Biology 4250 – Evolutionary Genetics

Fall 2017 – Instructor Dr Steve Carr [Sn-3020, x4776]
MWF 0900 – 0950 C-2026 Lab Th 1400-1700 Sn-3125

Required text:
Nielsen & Slatkin (2013) *Introduction to Population Genetics: Theory and Applications*. Sinauer [now Oxford].
[Available from Amazon.ca, or direct for Oxford University Publications: ask for student discount]

Website: [http://www.mun.ca/biology/scarr/Bio4250.html]
TBA: for History and Introductory material Weeks 1 & 2, see first four topics at

1. Introduction and History
2. Theory of Allele Frequencies
3. Theory of Natural Selection
4. Natural Selection in the Wild

The lecture outline is based on chapters in Nielsen & Slatkin, subject to modification as things develop:

Week 1 – Allele & Genotype Frequencies; Hardy – Weinberg Proportions
Week 2 – Genetic Drift & Mutation
Week 3 – Coalescence Theory
Week 4 – Population Structure: Subdivision & Sub-Subdivision
Week 5 – Inferring Population History & Demography
Week 6 – Linkage Disequilibrium & Gene Mapping
Week 7 – Theory of Natural Selection (I)
Week 8 – Selection in Finite Populations
Week 9 – The Theory of Neutrality
Week 10 – Natural Selection (II)
Week 11 – TBD
Week 12 – TBD

Labs – **Web-based Projects** for Genetics & Evolution Teaching (3 x 4-student groups)

Lab time will be an opportunity to develop a teaching laboratory of the kind used in Bio2250 & Bio2900. They are intended to emphasize computer and mathematical skills, and to develop familiarity with online genetic, evolutionary, and bioinformatic resources. I hope we can do something with the programming language PYTHON.

1. Comparative DNA sequence analysis of **Genera, Families, & Orders**: patterns & processes
2. Comparative DNA genome analysis of **Chimps *versus* Humans**: 99% revisited
3. **Phenylketonuria** as a model system for understanding genetic variation
4. **PYTHON** programming for evolutionary genetics

Grading Scheme - Project 50%: 10% Proposal due 29 Sept
15% Draft due 06 Nov
25% Project & Presentation due week of 27 Nov
Exams 50%: 20% Midterm, 23 Oct
30% Final, TBA