FAU

NEW COURSE PROPOSAL
Graduate Programs

FLORIDA ATLANTIC UNIVERSITY

Department Civil, Environmetnal. and Geomatics

College Engineering

*(To obtain a course number, contact **erudolph@fau.edu**)*

Prefix CGN Number 5244	(L = Lab Course; C = Combined Lecture/Lab; add if appropriate) **Lab Code**	**Type of Course** Lecture	**Course Title** Design and Analysis for Engineering Data

Credits *(Review Provost Memorandum)* 3 **Effective Date** *(TERM & YEAR)* Fall 2018	**Grading** *(Select One Option)* Regular ⦿ Sat/UnSat ◯	**Course Description** *(Syllabus must be attached; see Guidelines)* Development of hypothesis and thesis driven data analysis via applications of the basic principles of experimental design to analysis of engineering data, computational algorithms for sample size optimization, analysis of variance for experiments with a single factor, multi-variate analysis

Prerequisites a basic course in statistics, instructor permission	**Corequisites** none	**Registration Controls** *(Major, College, Level)* Graduate - first 2 semesters

Prerequisites, Corequisites and Registration Controls are enforced for all sections of course

Minimum qualifications needed to teach course: Member of the FAU graduate faculty and has a terminal degree in the subject area (or a closely related field.)	**List textbook information in syllabus or here** 1. Montgomery, D. (2013), Design and Analysis of Experiments, 8th ed., John Wiley and Sons
Faculty Contact/Email/Phone Frederick Bloetscher h2o_man@bellsouth.net 239-250-2423	**List/Attach comments from departments affected by new course** n/a

Approved by		**Date**
Department Chair	*Mackiasamy* (for)	11/16/2017
College Curriculum Chair	*Calder*	11/16/2017
College Dean		11/20/mon
UGPC Chair		12/13/17
UGC Chair		
Graduate College Dean	*Deborah Floyd*	12-15-17
UFS President		
Provost		

Email this form and syllabus to UGPC@fau.edu one week before the UGPC meeting.

GRADUATE COLLEGE

NOV 2 8 2017

Received

1. Course title/number, number of credit hours

Design and Analysis for Engineering Data CGN5244	3 credit hours

2. Course prerequisites, co-requisites, and where the course fits in the program of study

Prerequisites: graduate standing, a prior course in statistics.
Course is required to be taken in one of the first two semesters for all graduate students

3. Course logistics

Term: Fall 2018
2 hour and 50 minute lecture once per week

4. Instructor contact information

Instructor's name	TBA
Office address	TBA
Office hours	TBA
Telephone no.	TBA
Email address	TBA

5. TA contact information

Not applicable

6. Course description

Development of hypothesis and thesis driven data analysis via applications of the basic principles of experimental design to analysis of engineering data, computational algorithms for sample size optimization, analysis of variance for experiments with a single factor, multi-variate, randomized blocks and latin square designs, multiple comparison of treatment means, factorial, fractional factorial and nested designs, analysis of covariance, response surface methodology and complex computational modeling.

7. Course objectives/student learning outcomes/program outcomes

Course objectives	I.	Understand the different philosophical approaches to experimental design (Bayesian and frequentists)
	II.	Build a solid foundation for the statistical theory for experimental design.
	III.	Construct appropriate experimental designs for given problems: sample size determination, choice of levels of variables, designs with restrictions on randomization, utility functions for measuring design objectives, use of simulation to characterize properties of designs.
	IV.	Build appropriate statistical models to perform data analysis using appropriate software, and communicate results without use of statistical jargon.

8. Course evaluation method (note percentages subject to change)

Final Exam	30%	
Final Project	20%	
Midterm	30%	
Homework	20%	

9. Course grading scale

Course grades are assigned according to the attached Department of Civil, Environmental & Geomatics Engineering Grading Guidelines. Assignments and reports must be prepared according to the required formats (see attached documents: (a) Assignment Presentation and (b) Technical/Project/Laboratory Report Writing). Additional requirements may be given by the instructor.

10. Policy on makeup tests, late work, and incompletes

1.   Exams will be given only at the scheduled times and places. No one is exempt from the final examination

2. *Makeup tests* are given only if there is solid evidence of a medical or otherwise serious emergency that prevented the student of participating in the exam. Makeup exams will be administered and proctored by department personnel unless there are other pre-approved arrangements.
3. *Late work* is not acceptable.
4. *Incomplete grades* are against the policy of the department. Unless there is solid evidence of medical or otherwise serious emergency situation, incomplete grades will not be given.
5. *Attendance* to class is required. You are expected to attend and participate in all class sessions. Final grades will be reduced by one letter for every three (3) unexcused absences (as determined by the instructor).

11. Special course requirements

12. Classroom etiquette policy

1. Cell phones and beepers should have the ringers turned off as a courtesy to the instructor and your fellow classmates.
2. You are expected to complete the assigned reading prior to the date indicated on the class schedule, to do all homework assignments, and to participate fully in the group projects.
3. Assignments are due at the beginning of class on the date indicated on the assignment sheet. Late assignments are not accepted. Assignments turned in early will receive extra credit.
4. University policy requires that in order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular phones and laptops, are to be disabled in class sessions.

13. Disability policy statement

In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS)—in Boca Raton, SU 133 (561-297-3880); in Davie, LA 203 (954-236-1222); or in Jupiter, SR 110 (561-799-8585) —and follow all SAS procedures.

14. Honor code policy

Consultation with your classmates on assignments is expected and encouraged; however what you turn in must be your own work. Representing the work of others as your own is unethical and may result in sanctions (see the FAU Policy on Academic Honesty). FAU is committed to a policy of honesty in academic affairs. The instructor's duty is to pursue any reasonable allegation, taking action where appropriate, as described in the appropriate section of the FAU Catalog (http://www.fau.edu/ug-cat/academic.htm#irregular) and the Florida Administrative Code. Please be advised that the copying of material from the world wide web or any other written material is considered plagiarism and is also a breach of the Honor Code.

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty 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 unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and place high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. See University Regulation 4.001 at: http://www.fau.edu/regulations/chapter4/4.001_Code_of_Academic_Integrity.pdf.

Florida Atlantic University
Regulation 4.001 Code of Academic Integrity
(1) Purpose. Students at Florida Atlantic University are expected to maintain the highest ethical standards. Dishonesty 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. 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.

(2) Definitions. The FAU Code of Academic Integrity prohibits dishonesty and requires a faculty member, student, or staff member to notify an instructor when there is reason to believe dishonesty has occurred in a course/program requirement. The instructor must pursue any reasonable allegation, taking action where appropriate. Examples of academic dishonesty include, but are not limited to, the following:

(A) Cheating

1. The unauthorized use of notes, books, electronic devices, or other study aids while taking an examination or working on an assignment.
2. Providing unauthorized assistance to or receiving assistance from another student during an examination or while working on an assignment.
3. Having someone take an exam or complete an assignment in one's place.
4. Securing an exam, receiving an unauthorized copy of an exam, or sharing a copy of an exam.
(B) Plagiarism
1. The presentation of words from any other source or another person as one's own without proper quotation and citation.
2. Putting someone else's ideas or facts into your own words (paraphrasing) without proper citation.
3. Turning in someone else's work as one's own, including the buying and selling of term papers or assignments.
(C) Other Forms of Dishonesty
1. Falsifying or inventing information, data, or citations.
2. Failing to comply with examination regulations or failing to obey the instructions of an examination proctor.
3. Submitting the same paper or assignment, or part thereof, in more than one class without the written consent of both instructors.
4. Any other form of academic cheating, plagiarism, or dishonesty.

(3) Procedures.
(A) If the instructor determines that there is sufficient evidence to believe that a student engaged in dishonesty, the instructor will meet with the student at the earliest possible opportunity and provide notice to the student of the instructor's perception of the facts, the charges against the student, and the sanction. The instructor may not remove the student from the course until the appeal process has come to a conclusion.

(B) If, after this meeting, the instructor continues to believe that the student engaged in dishonesty, the instructor will provide the student written notice of the charges and the penalty. A copy of this statement shall be sent to the chair of the department or director of the school/program administering the course.

(C) The student is entitled to an opportunity to be heard at a meeting with the instructor and chair/director to review and discuss the instructor's charges/statement. Such request for a meeting must be made in writing and received by the chair/director within five (5) business days of receipt of the instructor's charges/statement. The purpose of the meeting is to discuss the facts and to advise the student of the appeal process. The chair/director will provide the student, the instructor, and the dean of the college administering the course a summary of both the student's position and the instructor's position.

(D) The student may appeal in writing to the dean of the college administering the course. The appeal must be received by the dean within five (5) business days of receipt of the chair/director's summary from the review meeting. The dean will convene a Faculty-Student Council ("Council"), which will be composed of the dean (or designee), two faculty members, and two students. The dean (or designee) will act as chair of the Council, direct the hearing, and maintain the minutes and all records of the appeal hearing, which will not be transcribed or recorded. The hearing is an educational activity subject to student privacy laws/regulations, and the strict rules of evidence do not apply. The student may choose to be accompanied by a single advisor, but only the student may speak on her/his own behalf. The student and instructor may present testimony and documents on his/her behalf. Additional witnesses may be permitted to speak at the dean's (or designee's) discretion and only if relevant and helpful to the Council. The Council will deliberate and make a recommendation to the dean to affirm or void the instructor's findings of academic dishonesty. The dean (or designee) will inform the student and instructor in writing of his/her findings of academic dishonesty after receipt of the Council's recommendation.

(E) The student may request an appeal in writing of the dean's findings of academic dishonesty to the University Provost (or designee) and include relevant documentation in support of such appeal. The University Provost (or designee) will notify the student, dean, and instructor of his/her decision in writing. This decision by the Provost (or designee) constitutes final University action.

(F) If there is a finding that the Code of Academic Integrity has been violated, the chair will notify the University Registrar that the following notation be included on both the student's official transcript and on the student's internal record: "Violation of Code of Academic Integrity, University Regulations 4.001." If such violation is appealed and overturned, the dean or University Provost (or their designees) will notify the University

Registrar that such notation should be removed from the student's transcript and internal record.

(4) Penalties.

(A) The instructor will determine the penalty to be administered to the student in the course. Penalty grades cannot be removed by drop, withdrawal, or forgiveness policy. Students should be aware that, in some Colleges/programs, failure in a course or a finding of dishonesty may result in other penalties, including expulsion or suspension from the College/program.

(B) In the case of a first offense, the student may elect to complete a peer counseling program administered by the Division of Student Affairs by the end of the semester following the semester in which the dishonesty occurred. Upon successful completion of this program, the notation regarding violation of the Code of Academic Integrity will be expunged from the student's official transcript. The grade, however, will remain unchanged and cannot be removed by drop or forgiveness policy. Also, the notation will remain in internal University student records.

(C) In the case of a repeat offense, even if the notation of violation of the Code of Academic Integrity from the first offense had been expunged from the official transcript as a result of successful completion of the peer counseling program, the student will be expelled from the University.

Specific Authority: Article IX of the Florida Constitution, 1001.706, 1001.74 F.S., Board of Governors Regulations 1.001, 6.010, and 6.0105. History–New 10-1-75, Amended 12-17-78, 3-28-84, Formerly 6C5-4.01, Amended 11-11-87. Formerly 6C5-4.001. Amended 5-26-10

15. Required texts/reading

1.   Montgomery, D. (2013), Design and Analysis of Experiments, 8th ed., John Wiley and Sons

16. Supplementary/recommended readings

1.   Design of Experiments: statistical Principles of research design and analysis. Second edition. Rober O. Kuehl, Duxbury Press, 2000. ISBN 0-534-36834-4
2.   Experiments: Planning, Analysis, and parameter Design optimization, C. F. Jeff Wu and Michael Hamada, 2000. Wiley Interscience publication, John Wiley & Sons, Inc. NY. ISBN 0-471-25511-4

17. Other

1.   College of Engineering and Computer Science (COECS) Technology Services Group (TSG)

TSG provides support for students with issues related to the use of College computing resources such as lamp.cse.fau.edu, the student web server, and GENIE, the Citrix Remote Application Server. TSG also supports the Microsoft Developer Network Academic Alliance portal through which students taking courses in CEECS can obtain free copies of many software products from Microsoft. Details of these and other resources are described on the TSG web site at tsg.eng.fau.edu.

For support issues not covered on the web site students must send email to help@eng.fau.edu. TSG responds to help requests only through this email address. Do not attempt to phone them or contact them personally. TSG support is limited to assistance with COECS computing resources such as having your password on lamp reset. They do not handle specific course related questions. Those should be directed to the instructor for the course.

2.   FAU Information Resource Management (IRM)

RM provides support for general computing and network issues at FAU. General information and many resources can be found on the IRM site, www.fau.edu/irm/index.php. IRM provides direct student through an online Help Desk at www.fau.edu/helpdesk/. The help desk includes extensive online support resources and a "Ticket" submission system for support requests. Areas of particular concern to students in this course covered by the Help Desk include general Blackboard, FAU NetId and network login, and FAU Google Email. The Help Desk can also be accessed by phone at (561) 297-3999. Phone access should generally be used only if you are unable to log in to FAU systems. For most other issues the phone consultant will simply record your concern and submit a help ticket on your behalf. The help ticket will get the same treatment as one you submit directly.

3.   College of Engineering and Computer Science (COECS) Division of Engineering Student Services (ESS)

ESS provides general advising and academic support for students in COECS including free tutoring support for all students in computer science courses. Additional information can be found on their web page at www.eng.fau.edu/engineering-student-services.

4.   FAU University Center for Excellence in Writing (UCEW)

The UCEW, sometimes referred to simply as the Writing Center, provides assistance to students with writing assignments through consultants. They can assess student writing skills and suggest approaches to dealing with problem areas. The center web site is at www.fau.edu/UCEW/WC.

18. Course topical outline, including dates for exams/quizzes, papers, completion of reading

Date	Topic	Assignment*
Week 1	Introduction Proper Literature Review Basics of Research Methods, Developing a Hypothesis	tbd
Week 2	Developing a Research Thesis Proper Literature Review	Literature review
Week 3	Strategy/Guidelines for Designing Experiments Designs for Simple Comparative Experiments Using literature review to help define the thesis question	tbd
Week 4	Single Factor Analysis of Variance Using the literature review to help define the variables of interest	tbd
Week 5	Factorial Experiments Randomized Blocks, Latin Squares Fractional Factorial Designs & Confounding	tbd
Week 6	Designs with Random Effects: Split Plots, Crossover Designs Optimal Designs and Model Uncertainty	tbd
Week 7	Random factors, nested and split-plot designs Review	tbd
Week 8	Midterm	Create methods section based on design of experiment for thesis
Week 9	Conjoint Design	tbd
Week 10	Response surface methods, robustness	tbd
Week 11	Optimization	tbd
Week 12	Design for Nonlinear Models	tbd
Week 13	Sequential Designs	tbd
Week 14	Design and Analysis of Computer Experiments Bayesian Processes	tbd
Week 15	PRESENTATION: introduction and methods of evaluation	Draft of literature review and methods section for thesis/dissertation/project (note the intention is that this will be submitted to professor and thesis advisor for grading)
Week 16	FINAL Exam	cumulative

* 5-10 Homework problems to be assigned from book by instructor based on review of text