Math 400: Research Methods in Mathematics

Contact Information:

Instructor: Professor C. Crawford

Office: DA 209C

Phone: 617-3479

Email: crawford@elmhurst.edu

Webpage: http://crawford.elmhurst.edu

Office Hours:

Monday   10:00 – 11:30 AM

Tuesday   2:00 – 3:00 PM

Thursday   1:00 – 2:00 PM

By appointment

Course Description:

This course is designed to broaden and strengthen your analytical and critical thinking skills by reading, researching, and writing about mathematics. The goals for this course include developing your mathematical and thinking skills to a level that will allow you to read and do mathematics on your own. This course offers you a unique opportunity to develop the valuable skill of independent learning. You will learn how use appropriate digital and print resources to research topics and find professional articles.   You will present the results of the articles to the class, generating discussion and further questions. Finally, you will write multiple papers reflecting your understanding of the topics and the conventions of professional writing in mathematics. *ECIC Tags: MTH 400 fulfills the Information Literacy Tag; MTH 400 & MTH 451 together fulfill the Writing Tag.* **Prerequisite**: *This course should be taken in the junior or senior year in preparation for writing the senior paper.* **Note:** *You must receive a C or better to take MTH 451 Senior Paper.*

Grading:

Attendance (Including Seminars and Seminar Questions)	**15 %**
Journal Categorization/Information Literacy/Mathematical Typesetting	**5%**
Philosophical, Historical, or Multicultural Summary/Review Paper	**15 %**
2 Technical Summary/Review Papers (15% each)	**30 %**
In-Depth Summary/Review Paper (meet w/ other faculty)	**35 %**
	100 %

Your final letter grade for the course will be based on the percentage breakdown above. Excessive and consistent disruptions (e.g. tardiness, leaving class for drinks or the restroom, cell phones, etc.) may result in lowering your grade up to one full letter grade. ___All cell phones must be turned completely off and put away___.

ATTENDANCE AND SEMINAR QUESTIONS: Since this course relies heavily on group presentation, discussion, and feedback it is important that you attend regularly. You are expected to attend both the class discussion and the weekly on-campus seminars. For each seminar, you will be required to submit at least one question about the topic. While ___I strongly encourage___ you to develop your confidence in ___asking the question(s) at the seminar___, I will not require that you do so.   Please turn in your question(s), with your name included, on a separate paper at the end of the seminar. I also recommend that you take notes during the seminar. If you miss a peer review session, your paper will be docked 10%.

JOURNAL CATEGORIZATION: You will each be assigned a journal (e.g. The College Mathematics Journal, Vol. 42, No. 1, January 2011) to evaluate by categorizing the articles by topic and perceived level of difficulty. You are not expected to read each article in full detail, but rather quickly skim through them to get an overall sense of the content. You will be given a form to fill out for this assignment.

INFORMATION LITERACY: On **February 7**, we will meet in the library computer classroom (aka the fishbowl) to learn about using the resources available for conducting mathematics research.   The skills learned in this session will be helpful throughout the course.

SUMMARY/REVIEW PAPERS: After learning how to read mathematical articles chosen by the instructor from professional journals and how to ask or generate questions based on those readings, you will have the opportunity

to choose articles for the 3 Summary/Review Papers. **One paper** **will be based on reading a** **philosophical, historical, educational, or multicultural article**. **The other** **two papers** **will be based on** **technical articles.** There will be time in class for you to present/summarize the results of the papers and brainstorm ideas with classmates to generate mathematical questions. The guidelines for the written Summary/Review Paper are given on a separate handout. **Each of these papers will require at least one additional source beyond the main source to demonstrate use of additional sources to explain background material and/or historical or biographical data.**

IN-DEPTH SUMMARY/REVIEW TECHNICAL PAPER: The final article that you read is to be analyzed in depth. The in-depth article should be one that could serve as a topic for your senior paper requirement. *Part of the in-depth assignment will be to discuss your topic with at least one other member of the Mathematics Department faculty,* with an eye toward selecting someone to supervise your senior paper. They can provide help with understanding your article, discuss possible extensions for a senior paper, or suggest other senior paper topics.

NOTES ABOUT PAPERS: For the 2 Technical Papers and In-Depth Paper, you must use at least 2 different overall topics/applications. For example, if you love sports, only 2 of the 3 papers can be about a sports-related application. All papers turned in are potentially subject to peer-review. If you turn in a paper to be peer-reviewed or a peer review late, your paper will be docked 10% each day.

Tentative Class Schedule:
01/31*	**How to read an article; Discuss Mathematical Writing Conventions;**
02/07*	**Mathematical Typesetting; Information Literacy Session**
02/14*	**Bring & Brainstorm Technical Article #1**
02/21*	**Technical Paper #1 First Draft Due; Peer Review Session**
02/28*	**Technical Paper #1 Final Draft Due; Bring & Brainstorm Technical Article #2**
03/07	**Brainstorm Technical Article #2;** *Seminars Begin*
03/14	**Technical Paper #2 Due;**
03/21	**Spring Break – No Class**
03/28	**Bring & Summarize Philosophical, Historical, or Multicultural Article;**
04/04	**Philosophical, Historical, or Multicultural Article Due; Bring & Brainstorm In-Depth Article;**
04/11	**Bring & Brainstorm In-Depth Article;**
04/18	**Brainstorm In-Depth Article**
04/25	**In-Depth Paper** *1st Draft* **Due; Peer Review Session**
05/02	**In-Depth Paper** *2nd Draft* **Due;**
05/09	**In-Depth Paper** *2nd Draft* **Due**
05/16	**In-Depth Paper** *Final Draft* **Due**

Policies and Academic Integrity:
You are expected to adhere to the College Academic Integrity Policy as stated in the *E-Book* as it applies to this class.

Accommodations:
The College will make reasonable accommodations for persons with documented disabilities. A student with a disability that may have some impact on work in this course should contact Dr. Corinne Smith, Disabilities Service Coordinator, at 630-617-6448 *and then contact me.*