

Syllabus: IENG343 Final – Production Planning and Control

Semester: Fall 2018, CRN 82946

Time and Location: Room 205, MRB 9:30 AM – 11:45 AM, Tuesday and Thursday

Number of credit hours: 3

Type of course: Required

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 213

Textbook: Principles of Operations Management: Sustainability and Supply Chain Management, Student Value Edition 10e – Jay Heizer, Texas Luthern University – SBN – 13: 0134183959 / 9780134183954

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

Course Web-Site: WVU eCampus

Instructor: Mr. Kenton Colvin, MS, CPIM, CIRM, C.P.M.
Adjunct Instructor

Room 331 ESB, Email: Kenton.Colvin@mail.wvu.edu

Office hours: Tuesday & Thursday 8:15 am – 9:15 am and 11:00 am – 12:00 pm

Other hours: by appointment (Appointments must be kept or the student must cancel at least 1 hour prior to appointment time or grade will be impacted).

Teaching Assistant: Josh Slocum

Room 335 ESB, Email: jhslocum@mix.wvu.edu

Office hours: Monday 2:30 pm – 3:30 pm and Wednesday 11:00 am – 11:50 am

Other hours: By appointment

Course Contribution to Professional Component:

Engineering Science - 50 %, Engineering Design - 50 %

Course Topics:

1. Course overview and Principles of Operations and Productivity (.5 week)
2. Operations Strategies (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 (.5 week)
7. Supply-Chain Management (1 week)
8. Materials Management: Inventory Management and Problems (2.5 weeks)
9. Production Planning for New Technologies: Just-in-time Systems, Lean Manufacturing, and Agile Manufacturing (2 weeks)
10. Master Production Planning and Materials Requirements Planning (MRP) (2 weeks)
11. Production Planning: Line Balancing Methods (Heuristic and Stochastic) (1 week)
12. 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.
4. To provide students with all the production and inventory control systems related to Just-in-Time, Lean Manufacturing and Agile Manufacturing methodologies.

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. Develop and analyze the capacity planning process. Identify characteristics and relationship to business operations in regard to managing product demand versus product capacity.

8. Design, develop, and analyze a Master Production Schedule and a resultant Materials Requirement Plan (MRP) for a complete production facility.
9. Design, develop and analyze production and inventory control processes with respect to Just-in-Time, Lean Manufacturing and Agile Manufacturing methodologies.
10. Analyze the impact on the company workers with respect to their role in production and inventory control.

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 (includes 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 Just-in-Time, Lean Manufacturing, Agile Manufacturing methodologies.
 - h) Application of *layout and team work* 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.
 - e) Apply statistical methodology to decision making.
 - f) Apply measurements of processes and systems and compare results both graphically and using mathematical methodology.
 - g) Communicate the results of the analysis in engineering project reports.
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 and quizzes	30%
➤ Projects	40%
➤ Attendance, class participation and homework	5%
➤ Final Exam (Thursday, December 13, 5 – 7 pm)	<u>25%</u>
Total	100%

This course is **project driven** with 5 projects that build upon the previous project. The student will set up their own company and products and apply all course material to their own company.

In class **quizzes** may be given during any class period without prior announcement. Late homework = no homework unless approved by instructor. Homework is due at the beginning of class on the due date. Classroom participation is expected.

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. Students who are absent from class for any reason are expected to take full responsibility for their own academic work and progress and are required to complete missed work or equivalent work, as deemed appropriate by the instructor.

Excused absences are absences in which the instructor agrees to provide an opportunity to make up missed class work or activities (e.g. assignments, exams). Events that justify an excused absence include religious observances, **mandatory military obligation**, mandatory court appearances, and participation in university activities at the request of university authorities. Other events may justify an excused absence at the discretion of the instructor or program. Students should let the instructor know prior to class via email or in person of any missed class. Instructors appropriately notified regarding anticipated absences may use their judgment as to whether to allow make-up work.

Instructors may require written documentation in advance of the absence from the academic or athletic unit sponsoring the activity for students participating at West Virginia University representative in official activities scheduled by academic or athletic units.

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 makeup 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 without prior arrangements made with the instructor.

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. *Although some lecture notes are placed on ecampus, the notes are incomplete.* The instructor may refuse office time for questions on material due to class absence of the student.

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 ***turn off cell phones***. Students may drink with containers that have lids on them. 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.

ACADEMIC INTEGRITY:

The integrity of the classes offered by any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud. Therefore, instructors will enforce rigorous standards of academic integrity in all aspects and assignments of their courses. For the detailed policy of West Virginia University regarding the definitions of acts considered to fall under academic dishonesty and possible ensuing sanctions, please see the West Virginia University [Academic Standards Policy](http://catalog.wvu.edu/undergraduate/coursecredittermsclassification) (<http://catalog.wvu.edu/undergraduate/coursecredittermsclassification>). Should you have any

questions about possibly improper research citations or references, or any other activity that may be interpreted as an attempt at academic dishonesty, please see your instructor *before* the assignment is due to discuss the matter.

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

WVU INCLUSIVITY STATEMENT:

The West Virginia University community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with the Office of Accessibility Services (293-6700). For more information on WVU's Diversity, Equity, and Inclusion initiatives, please see <http://diversity.wvu.edu>.

Adverse Weather Statement:

In the event of inclement or threatening weather, everyone should use his or her best judgment regarding travel to and from campus. Safety should be the main concern. If you cannot get to class because of adverse weather conditions, you should contact your instructor as soon as possible. Similarly, if your instructor(s) are unable to reach the class location, they will notify you of any cancellation or change as soon as possible, using agreed upon methods to prevent students from embarking on any unnecessary travel. If you cannot get to class because of weather conditions, instructors will make allowances relative to required attendance policies, as well as any scheduled tests, quizzes, or other assessments.

Campus Safety Statement:

The WVU Police are committed to creating and maintaining a safe learning environment for all students, faculty, and staff. Part of this mission includes educating the campus community on how to respond to potential campus threats, such as the threat of an active shooter on campus or other suspicious behaviors. Fortunately, WVU Police offer training - both online and in-person - on how to handle a variety of campus safety scenarios. All students are encouraged to visit the [WVU Police](https://police.wvu.edu/) (https://police.wvu.edu/) webpage, in particular the content under the [Active Shooter](https://police.wvu.edu/training) (https://police.wvu.edu/training) training program. Students are also encouraged to report any suspicious behaviors on campus using the [Report a Threat](https://police.wvu.edu/emergency-management/threat-assessment) (https://police.wvu.edu/emergency-management/threat-assessment) portion of the webpage. Additional materials on campus safety prepared by WVU Police, including special safety tips and training, will also be provided on our eCampus page.

Sale of Course Material Statement:

All course materials, including lectures, class notes, quizzes, exams, handouts, presentations, and other course materials provided to students for their courses are protected intellectual property. As such, the unauthorized purchase or sale of these materials may result in disciplinary sanctions under the [Student Conduct Code](#).

(<https://studentconduct.wvu.edu/policies-and-procedures>)

Sexual Misconduct Statement:

West Virginia University does not tolerate sexual misconduct, including harassment, stalking, sexual assault, sexual exploitation, or relationship violence [[BOG Policy 44](#)]. It is important for you to know that there are resources available if you or someone you know needs assistance. You may speak to a member of university administration, faculty, or staff; keep in mind that they have an obligation to report the incident to the [Title IX Coordinator](#).

(<https://titleix.wvu.edu/staff>)

If you want to speak to someone who is permitted to keep your disclosure confidential, please seek assistance from the [Carruth Center](#), 304-293-9355 or 304-293-4431 (24-hour hotline), and locally within the community at the [Rape and Domestic Violence Information Center](#) (RDVIC), 304- 292-5100 or 304-292-4431 (24-hour hotline).

Student Evaluation of Instruction Statement :

Effective teaching is a primary mission of West Virginia University. Student evaluation of instruction provides the university and the instructor with feedback about your experiences in the course for review and course improvement. Your participation in the evaluation of course instruction is both strongly encouraged and highly valued. Results are strictly confidential, anonymous, and not available to the instructor until after final grades are released by Admissions and Records. Information about how you can complete this evaluation will be provided by your instructor.

Incomplete Grades:

A grade of I (Incomplete) is a temporary grade assignment used when unforeseen, non-academic circumstances arise that prohibit students from completing the last course assignments or examinations at the end of the semester. The grade of Incomplete is typically assigned because of an excused absence from the final examination, or because assignments are unavoidably incomplete, as determined by the instructor. Generally, the student will have been active in the course up until the last day of the 13th week of classes and earned at least a D- to be eligible to request an incomplete. An instructor may not assign a grade of I without the student's agreement and an Incomplete Contract on file. If a student has not requested an Incomplete, or the request for an Incomplete grade has been denied, the instructor should assign the grade earned in the course. Within the Incomplete Contract, the instructor is required to indicate a grade earned for the course assuming no additional work will be completed. Should the signed contract not be fulfilled, the instructor must either submit a grade of F or the grade indicated in the contract.