Systematics	
Course Code	DIC 8009
Credits	Three (lectures: 3 hr per week)
Organizers	Chung-Ping Lin
Lecturers	Chung-Ping Lin (treehopper@ntnu.edu.tw)
Time	14:20-17:20, Thursday
Place	C303B, NTNU (Gungguan Campus)
Prerequisites	Intro Biology, Genetics, Evolution
Description	This is a topical course, focusing on understanding the basic concepts, principles and skills of systematics, how to design a feasible study plan, set up experiments and obtain data, and how to analyze data. It will also include lectures on how current methodologies and techniques are applied to solve systematic problems.
Objectives	The major objectives of this course are to provide basic background in systematics and to deliver the most updated knowledge, skills and applications of systematics to ecological and evolutionary problems. 1. To have the professional knowledge required for designing and conducting research in systematics. 2. To be able to analyze experimental data rigorously, draw appropriate conclusions and publish results in scientific journals.
Grade	Assignments 70% Class discussion & paticipation 30%
Reference	Textbook: 1. Felsenstein, J. 2003. Inferring Phylogenies. Sinauer, Sunderland, Massachusetts. 2. Analysis of Phylogenetics and Evolution with R (Use R!) by Emmanuel Paradis, 2012, 2nd ed., Springer. eTextbook available at Academia Sinica: http://link.springer.com/book/10.1007%2F978-1-4614-1743-9

Date	Topic
9/12	**Week 1** Lecture 1 Introduction and Importance of Systematics Lecture 2 The History of Phylogenetic Inference
9/19	**Week 2** Lecture 3 Characters: Homology, Morphology Lecture 4 Characters: Molecular

9/26	**Week 3** Lecture 5 Alignment Lecture 6A Introduction to Trees and Optimality Criteria: Parsimony
10/3	**Week 4** Lecture 6B Optimality Criteria: Maximum Likelihood & Minimum Evolution
10/10	**Week 5** National Day
10/17	**Week 6** Lecture 7 “Algorithmic Approaches” to Phylogeny Estimation
10/24	**Week 7** Lecture 8 Searching Tree Space
10/31	**Week 8** Lecture 9 The Importance of Models
11/7	**Week 9** Midterm Exam
11/14	**Week 10** Lecture 10 Models of DNA Sequence Evolution
11/21	**Week 11** Lecture 11 Increasing Model Complexity
11/28	**Week 12** Lecture 12 Selecting Models
12/5	**Week 13** Lecture 13 Performance of Methods
12/12	**Week 14** Lecture 14 Consensus Trees & Nodal Support
12/19	**Week 15** Lecture 15 Hypothesis Testing
12/26	**Week 16** Lecture 16 Molecular Clocks
1/2	**Week 17** Lecture 17 Multiple Data Sets Lecture 18 Species-Tree Estimation
1/9	**Week 18** Final Exam