

# MECHATRONIC ENGINEERING (MECA)

See Course Description Symbols and Terms (<https://catalog.csuchico.edu/academic-standards-policies/course-description-symbols-terms/>) for an explanation of course description terminology and symbols, the course numbering system, and course credit units.

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## MECA 140 Introduction to Design and Automation 2 Units

**Prerequisite:** MATH 119 or GE Mathematical Concepts/Quantitative Reasoning (2) Ready, first-year freshmen who successfully completed trigonometry and precalculus in high school can meet this prerequisite by achieving a score that meets department guidelines on the calculus readiness exam.

**Typically Offered:** Fall and spring

Introduces the design process and fundamentals of automation. Hands-on use of sensors, pneumatics, stepper motors, bearings, couplings, gears, belts, pulleys, and framing materials. Topics include AC and DC motor control, simple electrical circuits, machine controllers, PLC programming, testing and analysis of results, budgeting, and bills of materials. Teams design and build a proof-of-concept system to verify their design. 1 hour discussion, 3 hours laboratory. (005401)

**Cross listing(s):** MECH 140

**Grade Basis:** Graded

**Repeatability:** You may take this course for a maximum of 2 units

**Course Attributes:** Lower Division

## MECA 198 Special Topic 1-3 Units

**Typically Offered:** Inquire at department

Special topic generally offered one time only. Different sections may have different topics. See the Class Schedule for specific topic being offered. 3 hours lecture. (005652)

**Grade Basis:** Graded

**Repeatability:** You may take this course more than once

**Course Attributes:** Lower Division

## MECA 298 Special Topic 1-3 Units

**Prerequisite:** To be established when course is formulated.

**Typically Offered:** Inquire at department

Special topic generally offered one time only. Different sections may have different topics. See the Class Schedule for specific topic being offered. 3 hours lecture. (015849)

**Grade Basis:** Graded

**Repeatability:** You may take this course more than once

**Course Attributes:** Lower Division

## MECA 380 Measurements and Instrumentation 3 Units

**Prerequisite:** EECE 211 and EECE 211L or EECE 215; and CSCI 111, MECH 208 or AMAR 300.

**Typically Offered:** Fall and spring

Measurement of steady-state and dynamic systems using standard laboratory instruments. Topics include calibration and dynamic response of instruments, statistical treatment of data, and applied feedback control systems. Concepts are reinforced with hands-on laboratory exercises. 2 hours discussion, 3 hours laboratory. (005420)

**Grade Basis:** Graded

**Repeatability:** You may take this course for a maximum of 3 units

**Course Attributes:** Upper Division

## MECA 389 Industrial Internship 1-3 Units

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

**Typically Offered:** Fall and spring

Engineering experience in an industrial setting. Minimum duration of 400 hours of work under the direct supervision of an onsite engineering supervisor. On completion of the internship, a written report prepared under the direction of a faculty member is required. This course is an elective for the BS in Mechatronic Engineering, a total of 3 units must be completed to receive elective credit. 9 hours supervision. (005659)

**Grade Basis:** Credit/No Credit

**Repeatability:** You may take this course for a maximum of 3 units

**Course Attributes:** Upper Division

## MECA 398 Special Topic 1-3 Units

**Prerequisite:** To be established when course is formulated.

**Typically Offered:** Inquire at department

Special topic generally offered one time only. Different sections may have different topics. See the Class Schedule for the specific topic being offered. 3 hours lecture. (005653)

**Grade Basis:** Graded

**Repeatability:** You may take this course more than once

**Course Attributes:** Upper Division

## MECA 399 Special Problems 1-3 Units

**Prerequisite:** Approval of supervising faculty member.

**Typically Offered:** Inquire at department

This course is an independent study of special problems offered for 1.0-3.0 units. See the department office for information on registering. 9 hours supervision. (005654)

**Grade Basis:** Credit/No Credit

**Repeatability:** You may take this course for a maximum of 6 units

**Course Attributes:** Upper Division

## MECA 440AW Capstone Design I (W) 3 Units W, GW

**Prerequisite:** GE English Composition (1A); GE Oral Communication (1C); EECE 315 (may be taken concurrently); EECE 344; MECH 200; MECH 340W with a grade of C- or higher. Recommended: MECA 380.

**Typically Offered:** Fall and spring

Design methods applied to mechatronic systems in group design projects. Project definition, planning, and management. Design for manufacture, cost considerations, budgets, and teamwork. Oral and written presentation of design results. Initial stage of the capstone design project is continued in MECA 440B. 2 hours lecture, 3 hours supervision. (005656)

**Grade Basis:** Graded

**Repeatability:** You may take this course for a maximum of 3 units

**Course Attributes:** Upper Division; Writing Course; Graduation Writing Assessment Requirement Course

## MECA 440B Capstone Design II 3 Units

**Prerequisite:** EECE 315 and MECA 440AW. Recommended: MECA 380.

**Typically Offered:** Fall and spring

Implementation of the capstone design project from MECA 440AW including fabrication, testing, and evaluation of a working prototype. Impact of engineering solutions in global, economic, environmental, and societal context. Ethical and professional responsibilities in engineering including continuing self-education and career development. Must be taken the semester immediately following MECA 440AW. 2 hours lecture, 3 hours supervision. (005657)

**Grade Basis:** Graded

**Repeatability:** You may take this course for a maximum of 3 units

**Course Attributes:** Upper Division

<p><b>MECA 470 Introduction to Robotics Engineering</b> <b>3 Units</b>  <b>Prerequisite:</b> CSCI 111 or MECH 208; MECH 320 (may be taken concurrently).  <b>Typically Offered:</b> Fall and spring  This course introduces students to robotic manipulation design and control. Students apply the concepts in computer simulation and a physical system. 2 hours activity, 2 hours lecture. (021920)  <b>Grade Basis:</b> Graded  <b>Repeatability:</b> You may take this course for a maximum of 3 units  <b>Course Attributes:</b> Upper Division</p>	<p><b>MECA 499H Honors Project</b> <b>3 Units</b>  <b>Prerequisite:</b> Completion of 12 units of upper-division EECE, MECH, or MECA courses, faculty permission.  <b>Typically Offered:</b> Inquire at department  Open by invitation to MECA majors who have a GPA among the top 5% of MECA students based on courses taken at CSU, Chico. This is an "Honors in the Major" course; a grade of B or higher in 6 units of 499H certifies the designation of "Honors in the Major" can be printed on the transcript and the diploma. If taken twice, prerequisite to the second semester is a grade of B or higher in the first semester. Each 3-unit course will require both formal written and oral presentations. 9 hours supervision. (005661)  <b>Grade Basis:</b> Graded  <b>Repeatability:</b> You may take this course for a maximum of 6 units  <b>Course Attributes:</b> Upper Division</p>
<p><b>MECA 482 Control System Design</b> <b>3 Units</b>  <b>Prerequisite:</b> EECE 211 or EECE 215; MATH 260. Recommended: MECA 380, MECH 320; either CSCI 111 or MECH 208.  <b>Typically Offered:</b> Fall and spring  Modeling and simulation of dynamic system performance. Control system design for continuous systems using both analog and digital control techniques. 3 hours lecture. (005407)  <b>Grade Basis:</b> Graded  <b>Repeatability:</b> You may take this course for a maximum of 3 units  <b>Course Attributes:</b> Upper Division</p>	<p><b>MECA 697 Independent Study</b> <b>1-3 Units</b>  <b>Prerequisite:</b> Approval of supervising faculty member.  <b>Typically Offered:</b> Inquire at department  Independent study of a special problem. See department office for registration procedure. 3 hours lecture. (015838)  <b>Grade Basis:</b> Credit/No Credit  <b>Repeatability:</b> You may take this course for a maximum of 6 units  <b>Course Attributes:</b> Graduate Division</p>
<p><b>MECA 486 Motion and Machine Automation</b> <b>4 Units</b>  <b>Prerequisite:</b> EECE 211 or EECE 215, MECH 340W; EECE 482 or MECA 482 (may be taken concurrently).  <b>Typically Offered:</b> Spring only  Machine automation concepts in electrical circuits, precision mechanics, control systems, and programming. Motor sizing, gearing, couplings, ground loops, effective use of step motors, servo control loops, regeneration, networking, I/O, power supplies, vibration and resonance, mechanical tolerancing, linear bearings and drive mechanisms, and troubleshooting. Labs simulate application concepts such as point-to-point coordinated moves, registration, following, camming, and CAD-to-Motion by combining various motor technologies with various mechanical drive types. 4 hours activity, 2 hours lecture. (005655)  <b>Grade Basis:</b> Graded  <b>Repeatability:</b> You may take this course for a maximum of 4 units  <b>Course Attributes:</b> Upper Division</p>	<p><b>MECA 698 Advanced Topic</b> <b>1-3 Units</b>  <b>Prerequisite:</b> Specific to the topic being offered.  <b>Typically Offered:</b> Inquire at department  Advanced topic generally offered one time only. Different sections may have different topics. See the Class Schedule for specific topics being offered. 3 hours lecture. (015839)  <b>Grade Basis:</b> Graduate Graded  <b>Repeatability:</b> You may take this course for a maximum of 3 units  <b>Course Attributes:</b> Graduate Division</p>
<p><b>MECA 498 Special Topic</b> <b>1-3 Units</b>  <b>Prerequisite:</b> To be established when course is formulated.  <b>Typically Offered:</b> Inquire at department  Special topic generally offered one time only. Different sections may have different topics. See the Class Schedule for the specific topic being offered. 3 hours lecture. (005660)  <b>Grade Basis:</b> Graded  <b>Repeatability:</b> You may take this course more than once  <b>Course Attributes:</b> Upper Division</p>	<p><b>MECA 699P Master's Project</b> <b>1-6 Units</b>  <b>Prerequisite:</b> Approval of supervising faculty member.  <b>Typically Offered:</b> Inquire at department  Independent study of a special problem approved by student's graduate advisory committee. See the department office for registration procedures. 9 hours supervision. (015840)  <b>Grade Basis:</b> Report in Progress: CR/NC  <b>Repeatability:</b> You may take this course for a maximum of 6 units  <b>Course Attributes:</b> Graduate Division</p>
<p><b>MECA 499 Special Problems</b> <b>1-3 Units</b>  <b>Prerequisite:</b> Approval of supervising faculty member.  <b>Typically Offered:</b> Inquire at department  Independent study of a special problem. See the department office for registration procedure. 9 hours supervision. (015851)  <b>Grade Basis:</b> Credit/No Credit  <b>Repeatability:</b> You may take this course for a maximum of 6 units  <b>Course Attributes:</b> Upper Division</p>	<p><b>MECA 699T Master's Thesis</b> <b>1-6 Units</b>  <b>Prerequisite:</b> Approval of supervising faculty member.  <b>Typically Offered:</b> Inquire at department  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 procedure. 9 hours supervision. (015841)  <b>Grade Basis:</b> Report in Progress: CR/NC  <b>Repeatability:</b> You may take this course for a maximum of 6 units  <b>Course Attributes:</b> Graduate Division</p>