

CORAL REEF ECOLOGY LECTURES

SYLLABUS -- EBIO 4090

FALL SEMESTER 2009: DECEMBER 27, 2009 -- JANUARY 10, 2010

Four-hour, slide-illustrated, lecture-format classes will meet starting at the above date from 8:30 am - 12:30 pm in Ramaley N1B23, except Day 6 which will go until 1pm. If the building is locked, enter by the east-central door near Mel's office. The lectures will be interrupted by several short breaks, and coffee, tea and light breakfast foods will be provided. The first three and one-half hours will cover the academic subject matter, and the last 30 minutes will cover SCUBA diving techniques and safety concerning the field portion of the course. It is expected that the afternoons will be used for studying and/or preliminary library research concerning the required paper due in January (see Library Research Paper Guidelines, following).

DATE	LECTURE TOPICS	CHAPTERS
Day 1 Sun -12/27	Introd: Library research paper guidelines and topic sign up. Coral reefs: diversity; productivity; distribution; evolution. Cnidarians: Hydrozoans: hydroids; fire corals; siphonophores; Scyphozoans: jellyfishes and sea wasps (box jellyfish); Diving: Cozumel orientation and beach/twilight diving the first day.	1 - 6
Day 2 Mon -12/28	Anthozoans: sea anemones; hard & soft corals: reproduction. Zooxanthellae; Bleaching; Paleoclimatology. Protists: phytoplankton & zooplankton; Plants. Diving: slow ascents, buoyancy control and reducing air consumption.	4
Day 3 Tue -12/29	Sponges; Comb jellies; Flatworms; Molluscs: gastropods; bivalves; cephalopod introduction. Diving: underwater navigation/stress reduction.	4, 7, 9
Day 4 Wed -12/30	Cephalopods cont: nautilus; cuttlefishes; squids; octopuses. Annelids; polychaetes. Arthropods: Crustacea: lobsters; shrimps; crabs; misc. Diving: night diving; reducing anxiety and air consumption.	8 - 10
Day 5 Thu -12/31	Bryozoans; Echinoderms; Chordates: tunicates; sharks; rays; bony fish (general differences; day/night, juvenile/adult, male/female, camouflage, eye deception, color adaptations); morays; other eels; reptiles; mammals. Schooling fishes. Cleaning symbioses. Misc. symbioses. Loss of color at depth. Video: "Coral Triangle"(35) Diving: deep diving/nitrogen narcosis; boat protocols.	11 - 14
Fri - 1/1	NEW YEARS DAY -- NO CLASS	
Day 6 Sat -1/2	Note: This day ends at 1 pm. Videos/DVDs: "Jewels of the Caribbean Sea" (53); "Caribbean Fish Book" (45); "Blue Planet/Coral Seas" (48). Final arrangements: DIA transport; meeting on the beach tomorrow. Course final exam (last hour).	
Day 7 Sun -1/3	Travel to Cozumel -- Begin Field Studies Dusk dive off the hotel beach.	

Field Studies – Cozumel, Mexico – Sunday to Sunday – Jan. 3-10, 2010

Library Research Paper Due Thursday, 4:00 pm, January 21, 2010 – 10% penalty if late.

SYLLABUS (continued)

TEXT: *A Field Guide to Coral Reefs of the Caribbean and Florida* by Eugene H. Kaplan. 1999. Houghton Mifflin Co. Boston. Note: The 1982 edition is also okay. This guide is dated, but it still has some useful general marine ecology which will be helpful, and it is useful as a general Caribbean I.D. book. Recommended reading assignments are on the previous page.

RECOMMENDED RESOURCE MATERIALS: *Reef Fish Identification*, Second Edition, by Paul Humann. 2002. New World Pub. Inc. Jacksonville, FL. *Reef Creature Identification* by Paul Humann. 2001. New World Pub. Inc. Jacksonville, FL. *Reef Coral Identification* by Paul Humann. 2001. New World Pub. Inc., Jacksonville, FL. Mel will provide loaner copies of these ID books for the Cozumel portion of this course.

FINAL EXAM: This short-answer, short-discussion exam counting 30% of the course grade will come primarily from the lecture materials and will be given at 12:00 noon on the last day of lectures. Information in the text will undoubtedly support and supplement the lectures.

LIBRARY RESEARCH PAPER: A six-to-ten page, liberally-cited paper, using a **minimum** of six scientific, refereed journal articles on some aspect of Coral Reef Ecology, will count 60% of the course grade. While a few popular press sources may be added to the above references, the bulk of the resource material must come from the aforementioned scientific literature.

Interlibrary loan requests should be made early so that the papers will be available upon returning from the Caribbean. During the Christmas break, Norlin and Benson Libraries will be operating on restricted hours, so afternoons must be used efficiently. Attached is a non-exhaustive list of "Possible Project Topics."

The paper topic needs the instructor's prior approval, must be word processed (double-spaced) and submitted, along with a digital copy compatible with Microsoft Word 2000, no later than 4:00 pm, Thursday, January 21, 2010.

Late papers, reflecting a 10% loss in grade, will be accepted until noon on Thursday, one week later.

See the attached information on the "Library Research Paper Guidelines."

FIELD JOURNAL: While in the Caribbean, students must keep a **Field Journal** of the organisms encountered and the interactions of these with other organisms on the reef. This journal will count 10% of the course grade and is due to be turned in by the first day of class following the return from Cozumel. It is acceptable to document this information on the backs of diving-log-book pages.

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ATTACHED:
Library Research Paper Guidelines

CORAL REEF ECOLOGY - LIBRARY RESEARCH PAPER GUIDELINES

I. LIBRARY RESEARCH PAPER FORMAT

TOPIC/PURPOSE/FORMAT: This assignment is designed to follow the independent library research one might do for background information on his or her own research project. The paper may be either persuasive or argumentative in nature – not descriptive (*i.e.*, not like a book report). A coral reef ecology topic should be chosen which has not been previously selected, and it should be entered on the appropriate class “sign-up sheet.” It must be approved by the instructor. The **scientific** literature on this topic is to be researched and reported on in a manner understandable to a non-expert in the field. An abstract of the paper is not necessary.

LENGTH: six-ten, typed, double-spaced pages using a **minimum** of six scientific, peer-reviewed journal articles as references.

DUE DATES/LATE POLICY: The paper is due at 4:00 pm, Thursday, January 21st, 2010. This deadline is **firm**. The library research paper is to be started early to avoid last-minute, unforeseen problems. There is a 10% loss in score for a late paper which will be accepted until noon on Thursday, one week later. This ten per cent will be deducted from the final paper score (see PAPER EVALUATION, below). The “Library Research Paper” can be turned in during office hours or placed under the door of Ramaley C170. In addition to a hard/printed copy of the paper it is also required that a digital copy be submitted at the same time, either on a disc or via email. This copy needs to be in a format which is compatible with Microsoft Word 2000.

PAPER EVALUATION (Refer to Parts II, III, IV and V following):

- A. 70% PAPER CONTENT including: organization; strength and support of the argument/thesis; clarity; grammar; overall writing style; in-text citations (do not use inappropriate second-hand citations -- *i.e.*, references that others have used and cited, which you haven't read firsthand but included in your own **Literature Cited**).
- B. 15% BACKGROUND RESEARCH. This refers to the nature of the scientific references: Are they mostly peer-reviewed scientific journals? Are there a minimum of six?
- C. 15% LITERATURE CITED SECTION. Does it follow the proper format? Is it complete and accurate? Are there inappropriate references; *i.e.*, ones not cited in the text of the paper? Are there in-text citations with no references here? Is there a lack of ambiguity between in-text citations and the references here?

NOTE: There will be a ten percent penalty on any paper submitted late, up to one week. No papers will be accepted after that.

II. RESEARCH METHODS/REFERENCES: Since this is a scientific paper, the bulk of the resource materials must come from the scientific literature. Appropriate references can be accessed *via* **Chinook** at <http://libraries.colorado.edu/>, CU Boulder's on-line catalog and **e-Resources** access. To retrieve journal citations (and in many cases full-text articles), click on **Find Articles & More**. From there select the subject areas, or if you know the name of the database you can select from the A to Z list. Databases of interest:

Biological Abstracts--All aspects of biology, 1969 to present

Cambridge Scientific Abstracts

Click on Biological Sciences + to open complete database coverage including:

- Animal Behavior Abstracts – 1982 to present
- Ecology Abstracts – 1982 to present
- Toxicology – 1981 to present

GEOREF--All aspects of geology, including marine and environmental geology, 1966 to present. Includes water chemistry.

Web of Science--Science Citation Index, 1970 to present

It is acceptable to use a few “popular press” and/or internet references in addition to the peer-reviewed, scientific ones. However, using fewer than the minimum number of scientific references (six) will result in a significant reduction in paper score.

Following the guidelines listed herein will eliminate these penalties and emphasize the importance of the “scientific” nature of this paper. Articles from such publications as *American Scientist*, *Science News*, *National Geographic*, *National Wildlife*, *Natural History*, *Wildlife Conservation*, *New Scientist*, *Discover*, *Sea Frontiers*, *Audubon*, *Ocean Realm*, *Underwater USA* and textbooks or books in general are “popular press” publications (not peer-reviewed, scientific publications) and **not** to be the primary references in this paper. This also applies to articles downloaded from the internet.

Be forewarned that some journal articles will not be locally available and will have to be ordered through interlibrary loan. They may not arrive in time to be used.

CITATIONS/IN-TEXT: Both the author(s) and the date must be used for a citation, and it must not be ambiguous. For example: a) “Smith and Jones in 1992 found that...” or b) “The reproductive behavior and physiology in sharks was discovered to be quite complex (Smith and Jones, 1992).” Use a semicolon to separate two or more in-text citations (*e.g.*, Smith and Jones, 1992; Jones, *et al.*, 1994a). Footnotes must **not** be used. The above, and following, examples are taken from the “Sample Format,” see Section IV, below.

In citing a **book**, it is necessary to include the page number from which the citation was taken, *e.g.*, (Jones, 1973, p. 421). Note: This page citation is **not** to be included with the reference in the “Literature Cited” section (see Jones, 1973). The page number is **not** to be included when citing a journal article; *e.g.*, “Hansen, *et al.*, 1992” would be sufficient. The use of “*et al.*” is to be used whenever three or more authors are involved.

PLAGIARISM: Researchers must be given credit (*via* citations) in the paper for the work they have done. Failure to do so is a form of plagiarism. The highest standards and academic honesty are expected from the students in the College of Arts and Sciences, including the students writing this paper. Refer to the *University of Colorado at Boulder, Catalog*, “Campus Policies-Academic Integrity,” and the university publication *Ralphie’s Guide to Student Life*, “Academic Honesty” and the “Honor Code.” Students should be aware that their papers will be evaluated through *TurnItIn.com*, a plagiarism service provided to the faculty members at UCB, and that this service retains a copy of the submitted paper for future comparisons.

III. LITERATURE CITED SECTION NOTES:

A “LITERATURE CITED” section is to be added at the end of the paper, and it is to include all references used in the text of the paper and **no** others. The format below (Section IV) must be strictly followed! The heading of this section should be “Literature Cited”; **not** something else like “References,” *etc.*!

The journal articles/references are to be alphabetically ordered by the last name of the first author. **Only** the **first** author of a paper will be last-name first!

Last names and initials of **all** authors must be used. “*Et al.*” may **not** be used here.

If there are multiple papers by a single author (or a team of authors), the most recent paper must be listed first.

If a single author is also the first author on a multiple-author publication, list the single-author reference first, regardless of the publication dates. Duo-authored papers follow single-authored papers and appear before multiple-authored papers.

Ambiguity must be eliminated when multiple papers by a single author (or a team of authors with the same first author) are published in the **same year**. Adding an “a,” “b,” *etc.*, to the year as a suffix (*e.g.*, 1993a) will eliminate this ambiguity. The same suffix in the In-Text citation is to be used. See “Jones, 1993 (a & b)” and “Jones *et al.*, 1994 (a & b)” below in Section IV.

If multiple-authored papers with the same first author are published in different years, put the most recent one first, regardless of the alphabetical listings of the secondary authors (“multiple authors,” here is interpreted as three or more). See “Jones *et al.*, 1995,” “Jones *et al.*, 1994a” and “Jones *et al.*, 1994b” below.

The authors’ names will be followed by the year of publication.

The title of the paper follows the year, and that is followed by a period (.) and then the name of the journal or publisher. The name of the journal or publication must be either *italicized* or underlined (see examples below in Section IV).

The name of the journal is immediately followed by the volume number, a colon, and the page numbers of the article. Some publications include an issue number in parentheses, *e.g.*, “(4),” or with an abbreviation, “No. 4,” after the volume number. This issue number is **NOT** to be included here.

If a book is used, the sample format below must be followed -- see “Jones, 1973,” or “Miller, 1991.” A book is a non-refereed publication and, if used, must be in addition to the minimum of six scientific references.

If a reference is taken from the internet, it is **not** refereed and is considered to be a popular press publication. It may be used, but only in addition to the minimum of six scientific references. Include the date it was accessed. If a reference is not cited in the text of the paper, it is inappropriate for it to be included in the “Literature Cited.”

IV. LITERATURE CITED SECTION SAMPLE FORMAT:

Black, A.B. and C.D. Davis. 1994. The mating behavior of sharks. *Journal of Experimental Marine Biology* 179:921-931.

Hansen, E.F., G.H. Johnson and I.J. Jones. 1992. The geographical distribution of the grey reef shark, *Carcharhinus amblyrhynchis*. *Ecological Monographs* 62:164-184.

Jones, I.J. 1993a. The reproductive physiology of the great white shark. *Physiological Zoology* 66:771-780.

Jones, I.J. 1993b. The reproductive physiology of the tiger shark. *The American Journal of Physiology* 74:131-145.

- Jones, I.J. 1975. Aggressive behavior in the shark family Carcharhinidae. *Science* 189:653-671.
- Jones, I.J. 1973. *Sharks of the World*. Harvard University Press. Cambridge, MA.
- Jones, I.J., K.L. Miller and E.F. Hansen. 1995. Tooth morphology of the white shark, *Carcharodon carcharias*. *Journal of Morphology* 226:279-283.
- Jones, I.J., K.L. Miller and A.B. Black. 1994a. Sexual dimorphism in the shark family. *Environmental Biology of Fishes* 34:172-207.
- Jones, I.J., K.L. Miller and C.D. Davis. 1994b. Bottlenose dolphin (*Tursiops truncatus*) flight behavior from the great white shark (*Carcharodon carcharias*). *Marine Mammal Science* 10:515-521.
- Miller, K.L. 1991. Shark mating behavior. In *Biology of Sharks*, ed. M.N. Richards and O.P. Rogers. Prentice-Hall Inc. Englewood Cliffs, NJ.
- Russell, Q.R. and S.T. Wagner. 1994. Shark intelligence. *Journal of Fish Biology* 45: 111-147.
- Smith, U.V. and I.J. Jones. 1992. Shark aggressive behavior. *Journal of Ichthyology* 32: 143-167.

V. HELPFUL HINTS:

Since this is a take-home assignment counting **more** than the *final exam*, it seems that starting early, following all the guidelines and submitting an “A” paper would be in one’s best interest.

The scientific literature is often difficult to understand. It should be read and re-read until its significance can be logically explained to someone else.

The paper topic should be thoroughly researched and a level of understanding reached such that the results and assumptions of the researcher can be questioned. One should be willing to challenge the researcher’s conclusions.

Look for alternate premises and differing points of view. A scientific *versus* a less authoritative view might be argued. Additional popular press references may be helpful here. It is necessary to distinguish between facts and opinions. What one writes should reflect what he or she judges to be most logical and credible. Evidence from both sides of the argument should be included. Take a side, and use persuasion, logic and organization to defend it.

The thesis of this paper should be thoroughly defended and obviously reflect its author's own thoughts and ideas. Be reminded that this is not original research -- but a properly cited report on the research of others.

A significant amount of time should be spent on the organization of this paper. Pay particular attention to what is best for the audience. The audience should immediately realize where the paper is headed. Appropriate headings and transitions as well as attractive graphics will help hold the interest of the audience.

Only information (statements, figures, tables, photos, graphics, *etc.*) which is **necessary** for the support of the position/thesis should be integrated into the paper. Superfluous information (such as superfluous references in the "Literature Cited") is both inappropriate and confusing.

Be reminded that scientific names and foreign words such as "*et al.*," "*via*," "*i.e.*," "*in situ*," or "*El Nino*" wherever they are used are to be either *italicized* or underlined. The "species" name is never capitalized and the "Genus" name is always capitalized. See correct usage in several examples of the previous "LITERATURE CITED SECTION SAMPLE FORMAT" (Section IV).

This paper is to be carefully organized, clearly and concisely written with correct grammar, and be free of typographical errors. It should evolve through several revisions and be proofread by both the author and one or more outsiders. Submit a clean, neat, originally printed paper including a "Title Page" with all of the pages numbered. On the title page include the paper title, author, date and the course name and number. A **few** ink corrections are acceptable. In addition to a hard/printed copy of the paper, it is also required that an electronic copy be submitted, either on a disc or via email. This copy needs to be in a format which is compatible with Microsoft Word 2000.

NOTE: MAKE SURE THIS SYLLABUS IS UP TO DATE!