Alanya Alaaddin Keykubat University | Rafet Kayış Faculty of Engineering
Mechanical Engineering Department

Syllabus

Code/Name	MCE 108 / Mathematics II
Type	Required
Credit/ECTS	5/5
Hour per Week	4 (4+0+0)
Level/Year	Undergraduate/1
Semester	Fall
Classroom	WWF | A003
Content	Improper İntegrals, Applications of definite integrals: Area, volume, surface area, arc length, center of mass, moments, and moment of inertia. Infinite sequences. Series.
Prerequisites	
Textbooks	***Primary*** Class Notes ***Supplementary*** G. B. Thomas, M. D. Weir, J. Hass, F. R. Giordano, Thomas' Calculus, 11th Ed., Pearson Addison-Wesley, 2004, ISBN-13: 978-0321226426. D. G. Zill, W. S. Wright, Calculus: Early Transcendentals, 4th Ed., Jones & Bartlett Learning, 2009. F. Ayres, E. Mendelson, Schaum's Outline Series, 6th Edition, McGraw-Hill Education, 2012. J. Stewart, Calculus: Concepts and Contexts, 2nd Ed., Brooks/Cole, 2001.
Objectives	● To be able to explain the concept of improper integral and to classify the improper integrals according to their types ● To be able to define sequences and series and to explain their properties ● To be able to define the concepts of bounded sequence, monotone sequence, infinite series, geometric series, harmonic series and alternating series ● To be able to detect convergence or divergence of series with the help of Ratio Test, Integral Test, Comparison Test and other convergence tests ● To be able explain the concepts of absolute convergence, Power series, Power series representation of functions, Taylor and Maclaurin series and binomial series
Course Outcomes	In this course you will be able to: CO1 Evaluate the improper integrals CO2 Find the general term of a sequence and check the monotonicity and convergency CO3 Find the sum of the series CO4 Determine the convergency of the series CO5 Expand the Taylor and Maclaurin series

Weekly Schedule of Topics

W	Topic
1	Improper Integrals.
2	Convergency tests for Improper Integrals.
3	Application of definite integrals: Area between two curves (Cartesian, polar and parametric curves)
4	Application of definite integrals: Surface area (Cartesian, polar and parametric curves)
5	Application of definite integrals: Volume (Cartesian, polar and parametric curves)

6	Application of definite integrals: arc length (Cartesian, polar and parametric curves)
7	Application of definite integrals: Center of mass and moment of inertia
8	Sequences and their properties. Convergence of a sequence. Bounded sequence. Monotone sequences.
9	Series and series sum.
10	Convergency tests for series.
11	Convergency tests for series.
12	Functional series and uniform convergence
13	Term by term differentiation and integration of the functional series
14	Taylor and Maclaurin series and binomial series

Professional Contribution	Ability to compute limits, derivatives and definite/indefinite integrals.

Contribution to Program Outcomes*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	5	3	0	1	0	0	0	1	0	0	0
CO2	5	3	0	1	0	0	0	1	0	0	0
CO3	5	3	0	1	0	0	0	1	0	0	0
CO4	5	3	0	1	0	0	0	1	0	0	0
CO5	5	3	0	1	0	0	0	1	0	0	0

* Contribution Level | 0: None | 1: Very Low | 2: Low | 3: Medium | 4: High | 5: Very High

Special Conditions	None
Requirements	Basic knowledge of basic mathematical concepts as single variable functions and their properties, inverse and composition of functions, and some special functions and their properties.
Course Policy	● Be in the class on time. ● English should always be used to communicate with one another. ● At least 70% attendance is required, otherwise a grade of **DZ** will be assigned.
Cheating & Plagiarism	● Copying or letting someone copy your work on exams, assignments, or reports is cheating. ● Cutting and pasting text, figures and tables from web sources or any other electronic source is plagiarism. ● The consequence of academic dishonesty is to receive a grade of **FF** for the course.
Evaluation	Quizzes (2×10 pts.) 0% Midterm 50% Presentation 0% Final Exam 50% Total 100%

Instructor

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