MANUFACTURING (MANF)

MANF 1501: Intro to Engr. / Manufacturing
School of Engineering
This course will introduce students to the engineering and professional disciplines related to manufacturing including the leadership and entrepreneurial skills necessary in today's manufacturing and engineering industry.
1 credit
Potentially offered with the following Instruction Type(s):
Lecture

MANF 1502: Intro to Engr. & Manufacturing
Further exploration of technical and managerial aspects of manufacturing. Students will learn techniques, develop skills, and begin to employ methodologies utilized by successful manufacturing professionals.
1 credit
Prerequisites
MANF 1501.
Potentially offered with the following Instruction Type(s):
Lecture

MANF 2500: Graphics/Solid Modeling
School of Engineering
Computer-based sketching and modeling, interpretation of drawings, and an introduction to the theory and utilization of modern CAD/CAM/CAE systems.
3 credits
Potentially offered with the following Instruction Type(s):
Lecture
Course Fees:
$50.00

MANF 2510: Manufacturing Processes
School of Engineering
A survey of manufacturing technologies applicable to manufacturing processes covering the spectrum from large scale materials processing through microelectronic and electromechanical systems.
3 credits
Corequisites
MANF 2520
Potentially offered with the following Instruction Type(s):
Lecture

MANF 2520: Product Realization Lab.
School of Engineering
Hands-on introduction to manufacturing processes including prototype development techniques as an intrinsic part of the design process. Fundamentals of manufacturing including machining, welding, casting, and rapid prototyping introduced through lecture, films, laboratories, projects, and field trips.
1 credit
Corequisites
MANF 2510
Potentially offered with the following Instruction Type(s):
Laboratory

MANF 2530: Strategic Planning
A comprehensive study of the strategic management process involving the formulation and implementation of strategies at the corporate, business, and functional levels of a manufacturing organization.
3 credits
Corequisites
MANF 1501
Potentially offered with the following Instruction Type(s):
Lecture

MANF 2540: Continuous Flow/Layout
Intensive training on a manufacturing factory floor. This course will introduce students to how to observe, grasp current condition, and document. This course will introduce continuous flow and layout with focus on human movement.
3 credits
Prerequisites
One Way Co-Requisite MANF 2510. MANF 2540 Prerequisites: MANF 1501.
Potentially offered with the following Instruction Type(s):
Lecture

MANF 2550: Lean I: Std.ized Work & Takt T
School of Engineering
Experiential learning about takt time, line balancing, standard work, and process documentation.
1 credit
Prerequisites
MANF 2510.
Potentially offered with the following Instruction Type(s):
Lecture/Lab

MANF 3250: Princ. of Ops & Sup. Chain Mgm
School of Engineering
This course provides an introduction to fundamental principles and practices related to operations management and value chains. Topics include structural (e.g., capacity, facility, technical, and logistical & supply chain), and infrastructural (e.g., workforce, production planning, materials control, performance measures, and organization renewal and improvement) issues in operations of an organization with particular emphasis placed on the manufacturing sector. Students will utilize basic statistics to formulate operations and supply chain fundamentals.
3 credits
Prerequisites
24 Earned Credits.
Potentially offered with the following Instruction Type(s):
Lecture

MANF 3500: Standardized Work/Takt Time
Intensive training on a manufacturing factory floor. This course will help students to improve how to observe, grasp current condition, and document. This course will introduce standardized work and takt time with focus on human movement.
3 credits
Prerequisites
MANF 2540 and 24 Earned Credits.
Potentially offered with the following Instruction Type(s):
Lecture

MANF 3510: Manufacturing Prod./Proc. Des.
Development of product and process design for manufactured products to achieve business objectives.
1 credit
Prerequisites
MANF 3530 and 24 Earned Credits.
Corequisites
MANF 3550
Potentially offered with the following Instruction Type(s):
Lecture

MANF 3530: Acct & Finan. Mgmt for Manf
School of Engineering
This course explores accounting and financial management concepts important to a manufacturing setting. The course is designed to help students become more sophisticated users of strategic cost/managerial and financial accounting information for decision making. The course demonstrates how accounting information adds value to manufacturing organizations by providing recommendations to improve profitability of products, services, and customers. The course also focuses on measuring causes or drivers of costs, and making managerial recommendations about design, capacity, quality, and processes.
3 credits
Prerequisites
MANF 1501 and 24 Earned Credits.
Potentially offered with the following Instruction Type(s):
Lecture

MANF 3550: Lean II: Cont. Flow/Layout
School of Engineering
Experiential learning of techniques used by businesses and industries for creating efficient plant layouts, eliminating non-value-added activities, and reducing waste.
1 credit
Prerequisites
MANF 2550 and 24 Earned Credits.
Potentially offered with the following Instruction Type(s):
Lecture/Lab

MANF 3999A: Spec. Topics in Manufacturing
Special topics course taught by a Center for Manufacturing Excellence faculty or staff member.
1 - 3 credits
Prerequisites
24 Earned Credits.
Potentially offered with the following Instruction Type(s):
Lecture

MANF 3999B: Spec. Topics in Manufacturing
Special topics course taught by a Center for Manufacturing Excellence faculty or staff member.
1 - 3 credits
Prerequisites
24 Earned Credits.
Potentially offered with the following Instruction Type(s):
Lecture

MANF 4500: Practical Prob. Solv. in Manf
Intensive training on a manufacturing factory floor. This course will introduce practical problem solving using the scientific method using well established approaches in manufacturing.
3 credits
Prerequisites
MANF 3500 and 24 Earned Credits.
Potentially offered with the following Instruction Type(s):
Lecture

MANF 4510: Manf Design-Prod. Realization
Students will ideate a product and take that product through conceptual design and initial marketing. The course will address aspects of finance, advertising, marketing, and business development. It will also introduce project management/operation in a manufacturing business and prototype development
1 credit
Prerequisites
MANF 3510 and 24 Earned Credits.
Corequisites
MANF 4500
Potentially offered with the following Instruction Type(s):
Lecture

MANF 4520: Manf Des.-Prod. Realization, I
Students will take a product from initial design, through design and process improvement, to final production and sales. The course will address aspects of project management/operation in a manufacturing business such as personnel, process development, scheduling, supply chain, quality control, etc.
2 credits
Prerequisites
MANF 4510 and 24 Earned Credits.
Potentially offered with the following Instruction Type(s):
Lecture

MANF 4550: Lean III: Prctl. Prob. Solv.
School of Engineering
Experiential learning of problem solving and process improvement methodologies.
3 credits
Prerequisites
MANF 3510 and MANF 3550
Potentially offered with the following Instruction Type(s):
Lecture/Lab

MANF 4600: Intro. to Project Management
School of Engineering
This course introduces the field of project management and familiarizes students with management concepts/processes/terminology they will encounter in their careers in manufacturing. Topics covered will include the 10 knowledge areas commonly identified in PM, problem analysis and correction, understanding cost/schedule relationship, and ethics.
3 credits
Potentially offered with the following Instruction Type(s):
Lecture

MANF 4650: Apps. in Ops & Sup. Chain Mgmt
School of Engineering
This course provides an understanding of scope of operations management and value chains. Topics include structural (e.g., capacity, facility, technical, and logistical & supply chain), and infrastructural (e.g., workforce, production planning, materials control, performance measures, and organization renewal and improvement) issues in operations of an organization. Students will utilize basic statistics to formulate operations and supply chain fundamentals.
3 credits
Potentially offered with the following Instruction Type(s):
Lecture

MANF 4700: Principles of Lean Six Sigma
School of Engineering
This course will provide undergraduates with a working knowledge of the Lean Six Sigma process improvement methodology.
3 credits
Prerequisites
24 Earned Credits.
Potentially offered with the following Instruction Type(s):
Lecture

MANF 4750: Apps. in Adv. Manufacturing
School of Engineering
This course introduces the vast field of advanced manufacturing and covers the integration of conventional manufacturing with advanced technologies to diagnose operational flaws and improve manufacturing processes. Fundamental topics will include a survey of advanced, smart, and digital manufacturing applications.
3 credits
Prerequisites
24 Earned Credits.
Potentially offered with the following Instruction Type(s):
Lecture

MANF 4999A: Spec. Topics in Manufacturing
Special topics course taught by a Center for Manufacturing Excellence faculty or staff member.
1 - 3 credits
Prerequisites
24 Earned Credits.
Potentially offered with the following Instruction Type(s):
Lecture

MANF 4999B: Spec. Topics in Manufacturing
Special topics course taught by a Center for Manufacturing Excellence faculty or staff member.
1 - 3 credits
Prerequisites
24 Earned Credits.
Potentially offered with the following Instruction Type(s):
Lecture

MANF 6600: Project Management
This course provides an advanced study of project management principles, tools, and methodologies aligned with the Project Management Institute's (PMI) Project Management Body of Knowledge (PMBOK® Guide). Students develop the skills necessary to plan, execute, monitor, and control complex projects across technical and organizational settings. Emphasis is placed on integrating scope, schedule, cost, quality, risk, and stakeholder management within strategic objectives. The course prepares students for professional project management certification and leadership roles in engineering, manufacturing, and technology-based enterprises.
3 credits
Potentially offered with the following Instruction Type(s):
Lecture

MANF 6650: Manf Ops & Supply Chain Strate
This course provides an advanced study of global supply chain design, strategy, and digital integration. Students analyze network optimization, forecasting, enterprise resource planning (ERP), and sustainability practices using data analytics and simulation tools. Emphasis is placed on emerging technologies to enhance agility, efficiency, and resilience in modern supply chains. The course aligns with the ASCM CPIM and CSCP certification frameworks and prepares students to design and lead strategic supply chain initiatives in complex, data-driven environments.
3 credits
Potentially offered with the following Instruction Type(s):
Lecture

MANF 6700: Lean Six Sigma
This course develops advanced competencies in Lean Six Sigma methodology for organizational process improvement and operational excellence. Students learn to integrate Lean principles with advanced statistical tools such as regression analysis, design of experiments (DOE), and process capability studies. Emphasis is placed on leadership, financial performance, and strategic deployment of improvement initiatives through the DMAIC framework. Students complete a black belt-level project using real or simulated data and are prepared to sit for the CSSC Lean Six Sigma Black Belt certification exam upon successful completion.
3 credits
Potentially offered with the following Instruction Type(s):
Lecture

MANF 6750: Advanced Manufacturing Systems
This course explores the technologies and strategies driving Industry 4.0 and digital manufacturing transformation. Students study cyber-physical systems, robotics, additive manufacturing, artificial intelligence, and digital twin modeling to optimize production efficiency and sustainability. Through simulation, data analysis, and applied projects, students learn to integrate digital tools within intelligent manufacturing systems.
3 credits
Potentially offered with the following Instruction Type(s):
Lecture