COURSE NAME	Vector Analysis					
Code	PMM914	Year of study	1st and 2nd year of graduate study			
Course teacher	doc. dr. sc. Marija Bliznac Trebješanin	Credits (ECTS)	6			
Associate teachers		Type of instruction (number of hours)	L	S	E	
			45		15	
Status of the course	Compulsory, elective	Percentage of application of e-learning	30%			

COURSE DESCRIPTION	
Course objectives	The course objective is to introduce students to the basic properties of the nabla (del) operator and its action on scalar fields (gradient) and vector fields (curl, divergence). In the second part of the course, the students will recall the basic properties of curve and surface integral of scalar and vector fields. Finally, the course objective is to present students with statements and proofs of Green's formula, the Stokes' and Gauss' theorems and some of their applications.
Course enrolment requirements and entry competences required for the course	Taken course Fundamental of Mathematical Analysis and Vector spaces I.
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	The student will be able to: -explain the notions of scalar and vector fields, and their representatives in a given coordinate system, -define all basic notions covered in the course and illustrate them with examples and/or couterexamples, -state the basic theorems about the properties of the action of the del operator on scalar and vector fields, state the theorem about the properties of curve and surface integrals of scalar and vector fields as well as the Green's, Stokes' and Gauss' theorems, -prove the above theorems, -check the validity of a particular theorem in a concrete example.
Course content broken down in detail by weekly class schedule (syllabus)	-Basic properties of vector functions, continuity, differentialbility (6 hours). -Scalar and vector fields, Hamilton's del operator: the action of the del operator and scalar fields (gradient) and vector fields (curl, divergence), theorems about the actions' properties (4 hours). - Special vector fields: conservative, irrotational and solenoidal vector fields (2 hours). -Directional derivative operator (3 hours). -Space curve: parametrisation and orientation of space curves (5 hours). -Curve integrals: curve length, curve integral of a scalar field and its properties (3 hours) -Curve integral of a vector field and its properties (3 hours). - The Green's formula and its applications (4 hours) -Smooth surfaces: description of a smooth surface in three dimensional space, piecewise smooth surface, the area of a smooth surface (4 hours). -Surface integral of a scalar field (2 hours).

	-Surface integral of a vector field: orientation of a smooth surface, surface integral of a vector field and its properties (3 hours). -The Gauss' theorem (3 hours). -The Stokes' theorem (3 hours).
Format of instruction	Class lectures and tutorial sessions.
Student responsibilities	Class and tutorial sessions attendance, solving homework problems, self-learning of prescribed material by using the obligatory and optional literature.
Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Class attendance 1 ECTS. Final exam 5 ECTS.
Grading and evaluating student work in class and at the final exam	Students will write three homework tests during the semester. A positive grade on the homework tests is required to take the oral exam.
Required literature (available in the library and via other media)	N. Uglešić, Viša matematika Š. Ungar, Matematička analiza 3
Optional literature (at the time of submission of study programme proposal)	S. Colley, *Vector Calculus,* 4th ed., Pearson, Boston, 2011 S. Kurepa, *Matematička analiza III*, Tehnička knjiga, Zagreb, 1975. B.P. Demidovič, *Zadatci i riješeni zadatci iz više matematike s primjenom na tehničke znanosti*, Tehnička knjiga, Zagreb, 1986.
Quality assurance methods that ensure the acquisition of exit competences	Anonymous student evaluations at the end of semestar according to the regulations of the University of Split.
Other (as the proposer wishes to add)	