MATH 217 Probability and Statistics-CrsRvs-2018-02-22

Form Information
The page you originally access is the global template version. To access the template document that progresses through the workflow, please complete the following steps:

First Step: **ONLY** change the text in the [brackets] so it looks like this: **CRIM 101 Intro to Criminology-CrsRvs-2015-08-10**

- ***If DUAL LISTED list BOTH courses in the page title***

Second Step: Click **"SAVE"** on bottom right

- ***DO NOT TYPE ANYTHING INTO THE FIRST PAGE OTHER THAN THE TEXT IN BRACKETS***
- ***Please be sure to remove the Brackets while renaming the page***

Third Step: Make sure the word ***DRAFT*** is in yellow at the top of the proposal

Fourth Step: Click on "**EDIT CONTENTS**" (*not EDIT*) and start completing the template. When exiting or when done, click "**SAVE**" (*not Save Draft*) on bottom right

When ready to submit click on the workflow icon and hit approve. It will then move to the chair as the next step in the workflow.

***Indicates a required field**

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Proposing Department/Unit*	Mathematics	**Contact Phone***	724-357-2608

Course Level*	undergraduate-level

Course Revisions

(Check all that apply;fill out categories below as specified; i.e. if only changing a course title, only complete Category A)

Category A:	Category B:
catalog_desc_change	course_revision liberal-studies **** Teacher Education: Please complete the Teacher Education section of this form (below)*** **** Liberal Studies: Please complete the Liberal Studies section of this form (below)*** **** Distance Education: Please complete the Distance Education section of this form (below)***

Rationale for Proposed Changes (All Categories)

(A) Why is the course being revised/deleted:*	1. Assessments included to measure student learning outcomes for liberal studies. 2. Update catalog description and course outline to better demonstrate modern data science skills.
(B) University Senate Summary of Rationale*	***Please enter a single paragraph summary/rationale of changes or proposal for University Senate.*** 1. Assessments included to measure student learning outcomes for liberal studies. 2. Update catalog description and course outline to better demonstrate modern data science skills.
(C) Implications of the change on the program, other programs and the Students:*	None

Current Course Information*	
Category A	
(D) Current Prefix*	MATH
Proposed Prefix	
(E) Current Number*	217
Proposed Number	
(F) Current Course Title*	Probability and Statistics
Proposed Course Title	
(G) Prerequisite(s)	For non-mathematics majors
Proposed Prerequisite(s)	
(H) Current Catalog Description	Frequency distributions, measures of central tendency and variation, elementary probability, sampling, estimation, testing hypotheses, correlation and regression. Emphasis will be on applications in the social sciences using appropriate technology, as opposed to theoretical development of topics.
Proposed Catalog Description	An applied statistics course that uses basic statistical methodologies to explore data and answer research questions. Summarization, analysis and interpretation of data from the social sciences and other related areas (but not including Natural Science or Business). Topics include frequency distributions, graphical summaries, elementary probability, estimation, testing hypotheses, and correlation and regression. Emphasis upon applications using appropriate technology, as opposed to theoretical development of topics.
If changing Category A, no further action required.	
Category B (if no change, leave blank)	
(I)Repeatable Course ***This is for a course that can be repeated*** ***Multiple times e.g. Internship***	If YES, please complete the following: Number of Credits that May be Repeated: Maximum Number of Credits Allowed to be Repeated:

<table>
<tr><td>Proposed Repeatable Course</td><td>If YES, please complete the following:
Number of Credits that May be Repeated:
Maximum Number of Credits Allowed to be Repeated:</td></tr>
<tr><td>(J) Number of Credits</td><td>Class Hours per week:
Lab Hours:
Credits:</td></tr>
<tr><td>Proposed Number of Credits</td><td>Class Hours:Lab Hours:Credits:</td></tr>
<tr><td>(K) Current Course Student Learning Outcomes (SLOs)</td><td>1. Create and interpret the basic graphical representations of data.
2. Calculate and interpret basic numerical descriptions of data.
3. Solve problems using the concepts and rules of probability.
4. Estimate population parameters using confidence intervals.
5. Evaluate statements about a population using tests of significance.
6. Examine social, political, and economic justice issues using statistics.</td></tr>
<tr><td>(L) Proposed Course Student Learning Outcomes (SLOs)
For each outcome, describe how the outcome will be achieved</td><td>Note that the text box in the table expands
<table>
<tr><th>SLO #</th><th>Outcome</th><th>How outcome is assessed</th></tr>
<tr><td>1</td><td>Create and interpret the basic numerical descriptions and graphical representations of data.</td><td>Quiz/Test questions, and/or homework questions, and/or application projects</td></tr>
<tr><td>2</td><td>Solve problems using the concepts and rules of probability.</td><td>Quiz/Test questions, and/or homework questions, and/or application projects</td></tr>
<tr><td>3</td><td>Estimate population parameters using confidence intervals.</td><td>Quiz/Test questions, and/or homework questions, and/or application projects</td></tr>
<tr><td>4</td><td>Evaluate statements about a population using tests of significance.</td><td>Quiz/Test questions, and/or homework questions, and/or application projects</td></tr>
</table>
</td></tr>
</table>

(M) Previous Brief Course Outline ***(It is acceptable to copy*** ***from old syllabus)***	***As outlined by the federal definition of a "credit hour", the following should be a consideration*** ***regarding student work - For every one hour of classroom or direct faculty instruction,*** ***there should be a minimum of two hours of out of class student work.*** 1. Basic Sampling Designs, Observational Studies and Experiments 2. Graphically Summarizing Qualitative and Quantitative Data 3. Numerically Summarizing Quantitative Data 4. Scatterplots, Correlation and Regression 5. Basic Probability 6. The Normal Probability Distribution 7. Sampling Distributions for the Mean and Proportions 8. Confidence Intervals for the Mean and Proportions 9. Hypothesis Testing for the Mean and Proportions 10. Inference on Two Samples 11. Contingency Tables and the Chi-Square Test for Independence (optional)

(N) Brief Course Outline

(Give sufficient detail to communicate the

content to faculty across campus.

It is not necessary to include specific

readings, calendar or assignments)

As outlined by the federal definition of a "credit hour", the following should be a consideration

regarding student work - For every one hour of classroom or direct faculty instruction,

there should be a minimum of two hours of out of class student work.

1. Graphical Summaries of Qualitative and Quantitative Data

- Bar graph for categorical data
- Histogram/boxplot for numerical data

2. Numerical Summaries of Quantitative and Qualitative Data

- Frequency table for one categorical variable
- Contingency table for two categorical variables
- Measure of center for numerical variables
- Measure of spread for numerical variables
- 5-number summary for numerical variables

3. Scatterplots, Correlation and Regression

- Scatter plot for visualizing two numerical variables
- Simple linear regression for modeling two numerical variables

4. Basic Probability

- Preliminary Concepts
- Set Operations on Events
- Probability in Practice
- Probability Rules
- Conditional Probability
- Bayes' Theorem

5. Distributions of Random Variables

- Random Variables
- Expectation and Variability
- Binomial Distribution
- Normal Distribution

6. Confidence Intervals for Means and Proportions

- Confidence interval for a single mean
- Confidence interval for a single proportion

7. Hypothesis Testing for Means and Proportions

- Hypothesis testing for a single mean
- Hypothesis testing for a single proportion

8. Inference on Two Samples

- Confidence interval for comparing two means
- Confidence interval for comparing two proportions
- Hypothesis testing for comparing two means
- Hypothesis testing for comparing two proportions

9. Contingency Tables and the Chi-Square Test for Independence (optional)

- Chi-square Test of Independence
- Chi-square test of GOF

Distance Education Section

- Complete this section only if adding Distance Education to a New or Existing Course

If Completing this Section, **Check the Box to the Right:**	***NOTE: you must check this box if the Course has previously been approved for Distance Education***
Course Prefix/Number	
Course Title	
Type of Proposal	***See CBA, Art. 42.D.1 for Definition***
Brief Course Outline	***Give an outline of sufficient detail to communicate the course content to faculty across campus. It is not necessary to include specific readings, calendar or assignments*** ***As outlined by the federal definition of a "credit hour", the following should be a consideration regarding student work - For every one hour of classroom or*** ***direct faculty instruction, there should be a minimum of two hours of out of class student work.***
Rationale for Proposal (Required Questions from CBA)	
How is/are the instructor(s) qualified **in the Distance Education delivery** **method as well as the discipline?**	
For each outcome in the course, describe **how the outcome will be achieved using** **Distance Education technologies.**	
How will the instructor-student and **student-student interaction take place?** **(if applicable)**	
How will student achievement be evaluated?	
How will academic honesty for tests **and assignments be addressed?**	

Liberal Studies Section

- Complete this section only for a new Liberal Studies course or Liberal Studies course revision

If Completing this Section, **Check the Box to the Right:**	***NOTE: you must check this box if the Course/Program has previously been approved for Liberal Studies*** liberal-studies

Liberal Studies Course Designations (Check all that apply)	
Learning Skills:	mathematics
Knowledge Area:	
Liberal Studies Elective	***Please mark the designation(s) that apply - must meet at least one*** quantitative_reasoning
Expected Undergraduate Student Learning Outcomes (EUSLOs) **Map the Course Outcome to the EUSLO's**	***Map each course outcome to the appropriate EUSLOs tha apply. Fill in the course outcome number*** ***See https://www.iup.edu/liberal/faculty-and-staff/euslos/ for additional information regarding mapping EUSLOs***

Informed Learners demonstrate:	**Course SLO #**
• the ways of modeling the natural, social and technical worlds	1,2,3,4
• The aesthetic facets of human experience	
• the past and present from historical, philosophical and social perspectives	
• the human imagination, expression and traditions of many cultures	
• the interrelationships within and across cultures & global communiites	

• the interrelationships within and across disciplines	
Empowered Learners demonstrate:	**Course SLO #**
• effective oral and written communication abilities	
• ease with textual, visual and electronically-mediated literacies	
• problem solving skills using a variety of methods and tools	1,2,3,4
• information literacy skills including the ablity to access, evaluate, interpret and use informatoin from a variety of sources	
• the ablity to transform information into knowledge and knowledge into judgement and action	
• the ability to work within complex systems and with diverse groups	
• critical thinking skills including analysis, application and evaluation	1,2,3,4
• reflective thinking and the ability to synthesize information and ideas	
Responsible Learners demonstrate:	**Course SLO #**

• intellectual honesty	
• concern for social justice	
• civic engagement	
• an understanding of the ethical and behavioral consequences of decisions and actions on themselves, on society, and on the physical world	
• an understanding of themselves and a respect for the identities, histories and cultures of others	

How will each outcome be measured (note should mirror (L) Student Learning Outcomes* (SLO) from the course proposal

Narrative on how the course will address the Selected Category Content

Course SLO #	Assessment Tool to be used to measure the outcome
1	Quiz/Test questions, and/or homework questions, and/or application projects
2	Quiz/Test questions, and/or homework questions, and/or application projects
3	Quiz/Test questions, and/or homework questions, and/or application projects
4	Quiz/Test questions, and/or homework questions, and/or application projects

All Liberal Studies courses are required to include perspectives on cultures and have a supplemental reading.

Please answer the following questions.

Liberal Studies courses must include the perspectives and contributions of ethnic and racial minorities and of women whenever appropriate to the subject matter. Please explain how this course will meet this criterion.

Whenever appropriate, information will be introduced into the classroom discussion which will reflect the contributions made to the development of the fields of probability and statistics by women and minorities. Examples include an article in the New York Times entitled “David Blackwell, Scholar of Probability, Dies at 91” which describes the contributions of David Blackwell an African American probabilist; and a bibliography of Gertrude Cox a female statistician who did pioneering work in several areas of statistics including experimental design.

Liberal Studies courses require the reading and use by students of at least one non-textbook work of fiction or non-fiction or a collection of related articles. Please describe how your course will meet this criterion.	This course is designed to develop higher level quantitative skills, and as such, the content does not include substantial literary works.

Teacher Education Section

- Complete this section only for a new Teacher Education course or Teacher Education course revision

If Completing this Section, Check the Box to the Right:	***NOTE: you must check this box if the Course/Program has previously been approved for Teacher Education related items***
Course Designations:	
Key Assessments	
	For both new and revised courses, please attach (see the program education coordinator): • The Overall Program Assessment Matrix • The Key Assessment Guidelines • The Key Assessment Rubric **File** **Modified** No files shared here yet. Drag and drop to upload or browse for files
Narrative Description of the Required Content	***How the proposal relates to the Education Major***