WG14-revrew NOT APR 9.23.14

1st Bulletin 4-17-14
2nd Bulletin 4.16.15

1314139

COURSE APPROVAL ROUTING CHECKLIST

1. **Course Number:** ACM614

2. **Course Title:** Statistical and Data Analysis Software for Math/Science Professionals
(*no more than 70 characters*)

3. **Title Abbreviation:** Stat Data Anal SW
For use in Course Schedule (*no more than 19 characters*)

4. **Action:** New Course ☑ Revision ☐ IF Designation ☐ WAC ☐

Requested IF Designation(s): ______________________

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Course Proposal/Revision Checklist

This checklist will help departments avoid some of the more common mistakes made on course proposals and revisions. Your use of the checklist will allow the College Senate Curriculum Committee to focus its review on more substantive issues, thus expediting the approval process.

☑ Proposal conforms to all guidelines listed in the *Directory of Policy Statements.*

☑ Proposal has been proofread for spelling, punctuation, grammar, and narrative style.

☑ If the course is a new course, reasons for the additions are included; if the course is a revision of an existing course, reasons for revision and a copy of the old course are included as well as the IF submission narrative when appropriate.

☑ Catalog description follows the guidelines in the *College Senate Curriculum Handbook.*

☑ Student learning outcomes are correlated appropriately with course content and assessment.

☑ All resources are listed alphabetically and conform to a conventional academic style.

☐ Cross-listed courses have been checked with all chairs and deans involved in development of the course.

DEPARTMENTAL ACTION

[signature] 4/10/14
Chair, Department Curriculum Committee Date

Approved with confirmation that all necessary laboratories, studios, resources, facilities, and personnel for support of this course are available.

Hongliang Xu 4/11/14
Signature, Department Chairperson (both Chairs if course is cross-listed) Date

Mathematics
Department

(OVER)

Prefix, Number and Name of Course: ACM 614 Statistical and Data Analysis Software for Math and Science Professionals

Credit Hours: 1
In Class Instructional Hours: 1 **Labs/Studio:** 0 **Field Work:** 0

Catalog Description:
Prerequisite: Instructor permission.
Survey of statistical and data programming software and applications to real life problems in computational mathematics. Analysis of data to produce reports and presentations for diverse audiences with a focus on understanding the syntax and use of statistical programming languages.

Reasons for Addition:
The reason for addition of this course is to create a one-semester-hour core module in the use and application of statistical analysis software to problem solving in professional, applied and computational mathematics. This course is in response to the facts that (1) students in a professional programs should know how to translate theory into practical applications, in this case through the use of statistical analysis software, and (2) that statistical data analysis (and requisite fluency in statistical programming software packages) is a skill in high demand in business, government, education, and non-profit sectors.

Student Learning Outcomes: **Students will:**	**Course Content References:**	**Assessment:**
1. analyze data using different statistical programming languages.	II,III,IV,VI	Assignments, examinations, presentations, and computer projects.
2. design and implement algorithms using statistical programming languages.	I,II,III,IV,VI	Assignments, examinations, portfolios and computer projects.
3. compare and contrast the advantages and disadvantages of different statistical programming languages.	I,II,III,IV,V,VI	Assignments, group work, examinations and computer projects.
4. create reports and presentations using typesetting software.	IV, VI	Assignments, group work, examinations, performance-based assessment and computer projects.

Course Content:

I. Introduction to SAS Software
- A. The SAS Language
- B. SAS Data Sets
- C. The Two Parts of a SAS Program: DATA and PROC steps
- D. Choosing a Mode for Submitting SAS Programs
- E. Windows and Commands in the SAS Windowing Environment
- F. Submitting a Program in the SAS Windowing Environment
- G. Reading the SAS Log
- H. Viewing Your Results in the Output Window
- I. SAS Data Libraries
- J. Using SAS System Options

II. Getting Data into SAS
- A. Methods for Getting Data into SAS; Viewtable Window; Import Wizard; Proc Import
- B. Reading Raw Data
- C. Mixing Input Styles
- D. Temporary versus Permanent SAS Data Sets
- E. SAS Data libraries, ODBC connections to SQL servers, Teradata servers, etc.

III. Working with Data in SAS in the SAS Data Step
- A. Creating and Redefining Variables
- B. Using SAS Functions
- C. Grouping Observations with IF-THEN/ELSE Statements
- D. Simplifying Programs with Arrays
- E. Using Shortcuts for Lists of Variable Names
- F. Local and global macro variables

IV. Sorting, Printing, and Summarizing Data in SAS
- A. Using SAS Procedures
- B. Sorting, summarizing and printing data
- C. Graphing in SAS
- D. Writing Simple Custom Reports

V. Introduction to the R Statistical Programming Language
- A. Why learn R? Comparison of R and SAS
- B. Mixing R with SAS
- C. Installing R
- D. Running R interactively and in batch mode
- E. Integrated development environments (Rstudio, Eclipse)
- F. Graphical user interfaces

VI. R Programming Language Basics
- A. Simple calculations
- B. Data structures (vectors, matrices, arrays, lists)
- C. Data acquisition
- D. Importing data from Excel and SAS
- E. Writing Simple Custom Reports

Resources

Scholarship:

Cristina B. (2010). *The Little SAS Book: A Primer (4th ed.)*. Alexandria: American Statistical Association.

Field, A. P., Miles, J., & Field, Z. (2012). *Discovering Statistics Using R*. London ; Thousand Oaks, Calif.: Sage.

lliott, A. C., & Woodward, W. A. (2010). *SAS Essentials: A Guide to Mastering SAS for Research*. San Francisco, CA: Jossey-Bass.

Kleinman, K., & Horton, N. (2010). *SAS and R Data Management, Statistical Analysis, and Graphics*. Chapman and Hall CRC.

Marasinghe, M. G., Kennedy, W. J. L. (2008). *SAS for Data Analysis: Intermediate Statistical Methods* . New York. Springer.

Muenchen, R.A. (2011). *R and SAS for SPSS Users*. Springer.

Peng, C. Y. J. (2009). *Data Analysis Using SAS*. Los Angeles: SAGE.

Periodicals:

SIAM Journal on Computing
Journal of Statistical Software

Electronic and/or Audiovisual Resources:

The SAS resource center: https://www.sas.com/resources/

Internet Data Sources for Social Scientists:
http://www.ciser.cornell.edu/info/datasource.shtml

Institute for Digital Research and Education, SAS Resources:
http://www.ats.ucla.edu/stat/sas/