IE 564

DESIGN AND SCHEDULING OF CELLULAR MANUFACTURING SYSTEMS

WINTER 2019

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Office Hours: T, TR: 1:30 – 2:30 p.m.
Other times by appointment; please call or e-mail.

Class Schedule: T, TR: 12:00 – 1:20 p.m.

Credit Hours: 3

Prerequisite: Computer experience

Revision Date: December 27, 2018


Text: None


Course Website: http://classes.engr.oregonstate.edu/mime/winter2019/ie564

Course Learning Outcomes

1. Describe the key issues in cellular manufacturing to effectively implement manufacturing cells in industry practice.
2. Show how part-machine incidence matrix based algorithmic approaches can be used to design manufacturing cells.
3. Develop the model and algorithmic procedure to assess the impact of alternative process plans on the design of manufacturing cells.
4. Develop the model and algorithmic procedure to incorporate key operational constraints in manufacturing cell design.
5. Develop the model and algorithmic procedure to create disaggregated manufacturing cells.
6. Show how optimal and heuristics approaches can be used to solve group-scheduling problems.
Transfer of Research Experiences

Cellular Manufacturing (CM) is regarded as one of the foremost technologies that has helped most small to large size parts manufacturing companies increase their manufacturing productivity. The course focuses on transferring research experiences and findings having high industry merit acquired in the past into the classroom by addressing a host of issues related to the design and scheduling of CM systems. Topics ranging from an introduction to CM systems to the design of manufacturing cells, and scheduling of parts and part families assigned to the cells are covered in the course.

Lecture Material

1. Introduction to CM systems.
4. Alternative process plans and their impact on the design of manufacturing cells.
5. Incorporating features of lot splitting, multiple units of the same machine type, and non-consecutive operations of parts on the same machine as operational constraints in the design of manufacturing cells.
6. Creating disaggregated manufacturing cells through simultaneously dealing with duplicating bottleneck machines and subcontracting bottleneck parts.
8. Similarities between conventional flow shop scheduling problems and group scheduling problems.
10. Optimal and heuristic approaches for completely solving group scheduling problems at levels 1 and 2.

Grading

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<thead>
<tr>
<th>Grading</th>
<th>IF 564</th>
<th>Schedule</th>
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<tbody>
<tr>
<td>Mid-Term Test</td>
<td>20%</td>
<td>Thursday, February 14</td>
</tr>
<tr>
<td>Final Exam</td>
<td>30%</td>
<td>Friday, March 22 (9:30 - 11:20 am)</td>
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<tr>
<td>Homework</td>
<td>10%</td>
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<tr>
<td>Computer Projects</td>
<td>22%</td>
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<tr>
<td>Term Project</td>
<td>18%</td>
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<td>Total</td>
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<td>100%</td>
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- Seeking assistance from students who had taken this course before and/or acquiring materials/solutions they had access to when they were enrolled in the course, including work of their own, are strictly prohibited.
- During class, the use of cell phone/iPad to surf the web, to check emails, and/or to send/receive texts is strictly prohibited.
- During class, leaving and entering the classroom is strictly prohibited.
- During class, engaging in conversations with your neighbor or conducting yourself in a manner that is disruptive to the class is strictly prohibited.
• Arriving late to class or leaving early is **strictly prohibited**.

• **Attendance in class is a MUST.** Students who are unable to attend a class due to an illness or another valid reason must keep the instructor notified via email. In other words, perfect attendance is required unless there is a valid reason for missing a class, notified by email.

**HOMEWORK: Individual effort**

**Computer Projects and Term Project: Group effort.** Each student in a group is required to work jointly with the rest of the group by contributing their share of effort in the pursuit and completion of the computer projects and term project. If a student is found not to make his/her share of contribution, the rest of the group MUST bring the matter to the attention of the instructor immediately. If evidence of such non-contribution was found, the instructor will remove the student from the group and ask him/her to work independently on the project and turn in a report.

1. Mid-Term Exam and the Final Exam will be given on the dates indicated above. Students viewing the test at the scheduled time are considered to have taken the test. **There is no makeup for these tests.**
2. Assignments must be turned in at 1:20 p.m. (or as specified in class) on the due date. Late assignments **will not** be accepted.
3. A student’s academic record is a relatively permanent record of that student’s performance and activities while in school. It is important that each student and the integrity of each student’s record be protected.
4. **Students are responsible for any changes to this syllabus announced in class. These can be in the form of discussions/announcements in class and/or communications via email to the entire class list.**

**CODE OF STUDENT CONDUCT**

Students are held responsible for detailed Code of Student Conduct listed at:

[http://studentlife.oregonstate.edu/code](http://studentlife.oregonstate.edu/code). Specifics on Academic Misconduct ONLY are also listed below.

**The following academic misconduct is prohibited under the Code of Student Conduct:**

4.2 Academic Misconduct

1. Academic Misconduct. Any action that misrepresents a student or group’s work, knowledge, or achievement, provides a potential or actual inequitable advantage, or compromises the integrity of the educational process. Prohibited behaviors include, but are not limited to doing or attempting the following actions:

   a. **Cheating.** Unauthorized assistance, or access to or use of unauthorized materials, information, tools, or study aids. Examples include, but are not limited to, unauthorized collaboration or copying on a test or assignment, using prohibited materials and texts, unapproved use of cell phones, internet, or other electronic devices, etc.
b. Plagiarism. Representing the words or ideas of another person or presenting someone else's words, data, expressed ideas, or artistry as one's own. Examples include, but are not limited to, presenting someone else's opinions and theories as one's own, using another person's work or words (including unpublished material) without appropriate source documentation or citation, working jointly on a project and then submitting it as one's own, etc.

c. Falsification. Fabrication or invention of any information. Examples include, but are not limited to, falsifying research, inventing or falsely altering data, citing fictitious references, falsely recording or reporting attendance, hours, or engagement in activities such as internships, externships, field experiences, clinical activities, etc.

d. Assisting. Any action that helps another engage in academic misconduct. Examples include, but are not limited to, providing materials or assistance without approval, altering someone's work, grades or academic records, taking a test/doing an assignment for someone else, compelling acquisition, selling, bribing, paying or accepting payment for academic work or assistance that contributes to academic misconduct, etc.

e. Tampering. Interfering with an instructor’s evaluation of work by altering materials or documents, tampering with evaluation tools, or other means of interfering.

f. Multiple submissions of work. Using or submitting work completed for another or previous class or requirement, without appropriate disclosure, citation, and instructor approval.

g. Unauthorized recording and use. Recording and/or dissemination of instructional content without the express permission of the instructor(s), or an approved accommodation coordinated via Disability Access Services.

Any student found to have committed or to have attempted to commit the above described academic misconduct is subject to the sanctions outlined in Section 6: Sanctions in:


EXPECTATIONS:

The goal of Oregon State University is to provide students with the knowledge, skill and wisdom they need to contribute to society. Our rules are formulated to guarantee each student's freedom to learn and to protect the fundamental rights of others. People must treat each other with dignity and respect in order for scholarship to thrive. Behaviors that are disruptive to teaching and learning will not be tolerated, and will be referred to the Student Conduct Program for disciplinary action. Behaviors that create a hostile, offensive or intimidating environment based on gender, race, ethnicity, color, religion, age, disability, marital status or sexual orientation will be referred to the Affirmative Action Office.

Statement Regarding Students with Disabilities:
Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at http://ds.oregonstate.edu. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required,
students and faculty members are encouraged to discuss details of the implementation of individual accommodations.