



### ETLS 501-1 Production Operating Systems

John Walker  
Spring Semester 2009

<a href="#">Course Description</a>	<a href="#">Class Outline</a>	<a href="#">About the Instructor</a>	<a href="#">E-Mail Instructor</a>	<a href="#">Grad Engineering Home</a>
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**Instructor:** John Walker C.Eng, MIET, SME

**Time:** Section 1, Wednesday, 5:30 – 9:00 p.m.

**Note:** Classes will start February 4 and there will be no class, March 18, 2009

**Location:** St. Paul Campus, Binz LL2

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- Required Text:**
- *Operations Management, 11<sup>th</sup> Ed.* by Chase, Aquilano & Jacobs, Irwin/McGraw Hill.  
Note: 9<sup>th</sup> or 10<sup>th</sup> Edition Acceptable
  - Handbook of lectures available to students (cost of printing will be charged to the student's account)

**Course Description:** A comprehensive review of modern production methods and systems for production and service industries. Topics include location and facility layout, job design and measurement, group technology, push/pull systems, process planning, forecasting, production and capacity planning, scheduling and manufacturing systems. The course also provides a brief review of FMC, FMS, CNC, DNC and computer-integrated manufacturing.

**Course Objectives:** This is a course to introduce students to production operating systems that are used in manufacturing and service industries. Building up from plant layout, material control and work measurement to various factory systems. We also review some of the major systems & briefly discuss other systems that are used to plan and control the manufacturing of a product or the operation of a service industry.

- Learning Outcomes:** Upon successfully completing this course the student will be able to:
1. Explain the basic concepts of process, planning, group technology, facility location and plant layout (SE3, MS1)
  2. Describe the difference between time study and motion study and understanding the basic principles of time and motion study (SE3, MS1)
  3. Explain the use of learning curves and their application in a manufacturing environment (SE7, MS1)
  4. Select the most appropriate forecasting method for a product (SE6, MS6)

5. Explain what are the objectives of a manufacturing information system (SE3, MS7)
6. Understand the philosophy of chase, level and hybrid approaches to production and capacity planning and demonstrate this knowledge by calculations and applying the "transportation method" SE1, MS2)
7. Schedule "n" jobs for "n" machines by the appropriate priority rules and scheduling techniques (SE6, MS7)
8. Able to apply the principles of the theory of constraints (SE1, MS2)

Note: The understanding of these objectives is required to be demonstrated in the midterm and final exams (1 to 3 in midterm and 4 to 8 in final). If you believe you are already proficient in this material, contact your advisor to discuss alternatives.

**Course  
Methodology:**

During the course we will use selected chapters of the Course text book as a guide, augmented by lectures and student presentations. The course will concentrate on basic system principles rather than the operation of computer system programs. Video tapes will be used as appropriate. The reading assignments are designed to provide background to the weekly subjects. They are designated by a chapter and page range. If further designated – skim then only a brief review of the text is required. Note: To obtain more knowledge of a subject you should read the appropriate chapter and follow-up on the references provided at the end of each chapter.

**Associated  
Courses:**

1. ETLS 504 Excellence in Operations
2. ETLS 571 Automation in the US & Overseas

**Major  
Assignments:**

1. There will be a final paper due on the tenth week of class (5 point penalty per week or part of week late). This paper should be a case study/research project on a manufacturing system of your own choosing (with approval of instructor). It should include: a description of system improvement, theory, data, comparison of costs, projections, future improvements, application, etc. and incorporate some of the principals taught in the course. The paper should be written in a scholarly way with research into literature and case histories relevant to the topic being discussed, not just a regurgitation of existing literature (approximately 10 pages). (SE12)
2. Each person will be expected to produce a class report for presentation in class. This paper should preferably give the author's personal experience with a process. Oral presentations will be a maximum of 10 minutes. A written report of approximately 4 pages in length is also required for distribution to all class members. This report is to include a bibliography plus copies of any overheads, or Power Point material used in the oral presentation. Note; Presentations will be cut off at the 10 minute point (with a one minute warning).
3. There will be a midterm exam at the sixth session covering the subject matter of the first half of the course.
4. There will be a final exam on the eleventh session covering the second half of the course.

Note: the designators in parentheses refer to the learning outcomes of the master degrees. ( SE = MMSE, MS = MSMS)

<b>Grading Policy:</b>	Research Paper	30%
	Midterm Exam	25%
	Final Exam	25%
	Class Paper	15%
	Class Participation	5%

**Academic Integrity:** All students are expected to understand and follow the University of St Thomas policies on Academic Integrity. These are described at:  
<http://www.stthomas.edu/engineering/graduate/policies/>

Exams: Exams are one of the instruments used to evaluate the knowledge gained by an individual student of the class subject matter, and the progress towards meeting the outcomes of the class and the degree. To this end all exams (in class or take home) are intended to represent the effort of the individual and not a group effort unless specifically stated otherwise.

Plagiarism: Plagiarism is not allowed and will result in a minimum of an 'F' for the work. For your reference I have reproduced part of the relevant section of the Student handbook under Academic integrity and dishonesty:

*“ Plagiarism - The deliberate adoption or reproduction of ideas or words or statements of another person as one's own without acknowledgment. In every instance, you also must formally acknowledge the written source from which you took the material. (This includes material taken from the World Wide Web and other Internet sources.)*

The internet is an excellent resource for information. It can be used to gain knowledge of a subject but not copied verbatim. Use of the words of another author must be noted in quotation marks and the source referenced.

**Attendance Policy:** Students are expected to attend all class sessions. Circumstances which prevent attendance will be honored up to two instances. Absences in excess of two times may result in a lower grade for the course. Contact the instructor when a special situation arises. All absences require that the instructor be informed in advance.

**Students with Disabilities** Qualified students with documented disabilities who may need classroom accommodations should make an appointment with the Enhancement Program – Disability Services office during the first two weeks of the semester. Appointments can be made by calling 651-962-6315 or in person in O'Shaughnessy Educational Center, room 119.

**Copyright:** Permission is granted by the instructor for the use and/or reproduction by the student of any material presented during the course.

Permission is assumed from the student for the use and/or reproduction (by the instructor or other students attending the course) of the contents of any paper submitted (written or oral) during the course unless written notification to the contrary is received prior to the end of the course.

**Computers & other electronics** During the class sessions it is not acceptable to use computers, or any other electronic devices.

**Prerequisites** None

**Instructor Biography:** John Walker has industrial experience in process and production systems design and management on both sides of the Atlantic. At Honeywell Inc. and at companies in the United Kingdom, he has been responsible for production engineering and management of complex processes and systems. He is a Certified Engineer (Professional Engineer), a member of the Institute of Engineering and Technology and the Society of Manufacturing Engineers

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<b>Class / Date</b>	<b>Topics</b>	<b>Assignments</b>
Feb. 4 Week 1 Lecture 1, 2a,	1) Orientation and Description of the course 2) Lecture Handbook Available 3) Systems Basics 4) Designing Productive Systems	Chapters 1&2, Skim  Case Study: Wyatt Earp - Handout
Feb. 11 Week 2 Lecture 2b, 5a	1) <b>Process Planning</b> 2) Group Technology 4) <b>Video – Harley Davidson Motorbikes</b>	Product Design chapter 11 <sup>th</sup> edition: p. 110 (10 <sup>th</sup> edition-153, 9 <sup>th</sup> p. 143)  Case Study: Wyatt Earp – Discuss  Mfg. Process & selection p. 210  Tech Note, Group Technology chapter: 11 <sup>th</sup> edition 243-244 (10 <sup>th</sup> edition - p.200-202, 9 <sup>th</sup> p. 189-191)
Feb. 18 Week 3 Lecture 5c, 3a, 3b	1) Pull Systems (a Hands-on Experience)  <b>Guest speaker: Sara Braziller</b>	
Feb. 25 Week 4 Lecture 3b, 4a, 4b	4) Lean Production 3) Manufacturing Information Systems <b>Guest speaker: Sara Braziller</b>	Lean Production chapter; 11 <sup>th</sup> edition p. 468 (10 <sup>th</sup> edition p.424, 9 <sup>th</sup> p.392)  Material Requirements Planning chapter; 11 <sup>th</sup> edition p. 628 (10 <sup>th</sup> edition p. 582, 9 <sup>th</sup> p. 548)
March 11 Week 6 Lecture 6, 9, 10a	1) Class reports 2) Facility Layout (continued) 3) Jobs: Design, Analysis, and Measurement 3) Learning Curves 6) Handout Midterm Exam	Case Study: The Plant Location Puzzle 11 <sup>th</sup> edition p. 465 (10 <sup>th</sup> edition – p.421, 9 <sup>th</sup> p.389)  Tech Note- Design & Work Measurement chapter; 11 <sup>th</sup> edition p. 180 (10 <sup>th</sup> edition – p.125, 9 <sup>th</sup> p.113)  Tech Note- Learning Curves; 11 <sup>th</sup> edition p. 134 (10 <sup>th</sup> edition – p.48, 9 <sup>th</sup> p.40)

March 18	No Class	
March 25 Week 7 Lecture 7a, 6	1) Class Reports 2) Collect Midterm exam 3) Inventory control 4) Forecasting 5) Video	Inventory Control Chapter; 11 <sup>th</sup> edition p. 586 (10 <sup>th</sup> edition p.542, 9 <sup>th</sup> p.510)  Forecasting chapter; 11 <sup>th</sup> edition p. 510 (10 <sup>th</sup> edition p.464, 9 <sup>th</sup> p.432)
April 1 Week 8 Lecture 10a, 5b	1) Class Reports 2) Forecasting (continued)  4) Aggregate Production and Capacity Planning 5) Video	Aggregate Sales and operation Planning chapter; 11 <sup>th</sup> edition p. 558 (10 <sup>th</sup> edition p. 512, 9 <sup>th</sup> p. 480)
April 8 Week 9 Lecture 7b, 10b	1)Class Reports 2) Review mid term exam 3) Aggregate Production and Capacity Planning (continued) 3) Scheduling	Theory of Constraints chapter; 11 <sup>th</sup> edition p. 718 (10 <sup>th</sup> edition p. 670, 9 <sup>th</sup> p. 662)  Operations Scheduling chapter; 11 <sup>th</sup> edition p. 662 (10 <sup>th</sup> edition p. 618, 9 <sup>th</sup> p. 582)
April 22 Week 11 Lecture 10	1) Final Course/Instructor Evaluations 2) <b>Final Exam (in class)</b>	
April 29 Week 12 Lecture 7b, 10b	1) Exam Review 2) <b>Course Wrap-up</b>	