

Ecological and Evolutionary Genomics 生態與演化基因體學	
Credits	Three (lectures: 3hrs per week)
Organizers	Isheng Jason Tsai
Time	Thursday: 9:00-12:00
Place	B208, Biodiversity Research Center, AS
Description	This module offers an in-depth exploration of cutting-edge genomic methods, emphasizing their application in biodiversity, ecology, and evolutionary research. Through a combination of lectures, practical sessions, and case studies, students will gain familiarity in omic technologies, bioinformatics tools, and data analysis techniques. Topics include genome assembly, comparative and population genomics, transcriptomics, and advanced sequencing methods like Nanopore sequencing. Practical sessions will focus on R and Linux, equipping students with the computational skills to analyze genomic data. Evaluation is based on attendance, assignments, and a final exam, fostering both conceptual understanding and practical expertise.
Purpose	The purpose of this module is to equip students with a foundational understanding of genomics and bioinformatics, enabling them to apply these tools to their own research in biodiversity, ecology, and evolution. By integrating theoretical knowledge with hands-on practical experience, the module aims to demystify omic approaches and their relevance to addressing biological questions. Students will learn to navigate the complexities of sequencing technologies, genomic data analysis, and computational tools, fostering the skills necessary to design and execute robust research projects.
Grade	40% Assignment; 30% Final Exam; 30% Attendance

Week	Date	Topic
Week 1	2/20	Introductory Lecture (Dr. Isheng Tsai)
Week 2	2/27	Omics approaches to studying biodiversity (Dr. Isheng Tsai)
Week 3	3/6	R and Linux Practical I; (Dr. Isheng Tsai; video lecture)
Week 4	3/13	09:00am-12:00am: Mapping and Case studies (Dr. Isheng Tsai) 13:00pm-16:00pm: R and Linux Practical II
Week 5	3/20	Genome Assembly (Dr. Isheng Tsai)
Week 6	3/27	Comparative Genomics (Dr. Isheng Tsai)
Week 7	4/3	Tomb Sweeping Day (no class)
Week 8	4/10	Population Genomics (Dr. Isheng Tsai)
Week 9	4/17	Population genetics practical using R (Dr. Isheng Tsai)
Week 10	4/24	Transcriptomes (Dr. Isheng Tsai)
Week 11	5/1	Gene expression practical using R (Dr. Isheng Tsai)

Week 12	5/8	Nanopore sequencing (Dr Huei-Mien Ke)
Week 13	5/15	Nanopore sequencing practical (Dr Huei-Mien Ke)
Week 14	5/22	Midterm exam (Students) (Dr. Isheng Tsai)
Week 15	5/29	Final presentation or Case study discussion (Dr. Isheng Tsai)
Week 16	6/5	Final presentation II (Students) 10 mins x15(Dr. Isheng Tsai)