

Manufacturing Emphasis Area

Manufacturing Engineering applies scientific principles to the production of goods ranging from household items to medical devices to pharmaceuticals to passenger aircraft. The manufacturing sector still forms a large part of the US economy and by virtue of its nature will always be a sector strongly represented in the global economy.

Industrial Engineers with a Manufacturing focus design, analyze, and improve methods and processes for the manufacture of products with the required functionality and quality for the lowest possible cost. This field includes both the study of properties of materials as they progress through the manufacturing process as well as the study of integrated manufacturing systems, including the effects of technological advances, managerial considerations, and equipment capabilities.

Manufacturing-oriented Industrial Engineers will find great opportunities in those industries where the cost, quality, and/or time efficiency of the manufacturing process is important. Automotive, semiconductor, healthcare materials, metals production, and any discrete part manufacturer companies are typical examples. In addition, there is a strong emphasis on more efficient production processes in environmentally related industries, such as in solar cell manufacturing.

Manufacturing specialists have extensive knowledge of

- Manufacturing technologies
- Automated manufacturing systems
- Robotics

Manufacturing specialists have effective technical skills in

- Computer-Aided Manufacturing (CAM), Computer-Aided Design (CAD)
- Design of manufacturing systems

Courses

Courses taken from the following groupings help to provide students with a deeper understanding of manufacturing engineering. More information on each of these courses can be obtained by logging onto [myPurdue](#), navigating to the course catalog page for that department and clicking on the link for the course.

The courses listed below are listed in the course catalog for each department. They are meant to provide guidance as to what a student might take if they are interested in this emphasis area. The list of courses below is not exhaustive. In addition, the regularity of offerings of the listed courses is not guaranteed. Some courses are offered every semester, every other semester, or every other year. Other courses may have been offered at some point, but may not be offered again for a while, and we keep them in this list in hopes they will be offered again. *Therefore, the courses listed here should be considered an unreliable source of information.* A student wishing to take a particular course should always check the course schedule (via "Look Up Classes" in myPurdue) to see what is available.

Legend:

REQ: Required for IE majors

TE: Technical Elective

GE: General Education Elective

*: Course has not yet been pre-approved by the IE faculty as a TE, but approval is pending. A student may wish to petition for the immediate approval.

Manufacturing Technologies, Processes, and Materials

- IE 470: Manufacturing Processes II (TE)
- IE 570: Manufacturing Process Engineering (TE)
- ME 351: Machine Design I *
- MSE 230: Structure and Properties of Materials (TE)

Design for Manufacturing

- ME 473: Engineering Design Using Modern Materials *
- ME 404: Finite Element Analysis *
- ME 557: Design for Manufacturability *
- ME 444: Computer-Aided Design and Prototyping *
- ME 571: Reliability Based Design *
- ME 553: Product and Process Design *
- IE 532: Reliability (TE)

Robotics and Automated Manufacturing Systems

- IE 474: Industrial Control Systems (REQ)
- IE 574: Industrial Robotics and Flexible Assembly (TE)
- IE 590: Advanced Robotics and Machine Vision (TE)
- ME 387: Electronics and System Engineering Through Robotics *
- ME 576: Computer Control of Manufacturing Processes *

Compatible Minors

- Manufacturing
- Mechanical Engineering

Related faculty in IE

- Srinivasan Chandrasekar
- Gary Cheng
- Dale Compton
- Abhijit Deshmukh
- C. Richard Liu
- Juan Wachs

Relevant links

- [Society of Manufacturing Engineers](#)

DISCLAIMER: The emphasis area document is intended for use as an aid to students for developing a coherent curriculum plan. The courses listed are a representation of the courses that may be taken (or are taken as part of the IE curriculum) that develop skills that are needed for a career in a field focusing on this emphasis area. While we list required IE courses, students should strongly consider enhancing their base IE coursework with more advanced courses in one or more of the areas.