

Calculus I

Course Administrative Details

Course Title	Calculus I		
Instructor(s)	Yaroslav Kholodov	Instructor's e-mail	kholodov@cres.mipt.ru
Course #	102	Course Type	Core
Faculty	Computer Science and Engineering	Major	All
Academic year	2016-2017	Semester Offered	Fall
No. of Credits	6 ECTS	Total workload on average	[Ex: 12 hrs. per week inc. 8 hrs. of self-study]
Lecture Hours	2 per week	Lab Hours	2 per week
Language	English (Russian)	Frequency	Weekly
Target Audience	Bachelors	Anticipated Enrollment	130 students
Studying year	1		
Grading Mode	A, B, C, D	Keywords	Graph of a function, Limit, Differentiation, L'Hospital's rule, Integration, Convergence, Divergence, Taylor series

Course outline

This introductory calculus course covers differentiation and integration of functions of one variable, with applications. The basic objective of Calculus is to relate small-scale (differential) quantities to large-scale (integrated) quantities. This is accomplished by means of the Fundamental Theorem of Calculus. Should be understanding of the integral as a cumulative sum, of the derivative as a rate of change, and of the inverse relationship between integration and differentiation

Course Delivery

The course will be given over fall semester, one day per week. There will be two 2-hour classes per day one lecture and one seminar. There are ten assignments. Tutorial exercises will be set. There is a mid-term exam and a final examination.

Prerequisite courses

There is no course which is a prerequisite for this course.

Required background knowledge

It is necessary knowledges of algebra and trigonometry on high school level.

Course structure

IA – Individual Assignment

Week# / Date	Topic	Assignments and Quizzes
Week 1	The limit of a sequence	
Week 2	The limit and continuity of a function	
Week 3	Derivative and differential	IA-1 out
Week 4	Taylor's Formula, L'Hospital's Rule	IA-2 out
Week 5	Investigation of a function using derivatives	IA-3 out
Week 6	Functions of several variables	IA-4 out
Week 7	Indefinite integral	IA-5 out
Week 8	Mid-term Exam	
Week 9	Complex numbers	

Week 10	Decomposition of rational functions	
Week 11	Integration of rational, irrational, trigonometric and hyperbolic functions	IA-6 out
Week 12	Definite integral	IA-7 out
Week 13	Applications of the definite integral	IA-8 out
Week 14	Number series	IA-9 out
Week 15	Functional series, Taylor series	IA-10 out

Textbook(s)

- Тер-Криков А.М., Шабунин М.И. Курс математического анализа: Учеб. пособие для вузов. — 3-е изд., исправл. — М.: ФИЗМАТ-ЛИТ, 2001. — 672 с. — ISBN 5-9221-0008-4.
- Кудрявцев Л. Д., Кутасов А. Д., Чехлов В. И., Шабунин М. И. Сборник задач по математическому анализу. Том 1. Предел. Непрерывность. Дифференцируемость: Учеб. пособие/ Под ред. Л.Д. Кудрявцева. — 2-е изд., перераб. — М.: ФИЗМАТЛИТ, 2003. — 496 с. — ISBN 5-9221-0306-7.
- Кудрявцев Л. Д., Кутасов А. Д., Чехлов В. И., Шабунин М. И. Сборник задач по математическому анализу. Том 2. Интегралы. Ряды: Учеб. пособие/ Под ред. Л.Д. Кудрявцева. — 2-е изд., перераб. — М.: ФИЗМАТЛИТ, 2003. — 504 с. — ISBN 5-9221-0307-5.

Reference Materials

- George F. Simmons. Calculus with Analytic Geometry, 2nd Edition, McGraw-Hill Education, 1996. ISBN: 9780070576421
- Gilbert Strang. Calculus, 2nd Edition, Wellesley-Cambridge, 2010. ISBN: 9780980232745

Computer Resources

No computer resources are required for this course

Laboratory Exercises

There are no laboratory exercises for this course

Laboratory Resources

No laboratory resources are required for this course

Grading criteria

Assignments (10%), Two intermediate tests (15% each), Mid-term Exam (30%), and Final Exam (30%).

Late Submission Policy

This policy will be strictly applied in this course. If a personal emergency should arise that affects your ability to turn in an assignment in a timely fashion, you must contact the course instructor BEFORE the deadline to get a "Special Late Submission Approval" from the course instructor. Without the "Special Late Submission Approval" submissions will be still accepted up to 3 days late, but with a 25% penalty for each delay day. No "Special Late Submission Approval" will be granted after the deadline. All submissions should be submitted directly to the instructors.

Cooperation Policy and Quotations

We encourage vigorous discussion and cooperation in this class. You should feel free to discuss any aspects of the class with any classmates. However, we insist that any written material that is not specifically designated as a Team Deliverable be done by you alone. This includes answers to reading questions, individual reports associated with assignments, and exams. We also insist that if you include verbatim text from any source, you clearly indicate it using standard conventions of quotation or indentation and a note to indicate the source.