



industrial & systems engineering

WAYNE STATE UNIVERSITY COLLEGE OF ENGINEERING

## The Operations Management Leadership Program (OMLP)

### Program Background

The Operations Management Leadership Program (OMLP) focuses in two exciting areas, manufacturing (automotive, components, etc.) and service (health care, utilities, etc.) operations.

**Manufacturing:** American manufacturing faces a difficult challenge, attracting Industrial Engineers into careers in manufacturing operations and providing them with a multi-dimensional education that will prepare them for their first jobs. The program is designed to address the continuing need for technically trained, first-line production management supervisors in manufacturing organizations

**Service:** A growing area of need for Industrial Engineers is in the service sector. Service operations also face the challenge of attracting Industrial Engineers into careers in service industries and providing them with a multi-dimensional education that will prepare them for their first jobs. The program is designed to address the continuing need for technically trained engineers to improve operations and productivity in health care and utilities organizations.

The Operations Management Leadership Program (OMLP) is an industry/service organization-academic partnership. Leveraging a blend of traditional industrial engineering, cross-disciplinary and newly designed courses with sponsored internships and job placement, the OMLP represents an innovative approach to undergraduate engineering education.

Upon graduation from the Bachelors in Industrial Engineering (BSIE) program, students will have the necessary skill sets and practical experience for a smooth transition into leadership positions that maximize their background education in quality, management, labor relations, communications, analytical problem solving, and systems. Our goal is to graduate high-potential, immediately employable, operations managers for the benefit of local manufacturing and service organizations.



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## Program Content

The basic undergraduate curriculum in industrial engineering provides a wide-ranging foundation that we will expand and focus on manufacturing management. Operations managers need a broad range of communication and leadership skills. Currently, Wayne State University engineering students take the college freshmen writing course which is then followed by a two course sequence, English 3050 and English 3060 that are designed primarily for engineers.

**Technical Communication I: Report Writing.** This course provides instruction in basic technical writing skills. Requirements include writing letters and memos, summaries,

technical instructions, proposals, and reports. Topics include: audience and purpose analysis, visual support of texts, and formatting.

**Technical Communication II: Writing and Speaking.** This course is a continuation of the technical reporting techniques introduced in ENG 3050, emphasizing instruction and practice in oral technical reporting. Requirements include: process demonstrations, mechanism descriptions, press conferences, and a group project culminating in a written feasibility report and formal oral.

There will be three additional managerial skills courses required for students selecting the Production Management Leadership Program option: 1) Organizational Behavior, 2) Labor Relations in a Plant, and 3) Project and Program Management.

**Leadership:** The course will emphasize interpersonal and group skills in the context of a plant. It will cover the topics of motivation, communication, leadership, organizational development, group functions and processes. The course explores how to achieve alignment of personal and group goals.

**Labor Relations:** Managing a unionized workforce in manufacturing or service industries is the theme of this course. The course will emphasize interpersonal and group skills in the context of a plant. Specific issues to be addressed are conflict resolution and preventing and handling grievances.

**Project and Program Management.** This course presents project management strategies, tools and techniques. Students will develop skills in planning and commissioning the reconfiguration of process equipment.



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The development of interpersonal and leadership skills will not be limited to the above courses. In many of the classes, students will be organized into teams to complete projects. Supervisory responsibilities will be rotated. Team members will assess their leadership performance. These will be tracked throughout their curriculum and coaching will be provided by experienced managers. A leadership component will be expected during internships and participating companies will be encouraged to place students in small leadership supervisory situations where feedback from the assignment will be provided for leadership development purposes.

The undergraduate industrial engineering curriculum already includes a large number of courses that are important for first line supervisors. One group of three basic courses listed below has direct relevance to manufacturing consistently high quality products.

**Probability and Statistics in Engineering.** This course provides an introduction to probability theory and statistics with an emphasis on engineering data analysis and design methods that recognize the concept of variability. The course also provides an introduction to statistical process control (SPC), hypothesis testing, regression, design of experiments (DOE), and ANOVA.

**Advanced Engineering and Manufacturing Data Analysis.** The course develops advanced concepts for the analysis of variability in engineering problems with a special emphasis on understanding variability in manufacturing and assembly processes. Other topics to be covered include time series analysis and forecasting. This course will also cover the basics of Taguchi methods and Six Sigma.

**Principles of Quality Control.** Statistical quality control including process capability, control charts, and acceptance sampling procedures are covered in this course. Procedures for geometric dimensioning and tolerancing are introduced. Computer-based data collection and analysis are also discussed.

A second set of five courses teaches students about manufacturing operations from multiple perspectives. The first course, Work Environment, focuses on the role of the individual. The second, Manufacturing Processes, explores the technical engineering issues of manufacturing. The third course, Production Control, explores the internal production system from beginning to end. The fourth course, Facility Design, focuses on the facility and its role in the supply chain. The last course, Information Systems, discusses the role of information systems in the manufacturing environment.

**Work Environment and Lean Processes.** The course explores the role of the human as an element of the work environment. Traditional issues of work standards, productivity from an ergonomic perspective, and occupational safety are introduced. Students will



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learn to use computer-based technologies for work-cell design and also study the principles of lean operations.

**Manufacturing Processes.** Topics include: processing of metals, polymers, and ceramics, and computer-aided manufacturing.

**Production Control.** The design of production planning and control systems is the focus of this course. Topics include materials management, forecasting, planning, scheduling of production systems, the planning and scheduling of large scale projects and introduction to the design of computerized materials management systems. This course also introduces the principles of Theory of Constraints.

**Facilities Design.** Design of manufacturing, warehouse and material handling facilities. Use of analytic and computer-aided methods in the facilities design process.

**Information Systems for the Manufacturing Enterprise.** This course introduces students to methods for information flow modeling. Students learn about the information needs of global manufacturer: design, testing, manufacture, and delivery. Special attention is given to the role of IT in managing supplier relationships.

The industrial engineering curriculum also provides three advanced, analytic skills courses. One course focuses on economic analysis. The second course, Systems Simulation, is the primary modeling tool manufacturing systems designers use to determine the throughput of a production line and identify and resolve potential bottlenecks. The third course, Operations Research, covers an array of analytic decision modeling tools and explores the context in which each of these tools can be used.

**Engineering Economy.** Economic analysis of engineering projects is the theme of this course. Topics covered include selection of appropriate interest rates and methods of analysis, analysis and evaluation of alternatives, depreciation and tax considerations, and use of cost accounting to compare investment alternatives.

**Systems Simulation.** Systems modeling and discrete event simulation. Methodology applied to analysis and design of a broad range of systems including both production and service systems.

**Operations Research and Structured Decision Making.** The course provides students an understanding of the dynamics of decision making and also provides them with math modeling tools to structure decisions involving uncertainty and multiple objectives. They



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will also learn about a variety of other OR modeling tools including math programming and queuing models.

## Practicum

There is only so much you can learn about manufacturing management in a classroom. Before someone commits to a career in manufacturing and service operations, they should understand what they are likely to face. The OMLP curriculum will have a requirement for a three-month summer internship or co-op experience. That experience will include a requirement that involves writing an in-depth analysis of one aspect of the internship experience.

**Internship (or Co-op) experience.** The practicum will be carefully designed and overseen so as to provide the intern with actual supervisory experience. The experience will have to be tailored so as to be within realistic bounds of the capabilities of a college student.

**Day-to-Day Plant Operations and Continuous Improvement.** Students who have completed the internship will participate in a seminar series developed around the real challenges a manager or industrial engineer faces on a day-to-day basis. The course will also include readings on implementation of continuous improvement.

**Manufacturing System Design Project.** In their final semester, students will work on a team project designed to come up with a plan to improve the operations of a specific problem and attempt to sell their ideas to local management.

## Program Opportunities

The Department of Industrial and Systems Engineering will aggressively pursue the recruitment of a diverse pool of students. We are targeting students who have already completed two years of college, but will accept applications from outstanding first and second year students. We will offer the most talented students scholarships up to \$3000. Per year. Students graduating from the OMLP will have excellent contacts and work experience



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## **Application Process**

A completed admissions package will include:

- An application form
- Transcripts from WSU and/or all other post-secondary schools attended
- A personal statement explaining your future goals and how the OMLP would help that pursuit
- Two letters of recommendation

You **must** complete **all** parts of this application. Information requested in the application will be used to determine your eligibility for the OMLP program offered by the Department of Industrial and Systems Engineering. Applicants may be interviewed by University or industry and service interviewers before a final decision on awards is made.

***All materials should be submitted electronically to:***

Gail Evans, [gevans@wayne.edu](mailto:gevans@wayne.edu)

***Or mailed to:***

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