

SYLLABUS:

Course: IENG 343 – Production Planning and Control

Semester: Spring 2014, CRN 10824, Room 205 MRB, 11:00 AM – 12:15 PM, Tues, Thur

Number of credit hours: 3

Description: Application of industrial engineering theory and practice to the area of operations management and production planning/control. Analysis and understanding of forecasting, aggregate planning, operations strategy, capacity planning, supply-chain management, just-in-time systems, lean manufacturing, agile manufacturing, materials requirement planning, inventory management, short-term scheduling and sequencing, line balancing and other pertinent topics.

Prerequisite: IENG 220, Prerequisite or Concurrent: IENG 314

Textbook: Operations Management, Heizer, J., Render B., Prentice Hall, **Tenth Edition**.

Other Class Materials: APICS Materials, Instructor Handouts, Instructor Lecture

Instructor: Kenton Colvin, MS, CPIM, CIRM, C.P.M.,
Adjunct Professor, IMSE Department
Room: 309A MRB, Email: Kenton.Colvin@mail.wvu.edu or kcolvin@mix.wvu.edu,
Office hours: 9:30 – 10:30 a.m. on Tuesday and Thursday
Other office hours: By appointment

Teaching Assistant: Justin Du, 152 MRB, email yidu@mix.wvu.edu
Office hours: 12 – 2 pm on Fridays

Course Contribution to Professional Component:
Engineering Science - 50 %, Engineering Design - 50 %

Course Topics:

1. Course overview and Principles of Operations and Productivity (1 week)
2. Operations Strategy for Competitive Advantage (1 week)
3. Forecasting Demand (2 week)
4. Design of Goods and Services (1week)
5. Process Strategy and Capacity Planning (1 week)
6. Facilities Management: Layout Strategies (1 week)
7. Material Handling (1 week)
8. Supply-Chain Management (.5 week)
9. Materials Management: Inventory Management and Problems (2 weeks)
10. Production Planning for New Technologies: Just-in-time Systems, Lean Manufacturing, and Agile Manufacturing (1 week)
11. Master Production Planning and Materials Requirements Planning (MRP) (2 weeks)
12. Production Planning: Line Balancing Methods (Heuristic and Stochastic) (1 week)
13. Production Planning: Aggregate Scheduling, Shop Loading, Sequencing (.5 week)

Course Goals:

1. To provide students with the basic concepts related to the interactions between the operations management system parameters and their impact on production and inventory control systems design.
2. To provide students with methodology and models for the generation of company forecasts, materials management cost elements, business operations analysis, productivity, operations strategies for competitive advantage, location strategies, and supply-chain management.
3. To provide students with information on the design and management of operations and production planning/control systems including capacity planning, materials requirements planning, inventory models, scheduling and sequencing, and line balancing for various aspects of the manufacturing and service industry.

Student Learning Objectives:

Upon completing the course, the student will be able to:

1. Develop various operating cost components and business strategies for operations management.
2. Develop and analyze operations performance measurements and analysis for continuous improvement.
3. Describe and determine the effect of product, process, inventory costs, product forecasting, operations strategies, and schedule design parameters on design of materials requirements planning, inventory planning, capacity planning, and production planning/control systems.
4. Apply and analyze forecasting models to develop business enterprise forecasts for product demand, profits, sales, material requirements, capacity requirements, etc.
5. Identify the impact of production/inventory cost decisions and operations strategies on the break-even, return on investment and profit analysis of a business enterprise.
6. Develop and analyze production and inventory planning/control systems, and scheduling techniques by using engineering techniques for a complete production facility.
7. Perform and analyze methods of evaluating operations location alternatives.
8. Develop and analyze the capacity planning process. Identify characteristics and relationship to business operations in regard to managing product demand versus product capacity.
9. Design, develop, and analyze a Master Production Schedule and a resultant Materials Requirement Plan (MRP) for a complete production facility.

Course Relationship to Program Educational Outcomes:

The course relates strongly to the following program educational outcomes:

1. The course enables the students to acquire the ability to use modern and classical industrial engineering methodologies pertaining to production and inventory control systems. (Outcome 1). The key abilities the students will acquire are as follows:
 - a) Develop and evaluate *capacity planning* (including managing capacity and demand and the development and analysis of various operations and location strategies for competitive advantage)
 - b) Ability to use and compare various statistical *forecasting models*
 - c) Use and analysis of *inventory models* for independent and dependent demand (including determining and evaluating the impact of inventory holding, ordering, and setup costs)
 - d) Application of various *Materials Requirement Planning* models (including the analysis of various lot-sizing techniques and order policies and the development and evaluation of Master Production Plans and Master Scheduling)
 - e) Application and evaluation of *scheduling and sequencing* methodologies
 - f) Application of *line balancing* methodologies.
 - g) Application of JIT, Lean Manufacturing, and Agile Manufacturing methodologies.
 - h) Application of *layout and material handling* strategies and methodologies.

2. The course enables the students to acquire the ability to design and conduct experiments, analyze and interpret data, develop implementation strategies, shape recommendations so that results will be achieved and findings will be communicated effectively. (Outcome 3). The key abilities the students will acquire are as follows:
 - a) Analyze and interpret system data.
 - b) Develop recommendations that are specific, practical, and cost effective.
 - c) Conduct an analysis of different alternatives and make appropriate recommendations.
 - d) Gather information from a variety of sources including publications, the Internet, and reference materials.
 - a) Apply statistical methodology to decision making.
 - e) Apply measurements of processes and systems and compare results both graphically and using mathematical methodology.
 - f) Communicate the results of the analysis in an engineering project report.

3. The course enables students to acquire the ability to design integrated operations management and production/inventory control systems that include people, materials, information, product design, business strategies, performance measurements, material handling, layout design, and cost information. (Outcome 5). The key abilities the students will acquire are as follows:
 - a) Conduct a staffing analysis of a system to ensure that the correct level of staffing is provided for cost-efficient productive operations
 - b) Select operating strategies to be integrated with the enterprise mission and the materials management, and inventory/production control systems
 - c) Develop materials requirements for a system including inventory levels, ordering policies, lot-sizes, material costs, and material demand.
 - d) Apply management of capacity and demand methodologies in developing and improving the inventory planning and control systems

Grading:

- Exams – 30%
- Projects – 34%
- In Class Quizzes, Attendance and Homework – 4%
- Final Exam – 32%

Note: In class quizzes may be given during any class period without prior announcement. Late homework = no homework. Homework is due at the beginning of class on the due date.

Grading Scale:

- A = 90 – 100%
- B = 80 – 89%
- C = 70 – 79%
- D = 60 – 69%
- F = 59% or less

Statement on Attendance:

Student attendance is mandatory unless excused by the instructor. The basis for an excused absence will follow University and IMSE policy. Students who are absent from class for any reason are responsible for all missed work. Students absent for a scheduled exam will not be given a make-up examination without a valid and reasonable excuse given prior to the exam being conducted. This should be a valid and reasonable excuse in the view of the instructor based on appropriate supporting and verifiable documentation presented by the student. In the event a make up exam is given to a student, it should be understood that the exam will be given along

with the final exam and will be different in format and possibly slightly different in the level of difficulty when compared to the exam given to all the others. Students who miss a quiz will not be given a make-up quiz. Students who miss the final exam will not be given a make-up exam. Late assignments and homework will not be accepted. The basis for an *excused absence* will follow University policy. Students who have a documented *excused absence* must make arrangements with the instructor to make up any class work they missed during their absence. Students who anticipate missing class because they are representing the university (WVU team athletes, band members, etc.), must provide the instructor with appropriate documentation of the event and make arrangements for make-up work, BEFORE the absence. Any exception will be allowed at the sole discretion of the instructor.

Days of Special Concern:

WVU recognizes the diversity of its students and the needs of those who wish to be absent from class to participate in Days of Special Concern, which are listed in the Schedule of Courses. Students should notify their instructors by the end of the second week of classes or prior to the first Day of Special Concern, whichever is earlier, regarding Day of Special Concern observances that will affect their attendance. Further, students must abide by the attendance policy of their instructors as stated on their syllabi. Faculty will make reasonable accommodation for tests or field trips that a student misses as a result of observing a Day of Special Concern

Statement on Student Behavior in the Classroom:

Since you are all professionals in training, you are expected to conduct yourself in a professional manner while in this class. For instance, while the class is in progress, everyone is expected to remove hats and sunglasses, put away the newspaper, *refrain from eating and drinking*, and *turn off cell phones*. Students are expected NOT to talk to other students or laugh or create any such unwanted noise or other disruptions during the class period. Disruptive students will be warned during the class period that such behavior will not be tolerated and will possibly be re-seated. If disruption continues, the student will be required to leave the class and be referred to the Department Chair and/or other administrators for disciplinary action.

Statement on Disability Accommodations:

If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise the instructor and make appropriate arrangements with the Office of Disability Services (304-293-6700).

IMPORTANT DATES TO REMEMBER – PLEASE MARK YOUR CALENDARS!

Last Day to Register	Tuesday, January 24, 2014
Martin Luther Recess	Monday, January 20, 2014
Mid-Semester	Friday, February 28, 2014
Last Day to Drop a Class	Friday, March 7, 2014
Spring Break Recess	March 10-14, 2014
Before Easter Recess	Friday, April 18, 2014
Last Day of Classes	Friday, April 25, 2014
Final Exam Week	April 28 – May 2, 2014

Prepared By: Kenton Colvin, IMSE Department
For: IMSE Department, CEMR Spring 2014