WINONA STATE UNIVERSITY
NOTIFICATIONS

Department Mathematics & Statistics Date 1/20/14

If the proposed curricular change involves existing courses and is considered a Notification, complete and submit this form. Refer to Regulation 3-4, ***Policy for Changing the Curriculum***, for complete information on submitting proposals for curricular changes.

Please check type of change(s):
_ _ Reduction in course number __ Change in grading option __ Change in hours or credits in an independent study course
_x_ Change in course title _x_ Change in course description* __ Change in existing major, minor, option, concentration, etc.*
_x_ Change in prerequisites _x_ Change in course number within level, e.g. 310 to 350 _____Change in delivery method

A. **Current** Course Information

STAT 325 | Data Management | 3
Course No. | Course Title | Credits

This proposal is for a(n) __x__ Undergraduate Course _____ Graduate Course

Applies to __x__ Major __x__ Minor
__x__ Required _____ Required
_____ Elective __x__ Elective

Prerequisites An introductory statistics course.

Grading _____ Grade only _____ P/NC only __x__ Grade and P/NC Option

Frequency of offering Spring semesters

Proposed Course Information. (Please indicate only proposed changes below.)

DSCI 325 | Management of Structured Data | 3
Course No. | Course Title | Credits

Prerequisites DSCI 210

Grading _____ Grade only _____ P/NC only __x__ Grade and P/NC Option

Frequency of offering Offered yearly

Effective date (normally the next semester) Fall 2014

B. *If the proposal requests a change in the course description, please attach a description of the change requested and list both the current and proposed course description. If the proposal requests a change in an existing major, minor, option, concentration, etc., please attach a description of the change(s) requested and list both the current and proposed program listings.

Approved by the Department _____ 1/24/14
Department Chair Date

bdeppa@winona.edu
e-mail address

Notification to the College Dean ✓Yes ____No

_____ 1/29/14
Dean of College Date

Presented at A2C2 meeting on 3/19/2014 _____
Date Chair of A2C2

Presented at Graduate Council meeting on (if applicable) _____ _____
Date Chair of Graduate Council

Submitted to Registrar on 3/20/2014 Registrar: Please notify department chair via e-mail that Notification has been recorded.
Date

*If a dean has comments on a notification, the dean shall forward the comments to the department. [Revised 7-13-11]

Current Course Description	New Course Description
STAT 325 – Data Management (3 S.H.) This course will give students an overview of the issues related to the management of data. Topics to be covered in this course include: data warehousing, data integrity and quality, data cleansing, basic programming concepts, the construction of simple algorithms, and the appropriate descriptive and graphical summaries of data. Commonly used software packages for the analysis and management of data will be emphasized~~. Prerequisite: An introductory statistics course (preferably STAT 210). Offered spring semester.~~	DSCI 325 – Management of Structured Data (3 S.H.) This course will give students an overview of the issues related to the management of structured data. Topics to be covered in this course include: data warehousing, data integrity and quality, data cleansing, basic programming concepts, the construction of simple algorithms, and the appropriate descriptive and graphical summaries of data. Commonly used software packages for the analysis and management of data will be emphasized. Prerequisites: DSCI 210 – Data Science or permission of instructor. Offered yearly.

WINONA STATE UNIVERSITY
COLLEGE OF SCIENCE AND ENGINEERING
DEPARTMENT OF MATHEMATICS AND STATISTICS

Course Outline - DSCI 325

Course Title**:** DSCI 325: Management of Structured Data

Catalog Description:
This course will give students an overview of the issues related to the management of structured data. Topics to be covered in this course include: data warehousing, data integrity and quality, data cleansing, basic programming concepts, the construction of simple algorithms, and the appropriate descriptive and graphical summaries of data. Commonly used software packages for the analysis and management of data will be emphasized. Prerequisites: DSCI 210 – Data Science or permission of instructor. Offered yearly.

Number of Credits: 3

Possible Textbooks:
The Little SAS Book (2008) by Lora Delwiche and Susan Slaughter
SAS and R: Data Management, Statistical Analysis, and Graphics (2010) by Ken Kleinman and Nicholas Horton

Course Objectives / Learning Outcomes:
Students who take this course will gain an understanding of the wide variety of issues related to the management of data in our data centric world. A student who successfully completes this course will be able to construct and manage a data source, apply methods to access and manipulate data, and evaluate the appropriateness of descriptive and graphical summaries for various data structures. In addition, a student will be required to apply basic programming concepts for the design and construction of algorithms necessary for the management of data.

Topics Covered:

1. Introduction to Data Management (1.5 weeks)
    a. Basic Structure of Data
    b. Data Storage and Warehousing
    c. Integrity and Quality of Data
    d. Data Management Issues in Business, Healthcare, and Government
    e. Rules and Regulations for Data Collection and Management
        i. Institutional Review Board
        ii. HIPPA
        iii. Data Management Plans
2. Management of Data in Excel (1.5 weeks)
    Specific content should relate to Microsoft's Advanced Excel Certification Exam.
    a. Importing and Exporting Data
    b. Sorting and Filtering Data
    c. Using Functions to Manage and Manipulate Data
        i. Functions for Numerical Variables
        ii. Functions for String Variables
        iii. Other Functions
    d. PivotTables
        i. Creating and Managing PivotTables
        ii. Working with PivotTable options

iii. Creating Visual Displays with PivotTables
e. Creating Tables and Graphs for Report Writing
f. Creating Macros for Repetitive Tasks
g. Other potential topics: Conditional Formatting, Security Issues, Working with Auxiliary Data Sources

3. Management of Data in SAS (8 weeks)
Specific content should relate to SAS Corporation's Certification Exams for Base, Advanced, and Clinical Trials Programmer.
a. Data Warehousing and Data Structures
i. Creating SAS Libraries
ii. Creating temporary and permanent SAS datasets
iii. Using PROC IMPORT to Retrieve Data from Other Sources
iv. Using PROC EXPORT to Save Data to Other Sources
b. Importing Raw Data
i. Using the INFILE / INPUT Statements
ii. Advanced features of INFILE / INPUT Statements
iii. FORMAT and INFORMAT Statements
iv. Using PROC CONTENTS
c. Processing Data using the DATA STEP
i. Creating New Variables
ii. Modify Existing Variables
iii. Using SAS Functions to Manipulate Numerical Variables
iv. Using SAS Functions to Manipulate Character Variables
v. Using the RETAIN Statement
vi. Using ARRAYS in SAS
vii. Using Basic Programming Concepts to Manipulate Data
1. IF/THEN Statement
2. IF/THEN/ELSE Statement
3. DO Statement
viii. Data Cleansing Procedures
d. Dataset Processing
i. Modify an Existing Dataset
ii. Obtaining Subsets of a Dataset
iii. Sorting a Dataset
iv. Merging Two or More Datasets
e. Report Processing
i. Using PROC PRINT and PROC REPORT
ii. Generate a Custom Report within the DATA STEP
iii. Output Delivery System (ODS) in SAS
iv. Using SAS Procedures to obtain basic descriptive summaries
f. SQL Procedure in SAS
i. Retrieve Data using SQL Procedure
ii. Generate Reports using SQL Procedure
iii. Compare and Contrast the SQL Procedure to programming with the DATA STEP
g. Macros in SAS
i. Create User-defined Macros within the SAS Macro Language
ii. Using Macros to Enhance and Automate Programs
iii. Procedures for Debugging Macros
h. Handling Errors in SAS
i. Procedures to Verify the Integrity and Quality of Data
ii. Recognize and Correct Syntax Errors in Programs
iii. Identify and Resolve Programming Logic Errors
i. Other potential topics: PROC IML, Creating Graphs in SAS, Generating Random Variables, and Constructing Simulations Studies in SAS

4. Management of Data in R (4 weeks)
a. Introduction to R
b. Working with Data in R
i. Manipulation of Vectors
ii. Manipulation of Arrays, Matrices, and Data Frames
iii. Importing and Exporting Data in R
iv. Using Basic Programming Concepts in R

1. IF Statement
2. FOR Statement
3. REPEAT and WHILE Statements

v. Using the apply() function

c. Graphical Procedures in R
   i. Overview of Available Procedures
   ii. High-level Plotting Functions
      1. Examples
      2. Optional Arguments
   iii. Low-Level Plotting Commands
   iv. Interacting with Graphs
   v. Using the par() function
   vi. Using the LATTICE Package
d. User-Defined Functions in R
   i. Creating Functions in R
   ii. Specifying Inputs for Functions
   iii. Specifying Outputs for Functions
   iv. Writing Efficient Functions
e. Other potential topics: Using Packages in R, Constructing Simulation Studies in R, Obtaining Descriptive Summaries in R, Creating Tables and Graphs for Report Writing

Method of Instruction: The method of instruction for the course will include lecture, the use of several case studies, discussions, and the use of several in-class programming exercises that will advance a student's problem-solving skills and require each student to interact with their peers on a continuous basis.

Evaluation Procedure: Assessments will vary in style and may include written exams, quizzes, homework, group projects, and evidence of successful participation in classroom discussions.

Additional References

- Excel Resources:
  - Advanced Excel for Scientific Data Analysis (2004) by Robert de Levie
  - Course 10393: Intermediate Skills in Microsoft Excel 2010, [On-line] www.microsoft.com/learning
  - Course 10394: Advanced Skills in Microsoft Excel 2010, [On-line] www.microsoft.com/learning
  - Microsoft Excel Data Analysis and Business Modeling, (2004) by Wayne Winston

- SAS Resources:
  - Carpenter's Complete Guide to the SAS Macro Language (2004) by Art Carpenter
  - Proc SQL: Beyond the Basics Using SAS (2004) by Kirk Lafler
  - SAS SQL Procedure User's Guide, Version 8 (2000) by SAS
  - The Little SAS Book (2008) by Lora Delwiche and Susan Slaughter

- R Resources:
  - An Introduction to R (2010) by W.N. Venables, D. M. Smith and the R Development Core Team, [On-line] http://cran.r-project.org/doc/manuals/R-intro.pdf
  - Interactive Graphics for Data Analysis (2009) by Martin Theus and Simon Urbanek
  - Modern Applied Statistics with S (2002) W.N. Venables and B.D. Ripley
  - R Graphics (2006) by Paul Murrell
  - Random Number Generation and Monte Carlo Methods (2000) by James Gentle
  - SAS and R: Data Management, Statistical Analysis, and Graphics (2010) by Ken Kleinman and Nicholas Horton
  - The Elements of Graphing Data (1985) William S. Cleveland

Winona State University - Department of Mathematics & Statistics
Minutes of the Department Meeting on 1/24/14

Present: Joyati Debnath, Brant Deppa (chair), Jeff Draskoci-Johnson, Eric Errthum, Tisha Hooks, April Kerby, Steve Leonhardi, Chris Malone, Mike Markegard, Barry Peratt, Sam Schmidt, Samuel Tsegai, Aaron Wangberg, Nicole Williams, Lee Windsperger

New Business: Note: All of the items below were considered after the department waived the 40-hour rule without objection.

Motions from the Statistics Subgroup

1. STAT 100 – new course proposal and GEP proposal

The new STAT 100 course proposal and GEP proposal were approved without objection.

2. New program: B.S. Data Science (DSCI) major, minor, and courses

(i) The department approved two versions of the major, both without objection. The Math department indicated a preference for Version 2, but voted to accept Version 1 if Computer Science preferred that one. Chris was directed to submit whichever one Computer Science preferred. (Their discussion was still pending as of our meeting.)
(ii) The minor was approved without objection, also with the understanding that Computer Science might want to edit certain courses in the elective list.
(iii) All new courses associated with the proposed data science major were approved without objection. These include DSCI 210, DSCI 310, DSCI 395, DSCI 488, DSCI 492, and DSCI 495.
(iv) The notifications for the conversion of STAT 325 to DSCI 325 and STAT 425 to DSCI 425 were approved without objection.

3. Program revisions: B.S. Statistics (STAT) major, minor, and courses

(i) All revisions, both to the major and to the minor were approved without objection.
(ii) STAT 395 and STAT 495, i.e. the analogous courses to DSCI 395 and DSCI 495, were approved without objections.

Supporting documentation for items 1 – 3 above were sent to the department by Tisha Hooks (STAT 100) and Chris Malone (DSCI and STAT programs) via e-mail (01/22/14).

4. Notifications re: STAT

The following notifications seek Departmental approval. 1) In Spring, 2013, the department voted to make STAT 310 the prerequisite for a number of upper-division STAT courses. Either this paperwork was not submitted, or got lost. 2) The note in the course description for STAT 305 was corrected to read STAT 305 instead of Math 305. 3) A notification to edit course description slightly and to allow ECON 222 to serve as a possible prerequisite for STAT 310. 4) Include DSCI 210 as a prerequisite for STAT 370.

The department approved the submission/resubmission of all of these notifications.

5. Notifications re: MATH courses

The following notifications were submitted for departmental approval. (i) A change in course title for MATH 112 from "Modeling with Functions" to "Applied Precalculus" (ii) A change in the catalog description of MATH 112. (See the catalog language at the end of these minutes.) (iii) A change in number for MATH 140 to MATH 132 AND a change in prerequisites from "MATH 112 - Modeling with Functions, MATH 115 - College Algebra, or MATH 120 - Precalculus" to "MATH 112 – Applied Precalculus, MATH 115 - College Algebra, or MATH 120 - Precalculus" (iv) A change in the catalog description of MATH 132. (See the catalog language at the end of these minutes.)

The department approved all of these changes without objection.

6. Proposal re: MATH 117 from Steve, Barry, and Jeff

The department approved without objection the proposal to submit MATH 117 as a new course and also the proposal to submit it as a GEP course under Goal 4. Since the Math Subgroup had not had a chance to vote on the committee's work, the department waived normal procedures without objection. (The documents were handed out in the meeting.)

Secretary's note: If there is any confusion at to what, exactly, the department agreed to in Items 1-6 above, I can supply copies of the A2C2 paperwork upon request. Summaries of the proposals re: data science and statistics are attached below.

7. Adjourn

We adjourned about 12:50 p.m.

Respectfully submitted,
Jeff Draskoci-Johnson