



**KENTUCKY STATE
UNIVERSITY**

BACHELOR OF SCIENCE - MANUFACTURING ENGINEERING TECHNOLOGY

Plan of Study

Course	Title	Hours
Year 1		
Term 1 (Fall)		
ENG 101	English Comp I	3
CHE 101	General Chemistry I	3
CHE 110	General Chem I Laboratory	1
MAT 131	Calculus/Analy Geom I	5
KSU 118	Intro. to University Learning	3
Hours		15
Term 2 (Spring)		
ENG 102	English Comp II	3
MAT 132	Calculus/Analy Geom II	5
MAT 200	Intro to Stat Reasoning & Ana.	4
COS 107	Prob Solving, Logic & Design	3
Hours		15
Year 2		
Term 3 (Fall)		
MFG 208	Computer Aided Design	3
EGR 220	Intro to Mat, Proc. & Test	3
MFG 209	Fund of Manf. Processes	3
PHY 211	General Physics I	5
Select one General Education Arts Course		3
ART 130	Introduction to Art	
MUS 130	Introduction to Music	
THE 130	Introduction to Theatre	
ENG 211	Intro to Literature	
Hours		17
Term 4 (Spring)		
MFG 210	Manufact. Process & Materials	3
EGR 221	Robotics	3
EGR 222	Econ. Ana. for Engin & Tech	3
COM 103	Interpersonal Communication	3
PHY 212	General Physics II	5
Hours		17
Year 3		
Term 5 (Fall)		
EGR 320	Fluid Pwr Tech & Lab	3
MFG 308	Industrial Supervision	3
MFG 309	Computer Integrated Manufact.	3
MFG 310	Lean Manufacturing	3
Select one General Education Humanities Course		3
BUA 120	Business and Society	
Hours		15
Term 6 (Spring)		
MFG 311	: Quality Management Systems	3

MFG 312	Programmable logic Control	3
MFG 313	Manuf. Res. Plan & Control	3
Select one General Education Behavioral Science Course		3
PSY 200	General Psychology	
SOC 203	Principles of Sociology	
Guided Elective		3
Hours		15
Year 4		
Term 7 (Fall)		
MFG 408	Res. and Dev. in Technology	3
EGR 420	Project Management	3
MFG 209	Fund of Manf. Processes	3
EGR 421	Capstone Design I	3
Hours		12
Term 8 (Spring)		
MFG 410	Logistic & Supply Chain Mang.	3
EGR 422	Capstone Design II	3
Select one General Education Social Science Course		3
Guided Elective		3
FIN 101	Financial Literacy	
ECO 201	Prin of Economics I	
Select one General Educational Global/Civic Course		3
AFE 117	Global Perspect Ag/Food/Env	
ASP 303	American Civil Rights Movement	
POS 101	American Government	
POS 361	World Politics	
Hours		15
Total Hours		121

Manufacturing Engineering Technology (MFG)

MFG 208: Computer-Aided Design (CAD)

The course outlines modern solid modeling design, analysis, simulation, and manufacturing of mechanical systems. The theoretical focus is fundamental Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM) concepts. Numerous practical examples sustain these to provide the student with intensive hands-on experience with CAD/CAM. Implementations use the Creo design package (PTC Inc.). This course aims to prepare the students to utilize robust digital design, simulation, and manufacturing tools in classes, projects, and future work. The materials learned will help engineers develop a product from the research and development stage into prototype development and final commercial product development. Prerequisites: COS 107 or instructor's consent.

Credit hours: 3 Lecture hours: 3

MFG 209: Fundamentals of Manufacturing Processes

The course covers the fundamentals of various manufacturing processes, classified as constant mass operations, material removal operations, and material addition operations. The processes discussed are casting, metal forming, processing of plastics, powder metallurgy processing, heat treatment, metal cutting, grinding, finishing, unconventional machining and welding, and allied processes. The course involves theory and laboratory experiences dealing with basic machining and chip forming processes, inspection, cutting, computer-assisted numerical control, and newly developed processes.

Credit hours: 3 Lecture hours: 3

MFG 210: Manufacturing Processes and Materials

The course develops the skills to understand how to give materials usable form and improve function through manufacturing processes.

The objective is to help the students identify, discuss, and analyze the manufacturing processes for engineering materials and the associated equipment. It includes manufacturing processes such as casting, bulk deformation, sheet metal forming, traditional and nontraditional material removal, joining and fastening, and manufacturing of polymers, metal powders, composites, and ceramics.

Credit hours: 3 Lecture hours: 2 Lab Hours: 2

MFG 308: Industrial Supervision

Supervisory and managerial procedures are used in the industry for supervisors, managers, field and sales representatives, and inspectors. This course prepares students as future supervisors to manage facilities, equipment, materials, work processes, and people daily.

Credit hours: 3 Lecture hours: 3

MFG 309: Computer Integrated Manufacturing

The course introduces the theories and tools of computer-integrated manufacturing (CIM). CIM is the integration of manufacturing hardware and software systems. This course describes the production strategies and the importance of CIM. Students will learn the basics of automated equipment and software solutions. This course will cover the results of CIM operation on all major elements of product design, manufacturing production, and operational control systems. This course teaches students the implementing techniques of CIMs that may make the enterprises more competitive in the global market.

Credit hours: 3 Lecture hours: 3

MFG 310: Lean Manufacturing

The course introduces students to Lean Manufacturing, which is about creating value. The Lean process starts with creating value for the ultimate customer, which requires providing the right product at the right time for the specified price. While all manufacturing attempts to do this, what makes Lean Manufacturing distinct is the relentless pursuit and elimination of waste. Students will learn the concepts and tools of Lean, which include types of waste, visual management, 5S, value stream mapping, A3, & flow, and how it applies to materials systems.

Credit hours: 3 Lecture hours: 3

MFG 311: Quality Management Systems

The course introduces students to the philosophies, concepts, tools, and techniques of continuous quality improvement programs. It covers understanding the laws, principles, and phenomena in the field of quality management and the adoption of theoretical and practical knowledge and skills.

Credit hours: 3 Lecture hours: 3

MFG 312: Programmable Logic Control

The course introduces students to programmable logic controllers (PLCs), process control algorithms, interfacing of sensors and other I/O devices, simulation, and networking. Topics include processor units, numbering systems, memory organization, relay-type devices, timers, counters, data manipulators, and programming. Prerequisite: COS 107

Credit hours: 3 Lecture hours: 3

MFG 313: Manufacturing Resource Planning and Control

The course aims to deepen students' understanding of coordinating supply, production, and distribution functions. Additionally, it will teach students how to balance conflicting objectives to minimize the total costs involved and maximize customer service. The Manufacturing Planning and Control (MPC) system must stay current with technology, product, and market conditions in today's constantly evolving global marketplace. This course offers a thorough understanding of key elements of manufacturing planning and control. Regardless of the

industry or business, understanding the various systems involved in Manufacturing Planning and Control helps to increase the organization's bottom line. Every operation requires plans and control to satisfy customer demand. Planning and control are concerned with managing the ongoing activities of the operation within the constraints imposed by its design, although the degree of formality and detail may vary.

Credit hours: 3 Lecture hours: 3

MFG 408: Research and Development in Technology

The student will research and develop a solution to a technological problem in this course.

Credit hours: 3 Lecture hours: 2 Lab hours: 2

MFG 409: Production Planning and Control

The course provides students with knowledge in applying industrial engineering theory and practice in operations management and production planning/control. It includes an analysis and understanding various topics such as 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 relevant areas.

Credit hours: 3 Lecture hours: 3

MFG 410: Logistic and Supply Chain Management

The course aims to give an overview of the history and fundamental concepts of logistics and the competitive supply chain strategy. It will cover various topics, including delivering customer value, market strategies, logistics cost and performance, supply and demand, creating a responsive supply chain, strategic lead-time management, and sourcing and supply management.

Credit hours: 3 Lecture hours: 3

Engineering (EGR)

EGR 220: Introduction to Materials, Processes, and Testing

This course is designed to provide an introductory understanding of the properties of materials that make them suitable for manufacturing processes. The course will focus on ceramic, plastic, composite, and metallic materials. It will explore the conceptual perspective of material behavior origin and structure, property, and performance interrelationships and cover the selection and use of these materials in manufacturing applications.

Credit hours: 3 Lecture hours: 3

EGR 221: Robotics

This course is an introduction to the field of robotics. It covers the fundamentals of kinematics, dynamics, trajectory planning, control of robot manipulators, and sensing. The course deals with homogeneous transformations, forward and inverse kinematics of robotic manipulators, differential kinematic equations, the manipulator Jacobian, and force relations. It also presents the fundamental principles of proximity, tactile, and force sensing. Robotics as an application draws from many fields and allows the automation of various products as diverse as cars, manipulators used in factories, and medical robots. **Prerequisites:** MAT 131 & 132 and PHY 211. Co-req: PHY 212

Credit hours: 3 Lecture hours: 3

EGR 222: Economic Analysis for Engineering and Technology

The course provides students with the principles of investment economic analysis, decision-making among alternatives, and replacement analysis. Inflation, depreciation, cost concepts, bond, and income tax considerations are included.

Credit hours: 3 Lecture hours: 3

EGR 320: Fluid Power Technology and Lab

This course gives students a theoretical framework and practical knowledge of fluid power systems. Principles of operation, mathematical models, design criteria, performance characteristics, operation, and maintenance of fluid power systems are discussed.

Credit hours: 3 Lecture hours: 2 Lab Hours: 2

EGR 420: Project Management

This course provides a systematic and thorough introduction to all aspects of project management (PM). Projects are an increasingly important aspect of modern business. Therefore, the course underlines the importance of understanding the relationship between projects and the strategic goals of the organization. The course also discusses the technical, cultural, and interpersonal skills necessary to manage projects from start to finish successfully. It emphasizes that project management is a professional discipline with its tools, body of knowledge, and skills. Concepts are reinforced by case studies covering a wide variety of project types and industries.

Credit hours: 3 Lecture hours: 3

EGR 421: Capstone Design I

The EGR 421 is the first of a two-semester sequence capstone course, and EGR 422 is the second in the series. It is a required course for all students in engineering programs. It is a team and project course requiring extensive research, analysis, prototyping, testing, and evaluation. Students will complete various technical classes by their senior year and have the background necessary to complete a comprehensive design project. The senior design project is completed under the guidance of an engineering faculty member who serves as the course director.

Credit hours: 3 Lecture hours: 2 Lab hours: 2

EGR 422: Capstone Design II

The EGR 422 is the second of a two-semester sequence capstone design course, and EGR 421 is the first in the series. It is a required course for all students in the CPT program. It is a team and project course requiring extensive research, analysis, prototyping, testing, and evaluation. Students will complete various technical classes by their senior year and have the background necessary to complete a comprehensive design project. The senior design project is completed under the guidance of a CPT faculty member who serves as the course director.

Credit hours: 3 Lecture hours: 2 Lab hours: 2