IE 7880: Computer Collaborative Engineering (2 Credits)

Description: In order to compete in an unpredictable marketplace, increasingly US manufacturing companies are re-engineering their operations to meet the goals of agility and flexibility. The virtual enterprise requires all planning, design and production activities to be carried out in a collaborative environment where teams are distributed in both time and space. Collaborative Manufacturing (CM) is becoming a necessity in tomorrow's enterprise. It consists of team design, computer supported collaborative work, agile manufacturing, enterprise integration, virtual enterprises, concurrent engineering, distributed computing, computer integrated manufacturing, and business process reengineering. This course will focus on a collection of methods, tools and techniques that are used by product design and development teams in a distributed and non-distributed environment.

Course Objectives:
1. To bring together new ideas in collaborative manufacturing including Collaborative Product Design and development, Team Design, Virtual Enterprise Integration, and Computer Supported Collaborative Work.
2. To introduce multi-media software based engineering tools and technologies for distributed procedures such as product design and operation of distributed production systems.
3. To understand how enterprise information system are used by industries to support the product development process.

Instructor: Dr. Leslie Monplaisir
Classroom: Old main
Class Hours: MW 5:30 – 7:20
Office Hours: MW 2:00 – 5:00 pm
Contact Info: e-mail: ad5365@wayne.edu; Tel: 313-577-1645; Fax: 313-577-8833
Office Location: Room 2163, 4815 Fourth Street, MEB, Detroit, MI 48202
Course Website: http://blackboard.wayne.edu

Prerequisites: Graduate Standing

Textbooks:

Required Readings

Grading:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
<th>Points</th>
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<tbody>
<tr>
<td>Homework Assignments</td>
<td>@ 10 x 5</td>
<td>50 pts</td>
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<tr>
<td>Quiz</td>
<td>@ 5 x 20</td>
<td>100 pts</td>
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<tr>
<td>Case Studies</td>
<td>@ 3 x 50</td>
<td>150 pts</td>
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<tr>
<td>Exams</td>
<td>@ 2 x 100</td>
<td>200 pts</td>
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<tr>
<td>Term Paper</td>
<td>@ 1 x 100</td>
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<td>Total</td>
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<td>500 pts</td>
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Individual projects, exams, and special assignments might be curved
All exams will be open book and open notes exams
Project reports and special assignment reports have to be typed
Homework late by one class will be evaluated at 90% and more than one class at 70%

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%
General Policy: Student Conduct: It is the responsibility of each student to adhere to the principles of academic integrity. Academic integrity means that a student is honest with him/herself, fellow students, instructors, and the University in matters concerning his or her educational endeavors. Thus, a student should not falsely claim the work of another as his/her own, or misrepresent him/herself so that the measures of his/her academic performance do not reflect his/her own work or personal knowledge. In this regard, cheating will not be tolerated. Cheating includes (but is not limited to) any communication (written or oral) during examinations and sharing of work, such as using the same models or computer programs or copying work. All homework and projects must be an individual effort unless specifically noted. STUDENTS WHO CHEAT ON ANY ASSIGNMENT OR DURING ANY EXAMINATION WILL BE ASSIGNED A FAILING GRADE FOR THE COURSE. Therefore, avoid all appearance of improper behavior! Students who witness cheating should report the incident to the instructor as soon as possible. Students are also welcome to discuss any concerns related to cheating with the Chair of Industrial & Manufacturing Engineering.

Educational Accessibility Services: If you feel that you may need an accommodation based on the impact of a disability, please feel free to contact me privately to discuss your specific needs. Additionally, the Office of Educational Accessibility Services (EAS) coordinates reasonable accommodations for students with documented disabilities. The office is located in the Student Center Building, Room 583, Phone: 313-577-1851 (Voice)/577-3365(TTY).

Policy on Classroom Attendance: All students are expected to attend all lectures, quizzes, and examinations with enthusiasm. Although classroom attendance does not mathematically contribute to the final course grade, active class participation is expected of all students and may help to boost up the course grade in those “borderline” cases between failing and passing.

Course Outline/Schedule:

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<th>Week</th>
<th>Topic</th>
<th>Assignment</th>
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<tr>
<td>4</td>
<td>Fundamental Concepts in Collaborative Product Design and Development</td>
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<td>5</td>
<td>Groupware and Decision Making</td>
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<td>6</td>
<td>Collaborative Software Demonstration</td>
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<td>7</td>
<td>Collaborative Software Laboratory Exercise</td>
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<td>8</td>
<td>Mid Semester Examination</td>
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<td>9</td>
<td>Collaborative Product Development over the Web</td>
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<td>10</td>
<td>Life Cycle Focus for Collaborative Product Development</td>
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<td>11</td>
<td>Distributed Concurrent Engineering</td>
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<td>12 and 13</td>
<td>Collaborative Engineering Software Exercises, CAD and Visualization of the WWW</td>
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<td>14</td>
<td>Global Strategies to Support Collaborative Design and Manufacture</td>
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<td>15</td>
<td>Culture Factors affecting Collaborative Product Development</td>
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<tr>
<td>16</td>
<td>Final Project Presentations and Final Exam</td>
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Research Presentation

For this assignment you are required to work in teams of two or three. Each team is required to select a topic from the from topics provided for weeks 9 to 15. using the text as the main reference and research material from other sources, prepare a one hour presentation that outline ALL the main research issues. Your presentation must also focus on future research and practical applications of collaborative engineering. Teams will be scheduled to make presentations at the beginning of class. Each team will Submit Overheads of Presentation & names of team members. Every team member is required to have a one-page outline of comments, observations and lessons learned that are to be appended to the presentation material to be turned in.

Final Project

The final project will be a team effort. It should be based on outlining a Collaborative Engineering Strategy for an enterprise, business or company for which you are familiar. Such a strategy must be based on a thorough analysis of the potential user requirements.

Purpose

The purpose of the team case studies is to provide students with an opportunity to investigate some aspects of Collaborative Manufacturing (CM) in an organizational setting.
A secondary purpose is to enhance overall class learning by providing students with an opportunity to share CM insights and knowledge with classmates.

Written Case Requirements
The written case reports must be either typed or computer printed (laser quality only). The length of the report is strictly limited to 15 pages, but exhibits up to additional 5 pages may be appended. Each report must include the following information, but not necessarily in this order:

- Case Description or Definition
- “As Is” description of the Process
- Analysis of collaborative strategies
- Description of collaborative architecture
- Implementation Issues for new system
- Conclusions and Recommendations

Oral Presentation Requirement
Each team is expected to make a presentation of 10-15 minutes (including time for questions from the class). Reports will be collected after the last presentation is completed. Each group member must be actively involved in the oral presentation. Audio-visual materials appropriate to the CASE should be used. The presentations will be graded on clarity, content, and smoothness.

Grading
The CASE report and presentation will be graded using a 60-40 weighing scheme and on a group basis.

Guidance
Teams are welcome to meet with me during the term for advice. Meetings can be conducted during normal office hours, or by appointment.