

Program

**BS in Manufacturing Technology
Minor in Manufacturing**

This multidisciplinary program is designed to prepare men and women to meet the growing need for manufacturing professionals. The curriculum emphasizes organized laboratory experiences to provide students with a working knowledge of traditional and computer-aided design and production tools.

The program is built on a foundation of lower-division math, science, economics, and manufacturing concepts. Upper-division manufacturing technology (MFGT) classes integrate that foundation into a unified body of knowledge on the management of materials, processes, costs, and personnel. In addition to this core curriculum, the program currently offers a range of laboratory courses in three high demand areas:

- Computer-Integrated Manufacturing
- Metals Processing
- Polymer/Plastics Processing

The Minor in Manufacturing is specially designed to complement business and engineering majors.

The MFGT Degree Program is professionally accredited by the National Association of Industrial Technology (NAIT) and the Foundry Educational Foundation (FEF).

Career Outlook

Job opportunities are available throughout the manufacturing sector—in both large and small, local and national companies involved in the full range of operations—from research and development through mass production. Although the program is designed to educate students as technical managers, graduates are employed in numerous capacities. The median starting salary for 2005–2006 MFGT graduates was \$54,500 per year for these entry-level positions:

- Manufacturing/Operations Manager
- Maintenance/Testing Manager
- Manufacturing/Applications/Project Engineer
- Technical Sales/Purchasing Representative
- Production Planner/Supervisor
- Quality Engineer/Specialist
- Certified Technician/Practitioner
- Tooling/Process Designer
- Technical Instructor/Trainer

Industrial Support

Many organizations actively support the program by sponsoring projects, funding research, donating equipment and materials, and hiring graduates. The program's partners are exemplified by the Manufacturing Technology Advisory Board. Its members provide direction and guidance from their vantage point as senior managers in the manufacturing industry.



Student Organizations

Active participation in student chapters of professional organizations develops well-rounded individuals with leadership, managerial, social, and technical skills.

Current on-campus student chapters include:

- Society of Manufacturing Engineers (SME)
- Society of Plastics Engineers (SPE)

These student organizations arrange guest speakers, field trips, social activities, and sponsor professional certification exams. Manufacturing students also compete and excel in regional design and fabrication competitions.

Scholarships

In addition to university-wide scholarships, manufacturing students are eligible for twelve to fifteen MFGT-specific scholarships each year. Individual awards range from \$100 to \$1,000 and are based on academic performance/improvement, participation in activities, leadership qualities, and/or financial need.

Internships

On-campus work experience is available through a limited number of part-time production jobs and sponsored projects in the program's labs. Many students also take advantage of cooperative education/internship opportunities available through the Career Center's internship program. These are full-time, semester and/or summer positions with well-known companies. Participants gain professional experience, earn salaries of \$2,500–\$3,500 per month, as well as receiving upper-division course credit.

Manufacturing Technology

College of Engineering, Computer Science, and Construction Management
Dean: Michael Ward

Department of Mechanical Engineering, Mechatronic Engineering, and Manufacturing Technology
O'Connell Technology Center 419

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Chair: Ronald Roth

Program and Internship Coordinator:
Daren M. Otten
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530-898-4977

The Bachelor of Science in Manufacturing Technology

Admissions to the BS in Manufacturing Technology is currently suspended. Please contact the department of Mechanical Engineering, Mechatronic Engineering, & Manufacturing Technology to learn the current status of this program.

The manufacturing technology faculty are committed to preparing graduates for a variety of manufacturing careers, ranging from research and development to mass production. The faculty provide students with a broad undergraduate experience in math, science, business, and the humanities, as well as laboratory courses with a practical, applications orientation. The knowledge and skills gained will enable students to become Certified Manufacturing Technologists (CMfgT), after passing a comprehensive examination administered by the Society of Manufacturing Engineers (SME).

Manufacturing Technology Program Objectives

The program's objectives are best defined in terms of the following attributes of its graduates.

1. First and foremost, CSU, Chico manufacturing technology graduates understand how products are designed, produced, and tested.
2. They have experience with contemporary manufacturing processes, particularly for parts consisting of metals and polymers.
3. They understand the fundamental behavior of materials and the testing techniques used to determine material properties.
4. They integrate project management, quality assurance methods, and the economic issues involved in manufacturing.
5. They are familiar with contemporary computer applications and process automation, including the use of sensors, actuators, and controllers to automate machines and processes.
6. They are effective at communicating their ideas in oral, written, and graphical form.
7. They function effectively as team members.
8. They have an appreciation for the individual, society, and human heritage, and they are aware of the impact of their products on the environment.

Total Course Requirements for the Bachelor's Degree: 128 units

See "Requirements for the Bachelor's Degree" in the *University Catalog* for complete details on general degree requirements. A minimum of 40 units, including those required for the major, must be upper division.

A suggested Major Academic Plan (MAP) has been prepared to help students meet all graduation requirements within four years. Please request a plan from your major advisor or view it and other current advising information at <http://em.csuchico.edu/aap/ProgramSearch>.

General Education Requirement

Manufacturing Technology is a major with modifications to the University's General Education Requirements. The following courses, together with the approved General Education courses for the manufacturing technology major (marked with an * below), fulfill the General Education Requirement.

1. Three courses, one selected from each of Core Areas A1, A2, and A3.
2. One course selected from Breadth Area B2.
3. One course selected from Breadth Area C1 or C2 or C3.
4. One course selected from Breadth Area E.
5. Upper-division theme modification has been approved for this major. See the General Education chapter in the *University Catalog* for specifics on how to apply this modification or go to <http://www.csuchico.edu/mm>

Diversity Requirement: 6 units

Complete two Diversity courses, one U.S. Diversity and one Global Cultures. (See the "Bachelor's Degree Requirements" section.) Both courses must also satisfy one of the General Education requirements in order for 128 units to fulfill all requirements for the Manufacturing Technology degree.

U.S. History, Constitution, and American Ideals Requirement: 6 units

This requirement is normally fulfilled by completing HIST 130 and POLS 155. For other alternatives, see the "Bachelor's Degree Requirements" section.

Literacy Requirement:

See "Mathematics and Writing Requirements" in the *University Catalog*. Writing proficiency in the major is a graduation requirement and may be

demonstrated through satisfactory completion of a course in your major which has been designated as the Writing Proficiency (WP) course for the semester in which you take the course. Students who earn below a C- are required to repeat the course and earn a C- or better to receive WP credit. See the Class Schedule for the designated WP courses for each semester. You must pass ENGL 130 (or its equivalent) with a C- or better before you may register for a WP course.

Course Requirements for the Major: 98 units

Completion of the following courses, or their approved transfer equivalents, are required of all candidates for this degree.

Lower-Division Requirements: 56 units

19 courses required:

ACCT	201	Intro to Financial Accounting	3.0	FS
CHEM	107	Gen Chem for Applied Sciences	4.0	FS *
Prerequisites: Intermediate Algebra.				
CHEM	108	Organic Chem for Applied Sci	4.0	FS
Prerequisites: CHEM 107 or CHEM 111 or equivalent.				
ECON	102	Principles of Macro Analysis	3.0	FS *
ECON	103	Principles of Micro Analysis	3.0	FS *
EECE	110	Basic Electricity/Instruments	3.0	FS
Prerequisites: None. This course is not intended for engineering majors.				
MATH	105	Statistics	3.0	FS *
Prerequisites: Completion of ELM requirement.				
MATH	119	Precalculus Mathematics	4.0	FS *
Prerequisites: Completion of ELM requirement, and either 1/2 year of high school trigonometry or MATH 118.				
MECH	100	Graphics I	1.0	FS
Corequisites: MECH 100L.				
MECH	100L	Graphics I Laboratory	1.0	FS
Corequisites: MECH 100 (may be taken prior to taking MECH 100L).				
MECH	200	Graphics II	2.0	FS
Prerequisites: MECH 100 and MECH 100L.				
MFGT	160	Manufacturing Processes	3.0	FS
MFGT	201	Graphics Applications for Mfg	2.0	SP
Prerequisites: MATH 105, MECH 200.				
MFGT	211	Materials & Quality Testing	3.0	FA
Prerequisites: CHEM 107, PHYS 202A. Recommended: CHEM 108, MATH 105.				
MFGT	216	Introduction to Plastics	3.0	SP
Prerequisites: MFGT 211 or MECH 210.				
MFGT	218	Polymer Materials	3.0	FA
Prerequisites: MFGT 216. Recommended: CHEM 108.				
MFGT	260	Material Removal	3.0	SP
Prerequisites: MFGT 160 with a grade of C or higher. Recommended: PHYS 202A.				
PHYS	202A	General Physics	4.0	FS *
Prerequisites: High school physics or faculty permission. High school trigonometry and second-year high school algebra or equivalent (MATH 051 and MATH 118 at CSU, Chico).				
PHYS	202B	General Physics	4.0	FS
Prerequisites: PHYS 202A.				

Upper-Division Requirements: 36 units

11 courses required:

MFGT	350	Industrial Supervision	3.0	SP
Prerequisites: Junior standing.				
MFGT	352	Industrial Safety Management	4.0	SP WP
Prerequisites: ENGL 130 (or its equivalent) with a grade of C- or higher, junior standing.				
MFGT	360	Computer-Aided Manufact CAM	4.0	FA
Prerequisites: MFGT 201, MFGT 260.				
MFGT	386	Manufact Automation Systems	3.0	SP
Prerequisites: EECE 110, MFGT 360.				
MFGT	451	Quality Management	3.0	SP
Prerequisites: SCMS 306 or faculty permission. This course is also offered as SCMS 451.				
MFGT	454	Advanced Laboratory Practices	2.0	FS
Prerequisites: Senior standing, faculty permission.				
MFGT	458	Project Management	3.0	FA
Prerequisites: Senior standing.				
MFGT	464	Fluid Metallurgy	3.0	SP
Prerequisites: MFGT 211 with a grade of C or higher; MFGT 360.				
MFGT	468	Capstone: Manufact Tooling	4.0	SP
Prerequisites: MFGT 218, MFGT 360; MFGT 458 or MGMT 444.				
MFGT	490	Manufact Fundamentals & Pract	1.0	SP
Prerequisites: Graduation in MFGT expected within 12 months.				
SCMS	306	Operations Management	3.0	FS
Prerequisites: Business Administration or Business Information Systems status required for business majors. Completion of General Education Breadth Area A4 requirements required for all majors.				

Highlighted text indicates a change from the original publication.

1 course selected from:

SCMS 442	Prod Plan & Inventory Control	3.0	FS
Prerequisites: SCMS 306.			
SCMS 443	Prod Mgmt & Control Systems	3.0	FS
Prerequisites: SCMS 306.			

Major Elective Requirement: 6 units

2 courses selected from:

MFGT 362	Material Joining	3.0	Inq
Prerequisites: MFGT 160.			
MFGT 370	Plastics Processing & Manufact	3.0	Inq
Prerequisites: MFGT 216.			
MFGT 372	Composites Material/Processing	3.0	Inq
Prerequisites: MFGT 218.			
MFGT 389	Directed Manufacturing Exp	3.0	FS
Prerequisites: Approval of faculty internship coordinator prior to off-campus assignment.			
MFGT 472	Advanced Composites	3.0	Inq
Prerequisites: MFGT 218.			
MFGT 474	Polymer Flow Analysis	3.0	Inq
Prerequisites: MFGT 218.			
MFGT 476	Polymer Design and Tooling	3.0	Inq
Prerequisites: MFGT 218, MFGT 360. Recommended: MFGT 474.			
MFGT 478	Elastomers	3.0	Inq
Prerequisites: MFGT 218.			

Grading Requirement:

All courses taken to fulfill major course requirements must be taken for a letter grade except those courses specified by the department as Credit/No Credit grading only.

Advising Requirement:

Advising is mandatory for all majors in this degree program. Consult your undergraduate advisor for specific information.

The Minor in Manufacturing

Course Requirements for the Minor: 23-26 units

The following courses, or their approved transfer equivalents, are required of all candidates for this minor.

3 courses required:

MFGT 160	Manufacturing Processes	3.0	FS
MFGT 451	Quality Management	3.0	SP
Prerequisites: SCMS 306 or faculty permission. This course is also offered as SCMS 451.			
SCMS 306	Operations Management	3.0	FS
Prerequisites: Business Administration or Business Information Systems status required for business majors. Completion of General Education Breadth Area A4 requirements required for all majors.			

1-2 courses selected from:

CIVL 110	Graphics for Civil Engineers	2.0	FS
Prerequisites: High school trigonometry and algebra.			

OR

CMGT 110	Construction Graphics	3.0	FS
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OR (take both of the following courses)

MECH 100	Graphics I	1.0	FS
Corequisites: MECH 100L.			

MECH 100L	Graphics I Laboratory	1.0	FS
Corequisites: MECH 100 (may be taken prior to taking MECH 100L).			

1 course selected from:

MATH 107	Finite Math for Business	3.0	FS *
Prerequisites: Completion of ELM requirement.			

MATH 119	Precalculus Mathematics	4.0	FS *
Prerequisites: Completion of ELM requirement, and either 1/2 year of high school trigonometry or MATH 118.			

MATH 120	Analytic Geometry and Calculus	4.0	FS *
Prerequisites: Completion of ELM requirement; both MATH 118 and MATH 119 (or high school equivalent); a score that meets department guidelines on a department administered calculus readiness exam.			

1 course selected from:

BADM 103	Statistics of Business & Econ	3.0	FS
Prerequisites: For Business Administration majors: MATH 107. For others: Completion of General Education Breadth Area A4 requirement.			

CIVL 302	Engineering Econ & Statistics	3.0	FS
Prerequisites: MATH 121, junior standing.			

MATH 105	Statistics	3.0	FS *
Prerequisites: Completion of ELM requirement.			

MATH 108	Statistics of Business & Econ	3.0	FS
Prerequisites: For business administration students: MATH 107. For other students: completion of General Education Breadth Area A4 requirement.			

1 course selected from:

CMGT 457	Project Control and Scheduling	3.0	FS
Prerequisites: CMGT 450.			

MECH 440A	Mech Engr Design Project I	3.0	FA WP
Prerequisites: ENGL 130 (or its equivalent) with a grade of C- or higher, MECH 200, MECH 340, MFGT 160. Recommended: CIVL 302, MECA 380, MECH 308, MECH 338.			

MECA 440A	Mechatronic Engr Design Proj I	3.0	FA WP
Prerequisites: ENGL 130 (or its equivalent) with a grade of C- or higher, EECE 344, MECH 340, MFGT 160. Recommended: CIVL 302, MECA 380.			

MFGT 350	Industrial Supervision	3.0	SP
Prerequisites: Junior standing.			

MGMT 303	Survey of Management	3.0	FS
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SCMS 443	Prod Mgmt & Control Systems	3.0	FS
Prerequisites: SCMS 306.			

1-2 courses selected from:

MFGT 216	Introduction to Plastics	3.0	SP
Prerequisites: MFGT 211 or MECH 210.			

OR

MFGT 260	Material Removal	3.0	SP
Prerequisites: MFGT 160 with a grade of C or higher. Recommended: PHYS 202A.			

OR (take both of the following courses)

MECH 200	Graphics II	2.0	FS
Prerequisites: MECH 100 and MECH 100L.			

MFGT 201	Graphics Applications for Mfg	2.0	SP
Prerequisites: MATH 105, MECH 200.			

The Faculty

Manufacturing Technology

Scott Brogden, 2006, Lecturer A, BS, CSU Chico.

Leonard W. Fallscheer, 1979, Assoc Professor, MA, CSU Chico.

Joseph P. Greene, 1998, Professor, PhD, U Michigan.

Daren Otten, 2005, Program Coordinator, Lecturer B, MS, CSU Chico.

Emeritus Faculty

Bill Wesley Brown, 1967, Professor Emeritus, EdD, U Missouri.

Robert Wesley Donoho, 1970, Professor Emeritus, PhD, Kansas State U.

Ronald Walter Hall, 1968, Professor Emeritus, EdD, Arizona State U.

R. Lee Koenig, 1986, Professor Emeritus, MA, San Jose State U.

William J. McNelley, 1969, Professor Emeritus, PhD, Oregon State U.

Winfield R. Rummell, 1968, Professor Emeritus, EdD, Arizona State U.

George P. Waldheim, 1985, Professor Emeritus, EdD, SUNY Buffalo.

Jesse D. Wallace, 1958, Professor Emeritus, MA, U Missouri.

Dirk Vanderloop, 1997, Assoc Professor Emeritus, DPA, USC.

Manufacturing Technology Course Offerings

Please see the section on "Course Description Symbols and Terms" in the University Catalog for an explanation of course description terminology and symbols, the course numbering system, and course credit units. All courses are lecture and discussion and employ letter grading unless otherwise stated. Some prerequisites may be waived with faculty permission. Many syllabi are available on the Chico Web.

MFGT 160 Manufacturing Processes 3.0 Fa/Spr

This course is designed to familiarize the student with the basic concepts of manufacturing engineering, i.e., an understanding of the common manufacturing materials and processes, and the knowledge to solve manufacturing problems. 2.0 hours discussion, 3.0 hours laboratory. Special fee required; see the Class Schedule. (005149)

MFGT 198 Special Topic 1.0-3.0 Inquire

Prerequisites: To be established when course is formulated. Special topic generally offered one time only. Different sections may have different topics. See the Class Schedule for specific topic being offered. This course may be repeated for a maximum of 21 units to be counted toward the major. 1.0 hours activity. (015894)

MFGT 201 Graphics Applications for Manufacturing 2.0 Spring

Prerequisites: MATH 105, MECH 200. Advanced solid modeling techniques, quality assurance (inspection, metrology, coordinate measuring machines, statistical process control, six sigma), and design considerations (design for manufacturing, rapid prototyping). 1.0 hours discussion, 3.0 hours laboratory. Special fee required; see the Class Schedule. (015853)

MFGT 211 Materials and Quality Testing 3.0 Fall

Prerequisites: CHEM 107, PHYS 202A. Recommended: CHEM 108, MATH 105. Study of the manufacturing, processing, applications, and testing of common industrial materials, including metals, polymers, ceramics, and composites. 2.0 hours lecture, 3.0 hours laboratory. Special fee required; see the Class Schedule. (005164)

Manufacturing Technology

MFGT 216 Introduction to Plastics 3.0 Spring

Prerequisites: MFGT 211 or MECH 210.

Survey of polymer chemistry, mechanical properties, and industrial processing of thermoplastics. 2.0 hours lecture, 3.0 hours laboratory. Special fee required; see the Class Schedule. (005146)

MFGT 218 Polymer Materials 3.0 Fall

Prerequisites: MFGT 216. Recommended: CHEM 108.

Study of engineering thermoplastic materials, thermoplastic blends, elastomers, and thermoset composites. Investigation of injection molding, and structural foam. Introduction to plastic flow analysis. 2.0 hours lecture, 3.0 hours laboratory. Special fee required; see the Class Schedule. (005200)

MFGT 260 Material Removal 3.0 Spring

Prerequisites: MFGT 160 with a grade of C or higher. Recommended: PHYS 202A.

A study of the industrial applications of material-removal technology. Emphasis will be placed on the management of the application of the technology. Units involving the physics of metal-cutting, cutting-tool materials and geometry, conventional and semi-automatic machine tools, and cost-estimating are included. 2.0 hours lecture, 3.0 hours laboratory. Special fee required; see the Class Schedule. (005212)

MFGT 298 Special Topic 1.0 Inquire

Prerequisites: To be established when course is formulated.

Special topic generally offered one time only. Different sections may have different topics. See the Class Schedule for specific topic being offered. This course may be repeated for a maximum of 21 units to be counted toward the major. (015850)

MFGT 350 Industrial Supervision 3.0 Spring

Prerequisites: Junior standing.

Current supervisory and managerial procedures used in industry for supervisors, managers, field and sales representatives, and inspectors. (005255)

MFGT 352 Industrial Safety Management 4.0 Spring

Prerequisites: ENGL 130 (or its equivalent) with a grade of C- or higher, junior standing.

A study of effective industrial safety management practice and the philosophy and principles of industrial accident prevention. Coverage includes examination of current industrial safety practices and federal and state programs designed to improve safety in an industrial environment. Instruction in effective technical safety documentation -- gathering, organizing, and reporting industrial safety data. This is a writing proficiency, WP, course; a grade of C- or better certifies writing proficiency for majors. (005670)

MFGT 360 Computer-Aided Manufacturing (CAM) 4.0 Fall

Prerequisites: MFGT 201, MFGT 260.

A study of the concepts involved in programming computer numerically controlled (CNC) machines. This course includes integration of computer-aided manufacturing (CAD/CAM). 3.0 hours discussion, 3.0 hours laboratory. Special fee required; see the Class Schedule. (005278)

MFGT 362 Material Joining 3.0 Inquire

Prerequisites: MFGT 160.

A study of the industrial applications of material-joining technology directed toward managing the applications of the processes. Units involving adhesive bonding, mechanical fasteners, and welding are included, along with metallurgy, specimen testing, and cost estimating. 2.0 hours discussion, 3.0 hours laboratory. Special fee required; see the Class Schedule. (005210)

MFGT 370 Plastics Processing and Manufacturing 3.0 Inquire

Prerequisites: MFGT 216.

Study of plastics manufacturing, plastics processing, plastics compounding, plastic flow analysis, gating systems, tool design, data acquisition, experimental design, tooling, and processing equipment for injection molding, extrusion, compression molding, thermoforming, and rotational molding. 2.0 hours discussion, 3.0 hours laboratory. (005195)

MFGT 372 Composite Materials & Processing 3.0 Inquire

Prerequisites: MFGT 218.

Study of thermoplastic and thermoset composites and materials and processing with epoxy, polyester, and polyurethane reinforced with glass, kevlar, carbon fiber, and cored materials. Introduction to composites tool design and processing, including compression molding, resin transfer molding, hand lay-up, and vacuum assisted molding. 2.0 hours discussion, 3.0 hours laboratory. Special fee required; see the Class Schedule. (005669)

MFGT 386 Manufacturing Automation Systems 3.0 Spring

Prerequisites: EECE 110, MFGT 360.

A study of the programming and function of industrial robots and other automation systems used in modern manufacturing environments. Concepts include end effector design, material movement, storage and retrieval systems, programmable logic controllers, and vision systems. Lecture, demonstrations, and laboratory exercises designed to promote understanding of manufacturing automation. 2.0 hours discussion, 3.0 hours laboratory. Special fee required; see the Class Schedule. (005190)

MFGT 389 Industrial Internship 3.0 Fa/Spr

Prerequisites: Approval of faculty internship coordinator prior to off-campus assignment.

Manufacturing experience in an industrial setting which provides an opportunity to apply academic learning to professional practice. Minimum duration of 400 hours of work under the direct supervision of an on-site manufacturing supervisor. On completion of the internship, a report prepared under the direction of a faculty member is required. May be taken only once for credit toward the major. Credit/no credit grading only. (005294)

MFGT 395 Manufacturing Laboratory Practice 1.0 Fa/Spr

Prerequisites: MFGT 160 (may be taken concurrently).

Provides additional time in the manufacturing laboratories for completion of manufacturing and engineering course-related projects and assignments. 2.0 hours activity. You may take this course more than once for a maximum of 7.0 units. Special fee required; see the Class Schedule. Credit/no credit grading only. (020682)

MFGT 398 Special Topic 3.0 Inquire

Prerequisites: To be established when course is formulated.

Special topic generally offered one time only. Different sections may have different topics. See the Class Schedule for the specific topic being offered. Normally taught by professionals from the field. This course may be repeated for a maximum of 21 units to be counted toward the major. (005250)

MFGT 399 Special Problems 1.0-3.0 Inquire

Prerequisites: Approval of supervising faculty member.

Independent study of a special problem. See department office for registration procedure. You may take this course more than once for a maximum of 6.0 units. Credit/no credit grading only. (005251)

MFGT 451 Quality Management 3.0 Spring

Prerequisites: SCMS 306 or faculty permission.

The study and application of the quality management process in both the manufacturing and service sectors of the economy. Topics include process analysis and improvement, statistical process control, cost of quality, quality measurement, and quality in the global marketplace. This course is also offered as SCMS 451. (005784)

MFGT 454 Advanced Laboratory Practices 2.0 Fa/Spr

Prerequisites: Senior standing, faculty permission.

Provides qualified students an opportunity to do individual special interest study and practice toward gaining proficiencies in the student's area of specialization. (005279)

MFGT 458 Project Management 3.0 Fall

Prerequisites: Senior standing.

This course familiarizes students with techniques for managing technical projects while they design, plan, and implement a manufacturing project through the mock-up stage. Students work in groups on projects of mutual interest to gain experience in planning and updating schedules. Students learn to define requirements, estimate and manage resources, and structure decisions and trade-offs. Emphasis is placed on group dynamics in communication and problem solving. 2.0 hours activity, 2.0 hours discussion. Special fee required; see the Class Schedule. (005291)

MFGT 464 Fluid Metallurgy 3.0 Spring

Prerequisites: MFGT 211 with a grade of C or higher; MFGT 360.

A study of metal-casting technologies directed at the management of a metal-casting plant. 2.0 hours lecture, 3.0 hours laboratory. Special fee required; see the Class Schedule. (005209)

MFGT 468 Capstone: Manufacturing Tooling 4.0 Spring

Prerequisites: MFGT 218, MFGT 360; MFGT 458 or MGMT 444.

Students design, fabricate, test, and evaluate production tooling used in the manufacture or assembly of metal or plastic parts in their capstone projects. 3.0 hours discussion, 1.0 hours laboratory. Special fee required; see the Class Schedule. (005213)

Highlighted text indicates a change from the original publication.

MFGT 472 Advanced Composites 3.0 Inquire

Prerequisites: MFGT 218.
Investigation of aerospace composites materials and processing, including vinyl esters, polyesters, epoxy, PEEK, kevlar, metal matrix composites, ceramic composites, composite tooling and design. 2.0 hours discussion, 3.0 hours laboratory. Special fee required; see the Class Schedule. (005206)

MFGT 474 Polymer Flow Analysis 3.0 Inquire

Prerequisites: MFGT 218.
Investigation of flow simulation for injection molding using C-Mold and Moldflow CAE computer programs, and an introduction to finite element methods and analysis principles. 2.0 hours discussion, 3.0 hours laboratory. (005671)

MFGT 476 Polymer Design and Tooling 3.0 Inquire

Prerequisites: MFGT 218, MFGT 360. Recommended: MFGT 474.
Investigation of polymer design principles and tooling standards for injection molding, blow molding, and extrusion. Development and construction of injection molding and extrusion dies using computer analysis programs and metal removal machines. 2.0 hours discussion, 3.0 hours laboratory. Special fee required; see the Class Schedule. (005672)

MFGT 478 Elastomers 3.0 Inquire

Prerequisites: MFGT 218.
Study of rubber-like materials, including thermoplastic rubbers, thermoset rubbers, silicones, thermoplastic elastomers, and urethanes. Investigation of tooling and processing of elastomers. 2.0 hours discussion, 3.0 hours laboratory. (005204)

MFGT 490 Manufacturing Fundamentals and Practice 1.0 Spring

Prerequisites: Graduation in MFGT expected within 12 months.
Review of manufacturing technology fundamentals and foundation for professional practice. Current topics in manufacturing. Preparation and encouragement for the Fundamentals of Manufacturing Examination. 2.0 hours activity. Special fee required; see the Class Schedule. Credit/no credit grading only. (005673)

MFGT 498 Special Topic 1.0-3.0 Inquire

Prerequisites: To be established when course is formulated.
Special topic generally offered one time only. Different sections may have different topics. See the Class Schedule for the specific topic being offered. This course is normally taught by professionals from the field. This course may be repeated for a maximum of 21 units to be counted toward the major. (005308)

MFGT 499 Special Problems 1.0-3.0 Inquire

Prerequisites: Approval of supervising faculty member.
Independent study of a special problem. See department office for registration procedure. You may take this course more than once for a maximum of 6.0 units. Credit/no credit grading only. (015852)

MFGT 499H Honors Project 3.0 Inquire

Prerequisites: Completion of 12 units of upper-division MFGT courses, faculty permission.
Open by invitation to MFGT majors who have a GPA among the top five percent of MFGT students, based on courses taken at CSU, Chico. This is an Honors in the Major course; a grade of B or better in 6 units of MFGT 499H certifies the designation of "Honors in the Major" to be printed on the transcript and the diploma. If taken twice, prerequisite to the second semester is a grade of B or better in the first semester. Each 3-unit course will require both formal written and oral presentations. 9.0 hours supervision. You may take this course more than once for a maximum of 6.0 units. (005674)

MFGT 697 Independent Study 1.0-6.0 Inquire

Prerequisites: Approval from supervising faculty member.
This is a graduate-level independent study offered for 1.0-6.0 units. You may take this course more than once for a maximum of 6.0 units. (005676)

MFGT 698 Advanced Topic 1.0-3.0 Inquire

Prerequisites: To be established when course is formulated.
This course is for special topics offered for 1.0-3.0 units. Typically a topic is offered on a one-time-only basis and topics vary from term to term and from section to section. See the Class Schedule for the specific topics being offered. 3.0 hours clinical. You may take this course more than once for a maximum of 3.0 units. (005675)

MFGT 699P Master's Project 1.0-3.0 Fa/Spr

Prerequisites: Approval from supervising faculty member.
Independent study of a special problem approved by student's graduate advisory committee. See the department office for registration procedures. You may take this course more than once for a maximum of 6.0 units. (005679)

MFGT 699T Master's Thesis 1.0-6.0 Inquire

Prerequisites: Approval from supervising faculty member.
Independent study leading to a Master's Thesis of a special problem approved by the student's graduate advisory committee. See the department office for registration procedures. You may take this course more than once for a maximum of 6.0 units. (005677)

