Department Contact Information:
- Start Date: 01-MAR-2018
- College: A
- Department: IEE
- Initiator name: Lee Wells
- Department email: lee.wells@wmich.edu
- Proposed effective term: 2018-40
- Does course need General Education approval?: N
- Will course be used in teacher education?: N
- If 5000 level course, prerequisites apply to:

   B
   New Course IEE S170
   New course selected: This new course is not seeking approval as a general education course.

1. Proposed course prefix and number:
   IEE S170

2. Proposed credit hours:
   3

3. Proposed course title:
   Applied Data Mining for Engineers

4. Proposed course prerequisites:
   IEE 2610 or Equivalent

5. Proposed course corequisites:
   none

6. Proposed course prerequisites that may be taken concurrently (before or at the same time):
   none

7. Minimum grade for prerequisites (default grades are D for Undergrad and C for Grad):
   C

8. Major and/or minor restrictions:
   Not Applicable

9. List all the four-digit major and/or minor codes (from Banner) that are to be included or excluded:
   none

10. Classification restrictions:
    Exclude

11. List all the classifications (freshman, sophomore, junior, senior) that are to be included or excluded:
    FR, SO

12. Level restriction:
    Not Applicable

13. List the level (undergraduate, graduate) that is to be included or excluded:
    Not Applicable

14. Do prerequisites and corequisites for 5000-level courses apply to undergraduates, graduates, or both?
    UG

15. Is this a multi-topic course?
    No

16. Proposed course title to be entered in Banner:
    Applied Data Mining for Engrs

17. Is this course repeatable for credit?
18. Is this course mandatory credit/no credit?
No

19. Select class type:
Lecture

20. How many contact hours per week for this course?
3

A. Please choose Yes or No to indicate if this class is a Teacher Education class:
No

B. Please choose the applicable class level:
Both

C. Please choose Yes or No to indicate if this class is a General Education class:
No

D. Explain briefly and clearly the proposed improvement.
The proposed course aims to introduce data analysis methods, data warehousing, and data mining tools from an engineering perspective. Emphasis will be placed on the use of commercial data mining software to gain knowledge in data-rich engineering environments. Topics to be covered include data storage, preprocessing, clustering, classification, and prediction.

E. Rationale. Give your reason(s) for the proposed improvement. (If your proposal includes prerequisites, justify those, too.).
The majority of engineering students are generally unaware of the existence of advanced modeling techniques that can be used for complex data-sets. This course will expose these students to a world of data-driven models beyond simple linear regression.
Some of the models that will be covered in this course will rely on the students having a fundamental understanding of statistics, which is the reasoning behind the prerequisite.

Department Curriculum Chair approver: Azim Houshyar
Date: 12-MAR-2019
Comment:

Chair approver: Steven Butt
Date: 12-MAR-2018
Comment:

Curriculum Committee Approval

 Approve

Deny

Reason for denial:

Comment:

Enter Proposal number only if approved:
Proposal Number:

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

Course Teaching Assistant
TBD
Office Hours: TBD

Class Schedule
TBD

Course Description
The objective of this course is to introduce data analysis methods, data warehousing, and data mining tools from an engineering perspective. Emphasis will be placed on the use of commercial data mining software to gain knowledge in data-rich engineering environments. Topics to be covered include data storage, preprocessing, clustering, classification, and prediction.

Textbook

Course Learning Objectives
- Describe key concepts of data mining
- Apply critical thinking to analyze/interpret data for strategic use in decision making
- Implement computer applications related to data mining
- Evaluate and select appropriate data mining tools to analyze different scenarios

Course Grading
Homeworks (25%): Each homework problem will be graded on a ten point scale, where one point is reserved for neatness and professionalism. See Course Policies.

Project (50%): A significant portion of this course will consist of a project aimed at applying data mining tools to real-world data sets. This project will be graded on successful implementation of appropriate data mining tools, final project report, and presentation.

Exam (25%): One final take home exam will be given during the semester. The exam will be graded on a 100 point scale, where 10 points are reserved for neatness and professionalism. Please see Course Policies for additional information.

Grading Scale

<table>
<thead>
<tr>
<th></th>
<th>90 - 100</th>
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<th>70 - 74.9</th>
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<th>65 - 69.9</th>
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<th>60 - 64.9</th>
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<th>&lt; 60</th>
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</thead>
<tbody>
<tr>
<td>A</td>
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<td>C</td>
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<tr>
<td>BA</td>
<td>85 - 89.9</td>
<td>DC</td>
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<tr>
<td>B</td>
<td>80 - 84.9</td>
<td>D</td>
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<td>CB</td>
<td>75 - 79.9</td>
<td>E</td>
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The final grade for each student may be determined based upon both the student's score and its relationship to the class distribution.
Course Policies

Homeworks are assigned as 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 must be submitted on-line through eLearning as ONE PDF FILE. Late homeworks will only be accepted with prior written approval from instructor.

Exams are assigned as individual work. Students should ONLY discuss exams with the course instructor. Exams must be submitted on-line through eLearning as ONE PDF FILE.

Neatness, Legibility, and Professionalism of Submitted Work: The ability to express ideas in a well-ordered, clear, & concise manner is of paramount importance in any profession. Marks will be deducted if neatness and professionalism is lacking.

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. 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.

Tentative Course Schedule

<table>
<thead>
<tr>
<th>Week (Date)</th>
<th>Topic</th>
<th>Book Chapter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (9/8)</td>
<td>Introduction and Overview of Data Mining</td>
<td>1 &amp; 2</td>
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<tr>
<td>2 (9/15)</td>
<td>Data Preprocessing and Storage</td>
<td>3, 4, &amp; 5</td>
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<tr>
<td>3 (9/22)</td>
<td>Association Rules and Correlation Analysis</td>
<td>6</td>
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<tr>
<td>4 (9/29)</td>
<td>Classification: Decision Trees</td>
<td>8</td>
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<tr>
<td>5 (10/6)</td>
<td>Classification: Bayesian</td>
<td>8</td>
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<tr>
<td>6 (10/13)</td>
<td>Classification: Bayesian Belief Networks</td>
<td>9</td>
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<tr>
<td>7 (10/20)</td>
<td>Classification: Neural Networks</td>
<td>9</td>
</tr>
<tr>
<td>8 (10/27)</td>
<td>Classification: Support Vector Machines</td>
<td>9</td>
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<tr>
<td>9 (11/3)</td>
<td>Cluster Analysis: Partitioning</td>
<td>10</td>
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<tr>
<td>10 (11/10)</td>
<td>Cluster Analysis: Hierarchical</td>
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<tr>
<td>11 (11/17)</td>
<td>Cluster Analysis: Model Based</td>
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<tr>
<td>12 (12/1)</td>
<td>Outlier Detection</td>
<td>11</td>
</tr>
<tr>
<td>13 (12/8)</td>
<td>Final Project Presentations</td>
<td></td>
</tr>
</tbody>
</table>

Take Home Exam