HONS390-005: Honors Seminar on "Mathematics in Fiction"

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Introduction

This is going to be a literature class, with a twist. We will primarily be reading works of fiction and discussing them using the standard techniques of literary analysis, and the grade will be based almost entirely on two papers. In that sense, this class will be like a literature class. However, our focus will be on the representation of mathematics and mathematicians in those works of fiction, and that brings an entirely different academic aspect into the mix. So, there will also be a large component of mathematics. In fact, the class will be entirely interdisciplinary. It is my hope that we will see a significant amount of history, women's studies, psychology, physics, philosophy, and sociology as well! It is beyond my ability to do all of that by myself, since my training is really in mathematics and not in all of those other subjects. So I will be expecting your help in bringing to the class any relevant ideas you know from any discipline you have encountered. A good deal of creativity and patience will also be required - both for students and professor - since the area of "mathematical fiction" is relatively uncharted territory, and we are its pioneers.

Note that this class meets MWF 9:00-9:50AM in 320 Maybank Hall. This syllabus is available on the Web at http://kasmana.people.cofc.edu/HONS390/ and may be updated from time to time throughout the semester.

Assigned Readings

There are only three books which need to be purchased for the class:

- **Uncle Petros and Goldbach's Conjecture** by Apostolos Doxiadis
- **Proof** by David Auburn
- and **Arcadia** by Tom Stoppard

Other short readings will be made available online in our Electronic Coursepack.

We will read all of those together. In addition, the professor may provide the class with some of his own published writings! (Realizing that he is not a particularly talented author, the professor promises not to force the class to read too many of these stories.)

It is important to note that in addition to all of the common readings, each student will be expected to do some independent reading, which will be required to the class in the form of papers and some oral presentations. In this way, the students will be able to read whatever sort of fiction they enjoy most (e.g. mysteries, science fiction, comedy, classical, etc.) The selection of individual readings is subject to approval by the professor. Refer to the Mathematical Fiction Homepage for assistance in selecting appropriate works of fiction. Although some students may wish to purchase materials for the individual readings, between my extensive “private library” of mathematical fiction, the College library and the Charleston County Public Library, I believe it should be possible for students to simply borrow the books they need.

Graded Assignments

- **Reader's Diary:** Each student is required to have a spiral bound, lined notebook which is designated as their Reader's Diary. For each of the reading assignments in the class, whether a common reading or an individual reading, the student should log the date and time that they are reading in the book and then record some of their most significant observations or thoughts related to the reading. In the case of common reading assignments, specific questions will be given in advance that the student should address in their diary, although other observations and realizations may be recorded as well. The professor will check these diaries occasionally and without much warning. They will be graded primarily for effort and not on the basis of quality as a way of ensuring that the student is actually doing the reading assignments. However, it should be noted that I will be looking for evidence that you are thinking about the readings, and so what you choose to write should reflect independent intellectual activity and not just a record of time spent reading.

- **Class Participation:** Each student is expected to contribute to the discussion in class. Although you are encouraged to speak up whenever you have something to say, a minimum of two contributions per week is expected. Those shy (or unprepared) students who do not have at least two things to say each week will find their class participation grade suffering as a consequence.

- **Non-fictional Material Test:** There will be single test in the class (all multiple choice and/or matching) on the non-fictional material that we will learn as part of the class. In particular, you will be expected to identify some of the mathematicians and mathematical topics that we will encounter as part of our common readings in the class. The test will not involve any actual computation, but an understanding of some mathematical concepts learned in the class may be required to correctly answer some of the questions. The test will take up the entire class on December 3rd.

- **Short Paper:** Each student will pick a novel to read (see “individual readings” in reading assignments above) and write a 3-5 page paper on the book. The report will be due on October 10th, but one week prior to that date the student will be expected to make a very brief presentation in class describing the book they are reading and what they are going to say about it in the paper. Note that I will be looking for more than just a "book report" describing the work of fiction. A paper in which the grammar and writing are perfectly accurate which does no more than summarize the book will receive a grade of C+.

- **Uncle Petros and Goldbach's Conjecture: Is there a connection between insanity and mathematics?**
- **UP&GC as Pro-mathematical Propoganda**
- **The Unfair Portrayal of Mathematics and Mathematicians in UP&GC**
- **Uncle Petros and Goldbach's Conjecture: The history of Hardy, Littlewood and Ramanujan and its role in the novel.**
- **Uncle Petros and Goldbach's Conjecture: Why Gödel's Incompleteness Theorem is more important to the novel than the conjecture in the title.**

I've made a list of books that I think would be good choices for the report (both because they have enough to write about and because I know where you can get a copy). Click here to see the list.
**Term Paper**: The most important assignment in the class will be the 7-10 page term paper in which you will discuss several works of mathematical fiction but focusing on some unifying theme or question. At least three novels or plays ought to be addressed (and let us state here that for the purpose of the term paper, two short stories are equivalent to one novel). At least one of the three novels should be one that was not previously used either for the short paper or as a common reading assignment. The paper itself will be due on December 8th, however on two occasions prior to that date (two weeks before and one week before), the student will be expected to make a short oral presentation to the class describing the works they have selected and the ideas they hope to present in the paper.

Again, as in the short paper, this paper is not expected to be a summary of the works of fiction. In fact, to be able to say anything meaningful in a seven page paper, there probably would not be much room to summarize at all. Instead, the student is expected to have an idea of something to say that is not merely a repetition of what appears in the stories and to support their idea using appropriate support from non-fictional sources.

### Calendar of Graded Assignments

For your convenience, below you will find a calendar listing the dates on which the assignments are due:

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class participation and Reader's Diary</td>
<td>Always</td>
</tr>
<tr>
<td>Brief oral presentation concerning Short Paper</td>
<td>October 3</td>
</tr>
<tr>
<td>Short Paper Due</td>
<td>October 10</td>
</tr>
<tr>
<td>Brief oral presentation concerning Term Paper</td>
<td>November 24</td>
</tr>
<tr>
<td>Non-fictional Material Test</td>
<td>December 3</td>
</tr>
<tr>
<td>Brief oral presentation concerning Term Paper</td>
<td>December 1</td>
</tr>
<tr>
<td>Term Paper Due</td>
<td>December 8</td>
</tr>
</tbody>
</table>

### Final Grade

Your final grade will be determined from the other grades in the following proportions:

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>Reader's Diary</td>
</tr>
<tr>
<td>10%</td>
<td>Non-Fictional Material Test</td>
</tr>
<tr>
<td>10%</td>
<td>Class Participation</td>
</tr>
<tr>
<td>25%</td>
<td>Short Paper</td>
</tr>
<tr>
<td>45%</td>
<td>Term Paper</td>
</tr>
</tbody>
</table>

### Extra Credit

Those seeking extra credit in the class (or those who just can't get enough of it and want to do more) can consider any of the following tasks.

- Find works of mathematical fiction that I have not yet listed on my Website.
- Review works of mathematical fiction that I have not yet reviewed on my Website. (I have in mind a few that I was not able to read due to my limited abilities with foreign languages. Can you read French or Italian?)
- Write your own work of mathematical fiction!
- Get together a small group of actors from amongst the students in the class and perform some of the scenes from the plays we will read.

### Internet Resources

You will be expected to make use of non-fictional resources in writing your papers. Many students like to use the internet as a resource. It certainly is convenient, but much of the information it provides is of questionable value. You may use any book, magazine or journal which appears in the College library or the Charleston public library as a resource. We can trust the publisher and the librarian, each of whom played a role in selecting that material as worthwhile. On the other hand, anyone can post any garbage they want on the internet.

To help eliminate this problem, I am providing you with a list of internet resources you can use in writing your papers. If you wish to make use of some other Webpage, please clear it with me first.

- **Mathematical Fiction Homepage**: Of course, you can and should make frequent use of my Website. It lists and reviews works of mathematical fiction.
- **Mathematical Biographies**: This Website contains concise and accurate biographies of many famous mathematicians.
- **MathWorld**: This online encyclopedia of mathematics is in some ways inferior to the print versions you can find in a good library, but it is reasonably accurate and you can't beat it for convenience.
- **MathSciNet**: This site (only available on campus because we have a subscription) provides reviews of articles and books on mathematics.
- **The arXiv**: This is a repository of mathematics research papers. You probably wouldn't be able to read and understand many of them, but it still might be a source of information since you can get an idea of what sort of research people are doing these days and how much of it there is. Note that these papers are not refereed, so there is no real check on the quality of the papers.
- **Science Direct**: This Website available from campus computers gives the user access to many refereed research papers in mathematics (as well as other fields).

### Professor's Contact Information

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