

MOLECULAR EVOLUTION

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Lectures: Tues/Thurs 12:05pm-1:25pm ES&T L1118

Office Hours: Mondays 5-6pm IBB 3302

Prerequisites: Prior biology (Genetics and Evolution) and math undergraduate courses

Grading Scheme:

Participation in discussions	10%
Mid-Term exam	30%
Presentation (20 minutes)	20%
Final term paper	10%
Final exam	30%

Text:

Fundamentals of Molecular Evolution by Dan Graur, Wen-Hsiung Li. Sinauer Associates, ISBN: 0878932666

This book is on reserve in the library.

Homework:

A list of practice questions will be given before exams. Students are not expected to return them. They are solely for the purpose of studying.

Exams: Open-book, in the classroom. Final exam will cover the whole course.

Final Term Paper: graduate students are required to submit a final term paper. The paper should be in a review format similar to articles published in *Trends in Genetics*. The topic of the paper should be decided upon discussions with the instructor by the week after the mid-term exam.

Further Readings:

Molecular Evolution and Phylogenetics by Masatoshi Nei, Sudhir Kumar. Oxford University Press. ISBN: 0195135849

Molecular Evolution by Wen-Hsiung Li. Sinauer Associates, ISBN: 0878934634

Population Genetics: A Concise Guide by John Gillespie. Johns Hopkins University Press. ISBN: 0801857554

Presentation: A list of papers for presentation will be provided. Students can choose one paper and present it for 25-minutes during some classes. A short discussion will follow.

DETAILED SYLLABUS

Jan.10. Introduction. Chapter 1.

Jan.12. Molecular Population Genetics I. Chapter 2.

Jan.17. Molecular Population Genetics II. Chapter 2.

Jan.20. Effective Population Size. Chapter 2.

Jan.24. Models of nucleotide substitution I. Chapter 3.

Jan. 26. Students presentations 1,2

Jan. 31. Models of nucleotide substitution II. Chapter 3.

Feb. 2. Rates and patterns of nucleotide substitution I. Chapter 4.

Feb. 7. Students presentations 3,4

Feb. 9. Rates and patterns of nucleotide substitution II. Chapter 4.

Feb. 14. Students presentations 5,6.

Feb, 16. Test of Neutrality. Supplementary material.

Feb. 21. Student presentations 7,8.

Feb. 23. Review Session.

Feb. 28. Mid-term exam.

Mar. 2. Molecular Phylogenetics I. Chapter 5.

Mar. 7. Molecular Phylogenetics II. Chapter 5.

Mar. 9. Students presentations 9,10

Mar. 14. Gene Duplication and Chromosomal Evolution I. Chapter 6.

Mar, 16. Students presentations 11,12.

MAR, 21, 23: SPRING BREAK!!

Mar. 28. Gene duplication and Chromosomal Evolution II. Chapter 6.

Mar. 30. Students presentations 13,14.

Apr. 4. C-value paradox & Genome Evolution I, Chapter 8

Apr. 6. C-Value paradox & Genome Evolution II. Evolution by Transposition I. Chapter 7.

Apr. 11. Evolution by Transposition II. Chapter 7.

Apr. 13. Student Presentations 15,16

Apr. 18. Regulatory Evolution & Evolution of Development I. Supplementary Material.

Apr. 20. Regulatory Evolution & Evolution of Development II. Supplementary Material.

Apr. 25. Evolution of Biological Networks. Supplementary material.