

## **ISE 514**

### **Advanced Production Planning and Scheduling**

**Units: 3**

**2017**— Tuesday & Thursday 2:00 – 3:20 pm

**Location:** OHE 132

**Instructor:** Dr. Shalini Gupta

**Office:** GER 216 C

**Office Hours:** Thursday from 3:30 pm – 4:30 pm

**Contact Info:** [shalinig@usc.edu](mailto:shalinig@usc.edu)

**Teaching Assistant:** Yang Cao

**Office:** TBD

**Office Hours:** TBD

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### **Course Description**

The major objective of this course is to have you understand the nature of a production or service system – the intricate dependencies among long, intermediate and short range planning. The context of these systems - organizational, behavioral and technological must also be understood. Finally, it is a thorough understanding of the objectives, mathematical and applied methods and limitations of finite scheduling.

### **Course Notes**

D2L

### **Required Readings and Supplementary Materials**

**“Introduction to the Mathematics of Planning and Scheduling”, Geza P. Bottlik, Taylor and Francis, 2017, ISBN 978-1482259216.**

### **References:**

- Silver, Pyke and Peterson, Inventory Management and Production Planning and Scheduling, 3rd Ed. John Wiley, 1998

- R.W. Conway, W.L. Maxwell and L.W. Miller, Theory of scheduling, Addison Wesley, 1967
- S. E. Dreyfus and A.M. Law, The art and theory of dynamic programming, Academic press 1977
- F.S. Hillier and G. J. Lieberman, Introduction to Operation Research, McGraw-Hill, 1990
- George W. Plossl, Orlicky's Material Requirements Planning, Second Edition, McGraw-Hill, Inc. 1994
- Michael Pinedo, Scheduling, Second Edition, Prentice Hall, 2002 ISBN – 0-13-028138-7 T.E. Morton and D.W. Pentico, Heuristic Scheduling Systems, Wiley, 1993
- K. R. Baker, Elements of sequencing and scheduling, 2002 ISBN 0 – 9639746 – 1 – 0 D.R. Sule, Industrial Scheduling, PWS Publishing, 1997, ISBN – 0-534-95456-1
- “The fundamentals of production planning and control”, Stephen N. Chapman, Pearson Prentice Hall, 2006, ISBN 0-13-017615-X
- “Principles of Sequencing and Scheduling”, Kenneth R. Baker and Dan Trietsch, John Wiley and Sons, 2009, ISBN 978-0-470-39165-5
- Factory Physics, 3rd edition, Wallace J. Hopp and Mark L. Spearman

### **Description and Assessment of Assignments**

All assigned sections of the texts, plus topics discussed in lecture by the instructor.

**Exams:** Points will be assigned to each section of the exam. No re-takes will be allowed. No make-up exam will be given. The FINAL EXAM will be comprehensive. Grading will be similar to the midterm exams. Any person caught cheating on an examination will be referred to judicial affairs.

**Projects:** The project is designed to exercise the skills which you develop over the course of the semester. The project will require you to collect data, model and animate the system, and perform statistical analysis. Prior to working on a project, a proposal must be approved. Additional details will be provided during the course.

**Homework:** Problems sets will be assigned. Homework is not accepted late. Homework will be graded on an “all or nothing” basis. If a paper shows an acceptable answer to each assigned exercise, the grade for the assignment is 10 points. An answer to a qualitative exercise is acceptable if it is relevant to the issue. An answer to a quantitative exercise is acceptable if it uses

approximately the correct method. If any exercise is unacceptable, the paper will be returned with no points awarded.

### **Grading Breakdown**

Exams (1 and 2)	20% Each
Exams (3) Comprehensive	35%
Project (Teamwork)	15%
Homework (Individual)	10%
Total	100%

### **Grading Scale (Example)**

Course final grades will be determined using the following scale

A	95-100
A-	90-94
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	67-69
D	63-66
D-	60-62
F	59 and below

### **Grading Timeline**

7 – 8 Days

### **Additional Policies**

- The use of laptops, phones or similar devices during class is not allowed.
- Please Do Not bring food or drinks to the class (Water in plastic bottles is ok)
- All tests are open book. Laptops and cell phones are NOT allowed.

## Course Schedule: A Weekly Breakdown

<u>Week</u>	<u>Date</u>	<u>Topic</u>	<u>Text Chapters</u>
1	22-Aug	Introduction and overview	Ch. 1 & 2
2	24-Aug	EOQ Models	Ch. 3 & Suppl.
	29-Aug	EOQ Models	Ch. 3 & Suppl.
3	31-Aug	MRP	Ch. 5 & Suppl.
	5-Sep	MRP	Ch. 5 & Suppl.
4	7-Sep	Cost Calculations & Aggregate Planning	Ch. 4 & Suppl.
	12-Sep	Introduction to operations scheduling	Ch. 6 & Suppl.
5	14-Sep	Scheduling Problems & Notations	Ch. 6 & Suppl.
	19-Sep	Exam Review	
6	21-Sep	<b>Examination 1 (Open Book)</b>	
	26-Sep	Algorithms for one machine problems	Ch. 8 & Suppl.
7	28-Sep	Algorithms for two machine problems	Ch. 9 & Suppl.
	3-Oct	Implicit Enumerations & Dynamic Program.	Ch. 10 & Suppl.
8	5-Oct	Branch and Bound	Ch. 10 & Suppl.
	10-Oct	Shifting Bottleneck (Heuristics Approaches)	Ch. 12 & Suppl.
9	12-Oct	Shifting Bottleneck (Heuristics Approaches)	Ch. 12 & Suppl.
	17-Oct	Flow Shop Scheduling	Ch. 12 & Suppl.
10	19-Oct	Job shop scheduling rules & Gantt chart	Suppl. Material
	24-Oct	Exam Review	
11	26-Oct	<b>Examination – 2 (Open Book)</b>	
	31-Oct	Line Balancing	Suppl. Material
12	2-Nov	Project Scheduling	Appendix B & Suppl.
	7-Nov	Project Scheduling	Appendix B & Suppl.
13	9-Nov	Parallel Machine Scheduling	Ch. 13 & Suppl.
	14-Nov	Relaxation of Assumptions	Ch. 14 & Suppl.
14	16-Nov	Batch processing, sequence dependence	Ch. 14 & Suppl.
	21-Nov	Exam Review	
15	22-Nov	<b>No Class (Thanksgiving Break)</b>	
	28-Nov	Project Presentations	
16	30-Nov	Project Presentations	
	Tentative	<b>Final Exam (Open Book)</b>	

## Statement on Academic Conduct and Support Systems

### **Academic Conduct:**

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, “Behavior Violating University Standards” <https://policy.usc.edu/scampus-part-b/>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

### **Support Systems:**

*Student Counseling Services (SCS) - (213) 740-7711 – 24/7 on call*

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention. <https://engemannshc.usc.edu/counseling/>

*National Suicide Prevention Lifeline - 1-800-273-8255*

Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. <http://www.suicidepreventionlifeline.org>

*Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-4900 - 24/7 on call*

Free and confidential therapy services, workshops, and training for situations related to gender-based harm. <https://engemannshc.usc.edu/rsvp/>

*Sexual Assault Resource Center*

For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: <http://sarc.usc.edu/>

*Office of Equity and Diversity (OED)/Title IX Compliance – (213) 740-5086*

Works with faculty, staff, visitors, applicants, and students around issues of protected class. <https://equity.usc.edu/>

*Bias Assessment Response and Support*

Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. <https://studentaffairs.usc.edu/bias-assessment-response-support/>

*The Office of Disability Services and Programs*

Provides certification for students with disabilities and helps arrange relevant accommodations. <http://dsp.usc.edu>

*Student Support and Advocacy – (213) 821-4710*

Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic.

<https://studentaffairs.usc.edu/ssa/>

*Diversity at USC*

Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. <https://diversity.usc.edu/>

*USC Emergency Information*

Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible,

<http://emergency.usc.edu>

*USC Department of Public Safety – 213-740-4321 (UPC) and 323-442-1000 (HSC) for 24-hour emergency assistance or to report a crime.*

Provides overall safety to USC community. <http://dps.usc.edu>