

NEW COURSE PROPOSAL

Courses must be submitted by October 15, 2012, and finalized by the end of that fall semester for the next catalog production.

Use YELLOWED areas to enter data.

DATE (*Change if modified and redate file with current date*)

12.4.13; 12.10.13. 4.09.14

PROGRAM AREA(S)

MATHEMATICS

1. Course Information. *[Follow accepted catalog format.]*

Prefix(es) (Add additional prefixes if cross-listed) and **Course No.** **MATH 408**

Title: **Advanced Data Analysis Units: 3**

Prerequisites MATH 398

Corequisites or prerequisite

Consent of Instructor Required for Enrollment

Catalog Description (Do not use any symbols):

Introduction to data management and analytics. Bayesian methods, multivariate data, multivariate normal distribution, multivariate regression, principal components, factor, canonical correlation, discriminant analyses, and clustering. Extensive use of appropriate statistical and programming software. **Course will be taught in a computer lab.**

Grading Scheme:

X A-F Grades

Credit/No Credit

Optional (Student Choice)

Repeatability:

Repeatable for a maximum of units

Total Completions Allowed 3

Multiple Enrollment in Same Semester

Course Level Information:

X Undergraduate

Post-Baccalaureate/Credential

Graduate

Mode of Instruction/Components (*Hours per Unit are defaulted*).

	Units	Hours per Unit	Benchmark Enrollment	Graded Component	CS & HEGIS # (Filled in by the Dean)
Lecture	3	1	24	X	
Seminar		1			
Laboratory		3			
Activity		2			
Field Studies					
Indep Study					
Other Blank					

Leave the following hours per week areas blank. The hours per week will be filled out for you.

3 hours **lecture in the lab** per week

hours blank per week

Is this course always delivered online? Yes_____ No x

2. Course Attributes:

General Education Categories: All courses with GE category notations (including deletions) must be submitted to the GE website: <http://summit.csuci.edu/geapproval>. Upon completion, the GE Committee will forward your documents to the Curriculum Committee for further processing.

A (English Language, Communication, Critical Thinking)

A-1 Oral Communication

A-2 English Writing

A-3 Critical Thinking

B (Mathematics, Sciences & Technology)

- B-1 Physical Sciences
- B-2 Life Sciences – Biology
- B-3 Mathematics – Mathematics and Applications
- B-4 Computers and Information Technology

C (Fine Arts, Literature, Languages & Cultures)

- C-1 Art
- C-2 Literature Courses
- C-3a Language
- C-3b Multicultural

D (Social Perspectives)**E (Human Psychological and Physiological Perspectives)**

UDIGE/INTD Interdisciplinary

Meets University Writing Requirement

Meets University Language Requirement

American Institutions, Title V Section 40404: Government US Constitution US History

Refer to website, Exec Order 405, for more information: <http://senate.csuci.edu/comm/curriculum/resources.htm>

Service Learning Course (Approval from the Center for Community Engagement must be received before you can request this course attribute).

3. Justification and Requirements for the Course. (Make a brief statement to justify the need for the course)**A. Justification:**

This course focuses on advanced statistical methods of data analysis, data management and analytics.. Students will use appropriate statistical software applications for large data sets as well as statistical methods including multivariate data, multivariate normal distribution, multivariate regression, principal components, factor, canonical correlation, and discriminant analyses, and clustering. With increasing information and data collection in every area of human endeavour this course will provide students with state-of-the-art statistical analysis tools and modeling techniques.

- B. Degree Requirement:**
- ☒ Requirement for the Major/Minor
 - ☐ Elective for the Major/Minor
 - ☐ Free Elective

Note: Submit Program Modification if this course changes your program.

4. Student Learning Outcomes. List in numerical order. Please refer to the Curriculum Committee's "Learning Outcomes" guideline for measurable outcomes that reflect elements of Bloom's Taxonomy: <http://senate.csuci.edu/comm/curriculum/resources.htm>. The committee recommends 4 to 8 student learning outcomes, unless governed by an external agency (e.g., Nursing). Upon completion of the course, the student will be able to:

1. Evaluate, manage, reduce and search various data sets and databases.
2. Apply advanced statistical methods and software to analyze various data sets.
3. Discuss, visualize and describe various statistical properties of large data sets.
4. Apply various data searches and statistical methods to decision making.
5. Independently build models and apply appropriate methods on particular data analysis projects.
6. Present the results in visual, oral and written form.
7. Assess and critique in writing various aspects of data analysis and differences in models and results.

5. Course Content in Outline Form. [Be as brief as possible, but use as much space as necessary]

1. Variable types, study types, data collection and sharing methods
2. Data organization, clustering, databases, storage and visualization techniques
3. Multivariate distributions and advanced statistical modeling
4. Multivariate analyses, testing, and other data reduction methods
5. Data mining and software applications for large data sets

Does this course content overlap with a course offered in your academic program? **Yes** ☐ **No** ☒

If YES, what course(s) and provide a justification of the overlap. ☐

Does this course content overlap a course offered in another academic area? **Yes** ☐ **No** ☒

If YES, what course(s) and provide a justification of the overlap. ☐

Overlapping courses require Chairs' signatures.

6. Cross-listed Courses (Please note each prefix in item No. 1)

A. List Cross-listed Courses (Signature of Academic Chair(s) of the other academic area(s) is required).

List each cross-listed prefix for the course: MATH

B. Program responsible for staffing: MATHEMATICS

7. References. [Provide 3 - 5 references]

☐ Sam Kachigan, Multivariate Statistical Analysis, Radius Press 1991.

Alan Agresti, An Introduction to Categorical Data Analysis, Wiley 2007.

John P. Hoffmann, Generalized Linear Models: An Applied Approach, Pearson Education 2004.

Agostino Di Ciaccio, Mauro Coli, Jose Ibanez, Advanced Statistical Methods for the Analysis of Large Data-Sets, Springer 2012.

John Foreman, Data Smart: Using Data Science to Transform Information, Wiley 2013.

Michael Manoochchri, Data Just Right: Introduction to Large-Scale Data & Analytics, Addison Wesley 2014.

Conrad Carlberg, Decision Analytics: Microsoft Excel, Pearson Education 2014.

Richard Cotton, Learning R, O'Reilly Media 2013.

Wes McKinney, Python for Data Analysis, O'Reilly Media 2012.

8. Tenure Track Faculty Qualified to Teach This Course.

Jorge Garcia, Kathryn Leonard, Ivona Grzegorzcyk, Brian Thoms

9. Requested Effective Date:

First semester offered: Spring 2014

10. New Resources Requested. **Yes** ☐ **No** ☒

If YES, list the resources needed.

A. Computer Needs (data processing, audio visual, broadcasting, other equipment, etc.)

Existing computer labs

B. Library Needs (streaming media, video hosting, databases, exhibit space, etc.)

C. Facility/Space/Transportation Needs

☐ existing labs

D. Lab Fee Requested (please refer to Dean's Office for additional processing) **Yes** ☐ **No** ☐

E. Other



11. Will this new course alter any degree, credential, certificate, or minor in your program? Yes ☐ No ☒

Ivona Grzegorzcyk , Jorge Garcia, Kathryn Leonard, Matthew Wiers

Dec 4, 2013

Proposer of Course (Type in name. Signatures will be collected after Curriculum approval)

Date

Approval Sheet

Program/Course: MATH 309

If your course has a General Education Component or involves Center affiliation, the Center will also sign off during the approval process.

Multiple Chair fields are available for cross-listed courses.

The CI program review process includes a report from the respective department/program on its progress toward accessibility requirement compliance. By signing below, I acknowledge the importance of incorporating accessibility in course design.

Program Chair		
Signature		Date
Program Chair		
Signature		Date
Program Chair		
Signature		Date
General Education Chair		
Signature		Date
Center for International Affairs Director		
Signature		Date
Center for Integrative Studies Director		
Signature		Date
Center for Multicultural Engagement Director		
Signature		Date
Center for Civic Engagement Director		
Signature		Date
Curriculum Chair		
Signature		Date
AVP		
Signature		Date