HNRS 190 – Honors Tutorial
Fall Semester, 2009

Class Time: 4:00 – 4:50 R

Location: 102 Nunemaker Hall

Instructor: Dr. Perry Alexander
2022 Eaton Hall - 864-8833
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http://ittc.ku.edu/~alex

Office Hours: 1:00-2:30 TR or by appointment, 2022 Eaton Hall

Description: The topic of this honors tutorial is semantics and the link between mathematics, music and programming as realized by their representations and semantic interpretations. We will read and discuss selections from *Gödel, Escher, Bach*, learn some basic techniques for representing semantics, define some basic semantic structures, and discuss the implications of this work. The meta-objective of this course is to help you start learning what it means to be a scholar and be a part of the scholarly community.

Prereqs: There are no formal prerequisites for this class. Some knowledge of programming, math or music is helpful.

Texts: *Gödel, Escher, Bach: An Eternal Golden Braid,* Douglas Hofstadter, Basic Books.

Reference Texts: Papers from the literature and reference texts will be provided as the class progresses. See the class website for more details.

Grading:
- 90 – 100%   A
- 80 – 90%   B
- 70 – 80%   C
- 60 – 70%   D
- 0 – 60%   F

Weighting: The sole basis for your grade in this course is: (i) preparation and participation in our weekly meetings; and (ii) a moderate sized project. I do not take attendance, but it's pretty difficult to hide. You will be asked to lead discussion one or more times during the semester and there will be several very small projects.

Homework: Some preparation for class will be required each week. You may be asked to take charge of the discussion from time to time, but never alone.

Projects: You may be asked to do several small experimental programming, mathematical, or composition projects. These will be discussed extensively in class, but will rarely if ever be rigorously graded. What you are asked to do will reflect the area of study you feel most comfortable with.

You will be asked to do a moderate sized project towards the end of the semester. The structure and topic of this project will largely depend on what you want to study further. More details will be provided as the course progresses.

Repository: All homework assignments, exams, solutions and handouts you receive in class are linked to the HNRS 190 homepage. In general, I will not distribute hard copies of papers and handouts. All documents will be published using the Adobe PDF standard. PDF readers are freely available for Windows, Linux, and MacOS on the Adobe website.

Policies: *Class Participation* – I do not take attendance in class; however participation in class is important to your success. You must come to class to be successful. Please ask questions and participate in class discussions. This is your class - make it worth your time!

Email - I encourage you to use email to contact me. I am logged in when I am available and check email frequently. I will frequently post entries to the class blog when I want to contact you as a group.

Phone - Feel free to call me in my office at any time. I would prefer not to be called at home.

Office Hours - I will make every effort to be in my office during scheduled office hours. If there are exceptions, I will let you know as early as is possible. If you have a conflict with my office hours, please make an appointment. I try to have an open door policy; you are free to come by whenever you choose. If I am busy, I may ask that you make an appointment. My schedule is available on my web page.

Topics: The following list represents probable course topics. Specific topics are subject to change without notice.

- **Formal Systems**
  - Formal language
  - Semantics
  - Inference system
- **Formal languages**
  - Alphabets
  - Grammars
- **Semantics**
  - Denotational semantics
  - Operational semantics
  - Static vs. dynamic semantics
- **Inference Systems**
  - Axioms
  - Inference rules
- **Math, Music and Language**
  - Mathematics as a formal system
  - Music as a formal system
  - Languages as formal systems
- **A Bit of History**
  - When Cantor saw God
  - The Formalists and Proof
  - Hilbert's "program" of challenge problems
  - Godel's incompleteness proof and the end of the Formalists
  - Turing's machine
  - Church's functions
  - Chompsky's wonderfully successful failure