

Population Genetics and Evolution

Course outline

Fall 2025

Credits: Three (3 hr per week)

Time: 09:10-12:00, Tuesday

Place: 1. B204 (2F), Interdisciplinary Building, Academia Sinica, Biodiversity
Research Center (BRC Building), Academia Sinica

Organizers: Prof. Shou-Hsien Li (7749-6311)

Lecturers: Dr. John Wang

Tel: 2787-1582 (A302, BRC)

johnwang@as.edu.tw

Dr. Chih-Ming Hung

Tel: 2787-2297 (C210, BRC)

cmhung@as.edu.tw

Dr. Jen-Pan Huang

Tel: 2787-2292 (C308, BRC)

jphuang@as.edu.tw

Dr. Ko-Hsuan Chen

Tel: 2787-2292 (B301)

kohsuanchen@as.edu.tw

This is a graduate level course intended for PhD students to learn the fundamentals of population genetics and evolution. The course will be primarily discussion and based on the chapter and paper reading assignments; on most days, there will be no lectures. Students are expected to complete all reading assignments ahead of each class and be prepared for critical discussion.

At the end of the course, we hope that this course will help you develop as an independent scientist. Specifically, students will:

Learn the principles of population genetics and evolution

Develop skills to critically read and evaluate scientific publications

Identify interesting research questions and propose experimental tests in the form of a grant

Grading/Evaluation of students:

- 25%, weekly written homework assignments
- 35%, quality of class participation
- 15%, midterm: written critique and evaluation of a scientific manuscript
- 25%, final: grant proposal and reading committee evaluation

We will use the following textbooks:

Weeks 1-12:

Population Genetics 1st Edition by Matthew B. Hamilton (Wiley-Blackwell, 2011)

Weeks 13-16:

Evolution 5th Edition by Douglas J. Futuyma and Mark Kirkpatrick (Sinauer Associates, Inc, 2022/2023)

DATE	WEEK	TENTATIVE TOPIC
9/8	1	Class organization/Introduction/Thinking like a population geneticist Classroom: B204, BRC Building, Academia Sinica
9/15	2	Genotype frequencies
9/22	3	Genetic drift and effective population size 1
9/29	4	Genetic drift and effective population size 2
9/30	5	Population structure and gene flow 1
10/6	6	Population structure and gene flow 2
10/13	7	Mutation
10/20	8	Natural Selection 1
10/27	9	Natural Selection 2 Midterm [paper refereeing] due
11/3	10	Mol Evolution 1
11/10	11	Mol Evolution 2
11/17	12	Clades/Trees and Speciation
11/24	13	Sexual selection
12/1	14	Coevolution Final exam [grant proposal] due
12/8	15	Evo-Devo (Get grants to evaluate)
12/15	16	Grant "reading committee": Should grant be funded?
12/22	17	Revision of grant due (no class)