G685 EVOLUTION OF ECOSYSTEMS
FALL 2015, SECTION #33180

INSTRUCTOR: Dr. Claudia C. Johnson, Geology 501, 855-0646, claudia@indiana.edu
OFFICE HOURS: Mondays 2:30-3:30, after class, and by appointment
CLASS MEETING HOURS: Tuesday 2:30-5:30pm

COURSE DESCRIPTION: Advanced analysis of large-scale, cohesive environmental influences on ecosystem development and persistence through the rock record. Emphasis is on paleoecologic grouping at community and higher levels. Analytical methods include synthesis of published numerical, geochemical and sedimentological models.

COURSE MATERIALS: Readings from textbooks and scientific journals. For each item selected for reading and discussion we will address the following: why the paper was selected, what we should consider while reading the article, specific topics that are significant to guide the discussion, and a critical evaluation of the positive and negative points of the paper. Come prepared to every class session with written notes on each of these topics.

PHILOSOPHY AND OBJECTIVES OF THE COURSE: Group discussion and open-ended questions will be the norm as we synthesize our knowledge of specific ecosystems through the Phanerozoic. It is anticipated that these discussions will promote ideas for graduate student, and perhaps future, research projects.

By the end of the course you will have a temporal or geologic view of Earth's ecosystems, a more thorough understanding of evolutionary processes at numerous scales, and will be able to formulate scientific documents pertaining to the physical, chemical and biological changes that are possible for our future Earth.

As will become clear during the course, both writing and speaking skills will be sharpened during the semester. Bloom's Taxonomy of learning is an invaluable guide to moving through the stages of learning from memorization through synthesis and evaluation of scientific material.

GRADING POLICY: A final grade will be assigned based on the following criteria:

a. Quality of verbal participation in class discussions: 35%
   I will evaluate the quality of participation after each class meeting in order to make an accurate assessment at the end of the semester. You may ask for a tally of your grade at any time.
   Numerical assessment of quality is assigned as follows:
   1 - present, no contribution
   2 - answered directly from reading
   3 - contributed to general discussion by answering from reading, with a little more original thought
   4 - contributed to discussion and moved discussion in different direction
   5 - contributed significantly to discussion and moved discussion in different direction more than once
b. Midterm exam: 15%
   The exam consists of a written analysis of topics discussed in class and will focus on the theme "what I have learned about the evolution of ecosystems, and the questions that remain". The midterm is a take home, open book exam due Oct. 16 at midnight. The text is limited to 2 DS typewritten pages with reasonable margins and font size. Please submit a pdf file to Canvas.
c. Final project: oral presentation and written report: 50%
   Topic selection: The goal of the final project is to advance your dissertation research into the realm of ecosystem dynamics. Select an ecosystem that will place your data into a larger, more encompassing research analysis and synthesis. You may choose any ecosystem, any time period. Oral presentations will come at the end of the semester, during the last class sessions. Each student

will have one hour to present information, answer questions, and pose areas for future research investigations. The scientific content, including intellectual depth and breadth, and relation of the chosen topic to the semester's breadth of topics on ecosystems, as well as the quality of your responses to questions posed by class members and the instructor are the criteria I will use for assigning grades.

A suggested format for the final written report is an *Abstract*; *Introduction* that introduces the topic, provides sufficient scientific background, and informs reader of the importance of the project; a *Data/Methods* section; a *Discussion* section in which you assess the data and relate your work to that of related topics; a *Summary and Conclusions* section in which you summarize succinctly your contributions, and draw conclusions concerning the evolution of ecosystems; *References, and Figures*. Please limit the paper to 15 DS pages, exclusive of figures and references, and format per any scientific journal style. Make copies of the abstract, figures, and references for each class member to have at your presentation; these may be distributed by e-files. The final project reports are due on December 10.

G685 Evolution of Ecosystems Syllabus for Fall 2015

Aug.	25	Overview of the course Introductory questions and discussions on ecosystems Presentation on ecosystem basics
Sept.	1	Field observation of a modern *lacustrine ecosystem*
Sept.	8	Synthesis of a modern oceanic ecosystem – the *coral reef ecosystem*
Sept.	15	Field observation of a modern *terrestrial ecosystem* – stages in transition
Sept.	22	Analysis of Earth's oldest *marine ecosystem* – snapshots in time
Sept.	29	Fossil Lagerstätten – what they reveal about Earth's ancient ecosystems
Sept.	22	*Ecosystem models*–integration of several fields of research
Sept.	29	I. *Ecosystem methods* – how modern and ancient ecosystem components are analyzed II. Discussion of final project topic selections.
Oct.	6	FALL BREAK. No Class Meeting. Work on your final class projects this week.
Oct.	13	*Ecosystem functions* - nutrient cycling through ecosystems: C, O, N, S, P, trace elements
Oct.	20	I. *Evolution of Ecosystems*: Do ecosystems evolve? II. Discussion of final project outlines
Oct.	27	Analysis of *ecosystems in ancient greenhouse worlds*
Nov.	3	GSA ANNUAL MEETING. No Class Meeting. Work on your final class projects.
Nov.	10	Analysis of *ecosystem dynamics in ancient icehouse and transitional climate states*
Nov.	17	Recent publications in ecosystem research from *Science* & *Nature*

	24	THANKSGIVING BREAK. No Class Meeting.
Dec.	1	Student presentations
	8	Student presentations

Summary of Important Due Dates

Sept.	29	Topic selections for final project due today at outset of class. Bring two choices, written, with importance explained. Class discussion and input into final topic selection.
Oct.	16	Midterm exam due today at midnight.
Oct.	20	Outlines for final projects due at outset of class today. Address a hypothesis to test, develop the objectives and importance of the project to your research, and present a logical description of analytical methods.
Dec.	10	Final written projects due today.

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Code of Student Rights, Responsibilities, and Conduct
http://www.iu.edu/~code/

Academic Integrity: As a student at IU, you are expected to adhere to the standards and policies detailed in the Code of Student Rights, Responsibilities, and Conduct (Code). When you submit a paper with your name on it in this course, you are signifying that the work contained therein is all yours, unless otherwise cited or referenced. Any ideas or materials taken from another source for either written or oral use must be fully acknowledged. If you are unsure about the expectations for completing an assignment or taking a test or exam, be sure to seek clarification beforehand. All suspected violations of the Code will be handled according to University policies. Sanctions for academic misconduct may include a failing grade on the assignment, reduction in your final grade, a failing grade in the course, among other possibilities, and must include a report to the Dean of Students.

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