# 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. Please do not use highlight to select choices within a category but simply delete the options that do not apply to your proposal (e.g. in A.2 if this is a course revision proposal, just delete the creation and deletion options and the various program ones, so it reads “course revision”) Do not ever delete any of the numbered categories—if they do not apply leave them blank. ALL numbered categories in section (A) must be completed. If there are no resources impacted it is okay to put “none” in A. 7**

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| --- | --- | --- |
| A.1. [Course or program](#Proposal) | **MATH 139 Math, Data, and the Contemporary Citizen** |  |
| [Replacing](#Ifapplicable) | **Math 139 Contemporary Topics in Mathematics** |
| A. 1b. Academic unit | **Faculty of Arts and Sciences**  |  |
| A.2. [Proposal type](#type) | **Course: revision**  |  |
| A.3. [Originator](#Originator) | **John Burke** | [Home department](#home_dept) | **Department of Mathematical Sciences** |
| A.4. [Context and Rationale](#Rationale) Note: Must include additional information in smart tip for all [new programs](#type) | **Math 139 is being revised in order to focus its outcomes on data analysis and the usefulness and power of its applications. In particular, we highlight its applications to students’ personal lives and the roles these applications play in the functioning of a contemporary society.** **The purpose of Mathematics 139, Math, Data, and the Contemporary Citizen, is to convey the power of mathematics and tools of data analysis, as well as the direct applications such tools have in our lives.  The course is centered around not only statistical analysis of data, but also around the mathematical application of data to understanding personal finance, understanding flaws in democratic voting systems, and the study of fair division of assets and resources. The topics were specifically chosen for a general education audience based upon both their approachability and relevance to life in the digital/big data era.** **Consumer mathematics, for example, consists of topics that are essential to making informed purchases, both big and small. Anyone who intends to purchase a home, build a nest-egg for retirement, or even purchase a shirt on sale needs to know the mathematics at play to purposefully set goals while living within their own means whenever possible.** **Data-driven decision-making can influence students’ lives at both personal and political levels. Therefore, we cover some elementary statistics and probability so that we may understand (or be wary of) information that is given to us via the local news, the internet, or a relative at the dinner table. The internet, for better and for worse, has changed the way we exchange information. As such, it is becoming increasingly important to give students the mechanisms they need to parse data, understand assumptions and limitations of studies, and combat either false or misleading statements.** **The issue of voting systems and their flaws strikes at the core ideas of democracy, and it is incumbent upon every member of a democratic system to understand the inherent limitations and biases of such systems. The related notion of apportionment methods is built into our legal system to preserve fairness of electoral systems; in Mathematics 139, we can study the extent to which that endeavor is achieved as well as the role of mathematics in keeping (or attempting to keep) electoral voices distributed in a way that accurately reflects our country’s population.****Recent advances in the study of fair division methods are being tested and applied to issues of large scope (e.g., gerrymandering) as well as issues of smaller scope (e.g., division of assets after divorce).  Attempting to precisely quantify the notion of fairness is inextricably tied to methods of fair division, whether the division is of resources that are discrete (indivisible, as in items following a divorce) or continuous (as in a cake or plot of land). The ideas of individual valuation and envy make the discussion of fair division much more complicated than simply allocating “equally sized” or an “equal number” of resources. This topic encourages students to reflect deeply on what they believe the word “fair” means, as well as logical implications of applying that definition in various aspects of life.****Mathematics 139 serves to both empower and inform its students to become participants in a democratic society organized under the rule of law. Along the way, we seek to impart upon students that doing mathematics means more than solving equations or crunching numbers; in fact, such exercises, while important, make up only a small portion of the discipline.  It is the call to digest, analyze and synthesize information in a systematic way that makes mathematics equal parts intellectually stimulating and socially relevant.**  |
| A.5. [Student impact](#student_impact)Must include to explain why this change is being made? | **There will be no change to Math 139’s status as a general education course and there will be no change to its number of credit hours. Therefore, this revision will not affect any student’s study plan.** **The topics covered in Math 139 will change, as will the course learning outcomes. Students completing the course will have had exposure to important concepts in data analysis and its applications to their personal lives and the functioning of a contemporary society.**  |
| A.6. [Impact on other programs](#impact)  | **There will be no change to Math 139’s status as a general education course and there will be no change to its number of credit hours. Therefore, this revision will not affect other programs.**  |
| A.7. [Resource impact](#Resource) | [*Faculty PT & FT*](#faculty):  | **None** |
| [*Library*:](#library) | **None** |
| [*Technology*](#technology) | **None** |
| [*Facilities*](#facilities): | **None** |
| A.8. [Semester effective](#Semester_effective) | **Fall 2022** | A.9. [Rationale if sooner than next Fall](#Semester_effective) |  |
| A.10. INSTRUCTIONS FOR CATALOG COPY: Use the Word copy versions of the catalog sections found on the UCC Forms and Information page. Cut and paste into a single file **ALL the relevant pages from the college catalog that need to be changed.** Use the tracked changes feature to show how the catalog will be revised as you type in the revisions. If totally new copy, indicate where it should go in the catalog. If making related proposals a single catalog copy that includes all changes is preferred. Send catalog copy as a separate single Word file along with this form. |
| A.11. List here (with the relevant urls), any RIC website pages that will need to be updated (to which your department does not have access) if this proposal is approved, with an explanation as to what needs to be revised: |

B. [NEW OR REVISED COURSES](#delete_if)  **Delete section B if the proposal does not include a new or revised course. As in section A. do not highlight but simply delete suggested options not being used. 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.  | NewExamples are provided within some of the boxes for guidance, delete just the examples that do not apply. |
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| B.1. [Course prefix and number](#cours_title)  | **MATH 139** | **Same** |
| B.2. Cross listing number if any |  |  |
| B.3. [Course title](#title)  | **Contemporary Topics in Mathematics** | **Math, Data, and the Contemporary Citizen** |
| B.4. [Course description](#description)  | **The purpose of this course is to introduce selected areas of modern mathematics which have applications in contemporary society. Topics may include mathematics of social science, graph theory, consumer mathematics, and statistics.** | **This course introduces students to the power and usefulness of data and its mathematical application to their personal lives and to the function of the societies in which they belong.** |
| B.5. [Prerequisite(s)](#prereqs) |  |  |
| B.6. [Offered](#Offered) |  |  |
| B.7. [Contact hours](#contacthours)  |  |  |
| B.8. [Credit hours](#credits) |  |  |
| B.9. [Justify differences if any](#differences) | **The course description has been changed to reflect the new revised focus on data analysis and its applications.**  |
| B.10. [Grading system](#grading)  |  |  |
| B.11. [Instructional methods](#instr_methods) |  |  |
| B.11.a [Delivery Method](#instr_methods) |  |  |
| B.12. CATEGORIES 12. a. [How](#required) to be used | **Cognate for Technology Education B.S****Restrictive Elective for Philosophy B.A with Concentration in Knowledge and Reality** | **Same** |
|  12 b. Is this an Honors  course? | **NO** | **Same** |
|  12. c. [General Education](#ge) N.B. Connections must include at  least 50% Standard Classroom instruction. | **YES** **category: Mathematics** | **Same** |
|  12. d. Writing in the  Discipline (WID) | **NO** | **Same** |
| B.13. [How will student performance be evaluated?](#performance) |  |  |
| B.14 [Recommended class-size](#class_size" \o "Check appendix XVIII in the UCC Manual for Best Practices) |  |  |
| B.15. [Redundancy statement](#competing) |  |  |
| B. 16. Other changes, if any |  |

| B.17**.** [**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)**?** |
| --- | --- | --- |
| To understand the basic mathematical principles underlying personal finance and to apply these principles to real-world applications.  |  | Presentations, Group Work, Homework, Quizzes, and/or Exams |
| To understand the basic principles of probability and use them to analyze probabilistic statements about the world. |  | Presentations, Group Work, Homework, Quizzes, and/or Exams |
| To apply basic statistical methods to real-world data sets. |  | Presentations, Group Work, Homework, Quizzes, and/or Exams |
| To analyze voting and apportionment methods and their uses in contemporary societies.  |  | Presentations, Group Work, Homework, Quizzes, and/or Exams |
| To understand and apply fair division methods to real-world scenarios.  |  | Presentations, Group Work, Homework, Quizzes, and/or Exams |

| B.18. [**Topical outline**](#outline)**: DO NOT INSERT WHOLE SYLLABUS, JUST A TWO-TIER TOPIC OUTLINE. Proposals that ignore this request will be returned for revision.** |
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| 1. Personal Finance
	1. Percent, Sales, Tax, and Discounts
	2. Simple Interest
	3. Compound Interest
	4. Annuities, Methods of Saving, and Investment
	5. The Cost of Home Ownership
2. Counting Methods and Probability Theory
	1. The Fundamental Counting Principle
	2. Permutations
	3. Combinations
	4. Fundamentals of Probability
	5. Events Involving *Not* and *Or*; Odds
	6. Events Involving *And*; Conditional Probability
	7. Expected Value
3. Statistics
	1. Sampling, Frequency Distributions, and Graphs
	2. Measures of Central Tendency
	3. Measures of Dispersion
	4. The Normal Distribution
	5. Problem Solving with the Normal Distribution
	6. Scatter Plots, Correlation, and Regression Lines
4. Voting and Apportionment
	1. Voting Methods
	2. Flaws of Voting Methods
	3. Apportionment Methods
	4. Flaws of Apportionment Methods
5. Fair Division
	1. Fair Share
	2. Divider-Chooser Method
	3. Lone Divider Method
	4. Last Diminisher Method
	5. Moving Knife Method
	6. Sealed Bids Method
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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 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. THESE may include multiple departments, e.g., for joint/interdisciplinary proposals.

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| Earl Simson | Dean of the Faculty of Arts and Sciences |  |

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