

Preface

These notes are intended for use in an advanced undergraduate or introductory level graduate course in systematics. As such, the goal of the materials is to encourage knowledge of core systematic literature (*e.g.* works of Aristotle, Linné, Mayr, Hennig, Sokal, Farris, Kluge, Felsenstein) and concepts (*e.g.* Classification, Optimality, Optimization, Trees, Diagnosis, Medians, Computational Hardness). A component of this goal is specific understanding of methodologies and theory (*e.g.* Cluster Analysis, Parsimony, Likelihood, String Match, Tree Search). Exercises are provided to enhance familiarity with concepts and common analytical tools. These notes are focused on the study of pattern in biodiversity; notions of process receive limited attention and are better discussed elsewhere.

Each chapter covers a topic that could easily be the subject of an entire book-length treatment and many have. As a result, the coverage of large literatures is confined to what I think could be covered in a lecture or two, but may seem brief, idiosyncratic, but hopefully not too superficial. These notes are not meant to be the last word in systematics, but the first.

Students should have basic knowledge of biology and diversity including anatomy and molecular genetics. Some knowledge of computation, statistics, and linear algebra would be nice but not required. Relevant highlights of these fields are covered where necessary.

Using these notes

This is not a fugue. In most cases, sections can be rearranged, or separated entirely without loss of intelligibility. Several sections do build on others (*e.g.* sections on tree searching and support), while others can be deleted entirely if students have the background (*e.g.* sections on computational and statistical basics). The book was developed for a single semester course and, in general, each chapter is designed to be covered in a single 90 minute class period. The chapters on Parsimony, Likelihood, Posterior Probability, and Tree Searching are exceptions, spanning two such classes.

Exercises are of three types: those that can be worked by hand, those that require computational aids, and lastly those that are more suited to larger projects or group work. Hopefully, they are useful.

Acknowledgments

I would like to thank the support of the National Science Foundation (NSF) as well as the National Aeronautics and Space Administration (NASA) and the Defense Advanced Research Projects Agency (DARPA) for supporting the research that has gone into many sections of these notes.

John Wenzel and Adam Kashuba were supportive and persistent in urging me to publish these notes.

All errors, polemics, and disturbing asides are of course my own.

I thank the following people for offering expert advice in reviewing text, suggesting improvements, and identifying errors:

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Rowland Institute at Harvard
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Coastal Carolina University
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Molekylärsystematiska laboratoriet
Naturhistoriska riksmuseet
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