UČNI NAČRT PREDMETA / COURSE SYLLABUS (leto / year 2017/18)			
Predmet:	Računska geometrija		
Course title:	Computational geometry		

Študijski program in stopnja **Study programme and level**	**Študijska smer** **Study field**	**Letnik** **Academic year**	**Semester** **Semester**
Interdisciplinarni magistrski študijski program Računalništvo in matematika	ni smeri	1 ali 2	prvi ali drugi
Interdisciplinary Master's study programme Computer Science and Mathematics	none	1 or 2	first or second

Vrsta predmeta / Course type	izbirni / elective
Univerzitetna koda predmeta / University course code:	M2802

Predavanja **Lectures**	**Seminar** **Seminar**	**Vaje** **Tutorial**	**Klinične vaje** **work**	**Druge oblike študija**	**Samost. delo** **Individ. work**		**ECTS**
30	**15**	**30**			**105**		**6**

Nosilec predmeta / Lecturer:	prof. dr. Sergio Cabello Justo

Jeziki / Languages:	**Predavanja / Lectures:**	slovenski / Slovene, angleški / English
	Vaje / Tutorial:	slovenski / Slovene, angleški / English

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**
Vpis v letnik študija.	Enrolment in the programme.
Vsebina:	**Content (Syllabus outline):**

Presečišča daljic. Algoritmi pometanja. Večkotniki in triangulacije večkotnikov. Konveksne množice. Algoritme za iskanje konveksne ovojnice točk v ravnini. DCEL. Problem določanja položaja. Voronojevi diagrami. Fortuneov algoritem. Delaunayeva triangulacija. Podatkovne strukture za točke. Dualnost in razporeditve.	Segment intersections. Sweep-line algorithms. Polygons and triangulations of polygons. Convex sets. Algorithms to construct the convex hull of points in the plane. DCEL. Point location problem. Voronoi digrams. Fortune's algorithm. Delaunay triangulation. Data structures for points. Duality and arrangements.

Temeljni literatura in viri / Readings:

M. de Berg, O. Cheong, M. van Kreveld, M. Overmars, Computational Geometry: Algorithms and Applications, 3. izdaja, Springer, 2008.

S. Devadoss, J. O'Rourke, Discrete and Computational Geometry, Princeton University Press, 2011.

J. O'Rourke, Computational Geometry in C, 2. izdaja, Cambridge University Press, 1998.

Cilji in kompetence:	**Objectives and competences:**
Študent nadgradi svoje poznavanje podatkovnih struktur in osnovnih algoritmov, ki se uporabljajo za algoritmično reševanje geometrijskih in sorodnih problemov.	Students build their knowledge of data structures and basic algorithms used for solving geometric and related problems.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Osnovni geometrijski objekti Računanje z geometrijskimi podatki Osnovne podatkovne strukture za geometrijske podatke	Basic geometric objects Computing with geometric data Basic data structures for geometric data Basic algorithms in Computational Geometry.

Osnovni algoritmi računske geometrije	

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja, seminar, vaje, domače naloge, konzultacije in samostojno delo študentov.	Lectures, seminar, exercises, homework, consultations, and independent work by the students.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Način (pisni izpit, ustno izpraševanje, naloge, projekt):		Type (examination, oral, coursework, project):
Sprotno preverjanje (domače naloge, kolokviji in projektno delo)		Continuing (homework, midterm exams, project work)
Končno preverjanje (pisni ali ustni izpit)	50%	Final (written or oral exam)
Ocene: 6-10 pozitivno, 1-5 negativno (v skladu s Statutom UL)	50%	Grading: 6-10 pass, 1-5 fail (according to the rules of University of Ljubljana)

Reference nosilca / Lecturer's references:

CABELLO, Sergio, KNAUER, Christian. Algorithms for graphs of bounded treewidth via orthogonal range searching. Computational geometry, ISSN 0925-7721. [Print ed.], 2009, vol. 42, iss. 9, str. 815-824. [COBISS.SI-ID 15160409]

BERG, Mark de, CABELLO, Sergio, HAR-PELED, Sariel. Covering many or few points with unit disks. Theory of computing systems, ISSN 1432-4350, 2009, vol. 45, no. 3, str. 446-469. [COBISS.SI-ID 14900825]

CABELLO, Sergio, GIANNOPOULOS, Panos, KNAUER, Christian, ROTE, Günter. Matching point sets with respect to the Earth Mover's Distance. Computational geometry, ISSN 0925-7721. [Print ed.], 2008, vol. 39, iss. 2, str. 118-133. [COBISS.SI-ID 14450521]