Recommended Course Identification:

Prefix _____ PCB  Course Number __6457___ LAB CODE (L or C) ___

(TO OBTAIN A COURSE NUMBER, CONTACT MJENNIG@FAU.EDU)

Complete Course Title: Advanced Multivariate Biometry

Credits: 3

Textbook Information:


Grading (Select only one grading option): REGULAR X SATISFACTORY/UNSATISFACTORY ___

Course Description, no more than three lines: Class involves learning advanced techniques for analyzing biological and ecological data including time-series analyses, structural equation modeling, MDS, multiple regression, and other methods.

Prerequisites*: Experimental Design and Biometry (PCB 6456) or equivalent or Permission of the instructor

Corequisites: ___

Registration Controls (Major, College, Level)*:

Minimum Qualifications Needed to Teach this Course: Ph.D. in the relevant field

Faculty contact, email and complete phone number:
Dr. C. Edward Proffitt
cproffitt@fau.edu
(772) 242-2207

Approved by:
Department Chair: 
College Curriculum Chair: 
College Dean: 
UGPC Chair: 
Graduate College Dean: 
UGPC Chair: 
Provost: 

Date: 11/30/14 11/30/14 11/30/14 2/26/14

1. Syllabus must be attached; see guidelines for requirements: www.fau.edu/provost/files/course_syllabus_2011.pdf
3. Consent from affected departments (attach if necessary)

Email this form and syllabus to UGPC@fau.edu one week before the University Graduate Programs Committee meeting so that materials may be viewed on the UGPC website prior to the meeting.

FAUnewcrseGrad—Revised September 2013
Course Syllabus for Advanced Multivariate Biometry

1. Course title/number, number of credit hours
   Advanced Multivariate Biometry – PCB 6457 – 3 credit hours

2. Course prerequisites
   a. Experimental Design and Biometry (PCB 6456) or equivalent
   or
   b. Permission of the instructor

3. Course logistics
   a. Term – Spring 2015
   b. Notation if online course – N/A
   c. Class location and time (if classroom-based course) – To be determined

4. Instructor contact information
   a. Instructor’s name – C. Edward Proffitt
   b. Office address – Department of Biological Sciences, c/o Harbor Branch
      Oceanographic Institute, Marine Science II room 105, Ft. Pierce, FL
   c. Office hours – To be determined
   d. Contact telephone number – office (772) 242-2207, fax (561) 297-2436
   e. E-mail address – cproffit@fau.edu

5. TA contact information (if applicable)
   N/A

6. Course description
   The course covers advanced techniques for analyzing biological, marine
   science, and ecological data. In a collaborative, hands-on learning
   environment, we will explore the nature of multivariate biological data and
   study methods designed to handle those data. Students will learn to formulate
   and test multivariate hypotheses & to extract useful information from
   sometimes messy ecological & biological data. Real-world data will be used
   in most exercises and students will explore different techniques for analyzing
   these data, and discuss such options with the instructor and in some cases the
   scientists who gathered the data. Methods will include, but are not limited to,
   confirmatory factor analysis & structural equation modeling, Kullback-Leibler
   informatic approach to model selection & multi-model inference, multiple
   regression & correlation, ordination, metric and non-metric multidimensional
   scaling, meta-analysis, MANOVA, methods based on randomization
   techniques, etc.. Students will be exposed to SAS, R, Mplus, Primer, & Systat
   at a minimum. Copies of Mplus and Primer for student use will be available at
   the Harbor Branch campus, SAS is available at Harbor Branch, Davie and
   Boca campuses, R is free on-line.
7. **Course objectives/student learning outcomes**  
This course aims to introduce fundamental advanced techniques for analyzing data gathered in experimental and observational studies.

Students will be able to: explore data (summary statistics, graphs, etc), develop multivariate or coordinated hypotheses, design studies to address such hypotheses using appropriate statistical techniques, work in different platforms and with various kinds of statistical programs, analyze and evaluate data using the methods mentioned above.

8. **Course evaluation method**  
There will be graded homework project assignments accounting for 80% of the student's cumulative performance. Presentation of results in oral and written form will account for the remaining 20%.

9. **Course grading scale (optional)**

<table>
<thead>
<tr>
<th>Cumulative Performance</th>
<th>Grade</th>
</tr>
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<tbody>
<tr>
<td>&gt;94%</td>
<td>A</td>
</tr>
<tr>
<td>&gt;90% - 94%</td>
<td>A-</td>
</tr>
<tr>
<td>&gt;87% - 90%</td>
<td>B+</td>
</tr>
<tr>
<td>&gt;83% - 87%</td>
<td>B</td>
</tr>
<tr>
<td>&gt;80% - 83%</td>
<td>B-</td>
</tr>
<tr>
<td>&gt;75% - 80%</td>
<td>C+</td>
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<tr>
<td>&gt;65% - 75%</td>
<td>C</td>
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<tr>
<td>&gt;60% - 65%</td>
<td>C-</td>
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<td>&gt;57% - 60%</td>
<td>D+</td>
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<td>&gt;53% - 57%</td>
<td>D</td>
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<tr>
<td>&gt;50% - 53%</td>
<td>D-</td>
</tr>
<tr>
<td>&lt;50%</td>
<td>F</td>
</tr>
</tbody>
</table>

10. **Policy on late work and incompletes**  
If a student cannot submit a homework project on time due to circumstances beyond their control then the instructor may assign appropriate make-up work. Students will not be penalized for absences due to participation in University-approved activities, including athletic or scholastics teams, musical and theatrical performances, and debate activities. These students will be allowed to make up missed work without any reduction in the student's final course grade. Reasonable accommodation will also be made for students participating in a religious observance. Also, note that grades of Incomplete ("I") are reserved for students who are passing a course but have not completed all the required work because of exceptional circumstances. A grade of "I" will only be given under certain conditions and in accordance with the academic policies and regulations put forward in FAU's University Catalog. The student must show exceptional circumstances why requirements cannot be met. A request for an incomplete grade has to be made in writing with supporting documentation, where appropriate.
11. Special course requirements (if applicable)  
N/A

12. Classroom etiquette policy (if applicable)  
University policy on the use of electronic devices states: “In order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular telephones and pagers, are to be disabled in class sessions.”

13. Disability policy statement  
In compliance with the Americans with Disabilities Act (ADA), students who require special accommodation due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) -- in Boca Raton, SU 133 (561-297-3880); in Davie, MOD 1 (954-236-1222); in Jupiter, SR 117 (561-799-8585); or at the Treasure Coast, CO 128 (772-873-3305) – and follow all OSD procedures.

14. Honor Code policy statement  
Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty, including cheating and plagiarism, is considered a serious breach of these ethical standards, because it interferes with the University mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the University community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see University Regulation 4.001 at http://www.fau.edu/regulations/chapter4/Reg_4.001_5-26-10_FINAL.pdf

15. Required texts/readings  


16. Supplementary/recommended readings (optional)  

Byrne, B.M. 2012. Structural equation modeling with Mplus: basic concepts, applications, and programming. Routledge Taylor and Francis Group, NY.


17. Course topical outline

- Introduction to advanced and multivariate data analysis; Exploratory data techniques and developing meaningful graphics with appropriate error bars (1 week)
- Kulbeck-Leibler model selection & multimodel inference (3 weeks)
- Using model selection and multi-model inference to test alternative models as a means to resolve different points of view and disputes among parties (ie, the spotted owl example, etc) (2 weeks)
- ANOVA vs Semi-variogram analysis in field experiments (1 week)
- Metric and non-metric multidimensional scaling (1 week)
- A survey of techniques in ordination (1 week)
- Path analysis, structural equation modeling with manifest variables (2 week)
- Exploratory factor analysis (1 week)
- Confirmatory factor analysis; Latent variables ( and “the measurement model” in structural equation modeling) (1 week)
- Structural equation modeling - latent variables (structural model) (2 weeks)
- Network analysis (1 week)