COMMITTEE ON INSTRUCTION AND CURRICULUM

16-17 CIC 125
Monday, May 15, 2017

TO: The Academic Senate

FROM: Committee on Instruction and Curriculum (CIC)

SUBJECT: 16-17 CIC 125: Revision request for B.S. Statistics/Concentration in Data Science

PURPOSE: Information to the Academic Senate

ACTION REQUESTED: That the Senate accept the information that the revision request for Bachelors of Science in Statistics creating a Concentration in Data Science has been approved by CIC.

BACKGROUND INFORMATION:
The Senate process for approving transformed degree programs for the semester calendar is defined by 14-15 CIC 36. The subcommittee discussed the new Data Science Concentration for the B.S. Statistics at its May 15, 2017 meeting, which was attended by Mitchell Watnik, representing the Department of Statistics and Biostatistics. It was approved unanimously by the Committee with the acknowledgement that some non-substantive changes may occur in the Catalog copy. The proposal may be viewed within Curriculog; the summary is attached as a PDF document per ExCom’s request.
Data Science

2c. Semester Conversion Request for Approval of New or Revised Undergraduate Concentration

General Catalog Information

***READ BEFORE YOU BEGIN***

Use this form to revise existing concentrations (formerly options) or to create new concentrations, for your degree program, ONLY IF YOU'VE ALREADY SUBMITTED your Semester Conversion Request for Approval of Revision of the Undergraduate Degree Program/Major.

If a Degree Program/Major proposal has NOT been submitted, use form 2. Semester Conversion Request for Approval of Revision of the Undergraduate Degree Program/Major to submit your program and concentrations.

**STEP ONE:** Turn on help text, by clicking the Show Help Text icon above this section of the form.

**STEP TWO:** Complete all required fields below.

Select PROGRAM*

- Program
- Shared Core

Year: Fall 2018
2018-2019

Department*

Department of Statistics and Biostatistics

Has your department received Transformation Funding?*

- Yes
- No

Title of Degree Program*

Statistics (B.S.) 120 units

Title of
Concentration* Data Science

Concentration Description (if applicable)

Statistics is the science of learning from data. Majors study collecting and analyzing all kinds of data, and reporting the results of the analysis. Designs of experiments are used to plan data collection in experimental settings, such as in medical research. Surveys are used to collect opinions from samples in populations, such as in political polling. Observational data is collected commonly by business as part of standard business processes, such as in social media and web analytics. Statistical methods are used to process data into easily read visual displays and into summary statistics for interpretation, decision making, and reporting.

Statistics has been a rapidly growing science for many years and has many uses in other fields, such as Econometrics, Business Analytics, Machine Learning, and Visualization. Statistics is widely used by businesses and government organizations to understand changes in the economy and to make forecasts about future events based on past patterns in their data. Statistics is used to model relationships between variables and to predict future values of output variables from input variables. Statistical methods draw accurate inferences about large groups on the basis of a representative sample from the group or population. Descriptive Statistics are used to summarize and visualize the collected data.

The methodology of statistics can be adapted to many types of problems. Due to the extensive development of computers and the collection of large databases, the need for statistical techniques has greatly expanded in recent years. A society like ours, which has become increasingly dependent on its data, has a growing need for statisticians.

The Data Science Concentration emphasizes data, computer programming, and modern technology.

Please read before completing Concentration Requirements Section

Instructions:

Start with the View Curriculum Courses icon directly beneath the Concentration Requirements field. Select the Add Courses button to enter each individual course that will be used in your Concentration (includes required and electives). (Note: Include the Course Units in the Course Title (name) field for ease of review by campus committees).

Next select the View Curriculum Schema icon (to the left of the Curriculum Courses icon). Select Add Core to build the headers and requirements for your catalog page (i.e. add headers for Core Requirements, Electives, or subject areas.)

Preview your catalog chapter by selecting the Preview Curriculum icon.

Major Requirements (B.S.) 48 units

Please consult an advisor in your major department for clarification and interpretation of your major requirements.
The major consists of 48 units; the B.S. degree requires a total of 120 units.

**Introductory Core (9-10 units)**

**Introductory and lower division requirements**

- CS 100 Programming for Everyone
- **Select one of the following (CS 200 recommended for Data Science Concentration)**
  - CS 200 Advanced Programming for Everyone (3)
  - MATH 130 Calculus I (4)
- **Select one course from the following (STAT 315 recommended for Data Science Concentration):**
  - MATH 131 Calculus II (3)
  - STAT 303 Statistical Methods in Biology
  - STAT 310 Statistical Methods in the Social Sciences (3)
  - STAT 315 Exploring and Analyzing Data (3)

**Advanced Core (24 units)**

- STAT 330 Statistical Inference (3)
- STAT 331 Introduction to Analysis of Variance (3)
- STAT 432 Introduction to Linear Regression and Logistic Regression (3)
- STAT 495 Data Analysis with SAS (3)
- **Select one of the following (STAT 321 recommended for Data Science Concentration):**
  - STAT 320 Introduction to Probability Theory (3)
  - STAT 321 Probability Through Simulation (3)
- **Select 3 Elective Courses (9 units) from the following:**
  - STAT 351 Sampling Procedures for Surveys (3)
  - STAT 450 Introduction to R Programming for Data Science (3)
  - STAT 451 Introduction to Data Visualization (3)
  - STAT 452 Introduction to Statistical Learning (3)
  - STAT 460 Advanced Statistical Package Usage (3)
  - STAT 473 Introduction to Nonparametric Statistics (3)
  - STAT 474 Introduction to Time Series and Forecasting (3)
  - STAT 475 Introduction to Stochastic Processes (3)
  - STAT 481 Bayesian Statistics (3)
Data Science Concentration

Complete 15 units of approved courses in Computer Science and/or Statistics. If not used as part of the "3 electives" above, STAT 450, 451, 452 must be used here.

Total Units Required

<table>
<thead>
<tr>
<th>Quarter-Based Program:*</th>
<th>180</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester Based Program:*</td>
<td>120</td>
</tr>
</tbody>
</table>

Additional Notes/Information

This proposal includes some changes to the core of the B.S. Statistics program, including the possible use of CS 200 in place of MATH 130 and the possible use of STAT 321 in place of STAT 320.

Catalog Data

<table>
<thead>
<tr>
<th>Program Type</th>
<th>Bachelor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree Type</td>
<td>Bachelor of Science</td>
</tr>
</tbody>
</table>
Steps for Data Science

Originator

Participants

✅ Mitch Watnik 4/7/2017 3:50 PM

Activity

Required for Approval: 100% required
Date Completed: 4/7/2017 3:50 PM
Changes: Yes
Comments: Yes

Status: Approved

Department Chair

Participants

✅ Mitch Watnik 4/7/2017 3:50 PM

Activity

Required for Approval: 100% required
Date Completed: 4/7/2017 3:50 PM
Changes: No
Comments: No

Status: Approved

Dean's Office Review

Participants

✅ Danika LeDuc 4/8/2017 9:01 AM

Activity

Required for Approval: 100% required
Date Completed: 4/8/2017 9:01 AM
Changes: No
Comments: No

Status: Approved

College Curriculum Committee Approval

Status: Approved
<table>
<thead>
<tr>
<th>Participants</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>College of Science Curriculum Committee</strong></td>
<td><strong>Required for Approval:</strong> 100% required</td>
</tr>
<tr>
<td>Anne Kotchevar * 4/28/2017 4:11 PM</td>
<td><strong>Date Completed:</strong> 5/2/2017 10:25 AM</td>
</tr>
<tr>
<td>Danika LeDuc * 4/29/2017 8:28 AM</td>
<td><strong>Changes:</strong> Yes</td>
</tr>
<tr>
<td>Jaime Maldonado * 5/2/2017 10:25 AM</td>
<td><strong>Comments:</strong> Yes</td>
</tr>
<tr>
<td>* Agenda Administrator</td>
<td><strong>Agenda:</strong> Yes</td>
</tr>
</tbody>
</table>

**Dean's Office Approval**  
Status: Approved

<table>
<thead>
<tr>
<th>Participants</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jason Singley 5/5/2017 4:56 PM</td>
<td><strong>Required for Approval:</strong> 50% required</td>
</tr>
<tr>
<td></td>
<td><strong>Date Completed:</strong> 5/5/2017 4:56 PM</td>
</tr>
<tr>
<td></td>
<td><strong>Changes:</strong> No</td>
</tr>
<tr>
<td></td>
<td><strong>Comments:</strong> No</td>
</tr>
</tbody>
</table>

**APGS (Technical Review)**  
Status: Working

<table>
<thead>
<tr>
<th>Participants</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stephanie Matsuda</td>
<td><strong>Required for Approval:</strong> 100% required</td>
</tr>
<tr>
<td></td>
<td><strong>Time Spent:</strong> 10 days</td>
</tr>
<tr>
<td></td>
<td><strong>Changes:</strong> No</td>
</tr>
<tr>
<td></td>
<td><strong>Comments:</strong> No</td>
</tr>
</tbody>
</table>

**APGS (Dean, Undergraduate Studies Review)**  
Status: Incomplete

<table>
<thead>
<tr>
<th>Participants</th>
<th>Step Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maureen Scharberg</td>
<td><strong>Required for Approval:</strong> 100% required</td>
</tr>
<tr>
<td></td>
<td><strong>Work:</strong> edit, comment</td>
</tr>
</tbody>
</table>
Committee on Instruction and Curriculum

Participants
- Academic Senate
  Sophie Rollins *
- CIC
  Sophie Rollins *
  Mitch Watnik *

Step Details
- Required for Approval: 100% required
- Work: comment
- Agenda: Yes
  * Agenda Administrator

Executive Committee

Participants
- Academic Senate
  Sophie Rollins *
- ExCom
  Mark Karplus *
  Sophie Rollins *

Step Details
- Required for Approval: 100% required
- Work: comment
- Agenda: Yes
  * Agenda Administrator

Academic Senate

Participants
- Academic Senate
  Sophie Rollins *

Step Details
- Required for Approval: 100% required
- Work: comment
- Agenda: Yes
  * Agenda Administrator

President's Office

Status: Incomplete
<table>
<thead>
<tr>
<th>Participants</th>
<th>Step Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Senate</td>
<td>Required for Approval: 100% required</td>
</tr>
<tr>
<td>Sophie Rollins *</td>
<td>Work: comment</td>
</tr>
<tr>
<td>Agenda: Yes</td>
<td></td>
</tr>
<tr>
<td>* Agenda Administrator</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>APGS (Final Review &amp; Export)</th>
<th>Status: Incomplete</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants</td>
<td>Step Details</td>
</tr>
<tr>
<td>Sarah Aubert</td>
<td>Required for Approval: 100% required</td>
</tr>
<tr>
<td>Stephanie Matsuda</td>
<td>Work: edit, comment</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Attachments for Data Science

This proposal does not have any attachments.
Comments for Data Science

<table>
<thead>
<tr>
<th>Anne Kotchevar</th>
<th>4/28/2017 4:11 pm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved by the College of Science Curriculum Committee</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mitch Watnik</th>
<th>4/7/2017 3:50 pm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved by the Stat. Dept. Faculty at meeting on April 7.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mitch Watnik</th>
<th>4/6/2017 4:43 pm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sent to Department Faculty for consideration prior to Department approval.</td>
<td></td>
</tr>
</tbody>
</table>

Crosslistings for Data Science

Data Science (parent proposal)
This proposal does not have any active crosslisted proposals.
# Decision Summary for Data Science

## APGS (Technical Review)

### Status:
*Working*

### Step Summary
This step requires 100% approval from all participants to move forward.

<table>
<thead>
<tr>
<th>Participants</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stephanie Matsuda</td>
<td>Users Approved: 0</td>
</tr>
<tr>
<td></td>
<td>Users Rejected: 0</td>
</tr>
</tbody>
</table>

https://csueastbay.curriculog.com/proposal:4867/print