Mechanical and Aerospace Engineering (MAAE)

Mechanical and Aerospace Engineering (MAAE) Courses

MAAE 2001 [0.5 credit]  
Engineering Graphical Design  
Engineering drawing techniques; fits and tolerances; working drawings; fasteners. Elementary descriptive geometry; true length, true view, and intersection of geometric entities; developments. Assignments will make extensive use of Computer-Aided Design (CAD) and will include the production of detail and assembly drawings from actual physical models. Includes: Experiential Learning Activity  
Prerequisite(s): ECOR 1010 (no longer offered) or (ECOR 1051, ECOR 1052, ECOR 1053, and ECOR 1054), and second-year status in Engineering. Lectures and tutorials two hours a week, laboratory four hours a week.

MAAE 2101 [0.5 credit]  
Engineering Dynamics  
Review of kinematics and kinetics of particles: rectilinear and curvilinear motions; Newton's second law; energy and momentum methods. Kinematics and kinetics of rigid bodies: plane motion of rigid bodies; forces and accelerations; energy and momentum methods. Includes: Experiential Learning Activity  
Prerequisite(s): ((ECOR 1051, ECOR 1052, ECOR 1053, and ECOR 1054) or ECOR 1101), MATH 1004, and MATH 1104, and second-year status in Engineering. Lectures three hours a week, laboratory and problem analysis three hours a week.

MAAE 2202 [0.5 credit]  
Mechanics of Solids I  
Review of Principles of Statics; friction problems; Concepts of stress and strain at a point; statically determinate and indeterminate stress systems; torsion of circular sections; bending moment and shear force diagrams; stresses and deflections in bending; buckling instability. Includes: Experiential Learning Activity  
Prerequisite(s): ((ECOR 1051, ECOR 1052, ECOR 1053, and ECOR 1054) or ECOR 1101), MATH 1004, and MATH 1104, and second-year status in Engineering. Lectures three hours a week, problem analysis and laboratory three hours a week.

MAAE 2300 [0.5 credit]  
Fluid Mechanics I  
Fluid properties. Units. Kinematics, dynamics of fluid motion: concepts of streamline, control volume, steady and one-dimensional flows; continuity, Euler, Bernoulli, steady flow energy, momentum, moment of momentum equations; applications. Fluid statics; pressure distribution in fluid at rest; hydrostatic forces on plane and curved surfaces; buoyancy. Includes: Experiential Learning Activity  
Prerequisite(s): ((ECOR 1051, ECOR 1052, ECOR 1053, and ECOR 1054) or ECOR 1101), MATH 1004, and MATH 1104, and second-year status in Engineering. Lectures three hours a week, laboratory and problem analysis three hours a week.

MAAE 2400 [0.5 credit]  
Thermodynamics and Heat Transfer  
Basic concepts of thermodynamics: temperature, work, heat, internal energy and enthalpy. First law for closed and steady-flow open systems. Thermodynamic properties of pure substances; changes of phase; equation of state. Second law: entropy. Simple power and refrigeration cycles. Introduction to heat transfer: conduction, convection, radiation. Includes: Experiential Learning Activity  
Prerequisite(s): (CHEM 1101 or (CHEM 1001 and CHEM 1002)), MATH 1004, and MATH 1104, and second-year status in Engineering. Lectures three hours a week, laboratory and problem analysis three hours a week.

MAAE 2700 [0.5 credit]  
Engineering Materials  
Materials (metals, alloys, polymers) in engineering service; relationship of interatomic bonding, crystal structure and defect structure (vacancies, dislocations) to material properties; polymers, phase diagrams and alloys; microstructure control (heat treatment) and mechanical properties; material failure; corrosion. Includes: Experiential Learning Activity  
Prerequisite(s): additional credit for CIVE 2700. Lectures three hours a week, laboratory and problem analysis three hours a week.

MAAE 3004 [0.5 credit]  
Dynamics of Machinery  
Prerequisite(s): MAAE 2101 and MATH 1005. Lectures three hours a week, problem analysis and laboratories two hours a week.
MAAE 3202 [0.5 credit]
Mechanics of Solids II
Stress and strain transformations: torsion of non-circular sections; unsymmetric bending and shear centre; energy methods; complex stresses and criteria of yielding; elementary theory of elasticity; axisymmetric deformations. Includes: Experiential Learning Activity
Precludes additional credit for CIVE 3202.
Prerequisite(s): MAAE 2202 and MATH 1005.
Lectures three hours a week, problem analysis and laboratory three hours a week.

MAAE 3300 [0.5 credit]
Fluid Mechanics II
Prerequisite(s): MATH 1005, MATH 2004 and MAAE 2300.
Lectures three hours a week, problem analysis and laboratory three hours a week.

MAAE 3400 [0.5 credit]
Applied Thermodynamics
Prerequisite(s): MATH 1005 and MAAE 2400.
Lectures three hours a week, problem analysis and laboratories three hours a week.

MAAE 3500 [0.5 credit]
Feedback Control Systems
Precludes additional credit for MAAE 4500 (no longer offered), SYSC 4505.
Prerequisite(s): MATH 3705 and (SYSC 3600 or SYSC 3610), and second-year status in Engineering.
Lectures three hours a week, problem analysis and laboratories three hours a week.

MAAE 3901 [0.5 credit]
Mech and Aero Engineering Lab
Students perform a series of laboratory exercises dealing with a wide range of mechanical engineering topics. Course includes a group design project. Students relate theory and practice and develop experience with modern engineering equipment, measurement techniques and design methodology. Emphasis on good reporting practices. Includes: Experiential Learning Activity
Prerequisite(s): third-year status in Engineering.
Lectures and tutorials one hour a week, laboratory five hours a week.

MAAE 3999 [0.0 credit]
Co-operative Work Term
Includes: Experiential Learning Activity

MAAE 4102 [0.5 credit]
Materials: Strength and Fracture
Analysis and prevention of failures in metals; plasticity analysis and plastic collapse; micro-mechanisms of fracture, conditions leading to crack growth and transition temperature effects, fracture mechanics, fatigue, environmentally assisted cracking, non-destructive evaluation and testing. Prerequisite(s): MAAE 2700 and MAAE 3202.
Lectures three hours a week.

MAAE 4902 [0.5 credit]
Special Topics: Mechanical and Aerospace Engineering
Selected advanced topics of interest to Aerospace and Mechanical Engineering students, subject to the discretion of the Faculty of Engineering and Design. Prerequisite(s): permission of the Department.
Lecture three hours a week.

MAAE 4903 [0.5 credit]
Special Topics: Mech & Aero Eng.
At the discretion of the Faculty, a course may be offered that deals with selected advanced topics of interest to Aerospace and Mechanical Engineering students. Prerequisite(s): permission of the Department.
Lecture three hours a week.

MAAE 4904 [0.5 credit]
Special Topics: Mechanical and Aerospace Engineering
Selected advanced topics of interest to Aerospace and Mechanical Engineering students, subject to the discretion of the Faculty of Engineering and Design. Prerequisite(s): permission of department.
Lectures three hours a week.

MAAE 4906 [0.5 credit]
Special Topics: Mech and Aero Eng.
At the discretion of the Faculty, a course may be offered that deals with selected advanced topics of interest to Aerospace and Mechanical Engineering students. Prerequisite(s): permission of the Department.
MAAE 4907 [1.0 credit]
Engineering Design Project
Team project in the design of an aerospace, biomedical, mechanical, or sustainable energy system. Opportunity to develop initiative, engineering judgement, self-reliance, and creativity in a team environment. Results submitted in a comprehensive report as well as through formal oral presentations.
Includes: Experiential Learning Activity
Prerequisite(s): fourth-year status in engineering.
Completion of or concurrent registration in AERO 4003, AERO 4842, MECH 4003, MECH 4013, or SREE 4001, or permission of Department. Certain projects may have additional prerequisites.

MAAE 4917 [0.5 credit]
Undergraduate Directed Study
Study, analysis, and solution of an engineering problem. Results presented in the form of a written report. Carried out under the close supervision of a faculty member. Intended for students interested in pursuing graduate studies. Requires supervising faculty member and proposal from student.
Includes: Experiential Learning Activity
Prerequisite(s): permission of the Department and completion of, or concurrent registration in, AERO 4907 or MECH 4907.

Summer session: some of the courses listed in this Calendar are offered during the summer. Hours and scheduling for summer session courses will differ significantly from those reported in the fall/winter Calendar. To determine the scheduling and hours for summer session classes, consult the class schedule at central.carleton.ca

Not all courses listed are offered in a given year. For an up-to-date statement of course offerings for the current session and to determine the term of offering, consult the class schedule at central.carleton.ca