Univerza v Mariboru

MEDICINSKA FAKULTETA
FACULTY OF MEDICINE

| UČNI NAČRT PREDMETA / COURSE SYLLABUS | |
|---|---|
| **Predmet:** | Biomedicinska Informatika |
| **Course title:** | Biomedical Informatics |

| Študijski program in stopnja<br>Study programme and level | Študijska smer<br>Study field | Letnik<br>Academic year | Semester<br>Semester |
|---|---|---|---|
| BIOMEDICINSKA TEHNOLOGIJA | | 1 | 1,2 |
| BIOMEDICAL TECHNOLOGY | | | |

**Vrsta predmeta / Course type**

**Univerzitetna koda predmeta / University course code:** 1001

| Predavanja<br>Lectures | Seminar<br>Seminar | Sem. vaje<br>Tutorial | Lab. vaje<br>Laboratory work | Teren. vaje<br>Field work | Samost. delo<br>Individ. work | ECTS |
|---|---|---|---|---|---|---|
| 20 | 40 | - | 15 | - | 225 | 10 |

**Nosilec predmeta / Lecturer:** Izred. prof. dr. Dejan Dinevski<br>Doc. dr. Miljenko Križmarič

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| **Jeziki / Languages:** | **Predavanja / Lectures:** | Slovensko/Slovene |
| | **Vaje / Tutorial:** | Slovensko/Slovene |

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

Kandidat mora imeti pred vpisom ustrezno znanje iz naravoslovnih ved z ustreznega področja na nivoju univerzitetnega študija.

**Prerequisits:**

Prior to entering, the candidate for postgraduate program must have an appropriate knowledge and understanding of bioscience (biology, chemistry, physics, mathematics) on the university level.

**Vsebina:**

- Računalništvo in informacijske tehnologije
- Medicinska informatika
- Podatkovne zbirke: vrste in namen, podatkovno modeliranje, podatkovno rudarjenje relacijske zbirke, bibliografske zbirke
- Informacijska omrežja: topologije, gradniki, internetne storitve, intranet
- Uporaba slik in grafike v medicini
- Odločitveni sistemi v medicini
- Inteligentni sistemi v medicini
- Bioinformatika
- Napredno iskanje strokovnih in bibliografskih informacij s področja medicine
- biomedicinska tehnologija v kliničnih procesih
- simulatorji in simulacije v medicini
- Statistične in hevristične metode analize podatkov

**Content (Syllabus outline):**

- Computer science and information technology
- Medical informatics
- Databases: types and purpose, data modeling, data mining, relational databases, bibliographic databases
- Information networks, topology, internet services, intranet
- Pictures and graphics in medicine
- Decision support systems in medicine
- Intelligent systems in medicine
- Bioinformatics
- Advanced search methods of medical and bibliographic data
- biomedical technology in clinical settings
- simulators and simulations in medicine
- Statistical and heuristics methods for data analysis
- Basics of telemedicine technology, telehealth,

| | |
|---|---|
| - Osnove telemedicinske tehnologije, telezdravstvo, telenega, telenadzor, telekonzultacije<br>- Pregled telemedicinske prakse (teledermatologija, telekirurgija, telepatologija, telekardiologija…) | telecare, telemonitoring, teleconsultations<br>- Overview of telemedicine practice (teledermatology, telesurgery, telepathology, telecardiology…) |

**Temeljni literatura in viri / Readings:**

1. Edward H. Shortliffe, James J. Cimino: Biomedical Informatics, Springer USA, 2006
2. J.H. van Bemmel, M.A. Musen (Editors). The Handbook of Medical Informatics. Springer-Verlag, New York, 1998
3. Bashshur RL, Shannon GW, History of Telemedicine –Evolution, Context and Transformation, Mary Ann Liebert publishers, New York, 2009.
4. Kyle RR, Murray BW. Clinical simulation: operations, engineering, and management. Amsterdam, Academic Press, 2008
5. Enderle J, Blanchard SM, Bronzino JD. Introduction to Biomedical Engineering. Elsevier Science and Technology, 2005.

| **Cilji in kompetence:** | **Objectives and competences:** |
|---|---|
| Študent bo spoznal biomedicinsko in informacijsko tehnologijo ter aplikacije na področju medicine. Na podlagi osnov se bo poglobil v nekatera specialnima področja odločitvenih in inteligentnih sistemov ter bioinformatike. Specialna področja bodo študentje usvojili predvsem s raziskovalnimi seminarskimi nalogami.<br>To znanje bo študent lahko uporabljal pri raziskovalnem in praktičnem reševanju medicinskih problemov | Students will learn about biomedical and information technology/application in medicine. Special attention will be focused to decision support and intelligent systems and also bioinformatics.<br>Advanced subjects will be studied through research assignments.<br>The gained knowledge will be used by research and practical problem solving. |
| **Predvideni študijski rezultati:** | **Intended learning outcomes:** |
| Znanje in razumevanje bioinformacijskih tehnologij s katerimi bo študent sposoben bolj učinkovito reševati raznovrstne medicinske probleme.<br>Prenesljive/ključne spretnosti in drugi atributi:<br>- programiranje in delo z računalnikom<br>- poznavanje računalniško podprte biomedicinske tehnologije<br>- poznavanje simulatorjev in simulacij v medicini<br>- sposobnost napredne analize in razumevanja podatkov. | Knowledge and Understanding of bioinformatics technologies in more efficient solving of various medical problems<br>Transferable/Key Skills and other attributes:<br>- programming and computer skills<br>- knowledge about computer supported biomedical technology<br>- knowledge about medical simulators and simulations<br>- the ability to perform complex data analysis |
| **Metode poučevanja in učenja:** | **Learning and teaching methods:** |
| • Predavanja<br>• Seminar<br>• Vaje, e-izobraževanje | • Lectures,<br>• Seminar<br>• Excercises, e-learning |

| **Načini ocenjevanja:** | Delež (v %) / Weight (in %) | **Assessment:** |
|---|---|---|
| seminarska naloga | **30%** | Seminar work |
| pisni izpit | **50%** | Written exam |
| ustni zagovor | **20%** | Oral exam |