Struik - Krótki zarys historii matematyki do końca XIX wieku, PWN 1963.

Additional:
• J. L. Coolidge - The story of the binomial theorem, AMM 56, 1949, 147-157.
• J.-P. Friedelmeyer - Euler, ou l'art de chercher, découvrir, inventer, APMEP no.437, 2014, 867-879.
• E. A. González-Velasco - Journey through mathematics. Creative episodes in its history, Springer 2011.
• S. Hawking (ed.) - God created the integers. The mathematical breakthroughs that changed history, Running Press 2007.
• L. Hodgkin - A history of mathematics from Mesopotamia to modernity, Oxford University Press 2005.
• M. Kline - Mathematical thought from ancient to modern times (in 3 volumes), Oxford University Press 1972.
• S. G. Krantz - An episodic history of mathematics: Mathematical culture through problem solving, Mathematical Association of America 2009.
• L. Maligranda, W. Wnuk - 100 lat matematyki na Uniwersytecie w Poznaniu 1919-2019, WN UAM 2021.
• R. Murawski - Filozofia matematyki. Zarys dziejów, Wyd.Naukowe UAM 2017.
• M. Nauenberg - Barrow and Leibniz on the fundamental theorem of the calculus, arXiv:1111.6145, 2011, 1-27.
• E. Robertson, J. O'Connor - MacTutor history of mathematics, University of St Andrews, Scotland, https://mathshistory.st-andrews.ac.uk/ (visited 2022-05-21)
• S. Shapiro - Thinking about mathematics. The philosophy of mathematics Oxford University Press 2000.
• W. Smith et al. - The story of mathematics, Luke Mastin, https://www.storyofmathematics.com/ (visited 2020-08-29).
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• M. Szurek - Liczby w kulturze, Matematyka Stosowana 7, 2006, 52-78.
• R.Wagner - Making and breaking mathematical sense: Histories and philosophies of mathematical practice, Princeton University Press 2017.
• W. Więsław - Matematyka Hoene-Wrońskiego i za jego czasów, w: Hoene-Wroński. Życie, matematyka i filozofia, IM PAN, Warszawa 2008, 1-14.
• A. Wojciechowska - Rozwój matematyki a przemiany w jej nauczaniu, cz.I i II, msn.1 (UP-H Siedlce), 1988, 8-11, 14-20.
• L. Young - Mathematicians and their times: History of mathematics and mathematics of history, North Holland 1981.

Breakdown of average student's workload

	Hours	ECTS
Total workload	25	1,00
Classes requiring direct contact with the teacher	15	0,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	10	0,50