



Course Syllabus

Course #: MET 2520 Course Name: Mold Design

Division: Engineering and Industrial Technologies

Class Days: TBA

Class Time: TBA

Location: Classroom: TBA

Laboratory: E 106

Credit Hours: 3

Contact Hours:

Lab Hours: 0

Lecture Hours: 3

Instructor:

Office Location:

Phone:

Email Address:

Office Hours: TBD

Division Office/Location: Engineering Building **Division Fax:** 419-334-2300

Full-time Contact Person: Jayne Bowersox

Phone(s):

Course Description:

An introduction to plastic mold design with an emphasis on injection and blow molds. Class design projects will stress the theory of plastic molding, terminology and characteristics of a properly designed mold. Selection of components and the machining required to complete the design will be explained.

PURPOSE & SCOPE:

This course is designed to provide an in-depth study of the principles and practices of plastics mold design, construction and maintenance. Although both injection molds and blow molds will be covered, primary emphasis will be on injection mold design since the requirements for these molds are far more complex and stringent than those for blow molds.

Prerequisite(s): MTH 1150

Corequisite(s): None

Entry Level Skills and Knowledge:

This course is recommended for plastics technicians, apprentice mold makers and as a technical elective for Mechanical Engineering Technology students.

Required Texts, Supplies and Equipment:

1. Text: "Mold Design I for Plastics Injection Molding"; E. P. Allyn (Currently available only through Instructor, from SPE Publications)
2. Calculator
3. Notebook for note taking and class handouts.

Grading:

90= A

80= B

70= C

60= D

Below 59 = F

Learning Outcomes:

General Education

1. **Communicate effectively**
2. **Evaluate arguments in a logical fashion**—Competence in analysis and logical argument are explicit learning goals for most general education programs, although these skills go by a variety of names (e.g., critical thinking, analysis, logical thinking, etc.). **Students will be able to demonstrate competence in problem solving in communication, mathematics, and in team settings.**
3. **Employ the methods of inquiry characteristic of natural sciences, social sciences, mathematics, and the arts and humanities;** general education introduces students to methods of inquiry in several fields of study and thereby prepares students to integrate information from different disciplines.

Assessment of Student Learning:

Upon successful completion of this course, the student should be able to:

1. Explain the various styles of **injection molds**, including two plate, three plate, stack, compound, and runner-less molds
2. Explain the various styles of **blow molds**, including blow pin, blow stick, and needle blow molds
3. Starting with a print or actual part, calculate the number of cavities and machine clamp and plasticating capacity required to meet production requirements.
4. Identify, using accepted industry terminology, the various mechanical components of a mold and explain their functions.
5. Explain what is meant by 'balanced runner system' and why this is highly desirable.
6. Give detailed description of various runner system designs, including layout, runner cross-sections, the use of cold wells, etc.
7. Describe at least ten different gate configurations and explain the situations where each might be required (or desirable)
8. Explain the various factors which must be taken into consideration when deciding where to locate the gate on the part.
9. Explain the various techniques employed in creating the cavities; i.e., hand machining, CNC, hobbing, polishing, texturing, etc.
10. Explain the various methods used to provide mold cooling, and where each method might

be employed.

11. Describe the different types of so-called 'runner-less' and hot runner molds and explain the advantages and disadvantages of each.
12. Give details of the various methods for part ejection systems, both mechanical and pneumatic.
13. Describe the use of movable cores for producing undercuts, internal channels and holes in parts, and explain how they work.
14. Create detailed mold drawings for simple multiple cavity molds.

Assessment Project and Measurement in course (if any):

Plan of Work:

Week 1	Mold Description/basic parts/and definitions
Week 2	Cycle time/parting lines/and computing shrinkage/materials
Week 3	Volume and weight computation/press tonnage and selection
Week 4	Ejector pin location and cooling
Week 5	Inserts and venting/draft angles/undercuts
Week 6	Core pins/gating designs
Week 7	Mold plates detail and drawings
Week 8	Ejector mechanisms
Week 9	Guide pin & bushing details
Week 10	Mold design & alternatives checklist
Week 11	Production cost and operation efficiency
Week 12	Advanced Molding Operations
Week 13	Test procedures
Week 14	Problems and solutions
Week 15	The Future of molding Plastics and or Finals

Course Requirements:

Complete all assignments as required

Policies

Course Withdrawing: If for any reason you need to withdraw from this course, be certain that you do so according to College procedure. It is your responsibility to know and follow this procedure. If you simply stop coming to class, without officially withdrawing from the course, your grade is an automatic "F." Please follow official College procedure for withdrawing from this or any course.

College Academic Policies are located in the College Catalog. A copy of the current catalog may be picked up in any of the division offices or admissions. The list of college policies is also available online at <https://www.terra.edu/register/Collegecat/policies.asp>.

Support Services: The College offers a number of support services to assist in your success in this course and all courses. Among these services are the Writing & Math Center in B105, the Office of

Learning Support Services, which coordinates the campus disability services and tutoring programs, the computer labs, and the computers in the atriums.

Any student who feels he/she may need an accommodation based on the documentation of a disability should contact the Office of Learning Support Services privately to discuss his/her specific issues. Please contact the OLSS at (419) 334-8400 X 208 or visit 100 Roy Klay Hall (Building A) to coordinate reasonable accommodations.

If you have a documented disability and are receiving academic accommodations through the Office of Learning Support Services, please schedule a meeting with your instructor in a timely manner so that we may discuss how these services will be arranged.

Tutoring services are available to students beginning the second week of every quarter. Students requesting tutoring services should obtain a tutor request form from the OLSS in 100 Roy Klay Hall (Building A) or online at the Terra website. Please note that instructor verification and acceptance of the Student Learner Agreement is necessary for all tutoring requests. All requests should be submitted to 100 Roy Klay Hall (Building A).