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 3. ali 4.**
Mathematics, 3rd cycle		**1st or 2nd**	**1st or 3rd 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					150	6

Nosilec predmeta / Lecturer: Boštjan Brešar

Jeziki / Languages:	Predavanja / Lectures:	Slovenski jezik; Slovene
	Vaje / Tutorial:	

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

Poznanje temeljnih konceptov diskretne matematike: klasične in algebraične kombinatorike, teorije grafov, teorije načrtov. Poznavanje osnov linearne algebre, teorije grup, kombinatorike delno urejenih množic.

Prerequisits:

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:

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.

Content (Syllabus outline):

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, 5th Edition, Springer, Berlin, 2016.
- C. Godsil, G. Royle, Algebraic Graph Theory, Springer, New York, 2001.
- G. Grätzer, General Lattice Theory, 2nd Edition, Birkhäuser, Basel, 2003.
- R. Hammack, W. Imrich, S. Klavžar, Handbook of Product Graphs, 2nd Edition, CRC Press, Boca Raton, 2016.
- P. Hell, J. Nešetril, Graphs and Homomorphisms, Oxford University Press, Oxford, 2004.
- J. H. van Lint, R. M. Wilson, A Course in Combinatorics, Cambridge University Press, Cambridge, 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:

Znanje in razumevanje:

- poglobljeno znanje posebnega področja diskretne matematike;
- poglobljeno razumevanje nekaterih posebnih pojmov diskretne matematike.

Prenesljive/ključne spretnosti in drugi atributi:

- podlaga za raziskovalno delo na posebnem področju diskretne matematike.

Intended learning outcomes:

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

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

Reference nosilca / Lecturer's references:

1. BREŠAR, Boštjan, VALENCIA-PABON, Mario. Independence number of products of Kneser graphs. *Discrete Mathematics*, ISSN 0012-365X. [Print ed.], April 2019, vol. 342, iss. 4, str. 1017-1027. https://doi.org/10.1016/j.disc.2018.12.017, doi: 10.1016/j.disc.2018.12.017. [COBISS.SI-ID 18538073] kategorija: 1A3

2. BREŠAR, Boštjan, KLAVŽAR, Sandi, RALL, Douglas F., WASH, Kirsti. Packing chromatic number versus chromatic and clique number. *Aequationes mathematicae*, ISSN 0001-9054, 2018, vol. 92, iss. 3, str. 497-513. https://doi.org/10.1007/s00010-017-0520-9. [COBISS.SI-ID 18370905] kategorija: 1A2

3. BREŠAR, Boštjan, FERME, Jasmina. Packing coloring of Sierpiński-type graphs. *Aequationes mathematicae*, ISSN 0001-9054, Dec. 2018, vol. 92, iss. 6, str. 1091-1118. https://doi.org/10.1007/s00010-018-0561-8, doi: 10.1007/s00010-018-0561-8. [COBISS.SI-ID 18480985] kategorija: 1A2

4. BONOMO, Flavia, BREŠAR, Boštjan, GRIPPO, Luciano, MILANIČ, Martin, SAFE, Martin Dario. Domination parameters with number 2 : interrelations and algorithmic consequences. *Discrete applied mathematics*, ISSN 0166-218X. [Print ed.], Jan. 2018, vol. 235, str. 23-50. http://doi.org/10.1016/j.dam.2017.08.017. [COBISS.SI-ID 18192985] kategorija: 1A3

5. BREŠAR, Boštjan, MOVARRAEI, Nazanin. On the number of maximal independent sets in minimum colorings of split graphs. *Discrete applied mathematics*, ISSN 0166-218X. [Print ed.], Oct. 2018, vol. 247, str. 352-356. https://doi.org/10.1016/j.dam.2018.03.083, doi: 10.1016/j.dam.2018.03.083. [COBISS.SI-ID 18422873] kategorija: 1A3