Field Botany, Syllabus v.1
Summer Session I, 2023
Au Sable Institute

Kenneth J. Sytsma — Professor of Botany, University of Wisconsin, Madison. Research Interests: tropical systematics, speciation, & animal interactions; biogeography; island biology (especially Hawaii, tepuis, Andean high elevations); flowering plant classification using DNA; genetic variation of tropical plants; breeding systems of plants; Great Lakes Region floristics and ecology; conservation genetics of rare, endangered, and threatened species; relationship of science (evolution) and religion.

Course Webpage — http://www.botany.wisc.edu/fieldbotany/

Integrative Session Theme: *This Land is Your Land: The Ecological Neighborhood in Northern Michigan*

Date	Day	Topic(s)
June 4	Sun	p.m. Au Sable arrival
June 5	Mon	**Integrative Session 1: Au Sable Orientation & Sacred Grounds**
June 6	Tue	a.m. Vegetative features of plants and use of keys exercise Identification of the flora on Au Sable campus with iNaturalist; **Reading** in **JuddChpt4**, pp. 55-69, 75-81 [vegetative and floral features] p.m. Flower and inflorescence features of plants Identification of the flora on Au Sable campus with iNaturalist (cont.) [**Shoot collection and vegetative/floral charts due Sat., June 10**]
June 8	Thu	a.m. Forest types in Michigan, Methods of vegetation sampling; **Readings** in ***Michigan Trees*** **(pp.373-393)** and in ***Forests of Michigan*** **(pp.52-71)** a.m.-p.m. Flora and vegetation analysis of the northern hardwood forest community [**Analysis due Mon., June 26**]
June 11	Sun	p.m. Au Sable Vesper Service
June 12	Mon	**Integrative Session 2: Sutton Bays – Great Lakes Stewardship**
June 13	Tue	a.m. **Quiz 1 – lab and field identification** What's in a name? — nomenclature; introduction to plant collections; **Reading** in **Walters&KeilChpt2** Vascular plant classification I — Non-flowering plants; Gymnosperms; **Readings** in **WoodlandChpt10** and **JuddChpt8** p.m. Survey of mixed pine and jack pine forest communities
June 15	Thu	a.m.-p.m. Monitoring endangered and threatened dune species: Antrim Creek Nature Preserve (with Conservation Biology)
June 18	Sun	p.m. Au Sable Vesper Service
June 19	Mon	**Integrative Session 3: Ecosystem Management and the Conservation-Reliant Species: Kirtland's Warbler**
June 20	Tue	a.m. **Midterm Exam – lectures and integrative sessions**

		a.m.	Vascular plant classification II —Phylogenetic Classifications & Introduction to Angiosperms
		p.m.	Floristic survey of Skegemog wetland complex
June 22	Thu	a.m-	Vascular plant classification III — Flowering plants I
		a.m.-p.m.	Boreal forest ecosystem: Cheboygan State Park (L. Huron)
June 25	Sun	p.m.	Au Sable Vesper Service
June 26	Mon	**Integrative Session 4: A Most Beautiful Place: Geology, Biology and Conservation of the Great Lakes Dunes**	
June 27	Tue	a.m.	**Quiz 2 – lab and field identification** Vascular plant classification IV — Flowering plants II Plant adaptations to nutrient poor ecosystems - the carnivores
		p.m.	Flora and vegetation of a bog — Bear Lake Bog
June 29	Thu	a.m.	Island Biogeography; Work on plant collections
		p.m.	Jordan River — riparian and aquatic vegetation and flora
July 2	Sun	p.m.	Au Sable Vesper Service
July 3	Mon	**Integrative Session 5: The River in Your Neighborhood: An Intimate Introduction to the Manistee River**	
July 4	Tue	a.m.	Weeds – our "new" flora —Twin Lake Road; **Reading** in **Quammen1998**; pitcher thistle reports (Cons. Biol. class)
		p.m.	Final keying out and herbarium specimen preparation **[physical plant collection and iNaturalist observations due by Tuesday p.m.]**
July 6	Thu	a.m.	**Field Botany Final Exam**: Field/lab identification Quiz 3 & written exam

Course Philosophy: Plants reveal the dynamic history of the creation around us. If this earth has appeared static and unchanging, it is only because we see such a brief portion of its life processes. Plant communities and species distributions reflect patterns and processes as ancient as plate tectonics and as recent as glaciers and European settlement. They reflect the influence of temperature and moisture patterns determined at both the global and very local levels. They reflect influences of competition within and among plant species. They are shaped by interactions with animals, insects, and disease throughout their existence. And, increasingly, they are also influenced - positively or negatively - by the actions of humans — God's stewards in this creation. Thus, the focus of this course is on the process of exploring and understanding plant communities, and identification of their major vegetation and floristic elements. Much of the course will take place out in natural communities, with some time devoted to the lab room for further study of plants using microscopes, keys and manuals, and the herbarium. Our focus will be: *This Land is Your Land: The Ecological Neighborhood in Northern Michigan.* The Monday Integrative Sessions will bring all students and faculty together to examine five key components of this ecological landscape and will be an integral part required in Field Botany. Your journal from lab and field will be part of this exploration. All students are expected to attend the Sunday evening vespers service as the start of the weekly Au Sable community experience.

Course Knowledge & Skills:

- Demonstrate knowledge about the basic patterns of land plant diversity and identify the major groups of plants
- Demonstrate knowledge of important plant vegetation types and their interaction with light, water, soil, and animals and fungi
- Demonstrate proficiency in gathering vegetation data, summarizing species richness, frequency, density, and dominance, and relating the data to past, present, and future impacts
- Become familiar with a local flora: species diversity, biogeographical patterns, rarity, natural history, and ethnobotany
- Understand the causes and issues related to species rarity
- Learn skills of identifying plant species, using keys and manuals – for use anywhere in the world – and of collecting, pressing, and labeling plant species
- Become proficient at using online resources (e.g., iNaturalist, Michigan Flora) for documenting this diversity

Texts:

Newcomb, L. 1989. *Newcomb's Wildflower Guide*. Little, Brown & Co., Boston, MA. **ISBN-10:** 0316604429 **ISBN-13:** 978-0316604420 - ***Optional***

Barnes, B. V. And W. H. Wagner, Jr. 2004. *Michigan Trees: A Guide to the Trees of the Great Lakes Region.* University Michigan Press, Ann Arbor. **ISBN-10:** 9780472089215 - ***Optional***

Others that will useful (either in library or available from me):

Voss, E.G. and A.A. Reznicek. 2012. *Field Manual of Michigan Flora*. University of Michigan Press. Ann Arbor. ISBN 9780472118 [$25 via University of Michigan Press online - this is the best and completed flora for Michigan, great online key and splendid photographs of each species: http://michiganflora.net/home.aspx]

Barnes, B.V., C.W. Dick, and M.E. Gunn. 2016. *Michigan Shrubs and Vines: A Guide to the Species of the Great Lakes Region*. University of Michigan Press. Ann Arbor. ISBN 0472117777 [$27 paperback via University of Michigan Press online – this is an essential addition to the *Michigan Trees: A Guide to the Trees of the Great Lakes Region*: http://www.press.umich.edu/296735]

Cohen, J.G., M.A. Kost, B.S. Slaughter, and D.A. Albert. 2014. *Field Guide to the Natural Communities of Michigan*. Michigan State University Press.

Dickmann, D. I. and L. A. Leefers. 2004. *The Forests of Michigan*. University Michigan Press, Ann Arbor.

Curtis, J. T. 1959. *The Vegetation of Wisconsin*. University Wisconsin Press, Madison. [the classic source for ecological and floristic information on all plant communities in the Great Lakes region]

Black, M.R. and E.J. Judziewicz. 2009. *Wildflowers of Wisconsin and the Great Lakes Region*. University Wisconsin Press [field guide specific to Wisconsin but works for Great Lakes; nicely illustrated with descriptions, diagnostic features, and biogeographical distributions]

Cobb, B., E. Farnsworth, and C. Lowe. 2005. *Ferns of Northeastern and Central North America. 2nd edition. [Peterson Field Guides]*. Houghton Mifflin, Boston, MA. – the best up-to-date guide to ferns and their relatives. ISBN 06183949600

Gleason, H. A. and A. Cronquist. 1991. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada* (2nd edition). New York Botanical Garden [this is considered the "Bible" for plant identification for NE North America; no pictures however!

Holmgren, N. H. 1998. *Illustrated Companion to Gleason and Cronquist's Manual*. New York Botanical Garden. [just line drawings of every species in Gleason and Cronquist, 1991]

Harris, J. G. and M. W. Harris. 1994. *Plant Identification Terminology. An Illustrated Glossary*. Spring Lake Publ. Spring Lake, Utah. [the "illustrated" dictionary on taxonomic terms]

Grading: Ten items will count towards the final grade:

1. Vegetative/floral plant features	10 points	A+	97%	291 pts
2. Quiz 1 – lab and field identification	25	A	93%	279
3. Quiz 2 – lab and field identification	25	A-	90%	270
4. Quiz 3 – lab and field identification	25	B+	87%	261
5. Vegetation analysis of forests	50	B	83%	249
6. Midterm	50	B-	80%	240
7. Final exam	50	C+	77%	231
8. Plant collection/iNaturalist observations	65	C	73%	219
		C-	70%	210
		D	60%	180
Total	**300 points**			