



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Uvod v matematiko
Course title:	Introduction to Mathematics

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Enovit magistrski študijski program druge stopnje Predmetni učitelj	/	1.	1.
Five-year master's degree program Subject Teacher	/		

Vrsta predmeta / Course type

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
30		45			75	5

Nosilec predmeta / Lecturer:

Jeziki /	Predavanja / Lectures:	slovenski / Slovenian
Languages:	Vaje / Tutorial:	slovenski / Slovenian

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Ni jih.	None.

Vsebina: **Content (Syllabus outline):**

- Pojem izreka: izreki tipa “če-potem” in “če in samo če”, osnovne logične povezave, poimenovanje izrekov (lema, trditev, izrek, posledica). Pojem definicije v matematiki. Primeri dokazov na primerih iz elementarne matematike. Pojem protiprimera. Metode dokazovanja: direktna izpeljava, dokaz s protislovjem, dokaz z najmanjšim protiprimerom, matematična indukcija. Matematični poskusi. Heuristika.
- Realna števila. Ravninski koordinatni sistem. Elementarne funkcije: linearne, kvadratne, polinomi, racionalne, eksponentne, logaritemske, trigonometrične in njihovi inverzi.

- The concept of a theorem: “if-then” theorems, “if and only if theorems”, basic logic connections, naming theorems (lemma, proposition, theorem, corollary). The concept of a definition in mathematics. Examples of proofs from elementary mathematics. Proof methods: direct proofs, proof by contradiction, proof by smallest counterexample, mathematical inductions. Experiments in mathematics. Heuristics.
- Real numbers. Plane coordinate system. Elementary functions: linear, quadratic, polynomial, rational, exponential, logarithmic, trigonometric and their inverses.

Temeljni literatura in viri / Readings:

G. Polya, Kako rešujemo matematične probleme, DMFA založništvo, Ljubljana, 1989

E. R. Scheinerman, Mathematics, A Discrete Introduction, Second Edition, Brooks/Cool, Pacific Grove, 2006

Ronald L. Graham, Donald E. Knuth, Oren Patashnik, Concrete mathematics : a foundation for computer science, Addison-Wesley, 1999

Cilji in kompetence:

Spoznati osnovne principi matematičnega mišljenja in dela. Spoznati matematični formalizem in dokazovanje v matematiki ter načine kreativnega reševanja matematičnih problemov. Spoznati elementarne funkcije.

Objectives and competences:

To know basic principles of mathematical thinking and work. To know mathematical formalism and methods of proofs in mathematics, as well as methods of creative solving of mathematical problems. To know elementary functions.

Predvideni študijski rezultati:

Znanje in razumevanje:

- Razumevanje temeljnih principov matematike.
- Dokazovanje preprostejših izrekov z različnimi metodami.
- Sposobnost za uporabo heurističnih metod.
- Sposobnost dela z elementarnimi funkcijami.
- Pridobljena znanja so osnova za vse druge matematične predmete.

Intended learning outcomes:

Knowledge and understanding:

- Ability to understand basic principles of mathematics.
- Proving simpler theorems using different methods.
- Ability to use heuristic methods.
- Ability to work with elementary functions.
- The obtained knowledge forms a foundation for all other mathematical subjects.

Metode poučevanja in učenja:

Learning and teaching methods:

- Predavanja
- Seminarske vaje
- Individualno delo

- Lectures
- Tutorials
- Individual work

Delež (v %) /

Načini ocenjevanja:

Weight (in %)

Assessment:

<p>Pisni izpit – problemi</p> <p>Ustni izpit – teorija</p> <p>Pisni izpit – problemi se lahko nadomesti z dvema delnima testoma (ki sta sprotni obveznosti).</p> <p>Tako pisni izpit – problemi kot ustni izpit – teorija morata biti opravljena s pozitivno oceno.</p> <p>Positivna ocena pri pisnem izpitu - problemi je pogoj za pristop k ustnemu izpitu – teorija.</p>	<p>50 %</p> <p>50 %</p>	<p>Written exam – problems</p> <p>Oral exam – theory</p> <p>Written exam – problems can be replaced with two mid-term tests.</p> <p>Both written exam - problems and oral exam - theory must be assessed with a passing grade.</p> <p>Passing grade of the written exam – problems is required for taking the oral exam – theory.</p>
---	-------------------------	---

Reference nosilca / Lecturer's references:

1. BANIČ, Iztok, ČREP NJAK, Matevž, MERHAR, Matej, MILUTINOVIĆ, Uroš, SOVIČ, Tina. The closed subset theorem for inverse limits with upper semicontinuous bonding functions. *Bulletin of the Malaysian Mathematical Society*, ISSN 0126-6705, 2019, vol. 42, iss. 3, str. 835-846, doi: [10.1007/s40840-017-0517-5](https://doi.org/10.1007/s40840-017-0517-5). [COBISS.SI-ID [23281928](#)].
2. BANIČ, Iztok, ČREP NJAK, Matevž, MERHAR, Matej, MILUTINOVIĆ, Uroš. The (weak) full projection property for inverse limits with upper semicontinuous bonding functions. *Mediterranean journal of mathematics*, ISSN 1660-5446, Aug. 2018, vol. 15, iss. 4, str. 1-21, doi: [10.1007/s00009-018-1209-6](https://doi.org/10.1007/s00009-018-1209-6). [COBISS.SI-ID [23960328](#)].
3. BANIČ, Iztok, ČREP NJAK, Matevž, MERHAR, Matej, MILUTINOVIĆ, Uroš, SOVIČ, Tina. An Anderson-Choquet-type theorem and a characterization of weakly chainable continua. *Mediterranean journal of mathematics*, ISSN 1660-5446, 2017, vol. 14, iss. 2, str. 1-14, doi: [10.1007/s00009-017-0868-z](https://doi.org/10.1007/s00009-017-0868-z). [COBISS.SI-ID [22997512](#)].
4. BANIČ, Iztok, ČREP NJAK, Matevž, ERCEG, Goran, MERHAR, Matej, MILUTINOVIĆ, Uroš. Inducing functions between inverse limits with upper semicontinuous bonding functions. *Houston journal of mathematics*, ISSN 0362-1588, 2015, vol. 41, no. 3, str. 1021-1037. [COBISS.SI-ID [21550856](#)].
5. BANIČ, Iztok, ČREP NJAK, Matevž, MERHAR, Matej, MILUTINOVIĆ, Uroš. Inverse limits, inverse limit hulls and crossovers. *Topology and its Applications*, ISSN 0166-8641. [Print ed.], 2015, vol. 196, str. 155-172, doi: [10.1016/j.topol.2015.09.040](https://doi.org/10.1016/j.topol.2015.09.040). [COBISS.SI-ID [21615112](#)].