# IE 7445: Manufacturing Analytics – 3 Credits
## Course Syllabus - Fall 2018

**Instructor:** Kyoung-yun Kim & Jeremy L. Rickli  
**Email & Phone:** kykim@eng.wayne.edu (313-577-4396), jlrickli@wayne.edu (313-577-1752)  
**Time & Location:** Tuesday 1:30 to 4:20 PM  
**Office Location:** MEB #2067 & MEB #2173  
**Office Hours:** TBD  
**Teaching Assistant:** NA  
**Prerequisites:** IE6210 Applied Engineering Statistics  

**Course Description:** The goal of Manufacturing Analytics is to provide Ph.D. students with a deep understanding of the intersection of manufacturing and analytics and its application in current manufacturing industries to improve operations and gain competitive advantages. The course will cover fundamental concepts from data acquisition to analysis to decision making in manufacturing. Specifically, the course will focus on:

1. Manufacturing process and systems data acquisition  
2. Manufacturing data and information systems hierarchies and flows (IT/OT layers)  
3. Manufacturing analytics, both real-time and historical  
4. Data driven manufacturing decision making  

These topics will be investigated through lectures, projects, presentations, and student led discussions of current and relevant journal articles from leading researchers in manufacturing analytics. Ph.D. students will be required to formulate and execute a term project utilizing a real manufacturing dataset, and will be required to lead group discussions of journal articles.

**Course Learning Outcomes:** At the completion of this course, students should be able to:

1. List different manufacturing data analytics areas in current manufacturing industries  
2. Recognize the requirements and methods of manufacturing data acquisition  
3. Identify the manufacturing data/information system layers with other service domains  
4. Distinguish appropriate data analytics methods for manufacturing objectives and decision making  
5. Construct manufacturing data analytics framework and execute the framework  
6. Formulate manufacturing relevant decisions based on manufacturing data analytics results.

**Textbooks:** Lecture notes and selected journal publications will be provided during the course.


**Grading:**  
- Presentations & discussion leads (2) 30  
- Term project (proposal, progress, and report) 50  
- Final Exam 20  

Guidelines for assigning grades: A = 95%+, A− = 90%+, B+ = 87%+, B = 83%+, B− = 80%+, C+ = 77%+, C = 73%+, C− = 70%+, D+ = 65%+, D = 60%+, D− = 55%+, E = less than 55%

**Homework Policy:** Late assignments will be deducted 10% per day for three days. After three days, assignments will not be accepted unless extension is granted by the instructor(s).

**Exams:** The final exam is a take home exam that must be done independently and without collaboration/discussion with other students in the course.
Cheating: Plagiarism and Dishonesty

Academic Recordings:

Class Recordings:

Projects:

Attendance Policy:

Wayne State University Policies and Procedures

Religious Holidays:

Student Services:

Academic Dishonesty – Plagiarism and Cheating:

Attendance and participation are important predictors of positive learning outcomes and course performance. All students are expected to attend all lectures and examinations. Unless stated elsewhere in a supplemental attendance policy specific to this course, attendance will not be regularly taken nor will it count towards a portion of your course grade.

Manufacturing analytics is focused heavily on the term project. Based on the framework and topic areas of the course, students will identify and propose a term project. The project must address each of the manufacturing analytics topics areas or focus on a deeper understanding of one specific course topic. All projects must utilize an existing manufacturing dataset or generate a manufacturing dataset during the course. Students must propose their project topic, present and demonstrate progress on the project during the course, and present results and conclusions at the end of the course. A term report must also be submitted in the format provided by the instructors.

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all or part of an un-administered test or answers to the test; (e) changing or altering a grade on a test or other academic grade records.

**Student Disability Services:**
If you have a documented disability that requires accommodations, you will need to register with Student Disability Services for coordination of your academic accommodations. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library in the Student Academic Success Services department. SDS telephone number is 313-577-1851 or 313-577-3365 (TTD only).

Once you have your accommodations in place, I will be glad to meet with you privately during my office hours or at another agreed upon time to discuss your needs. Student Disability Services' mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at Wayne State University. Please refer to the SDS website for further information about students with disabilities and the services we provide for faculty and students: [http://studentdisability.wayne.edu/](http://studentdisability.wayne.edu/)

Students who are registered with Student Disability Services and who are eligible for alternate testing accommodations such as extended test time and/or a distraction-reduced environment should present the required test permit to the professor at least one week in advance of the exam. Federal law requires that a student registered with SDS is entitled to the reasonable accommodations specified in the student’s accommodation letter, which might include allowing the student to take the final exam on a day different than the rest of the class.

**Course Drops and Withdrawals:**
In the first two weeks of the (full) term, students can drop this class and receive 100% tuition and course fee cancellation. After the end of the second week there is no tuition or fee cancellation. Students who wish to withdraw from the class can initiate a withdrawal request on Pipeline. You will receive a transcript notation of WP (passing), WF (failing), or WN (no graded work) at the time of withdrawal. No withdrawals can be initiated after the end of the tenth week. Students enrolled in the 10th week and beyond will receive a grade. Because withdrawing from courses may have negative academic and financial consequences, students considering course withdrawal should make sure they fully understand all the consequences before taking this step. More information on this can be found at: [http://reg.wayne.edu/pdf-policies/students.pdf](http://reg.wayne.edu/pdf-policies/students.pdf)

**Deferred Grade:**
A grade of 'I' can only be assigned if all of the following criteria are met:
1. the student IS NOT currently failing the class and,
2. there is NOT a substantial quantity of work yet to be completed,
3. there is no extra work required of the instructor beyond the normal duties of grading the paper/exam,
4. there is no need for the student to attend the class in subsequent terms.

The final decision to assign an incomplete grade rests with the instructor. An 'I' grade MUST be made up within one year of assignment of the grade.

**Course Schedule:**

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<th>Week</th>
<th>Topic</th>
<th>Assignments</th>
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<td>1</td>
<td>Overview</td>
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<td>Manufacturing data acquisition: lecture overview</td>
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<td>3</td>
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<td>Manufacturing data acquisition: student led discussion 2</td>
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<td>Term project proposal presentations and discussions</td>
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<td>Manufacturing data and information systems (IT/OT in manufacturing): lecture overview</td>
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<td>7</td>
<td>Manufacturing data and information systems (IT/OT in manufacturing): student led discussion 1</td>
<td>Project progress discussion</td>
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<td>8</td>
<td>Manufacturing data and information systems (IT/OT in manufacturing): student led discussion 2</td>
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<tr>
<td>Week</td>
<td>Topic</td>
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<td>Week 9</td>
<td>Manufacturing analytics: lecture overview</td>
<td>Project progress discussion</td>
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<td>Week 10</td>
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<td>Manufacturing analytics: student led discussion 2</td>
<td>Project progress discussion</td>
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<td>Week 12</td>
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<td>Week 13</td>
<td>Manufacturing decision making based on analytics: student led discussion 1</td>
<td>Project progress discussion</td>
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<td>Week 14</td>
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<tr>
<td>Week 15</td>
<td>Final project presentation and final exam</td>
<td>Project report</td>
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