

Dear Students,

It has been a pleasure to teach you all this semester. I would consider this a successful course if you had fair opportunities to learn new ideas/concepts and you were challenged to grow intellectually. If you gained confidence in using and understanding mathematical logic, statements, and various types of proofs as used in mathematics, and developed a better appreciation for beautiful mathematics. If you were able to take advantage of the opportunity through projects and labs to learn about some special mathematical topics and research/computation/experimentation. You have a basic idea of various parts of modern applied mathematics as practiced in our department. And, most importantly, you saw how ethics and related social issues affect work and study in the Mathematical sciences. And, how building social connections with each other within and outside the mathematical society is essential both for our personal and social progress.

(Reread my letter to you at <http://www.math.iit.edu/~kaul/cv/HighSchoolLetter.pdf>)

### **What next?**

1) You can **take courses at IIT** that complement and supplement Math 100, which are essentially all Math and CS courses.

- In Math 230, 332, and most 400 level courses, you will utilize proofs and mathematical arguments, etc.
- In Math 380 and 497, you will again get an opportunity to do mathematical projects. The project experience is essential for success in whatever career you pursue after IIT.
- In Math 350, 477 and others, you will utilize computational methods and algorithms with Matlab, etc.

2) You can do some **self study** based on your interests

- Both the course textbooks (by Alcock and by Devlin) are meant to be read and reread throughout your stay at IIT. Make good use of them.
- Read "Mathematics: A Very Short Introduction" by Gowers. It's something worth rereading over the time you are at IIT.
- Read "How to Solve it" by Polya. This is a classic of mathematical writing and still the best advice you can get for learning mathematical problem solving. Highly recommended. You can supplement it with "Solving Mathematical Problems: A Personal Perspective" by Tao, and "Algorithmic Puzzles" by Levitin and Levitin.
- Read "Mathematical Fallacies, Flaws, and Flimflam" by Barbeau. A great way to train yourself to detect subtle mathematical errors in an entertaining way.

3) **Have (reading) fun :-)**

- Read "Proofs from the BOOK" by Aigner and Ziegler (several editions up 6th), which has many chapters on beautiful mathematical results and arguments. This can be read slowly for the rest of your life.

- Read "Godel, Escher, Bach: An Eternal Golden Braid" by Douglas Hofstadter. A beautiful book about foundations of mathematics and computer science.
- Read articles from the Quanta Magazine. For example,
  - <https://www.quantamagazine.org/tag/quantized-academy/>
  - <https://www.quantamagazine.org/tag/applied-math>

#### 4) **Explore beyond the curriculum!**

Participate in various student organizations, including our own SIAM chapter, and build a social network; explore project and research opportunities in and out of IIT; explore the art, culture, and nature around the city. Come talk to me if you need advice or suggestions for any of these.

If you need help with any of the topics we studied in Math 100 at any time in the future, just send me an email or stop by my office.

I hope to see you in my future courses. In the meantime, please do not hesitate to contact me if I can be of any help towards making your studies at IIT successful.

My best wishes for all your future endeavors!

Wishing you relaxing and enjoyable holidays,  
Hemanshu