

Math 0420 - Introduction to the Theory of 1-Variable Calculus (Spring 2016)

Prerequisites: The course concerns the "theoretical" One-Variable Calculus. Prerequisite is Math 413: Introduction to Theoretical Mathematics. If you do not feel comfortable with the prerequisite material, please contact the instructor in the beginning of the course.

Core Topics:

1. The Bolzano-Weierstrass Theorem; Cauchy sequences; Cauchy completeness of the real numbers.
2. Real-valued functions on an interval: limits and continuity.
3. Intermediate Value Theorem; Max-Min Theorem.
4. Uniform continuity; continuous functions on a closed and bounded interval are uniformly continuous.
5. Differentiable functions.
6. Interior Extremum Theorem, Rolle's Theorem, Mean Value Theorem.
7. Taylor's Theorem and Taylor Series.
8. The Riemann Integral on a closed and bounded interval. Increasing functions are Riemann-integrable. Continuous functions are Riemann-integrable.
9. The Fundamental Theorem of Calculus.
10. Definition and examples of pointwise and uniformly convergent sequences of functions.
11. Continuity of uniform limits of continuous functions.
12. Interchange of uniform limits and integration.
13. Interchange of limits with differentiation.
14. The M-test for uniform convergence of series.
15. Application to power series.

This course fulfills requirements for the following majors:

- Bachelor of Science in Mathematics
- Bachelor of Science in Applied Mathematics
- Bachelor of Science in Mathematics-Economics
- Bachelor of Science in Mathematical Biology

Grading Scheme:

- Homework and Quizzes (30%)
- Midterms (15% each)
- Final Exam (40%)

Homework Assignments: Homework assignments are posted on the class website, and are due on most Fridays.

Notes About Homework/Exams: Homework must be turned in at the beginning of class on the due date. Late homework will not be accepted, but your lowest homework grade will be dropped. There are no make up exams given.

Disability Resource Services: If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and the Office of Disability Resources and Services, 216 William Pitt Union (412) 624-7890 as early as possible in the term.

Academic Integrity: Cheating/plagiarism will not be tolerated. Students suspected of violating the University of Pittsburgh Policy on Academic Integrity will incur a minimum sanction of a zero score for the quiz, exam or paper in question. Additional sanctions may be imposed, depending on the severity of the infraction.

On homework, you may work with other students or use library resources, but each student must write up his or her solutions independently. Copying solutions from other students will be considered cheating, and handled accordingly.