Preliminary Syllabus for Fall 2013

MCB 3421: Introduction to Molecular Evolution and Bioinformatics
http://gogarten.uconn.edu/mcb3421_2013

Instructor:
J Peter Gogarten
Dept. Molecular and Cell Biology
University of Connecticut
Storrs, CT 06269-3125
Phone: 486-4061
Email: gogarten@uconn.edu
Office hours
MW noon-1pm or after arrangement: for fast response send an email!
For questions of general interest, use the bulletin board on WebCT.
Teaching Assistant: Amanda Dick <amanda.dick@uconn.edu>

Basis for grading:
Participation (webct discussion board, in class discussions),
Assignments from the computer labs,
Take-home quizzes and questions,
Midterm,
Final.
> **Weights:**
> Final: 30%,
> Midterm: 25%,
> Participation, bulletin board postings, and in-class assignments: 10%
> Take-home assignments, quizzes, and presentations: 35%
> (You can drop the worst 4 grades from the Take Home Assignments).

Plagiarism and "collaborations" for writing assignments and take-home exams will not be tolerated!
In case of misconduct you will receive an F for the assignment, AND the F will counted towards the final grade.

Exam policy: When students are forced to miss a final examination due to illness, accident, death in the family or other unavoidable reasons they can come to the Office of Student Services & Advocacy to receive approval to arrange another exam time with their instructor. Students should present appropriate documentation to support their request. Students who have a conflict about which they have or should have had advanced notice (bunched, religious obligation, legal/medical appointments…) MUST seek permission to reschedule their assessment NO LATER THAN November 30th.

With other exams and assignments, which are required during the semester students bring their documentation of extenuating circumstances directly to their instructors. There are no make-up exams for the take-home exam. If you need to reschedule your final, please let your instructor know ASAP.

Preliminary Schedule

red: computer lab exercises in T115 (F 10.10 -11.40 or 13.25-14.55);
blue: lectures, demonstrations and discussions in CB110 (MW 11.15-12.05)

Class 1: Overview; topics; textbook; reading materials; How will grades be calculated?
Class 2: Protein structure, protein evolution, Swiss Protein Data bank Viewer
Class 3: Using Deep View
Class 4: Why is an evolutionary perspective important?
Class 5: Aligning protein pdb files in deep view
Class 6: Aligning pdb file in Deep view, review of the homology concept
Class 7: Databanks, Entrez
Class 8: Simple Databank searches using Entrez and Web of Science
Class 9: Discussion and review
Class 10: Z scores, expectations and probabilities
Class 11: Simple homology searches
Class 12: Multiple substitutions, dot matrix representation
Class 13: Blast and the command line
Class 14: Simple blast and blastall searches
Class 15: blastall discussion, optimal pairwise alignment
Class 16: dotlet, optimal alignments, intro to trees - part 1
Class 17: dotlet, inspecting protein protein and protein DNA alignments
Class 18: dotlet, and exon shuffling (broken projection equipment)
Class 19: clustal, muscle and SATe
Class 20: clustal and jalview
Class 21: Trees, terminology and coalescence
Class 22: Tree terminology, part 1
Class 23: Finding ORFs, Gene Plots, and Synteny
midterm
Class 24: Tree terminology, part 2
Class 25: Intron/Exon detection, prediction of membrane spanning helices
Class 26: Gene duplications, types of homology
Class 27: Gene duplications continued
Class 28: TaxPlot, TaxTable and Mummer
Class 29: Genes, populations and selection
Class 30: In vitro selection, recombination and linkage between protein evolution and the encoding genes
Class 31: Trees with clustal and phylip
Class 32: Neutral Evolution
Class 33: PSI blast
Class 34: PSI blast exercises
Class 35: Building trees, support values
Class 36: Bayes and ASRV
Class 37: Distance matrix, bootstrap and parsimony analyses - long branch attraction.
Class 38: Probability mapping and detecting positive selection
Class 39: Detecting positive and purifying selection.
Class 40: MrBayes - Introductory Exercises