FLORIDA ATLANTIC UNIVERSITY™

# Graduate Programs—NEW COURSE PROPOSAL

UGPC APPROVAL _____
SCNS SUBMITTAL _____
CONFIRMED _____
BANNER POSTED _____
CATALOG POSTED _____
WEB POSTED _____

**DEPARTMENT NAME: BIOLOGICAL SCIENCES**

**COLLEGE OF:** Science

**RECOMMENDED COURSE IDENTIFICATION:**

**PREFIX** ___PCB____ **COURSE NUMBER** __6456____ **LAB CODE** (L or C) _____

**COMPLETE COURSE TITLE** **EXPERIMENTAL DESIGN AND BIOMETRY**

**EFFECTIVE DATE** (first term course will be offered): ____**FALL, 2010**____

**INSTRUCTIONAL METHOD (V, BB, IC, EC, ETC.):**

| **CREDITS: 4** | **LAB/DISCUSSION:** | **TEXTBOOK INFORMATION:** HANDOUT |
|---|---|---|
| **LECTURE:** | **FIELD WORK:** | |

**GRADING: REGULAR** ___x___ **PASS/FAIL** _____ **SATISFACTORY/UNSATISFACTORY** _____

**COURSE DESCRIPTION, NO MORE THAN 3 LINES:** THIS COURSE COVERS EXPERIMENTAL DESIGN AND STATISTICAL ANALYSIS IN THE BIOLOGY AND ECOLOGY. STUDENTS LEARN PROBABILITY THEORY BASICS, UNIVARIATE AND MULTIVARIATE ANALYSES, PROPER EXPERIMENTAL DESIGN (REPLICATION, BLOCKING, ETC) AND HOW TO USE THE SAS SOFTWARE APPLICATION.

| **PREREQUISITES:** | **COREQUISITES:** | **OTHER REGISTRATION CONTROLS (MAJOR, COLLEGE, LEVEL):** |
|---|---|---|
| **PERMISSION FROM INSTRUCTOR**<br>O *Check box to enforce** | O *Check box to enforce** | O *Check box to enforce** |

**MINIMUM QUALIFICATIONS NEEDED TO TEACH THIS COURSE:**

**PHD IN MOLECULAR BIOLOGY**

Other departments, colleges that might be affected by the new course must be consulted. List entities that have been consulted and attach written comments from each.

Department of Mathematics –see below

C. Edward Proffitt, cproffit@fau.edu, 772 297-1011 (at Harbor Branch) _____
Faculty Contact, Email, Complete Phone Number

## SIGNATURES

| ***Approved by:*** | ***Date:*** |
|---|---|
| Department Chair:  | _____*03.25.2010*____ |
| College Curriculum Chair: _____ | _____ |
| College Dean: _____ | _____ |
| UGPC Chair: _____ | _____ |
| Dean, Graduate Studies _____ | _____ |

## SUPPORTING MATERIALS

**Syllabus**—must include course objectives.

**Written Consent**—required from all departments affected.

Go to: *http://graduate.fau.edu/gpc/* to download this form

* "Enforce" prerequisites or other registration controls adds these restrictions to the course schedule; students whose academic careers do not show these prerequisites or other details will not be able to register. When box is not checked, restrictions show in catalog description only.

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

**Course name:** Experimental Design and Biometry (3 Credits)

**Course number:** PCB 6456

**Section number:**

**Pre-requisites:** Permission of instructor

**Co-requisites:** None

**Recommended texts:**

Zar, J.H. 2005. Biostatistical analysis. Prentice Hall, N.J.

Scheiner, S.M. and J. Gurevitch. 2001. Design and analysis of ecological experiments. Chapman & Hall, NY, NY.

**Course and instructional objectives**: Graduate students should be able to:

1. Design biological experiments and analyze the resulting data.
2. Understand the basics of probability theory and data distributions and apply this knowledge to design and analysis.
3. Understand and discuss statistical techniques in the published biological and ecological literature.

**Bibliography of Papers discussed:**


Doak, D.F., K. Gross, and W.F. Morris. 2005. Understanding and predicting the effects of sparse data on demographic analyses. Ecology 86:1154-1163.

Gotelli, N.J. and D.J. McCabe. 2002. Species co-occurrence: a meta-analysis of J.M. Diamond's assembly rules model. Ecology 83:2091-2096.

Grossman, G.D. et al. 2006. Population dynamics of mottled sculpin (Pisces) in a variable environment: Information theoretic approaches. Ecol. Monogr. 76:217-234.

Hurlbert, S.J. 2004. On misinterpretations of pseudoreplication and related matters: a reply to Oksanen. Oikos 104:591-597.

Lindegarth, M. and L. Gamfeldt. 2005. Comparing categorical and continuous ecological analyses: effects of "wave exposure" on rocky shores. Ecology 86:1346-1357.

Mitchell, R.J. 1992. Testing evolutionary and ecological hypotheses using path analysis and structural equation modeling. Functional Ecology 6:123-129.

Oksanen, L. 2001. Logic of experiments in ecology: is pseudoreplication a pseudoissue? Oikos 94:27-38.

Special Feature. 2005. The Statistics of Rarity. Ecology 86: 1079-1163

**Syllabus**

1. Introduction to experimental design, hypothesis testing, & probability. Data reduction and descriptive statistics (2 weeks).
2. ANOVA: simple one-way, Block, two-way, and nested designs. Non-parametric and alternatives to ANOVA and robust ANOVA. Split-plot, and repeated-measures designs. Non-parametric alternatives (2 weeks).
3. Analysis of Covariance (ANCOVA) and Multiple analysis of variance (MANOVA) (1 week).
4. Simple linear regression and multiple regression model selection. Logistic regression for dichotomous variables (2 weeks).
5. Goodness of fit. Chi-square distribution and tests. Logit and Log-linear modeling. Other multivariate techniques (PCA, Ordination, MDS, etc.) (2 week)
6. Introduction to path analysis and Structural Equation Modeling (2 week).
7. Failure-time or survival analysis (2 week).
8. Intervention Analysis (ARMA) (1 week)
9. Mantel tests in field experiments (1 week)
10. Further advanced topics (1 week).

Total 16 weeks.

**Method of instruction:** Lecture via Distance Learning.

**Assessment procedures including tests, quizzes and projects:** Two tests (two, 35% each), paper discussions / written critique (10%), and homework data analysis of problems (20%).

**Grading criteria: A (>90%), A- (89-90 %), B+ (87-88 %), B (80-86 %), B- (78-79 %), C+ (76-77 %), C (70-75%), C- (68-69), D (60-67%), F (0-59%).**

In compliance with the Americans with Disabilities Act (ADA), students who require special accommodations due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) located in Boca Raton - SU 133 (561-297-3880), in Davie - MOD I (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.

## Honor Code

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 http://www.fau.edu/regulations/chapter4/4.001_Honor_Code.pdf.

**From**: Spyros Magliveras
**To**: Rod Murphey
**Cc**: Lianfen Qian ; Dragan Radulovic ; Hongwei Long ; Lee Klingler ; Bill Kalies
**Sent**: Fri Jan 09 11:54:47 2009
**Subject**: Exper. Design - Biometry

Dear Rod,

In a meeting we had in the Mathematical Sciences Department among colleagues who may have overlap interests with Exper. Design, we have agreed that the graduate course proposed by Dr. Ed. Proffitt, titled "Experimental Design and Biometry" is certainly a course related to the research activities in Biology and give our blessings to its establishment in the Biology Department.

Best wishes,

Spyros Magliveras
Professor and Chair, Mathematical Sciences - FAU
& Director, CCIS