

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Uvod v prostorsko geometrijo
Course title:	Introduction to Spatial Geometry

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Razvoj videoiger in razširjenih resničnosti, visokošolski strokovni študijski program prve stopnje	-	Drugi	Četrta
Game and Extended Reality Development, first cycle Professional Study Programme	-	Second	Fourth

Vrsta predmeta / Course type Izbirni / Elective

Univerzitetna koda predmeta / University course code: 4-RVRR-VS-IP-UPG-2025-09-19

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
30	-	45	-	-	105	6

Nosilec predmeta / Lecturer: pred. mag. Matjaž Praprotnik

Jeziki / Languages: Predavanja / Lectures: Slovenski / Slovenian, Angleški / English

Vaje / Tutorial: Slovenski / Slovenian, Angleški / English

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

Pogoj za vključitev v delo je opravljen izpit iz Matematike 1.

Študent/študentka mora pred pristopom k izpitu opraviti vse obveznosti na vajah.

Prerequisites:

To enroll in the course, it is necessary to pass Mathematics 1.

Before examination, a student must complete all assignments given at the exercises.

Vsebina:

- Točke v prostoru, koordinatni sistemi.
- Vektorske operacije in transformacije v koordinatnih sistemih.
- Matematični zapis krivulj, ploskev, teles in zlepkov, v ravnini in prostoru.
- Krivulje in ploskve drugega reda.
- Poligone in mreže
- Uporaba trigonometrije v prostorski geometriji

Content (Syllabus outline):

- Points in space, coordinate systems.
- Vector operations and transformations in coordinate systems.
- Mathematical expressions of curves and surfaces in plane and space.
- Polygons and meshes.
- Application of trigonometry in spatial geometry.
- Basics of topology.

- Osnove topologije.

Temeljni literatura in viri / Readings:

- Audin, M. (2003). Geometry. Springer.
- Stillwell, J. (2005). The Four Pillars of Geometry, Springer.
- Vidav, I. (1991). Višja matematika I. DMFA.
- Øyvind, H., Dæhlen, M. (2006). Triangulations and Applications, Springer.
- Alliez, P., Levy B., Botsch M., Pauly M., Kobbelt L. (2011). Polygon Mesh Processing, A.K. Peters Ltd.
- de Berg, M., Cheong, O., van Kreveld, M., Overmars, M. (1998). Computational Geometry - Algorithms and Applications, Springer.
- Crossley, M. D. (2005). Essential Topology, Springer.

Cilji in kompetence:

Učna enota prispeva k razvoju naslednjih splošnih in predmetno-specifičnih kompetenc:

Splošne kompetence:

- Sposobnost analitičnega in algoritmičnega razmišljanja.
- Sposobnost fleksibilne uporabe znanja v praksi.

Predmetno-specifične kompetence:

- poznavanje koordinatnih sistemov
- poznavanje krivulj in ploskev v prostoru in njihovih osnovnih lastnosti
- poznavanje matematičnega modela prostorskih podatkov
- Poznavanje poligonov in mrež

Objectives and competences:

The instructional unit contributes to the development of the following general and subject-specific competences:

General competences:

- Ability of analytical and algorithmic thinking.
- Ability of flexible usage of knowledge in practice.

Subject-specific competences:

- Familiarity with coordinates systems
- Familiarity with curves and surfaces in space and their properties
- familiarity with the mathematical spatial data model
- Familiarity with polygons and meshes

Predvideni študijski rezultati:

Znanje in razumevanje:

Študent/študentka:

- spozna matematične temelje za opisovanje prostorskih informacij,
- pridobi sposobnost matematične analize in modeliranja prostorskih objektov,
- razume povezave med analitičnimi in vektorskimi pristopi

Intended learning outcomes:

Knowledge and understanding:

The student:

- obtains a mathematical basis for modelling spatial data
- acquires the ability for mathematical analysis and modeling of spatial objects,
- understands the connections between analytical and vector approaches

Metode poučevanja in učenja:

- predavanja z aktivno udeležbo študentov (razlaga, diskusija, vprašanja, primeri, reševanje problemov)

Learning and teaching methods:

- lectures with active student participation (explanation, discussion, questions, examples, problem solving)

- vaje: na vajah bodo reševali manjše primere, s katerimi bodo utrjevali snov s predavanj
- domače naloge in projektna naloga – z njimi bo študent preko samostojnega dela utrdil vse znanje, ki ga je pridobil na predavanjih in vajah
- kolokviji: z njimi bodo študentje stimulirani, da sproti študirajo snov, ki bo obravnavana na predavanjih in vajah

- tutorials where students will rehearse, revise and lit up notions, methods encountered at lectures
- homework and project work: with them will students by individual work consolidate knowledge obtained at lectures and tutorials
- mid-term examinations will stimulate students to study the matter dealt with at lectures and tutorials simultaneously

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
<p>Način (pisni izpit, ustno izpraševanje, naloge, projekt):</p> <ul style="list-style-type: none"> • ustni izpit • pisni izpit <p>Namesto pisnega izpita lahko študent opravi obveznosti predmeta z domačimi nalogami in sprotnim delom (kolokviji, kvizi).</p> <p>Za pristop k ustnemu izpitu je potrebno s pisnim izpitom ali s sprotnim delom zbrati vsaj 51% možnih točk.</p> <p>Ustnega izpita ni potrebno opravljati, kadar študent s pisnim izpitom vsaj 85% točk.</p>	<p>30</p> <p>70</p>	<p>Type (examination, oral, coursework, project):</p> <ul style="list-style-type: none"> • oral exam • written exam <p>Written exam can be replaced with homeworks and intermediate work (mid-term examinations, quizzes).</p> <p>As a prerequisite for the oral examination student must gain at least 51 % of possible points with intermediate work or with written exam.</p> <p>Students who have gained at least 85 % with written exam are exempted from the oral examination.</p>

Reference nosilca / Lecturer's references:

- PRAPROTNIK MATJAŽ (2016) Učinkovito generiranje eliptičnih krivulj za potrebe parjenj: magistrsko delo, Ljubljana.
- PRAPROTNIK MATJAŽ (2001) Kriptoanaliza urno-kontroliranega pomičnega registra: diplomsko delo, Ljubljana.