

Advanced Production Planning and Scheduling (ISE514 Spring 2017 (rev. 12/11/2016))

Instructor:	Geza Bottlik, E-mail: bottlik@usc.edu
Office Hours:	Mon/Tue/Wed/Thu, 3:30 P.M. – 4:45 P.M, Room GER 202 or by appointment
	Phone 213 740 - 5050
TA:	TBD
TA Office Hours:	
Class time/place:	Monday/Wednesday 5:00 P.M. – 6:20 P.M., OHE 100B

Test Schedule:

Midterm 1:	Wednesday, February 22 , 2017	5:00 P.M. – 6:20 P.M.
Midterm 2:	Monday, April 3 , 2017	5:00 P.M. – 6:20 P.M.
Final:	Monday, May 3, 2017	4:30 P.M. – 6:30 P.M.

Web Pages: www.gezabottlik.com, <https://courses.uscdcn.net>

At the www.gezabottlik.com site you will find:

- The syllabus, your grades, team composition
- Lecture Notes, Assignments and due dates, solutions, old exams
- Messages of current interest - e.g. a cancelled class (it won't happen!)
- The D2L website is only used for assignments, e-mail, and the discussion board

Your responsibility:

- Register on the www.gezabottlik.com site and learn how to use the site
- Check your email on a regular basis
- Download the lecture notes and assignments for each class
- Review your grades to track your progress and standing in the class.

Assignments: Readings and Problems will be included in most weeks' assignments. It is imperative that you **prepare for class** -- you will find it extremely difficult to follow the discussion if you have not read the material. Usually, problems are assigned on Monday and are due on the following Sunday at midnight. We will return the assignments one week later on the assignment manager if points have been deducted. Late homework **cannot** be accepted, unless **prior** arrangements have been made (e.g. out of town funeral). Homework is to be in digital format, a **single, printable** document (no zip files), submitted through the assignment manager on Blackboard.

Your name, assignment number, the date and whom you worked with must be in the header. Use a consistent template and format the output for a professional appearance. The assignments should be as professional in appearance as if you were preparing reports at work or for publication. Clearly label your conclusions for each problem, followed by the supporting calculations and discussion. The problems must be in the order assigned. Out of sequence problems will receive no credit.

It's OK to work on homework together, but finish it by yourself and indicate whom you worked with in the header. Each student must turn in a separate homework, unless the assignment is specified as a team assignment. Generated data and essay questions must be unique to each student. Do not give your files to others and do not use others' files. Do not copy problems. Homework files will be named by the assignment manager, so keep them **very** short. The same rules apply among teams for team assignments. **If the answer is given in a book, don't just copy it, explain how you got it.**

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Objectives of the course

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.

Grading:

Homework	~15%	1.4 pts. each
Midterm 1	~15%	15 points
Midterm 2	~21%	21 points
Final exam	~31%	31 points
Participation (quizzes, attendance, asking questions, making contributions, postings on the discussion board)	~18%	1.5 pts. Each for quizzes, 0.25 for others

Participation includes, e-mail, questions, contributions and comments during lectures, postings on the discussion board and is expected every session. Students receive some partial participation credit for attendance but also need to participate. The grade for the course will only be based on the required work listed above and **cannot** be improved with additional work. Note that 18% of the grade is for participation – **so participate!**

The **required** text for the course is:

1. "Introduction to the Mathematics of Planning and Scheduling", Geza P. Bottlik, Taylor and Francis, 2017, ISBN 978-1482259216 will be available in February. Drafts will be provided until then.

References:

1. Silver, Pyke and Peterson, Inventory Management and Production Planning and Scheduling, 3rd Ed. John Wiley, 1998
2. R.W. Conway, W.L. Maxwell and L.W. Miller, Theory of scheduling, Addison Wesley, 1967
3. S. E. Dreyfus and A.M. Law, The art and theory of dynamic programming, Academic press 1977
4. F.S. Hillier and G. J. Lieberman, Introduction to Operation Research, McGraw-Hill, 1990
5. George W. Plossl, Orlicky's Material Requirements Planning, Second Edition, McGraw-Hill, Inc. 1994
6. 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
7. 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
8. "The fundamentals of production planning and control", Stephen N. Chapman, Pearson Prentice Hall, 2006, ISBN 0-13-017615-X
9. "Principles of Sequencing and Scheduling", Kenneth R. Baker and Dan Trietsch, John Wiley and Sons, 2009, ISBN 978-0-470-39165-5

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Recommended reading:

1. Womack, J. P., Jones, D. T., and Roos, D. The machine that changed the world, Rawson Associates, NY, 1990
2. Goldratt, E.M., The Haystack syndrome, North River Press, NY, 1990

Course Outline:

01/09	Introduction and overview, Production planning (Week 1)
01/18	Production planning (2)
01/23	MRP (3)
01/30	Introduction to operations scheduling, definitions and performance measures, job shop model and algorithms (4)
02/06	Mathematical methods: dynamic programming (6)
02/13	Branch and Bound (5), Schedule generation, dispatching rules
02/22	Review (7), Midterm 1
02/27	Heuristics, Searches (8)
03/06	Heuristics, Searches (9)
03/20	Performance guaranties, Early/Tardy Problems (10)
03/27	Project Scheduling (11)
04/03	Midterm 2, Project Scheduling (12)
04/10	Batch processing, sequence dependence (13)
04/17	Stochastic Problems (14)
04/24	Review (15)
05/03	Final

Examinations:

The midterms and final exams are open book and open notes. Calculators and laptops may be used. Exam problems will be both numerical and essay, with occasional true/false, fill in the blank, or multiple choice. Time limits will be strictly enforced.

Quizzes:

There will be quizzes most weeks at the start of class on Monday or Wednesday. The format is True/False and fill in the blank. The purpose of these quizzes is to encourage you to keep up with the class material. I anticipate that you will have little difficulty in answering the questions if you are up to date on the class materials, including those for the next class. There is normally no make-up of a missed quiz. However, if a student expects to be away from class for a valid reason (e.g. employment travel) then special arrangements can be made ahead of time to allow the quiz to be taken on-line. Each quiz will be based primarily upon two subjects: the material from the previous week and the reading assignment for that week. You are expected to have read the weekly assignment prior to the start of class. Quizzes will be announced during the previous week.

The midterms and final will be based on problems similar to the ones assigned in the homework and the discussions in class. **All tests are open book and open notes. Laptops are also allowed.** Students are expected to **apply** what they should have learned up to that point to analyzing situations, identifying the problems and applying the appropriate techniques to solve them.

NEATNESS, SPELLING, AND GRAMMAR COUNT. THEY ARE AN EXPRESSION OF YOUR COMMITMENT TO DO A GOOD JOB.

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Expectations:

Students are expected to attend every session, be on time, to have read the preparation material and participate actively in the discussions in the class. If you are late, be sure not to disturb the class as you enter. Frequent absences will result in a reduction in grade. The use of laptops, I phones or similar devices during class is not allowed. This is intended to be an interactive class and your participation should increase as the semester progresses. Students are expected to post comments and questions on the discussion board (or send emails or contributions to be used in class). You should be prepared to devote the time necessary to take the course. The course material is cumulative and you need to keep up as we go along.

Method of Instruction:

Class sessions will generally consist of quizzes and their solution, going over homework, assigning new homework, questions and answers, lecture, and discussion.

ALWAYS BE SURE TO GIVE THE SOURCE OF ALL YOUR INFORMATION. ANYTHING TAKEN VERBATIM FROM SOMEONE ELSE MUST BE IN QUOTATION MARKS AND REFERENCED. THIS INCLUDES PARTIAL SENTENCES.

PLEASE DO NOT BRING FOOD OR DRINKS TO THE CLASS. (Water in plastic bottles is OK)

Last but most important:

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 Section 11, *Behavior Violating University Standards* <https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions>. 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>.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* <http://equity.usc.edu> or to the *Department of Public Safety* <http://capsnet.usc.edu/department/departement-public-safety/online-forms/contact-us>. This is important for the safety of the whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage <http://sarc.usc.edu> describes reporting options and other resources.

Support Systems

A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* <http://emergency.usc.edu> will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.