Univerza v Mariboru

Fakulteta za naravoslovje in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	**Osnove analize**
Course title:	Calculus

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Fizika, 1. stopnja		**1.**	**2.**
Physics, 1st degree		**1.**	**2.**

Vrsta predmeta / Course type	Obvezni / Obligatory
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
60		**45**			**105**	**7**

Nosilec predmeta / Lecturer: Uroš Milutinović

Jeziki / Languages:	**Predavanja / Lectures:**	SLOVENSKO/SLOVENE
	Vaje / Tutorial:	SLOVENSKO/SLOVENE

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
Priporočeno je predznanje maturitetnega kurza matematike.	Matura-level knowledge of mathematics is recommended.

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

1. Funkcije ene realne spremenljivke. Pregled elementarnih funkcij. Zveznost in limita funkcij. 2. Definicija in geometrijski pomen odvoda, odvodi elementarnih funkcij, pravila za odvajanje. Analiza poteka funkcije; monotonost, konveksnost in konkavnost; ekstremi in prevoji. Lagrangeov izrek, L'Hospitalovo pravilo. Višji odvodi. 3. Zaporedja, vrste, potenčne vrste, Taylorjeve vrste. 4. Definicija nedoločenega integrala, metode integriranja, integrali elementarnih funkcij. Definicija določenega integrala. Newton-Leibnizova formula. Uporaba določenega integrala. 5. Pojem diferencialne enačbe.	1. Functions of one real variable. Elementary functions. Continuity and limits of functions. 2. Definition and geometric meaning of a derivative, derivatives of elementary functions, rules for calculating derivatives. Determining the graph of a function; monotonicity, convexity, maxima and minima, inflexion points. Mean value theorems. L'Hospital's rule. Higher order derivatives. 3. Sequences, series, power series, Taylor's series. 4. Indefinite integrals, methods of integration, integrals of elementary functions. Definition of the definite integral. The fundamental theorem of the calculus. Applications. 5. The concept of a differential equation.

Temeljni literatura in viri / Readings:

1. Vidav: Višja matematika I. Ljubljana, DZS, 1974
2. F. Ayres, J., E. Mendelson: Schaum's Outline of Calculus, New York, McGraww-Hill, 1962
(Fourth Edition, 1999)
3. E. Mendelson: 3000 Solved Problems in Calculus. New York, McGraw-Hill,1988

Cilji in kompetence:	**Objectives and competences:**
Študentje obvladajo osnovne pojme in metode analize, na nivoju diferencialnega in integralnega računa funkcij ene realne spremenljivke.	Students learn the basic concepts and methods of the calculus of functions of one real variable.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje. Znajo osnove analize. Prenesljive/ključne spretnosti in drugi atributi: Matematično orodje, ki je nujno potrebno za delo pri vseh fizikalnih predmetih.	Knowledge and understanding. They know calculus. Transferable/Key Skills and other attributes: Knowledge of mathematical tools that is essential for all the subjects on physics

Metode poučevanja in učenja:	Learning and teaching methods:
• Predavanja • Teoretične vaje	• Lectures • Theoretical exercises

Načini ocenjevanja:		Assessment:
Način (pisni izpit, ustno izpraševanje, naloge, projekt) Izpit: Pisni izpit – problemi Ustni izpit – teorija Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno. Pozitivna ocena pri pisnem izpitu - problemi je pogoj za pristop k ustnemu izpitu – teorija. Pisni izpit – problemi se lahko nadomesti z dvema delnima testoma (ki sta sprotni obveznosti).	Delež (v %) / Weight (in %) 50% 50%	Type (examination, oral, coursework, project): Exams: Written exam – problems Oral exam – theory Each of the mentioned assessments must be assessed with a passing grade. Passing grade of the written exam – problems is required for taking the oral exam – theory. Written exam – problems can be replaced by two mid-term tests.
Reference nosilca / Lecturer's references:		

1. BANIČ, Iztok, ČREPNJAK, Matevž, MERHAR, Matej, MILUTINOVIĆ, Uroš, SOVIČ, Tina. Ważewski's universal dendrite as an inverse limit with one set-valued bonding function. *Preprint series*, 2012, vol. 50, št. 1169, str. 1-33. http://www.imfm.si/preprinti/PDF/01169.pdf. [COBISS.SI-ID 16194137]

2. BANIČ, Iztok, ČREPNJAK, Matevž, MERHAR, Matej, MILUTINOVIĆ, Uroš. Paths through inverse limits. *Topol. appl.*. [Print ed.], 2011, vol. 158, iss. 9, str. 1099-1112. http://dx.doi.org/10.1016/j.topol.2011.03.001. [COBISS.SI-ID 18474504]

3. BANIČ, Iztok, ČREPNJAK, Matevž, MERHAR, Matej, MILUTINOVIĆ, Uroš. Limits of inverse limits. *Topol. appl.*. [Print ed.], 2010, vol. 157, iss. 2, str. 439-450. http://dx.doi.org/10.1016/j.topol.2009.10.002. [COBISS.SI-ID 15310169]

4. KLAVŽAR, Sandi, MILUTINOVIĆ, Uroš, PETR, Ciril. Stern polynomials. *Adv. appl. math.*, 2007, vol. 39, iss. 1, str. 86-95. http://dx.doi.org/10.1016/j.aam.2006.01.003. [COBISS.SI-ID 14276441]

5. IVANŠIĆ, Ivan, MILUTINOVIĆ, Uroš. Closed embeddings into Lipscomb's universal space. *Glas. mat.*, 2007, vol. 42, no. 1, str. 95-108. [COBISS.SI-ID 14338393]