This course focuses on the major managerial issues in Production Operations / Supply Chain / Manufacturing and the tools that can be used to manage them. The major issues include strategic planning, inventory management, scheduling, and quality management et.al. Major tools and techniques include linear programming, queuing theory, and simulation. Where appropriate, the use of operations management techniques in service and distribution organizations will be demonstrated.

Course objectives
- Develop an understanding of the concepts attendant to production operations and production operations management
- Develop an understanding of the challenges and opportunities faced by production operations management
- Develop an understanding of and an ability to apply production management tools, strategies and practices

Semester Schedule

**Tue, January 20, 2015** Spring Semester Classes Begin  
**Sun, March 22, 2015** Spring Recess  
**Mon, March 30, 2015** Classes Resume  
**Sat, May 09, 2015** Last day of spring classes  
**Mon, May 11, 2015** Spring Final Exams Begin  
**Sat, May 16, 2015** Spring Semester Closes End of Day  
**Sat, May 16, 2015** Spring Commencement

This class will be administered as a blended offering, face-to-face and virtual, asynchronous classes as discussed and scheduled in this syllabus

Text: Operations Management, Sustainability and Supply Chain Management, 11th Edition,  
By Heizer, Jay and Render, Barry  
Pearson Education, Upper Saddle River NJ, 2014  
Available in Hardbound and Loose Leave versions

Supplemental readings as assigned and posted in MyGateway
Assessment

- Class Participation .................. 20%
- Group Module Assignments ... 20%
- 1st Exam ............................. 20%
- 2nd Exam ................................. 20%
- Term Paper .......................... 20%

Grading based on total points accumulated

- 95-100 ...................... A+
- 90-94 ......................... A
- 86-89 ......................... A-
- 83-85 ......................... B+
- 78-82 ......................... B
- 74-77 ......................... B-
- 65-74 ......................... C

Note ... Class participation will be a function of one’s performance in the discussion boards which are an integral part of this course offering. There will be a discussion board for each module and grading will be based on thought leadership and overall participation; a rubric is provided.

Note: ... There will be a Group Module Assignment / Project at the end of each of the course modules; they will be, collectively, worth 20% of one’s final grade. Each Group Module Assignment will require the preparation of a written report and a presentation; we will critically review the presentations prepared by each group during our face-to-face classes. Group Projects / reports are due on the night of the associated Face-to-Face class ... please bring a hardcopy of the report and any presentation material to class and submit an electronic copy of the reports using the assignment dropbox.

Note ... There will be two, non-cumulative examinations.

- They will be administered in an on-line, asynchronous, timed basis.
- Examination one will be open for taking on 10 March through 12 March.
- Examination Two will be open for taking on 11 May through 13 May, inclusive. Each examination will be worth 20% of one’s final grade.
Note ... There will be a term paper, written about any Project Management topic you may choose, worth 20% of one's final grade, required as a part of your course of study
  o In general, a discussion of an operations management scenario about which you have detailed knowledge or can obtain detailed knowledge, together with a discussion about how improved management practices might improve the business offers the best opportunity for you to demonstrate subject mastery
  o Detailed instructions for this paper will be posted to MyGateway
  o The paper will be due 10 May 2015

Getting Started

*Operations Management is defined as the design, operation and improvement of the systems that create and deliver a firm’s primary products or services. Those who are responsible for operations management typically make decisions that one can divide into three broad areas: one) strategic or long-term; two) tactical or medium-term; and three) operational*

Text Readings:
Heizer and Render, *Operations Management, Sustainability and Supply Chain Management*, Chapter 1; *Operations and Productivity*

Discussion Topics:
  - Introductions, orientation and expectations
  - Operations and Supply Chain Management Basic Concepts
    o O&SM as a transformation process
    o The growth of services

*Module One... Analytics and Decision Support*

Week One ...

**Decision Support ...** Operations management may be thought of as the science of making decisions and optimization models and analytical tools support those decisions. *Linear Programming* is a specific tool used; LP finds application is estimating, scheduling, and resource management. A basic understanding of LP provides a foundation
Text Readings:
Heizer and Render, Operations Management,
Sustainability and Supply Chain Management,
Module A: Analytic Decision Making Tools and
Module B: Linear Programming

Discussion Topics:
• Introduction to Ops and Supply Management tools
  o Optimization Models … Review of LOM 5300 topics essential to this course
    ▪ Mathematical and analytic tools
      • Linear regression
      • Exponential smoothing
      • Advanced Forecasting Methods
    ▪ Linear Programming …
      • Applicability
      • Assumptions
      • Problem Creation and Setup
      • Graphical Solution
      • Solvers
      • The Transportation Model

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Week Two M1W2
Decision Support / Queuing and Simulation …
Operations management may be thought of as the science of making decisions and optimization models and analytical tools support those decisions. Queuing theory is a specific discipline that finds application in design and scheduling. Simulation allows modeling, analysis, and solution of LOM problems

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Text Readings:
Heizer and Render, Operations Management,
Sustainability and Supply Chain Management,
Module D: Queuing and Waiting Lines and
Module F: Simulation
Discussion Topics:
• Introduction to Ops and Supply Management tools
  o Waiting Line Analysis and Queuing Theory
    ▪ Arrival, Server, and Queue Characteristics
    ▪ Arrival rate, service rate
    ▪ Distributions and variability
    ▪ Queue analysis and O&SM
  o Stochastic Simulation
    ▪ The simulation model and an analysis tool
      • Arena

Week Three M1W3

Project Management ... A Project is an ordered set of related jobs or actions dedicated toward the production of a good or service. Project Management is the act of planning, directing and controlling resources to meet the technical, cost, and time constraints of the project. Project Management processes are LOM processes.

Text Readings:
Heizer and Render, Operations Management, Sustainability and Supply Chain Management, Chapter 3: Project Management

Discussion Topics:
• Introduction to Project Management
  o Requirements Development
  o Critical Path Methods
  o Risk Management
  o Audit and Control
  o Organization

Week Four In Class 09 Feb 2015

Face to Face Discussion of Module Material, Supplemental Materials, Group Project Presentations and Discussions

Module Two... Design of Deliverables and Processes

Week Five M2W1...

Design of Goods and Services ... Product design is not an operations management function per se. However, operations specialists are taking their places on design teams Concurrent design involves including operations personnel and considerations into the design process. A Service business is an
organization whose primary business requires interaction with the customer to produce a product.

Text Readings:
Heizer and Render, Operations Management, Sustainability and Supply Chain Management, Chapter 5: Design of Goods and Services

Discussion Topics
• Design of goods and Services
  o CAD/CAE/CAM
  o Voice of the Customer (Quality Function Deployment)
• Service Design

Week Six
Process Design ... Product design is NOT an operations management function per se. Process design is, however, a fundamental Operations Management process ... designing the way a product will be manufactured

Text Readings:
Heizer and Render, Operations Management, Sustainability and Supply Chain Management, Chapters 7: Process Strategy

Discussion Topics
• Product Manufacturing Process Design
  o Manufacturing Process design
    • Product Strategy ... Repetition, Product Focus, etc.
    • Product Strategy... Work Cells, Work Centers, etc.
    • Product Strategy ... job shop, batch shop, etc.
    • Product / Process matrix
• Service Delivery Process Design
  o Service Processes
• Process Analysis

Week Seven
Job design and facility Location ... Job design and facility Location selection are operations
management functions  Thee two elements may be considered the active part of product and process design

Text Readings:
Heizer and Render, Operations Management, Sustainability and Supply Chain Management, Chapters 8: Process Strategy, 9: Layout Strategies, and 10: Human Resources and Job Design

Discussion Topics
• Job Design
  o Socio-Technical Systems
  o Job Specialization
  o Job Enrichment
  o Labor Specialization
• Facility Site Selection
  o Product Production Facilities
  o Service Facilities

<table>
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<tr>
<th>Week Eight In Class 09 March 2015</th>
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<td>Face to Face Discussion of Module Material, Supplemental Materials, Group Project Presentations and Discussions</td>
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Module Three … Lean and efficient, high quality, effective operations

Supply Chain Design … The supply chain is no longer thought of as an add-on to operations, it is now recognized that the supply chain is an integral part of a business and supply chain management and design is clearly an operations management task

Text Readings:
Heizer and Render, Operations Management, Sustainability and Supply Chain Management, Supplement to Chapter 5; Sustainability in the Supply Chain, and Chapter 11: Supply Chain Management

Journal Reading Assignment:
Fisher (HBR1997) … What Supply Chain is Right
For Your Product?

Discussion Topics:
• Lean and Sustainable Supply Chains
  o Matching supply chain to product ...
    Fisher’s Law
  o Lean Supply Chains
    • Supply Chain Design
  o Lean Sourcing

Week Ten
M3W2 Quality Management and Assurance ... In general
Quality Improvement can be thought of as an
absolute drive for the elimination of waste and
inefficiency. Statistics and sampling inspection offer
a key to quality management though the evaluation
and maintenance of the processes rather than
through looking at individual products; a process
that is in control will produce quality products
consistently. Processes that are out of control need
to be addressed and stabilized.

Text Readings:
Heizer and Render, Operations Management,
Sustainability and Supply Chain Management,
Chapter 6: Managing Quality, and Supplement to
Chapter 6: Statistical Process Control

Discussion Topics:
• Quality as an Operations Management
  Strategy and Practice
  o Quality Management Control
    • TQMS
    • Design vs. Conformance
      Quality
  o Statistical Process Control
    • Product variation
    • Statistical Process Control
    • Process control charts

Week Eleven
M3W3 Lean and JIT ... JIT and Lean are pervasive in
modern thought about operations. While little JIT
speaks to a scheduling of activities in a production
environment, BIGJIT is a philosophy built around a
set of integrated activities aimed at elimination of
waste at all levels and all points in a production
environment and all aspects of a firm’s working.
Discussion Topics

• Lean Production
  - Lean / JIT Philosophy
    - The First Key ... Elimination of waste
    - The Second Key ... Respect for the human

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**Module Four ... Detailed Operations Planning and Inventory Management**

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<th>Week Thirteen</th>
<th>M4W1...</th>
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| Aggregate Planning ... Planning is the conversion of annual (and quarterly) business plans into production plans. The purpose of an aggregate plan is the specification of the optimal combination of production rate, labor, and inventory on hand to meet the forecast production needs. Aggregate planning involves setting production rates, workforce levels, and inventories for the set of products and services produced by a company. Work-flow is driven by schedule; Workflow drives cash flow; Cash is king so scheduling may be thought of as the key to the kingdom. Some aspects of service operations may be handled by scheduling concepts, but the analogies are relatively loose.

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Text Readings:
Heizer and Render, Operations Management, Sustainability and Supply Chain Management, Chapters 13; Aggregate Planning, and 15; Short Term Scheduling
Operations Scheduling
- Aggregate Planning
  - Operations Scheduling
    - Integrated scheduling using heuristics, mathematical approaches such as LP, and simulation
    - Resource allocation

Week Fourteen

Inventory Management … Holding inventory is one of the major costs confronting a company, so inventory management is critical to a firm’s profitability. Relevant inventory costs include ordering costs and holding costs. Inventory management systems fall into two broad categories: Fixed-order-quantity or Q systems and Fixed-time period or P systems. Each has its benefits and disadvantages. MRP, MRP II, and ERP systems support today’s inventory management processes.

Text Readings:
Heizer and Render, Operations Management, Sustainability and Supply Chain Management, Chapters 12; Inventory Management, and 14; MRP and ERP

Discussion Topics:
- Management of the Firm’s Inventory
  - Chapter Inventory Control
    - P and Q form inventory management
    - Hybrid inventory management concepts
  - Material Requirements Planning
    - The MRP concept
    - MRP systems
    - Enterprise Resource Planning Systems

Face to Face Discussion of Module Material, Supplemental Materials, Group Project Presentations, and Discussions

University / College of Business Administration Policies
University policy stresses the principle of academic honesty; violation of this principle may result in zero credit for the assignment / task in question and may also result in further disciplinary action. [http://www.umsl.edu/services/academic/policy/academic-dishonesty.html](http://www.umsl.edu/services/academic/policy/academic-dishonesty.html)

All students are expected to respect their class-mates, the instructor and the university; Civility is a basic requirement.

The University, the college, and the department are fully supportive of all policies concerning special needs students. Any student who requests accommodations requiring extended exam time, alternate testing procedures, etc. must contact the Disability Access Services office for an auxiliary aids and special services assessment before such requests are granted. [http://www.umsl.edu/services/disabled/](http://www.umsl.edu/services/disabled/)

*It is vitally important that our classroom environment promote the respectful exchange of ideas. This entails being sensitive to the views and beliefs expressed during discussions whether in class or online.*

It is a violation of University of Missouri policy to distribute such recordings without my authorization and the permission of others who are recorded. Please speak with me before considering recording any class activity. This syllabus may be revised at the discretion of the instructor without the prior notification or consent of the student.

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### Class Policies and Procedures

*This syllabus may be revised at the discretion of the instructor without the prior notification or consent of the student.*

- I will post an announcement whenever this syllabus is changed.

*Attendance in class and attendant work/ team sessions goes hand in hand with participation; attendance and active participation are expected.*

- Your success in this course will heavily depend on your ability to communicate, engage and participate in all course activities. Successful completion of this course requires that a student keep up with all assignments, coursework and discussions. Timely participation in online discussions is a very important part of this course and participation in these discussions, and other activities as assigned, is not optional. You are expected to prepare and post to discussions in a timely manner consistent with the requirements contained within the course syllabus and discussion rubric.
- For synchronous or face to face classes, attendance is determined in conventional ways. However, for asynchronous
classes such as this, “Present” is determined by participation in an “academically related activity,” i.e. submission of an assignment, assessment or discussion forum posting. The last day of attendance is the last day a student is academically participating in the online course.

• Documentation that a student has logged into an online class is not sufficient by itself to demonstrate academic attendance.
• If you are unable to participate in the scheduled class activity or discussions you must notify the instructor within the week of that class module or discussion. An unexcused failure to engage or participate with the class will be counted as an absence; unexcused absences may result in failure for the unit or assignment. The instructor reserves the right to make judgment to accept and/or make–up assignments missed because of failed participation in the course activities.

Class Participation and Discussion Boards … Much of our work will be carried out through discussions that are implemented using the MyGateway system in general and MyGateway Forums / Discussion Boards, BLOGS and WIKIs in particular

• Posting of your thoughts, ideas, reactions, and inputs etc. to our discussion boards is a fundamental class interaction / participation mechanism, a fundamental part of this learning experience, and a fundamental requirement of this course.
• All postings will be made using the Discussions / Forums feature of MyGateway … Forums will be on a Weekly basis.
• Since our use of the discussion board is a virtual discussion among us all, your postings should be evenly distributed during the discussion week.
• Postings should be a minimum of three sentences, or one short paragraph, and a maximum of two paragraphs; supporting documents may be referenced and attached.
• Responses should be well written with proper punctuation, spelling and grammar. They shall demonstrate insightful thought and critical reasoning.
• While I will not respond to every posting, I will from time to time and as appropriate join in the discussions. I will be monitoring each discussion / forum so that I can provide guidance as appropriate to ensure that we are meeting our learning objectives, provide clarifications and insert extra data / information and or points of view into the discussion.
• Your participation in these discussions will be graded; grading will run from the concept of “thought and discussion leader” through “participant” on to “non-participant”; the grading rubric I will use is available for you to see.
• You should:
  o Avoid short one-word postings, for instance, “I agree,” unless accompanied by supporting statements from the readings or prior knowledge (work and life experience).
Online Class Netiquette/behavior ... participation in an on-line community brings with it some responsibilities

• Be self-reflective before you post an emotional response and reread what you have written to be sure it is positive. Think of your comments as printed in the newspaper. Your online comments will be seen, heard and remembered by others in the class.
  o Use effective communication.
  o Avoid the use of all caps or multiple punctuation elements (!!!, ??? etc.).
  o Be polite, understate rather than overstate your point, and use positive language.
  o If you are using acronyms, jargon or uncommon terms, be sure to explain them so everyone can understand and participate in the discussion.
• Ask for clarification to a point if you feel emotional from a classmate’s post. It is likely that you misunderstood his/her point. This strategy will also help you step away from the intensity of the moment to allow for more reflection.
• Sign your name. It is easier to build a classroom community when you know to whom you are responding.
• Foster community. Share your great ideas and contribute to ongoing discussions. Consider each comment you make as one that is adding to, or detracting from, a positive learning environment for you and your classmates.
• Be constructive. You can challenge ideas and the course content, but avoid becoming negative online. When you disagree politely you stimulate and encourage great discussion. You also maintain positive relationships with others with whom you may disagree on a certain point.
• Keep the conversation on topic by responding to questions, adding thoughtful comments about the topics at hand. Online dialogue is like conversation. If there is a particular dialogue going on, please add to it, but if you have something new to say, please post it in another thread.
• Define your terms. When using acronyms or terms that are particular to your field (or new to our course), please define them for others.
**Groups**... *There will be a group task assigned at the end of each module; the task will vary from an analysis of various Operations Management approached, procedures and practices to considering a case study.*

- All group members will receive the same grade for the paper and the video presentation, provided that all members make a just and reasonable contribution.
  - Individuals in a group never contribute exactly equal amounts of time, effort, content, and value. This often leads to some people feeling they worked more than others, and some people feeling left out. Usually a leader emerges, one who will hopefully help find the gifts of each individual.
  - Unfortunately, I cannot effectively intervene in these matters, and rely on you as adults to ensure that all members of your group meaningfully contribute to the data gathering, analysis, writing, preparing the final document and preparing and presenting the attendant video presentation.
  - In order to provide some accountability, albeit imperfect, I will ask that each group member fill in a form evaluating the group experience and his/her own contributions and that of his/her group mates. These forms are due along with your paper submission.
  - I will use the aggregate of these forms over the semester to, as necessary, adjust, positively or negatively, this portion of the course grade.

**Feedback and Grading**

- Timely feedback is an essential part of the learning experience, and especially so in an asynchronous on-line offering. As such
  - I will be participating as appropriate in each discussion board / virtual discussion. I will be evaluating students’ contributions using the noted rubric, and will make every attempt to provide discussion board grading by the middle of the week following the closing of each forum.
  - I will grade the two examinations and post each student’s grades to MyGateway within a week of the closure of the examination period.

**Technology Requirements:**

As a student in an online course, you are expected to have access to the Internet almost every day. If you have computing problems, it is your responsibility to address these, or come to campus to use the student computing labs. Problems with your computer or other technology issues are not an excuse for any delays in meeting expectations and deadlines for the course. So, if you have a problem,
get help in solving it immediately. At a minimum, you will need the following software/hardware to participate in this course:

- Computer with an updated operating system
  - Windows 7 (recommended)
  - Mac OSX 10.6 or higher
- Daily access to a computer with minimum specifications:
  - Intel Core 2 Duo (or AMD) – 3GHz processor
  - 2 GB RAM
  - Graphics card and monitor capable of 1024x768 display
  - Stereo sound card, speakers and/or headset, microphone
  - Webcam may be required in courses in some programs
- Supported Internet Browser (please install all)
  - Windows
    - Microsoft Internet Explorer
    - Google Chrome
    - Mozilla Firefox
  - Mac OS
    - Apple Safari
    - Google Chrome
    - Mozilla Firefox
- Ability to navigate MyGateway (Blackboard Learning Management System)
- Internet access is required to participate in online components. A broadband connection (LAN, Cable, or DSL) is highly recommended for optimal student experience. Satellite and/or cellular (3G/4G) may also be used.
- Media Plugins Installed:
  - Windows Media Player

Student Support

Problems with your computer or other technology issues are not an excuse for any delays in meeting expectations and deadlines for the course. So, if you have a problem, get help in solving it immediately. At a minimum, you will need the following software/hardware to participate in this course:
• Computer with an updated operating system (e.g. Windows, Mac, Linux) and to an Internet browser (e.g. Mozilla Firefox, Internet Explorer)
• Ability to navigate MyGateway (Blackboard Learning Management System)
• Minimum Processor Speed of 250 MHz, 400 MHz recommended.
• DSL Internet connection or a connection speed no less than 7 MB/s
• Media player such as Windows Media Player to open course media. Flash player may be required by some aspects of the course and is available as a free download here: http://get.adobe.com/flashplayer/
• Adobe Acrobat to open PDF files throughout the course – available as a free download here: http://get.adobe.com/reader/?promoid=HRZAC

Technology support is provided through the Technology Support Center
• My Gateway (Blackboard): If you have problems logging into your online course, or an issue within the course site, you may contact the Technology Support Center:
  ▪ Phone: (314) 516-6034
  ▪ Email: helpdesk@umsl.edu
  ▪ Website: http://www.umsl.edu/technology/tsc/

____________________________________________________

Academic support is provided through the center for student success and related organizations
• Academic Support
  ▪ The Online Writing Lab: At our My Gateway site, students can send their papers to our tutors, who will read them and send them back with suggestions. Students can also access SafeAssign, which identifies quoted material in their essays.
    ▪ Visit the online Writing Lab page on MyGateway to submit drafts online.
    ▪ We try to respond within 48 hours, but it may take longer, so allow ample time.
  ▪ NetTutor: Online tutoring in many subjects is now available through NetTutor. In your courses on MyGateway, click on Tools and select NetTutor® to log in.
• Student Services:
  ▪ The Center for Student Success offers assistance tailored to specific student needs.
    ▪ 225 Millennium Student Center
    ▪ Phone: (314) 516-5300
    ▪ Email: css@umsl.edu
    ▪ Website: http://www.umsl.edu/services/css/
If you have difficulty communicating in English with the instructor of this course, contact the **Office of International Students and Scholar Services:**

- Phone: (314) 516-5229
- Email: iss@umsl.edu
- Website: [http://www.umsl.edu/~intelstu/index.html](http://www.umsl.edu/~intelstu/index.html)