UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Izbrana poglavja iz diskretne matematike
Course title:	Topics in Discrete Mathematics

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Matematika, 3. stopnja		**1. ali 2.**	**1. ali 4.**
Mathematics, 3rd Degree		**1st or 2nd**	**1st or 4th**

Vrsta predmeta / Course type   izbirni/elective

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
30					120	5

Nosilec predmeta / Lecturer: Sandi Klavžar

Jeziki / **Languages:**	**Predavanja /** **Lectures:**	Slovenski in angleški jezik; Slovene and English
	Vaje / Tutorial:	Slovenski in angleški jezik; Slovene and English

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Prerequisits:

Poznanje temeljnih konceptov diskretne matematike: klasične in algebraične kombinatorike, teorije grafov, teorije načrtov. Poznavanje osnov linearne algebre, teorije grup, kombinatorike delno urejenih množic.	Basic knowledge of fundamental concepts of discrete mathematics: classical and algebraic combinatorics, graph theory, design theory. Knowledge of basic linear algebra, group theory, combinatorics of partially ordered sets.

Vsebina:

Content (Syllabus outline):

Izbrana so posebna poglavja iz teorije grafov, klasične in algebraične kombinatorike, uporab diskretne matematike, ali katerega drugega modernega področja diskretne matematike. Izbira poglavij je odvisna od interesa in raziskovalne usmerjenosti študentov ter trendov v sodobni diskretni matematiki. Spodaj navedena literatura praviloma služi le kot osnova in je nadgrajena z bolj specializiranimi teksti.	Special topics in graph theory, classical and algebraic combinatorics, applications of discrete mathematics, or some other area of contemporary discrete mathematics are chosen. The choice depends on students' interests and their research orientation, as well as on trends in modern discrete mathematics. The literature below in principle serves only as a basis, and is combined with more specialized texts.

Temeljni literatura in viri / Readings:

- M. Aigner, Discrete Mathematics, American Mathematical Society, Providence, 2007.
- R. Diestel, Graph Theory, Third Edition, Springer, Berlin, 2005.
- C. Godsil, G. Royle, Algebraic Graph Theory, Springer, New York, 2001.
- P. Hell, J. Nešetril, Graphs and Homomorphisms, Oxford University Press, Oxford, 2004.
- W. Imrich, S. Klavžar, Product Graphs : Structure and Recognition, Wiley-Interscience, New York, 2000.
- J. H. van Lint, R. M. Wilson, A Course in Combinatorics, Cambridge University Press, Cambridge, 2001.
- B. Mohar, C. Thomassen, Graphs on Surfaces, Johns Hopkins University Press, Baltimore, 2001.

Cilji in kompetence:

- študentu predstaviti izbrano področje moderne diskretne matematike, kar lahko služi kot uvod v raziskovalno delo; - Doseči poglobljeno razumevanje teoretskih in metodoloških konceptov s področja diskretne matematike - Razviti sposobnost za samostojno reševanje najzahtevnejših problemov iz diskretne matematike - Zmožnost razvijanja kritične refleksije na področju diskretne matematike	

Objectives and competences:

- to present a selected area of modern discrete mathematics, which can serve as an introduction to student's research work;
- To achieve a deeper understanding of theoretical and methodological concepts of discrete mathematics
- To develop the ability for solving the most challenging problems in discrete mathematics
- Ability to develop critical reflection in discrete mathematics

Predvideni študijski rezultati: Intended learning outcomes:

Znanje in razumevanje: - poglobljeno znanje posebnega področja diskretne matematike; - poglobljeno razumevanje nekaterih posebnih pojmov diskretne matematike. Prenosljive/ključne spretnosti in drugi atributi: - podlaga za raziskovalno delo na posebnem področju diskretne matematike.	Knowledge and understanding: - a deeper knowledge of a special topic in discrete mathematics; - a deeper understanding of some special concepts in discrete mathematics. Transferable/Key Skills and other attributes: - a basis for research in a special area of discrete mathematics.

Metode poučevanja in učenja: Learning and teaching methods:

	lectures;
• predavanja;	• lectures;
• priprava seminarja;	• seminar work;
• konzultacije;	• consultations;
• samostojni študij.	• self-study.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Način (pisni izpit, ustno izpraševanje, naloge, projekt)		Type (examination, oral, coursework, project):
• seminar;	**20 %**	• seminar;
• domače naloge;	**30 %**	• homework;
• ustni izpit.	**50 %**	• oral examination.

Reference nosilca / Lecturer's references:

IMRICH, Wilfried, KLAVŽAR, Sandi, RALL, Douglas F.. *Topics in graph theory : graphs and their Cartesian product*. Wellesley (Mass.): A. K. Peters, 2008. XIV, 205 str., ilustr. ISBN 978-1-56881-429-2. [COBISS.SI-ID 14965081]

HAMMACK, Richard H., IMRICH, Wilfried, KLAVŽAR, Sandi. *Handbook of product graphs*, (Discrete mathematics and its applications). Boca Raton; London; New York: CRC Press, cop. 2011. XVIII, 518 str., ilustr. ISBN 978-1-4398-1304-1. [COBISS.SI-ID 15916121]

HINZ, Andreas M., KLAVŽAR, Sandi, MILUTINOVIĆ, Uroš, PETR, Ciril. *The tower of Hanoi - Myths and Maths*. Basel [etc.]: Birkhäuser, cop. 2013. XV, 335 str., ilustr. ISBN 978-3-0348-0236-9. ISBN 978-3-0348-0237-6. http://dx.doi.org/10.1007/978-3-0348-0237-6, doi: 10.1007/978-3-0348-0237-6. [COBISS.SI-ID 16565337]

KLAVŽAR, Sandi. Structure of Fibonacci cubes: a survey. *Journal of combinatorial optimization*, ISSN 1382-6905, 2013, vol. 25, iss. 4, str. 505-522. http://dx.doi.org/10.1007/s10878-011-9433-z. [COBISS.SI-ID 16603737]

KLAVŽAR, Sandi, SHPECTOROV, Sergey. Convex excess in partial cubes. *Journal of graph theory*, ISSN 0364-9024, 2012, vol. 69, no. 4, str. 356-369. http://dx.doi.org/10.1002/jgt.20589. [COBISS.SI-ID 16243033]