IE 322: Analytics and Computing for Industrial Engineers
Fall 2015

Time: 3:00-4:20 PM Monday and Wednesday
Place: Norton 214
Website: Please use UBlearns to access all course materials

Instructor: Dr. Qing He, 313 Bell Hall, or 225 Ketter Hall
Office Hours: M/W 4:30-5:30 PM, 313 Bell Hall
Email: qinghe@buffalo.edu
Best way to contact: email with “IE 322” as the subject

TA: TBA

Course Description:

The “big data revolution” has placed emphasis on computational techniques in Industrial Engineering. Large-scale data collection, processing, visualization and analysis are now commonplace among researchers and practitioners. Now more than ever, there is a need not only to develop new techniques, but also to implement and use them.

The purpose of this course is to provide students with the knowledge and skills necessary to manage, manipulate, analyze, and derive insights from large data sets using IE related computational tools, such as IBM SPSS Modeler. Data and problems will be representative of typical problems faced by Industrial Engineers across a wide variety of industries including manufacturing, service, healthcare, and transportation industries.

Student Learning Outcomes:

This course has the following learning outcomes, which are mapped to BSIE Student Outcomes (http://ise.buffalo.edu/undergraduate/bsie_objectives) as follows:

<table>
<thead>
<tr>
<th>Course Student Learning Outcome</th>
<th>BSIE Student Outcomes</th>
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<tbody>
<tr>
<td>1. Students will be able to explore, model, and pose appropriate questions of data representative of typical IE problem domains such as manufacturing, service systems, healthcare, and transportation</td>
<td>An ability to design and conduct experiments involving people or processes, as well as to analyze and interpret data</td>
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<tr>
<td>2. Students will be able to apply common, modern data analytic tools such as Excel,</td>
<td>An ability to identify, formulate, and solve Industrial Engineering problems involving systems of people, materials, information, equipment, and/or energy</td>
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<td>An ability to use the techniques, skills, and modern engineering tools necessary for</td>
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VBA, and SPSS to manipulate, query, and model data

Industrial Engineering practice

3. Students will be able to apply appropriate methods to visualize data and communicate results

An ability to communicate effectively to academic and industrial audiences using different methods

4. Students will be able to identify and describe assumptions and limitations in their data analysis and interpretation

An understanding of professional and ethical responsibility

Course Requirements:

<table>
<thead>
<tr>
<th>Course Requirement</th>
<th>Due Date</th>
<th>Course Learning Outcome</th>
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<tbody>
<tr>
<td>Homework 1: Identifying appropriate questions, data sampling</td>
<td>Week 3</td>
<td>1, 2</td>
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<tr>
<td>Homework 2: Data Management</td>
<td>Week 5</td>
<td>1, 2</td>
</tr>
<tr>
<td>Homework 3: Characterization and Outliers</td>
<td>Week 9</td>
<td>4</td>
</tr>
<tr>
<td>Homework 4: Querying and Modeling</td>
<td>Week 12</td>
<td>1, 2</td>
</tr>
<tr>
<td>Homework 5: Visualization and Communication</td>
<td>Week 14</td>
<td>3</td>
</tr>
<tr>
<td>Group Project: Based on IE Case Example and Data Set (e.g., patient hospital utilization; inventory/supply chain; transportation demands)</td>
<td>Milestones due Week 4, 6, 11, 13, Final Project Due last day of class</td>
<td>All</td>
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<tr>
<td>Midterm Exam</td>
<td>Week 7</td>
<td>1, 2, 4</td>
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<tr>
<td>Final Exam</td>
<td>Final Exam Week</td>
<td>All</td>
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Academic Content:

Students are responsible for attending lectures, assigned reading (from the text), completing homework, exams, and participating fully in the group project.

Grading Policy

- Homework assignments (5-6 assignments, due approximately every other week) – 20%
• Midterm Exam – 20% (given in week 6 or 7)
• Final Exam – 20% (given during final exam week)
• Group Project – 40% (due last day of class with intermediate milestones)

Tests will only be made up due to emergencies/sickness. Please let the instructor know ahead of time/or as soon as possible. No late homework/projects will be accepted except in case of documented illness.

Letter Grades will be assigned as follows –
90-100 – A
86-89 – A-
82-85 – B+
78-81 – B
74-77 – B-
70-73 – C+
66-69 – C
62-65 – C-
58-61 – D+
54-57 – D
<54 – F

Please see the UB Incomplete Policy for information on undergraduate incomplete grades:
http://undergradcatalog.buffalo.edu/policies/grading/explanation.shtml#incomplete

Academic Integrity

Academic Integrity is both a critical part of the education process and the engineering profession itself. We expect all IE students to abide by the university policy on academic integrity as well as that espoused by the engineering profession, as described in the following:

http://undergrad-catalog.buffalo.edu/policies/course/integrity.shtml
http://www.nspe.org/resources/ethics/code-ethics

Accessibility Resources

Please visit http://www.student-affairs.buffalo.edu/ods/ to learn about and obtain accommodations regarding physical or learning accessibility.