M085	Obligatory Semester 2	**Integral Calculus**	L	S	E	ECTS
			2	0	3	7

Course objectives. At the introductory level, the aim of the course is to introduce students to the basic ideas and methods of mathematical analysis, which are the basis for many other courses. During lectures, basic concepts and their usefulness and applications will be considered. During exercises, students should become familiar with appropriate techniques and solving specific problems.

Course prerequisites. Differential Calculus.

Syllabus

1. Riemann integral. Problem of the area. Definition and properties of Riemann integral. Integrability of monotone and continuous functions. Mean value theorem for integral of continuous function. Newton-Leibniz's formula. Indefinite integral. Integration methods. Basic integration techniques. Integral calculus applications: area of pseudo-trapeze, volume rotation calculus, arc length, action force, moments, centre of mass. Improper integral. Drawbacks of Riemann integral
2. Real numbers series. Notion of series and convergence. Convergence criteria.
3. Function series. Notion of function series. Uniform convergence. Power series. Taylor's series of elementary functions.

LEARNING OUTCOMES

No	LEARNING OUTCOMES
1.	Differentiate between and give typical examples of integrable and non-integrable real functions of one variable, convergent and divergent series of real numbers;
2.	Apply the techniques for computing definite and indefinite integral of real functions of one variable;
3.	Interpret results of the application of definite integral to a simpler problem of calculating the area, volume rotation calculus and calculating the arc length;
4.	Apply the technique of function development in the power series and identify conditions on the function that could allow this.
5.	Understand and reproduce the correct mathematical proof of claim applying basic forms of mathematical and logical inference.
6.	Use mathematics literature from various sources and apply at least one programming tool for illustration of different examples.

RELATING THE LEARNING OUTCOMES, ORGANIZATION OF THE EDUCATIONAL PROCESS AND ESTIMATION OF THE LEARNING OUTCOMES.

Organization of the educational process	ECTS	Learning outcomes **	Student activities*	The method of estimate	Points	
					Min	max
Lecture attendance	1	1-6	Lecture attendance, discussion, team work and independent work on given tasks	Attendance sheets, tracking activities	0	4
Written exam (preliminary exam)	3	1-6	Prepairing for written exam.	Evaluation	25	48
Final exam	3	1-6	Repetition of the subject matter	Oral exam	25	48
Total	7				50	100

Teaching methods and student assessment. Lectures and exercises are obligatory. The exam consists of a written and oral part. After the completion of lectures and exercises students can take the exam. Acceptable mid-term exam scores replace the written examination.

Can the course be taught in English: Yes.

Basic literature:

1. J. Stewart, Calculus 7th Edition, McMaster University and University of Toronto, Brooks/Cole, Cengage Learning, Belmont, 2008.

Recommended literature:

1. D. Jukić, R. Scitovski, Matematika I, Odjel za matematiku, Osijek, 2000.
2. B. P. Demidovič, Zadaci i riješeni primjeri iz više matematike s primjenom na tehničke nauke, Tehnička knjiga, Zagreb, 1986.
3. W. Rudin, Principles of Mathematical Analysis, Mc Graw-Hill, Book Company, 1964
4. S. Kurepa, Matematička analiza 1 (diferenciranje i integriranje), Tehnička knjiga, Zagreb, 1989.
5. S. Kurepa, Matematička analiza 2 (funkcije jedne varijable), Tehnička knjiga, Zagreb, 1990.