# http://www.ric.edu/webcommunications/images/SealWithText_Small_Black.pngUNDERGRADUATE CURRICULUM COMMITTEE (UCC) PROPOSAL FORM

## Cover page scroll over blue text to see further important [instructions](#instructions): [if not working select “COMMents on rollover” in your Word preferences under view] please read these.

**N.B. DO NOT USE HIGHLIGHT, where choices are given within categories, please DELETE those THAT DO NOT APPLY TO YOUR PROPOSAL. Do not delete numbered categories.**

**ALL numbers in section (A) to be completed, including the impact ones (#5-7), put “none” if that is the case.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| A.1. [Course or program](#Proposal) | **Minor in statistical modeling** | | | |  |
|  |  | | | |
| A.2. [Proposal type](#type) | **Program:** [**creation**](#creation) **|** | | | |
| A.3. [Originator](#Originator) | **Stephanie Costa** | [Home department](#home_dept) | **Mathematics and Computer Science** | | |
| A.4. [Context and Rationale](#Rationale) | **According to a recent McKinsey report (2), the amount of data being produced is doubling every three years and the biggest barrier to realizing its full potential is the lack of a workforce educated to analyze it. The Bureau of Labor Statistics has identified careers in the mathematical sciences as being among the fastest growing occupations in the US with a predicted growth of almost 30% from 2018-2028 (1). The ability to make data-driven decisions is necessary in almost every discipline and a minor in Statistical Modeling will educate students with the basic skills and knowledge necessary to do so. We need to respond to the changing needs of the workforce if we want to adequately prepare our students for careers in a data-driven world.**  **The courses designated in the minor in Statistical Modeling will, most importantly, produce students with strong critical and creative thinking skills. In addition to statistical knowledge, students will become proficient in a software package to analyze data and learn the calculus and linear algebra necessary to understand some basic mathematical models.**  **In our introductory course, Statistical Methods I (MATH 240), students will learn about descriptive and inferential statistics, be introduced to discrete and continuous probability distributions, confidence intervals, hypothesis testing, and simple linear regression.**  **A new course, Principles of Data Science (MATH 245), introduces students to statistical software that can be used to analyze and visualize data while extending their statistical knowledge by covering topics like multiple linear regression and analysis of variance. Knowledge of a statistical software package is essential to working with large data sets.**  **A second new course, Linear Models for Data Science (MATH 345), is an applied linear algebra course which focuses on the theory behind linear models. In order to understand the theory a student would need a background in Calculus (MATH 212).**  **Finally, Advanced Statistical Methods (MATH 445), introduces students to more advanced models and statistical learning techniques. A statistical software package will be used for data analysis.**   1. Rieley, M., ‘Big data adds up to opportunities in math careers’, Beyond the Numbers: Employment & Unemployment, vol. 7, no. 8 , U.S. Bureau of Labor Statistics, 2018, Retrieved October 4, 2019 (<https://www.bls.gov/opub/btn/volume-7/big-data-adds-up.htm>). 2. Henke, N., Chui, M., Manyika, J., Saleh, T., Wiseman, B., Sethupathy, G., ‘The Age of Analytics: Competing in a Data Driven World’, McKinsey & Company, 2016, Retrieved November 28, 2019 (<https://www.mckinsey.com/business-functions/mckinsey-analytics/our-insights/the-age-of-analytics-competing-in-a-data-driven-world>). | | | | |
| A.5. [Student impact](#student_impact) | **All students on campus will be able to earn a minor in Statistical Modeling.**  **This option will be especially attractive to students majoring in Computer Science, Mathematics, or the Sciences whose majors already require them to take some of the courses included in the minor.** | | | | |
| A.6. [Impact on other programs](#impact) | **Together with MATH 445, the two new courses identified in the minor (MATH 245 and MATH 345) make up the statistics and modeling core of the proposed Data Science major which we plan to bring to the Curriculum Committee in February. Our hope is that the minor will increase enrollment in these courses, maximizing college resources.** | | | | |
| A.7. [Resource impact](#Resource) | [*Faculty PT & FT*](#faculty): | **None.** | | | |
| [*Library*:](#library) | **None.** | | | |
| [*Technology*](#technology) | **None, existing software packages will be utilized.** | | | |
| [*Facilities*](#facilities): | **None, existing computer labs will be utilized.** | | | |
| A.8. [Semester effective](#Semester_effective) | **Fall 2020** | A.9. [Rationale if sooner than next Fall](#Semester_effective) | |  | |
| A.10. INSTRUCTIONS FOR CATALOG COPY: This single file copy must include ALL relevant pages from the college catalog, and show how the catalog will be revised. (1) Go to the “Forms and Information” page on the UCC website. Scroll down until you see the Word files for the current catalog. (2) Download ALL catalog sections relevant for this proposal, including course descriptions and/or other affected programs. (3) Place ALL relevant catalog copy into a single file. Put page breaks between sections and **delete any catalog pages not relevant for this proposal**. (4) Using the track changes function, revise the catalog pages to demonstrate what the information should look like in next year’s catalog. (5) Check the revised catalog pages against the proposal form, especially making sure that program totals are correct if adding/deleting course credits. If new copy, indicate where it should go in the catalog. If making related proposals a single catalog copy that includes all is acceptable. Send as a separate single file along with this form. | | | | | |

### C. [Program Proposals](#program_proposals) **complete only what is relevant to your proposal. Delete this whole page if the proposal is not revising, creating, deleting or suspending any progam.**

|  | [Old (for revisions only)](#old_program) | New/revised |
| --- | --- | --- |
| C.1. [Enrollments](#enrollments) |  | **20 students** |
| C.2. [Admission requirements](#admissions) |  | **We will be using RIC admissions requirements** |
| C.3. [Retention requirements](#retention) |  | **We will be using RIC retention requirements** |
| C.4. [Course requirements](#course_reqs) for each program option. Show the course requirements for the whole program here. |  | **The minor is made up of the following five courses (20 credits):**  **MATH 212 (Calculus I) 4 cr,**  **MATH 240 (Statistical Methods I) 4cr,**  **MATH 245 (Principles of Data Science) 4cr (new)**  **MATH 345 (Linear Models for Data Science) 4 cr (new)**  **MATH 445 (Advanced Statistical Methods), 4cr (rev.)** |
| C.5. [Credit count](#credit_count) for each program option |  | **20** |
| C.6. Other changes if any |  |  |
| C.7 [Program goals](file:///C:/Users/sabbotson/Documents/Curriculum/Program%20goals)  Needed for all new programs |  | **1. Students will acquire a background in the content and methodology of basic statistics and modeling.**  **a. Students will understand and use concepts and techniques in calculus, linear algebra, and statistics.**  **b. Students will understand and use concepts and techniques in data collection, analysis, modeling, and statistical inference.**  **2. Students will apply knowledge in mathematics, and statistics to solve problems.**  **a. Student will choose, fit, and use mathematical models to solve problems.**  **b. Students will use a high-level language to explore, visualize, and form hypotheses about data.**  **3. Students will conduct data-based investigations and effectively communicate their findings.**  **a. Students will receive raw data from a variety of sources and formats and then clean, transform, and structure the data for analysis.**  **b. Students will communicate data-based findings visually, orally, and in writing.** |

## D. Signatures

* Changes that affect General Education in any way MUST be approved by ALL Deans and COGE Chair.
* Changes that directly impact more than one department/program MUST have the signatures of all relevant department chairs, program directors, and their relevant dean (e.g. when creating/revising a program using courses from other departments/programs). Check UCC manual 4.2 for further guidelines on whether the signatures need to be approval or acknowledgement.
* Proposals that do not have appropriate approval signatures will not be considered.
* Type in name of person signing and their position/affiliation.
* Send electronic files of this proposal and accompanying catalog copy to [curriculum@ric.edu](mailto:curriculum@ric.edu) and a printed signature copy of this whole form to the current Chair of UCC. Check UCC website for due dates.

##### D.1. Approvals: required from programs/departments/deans who originate the proposal. may include multiple departments, e.g., for joint/interdisciplinary proposals.

| Name | Position/affiliation | [Signature](#_Signature" \o "Insert electronic signature, if available, in this column) | Date |
| --- | --- | --- | --- |
| Earl Simson | Dean of Arts and Sciences |  |  |
| Stephanie Costa | Chair Department of Mathematics and Computer Science |  |  |

##### D.2. [Acknowledgements](#acknowledge): REQUIRED from OTHER PROGRAMS/DEPARTMENTS (and their relevant deans if not already included above) that are IMPACTED BY THE PROPOSAL. SIGNATURE DOES NOT INDICATE APPROVAL, ONLY AWARENESS THAT THE PROPOSAL IS BEING SUBMITTED. CONCERNS SHOULD BE BROUGHT TO THE UCC COMMITTEE MEETING FOR DISCUSSION; all faculty are welcome to attend.