Curriculum Course Request Change Course IEE 2621 - A-2018-IEM-123; effective term: 202010

Steven E Butt

Mon 11/26/2018 12:04 PM

To: Raja G Aravamathan <raja.aravamathan@wmich.edu>; Said M Abubakr <said.abubakr@wmich.edu>
Cc: Holly Blanks <holly.blanks@wmich.edu>

0 1 attachments (374 KB)
Syllabus_IEE_2621_Generic_Proposed.pdf;

Please verify your data for New Curriculum Course Request for department: IEM; college: A.
Go to the following URL to complete your worklist items: https://bwfp1.cc.wmich.edu:7102/wfbprod

Date of request: 25-NOV-2018
Request ID: A-2018-IEM-123
College: A
Department: IEM
Initiator name: James Burns
Initiator email: j.burns@wmich.edu

Proposed effective term: 202010
Does course need General Education approval?: N
Will course be used in teacher education?: N
If 5000 level course, prerequisites apply to: U

Proposed course data:
Change Course IEE 2621
Specific Course Change type selected: Description
Specific Course Change type selected: Credit hours

1. Existing course prefix and number:
IEE 2621

2. Existing credit hours:
2.00

3. Proposed credit hours:

https://outlook.office.com/owa/?realm=WMICH.EDU&exsvurl=1&ll-cc=1033&modurl=0&path=/mail/inbox
A. Please choose Yes or No to indicate if this class is a Teacher Education class:
No

B. Please choose the applicable class level:
Undergraduate

C. Please respond Yes if this is a current general education course and/or a course being submitted for the new WMU Essential Studies program. Please respond No if it is neither. 
No

D. Explain briefly and clearly the proposed improvement.
Adding 1 credit hour to the course in order to teach additional topics related to probability and computers that are essential to thorough understanding of course material. Includes developing and using computer models to explore and verify probability theories learned in the course.

E. Rationale. Give your reason(s) for the proposed improvement. (If your proposal includes prerequisites, justify those, too.).
Another course (1 credit hour) in which students learning the basic elements of computer programming is being phased out by the host department. The additional credit hour added to IEE 2621 will allow students to learn and apply basic computer programming and modeling skills in a course that best utilizes those skills.

F. List the student learning outcomes for the proposed course or the revised or proposed major, minor, or concentration. These are the outcomes that the department will use for future assessments of the course or program.
1. Apply basic rules and theorems of probability theory to engineering problems.
2. Appropriately choose, define, and/or derive probability distributions for use in engineering problems and models.
3. Develop and implement computer models of probabilistic systems.
4. Develop functions of random variables that can be used in decision making.

G. Describe how this curriculum change is a response to student learning assessment outcomes that are part of a departmental or college assessment plan or informal assessment activities.
NA

H. Effect on other colleges, departments or programs. If consultation with others is required, attach evidence of consultation and support. If objections have been raised, document the resolution. Demonstrate that the program you propose is not a duplication of an existing one.
No consultation is needed for the change. No objections have been raised. No conflicts exist.

I. Effect on your department’s programs. Show how the proposed change fits with other departmental offerings.
No meaningful change to the department’s programs or offerings.

J. Effects on enrolled students: are program conflicts avoided? Will your proposal make it easier or harder for students to meet graduation requirements? Can students complete the program in a reasonable time? Show that you have considered scheduling needs and demands on students’ time. If a required course will be offered during summer only, provide a rationale. No significant student impacts are anticipated. Based on historical scheduling patterns, this change will not impact students or capacity.

K. Student or external market demand. What is your anticipated student audience? What evidence of student or market demand or need exists? What is the estimated enrollment? What other factors make your proposal beneficial to students?
No expected increases or decrease in enrollment are anticipated.

L. Effects on resources. Explain how your proposal would affect department and University resources, including faculty, equipment, space, technology, and library holdings. Tell how you will staff additions to the program. If more advising will be
needed, how will you provide for it? How often will course(s) be offered? What will be the initial one-time costs and the ongoing base-funding costs for the proposed program? (Attach additional pages, as necessary.)
No effect on resources is anticipated.

M. With the change from General Education to WMU Essential Studies, this question is no longer used.

For courses requesting approval as a WMU Essential Studies course, a syllabus identifying the student learning outcomes and an action plan for assessing the student learning outcomes must be attached in the Banner Workflow system.
Not Applicable

N. (Undergraduate proposals only) Describe, in detail, how this curriculum change affects transfer articulation for Michigan community colleges. For course changes, include detail on necessary changes to transfer articulation from Michigan community college courses. For new majors or minors, describe transfer guidelines to be developed with Michigan community colleges. For revisions to majors or minors, describe necessary revisions to Michigan community college guidelines. Department chairs should seek assistance from college advising directors or from the admissions office in completing this section.
No impacts are anticipated. No changes to prerequisites are being requested.

O. Current catalog copy:
IEE 2621 - Probability for Engineers

Introduction to probability emphasizing applications in engineering. Use of discrete and continuous random variables common to engineering problems in engineering models.

Prerequisites & Corequisites: Prerequisite: MATH 2720 (may be taken concurrently).

Credits: 2 hours
Lecture Hours - Laboratory Hours: (2 - 0)
When Offered: Spring

P. Proposed catalog copy:
IEE 2621 - Probability for Engineers

Introduction to probability emphasizing applications in engineering. Use of discrete and continuous random variables common to engineering problems and engineering models. Includes exploration of probability through theory and computer models.

Prerequisites & Corequisites: Prerequisite: MATH 2720 (may be taken concurrently).

Credits: 3 hours
Lecture Hours - Laboratory Hours: (3 - 0)
When Offered: Spring

Department Curriculum Chair approver: Larry Mallak

Department Curriculum Chair comment:

Date: 26-NOV-2018
Department approver: Steven Butt

Chair comment:

Date: 26-NOV-2018
IEE 2621 Probability for Engineers  Semester: Spring

Instructor
Dr. Lee Wells, lee.wells@wmich.edu, E-208 Parkview Campus
Office Hours:

Course Teaching Assistants
TA:
Office Hours:

Class Schedule
Day(s): Time: Location:

Prerequisite
MATH 2720 (May be taken concurrently)

Course Description
Introduction to probability emphasizing applications in engineering. Use of discrete and continuous random variables common to engineering problems and engineering models. Includes exploration of probability through theory and computer models.

Textbook

Software
MINITAB Statistical Software: Release 17, Minitab Inc.
Excel with Visual Basic for Applications, Microsoft Corp.

Course Grading
Project (20%): This course will include a project that will encompass a majority of the topics covered throughout this course.
Homeworks (30%): Each homework problem will be graded on a ten-point scale, where one point is reserved for neatness and professionalism. See Course Policies.
Exam (50%): Two in-class exams will be given during the semester. These exams will be worth 30% and 20% for each student's best and worst exam, respectively. Each exam will be graded on a 100 point scale.

Grading Scale

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90 - 100</td>
<td>C</td>
<td>70 - 74.9</td>
</tr>
<tr>
<td>BA</td>
<td>85 - 89.9</td>
<td>DC</td>
<td>65 - 69.9</td>
</tr>
<tr>
<td>B</td>
<td>80 - 84.9</td>
<td>D</td>
<td>60 - 64.9</td>
</tr>
<tr>
<td>CB</td>
<td>75 - 79.9</td>
<td>E</td>
<td>&lt; 60</td>
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</table>

The final grade for each student may be determined based upon both the student's score and its relationship to the class distribution.
Course Learning Objectives

1. Apply basic rules and theorems of probability theory to engineering problems.
2. Appropriately choose, define, and/or derive probability distributions for use in engineering problems and models.
3. Develop and implement computer models of probabilistic systems.
4. Develop functions of random variables that can be used in decision making.

Description of Objectives

Objective 1

- Understand and apply probability concepts, such as: the definitions of an element, set, sample space, event, probability, and conditional probability.
- Use counting rules and logic to assign probabilities to events.
- Apply probability axioms and theorems, such as Bayes' Theorem, to determine probabilities that help to solve engineering problems.
- Determine whether two or more events are mutually exclusive or statistically independent.

Objective 2

- Define a discrete random variable and its associated pmf and cdf.
- Define a continuous random variable and its associated pdf and cdf.
- Appropriate use probability distributions to model and solve engineering problems.
- Determine the expectations of a random variable.

Objective 3

- Develop algorithms to model and solve probability problems.
- Appropriately use programming languages to translate algorithms into workable computer models.
- Verify probability theory through the use of computer models.

Objective 4

- Derive a probability distribution for the function of a random variable, along with its associated expectations.
- Properly utilize joint distributions to solve engineering problems.
- Define and interpret the covariance and correlation coefficient associated with bivariate distributions.
- Employ conditional distributions and expectations of bivariate distributions to make engineering decisions.
Performance Criteria and Student Learning Outcomes

<table>
<thead>
<tr>
<th>Objective</th>
<th>Performance Criteria</th>
<th>ABET-EAC Outcomes</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>A1: Applies appropriate statistical techniques.</td>
<td>a, e, k</td>
</tr>
<tr>
<td>2</td>
<td>A1: Applies appropriate statistical techniques.</td>
<td>a, k</td>
</tr>
<tr>
<td>3</td>
<td>A1: Applies appropriate statistical techniques.</td>
<td>a, c, k</td>
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</tbody>
</table>

Course Policies

*Homeworks:* Homework assignments are individual work. Students are allowed to discuss homework with their classmates; however, each student must submit his/her own work. You can talk about the assignment but you cannot share the solution or results. Homework assignments will be posted on the course webpage and must be submitted in class (before the start of class), in hardcopy form, and stapled; unless prior arrangements have been made with course instructor. Late assignments will receive a one point reduction (from every problem) for each day late.

*Neatness, Legibility, and Professionalism of Submitted Work:* The ability to express ideas/results in a well-ordered, clear, & concise manner is of paramount importance in any profession. One point per question will be deducted if neatness, legibility, and professionalism are lacking.

*Exams:* Exams will occur on the day and time listed in the schedule. Students are allowed the use of a calculator and one 8" x 11" sheet of paper (front and back) for notes.

*Academic Honesty:* You are responsible for making yourself aware of and understanding the policies and procedures in the Undergraduate and Graduate Catalog that pertain to Academic Integrity or on the web at [http://www.wmich.edu/conduct/academicintegrity](http://www.wmich.edu/conduct/academicintegrity). These policies include cheating, fabrication, falsification and forgery, multiple submission, plagiarism, complicity and computer misuse. If there is reason to believe you have been involved in academic dishonesty, you will be referred to the Office of Student Conduct. If you believe you are not responsible, you will have the opportunity for a hearing. You should consult with me if you are uncertain about an issue of academic honesty prior to the submission of an assignment or test. Penalty for academic dishonesty will range from a reduction in grade up to failure in the course.

*Re-Grades:* Requests for re-grades of exams and homeworks must be submitted to the course instructor, in writing, within one week of the date the work was returned to the student. The instructor reserves the right to re-grade any section of the work as deemed appropriate. Adjusted scores following shall be considered final.

*Phones and Laptops:* Cell phones must not be used during the class; otherwise, you will be asked to leave the classroom. Laptops must be turned off unless used to take notes.
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Book Chapter</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction &amp; Combinatorics</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Sample Space and Events</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Conditional Probability &amp; Bayes' Theorem</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Discrete Random Variables</td>
<td>5</td>
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<tr>
<td>5</td>
<td>Discrete Distributions</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>Review &amp; Overflow</td>
<td></td>
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<tr>
<td>7</td>
<td>Midterm Exam, Continuous Random Variables</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>Continuous Random Variables</td>
<td>6</td>
</tr>
<tr>
<td>9</td>
<td>Continuous Distributions</td>
<td>6</td>
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<tr>
<td>10</td>
<td>Multivariate Distributions</td>
<td>7</td>
</tr>
<tr>
<td>11</td>
<td>Conditional Distributions</td>
<td>7</td>
</tr>
<tr>
<td>12</td>
<td>Simulation and Distribution Fitting</td>
<td>10</td>
</tr>
<tr>
<td>13</td>
<td>Markov Chains</td>
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<tr>
<td>14</td>
<td>Review &amp; Overflow</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Final Exam</td>
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