UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	SPOROČANJE MATEMATIČNIH IN FIZIKALNIH ODKRITIJ
Course title:	Communication of discoveries in mathematics and physics

Vrsta predmeta / Course type | D - Splošni izbirni predmet

Univerzitetna koda predmeta / University course code: | /

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
10	20	0		0	120	5

Nosilec predmeta / Lecturer:

doc. dr. Jurij Bajc
doc. dr. Boštjan Kuzman

Jeziki / Languages:

Predavanja / Lectures:	slovenščina, angleščina
Vaje / Tutorial:	slovenščina, angleščina

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

Prerequisits:

Vpis v letnik študija.	The enrolment in the study year is required.

Vsebina:

1. Oris vloge matematike in fizike v sodobni družbi.
2. Predstavitev izbranih znanstvenih metod in aktualnih dosežkov iz različnih področij matematike in fizike (npr. teorija grafov, algebra, seizmologija, fizika delcev in drugih …) ter javnega poročanja o teh dosežkih.
3. Pregled orodij za komunikacijo in širjenje znanstvenih idej in odkritij z uporabo tradicionalnih (radio, televizija, tisk) in novih medijev (svetovni splet, elektronska pošta, znanstveni blogi in forumi, film, spletni videoposnetki in videokonference, socialna omrežja, orodja za sodelovanje na daljavo …).
4. Spoznavanje različnih načinov promocije in širjenja javne zavesti o pomenu znanstvenih odkritij s področja matematike in fizike: javne predstavitve in predavanja za različne ciljne javnosti, delavnice, razprave, skupinski eksperimenti, tekmovanja, natečaji, razstave, gledališke predstave, umetniški projekti, koncerti, umetniške skulpture.
5. Prilagajanje različnim ciljnim javnostim: predšolska, osnovnošolska, srednješolska mladina, izobraženci in strokovna javnost.

Content (Syllabus outline):

1. Outline of the role of mathematics and physics in contemporary society.
2. Presentation of selected scientific methods and recent achievements in different fields of mathematics and physics (for instance, graph theory, algebra, seismology, particle physics, etc.) and public reports about these achievements.
3. Overview of tools for communication and circulation of scientific ideas and discoveries by means of traditional (radio, TV, press) and new media (world wide web, e-mail, scientific blogs and forums, movies, video recordings and video conferences, social networks, group collaboration tools, etc.).
4. Introduction to different means of promotion and raising public awareness about the importance of scientific achievements in mathematics and physics: public presentations and lectures for different target audiences, workshops, debates, group experiments, competitions, contests, exhibitions, theatrical shows, artistic projects, concerts, artistic sculptures.
5. Adopting content to different target audiences: preschool, primary, secondary school youth, educated public, and general public.

6. Razvoj razumevanja odnosa med popularizacijo in široko poljudnostjo ter strokovnostjo in poglobljenimi pristopi.	6. Development of understanding the relation between popularization and wide acceptability versus scholarly and in-depth approach.
7. Predstavitev izbranih uspešnih primerov iz domače in mednarodne prakse: matematične ali fizikalne razstave, muzeji, festivali, tradicionalni in posebni priložnostni projekti (Verižni eksperiment, projekt MARS, Svetovno leto fizike, Mednarodno leto astronomije, Matematika planeta Zemlja …).	7. Presentation of selected successful examples from home and international practice: mathematical or physical exhibitions, museums, festivals, traditional and specific occasion projects (The Chain Experiment, Project MARS, World year of Physics, International year of Astronomy, Mathematics of Planet Earth, etc.).

Temeljni literatura in viri / Readings:

1. BEHRENDS, Erhard, CRATO, Nuno, RODRIGUES, José Francisco (Eds.), Raising Public Awareness of Mathematics, ISBN 978-3-642-25710-0, Springer 2012, XV, 404 p. 292 illus., 254 illus. in colour.
2. Raising public awareness of science and technology: a review of actions in the fifth framework programme (1998-2002) / prepared by European Commission, Directorate-General for Research, Luxembourg: Office for Official Publications of the European Communities, cop. 2004.
3. DEVLIN, Keith: Nova zlata doba matematike. - Ljubljana: Društvo matematikov, fizikov in astronomov Slovenije, 1993. - 272 str. : graf. prikazi ; 20 cm. - (Knjižnica Sigma, ISSN 1408-1547 ; 53).
4. DERGANC, Jure, DOLENC, Sašo, OMLADIČ, Luka, RAZPET, Alenka, SVENŠEK, Daniel, ZUPAN, Jure (uredniki) Zakaj je nebo modro?: začasni odgovori na večna vprašanja, ISBN 961-6174-66-5, 313 strani, Krtina, Ljubljana, 2004.

Cilji in kompetence: / Objectives and competences:

Cilji in kompetence:	Objectives and competences:
1. Sposobnost komuniciranja, sodelovalno/timsko delo.	1. Ability to communicate, collaborative / teamwork.
2. Splošna razgledanost, sposobnost komuniciranja s strokovnjaki iz drugih strokovnih in znanstvenih področij.	2. General knowledge, ability to communicate with experts from other professional and science fields.
3. Sposobnosti za upravljanje s časom, za samopripravo in načrtovanje, samokontrola izvajanja načrtov.	3. Ability to manage time, of self-preparation and planning, self-control and implementation of plans.
4. Poznavanje in razumevanje socialnih sistemov (posebej procesov v vzgoji in izobraževanju).	4. Knowledge and understanding of social systems (especially the processes of education)
5. Poznavanje in razumevanje razvojnih zakonitosti, razlik in potreb posameznika.	5. Knowledge and understanding of development principles, differences and needs of individuals.
6. Poznavanje vsebine in metodike področja.	6. Knowledge of the content and methodology of the field.
7. Interdisciplinarno povezovanje vsebin.	7. Interdisciplinary integration of contents.
8. Razvijanje sposobnosti naravoslovnega razmišljanja.	8. Developing the skills of science thinking.
9. Poznavanje in razumevanje vpliva fizike na razvoj tehnike in tehnologije.	9. Knowledge and understanding of the impact of physics on the development of techniques and technologies.
10. Priprava, izvedba in interpretacija demonstracijskih poskusov.	10. Preparation, execution and interpretation of demonstrations.
11. Organiziranje in vodenje projektnega, skupinskega in laboratorijskega dela.	11. Organization and management of the project, team and laboratory work.
12. Zavedanje o pomenu matematike v človeški kulturi.	12. Awareness of the importance of mathematics in human culture.
13. Zavedanje o različnih stilih in zmožnostih matematičnega razmišljanja (npr. vizualni in nevizualno - simbolni stil) ter upoštevanje tega pri	13. Awareness of different styles and abilities of mathematical thinking (e.g. visual and non-visual - a

pouku.	symbolic style) and taking account thereof in the classroom.

Predvideni študijski rezultati: | **Intended learning outcomes:**

Znanje in razumevanje: 1. študent osvoji poglobljeno razumevanje izbranih vsebin oziroma znanstvenih dosežkov iz matematike ali fizike, primernih njegovemu predznanju (glede na študijsko smer). Prenosljive spretnosti: 1. študent se nauči predstaviti izbrano vsebino oziroma znanstveni dosežek na izviren, atraktiven in strokovno korekten način, primeren glede na izbrano ciljno javnost (predšolska, šolska mladina, osebe s posebnimi potrebami, širša publika, strokovna javnost …).	Knowledge and understanding: 1. students obtain in-depth understanding of the selected topics or scientific achievements in mathematics or physics, adjusted to their prior knowledge (depending on their study field). Transferable skills: 1. students learn how to present a selected topic or scientific achievement in an innovative, attractive, and scientifically correct way, adjusted to the target audience (preschool or school children, people with special needs, general public, educated public, etc.).

Metode poučevanja in učenja: | **Learning and teaching methods:**

1. Predavanja. 2. Seminar (zasnova, diskusija in priprava skupinskih projektov v skupinah 2-4 študentov, na primer razstave, predstave, javnega eksperimenta, delavnice, multimedijske vsebine, poljudnoznanstvene objave in podobno …).	1. Lectures. 2. Seminar (idea formation, discussion and realisation of projects done in groups of 2-4 students, for example exhibitions, shows, public experiments, workshops, multimedia, media releases for general public, etc.).

Načini ocenjevanja: | **Delež (v %) / Weight (in %)** | **Assessment:**

Skupinski projekt z javno predstavitvijo ali medijsko objavo	60	Group projects with public presentation or media release
Pisno poročilo o prispevku posameznika k projektu	40	Written report on individual contribution to the project
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Reference nosilca / Lecturer's references:

doc. dr. Jurij Bajc:
1.   ZIHERL, Saša, BAJC, Jure, ČEPIČ, Mojca. Refraction and absorption of microwaves in wood. European journal of physics, ISSN 0143-0807, 2013, vol. 34, no. 2, str. 449-459
2.   ZIHERL, Saša, BAJC, Jure, URANKAR, Bernarda, ČEPIČ, Mojca. Anisotropy of wood in the microwave region. European journal of physics, ISSN 0143-0807, May 2010, vol. 31, no. 3, str. 531-542.
3.   ZIHERL, Saša, SUSMAN, Katarina, PAVLIN, Jerneja, BAJC, Jure, ČEPIČ, Mojca. Teaching liquid crystals with a wood model. V: Proceedings of the 23rd International Liquid Crystal Conference (ILCC 2010), (Molecular Crystals and Liquid Crystals, ISSN 1542-1406, vol. 547; 1). Philadelphia: Taylor and Francis, 2011, vol. 547, str. 241-248.

4.   KUZMAN, Boštjan. On graphs of prime valency admitting a solvable arc-transitive group. Bulletin of the Australian Mathematical Society, ISSN 0004-9727, 2015, vol. 92, iss. 2, str. 214-227.

5.   KOVÁCS, István, KUZMAN, Boštjan, MALNIČ, Aleksander, WILSON, Stephen. Characterization of edge-transitive 4-valent bicirculants. Journal of graph theory, ISSN 0364-9024, 2012, vol. 69, no. 4, str. 441-463.

6.   KUZMAN, Boštjan. Invariant subspaces of matrix groups and elementary-abelian covers of K [sub] {4,4}. Filomat, ISSN 0354-5180, 2011, vol. 25, no. 4, str. 37-53.

doc. dr. Boštjan Kuzman:

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