



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Praktično usposabljanje 2
Course title:	Practical qualifying 2

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Fizika		3	6
Physics			

Vrsta predmeta / Course type:

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Lab. vaje Laboratory work	Terenske vaje Field work	Samost. delo Individ. work	ECTS
	15				165	6

Nosilec predmeta / Lecturer:

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

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

Prerequisites:

Vsebina:

Na seminarju predstavimo pomen in delo v interdisciplinarni skupini. Podrobna vsebina seminarja se prilagaja glede na to, kam so študenti odšli na prakso. Študent se sam dogovori za prakso na inštituciji ali v podjetju na temo, ki je v povezavi s fiziko. Nosilec predmeta oceni primernost prakse v obsegu 100 ur in jo odobri. Nekatere izmed možnosti so:
- diagnostika v medicini (RTG, NMR, CT), nuklearna medicina in obsevanja,

Content (Syllabus outline):

At the seminar we present the meaning and work in an interdisciplinary group. The detailed content of the seminar depends on the chosen institutions and firms, where students are practical qualifying. Students arrange the work at an institution or a firm according to their wishes. The chosen field should be related to physics. Practical work is done at a firm or institution. Lecturer evaluates and approves the chosen practical work in the range of 100 hours. Some of the possibilities are:

- fizikalna merjenja (zagotavljanje kakovosti, kibernetika, upravljanje in optimizacija delovnih procesov, preizkus kvalitete izdelkov),
 - jedrski reaktor in izkoriščanje jedrske energije,
 - analitične metode v fiziki in eksperimentalna tehnika, polarizacijski mikroskop, tunelski mikroskop, mikroskop na elektronsko silo, NMR, spektroskopija),
 - tekočerkristalne aplikacije,
 - druga področja eksperimentalne fizike.

- Medical diagnostic (RTG, NMR, CT), nuclear medicine and ray therapy,
 - Physical measuring (quality assured, cybernetics, administering operation, quality control),
 - Nuclear reactor and nuclear energy,
 - Analytical methods in physics and experimental technique (polarized microscope, tunnel microscope, electronic force microscope, NMR, spectroscopy),
 - Liquid crystal applications,
 - Other experimental physics methods.

Temeljni literatura in viri / Readings:

Učbeniki s področja obravnavanih tem, ki se bodo letno spreminjale. Literatura bo podana letno na spletnih straneh oddelka <http://www.fizika.fnm.um.si/> / Textbook on the topics chosen by students for their qualifying in practice. The list will change annually according to the students interests and will be given at the department web page <http://www.fizika.fnm.um.si/>.

Cilji in kompetence:

Študentje osvojijo praktična znanja in izkušnje, potrebna za kompleksnejše razumevanje fizikalnih pojavov, procesov in reševanje fizikalnih problemov na različnih delovnih področjih in v aplikacijah.

Objectives and competences:

Students conquest practical knowledge and experiences that are necessary for complex understanding of physical phenomena, processes and solving physical problems in different fields of activities and in applications.

Predvideni študijski rezultati:

Znanje in razumevanje:

Po uspešno zaključeni učni enoti študent:

- osvoji praktična znanja in izkušnje iz specifičnega področja,
- pridobi spretnosti o načinu prenosa znanja v prakso,
- prepozna pomen prenosa teoretičnega znanja v prakso,
- se seznaniti z realnim delovnim okoljem,
- načrtuje in vodi delo,
- natančno in strokovno poroča o opravljenem delu.

Prenesljive/ključne spretnosti in drugi atributi:

Intended learning outcomes:

Knowledge and understanding:

On completion of this course student will be able to:

- acquire practical knowledge and experience from a specific field,
- acquire skills about how to transfer theoretical knowledge into practice,
- recognizes the importance of transferring theoretical knowledge to practice,
- get acquainted with the real working environment,
- plans and manages work,
- report precisely and professionally about the work done.

Transferable/Key Skills and other attributes:

- Neposredna vključitev v uporabo fizike v gospodarstvu in drugih dejavnostih.
- Razvoj spretnosti samostojnega in skupinskega strokovno raziskovalnega dela.
- Razvoj poklicno specifičnih kompetenc in kompetence podjetnosti.
- Razvoj komunikacijskih spretnosti.

- Direct involvement of students to physics application in economic organizations and firms.
- Development of skills of individual and group professional research work.
- Development of professionally-specific competences and competence of entrepreneurship.
- Development of communication skills.

Metode poučevanja in učenja:

Seminar: teoretičen uvod v aplikativno uporabo fizikalnih znanj v različnih področjih dela (razlaga, razgovor, demonstracija, študija primera)
Individualizacija učenja.

Learning and teaching methods:

Seminar: theoretical introduction on applicative use of physical knowledge on different fields of activity (explanation, discussion, demonstrartion, case study)
Individualization in teaching.

Delež (v %) /

Weight (in %)

Načini ocenjevanja:

Assessment:

<p>Način (pisni izpit, ustno izpraševanje, naloge, projekt): projektna naloga in predstavitev ustni izpit Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno. Pozitivna ocena projektne naloge je pogoj za pristop k ustnemu izpitu.</p>	<p>80 20</p>	<p>project work and presentation oral oexamination Each of the mentioned commitments must be assessed with a passing grade. Positive grade of project work is a prerequisite for access to the oral exam.</p>
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Reference nosilca / Lecturer's references:

WEI, Zhouchao, ZHU, Bin, YANG, Jing, PERC, Matjaž, SLAVINEC, Mitja. Bifurcation analysis of two disc dynamos with viscous friction and multiple time delays. *Applied mathematics and computation*, ISSN 0096-3003. [Print ed.], 2019, vol. 347, str. 265-281, doi: [10.1016/j.amc.2018.10.090](https://doi.org/10.1016/j.amc.2018.10.090). [COBISS.SI-ID [24361480](https://www.cobiss.si/id/24361480)]

FISTER, Iztok, IGLESIAS, Andres, GÁLVEZ, Akemi, DEL SER, Javier, OSABA, Eneko, FISTER, Iztok, PERC, Matjaž, SLAVINEC, Mitja. Novelty search for global optimization. *Applied mathematics and computation*, ISSN 0096-3003. [Print ed.], 2019, vol. 347, str. 865-881, doi: [10.1016/j.amc.2018.11.052](https://doi.org/10.1016/j.amc.2018.11.052). [COBISS.SI-ID [24211976](https://www.cobiss.si/id/24211976)]

ÜLEN, Simon, GERLIČ, Ivan, SLAVINEC, Mitja, REPNIK, Robert. Evaluating the effectiveness of physlet-based materials in supporting conceptual learning about electricity. *Journal of science education and technology*, ISSN 1059-0145, 2017, vol. 26, iss. 2, str. 151-160, tabele, doi: [10.1007/s10956-016-9661-1](https://doi.org/10.1007/s10956-016-9661-1). [COBISS.SI-ID [22803208](https://www.cobiss.si/id/22803208)]