

MATH 100 – Introduction to the Profession

Course Description from Bulletin: Introduces the students to the scope of mathematics as a profession, develops a sense of mathematical curiosity and problem solving skills, identifies and reinforces the student's career choices, and provides a mechanism for regular academic advising. Provides integration with other first-year courses. Introduces applications of mathematics to areas such as engineering, physics, computer science, and finance. Emphasis is placed on the development of teamwork skills. (3-0-3)

Enrollment: Required for AM and elective other majors.

Textbooks: Timothy Gowers, *Mathematics: A Very Short Introduction*, Oxford University Press (2002), ISBN 0-19-285361-9;
Keith Devlin, *Sets, Functions, and Logic: An Introduction to Abstract Mathematics, Third Edition* (2003), ISBN: 1584884495.

Other required material: Cleve Moler, *Experiments with MATLAB*,
<http://www.mathworks.com/moler/exm/chapters.html>

Prerequisites: None

Objectives:

1. Students will learn about real world applications and careers for applied mathematicians.
2. Students will learn about professional ethics as applies to mathematicians.
3. Students will work in small teams of approximately three students on a semester-long group project.
4. Students will know the curricula the department offers, including the required courses and different specializations.
5. Students will get a taste of different areas of mathematics via examples and experiments using MATLAB, including analysis, discrete mathematics, computational mathematics and stochastics.
6. Students will understand the role of proof and conjecture in mathematics.
7. Students will understand the different nature of “results” in various areas of pure and applied mathematics, such as: surprising truths, good definitions, estimates and approximation, good models, provably good algorithms, effective heuristics, inference (statistics).

Lecture schedule: Two 75 minute meetings per week

Course Outline:

	Hours
1. An Introduction to Mathematics and Careers as a Mathematician	3
2. MATLAB (including applications)	14
3. Logic, proofs, and certain other fundamentals	9
4. Resources at IIT (such as Galvin Library, ARC or CMC)	1
5. Professional Ethics	1
6. Topics:	
a. Discrete Applied Mathematics.	6

b. Applied Analysis	2
c. Computational Mathematics	2
d. Stochastics	2

Assessment:	Class participation (including reading and attendance)	30-80%
	Homework & MATLAB labs	10-40%
	Group Project	10-40%

Projects: Group project ideas will be suggested by faculty members at the beginning of the semester. If a group of students wants to propose their own project, then it needs to be approved by a faculty member. Most projects will include a presentation, and a computer program (probably, but not necessarily using MATLAB). Presentations will be given during finals week, during our reserved slot for the final exam. Groups will be graded both on the final project itself as well as by whether or not they adequately meet certain deadlines:

4th week: Choice of project and groups, including a one-page description of the topic.

8th week: midterm report, content and format determined by the faculty adviser of the project.

Discussion of project with the faculty adviser late November/early December – all group members should be capable to discuss what has been written up so far.

Syllabus prepared by: M. Pelsmajer, G. Fasshauer, X. Li

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