Courses of Instruction 2016-2017 Undergraduate Announcements

ML 2020 Leadership Development I 3(2)
Continued study of leadership at the team and small group levels. Focuses on moral leadership, officercraft, and the Army as a profession. Leadership laboratory training includes small unit tactics, airmobile operations, and weapons firing. Students lead teams throughout the semester. Coreq: ML 2021.


ML 2100 Leaders' Training Course 4 (8) Five-week leadership camp conducted on an Army post. Students' pay and expenses are provided by the U.S. Army. Environment is rigorous and focused on leadership development. No military obligation is incurred. Completion of this course qualifies students for entry into the Army ROTC Advanced Course.

ML 3010 Advanced Leadership I 4(2)
Study of leadership focused on decision making, planning, communicating, and executing. Addresses motivational techniques, the role of a leader, and performance assessment. Provides students with leadership management tools and methodology. Students are responsible for training, developing, and mentoring Basic Course students. Students apply learned techniques in leadership laboratory. Preq: ML 2020 or ML 2100. Coreq: ML 3011.

ML 3011 Advanced Leadership I Laboratory 0(4) Non-credit laboratory to accompany ML 3010. Coreq: ML 3010.

ML 3020 Advanced Leadership II 4(2)
Continuation of leadership focus on collective skills training, tactics, and small group instruction. Synthesizes various components of training, leadership, and team-building learned during the Basic Course and ML 3010. Final step in students' progression prior to the Leader's Development and Assessment Course. Preq: ML 3020. Coreq: ML 3021.

ML 3021 Advanced Leadership II Laboratory 0(4) Non-credit laboratory to accompany ML 3020. Coreq: ML 3020.

ML 3900 American Army Military Experience 3(3)
Covers the purpose of the American military experience from its Colonial origins to today's War on Terrorism. Topics include the evolution of U.S. joint forces and coalition operations, effects of United States society on its military, and how leaders utilize the military decision-making process. How historical leaders developed critical thinking skills about the human dimensions of war is also discussed. Preq: Enrollment in Army ROTC program.

ML 4010 Organizational Leadership I 4(2)
Culmination of leadership study in preparation for commissioning as Army officers. Students continue exercising leadership and management skills as senior cadet leaders. Leadership instruction focuses on coordinating activities with staffs, communicating effectively, counseling and mentoring subordinates, training management, and ethics. Preq: ML 3020. Coreq: ML 4011.

ML 4011 Organizational Leadership I Laboratory 0(4) Non-credit laboratory to accompany ML 4010. Coreq: ML 4010.

ML 4020 Organizational Leadership II 4(2)
Continuation of ML 4010. Focuses on the continued study of moral, ethical, and legal issues faced by leaders. Includes instruction in administrative and logistical management. Requires students to apply their knowledge individually and collectively to solve problems and improve the organization. Preq: ML 4010. Coreq: ML 4021.

ML 4021 Organizational Leadership II Laboratory 0(4) Non-credit laboratory to accompany ML 4020. Coreq: 4020.

ML 4510 Organizational Leadership III 3(2)
Transitional leadership development and training for completion cadets and others designed to enhance practical experiences in managing organizational training programs, develop leadership skills by serving in cadet staff positions, develop small group decision making and conflict management skills, and reinforce physical fitness and lifestyle skills required of leaders. May be repeated for a maximum of six credits. Preq: ML 4020. Coreq: ML 4511.

ML 4511 Organizational Leadership III Laboratory 0(3) Non-credit laboratory to accompany ML 4510. Coreq: ML 4510.

MATERIALS SCIENCE AND ENGINEERING


SE 2100 Introduction to Materials Science 3(3)
Introductory course in materials science designed primarily for engineering students. Studies the relation between the electrical, mechanical, and thermal properties of products and the structure and composition of these products. All levels of structure are considered from gross structures easily visible to the eye through electronic structure of atoms. Preq: CH 1010 with a C or better. Preq or concurrent enrollment: MATH 1080.

SE 2410 Materials Science 3(1)
Covers the three laws of thermodynamics, phase equilibria, energy requirements for reactions, material corrosion, and environmental stability. Preq: CH 3310 and MATH 2210.

SE 3270 Transport Phenomena 3(3)
Kinetic aspects of mass, heat, and fluid transport as they relate to the processing and performance of materials. Preq or concurrent enrollment: SE 2100 and MATH 3260.

SE 3280 Phase Diagrams for Materials Processing and Applications 3(3) Teaches students to use single-component binary and ternary phase diagrams to analyze material processing routes and utilization. Considers reaction pathways by which material microstructure evolves and the relationship of reaction pathway to equilibrium phase diagrams. Also considers material interactions/degradation during use. Preq: CH 3310 or MATH 3260.

SE 3420 Structure/Property Laboratory 2 (6) Provides a broad understanding of how microstructure interrelationships and processes affect the physical properties of materials and how environmental effects modify structure and mechanical behavior of materials. Preq: SE 2410.

SE 3610 Processing of Metals and Their Composites 3(3) Examines the control of microstructure property relationships in metallic materials and their composites through development and selection of innovative manufacturing methods. Preq: SE 2100.

SE 3950 Honors Research 1 3 (9) Individual research under the direction of a Ceramic and Materials Engineering faculty member. Preq or concurrent enrollment: SE 3270.

SE 4020* Solid State Materials 3(3) Discussion of the properties of solids as related to structure and bonding with emphasis on electronic materials. Band structure theory, electronic, and optical properties are treated. Preq: CH 3310 or MATH 3260; and MATH 2210; and PHYS 2210.

SE 4070 Senior Capstone Design 3(1) Work with industrial partners who have materials-related processes or product problems. Emphasizes interdisciplinary team approach and global perspective of products and problems. Incorporates critical thinking, group effectiveness, and problem solving with materials and processes. Collaborative efforts between industry and student academic teams are employed. Preq: IE 3840. Coreq: MATH 4071.

SE 4071 Senior Capstone Design Laboratory 0(6) Non-credit laboratory to accompany SE 4070. Coreq: MATH 4070.

SE 4130* Noncrystalline Materials 3(3) Study of the fundamentals of the noncrystalline state. Includes cooling kinetics and effects on formation as well as physical properties of noncrystalline substances in metallic, polymeric, and ceramic systems. Preq: MATH 3260. Preq or concurrent enrollment: SE 4070.
MSE 4150* Introduction to Polymer Science and Engineering 3(3) Chemistry of monomers and polymers and the chemical and physical properties of polymers are discussed emphasizing fiber forming, synthetic polymers. Includes molecular characterization, structure, morphology, and mechanical properties as they relate to the design of polymer systems for end uses in textiles, geotextiles, plastics and fiber-reinforced composite materials. Includes Honors sections. Preq: CH 2010 or CH 2240.

MSE 4160* Electrical Properties of Materials 3(3) Covers a range of topics dealing with electrical and magnetic materials, including metal and polymer conductors, insulators, ceramic and polymer materials for dielectric applications, and ferroelectric, piezoelectric, pyroelectric, and electrooptic materials. Metal and ceramic magnetic materials are also discussed.

MSE 4220* Mechanical Behavior of Materials 3(3) Covers the microstructural basis of deformation and fracture in ceramic, metallic, and polymeric systems. Preq: CE 2010 and MATH 2080.

MSE 4240* Optical Materials and Their Applications 3(3) Introduces the interaction of materials with light. Specific topics include fundamental optical properties, material synthesis, optical fiber and planar waveguides, and the componentry and systems level aspects of optical communication systems. Preq: MSE 4020 and MSE 4130.

MSE 4320 Manufacturing Processes and Systems 3(3) Plant layout and design for manufacturing of ceramic products. Emphasizes process control and verification of processing results. Includes adaptation of computers in process simulation/robotics and the use of programmable logic controllers and robotics in processing. Preq: MSE 3260.

MSE 4330 Combustion Systems and Environmental Emissions 3(3) Study of the application of burners, burner controls, firing atmospheres, hydrocarbon fuels, and other energy resources to industrial kilns, furnaces, and firing operations. Topics include energy resources, fuel chemistry, combustion analysis, ratio control systems, flow and pressure measurement and control, kiln atmosphere controls, industrial burners, and flames. Preq: MSE 3260.

MSE 4410 Manufacturing Laboratory 1(3) Provides students with the understanding of process optimization. Emphasizes the use of complex experimental design schemes to elucidate the interrelationships between processing, microstructural development, and resulting properties. Preq: MSE 3420.

MSE 4450 Practice of Materials Engineering 1(1) Students working in groups present and discuss practical, ethical, safety, business, and selected technical topics. Invited speakers discuss various aspects of the engineering world. To be taken Pass/No Pass only. Preq: Senior standing.

MSE 4550 Polymer and Fiber Laboratory 1(3) High molecular weight polymers are prepared from monomers, and their chemical and physical properties are measured as functions of critical end use parameters using instrumental and physical methods. Preq or concurrent enrollment: MSE 4150.

MSE 4560 Polymer and Fiber Materials II 3(2) Chemicals used in the preparation of fabric for dyeing and finishing. Oxidizing and reducing agents and their control and effect on various fibers. Colloidal and surface active properties of various compounds and the fundamental influences concerning these properties. Preq: MSE 4560. Coreq: MSE 4561.

MSE 4570 Polymer and Fiber Science I Laboratory 0(2) Non-credit laboratory to accompany MSE 4570. Coreq: MSE 4560.

MSE 4580 Color Science 3(3) Understanding of physical, chemical, and mechanical principles behind the application of colors and finishes to textiles. Requires an appreciation of fiber chemistry and morphology, dye and finish structures and reactivity and mechanical principles behind equipment used to effect transfer of these chemicals onto the textile substrate. Includes Honors sections.

MSE 4590 Color Science Laboratory 1(3) Introduction to common dyeing and printing methods and to some of the machinery necessary to carry out dyeing operations. Preq or concurrent enrollment: MSE 4570.

MSE 4600 Surface Phenomena in Materials Science and Engineering Laboratory 1(3) Covers finishing in addition to dyeing operations and their instrumental control. Preq or concurrent enrollment: MSE 4580.

MSE 4610 Polymer and Fiber Materials III 3(2) Familiarizes students with the physical properties of textile and high performance fibers and how these properties influence process and end-use performance; method of measuring those properties; and how those properties are related to structural features of the fiber. Includes Honors sections. Coreq: MSE 4610.

MSE 4611 Polymer and Fiber Materials III Laboratory 0(2) Non-credit laboratory to accompany MSE 4610. Coreq: MSE 4610.

MSE 4810 Undergraduate Research Fundamentals 1(1) Investigation of skills needed to become a successful, safety conscious and ethical researcher. This course reviews most safety training required by Clemson University, ethical decision making and the important skills, such as writing skills and record keeping, needed to be a successful researcher. Preq: MSE 3270.

MSE 4890 Selected Topics in Materials Science and Engineering 1-3(1-3) Study of topics not ordinarily covered in other courses. Taught as the need arises. Typical topics could include current research in a specific area or technological advances. May be repeated for a maximum of six credits, but only if different topics are covered. Includes Honors sections.

MSE 4910 Undergraduate Research 1-3(2-6) Investigation of a typical materials science and engineering research problem under the direct supervision of a faculty member. After completing the research, students prepare a formal written and oral report. May be repeated for a maximum of six credits. Preq: Consent of instructor.

MSE 4950 Honors Research II 3(9) Individual research under the direction of a Ceramic and Materials Engineering faculty member. Preq: MSE 3950.

MSE 4970 Honors Thesis 1(1) Preparation of honors thesis based on research conducted in MSE 3950 and 4950. Preq: MSE 4950.

MUSIC


MUSC 1010 Beginning Class Piano 1(2) Thorough introduction to basic keyboard skills including solo and ensemble repertoire, technique, applied keyboard theory, and performance. Applied music fee is assessed.

MUSC 1020 Intermediate Class Piano 1(2) Continued work on keyboard skills, applied keyboard theory, solo and ensemble repertoire, and performance. Applied music fee is assessed. Preq: MUSC 1010.

MUSC 1110 Beginning Class Guitar 1(2) Introduction to basic guitar skills, including finger-style technique, strumming, and song accompaniment. Students develop skills and appreciation of the discipline through teacher-led drills, ensemble playing, and the exploration of guitar history, style, and the impact of various players and composers on the medium. A applied music fee is assessed.

MUSC 1120 Intermediate Class Guitar 1(2) Continued work on guitar skills, including finger-style, strumming, pick playing, ensemble playing, and soloing. Also includes music theory for guitarists such as keys, scales, and chord building, as well as discussions of the impact of various players and composers on the medium. Applied music fee is assessed. Preq: MUSC 1110.

MUSC 1210 Beginning Class Voice 1(2) Introduction to basic vocal skills, including breathing, tone production, diction, intonation, and interpretation. Includes solo and ensemble repertoire. In class group and individual performances are required. Applied music fee is assessed.

MUSC 1420 Music Theory I 3(3) Introduces the materials of music theory, including notation, scales, keys, intervals, basic rhythms, and meter, triads and seventh chords, chord inversions, and non-chord tones. Coreq: MUSC 1430.