

MATH 495/573 HILBERT'S 23 PROBLEMS

Nicholls State University, Summer 2014

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My office hours are 1:00-2:00, 3:45-4:30 M-Th. Please contact me (phone, email, or in person) during these times if you have any questions. If you need assistance at a different time, let me know and we'll work something out.

Prerequisite: MATH 358

Text: *The Honors Class: Hilbert's Problems and Their Solvers* by Ben H. Yandell (A.K. Peters ISBN 1-56881-216-7)

Course Description (catalog): Selected topics in the history of mathematics. A general survey of mathematics normally includes developments in geometry, algebra, number theory, and calculus as well as biographies of significant mathematicians and their contributions to mathematics and society. May be repeated for credit if content differs. No more than six hours may be counted towards a degree.

Course Description (instructor): At the 2nd International Congress of Mathematicians in Paris, David Hilbert presented a talk entitled innocently enough "Mathematical Problems". In this talk, he outlined 23 problems facing mathematics that he believed should be researched during the coming century. His stature was such that the mathematical community went to work.

This of course is a slight exaggeration, as many of the supported problems were already the subject of intense research. However, Hilbert's endorsement of these programs certainly added credibility to them and encouraged more participation and therefore progress. Several of the problems are specific in nature, requesting the solution to a particular unsolved problem, while others are more broad; suggesting the exploration or development of new fields of mathematics.

In this class, we will learn about Hilbert and the people that solved his problems or made significant progress on them. We will read "The Honors Class" by Ben Yandell (<http://www.amazon.com/dp/1568812167>). The class will be a very humanities-esque style class; lots of reading, writing, and discussion board

participation. Much of the relevant mathematics is formidable, but we will cover some topics in detail as they come up.

A few words need to be said about the Internet aspect of this course. All assignments, notes, announcements, etc. will be posted on Moodle. All students enrolled in an Internet course should have basic computer skills (such as word processing, e-mail, navigating the Internet, etc.). I invite you to visit the distance education webpage (<http://www.nicholls.edu/distance>) for more information and guidance. As an online student, you will be somewhat self-paced. This therefore requires self-discipline and self-motivation. All deadlines need to be respected. It is the responsibility of the student to notify the instructor of technical and/or personal problems that may interfere with online participation. Since email will be our primary means of communication, you will need to check your Nicholls email account regularly (*at least* once a day) for possible news and/or announcements. Additionally, please feel free to email me as often as is necessary if you have questions about the material. Finally, just like a typical class, instances of academic dishonesty such as plagiarism will not be tolerated. Sanctions for such behavior are outlined in the *Code of Student Conduct* (Section 1.9).

Special Note: Section Five of the Code of Student Conduct, 'Academic Dishonesty and Disruptive Behavior,' includes a requirement that faculty file a charge complaint statement with their respective dean whenever a student is confronted or disciplined for cheating. The Office of Academic Affairs will maintain these records, and any student confronted and/or disciplined for multiple offenses of academic dishonesty will be brought before the Academic Affairs Integrity Committee for further review and potential sanctions. Please read the Code of Student Conduct for further details regarding this policy."

Grading Policy: We will have weekly discussion boards and a final exam. These will be described fully below.

Discussion Boards: Every week, you will be given a reading from Yandell's book and the following week we will discuss it. I envision the discussion being very similar to an in-class roundtable discussion...with the "roundtable" being replaced by the Internet. You will be graded thoroughly on your discussion board participation. I will explain this component in more detail below.

This portion will count for 70% of your course grade.

Final Exam: We will have a "take-home" final. By the end of the semester, we will have completed the book and I will test you on many details of it as well as your impressions of it. You'll be expected to know important people, places, dates, mathematics, and events, but as an "open book" exam, the test will focus more on interpreting what we

read and learned. Short answer and/or essay questions will be expected to be answered with coherence and clarity.

This exam will count for 30% of your semester grade.

At the conclusion of the semester, letter grades will be assigned based on the usual 10% grading scale (A: 90-100%, B: 80-89%, C: 70-79%, etc). Late assignments will not be accepted unless there are VERY unusual circumstances, and make-up exams will only be administered if the student provides a valid excuse. The instructor decides which excuses are valid and which circumstances are unusual. As I said above, academic dishonesty (i.e. cheating, plagiarism, etc.) will not be tolerated.

Discussion Boards: Every week, we will discuss a reading from Yandell's book over two days (Monday and Tuesday). You will be given prompts to which you will be required to reply and then the whole class will post comments to everyone's replies.

I will moderate the first discussion and give feedback/grades once it's completed so that students will be able to adapt to my expectations. The following discussions will be facilitated by pairs of graduate students. Everyone will receive a grade each week assessing how actively and insightfully they participated in the week's discussion and the graduate student facilitators will also be assessed based on (a) how well they engaged the other students, (b) how thought-provoking their prompts were, and (c) how effectively they managed the discussion.

During your reading:

- Make Notes.
- Read Carefully (repeatedly?).
- Look up people/places (if necessary or interested).
- If the mathematics gets formidable, keep going. It might get clearer later on, or we may not focus too much on it.
- Get used to going back and forth between the voice of Hilbert (pages 389-424) and Yandell.
- Feel free to read ahead, but keep your thoughts organized between the current discussion board topic and your upcoming topic.
- (Grad Students) Coordinate with your facilitating partner what your prompts will be.

During each discussion board:

- The facilitator(s) of the week must post their prompt by noon (CDT) Monday.
- You must respond to the initial prompt posted by the week's facilitator(s) by 11:55pm (CDT) Monday.
- I will then open up the responses for all to see on Tuesday and we will discuss them until 11:55pm (CDT) Tuesday night.
- **Minimal Activity:** In addition to your initial reply on Monday to the

prompt(s), you will be required ***at a minimum*** to post a comment to two different initial replies and then reply to at least one comment posted to YOUR reply. (Note: Facilitators will not be required to answer their own prompts.)

- Comments must be substantial (“Yeah, me too” won’t count) and on-topic (“Dr. Heck is awesome!” or “How about those Texas Rangers?!?” won’t cut it!). You can reply to the prompt, answer questions, and/or pose new questions.
- The four required posts (reply to initial prompt(s), comment #1, comment #2, and reply to comment) will only be the bare minimum for participation; think C-level work. For A or B-level work, more posts or more insightful comments will be necessary.
- I will want to see that you read the required reading, have insightful comments or thought-provoking questions, and actively respond to others.
- Disrespectful, insulting, or offensive posts will not be tolerated.

***** Note: I reserve the right to amend or alter the details of this process once I see how it’s going, but I’m confident that you will be engaged and have no trouble meeting deadlines. *****

Reading/Discussion Board Schedule

Week	Dates	Reading (pages)	Topic	Facilitator(s)
1	6/9-6/10	pgs. 1-22, 389-396 (29)	Introduction	Dr. Heck
2	6/16-6/17	pgs. 396-398, 406, 23-114 (96)	#1, #2, #10	DeBello/Lambert
3	6/23-6/24	pgs. 398-403, 115-162 (53)	#3, #4, #5, #6	LeCroy/Thomas
4	6/30-7/1	pgs. 404-408, 163-257 (100)	#7, #8, #9, #11, #12	Williams/Reynolds
5	7/7-7/8	pgs. 409-414, 259-291 (39)	#14, #15, #16, #17, #18	Norvell/Tinney
6	7/14-7/15	pgs. 408, 414-424, 293-385 (105)	#13, #19, #20, #21, #22, #23	Dr. Heck

Important Dates

‘W’ Day – Thursday, July 10, 2014

Academic Grievances: The proper procedure for filing grade appeals or grievances related to academic matters is listed in Section 5 of the *Code of Student Conduct* and at the following link:

www.nicholls.edu/documents/student_life/code_of_conduct.pdf

Continued Learning following an Extreme Emergency: In order to make continued learning possible following an extreme emergency

students are responsible for:

- reading regular emergency notifications on the NSU website;
- knowing how to use and access Moodle
- being familiar with emergency guidelines;

- evacuating textbooks and other course materials;
- knowing their Moodle student login and password;
- contacting faculty regarding their intentions for completing the course.

faculty are responsible for:

- their development in the use of the Moodle software;
- having a plan for continuing their courses using only Moodle and email;
- continuing their course in whatever way suits the completion of the course best, and being creative in the continuation of these courses;
- making adjustments or compensations to a student's progress in special programs with labs, clinical sequences or the like only in the immediate semester following the emergency.

Assistance with Studying and Assignments:

- The Tutoring Center at 143 Peltier Hall. Call 985-448-4100, email tutoring@nicholls.edu, or visit <http://www.nicholls.edu/academic-enhancement>.
- The Writing Center at 144 Peltier Hall. Call 985-448-4100, email tutoring@nicholls.edu, or visit <http://www.nicholls.edu/academic-enhancement>.
- Online Tutoring through Moodle. Look for the Brainfuse log-in link on the home page, <http://moodle2.nicholls.edu/moodle>

ADA Compliance: If you have a documented disability that requires assistance, you will need to register with the Office of Disability Services for coordination of your academic accommodations. The Office of Disability Services is located in 158A Shaver Gym. The phone number is (985) 448-4430 (TDD 449-7002).