# 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.**

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| --- | --- | --- | --- | --- | --- |
| A.1. [Course or program](#Proposal) | **Math 245: Principles of Data science** | | | |  |
|  |  | | | |
| A.2. [Proposal type](#type) | **Course: revision** | | | |
| A.3. [Originator](#Originator) | **Stephanie Costa** | [Home department](#home_dept) | **Mathematics and Computer Science** | | |
| A.4. [Context and Rationale](#Rationale) | **This course was approved Dec. 2019 and is intended to introduce students to the field of data science. Since then we have presented this to COGE in order to make it an AQSR course within the General Education program, and they approved.**  **The original catalog copy had an error and only listed MATH 240 as a prerequiste, whiole the proposal did have MATH 240 or MATH 248—so that is also being fixed here.**  **The class will still be capped at 24 students since a substantial amount of time will be spent in campus computer labs.** | | | | |
| A.5. [Student impact](#student_impact) | **This will be a great course for any student looking to learn more about mathematical modeling and gain experience using statistical software to manage and analyze data.** | | | | |
| A.6. [Impact on other programs](#impact) | **None.** | | | | |
| A.7. [Resource impact](#Resource) | [*Faculty PT & FT*](#faculty): | **Current and existing full-time faculty will be used.** | | | |
| [*Library*:](#library) | **No additional needs are anticipated.** | | | |
| [*Technology*](#technology) | **We expect current labs to be sufficient.** | | | |
| [*Facilities*](#facilities): | **None** | | | |
| 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. | | | | | |

B. [NEW OR REVISED COURSES](#delete_if)  **DO NOT use highlight. Do not delete numbered categories, just leave blank if they do not apply. Delete this whole page if the proposal does not include a new or revised course. Always fill in b. 1 and B. 3 for context.**

|  | Old ([for revisions only](#Revisions)) ONLY include information that is being revised, otherwise leave blank. | New Examples are provided within some of the boxes for guidance, delete just the examples that do not apply. |
| --- | --- | --- |
| B.1. [Course prefix and number](#cours_title) |  | **MATH 245** |
| B.2. Cross listing number if any |  |  |
| B.3. [Course title](#title) |  | **Principles of Data Science** |
| B.4. [Course description](#description) |  |  |
| B.5. [Prerequisite(s)](#prereqs) | **MATH 240** | **MATH 240 or MATH 248** |
| B.6. [Offered](#Offered) |  |  |
| B.7. [Contact hours](#contacthours) |  |  |
| B.8. [Credit hours](#credits) |  |  |
| B.9. [Justify differences if any](#differences) |  | |
| B.10. [Grading system](#grading) |  |  |
| B.11. [Instructional methods](#instr_methods) |  |  |
| B.12.[Categories](#required) |  |  |
| B.13. Is this an Honors course? | **No** | **No** |
| B.14. [General Education](#ge)  N.B. Connections must include at least 50% Standard Classroom instruction. | **NO** | **YES: AQSR** |
| B.15. [How will student performance be evaluated?](#performance) |  |  |
| B.16 [Recommended class-size](#class_size" \o "Check appendix XVIII in the UCC Manual for Best Practices) |  |  |
| B.17. [Redundancy statement](#competing) |  |  |
| B. 18. Other changes, if any |  | |

| B.18**.** [**Course learning outcomes**](#outcomes)**: List each one in a separate row** | [**Professional Org.Standard(s)**](#standards)**, if relevant** | [**How will each outcome be measured**](#measured)**?** |
| --- | --- | --- |
| (These are the Gen Ed. outcomes we have added):  Critical and Creative Thinking |  | The course will make use of readily available data sets such as the National Household Survey of Drug Use and Health, the National Survey on Energy and Environment, environmental datasets on rainfall and fires in Australia, World Health Organization data sets on a variety of health topics, or the Gapminder data set on country level indicators of health, wealth, and development.  Students will read codebooks to familiarize themselves with the variables in the data set and construct research questions which they would like to explore. Students will analyze data using various visual and numerical descriptive statistics and generate graphs, tables, and plots to aid in data visualization. From these visualizations, students will form hypotheses about relationships between variables and build mathematical models using simple and multiple linear regression techniques.  Throughout the course, students will be taught to check their assumptions to be sure the model they build meets the necessary conditions for inference. To this end, students will be taught how to generate scatterplots, Q-Q plots, and residual plots using R. |
| Quantitative Literacy |  | Students will learn how to receive raw data from a variety of sources and clean, transform, and structure the data for analysis. With the use of various packages in R, students will explore the dataset and form hypotheses about the data.  Students will use the ggplot2 package in R to generate scatter plots, box plots, bar plots, histograms, and other visual descriptive statistics. This powerful package enables users to use a general scheme for data visualization to break up graphs into semantic components such as scales and layers. With these visualizations, students will be able to unearth crucial insights from the data.  Students will communicate their data-based findings orally and in writing using the R Markdown package which makes it easy to incorporate graphs and tables generated by R into a written report on data analysis. |
| Scientific Literacy |  | Students will explore data sets and form hypothesis to be tested with statistical techniques. Students will learn about analysis of variance (ANOVA) and use simple and multiple regression to build mathematical models. Students will learn how to select the best set of variables to include in a model with multiple predictors and how to determine if adding a particular predictor will improve upon or detract from the given model. |

| B.19. [**Topical outline**](#outline)**: DO NOT INSERT WHOLE SYLLABUS, JUST A TWO-TIER TOPIC OUTLINE. Proposals that ignore this request will be returned for revision.** |
| --- |
| 1. Introduction to R  a. Installing and running R  b. R Packages  c. Working with large data sets  2. Working with Data  a. Data Structures  b. Data input  c. Functions for working with data sets  3. Visualizing data - Basics  a. The ggplot package  b. Working with graphs  4. Data Management  a. Creating new variables  b. Dealing with missing values  c. Merging data sets  d. Subsetting data sets.  5. More Data Visualization  a. Bar plots  b. Pie charts  c. Histograms  d. Kernel density plots  e. Box plots  f. Dot plots  g. Scatterplots  h. Scatterplot matrices  6. Statistical Models  a. Numerical descriptive statistics in R and associated packages  b. Generating frequency distributions and contingency tables  c. Chi-square tests in R  d. Correlation coefficients and associated tests in R  7. Regression  a. Simple linear regression  b. Multiple linear regression  c. Model selection  8. Analysis of Variance  a. Introduction to ANOVA  b. Q-Q plots and residual plots  c. Conditions for inference. |
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## 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 |
| --- | --- | --- | --- |
| Stephanie Costa | Chair of Mathematics and Computer Science | Stephanie Costa | 5/8/2020 |
| Earl Simson | Dean, Faculty of Arts and Sciences | Earl Simson | 5/8/2020 |
| Jayashree Nimmagadda | Dean of School of Social Work (interim) |  |  |
| Jeannine Dingus-Eason | Dean of Feinstein School of Education and Human Development | page5image3803552 | 5/9/2020 |
| Debra Servello | Dean of School of Nursing (interim) | Debra Servello | 5/9/2020 |
| Jeffrey Mello | Dean of School of Business |  | 5/9/2020 |
| James Magyar | Chair COGE | James Magyar | 5/8/2020 |

##### 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.

| Name | Position/affiliation | [Signature](#Signature_2) | Date |
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