MATH-M463 Syllabus

Contents

1 Course Information ................................................. 2
  1.1 Course Materials ............................................. 2
  1.2 Instructor Information ....................................... 2

2 Learning Outcomes .................................................. 2

3 Policies .................................................................. 2
  3.1 IU Kokomo Student Policies ................................... 2
  3.2 Course-Related Policies ....................................... 3
    3.2.1 Test Make-Up Policy for Mathematics Courses .......... 3
    3.2.2 Late Work Policy ......................................... 3
    3.2.3 Low Scores Policy ........................................ 3
    3.2.4 Student Conduct ......................................... 3

4 Important Dates ....................................................... 3
  4.1 Tests and Final Exam ............................................ 3
  4.2 Holidays – No Class ............................................ 4
  4.3 Withdrawal Deadlines ......................................... 4

5 Grading and Grades ................................................... 4

6 Tentative Course Schedule ......................................... 5

7 Required Textbook Problems ....................................... 6
1 Course Information

Course Title: Intro. to Probability Theory 1  
Course Number: MATH-M463  
IUK Section Number: #34261  
Days and Time: MW 01:00PM – 02:15PM  
Room: KO 052  
Semester: Fall 2018  
Credit Hours: 3  
Prerequisites: A grade of C- or better in MATH-M311 OR equivalent.  
Course Description: Counting techniques, the meaning of probability. Random experiments, conditional probability, independence. Random variables, expected values and standard deviations, moment generating functions, important discrete and continuous distributions. Poisson processes. Multivariate distributions, basic limit laws such as the central limit theorem.

1.1 Course Materials

Textbook: John E. Freund’s Mathematical Statistics with Applications, 8th edition, Miller & Miller  
Calculator: You will need a TI-83 or TI-84 graphing calculator (any version). If you already own a different model of graphing calculator, talk to the instructor to confirm its suitability for this course.  
Canvas: All course materials, other than tests, will be posted on Canvas.

1.2 Instructor Information

Instructor: Dr. Chris Caruvana  
Office: KO 081D  
Email: chcaru@iu.edu  
Phone: 765-455-9338  
Office Hours: MW 02:30PM – 03:30PM, TR 04:00PM – 05:00PM  
Students unable to see me during these times may request an appointment.

2 Learning Outcomes

This course contributes to the fulfillment of the following goals for the degree in mathematics:

- Understand the nature of truth and the concept of proof in the discipline of mathematics.
- Understand the application of mathematical techniques to other fields.
- Formulate and solve problems mathematically.
- Communicate mathematical ideas clearly and effectively.
- Independently comprehend mathematical material appropriate for undergraduates.

3 Policies

3.1 IU Kokomo Student Policies

Accessibility: http://iuk.edu/academic-affairs/resources/Accessibility-Statement.php  
Civility: http://iuk.edu/academic-affairs/resources/civility%20statement.php  
Student Handbook: http://www.iuk.edu/advising/handbook/  
Code of Student Rights, Responsibilities, and Conduct: http://studentcode.iu.edu/  
Emergency Procedures: http://protect.iu.edu/emergency/procedures/
3.2 Course-Related Policies

3.2.1 Test Make-Up Policy for Mathematics Courses

- If you know that you cannot attend class when a test is scheduled, you should contact your instructor in writing (by email) at least two weeks in advance to make alternative arrangements for taking the test.

- If you miss a test with no advance notice for a valid reason (e.g. due to illness), you must contact your instructor within 24 hours of the test. At the instructor’s discretion, a make-up test may be offered. All make-up tests must be complete before the graded tests are returned to the rest of the class.

- If you miss a second test, you will be required to provide a documented reason for your absence in order to make-up the missed test. Without such documentation, your score for the missed test will be 0.

- If it is not possible to schedule a make-up test and you provide documentation, your grade for one missed test will be determined by your final exam grade.

3.2.2 Late Work Policy

- Late work is not accepted. See Low Scores Policy 3.2.3. If there is an extenuating circumstance with documentation (jury duty, surgery, hospitalization, etc.), that may be taken into consideration.

- If you know in advance that you will miss class due to a valid reason such as an IUK athletic event, KEY field trip, or religious observance, all makeup work should be completed prior to the missed class date. It is the student’s responsibility to make arrangements well in advance to complete the work early.

3.2.3 Low Scores Policy

- To accommodate for situations preventing attendance, the lowest two graded assignment scores will be dropped.

- Your final exam grade may replace one test grade. This replacement will only occur if your final exam score is higher than your lowest test score.

3.2.4 Student Conduct

Students are expected to adhere to the Code of Student Ethics regarding classroom conduct. Any inappropriate behavior, disorderly conduct, or non-compliance with faculty directions can result in a charge of Academic and/or Personal Misconduct, which may result in the lowering of a course grade, course failure, or requirement to withdraw.

4 Important Dates

4.1 Tests and Final Exam

- Test 1: Wednesday, 3 October 2018
- Test 2: Wednesday, 14 November 2018
- Final Exam: Monday, 10 December 2018, 01:00PM – 03:00PM
4.2 Holidays – No Class

- 3 Sept. 2018 (Labor Day)
- 21 Nov. 2018 – 25 Nov. 2018 (Thanksgiving)

4.3 Withdrawal Deadlines

- 23 Oct. 2018 for Purdue Technology students
- 25 Nov. 2018 for Indiana University students

Withdrawal forms will not be approved after the deadline above. It is the responsibility of the student to complete the withdrawal process by the deadline. Contact academic advising and financial aid for details.

5 Grading and Grades

Your course grade will be determined by your performance in regular graded assignments (posted to Canvas), two midterm tests, and a comprehensive final exam (which will cover the entire semester’s work). Students who fail and stopped attending class receive an FN grade which is reported to the Financial Aid office.

<table>
<thead>
<tr>
<th>Component</th>
<th>Percent of Course Grade</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test 1</td>
<td>24%</td>
<td>Wed., 3 Oct.</td>
</tr>
<tr>
<td>Test 2</td>
<td>24%</td>
<td>Wed., 14 Nov.</td>
</tr>
<tr>
<td>Graded Assignments</td>
<td>24%</td>
<td>—</td>
</tr>
<tr>
<td>Final Exam</td>
<td>28%</td>
<td>Mon., 10 Dec.</td>
</tr>
</tbody>
</table>

Your letter grade will be determined as follows:

<table>
<thead>
<tr>
<th>Weighted Average</th>
<th>Letter Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>⩾ 90%</td>
<td>A (A+ if ⩾ 98.4% ; A- if ⩽ 91.5%)</td>
</tr>
<tr>
<td>⩾ 80% and &lt; 90%</td>
<td>B (B+ if ⩾ 88.4% ; B- if ⩽ 81.5%)</td>
</tr>
<tr>
<td>⩾ 70% and &lt; 80%</td>
<td>C (C+ if ⩾ 78.4% ; C- if ⩽ 71.5%)</td>
</tr>
<tr>
<td>⩾ 60% and &lt; 70%</td>
<td>D (D+ if ⩾ 68.4% ; D- if ⩽ 61.5%)</td>
</tr>
<tr>
<td>&lt; 60%</td>
<td>F (Nonattendance indicators: FN/FNN)</td>
</tr>
</tbody>
</table>

Note: To be successful in this course it is very important to set aside enough time for private study (a minimum of five hours each week). A list of required ungraded homework from the text will be provided and it is strongly recommended that you keep up to date with these assignments and be ready to discuss them in class.
6 Tentative Course Schedule

This schedule is tentative and, hence, subject to change.

<table>
<thead>
<tr>
<th>Week</th>
<th>Monday</th>
<th>Wednesday</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction&lt;br&gt;Section 1.2&lt;br&gt;Combinatorial Methods</td>
<td>Section 1.3&lt;br&gt;Binomial Coefficients</td>
</tr>
<tr>
<td>2</td>
<td>Sections 2.2 and 2.3&lt;br&gt;Sample Spaces, Events</td>
<td>Sections 2.4 and 2.5&lt;br&gt;Prob. Postulates, Prob. Rules</td>
</tr>
<tr>
<td>3</td>
<td>No Class&lt;br&gt;Labor Day</td>
<td>Section 2.6&lt;br&gt;Conditional Prob.</td>
</tr>
<tr>
<td>4</td>
<td>Section 2.7&lt;br&gt;Independent Events</td>
<td>Section 2.8&lt;br&gt;Bayes’ Theorem</td>
</tr>
<tr>
<td>5</td>
<td>Sections 3.1 and 3.2&lt;br&gt;Random Variables, Prob. Distributions for discrete vars</td>
<td>Sections 3.3 and 3.4&lt;br&gt;Continuous r.v. and prob. densities</td>
</tr>
<tr>
<td>6</td>
<td>Section 3.5&lt;br&gt;Multivariate distributions</td>
<td>Section 3.6&lt;br&gt;Marginal distributions</td>
</tr>
<tr>
<td>7</td>
<td>Section 3.7&lt;br&gt;Conditional distributions</td>
<td>Test 1</td>
</tr>
<tr>
<td>8</td>
<td>Sections 4.1 and 4.2&lt;br&gt;Expected value of a r.v.</td>
<td>Section 4.3 and 4.4&lt;br&gt;Moments, Chebyshev’s Theorem</td>
</tr>
<tr>
<td>9</td>
<td>No Class&lt;br&gt;Fall Break</td>
<td>Section 4.5&lt;br&gt;Moment generating functions</td>
</tr>
<tr>
<td>10</td>
<td>Section 4.6&lt;br&gt;Product moments</td>
<td>Sections 4.7 and 4.8&lt;br&gt;Moments of linear combinations of r.v., Conditional expectation</td>
</tr>
<tr>
<td>11</td>
<td>Section 5.2&lt;br&gt;Discrete uniform distribution</td>
<td>Sections 5.3 and 5.4&lt;br&gt;Bernoulli distrib., Binomial distrib.</td>
</tr>
<tr>
<td>12</td>
<td>Sections 5.5 and 5.6&lt;br&gt;Negative binomial distrib., Geometric distrib., Hypergeometric distrib.</td>
<td>Section 5.7&lt;br&gt;Poisson distrib.</td>
</tr>
<tr>
<td>13</td>
<td>Sections 5.8 and 5.9&lt;br&gt;Multinomial distrib., Multivariate hypergeometric distrib.</td>
<td>Test 2</td>
</tr>
<tr>
<td>14</td>
<td>Sections 6.2 and 6.3&lt;br&gt;Uniform distrib., Gamma distrib., Exponential distrib., Chi-squared distrib., Beta distrib.</td>
<td>No Class&lt;br&gt;Thanksgiving</td>
</tr>
<tr>
<td>15</td>
<td>Sections 6.4 and 6.5&lt;br&gt;Beta distrib., Normal distrib.</td>
<td>Section 6.7&lt;br&gt;Bivariate normal distrib.</td>
</tr>
<tr>
<td>16</td>
<td>Section 6.6&lt;br&gt;Normal approx. to binomial distrib.</td>
<td>Section 6.8&lt;br&gt;Normal scores plots</td>
</tr>
</tbody>
</table>
Required Textbook Problems

These problems should be done as soon as the corresponding material has been covered in class. Any difficulties should be discussed in class. They should be written up neatly and form part of your notes. They will not be collected or graded.

Chapter 1

• Page 15: Exercises 1.1, 1.5, 1.9.
• Page 18: Exercises 1.25, 1.31, 1.41, 1.49, 1.51, 1.53.

Chapter 2

• Sections 2.1 to 2.3
  – Page 27: Exercises 2.1, 2.3.
  – Page 52: Exercises 2.39, 2.47, 2.51.
• Sections 2.4 to 2.5
  – Page 36: Exercises 2.5, 2.10.
  – Page 54: Exercises 2.53, 2.59, 2.65, 2.71.
• Sections 2.6 to 2.8
  – Page 48: Exercises 2.17, 2.25.
  – Page 56: Exercises 2.81, 2.89, 2.91, 2.95, 2.103, 2.105, 2.107.

Chapter 3

• Sections 3.1 to 3.2
• Sections 3.3 to 3.4
  – Page 107: Exercises 3.93, 3.95.
• Section 3.5
• Sections 3.6 to 3.7
  – Page 100: Exercises 3.69, 3.74, 3.75, 3.77.
• Section 3.8
  – Pages 101–106: Read this section.

Chapter 4

• Sections 4.1 to 4.2
  – Page 120: Exercises 4.1, 4.5, 4.7, 4.9, 4.11, 4.13.
• Sections 4.3 to 4.5
  – Page 142: Exercises 4.71, 4.73, 4.75, 4.77.

• Sections 4.6 to 4.8
  – Page 139: Exercises 4.43, 4.49, 4.51.
  – Page 143: Exercises 4.79.

Chapter 5
• Sections 5.1 to 5.4
  – Page 151: Exercises 5.1
  – Page 171: Exercises 5.41, 5.43

• Sections 5.5 to 5.7
  – Page 165: Exercises 5.28
  – Page 172: Exercises 5.57, 5.59, 5.63, 5.69, 5.75, 5.81.

• Sections 5.8 to 5.9

Chapter 6
• Sections 6.1 to 6.4

• Sections 6.5 to 6.7
  – Page 202: Exercises 6.63, 6.65, 6.67, 6.71, 6.73, 6.79.

• Section 6.8
  – Page 204: Exercises 6.81, 6.84.