Syllabus, Genome 466 - Cancer Genetics, Winter 2020.
Professors James Thomas, jht@uw.edu, Foege S340B. Office hours Wednesdays 2:30-3:20 in Vista Cafe space (ground floor Foege South).
David Hawkins, rdhawk@uw.edu, HSB K236B. Office hours Thursdays 2:30-3:30
Teaching Assistant Emma Hoppe, erhoppe@uw.edu, Office hours TBA

Discussion section: Tuesday, 12:30-1:20 Foege S110.

Web site: http://courses.washington.edu/gs466/

Exams: Midterm – Feb. 12 12:30-1:20 pm; Final – Mar 19 8:30-10:20 am.

Course format: After an introductory lecture segment, the class will consist largely of reading and discussing a variety of seminal research papers on cancer genetics. Each class will cover one such paper in detail, with some background and coverage of related research when appropriate. The paper to be discussed in detail will be assigned for reading. You are **expected to read each paper before class** and to return to the paper after the class discussion, hopefully with a fuller understanding of the work. In class, we will expand on the logic and the techniques used in the paper, with the purpose of giving you the tools to understand the research in depth. This paper analysis will form most of the work for the class, and it will be largely up to you to make the effort needed to get the most from the course.

By Wednesdays, we will post on the class web site pdfs of the papers assigned for the next week, along with brief guides to reading the paper, and a short list of questions to which you should write answers **before the paper is covered in lecture. Answers will be collected at the start of each class and some of these will be graded!** (see Grading below) It is your responsibility to see that you get the paper and guide.

There will be an informal help section for an hour on Tuesdays of each week, led by Emma. Emma will answer questions about the papers and other topics that are covered in lecture. This section is not required and nothing on exams will come from material presented only in quiz section, but we recommend it highly as a study aid. Past students have rated the section highly.

Grading: We will collect your answers to the set of questions about each paper at the start of each class. We will randomly grade 11 of these. **To enforce paper reading, these will not be announced ahead of time.** Experience shows that this is a reliable way to encourage class attendance and serious paper reading, experiences that are the core of the course. However, these questions are **NOT** representative of the kinds of questions on exams. There will be two graded exams, a Mid-term and Final. Both exams will be written, problem-based short essay exams; the final will **NOT** be cumulative. One third of the grade will come from the collected paper answers and class participation, and one third from each exam. Grading will be on a curve, with a mean likely to be somewhere 3.0.

Topics:

Introduction to the biology and history of cancer.
- history, features of cancer, cancer as a genetic disease

The discovery of oncogenes.
- tumor viruses, chemically induced oncogenes.

The discovery of tumor suppressor genes.
- pedigree analysis
- loss of heterozygosity
- case study of retinal cancer (Rb)

Mutagens and cancer.
- Ames test

DNA repair and cancer.
- case study of colon cancer (HNPCC)
- UV light and xeroderma

Familial cancer.
- breast cancer case study

Genome stability and checkpoints
- p53 as a tumor suppressor
- E2F and the cell cycle

Other pathways in cancer
- cell death
- epigenetics
- angiogenesis
- telomeres

Multiple mutations and the evolution of metastases.
- multiple mutations in cancer
- metastasis

Modern cancer
- genome analysis
- kinase inhibitors
- Hela cells
- variants of unknown significance