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| **UČNI NAČRT PREDMETA / COURSE SYLLABUS** | | | | | | | | | | | | | | | | | | |
| **Ime predmeta:** | | GEOGRAFSKI INFORMACIJSKI SISTEMI | | | | | | | | | | | | | | | | |
| **Course title:** | | GEOGRAPHICAL INFORMATION SYSTEMS | | | | | | | | | | | | | | | | |
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| **Študijski program in stopnja**  **Study programme and cycle** | | | | | **Študijska smer**  **Study option** | | | | | | | | | **Letnik**  **Year of study** | | **Semester**  **Semester** | | |
| LOGISTIKA SISTEMOV 1. stopnja | | | | |  | | | | | | | | | 2. | | 4. | | |
| SYSTEM LOGISTICS 1st degree | | | | |  | | | | | | | | | 2. | | 4. | | |
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| **Vrsta predmeta (obvezni ali izbirni) /**  **Course type (compulsory or elective)** | | | | | | | | | | | | | OBVEZNI | | | | | |
| COMPULSORY | | | | | |
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| **Univerzitetna koda predmeta / University course code:** | | | | | | | | | | | | | UN | | | | | |
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| **Predavanja**  **Lectures** | **Seminar**  **Seminar** | | | **Vaje**  **Tutorial** | | | **Klinične vaje**  **Clinical training** | | | | | **Druge oblike študija**  **Other forms of study** | | | **Samost. delo**  **Individual work** | |  | **ECTS** |
| 12 e-P  18 a-P |  | | | 18 e-V  27 a-V | | |  | | | | |  | | | 105 | |  | 6 |
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| **Nosilec predmeta / Course coordinator:** | | | | | **KLEMEN PRAH** | | | | | | | | | | | | | |
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| **Jeziki /Languages:** | | | **Predavanja / Lectures:** | | | | | SLOVENSKI/SLOVENE | | | | | | | | | | |
| **Vaje / Tutorial:** | | | | | SLOVENSKI/SLOVENE | | | | | | | | | | |
| **Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:** | | | | | | | | |  | **Prerequisites for enrolling in the course or for performing study obligations:** | | | | | | | | |
| Ni pogojev. | | | | | | | | |  | None. | | | | | | | | |
| **Vsebina (kratek pregled učnega načrta):** | | | | | | | |  | | **Content (syllabus outline):** | | | | | | | | |
| 1. Koncept in razvoj GIS 2. Prostorski podatki (vrste, zajemanje, dostopanje, umeščenost v prostor, podatkovni modeli, uporaba) 3. Primeri rabe GIS v logistiki 4. Sodobna GIS analiza v logistiki:    * Načrtovanje projekta, pregled literature iz izbira metodologije    * Sodelovanje z institucijami in terensko delo    * Analitični postopki in orodja    * Priprava poročila 5. Osnove prostorskega modeliranja logističnega procesa z GIS, izgradnja modela in analiza. 6. GIS programska oprema: lastniška (ArcGIS Pro) in odprtokodna (QGIS, GRASS GIS) 7. Geovizualizacija | | | | | | | |  | | 1. Concept and development of GIS 2. Spatial data (types, capturing, accessing, spatial reference, spatial data models, usage) 3. Examples of GIS in logistics 4. Contemporary GIS analysis in logistics:  * GIS project design, literature review and methodology selection * Cooperation with institutions and field work * Analytical approaches and tools * Report creation  1. Basics of spatial modeling of logistics process with GIS, model building and analysis. 2. GIS software: proprietary (ArcGIS Pro) and open source (QGIS, GRASS GIS) 3. Geovisualization | | | | | | | | |
| **Temeljni literatura in viri / Reading materials:** | | | | | | | | | | | | | | | | | | |
| 1. Bolstad, P. (2019). GIS fundamentals: a first text on geographic information systems (6th ed., str. XIV, 764). Eider; XanEdu. https://www.paulbolstad.net/gisbook.html 2. Longley, P.A., Goodchild, M.F., Maguire, D.J., Rhind, D.W., 2015. Geographic Information Systems & Science. Fourth edition. Wiley. 3. Mitchell, A., Griffin, L.S., 2021. ESRI Guide to GIS Analysis, Volume 2: Spatial Measurements and Statistics. Second edition. Esri Press. 4. Modeliranje pokrajine (2020). GIS v Sloveniji 15. Rok Ciglič (Ur.), Matjaž Geršič (Ur.), Drago Perko (Ur.), Matija Zorn (Ur.). ZRC SAZU. 5. Esri. (b.d.). ArcGIS Pro. Get Started. <https://pro.arcgis.com/en/pro-app/latest/get-started/get-started.htm> 6. Esri. (b.d.). ArcGIS Pro. Help. <https://pro.arcgis.com/en/pro-app/latest/help/main/welcome-to-the-arcgis-pro-app-help.htm> | | | | | | | | | | | | | | | | | | |
| **Cilji in kompetence:** | | | | | | | |  | | **Objectives and competences:** | | | | | | | | |
| Cilji predmeta so:   * razumevanje osnovnih konceptov GIS in razvoja GIS * poznavanje, zbiranje in raba prostorskih podatkov * razumevanje in apliciranje prostorskih referenc prostorskih podatkov * poznavanje GIS podatkovnih modelov * interpretacija primerov uporabe GIS v logistiki * načrtovanje in izvedba GIS analize v logistiki ter priprava poročila * koncipiranje in izgradnja osnovnega modela logističnega procesa z GIS ter uporaba modela * poznavanje in raba lastniške in odprtokodne GIS programske opreme * geovizualiziranje prostorskih informacij   Kompetence, ki jih študenti osvojijo:   * razvijajo geoprostorske predstave na področju logističnih objektov in procesov * poznajo, pridobijo in uporabijo digitalne geoprostorske podatke * razvijajo napredno delo z GIS v logistiki, vključno z analizo in modeliranjem * razvijajo geovizualizacijske sposobnosti | | | | | | | |  | | The aims of this course are:   * understanding basic GIS concepts and development of GIS * knowledge, collection and usage of spatial data * knowledge and application of georeferences * knowledge of GIS data models * interpretation of the examples of the use of GIS in logistics * planning and performing GIS analysis in logistics and creation of report * conception and building a basic model of the logistics process with GIS and using the model * knowledge and use of proprietary and open source GIS software * practicing geovisualization of spatial information   Competences acquired by students:   * develop geospatial representations in the field of logistics facilities and processes * know, acquire and use digital geospatial data * develop advanced work with GIS in logistics, including analysis and modeling * develop geovisualization skills | | | | | | | | |
| **Predvideni študijski rezultati:** | | | | | | | | |  | **Intended learning outcomes:** | | | | | | | | |
| Študent bo ob zaključku predmeta zmožen:   * opisati in razložiti osnovne koncepte GIS * razvrstiti in opisati glavne mejnike v razvoju GIS * poznati, pridobiti in uporabiti različne vrste prostorskih podatkov * razumeti, primerjati in uporabiti kartografske projekcije, koordinatne sisteme in geodetske datume * poznati, izbrati in uporabiti GIS podatkovne modele * poiskati in interpretirati primere uporabe GIS v logistiki * načrtovati in sodelovati pri izvedbi GIS analize v logistiki * ustrezno izbrati in uporabiti GIS analitična orodja * sodelovati pri pripravi poročila o izvedbi analize * koncipirati in zgraditi model logističnega procesa z GIS; pri tem uporabiti ustrezno GIS orodje za modeliranje * uporabiti model in interpretirati rezultate * poznati in kritično obravnavati GIS računalniške programe; pri tem uporabiti en lastniški in en odprtokodni program * operirati z orodji za interaktivno prikazovanje prostorskih informacij in pripraviti končni zemljevid   Prenosljive/ključne spretnosti:   * usposobijo se za delo z GIS v bodočem službenem (logističnem) okolju * usposobijo se za uporabo GIS pri osebnem vseživljenjskem izpopolnjevanju * uporabiti znanje s področja GIS pri drugih študijskih predmetih in pri nadaljevanju študija na magistrskem programu | | | | | | | | |  | At the end of the course the student will be able to:   * describe and explain basic GIS concepts * classify and describe the main milestones in the development of GIS * know, acquire and use different types of spatial data * understand, compare and use map projections, coordinate systems and datums * know, select and use GIS data models * find and interpret examples of the use of GIS in logistics * plan and participate in the implementation of GIS analysis in logistics * choose and use GIS analytical tools appropriately * participate in the preparation of a report on the performance of the analysis * to conceive and build a logistic process model with GIS; to use an appropriate GIS tool for modeling * apply the model and interpret the results * know and critically consider GIS computer programs; use one proprietary and one open source program * operate with tools for interactive display of spatial information and prepare the final map   Transferable/Key skills:   * qualify to work with GIS in the future employment (logistics) environment * qualify to use GIS in personal lifelong development * apply knowledge and skills in the field of GIS in other study subjects and in continuing studies in the master's program | | | | | | | | |
| **Metode poučevanja in učenja:** | | | | | | | | |  | **Learning and teaching methods:** | | | | | | | | |
| Predavanja: pri predavanjih študent spozna teoretične vsebine predmeta. Del predavanj se izvaja na klasični način v predavalnici, del pa v obliki e-predavanj. Pri klasičnih in e-predavanjih pridejo do izraza:  - načelo raznovrstnosti učnih gradiv,  - načelo relevantnih in najsodobnejših vsebin,  - pristop analize sprememb v prostoru in času (t.i. Wayback Image),  - pristop ustvarjanja miselnih shem,  - študije primerov.  Vaje: pri vajah študent utrdi teoretično znanje in spozna aplikativne možnosti. Del vaj se izvaja na klasični način v računalniški učilnici, del pa v obliki e-vaj. V sklopu vaj bo tudi izvedeno terensko delo z namenom GIS analize v logistiki na konkretnem lokalnem primeru, pri čemer se sledi metodi izkustvenega učenja. Pri vajah tudi pride do izraza pristop različnih kartografskih meril (lokalno/globalno). | | | | | | | | |  | Lectures: during the lectures, the student learns the theoretical content of the course. Part of the lectures are conducted in a classroom, and part in the form of e-lectures. In classic and e-lectures, the following is expressed:  - the principle of diversity of teaching materials,  - the principle of relevant and up-to-date content,  - the approach of analyzing changes in space and time (i.e. Wayback Image),  - the approach of creating mental schemes,  - case studies.  Tutorials: in tutorials, the student consolidates theoretical knowledge and learns about application possibilities. Part of the tutorials is carried out in a computer classroom, and part in the form of e-tutorials. As part of tutorials, a field work is carried out with the aim of GIS analysis on a local case, following the method of experiential learning. In tutorials, an approach of different cartographic scales (local/global) is also expressed. | | | | | | | | |
| **Načini ocenjevanja:** | | | | | | Delež (v %) /  Share (in %) | | | | | **Assessment methods:** | | | | | | | |
| * Opravljene obveznosti e-predavanj in e-vaj so pogoj za pristop k izpitu. * Teoretični del izpita (pisno). * Praktični del izpita. * Projektna naloga. * Teoretični in praktični del izpita morata biti vsak posebej pozitivna. | | | | | | 35%  35%  30% | | | | | * Successful completion of e-lectures and e-tutorials is a prerequisite for entering the exam. * Theoretical examination (written). * Practical examination. * Project work. * Theoretical and practical examination must be individually positive. | | | | | | | |
| **Reference nosilca / Course coordinator's references:** | | | | | | | | | | | | | | | | | | |
| 1. PRAH, Klemen, KMETEC, Mark, KNEZ, Matjaž. Electric vehicle charging stations coverage : a study of Slovenia. Tehnički vjesnik : znanstveno-stručni časopis tehničkih fakulteta Sveučilišta u Osijeku. 2022, vol. 29, no. 1, str. 285-292, ilustr. ISSN 1330-3651. <https://doi.org/10.17559/TV-20200518121739> , DOI: 10.17559/TV-20200518121739.  2. ŠINKO, Simona, PRAH, Klemen, KRAMBERGER, Tomaž. Spatial modelling of modal shift due to COVID-19. Sustainability. 2021, vol. 13, iss. 13, str. 1-15, ilustr. ISSN 2071-1050. https://doi.org/10.3390/su13137116, DOI: 10.3390/su13137116.  3. ŠINKO, Simona, RUPNIK, Bojan, PRAH, Klemen, KRAMBERGER, Tomaž. Spatial modelling of the transport mode choice : application on the Vienna transport network. Transport. [Online ed.]. 2021, vol. 36, iss. 5, 386-394 str., ilustr. ISSN 1648-3480. https://doi.org/10.3846/transport.2021.16128, DOI: 10.3846/transport.2021.16128.  4. PRAH, Klemen (avtor, kartograf), KRAMBERGER, Tomaž, DRAGAN, Dejan. Primerjava 2D in 3D GIS modela pri načrtovanju šolskih prevozov. Dela. [Tiskana izd.]. 2018, [št.] 49, str. 61-74, ilustr. ISSN 0354-0596. https://doi.org/10.4312/dela.49.61-74, DOI: 10.4312/dela.49.61-74.  5. PRAH, Klemen, SHORTRIDGE, Ashton. Travels in San Francisco : effect of terrain on road network distance. V: 2019 East Lakes Division of the American Association of Geographers Annual Meeting, October 10-11, 2019, University Center, Michigan. [Saginaw: College of Arts & Behavioral Sciences, 2019]. Str. 33. | | | | | | | | | | | | | | | | | | |