**Northeastern University**

**Department of Civil and Environmental Engineering**

Instructor’s Assessment

CIVE 3464 Probability and Engineering Economy

**Semester / Year:** Spring / 2013 **Instructor: Auroop Ganguly Date:** 05/11/2013

Expectations regarding this course assessment:

1. Before the start of the course, review the most recent instructor assessment for recommendations on how to improve the course.
2. Grade summaries will be based on up to three exams.
3. *Questions to be asked on the in-class evaluation:*  Listed in item 3 below.
4. This assessment form is based on the set of topics and learning outcomes listed in the course syllabus. Do not change this part of the syllabus without action from the discipline group. If there is a change, notify the Undergraduate Studies Committee so that this form can be modified.
5. Complete the form and save it as a Word document with filename like this: IAssess\_3464 \_2013\_Fall

**1. What course improvements did you make? How successful were they? Relate them to recommendations made in previous course assessments.** *Expand the table as necessary.*

|  |  |
| --- | --- |
| 1. | Unlike last year, this year we did not have any MATLAB / R type programming |
| 2. | We had many more homework assignments (total: 10) |
| 3. | We had in-class quizzes, two in-class tests, and one Final Exam |

**2. Your response to student comments and/or TRACE evaluation:** *Respond to serious criticisms and suggestions. Expand table as necessary.*

|  |  |  |
| --- | --- | --- |
|  | **Student Comment** | **Your Comment(s)** |
| 1. | “More focus on worked out examples in-class, and less focus on the theory behind them.”  “Focus more on example problems rather than theory.” | The “theory” was just basic concepts, but this is a generic concern. Will address next time. |
| 2. | “Probability is a very challenging course to teach. I did not dislike the course because of the professor but rather because I do and always will find this material dry.” | Will try harder next time: More focus on engineering economy and less on probability, perhaps? |
| 3. | “The only issue with the professor is that is way too lenient with the students and lets the students run the class.” | Interesting point: Never thought of it this way. Will try and address next time. |
| 4. | Two differing (sample) opinions:  Opinion Type 1: “Professor is very good at explaining concepts, but perhaps too good! The class participation level was too low so concepts and course objectives got repeated too often. In-class problems could have been presented more frequently. Also, too much power was given to the students, in my opinion. Overall a very good teacher!”  Opinion Type 2: “He means well but is truly a VERY poor teacher. I believe that entire class would agree. His teaching effectiveness is rarely effective. I would have preferred a different professor.” | As the two opinions suggest, there were two nearly distinct groups of students. One group really liked the course and the teaching and the other group, not so much. The first group rarely missed a class and even if they had to miss one, they would notify by email beforehand, but the other group missed many classes.  Interestingly enough, in many of the quizzes and exams which required a bit more thought rather than memory, the grade curve tended to show a bimodal distribution as well. Not sure if there was a direct correlation.  I would probably do disservice to the serious set of students if I tried to overly cater to the less serious ones.  Will think deeply about this for next time and try to think of a way out of the situation. |

**3. Student questionnaire summary**

**4. Grade Summary**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Exam 1 question #** | **Topic** | **Average score** (0 to 100) | **% students with adequate achievement** | **Comment on any item with poor achievement** |
| 1.1 | Set theory; conditional probability | 23 / 30 | 90 |  |
| 1.2 | Counting: Permutation; Combination | 26 / 35 | 80 |  |
| 1.3 | Total Probability and Bayes Theorem | 29 / 35 | 90 |  |
| 1.4 (Extra Credit) | Harder problems on conditional probability and Bayes concepts with realistic CE applications | 14 / 25 | 65 |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Exam 2 question #** | **Topic** | **Average score** (0 to 100) | **% students with adequate achievement** | **Comment on any item with poor achievement** |
| 2.1 | Present & Annual Worth | 19 / 20 | 90 |  |
| 2.2 | Comparing Alternatives | 27 / 30 | 90 |  |
| 2.3 | MARR & IRR | 10 / 20 | 60 | A few students got confused with the wording of the question. While the question was from a book, the confusion was genuine. A take home extra credit was allowed later to make up for lost grades on this one problem. |
| 2.4 | IRR | 17 / 20 | 90 |  |
| 2.5 | Understanding Conversion Table | 17 / 20 | 90 |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Final Exam question #** | **Topic** | **Average score** (0 to 100) | **% students with adequate achievement** | **Comment on any item with poor achievement** |
| 3.1 | CE application of the Normal distribution | 13 / 20 | 75 |  |
| 3.2 | CE application of nonstandard continuous probability distributions | 11 / 20 | 60 | Even with many, many, practice problems solved in class and in handouts, calculus (even simple integrations) cause problems. |
| 3.3 | CE application of Binomial and Poisson distributions | 14 / 20 | 80 |  |
| 3.4 | Conditional probability and total probability | 17 / 20 | 85 |  |
| 3.5 | Engineering Economy with Uncertainty | 19 / 20 | 95 |  |

**5. Here are the topics listed on your syllabus.** Based on your grade summaries, report the fraction of students that showed ability to apply knowledge and to identify, formulate, and solve problems. In the column “Basis for assessment” report the particular item(s) in the grade summary that support this assessment; or if the topic is not covered in the grade summary, state the basis of your assessment.

|  |  |  |  |
| --- | --- | --- | --- |
| **Topic** | **Percentage of students showing ability to apply knowledge and solve problems** | **Basis for assessment** | **Comments** |
| 1. *Descriptive statistics* | 95 | Homework assignments, quizzes, exams |  |
| 1. *Probability: set theory, conditional probability, independence, total probability* | 85 | Ditto |  |
| 1. *Decision Analysis* | 85 | Ditto |  |
| 1. *Discrete random variables with applications in civil engineering* | 75 | Ditto |  |
| 1. *Continuous random variables with applications in civil engineering* | 65 | Ditto |  |
| 1. *Random sampling, estimation, and confidence intervals* | 80 | Ditto |  |
| 1. *Cash flow, time value of money, and economic equivalence* | 95 | Ditto |  |
| 1. *Rates of return* | 90 | Ditto |  |
| 1. *Methods for evaluating alternatives* | 90 | Ditto |  |

**6. Assessment of Program-Level Outcomes not Covered in Topic Assessment**

What percentage of students achieved the following learning outcomes?

|  |  |  |  |
| --- | --- | --- | --- |
| **Learning Outcome** | **Percentage achieving** | **Basis for this rating** | **Comments?** |
| an ability to analyze and interpret data | 70 | Syllabus and performance | The course is simple and does not even begin to offer the background in probability and statistics that an engineer in this day and age would require. Previous attempts at introducing simple programming (e.g., MATLAB, R, etc.) were not successful. Basic calculus remains scary to many. Exams that are even a bit conceptual can be problematic. The problem is that this is the only such required course. |
| an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice | 60 | Ditto |
| an ability to formulate and compare alternatives using appropriate methodologies | 65 | Ditto |

**7. Recommendations for improving this course.** Expand the table as needed.

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| --- | --- |
| 1. | Set prerequisite and require the understanding and application of calculus and programming |
| 2. | Explain the significance of probability and statistics to modern civil engineering practice |
| 3. | Re-introduce programming and focus on conceptual understanding even if not fully popular |