

**APS1028 Operations and Production Management - 10 Day Spring 2017 (9AM- Noon)  
Weeks; 5<sup>th</sup> June to 9<sup>th</sup> June 2017 and 19<sup>th</sup> June to 23<sup>rd</sup> June 2017: Room SF3201**

## **Course Outline**

Operations Management is the systematic approach and control of the processes that transform inputs (e.g. human resources, facilities, materials, Information systems etc.) into finished goods and services. The operations function consists of the core wealth creation processes of a business and helps an organization to efficiently achieve its mission while constantly increasing productivity and quality. This course focuses on the role of operations management as a strategic element of the total organization. We will cover classic and up-to-date tools and concepts used to support operational managerial decisions. **The course is tailored for engineers that aspire to senior management positions starting as departmental / functional managers of operations or engineering, and then progressing to directors, VP Operations, VP Manufacturing and eventually becoming a Chief Operations Officer (COO) of a small to large scale enterprise.**

## **Course Objectives**

**Upon course completion, the participants will be able to:**

- 1) To gain an understanding and appreciation of the principles and applications relevant to the planning, design, and operations of manufacturing/service firms.
- 2) To develop skills necessary to effectively analyze and synthesize the many inter-relationships inherent in complex socio-economic productive systems.
- 3) To reinforce analytical skills already learned, and build on these skills to further increase your "portfolio" of useful analytical tools for operations tasks.
- 4) To gain some ability to recognize situations in a production system environment that suggests the use of certain quantitative methods to assist in decision making on operations management and strategy.
- 5) To understand how Enterprise Resource Planning and MRPII CAD / CAM/CIM and automated factory systems are used in managing operations
- 6) To increase the knowledge, and broaden the perspective of the world in which you will contribute your talents and leadership in business operations.
- 7) To understand the managerial responsibility for Operations, even when production is outsourced, or performed in regions far from corporate headquarters.

## **Learning outcomes**

**Knowledge and Comprehension:**

- Understand the core features of the operations and production management function at the operational and strategic levels, specifically the relationships between people, process, technology, productivity and quality and how it contributes to the competitiveness of firms.
- Explain the various parts of the operations and production management processes and their interaction with other business functions (strategy, engineering, finance, marketing, HRM, project management and innovation)

**Intellectual Skills (Analysis and Synthesis)**

- Students will develop an integrated framework for strategic thinking and decision making to analyze the enterprise as a whole with a specific focus on the wealth creation processes
- **Be prepared to engage in a career path into senior operational management that can eventually lead to a C-Level role in a small to very large enterprise**

**Practical Skills (Application and Evaluation) Students will be able:**

- Develop the ability to identify operational methodologies to assess and improve an organizations performance
- Assess the OPM function performance and capabilities in various organizations
- To communicate effectively through discussion in seminars, teamwork and writing in discussion board, critiques and a project report
- To gather, organize and deploy evidence, data and information to make decisions.
- To plan and carry out work independently and to be self-disciplined and self-directed.
- To develop the skills of insight and critical evaluation.

**Course Grading:** The components of the final course grade will be weighted as follows:

Final Team Report (5% Charter and Summary ppt 10%)	40%
In Class Participation (team presentations and discussions)	50%
Written Book or Special Interest Review (CR2) & Possible Verbal (1 off)	10%

In Class Participation will determine 50% of the grade. **A Rubric and discussion samples are available on the course web site that details best practice techniques for engaging in discussions.** 40% of the grade will be determined by the final team project report. 10% will be one written CR paper - a **book review or integrated case study or special interest topic** (between 1,000-1,500 words). **It is absolutely essential that students have a working level ability of English – Reading, Writing and Verbal.**

**Class Participation** The course will be taught through a combination of video lectures (40-50 minutes), live in-class lectures, critical review presentations, in-class and online discussions. Because of this style of teaching, **regular class attendance is mandatory. Please don't underestimate this requirement your learning experience will - be enhanced through participation and teamwork.** I understand, though, that occasions do arise where you have to miss a class. Therefore, I will allow each student *one unexcused absence without any penalty.* In all cases, I greatly appreciate advanced notice if you will not be in class. Showing up is

necessary but not sufficient, however, to achieve success in the class preparation for interaction in each class is vital.

**Critical Review papers, presentations or discussions.** Critical reviews are written papers or discussions (800 – 1500 words –**depends on the context**). Online students will produce a 6-minute video presentation. Critical reviews will be reactions to lectures and also consist of readings from each theme. The critical review readings can be from scholarly papers listed in the assignment reading list and on the course web site – there are lots of choices. There are three prime books; “*Operations Management*” Heizer & Render. 7<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup> or 10<sup>th</sup> Edition,” Pearson (2011), “*Strategic Operations Management*” Brown, Bessant, Lamming. Routledge, 3<sup>rd</sup> Edition, (2013), “*Operations Management, Integrating Manufacturing and Services*” Davies & Heinke, McGraw Hill (2005). It is not mandatory to buy these books but they can be a good reference in the future. There are other texts available in the library that we will refer to throughout the course. They are listed in the reading assignment document. It is important that you think critically – what are the benefits and pitfalls of the author’s views?

**Final Project Report.** Students will form into teams. Teams will be formed in week 1 (by day 3 for the 10 day course). A list of project topics will be generated by week 2 and finalized by week 3 or 4. For the final project report you are free to select a topic in OPM that interests you. The goal of the final project report is not to do original field research, but to demonstrate to me your ability to do research on a topic and synthesize into a cohesive body of knowledge. The final report should be double-spaced, 12 point font, (approximately 1500 - 2000 words per student). Timing is very important in OPM! **A hard copy and a soft copy of the paper** (Adobe Acrobat PDF) must be delivered electronically no later than **3rd July at 4pm** - the hard copy to be given to the mechanical & industrial engineering graduate office

**Please note:** for guidance purposes summaries of team project reports from other courses team projects (2010 – 2017) classes are available at the following link:  
<http://amgimanagement.com/founder/teaching.html>

**Office Hours.** Because I am part time faculty it will be difficult to meet all of you individually in a timely manner because of the class size but I will endeavor to answer email queries.

### **Important Dates:**

- 5<sup>th</sup> June – First Seminar (Mod 0 & Mod1): Orientation – Overview, Planning, and Reading Assignments and OM Introduction
- 2<sup>nd</sup> June– Team Charter Due- Submit physical copy in class
- 23<sup>th</sup> June – Last Seminar and submission of Special interest paper or Book Review
- 23<sup>th</sup> June - Final Report Summary PPT Presentation
- 3<sup>rd</sup> July–Final Report Submit to Engineering Reception 44 St George St
- Mid July– All coursework grades submitted

**Course Structure and Content:** Operations and Production Management is divided into 3 themes and 13 modules:

## **Part I – Operations and Production Management in Context**

### **Mod 0: Orientation, instructor background, syllabus overview**

- Overview of the entire course
- Grading structure (Critical Reviews, Book Review, Discussions, Projects)
- Web site layout and operation
- Project team formation and operation – Review past projects
- Critical Thinking and Performance Rubric
- Course Value in Career Planning – Levels of Management Thinking

### **Mod 1: (5<sup>th</sup> June) Operations and Production (OPM) Introduction**

- What is Operations and Production Management?
- Organizing To Produce Goods and Services
- Why Study OPM?
- What Operations and Production Managers do – Careers
- The Professional Engineer and OPM
- Where are the OPM Jobs?
- Operations in the Service Sector
- New Trends and Operation and Production Management
- The Productivity Issue

#### **Important Link to My Company Web Site (Advanced Manufacturing Systems Projects)**

- This is a link to real practical work that I performed on employer / client projects over 30 years. You can choose an area that you are interested in as a team project or to do a special interest topic or even to do a critical review. They are quite narrow specialized in depth topics (real expert practitioner oriented - not abstract theoretical). I will send you the paper (if I have it). These are very much focused on the advanced manufacturing systems—varies by industry sectors. Please ignore the Business Transformation section - this is included in the APS1012 – Management of Innovation and Change.

<http://www.amgimanagement.com/online.html>

### **Mod 2: (6<sup>th</sup> June) OM Strategy Development and Implementation**

- **Developing Mission and Strategies:** (Mission and Strategy)
- **Achieving Competitive Advantage Through Operations** (Competing on Differentiation, Competing on Cost, Competing on Response)
- **Ten Strategic OM Decisions**
- **Issues in Operations Strategy** (Research, Preconditions, Dynamics)
- **Strategy Development and Implementation** (Identify Critical Success Factors, A Global view of Operations Cultural and Ethical Issues, Build and Staff the Organization, Integrate OM with Other Activities)
- **Global Operations Strategy Options** (International Strategy, Multi-domestic Strategy, Global Strategy, Transnational Strategy)

### **Mod 3 (7<sup>th</sup> June) Role of Technology in Operations and Manufacturing**

- Types of information systems that exist in an organization.
- How technology can add value to the operations function within an organization.
- Identify the ways technology can be used in a manufacturing company.

- Enterprise resource planning (ERP) systems and how they can affect an organization.
- CAD/CAM/CAE/CIM
- Demonstrate the ways technology can be integrated into service operations.
- Present a framework for defining the types of e-services currently being offered

## **Part 2 – Designing and Building the Operations Function**

### **Mod 4: (8<sup>th</sup> June) Product Design**

- Goods and services selection
- Generating new products
- Product development
- Issues for product design
- Time-based competition
- Defining the product
- Documents for production
- Service design

### **Mod 5: (9<sup>th</sup> June) Process Design and Plant Layout**

- Four Process Strategies
- Process Analysis and Design
- Service Process Design
- Selection of Equipment and Technology
- Production Technology
- Technology in Service Industry
- Environmentally Friendly Processes
- Business Process Reengineering

### **Mod 6: (9<sup>th</sup> June) Plant Location**

- **Global company profile:** Federal Express
- **The strategic importance of location**
- **Factors affecting location decisions** (Labor Productivity, Exchange Rates and Currency Risks, Costs, Attitudes, Proximity to Markets, Proximity to Suppliers, Proximity to Competitors (Clustering))
- **Methods of evaluating location alternatives** (The Factor-Rating Method, Location Break-Even Analysis, Center-of-Gravity Method, The Transportation Method)
- **Service Location Strategy** (How Hotel Chains Select Sites, The Telemarketing Industry, Geographic Information Systems)

### **Mod 7: (19<sup>th</sup> June) Work System and Job Design**

- **Human resource strategy for competitive advantage**
- **Labor Planning** (Employment-Stability Policies, Work Schedules, Job Classifications and Work Rules)

- **Job Design** (Labor Specialization, Job Expansion, Psychological Components of Job Design, Self-Directed Teams, Motivation and Incentive Systems, Ergonomics and Work Methods)
- **The visual workplace**
- **Labor standards**

## **Part 3 – Operations Planning, Execution, & Control**

### **Mod 8: (20<sup>th</sup> June) Inventory Management**

- **Functions Of Inventory** (Types and classifications of Inventory)
- **Inventory Management** (ABC Analysis, Record Accuracy, Cycle Counting, Control of Service Inventories)
- **Inventory Models** (Independent Versus Dependent Demand, Holding, Ordering, And Setup Costs)
- **Inventory Models For Independent Demand** (Basic Economic Order Quantity (EOQ) Model, Minimizing Costs, Reorder Points, Production Order Quantity Model, Quantity Discount Models)

### **Mod 9: (20<sup>th</sup> June) Advanced MFging Systems–Tailored to Class Interest**

- **MRP, MRPII, ERP Structure**
- **MRPII, ERP Management** (MRP Dynamics, MRP and JIT)
- **Lot-Sizing Techniques**
- **Extensions of MRP** (Material Requirements Planning, MRP II, Closed-Loop MRP, Capacity Planning)
- **MRP In Services** (Distribution Resource Planning - DRP)
- **Enterprise Resource Planning - ERP** (Advantages and Disadvantages of ERP Systems, ERP in the Service Sector)
- **Computer Integrated Manufacturing** - CAD/CAM/CAE/Factory Automation

### **Mod 10: (21<sup>st</sup> June) Lean and JIT**

- **Global Company Profile: Toyota Motor Corporation**
- **Just-in-Time, the Toyota Production System, and Lean Operations** (Eliminate Waste, Remove Variability, Improve Throughput)
- **Just-in-Time** (JIT Partnerships, Concerns of Suppliers)
- **JIT Layout** (Distance Reduction, Increased Flexibility, Impact on Employees, Reduced Space and Inventory)
- **Just-in-Time** (JIT Partnerships, Concerns of Suppliers)
- **JIT Layout** (Distance Reduction, Increased Flexibility, Impact on Employees, Reduced Space and Inventory)
- **JIT Inventory**
- **Reduce Variability** (Reduce Inventory, Reduce Lot Sizes, Reduce Setup Costs)
- **JIT Scheduling** (Level Scheduling, Kanban system)
- **JIT Quality**

- **Toyota Production System** (Continuous Improvement, Respect for People, Standard Work Practices)
- **Lean Operations** (Building a Lean Organization)
- **Lean Operations in Services**

### **Mod 11: (22<sup>nd</sup> June) Project Management in Engineer To Order Operations**

- **Engineer to Order Manufacturing Companies**
- **The importance of project management**
- **Project Planning** (The Project Manager, Work Breakdown Structure)
- **Project Scheduling**
- **Project Control**
- **Project Management Techniques: PERT AND CPM** (Network Diagrams and Approaches, Activity on Node Example)
- **Determining the Project Schedule** (Forward Pass, Backward Pass, Calculating Slack Time and Identifying the Critical Path)

### **Mod 12- (23<sup>rd</sup> June) Maintenance Management**

- **The strategic importance of maintenance and reliability)**
- **Reliability** (Improving Individual Components, Providing Redundancy)
- **Maintenance** (Implementing Preventive Maintenance, Increasing Repair Capability)
- **Total Productive Maintenance**
- **Techniques for establishing maintenance policies**

### **Mod 13: (23<sup>rd</sup> June) Total Quality Management**

- **Quality and Strategy**
- **Defining quality** (Implications of Quality, Malcolm Baldrige National Quality Award, Cost of Quality (COQ))
- **International Quality Standards**
- **Total Quality Management** (Continuous Improvement, Employee Empowerment, Benchmarking, Just-in-Time (JIT), Taguchi Concepts, Knowledge of TQM Tools)
- **Tools of TQM** (Check sheets, Scatter Diagrams, Cause-and-Effect Diagram, Pareto Charts, Flow Charts, Histograms, Statistical Process Control (SPC))
- **TQM in services**

## **Other Optional Modules**

**Mod 14. Applied Computer Integrated Manufacturing (CAD/CAE/CAPP/FMS)**

**Mod 15. Aggregate Production Planning**

**Mod 16. Sales and Operational Planning**

**Mod 17. Forecasting for OPM**

**Mod 18: Masters Production Scheduling (MPS)**

**Mod 19. Bills of Material Structuring and Management**

**Mod 20. Work Centre and Routing Management**

**Mod 21. Distribution Resource Planning (DRP)**

**Mod 22. Rough Cut Capacity Planning (RCCP)**

**Mod 23. Material Requirement Planning**

**Mod 24. Short Term Scheduling**

**Mod 25. Capacity Requirements Planning**

**Mod 26. Purchasing Management**

**Mod 27. Production Activity and Shop Floor Control**

**Mod 28. Manufacturing Strategy**

**Mod 29: Planning, developing, implementing an ERP Manufacturing system**

**Mod 30. MRPII / ERP Performance Measurement**

**Mod 31. ERP History (MRP – MRP II – ERP – ERP II)**

**Mod 32. Supply Chain Management and ERP**

**Mod 33. 16 Steps to ERP Success**

**Mod 34. ERP ABCD Best Practice Checklist**

**Mod 35. ERP Cost Benefit Analysis**

**Mod 36. Achieving Data Accuracy**

**Mod 37. Business Process Management / Process Reengineering**

**Mod 38. Product Data / Life Cycle Management**

**Mod 39. OPM and the Management of Innovation**

**Mod 40. Systems Engineering Approach in OM**

**Mod 41. Applying Concurrent Engineering / DFM in OM**

**Mod 42. New Product Development Management**

**Mod 43. Management of Technology**