Life depends on the propagation of genetic material from one generation to next through cycles of genome replication and cell division. The genome is copied by the parent, and one exact copy is inherited by each daughter cell. We will treat chromosomes as discrete entities, rather than collections of genes, that are replicated and divided with high fidelity to ensure that the genome remains stable over many generations. By reading selected primary literature covering several decades, we will build an understanding of the cell cycle by focusing on chromosomes and the associated molecular machinery. We will explore mechanisms that underlie replication and division, particularly control mechanisms that maintain genome integrity and are critical to prevent disease. The goal of the course is to develop a picture of the cell cycle by examining some of the key experiments and insights that have led to our current understanding.

Prerequisites: The course is designed for advanced biology students who have taken BIOL 202 or equivalent. It is also open to graduate students.

There is no textbook for the course, though one of the standard cell/molecular biology textbooks (Alberts et al. Molecular Biology of the Cell, Lodish et al. Molecular Cell Biology, or equivalent) may be useful for background knowledge. Note that several textbooks are available on-line and searchable at www.ncbi.nlm.nih.gov (select Books from the Search list). Other links for background information that you may find useful: Ergito.com (Great Experiments) and www.nature.com/celldivision (Nature Milestones in Cell Division).

Readings from the primary literature will be assigned for each meeting and provided as pdf files. Presentations of these papers and class participation, including questions and critical evaluation, are an essential part of the course. Grading will be based on one in-class midterm exam (20%), a take-home final exam (30%), and class participation (40%, including paper presentations).
SCHEDULE
Please note that the schedule is subject to revision, depending on student interests and the progression of classroom discussions.

**Historical perspective**


**Microtubule dynamics and the mitotic spindle**


**Cell cycle control**


Li X, Nicklas RB. Mitotic forces control a cell-cycle checkpoint. Nature. 1995 Feb


**Cohesion**

Holloway SL, Glotzer M, King RW, Murray AW. Anaphase is initiated by proteolysis rather than by the inactivation of maturation-promoting factor. Cell. 1993 Jul 2;73(7):1393-402.

