# Course Schedule - Spring 2008

## Materials Science and Engineering

183 ***Freshman Materials Laboratory*** credit: 1 hours.
A team-based laboratory developing concepts initially introduced in MSE 182. Practical descriptions of materials concepts, literature research, experimental design, concept validation, teamwork and presentation of results are emphasized, fostering early extension of experience in MatSE. Prerequisite: MSE 182.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 48164 | laboratory-discussion | A | 04:00 PM - 04:50 PM | MW | room 218 Ceramics Bldg | Braun, P |
| 48165 | laboratory-discussion | B | 07:00 AM - 07:50 AM | MW | room 218 Ceramics Bldg | Braun, P |

199 ***Undergraduate Open Seminar*** credit: 1 to 5 hours.
May be repeated to a maximum of 5 hours. May be repeated in the same term.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 10557 | independent study | | ARRANGED | | | |
| 10557: Instructor Approval Required | | | | | | |

206 ***Mechanics for MatSE*** credit: 4 hours.
Topics from statics, mechanics of materials, and fluid mechanics pertinent to the fields of materials science and engineering: force resultants, stresses and strains produced in elastic bodies, microscopic effects of different loading states (tension, compression, torsion, and bending) on deformable bodies, beam stresses and deflections, introduction to three-dimensional stresses and strains, stress and strain-rate relationships for Newtonian and non-Newtonian fluids, conservation equations (control volume analysis) for fluid flow, Reynolds number, and slow inertial and turbulent flows. Tailored for students with interests in materials science and engineering. Same as TAM 206. Credit is not given for both MSE 206 and either TAM 251 or TAM 335. Prerequisite: Credit or concurrent registration in MSE 201.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 43379 | discussion-recitation | AD1 | 01:00 PM - 01:50 PM | F | room 218 Ceramics Bldg | Keane, R |
| 36224 | lecture | AL1 | 11:00 AM - 11:50 AM | F | room 218 Ceramics Bldg | Keane, R |
| | lecture | AL1 | 11:00 AM - 12:20 PM | MW | room 218 Ceramics Bldg | Keane, R |

280 ***Intro to Eng Materials*** credit: 3 hours.
Introduction to the materials science and engineering of ceramics, electronic materials, metals and polymers. Bonding; crystallography; imperfections; processing and properties of semiconductors, polymers, metals, ceramics and composites; phase diagrams. Case studies will be used to exemplify the lecture material. Credit is not given for both MSE 280 and any of CEE 300, ME 330, MSE 201. Prerequisite: CHEM 102; credit or registration in PHYS 214.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 45916 | lecture-discussion | A | 02:00 PM - 03:20 PM | MW | room 218 Ceramics Bldg | Johnson, D |
| 38203 | lecture-discussion | B | 10:30 AM - 11:50 AM | TR | room 218 Mechanical Engineering Bldg | Allen, L |

304 ***Electronic Properties of Matls*** credit: 3 hours.
Study of the electronic structure and bonding of materials, electrical conduction in metals and semiconductors, and dielectric and magnetic properties of solids. Credit is not given for both MSE 304 and PHYS 460. (PHYS 460 may be substituted for MSE 304 as part of the MatSE degree requirements.) Prerequisite: PHYS 214.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 38206 | lecture-discussion | C | 09:00 AM - 09:50 AM | MWF | room 218 Ceramics Bldg | Weaver, J |

308 ***Materials Laboratory II*** credit: 3 hours.
Experiments characterizing mechanical, transport, and magnetic-electric properties of materials and the use optical and scanning electron microscopy and infrared spectroscopy. MSE 307 and MSE 308 are approved for General Education credit only as a sequence. Both courses must be completed to receive Advanced Composition credit. Prerequisite: MSE 307; credit or concurrent registration in MSE 304 and MSE 405.

This course satisfies the General Education Criteria for a Advanced Composition course.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 38210 | laboratory | AB1 | 02:00 PM - 04:50 PM | T | room 105 Ceramics Kiln House | Shang, J |
| 38210: Advanced Composition course. | | | | | | |
| 38211 | laboratory | AB2 | 02:00 PM - 04:50 PM | W | room 105 Ceramics Kiln House | Shang, J |
| 38211: Advanced Composition course. | | | | | | |
| 38214 | laboratory | AB3 | 02:00 PM - 04:50 | R | room 105 | Shang, J |

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|---|---|---|---|---|---|---|
| | | | PM | | Ceramics Kiln House | |
| 38214: Advanced Composition course. | | | | | | |
| 38208 | lecture | AL1 | 01:00 PM - 01:50 PM | MW | room 218 Ceramics Bldg | Shang, J |
| 38208: Advanced Composition course. | | | | | | |

395 ***Materials Design*** credit: 1 hours.
Design of various engineering devices, objects, or systems. Projects directed toward the development of materials-based solutions to problems originating from student, faculty, and industrial suggestions will be team-based and faculty guided. Solutions are to be based on the knowledge, skills, and design experience acquired in earlier course work and incorporate engineering standards and realistic constraints including most of such factors as economic, environmental, sustainability, manufacturability, ethical, health and safety, social, and political concerns. Prerequisite: One of MSE 422, MSE 441, MSE 453, MSE 460, MSE 462, MSE 470.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 38216 | lecture | A | 02:00 PM - 03:50 PM | F | room 218 Ceramics Bldg | Geil, P |

397 ***Independent Study*** credit: 1 to 4 hours.
Individual study of any topic in materials science and engineering selected by the student and conducted under the supervision of a member of the faculty. May be repeated if topics vary. Prerequisite: Consent of instructor.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 10559 | independent study | | ARRANGED | | | |
| 10559: Instructor Approval Required | | | | | | |
| 10559: Individual Advisor course reference numbers (CRN) are posted in 201 MSEB. Do not use the number listed above. | | | | | | |

402 ***Kinetic Processes in Materials*** credit: 3 hours.
Studies kinetics of chemical reactions; rate equations, reaction mechanisms; transport processes; diffusion equations, atomic and molecular diffusion. Phase transformations; nucleation, crystallization, displacive, spinodal decomposition. Examines surface and interface phenomena; sintering, grain growth, recovery and recystallization. Credit is not given toward a MatSE graduate degree. Prerequisite: MSE 201 and MSE 401.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 38218 | lecture-discussion | L | 09:00 AM - 10:20 AM | TR | room 218 Ceramics Bldg | Granick, S |

405 ***Microstructure Determination*** credit: 3 hours.
Study of the fundamentals and applications of various forms of microscopy and diffraction for characterization of physical microstructure of materials and of various forms of spectroscopy for characterization of chemical microstructure. Prerequisite: PHYS 214, CHEM 104, and MSE 201.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 43381 | laboratory | AB1 | 02:00 PM - 04:20 PM | T | room 113 Ceramics Bldg | Cahill, D |
| 43386 | laboratory | AB2 | 02:00 PM - 04:20 PM | W | room 113 Ceramics Bldg | Cahill, D |
| 43389 | laboratory | AB3 | 02:00 PM - 04:20 PM | R | room 113 Ceramics Bldg | Cahill, D |
| 45288 | laboratory | AB4 | 02:00 PM - 04:20 PM | F | room 113 Ceramics Bldg | Cahill, D |
| 43371 | lecture | AL1 | 01:00 PM - 01:50 PM | TR | room 305 Materials Science and Eng Bld | Cahill, D |

420 ***Ceramic Materials & Properties*** credit: 3 hours.
Basic principles and understanding of ceramic materials and properties, emphasizing structure-property relations. Gives a fundamental appreciation of the development, use, and control of the properties of a wide variety of ceramic materials from a physico-chemical point of view.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 38221 | lecture-discussion | B | 10:30 AM - 11:50 AM | TR | room 214 Ceramics Bldg | Payne, D |

423 ***Ceramic Processing Laboratory*** credit: 3 hours.
Experiments and demonstrations involving a wide range of modern ceramic processing methods will be conducted to develop fundamental understanding of the relationships between raw materials, processing methods, microstructural development, and physical properties. The lab emphasizes the underlying physics and chemistry of processing, as well as designing processing routes to achieve desired material properties. Technical reports will be required. Prerequisite: MSE 421.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 38223 | lecture | AL1 | 01:00 PM - 01:50 PM | MW | room 4101 Materials Science and Eng Bld | Kriven, W |

| | | | | | | |
|---|---|---|---|---|---|---|
| 38223: Students must register for the lecture and one lab. | | | | | | |
| 38226 | laboratory-discussion | AY1 | 02:00 PM - 04:50 PM | MW | room 203 Ceramics Kiln House | Kriven, W |
| 38228 | laboratory-discussion | AY2 | 02:00 PM - 04:50 PM | TR | room 203 Ceramics Kiln House | Kriven, W |

441 ***Metals Processing*** credit: 3 hours.
Discussion of melt, mechanical, thermal, powder, and surface processing of metals. Extraction of metals, joining of metals, metal composites, and metal recycling are also reviewed. The relationships between the processing of metals, the microstructures that are produced, and the behavior of metal components are emphasized. Prerequisite: MSE 406.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 43599 | lecture-discussion | A | 11:00 AM - 11:50 AM | MWF | room 4101 Materials Science and Eng Bld | Bellon, P |

442 ***Metals Laboratory*** credit: 3 hours.
Advanced metallurgy laboratory. Effects of heat treatment; mechanical testing, oxidation and corrosion; metallography of selected alloys. Prerequisite: MSE 308, MSE 440, and MSE 441.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 38232 | laboratory | AB1 | 03:00 PM - 04:50 PM | MW | room 204 Ceramics Kiln House | Averback, R |
| 38231 | lecture | AL1 | 02:00 PM - 02:50 PM | MW | room 214 Ceramics Bldg | Averback, R |

444 ***Welding and Joining Processes*** credit: 0 to 4 hours.
Same as CEE 400. See CEE 400.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 48470 | laboratory | AB1 | 11:00 AM - 11:50 AM | T | room 1140 Newmark Civil Engineering Bldg | Banas, G; Shen, B |
| 48471 | laboratory | AB2 | 01:00 PM - 01:50 PM | T | room 1140 Newmark Civil Engineering Bldg | Banas, G; Shen, B |

| | | | | | | |
|---|---|---|---|---|---|---|
| 48472 | laboratory | AB3 | 02:00 PM - 02:50 PM | T | room 1140 Newmark Civil Engineering Bldg | Banas, G; Shen, B |
| 48473 | laboratory | AB4 | 03:00 PM - 03:50 PM | T | room 1140 Newmark Civil Engineering Bldg | Banas, G; Shen, B |
| 48474 | laboratory | AB5 | 11:00 AM - 11:50 AM | R | room 1140 Newmark Civil Engineering Bldg | Banas, G; Shen, B |
| 48475 | laboratory | AB6 | 01:00 PM - 01:50 PM | R | room 1140 Newmark Civil Engineering Bldg | Banas, G; Shen, B |
| 48476 | laboratory | AB7 | 02:00 PM - 02:50 PM | R | room 1140 Newmark Civil Engineering Bldg | Banas, G; Shen, B |
| 48477 | laboratory | AB8 | 03:00 PM - 03:50 PM | R | room 1140 Newmark Civil Engineering Bldg | Banas, G; Shen, B |
| 40572 | lecture-discussion | AY1 | 10:00 AM - 10:50 AM | MWF | room 218 Ceramics Bldg | Banas, G |
| 40572: This section is for Graduate students only, you may choose either 3 or 4 credit hours. | | | | | | |
| 43523 | lecture-discussion | AY2 | 10:00 AM - 10:50 AM | MWF | room 218 Ceramics Bldg | Banas, G |
| 43523: 3 hoursThis section is for Undergraduate students only. | | | | | | |

445 ***Corrosion of Metals*** credit: 3 or 4 hours.
Electrochemistry, thermodynamics, and kinetics of corrosion; behavior of ferrous and nonferrous metals; corrosion rates; corrosion control; cathodic and anodic protection; high-temperature corrosion; corrosion testing; electrolytic machining methods. 3 undergraduate hours. 3 or 4 graduate hours.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 39396 | lecture-discussion | A | 02:30 PM - 04:20 PM | TR | room 305 Materials Science and Eng Bld | Altstetter, C |
| 39396: This section is for Graduate students only, you may choose either 3 or 4 credit hours. | | | | | | |
| 43553 | lecture-discussion | B | 02:30 PM - 04:20 PM | TR | room 305 Materials Science and Eng Bld | Altstetter, C |
| 43553: 3 hoursThis section is for Undergraduate students only. | | | | | | |

450 ***Polymer Science & Engineering*** credit: 3 or 4 hours.
Fundamentals of polymer science and engineering. Polymer solution properties, conformation, and molecular weight characterization. Rheological and viscoelastic behavior: relaxations and transitions, rubber elasticity. Crystallinity, morphology, and deformation of crystalline polymers. Blends and composites. Methods of fabrication. 3 undergraduate hours. 3 or 4 graduate hours.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 38243 | lecture-discussion | A3 | 10:30 AM - 11:50 AM | TR | room 305 Materials Science and Eng Bld | Braun, P |
| 38243: This section is for Graduate students only, you may choose 3 or 4 credit hours. | | | | | | |
| 38248 | lecture-discussion | A4 | 10:30 AM - 11:50 AM | TR | room 305 Materials Science and Eng Bld | Braun, P |
| 38248: 3 hoursThis section is for Undergraduates only. | | | | | | |

454 ***Mechanics of Polymers*** credit: 3 hours.
Same as AE 427 and TAM 427. See TAM 427.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 49389 | lecture-discussion | F | 03:00 PM - 03:50 PM | MWF | room 105 Talbot Laboratory | Sottos, N |

455 ***Polymer Physics*** credit: 3 hours.
Techniques and applications of polymer crystal structure and morphology observation; x-ray, electron, light, and neutron scattering and diffraction; light and electron microscopy. Morphology-processing property relationships of crystalline polymers, blends, and copolymers; liquid, plastic, and condis crystals; deformation mechanisms and orientation characterization; relaxations and transitions; crystallization theory. Prerequisite: MSE 450.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 38259 | lecture-discussion | A | 11:00 AM - 11:50 AM | MWF | room 305 Materials Science and Eng Bld | Geil, P |

457 ***Polymer Chemistry*** credit: 3 or 4 hours.
A comprehensive overview and examination of the methods used to synthesize macromolecules. Both descriptive and mechanistic organic chemistry, as it relates to polymer synthesis, are discussed. Same as CHEM 480. 3 undergraduate hours. 3 or 4 graduate hours.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 39037 | lecture-discussion | A | 01:00 PM - 02:20 PM | TR | room 4101 Materials Science and Eng Bld | Economy, J |
| 39037: This section is for Graduate students only, you may choose either 3 or 4 credit hours. | | | | | | |
| 43532 | lecture-discussion | B | 01:00 PM - 02:20 PM | TR | room 4101 Materials Science and Eng Bld | Economy, J |
| 43532: 3 hoursThis section is for Undergraduate students only. | | | | | | |

458 ***Polymer Physical Chemistry*** credit: 3 or 4 hours.
An intermediate level introduction to the fundamental physical chemistry of polymer systems. Focus is on equilibrium conformation, structure, properties and phase transitions of polymer solutions, dense melts, liquid crystals, mixtures, block copolymers, surfaces and interfaces, and electronic polymers. Same as CHEM 482. 3 undergraduate hours. 3 or 4 graduate hours. Prerequisite: One of CHEM 444, CHBE 321, MSE 401, PHYS 427.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 38260 | lecture-discussion | A3 | 10:30 AM - 11:50 AM | TR | room 4101 Materials Science and Eng Bld | Luijten, E |
| 38260: 3 hoursThis section is for Undergraduate students only. | | | | | | |
| 38261 | lecture-discussion | A4 | 10:30 AM - 11:50 AM | TR | room 4101 Materials Science and Eng Bld | Luijten, E |
| 38261: This section is for Graduate Students only, you may choose either 3 or 4 credit hours. | | | | | | |

460 ***Electronic Materials I*** credit: 3 hours.
Introduces the materials science, engineering, and processing of semiconductors. The structure and chemistry of semiconductors are related to the electronic and optical properties. Includes how semiconductors are produced and how to control processing to achieve desired materials properties; how to design and produce novel materials to obtain superior performance from electronic devices. Prerequisite: ECE 440.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 38264 | lecture-discussion | A | 10:00 AM - 10:50 AM | MWF | room 214 Ceramics Bldg | Rockett, A |

462 ***Electronic Materials Lab*** credit: 3 hours.
Introduces the fabrication, analysis, and properties of thin film materials through a combination of lectures and

experiments. Covers both the principles and practice of (i) deposition of thin film materials by vacuum evaporation, sputtering and plasma assisted processes; (ii) modification of properties by thermal reaction, surface treatment, etc.; (iii) characterization of key properties including electrical conductivity, optical properties, and stress. Emphasizes methods to optimize the film microstructure and engineering properties via growth techniques. Prerequisite: Credit or concurrent registration in MSE 460.

Register for the Lecture, one LAB and one LBD section.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 38265 | laboratory | AB1 | 11:00 AM - 01:50 PM | W | room 218 Ceramics Kiln House | Allen, L |
| 38267 | laboratory | AB2 | 11:00 AM - 01:50 PM | R | room 218 Ceramics Kiln House | Allen, L |
| 38344 | lecture | AL1 | 09:00 AM - 09:50 AM | TR | room 122 Ceramics Kiln House | Allen, L |
| 38266 | laboratory-discussion | AY1 | 02:00 PM - 04:50 PM | W | room 218 Ceramics Kiln House | Allen, L |
| 38268 | laboratory-discussion | AY2 | 02:00 PM - 04:50 PM | R | room 218 Ceramics Kiln House | Allen, L |

472 ***Biomaterials Laboratory*** credit: 3 hours.
Experiments cover topics in chemistry and physics of biomaterials, biocompatibility of materials, tissue regeneration, rheology of biomaterials and tissues, structural studies of biomaterials, and controlled release of small molecules and drugs. Laboratory techniques include protein purification, cytotoxicity testing, tissue culture, mechanical testing, microscopy, and X-ray diffraction. Same as BIOE 473. Prerequisite: MSE 470.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 46325 | laboratory | AB1 | 01:00 PM - 04:50 PM | MW | room 220 Ceramics Kiln House | Xian, W |
| 46326 | laboratory | AB2 | 01:00 PM - 04:50 PM | TR | room 220 Ceramics Kiln House | Xian, W |
| 46189 | lecture-discussion | AE1 | 11:00 AM - 11:50 AM | MW | room 214 Ceramics Bldg | Xian, W |

473 ***Biomolecular Materials Science*** credit: 3 hours.
Material anisotropy and elasto-plastic properties at the crystal level; microstructural basis for fatigue, fracture, and creep in metals, polymers, and ceramics; failure mechanisms and toughening in composites; structure and behavior of metal-matrix composites, ceramic-matrix composites, and polymer composites. Integrated with discussions of

experimental characterization and manipulation techniques in biotechnology. A case study term project involving application of course content and expository research into current literature is required.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 38346 | lecture | A | 09:00 AM - 09:50 AM | MWF | room 305 Materials Science and Eng Bld | Wong, G |

485 ***Atomic Scale Simulations*** credit: 3 or 4 hours.
Fundamental techniques of Monte Carlo and Molecular Dynamics are used in (primarily classical) simulations to understand and predict properties of microscopic systems in materials science, physics, biology, and chemistry. Numerical algorithms, connections between simulation results and real properties of materials (structural or thermodynamic), as well as statistical and systematic error estimation using real simulation programs are emphasized. A simulation project composed of scientific research, algorithm development, and presentation is required. Same as CSE 485 and PHYS 466. 3 undergraduate hours. 4 graduate hours. Prerequisite: One of CHEM 444, CHBE 321, MSE 401, ME 404, PHYS 427; C or C++, or Fortran programming experience.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 44675 | lecture-discussion | A | 02:00 PM - 03:20 PM | MW | room 4101 Materials Science and Eng Bld | Ceperley, D |
| 44675: 3 hoursThis section is for Undergraduate Students only. | | | | | | |
| 44678 | lecture-discussion | A1 | 02:00 PM - 03:20 PM | MW | room 4101 Materials Science and Eng Bld | Ceperley, D |
| 44678: This section is for Graduate Students only, you may choose either 3 or 4 credit hours. | | | | | | |

492 ***Lab Safety Fundamentals*** credit: 1 hours.
Presents key aspects of laboratory setups, operating procedures and emergency preparedness measures necessary for the experimentalist at UIUC, and in his/her future career. Same as CHEM 494. Approved for S/U grading only. Credit earned does not count toward M.S. or Ph.D. degree in MatSE.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 38353 | lecture | A | 07:00 PM - 08:50 PM | MW | room 228 Natural History Bldg | Shang, J |
| 38353: Meets 10-Mar-08 - 30-Apr-08. | | | | | | |
| 38353: THIS CLASS MEETS ONLY FIVE TIMES EACH SEMESTER. THE FIRST CLASS MEETS ON MARCH 24, 2008. THIS CLASS IS RESTRICTED TO JUNIORS, SENIORS AND GRADUATE STUDENTS IN ENGINEERING. | | | | | | |

497 ***Independent Study*** credit: 1 to 4 hours.
Individual study of any topic in materials science and engineering under the supervision of a member of the faculty. May be repeated to a maximum of 4 hours. Prerequisite: Consent of instructor.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 10601 | independent study | | ARRANGED | | | |
| 10601: Instructor Approval Required | | | | | | |
| 10601: Individual Advisor course reference numbers (CRN) are posted in 201 MSEB. Do not use the number listed above. | | | | | | |

498 ***Special Topics*** credit: 1 to 4 hours.
Structured presentations of new and developing areas of knowledge in materials science and engineering offered by the faculty to augment the formal courses available. May be repeated. May be repeated in same term. Prerequisite: As specified for each topic offering, see Schedule or departmental course information.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 48861 | lecture-discussion | JA | 09:00 AM - 09:50 AM | MWF | room 214 Ceramics Bldg | Abelson, J |
| 48861: 3 hoursTopic: Photovoltaic Cells: Materials, Devices and Performance. This section is for undergrad and graduate students for 3 hours of credit. | | | | | | |
| 48862 | lecture-discussion | JA2 | 09:00 AM - 09:50 AM | MWF | room 214 Ceramics Bldg | Abelson, J |
| 48862: 4 hoursTopic: Photovoltaic Cells: Materials, Devices and Performance. This section is for graduate students to take 4 hours of credit | | | | | | |
| 39039 | lecture-discussion | JC | 10:00 AM - 10:50 AM | MWF | room 305 Materials Science and Eng Bld | Cheng, J |
| 39039: 3 hoursTopic: Synthesis of Biomaterials. This section is for both undergrad and graduate students for 3 hours of credit. | | | | | | |
| 46738 | lecture-discussion | JC2 | 10:00 AM - 10:50 AM | MWF | room 305 Materials Science and Eng Bld | Cheng, J |
| 46738: 4 hoursTopic: Synthesis of Biomaterials. This section is for graduate students to take 4 hours of credit. | | | | | | |
| 46190 | lecture-discussion | JR | 01:00 PM - 02:20 PM | TR | room 206 Transportation Bldg | Rogers, J |
| 46190: 3 hoursTopic: Optical Properties of Materials. This section is for undergraduates and graduate students | | | | | | |

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|---|---|---|---|---|---|---|
| taking 3 hours of credit. | | | | | | |
| 46282 | lecture-discussion | JR2 | 01:00 PM - 02:20 PM | TR | room 206 Transportation Bldg | Rogers, J |
| 46282: 4 hoursTopic: Optical Properties of Materials. This section is for graduate students that want to take 4 hours of credit. | | | | | | |
| 39038 | lecture-discussion | MS | 02:30 PM - 03:50 PM | TR | room 4101 Materials Science and Eng Bld | Shim, M |
| 39038: 3 hoursTopic: Introduction to Nanotechnology. This section is for undergraduate and graduate students. | | | | | | |
| 46739 | lecture-discussion | MS2 | 02:30 PM - 03:50 PM | TR | room 4101 Materials Science and Eng Bld | Shim, M |
| 46739: Topic: Introduction to Nanotechnology. This section is for graduate students only. | | | | | | |

499 ***Senior Thesis*** credit: 1 to 5 hours.
Individual research in an area of materials science and engineering under the supervision of members of the staff. Results of research may be used for a senior (undergraduate) thesis. 1 to 5 undergraduate hours. No graduate credit. May be repeated to a maximum of 6 hours. A minimum total credit of 3 undergraduate hours is required. Prerequisite: Grade point average of 3.0 and and consent of instructor.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 10561 | independent study | | ARRANGED | | | |
| 10561: Instructor Approval Required | | | | | | |
| 10561: Individual Advisor course reference numbers (CRN) are posted in 201 MSEB. Do not use the number listed above. | | | | | | |

501 ***Kinetic Processes in Materials*** credit: 4 hours.
Examines the fundamentals of rate processes in materials, both from a phenomenological and an atomistic point of view, with special emphasis on the kinetics of transformations and the transport of matter in solids. Prerequisite: MSE 500 or PHYS 560.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 38356 | lecture-discussion | A | 09:00 AM - 10:20 AM | TR | room 218 Ceramics Bldg | Granick, S |

529 ***Seminar in Ceramics*** credit: 0 to 1 hours.
Seminar on current research in ceramic science and engineering; includes presentations by visiting lecturers, staff,

and students. Approved for S/U grading only. May be repeated. A maximum of 2 hours of MSE 529, MSE 559, and MSE 590 may count toward the MatSE M.S. degree; likewise 4 hours for the MatSE Ph.D. degree.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 38358 | lecture | R | 02:00 PM - 03:20 PM | R | room 218 Ceramics Bldg | Payne, D |

559 ***Soft Materials Seminar*** credit: 1 hours.
Seminar on current research in the science and engineering of soft materials; includes presentations by visiting lecturers, staff, and students. Approved for S/U grading only. May be repeated. A maximum of 2 hours of MSE 529, MSE 559 and MSE 590 may count toward the MatSE M.S. degree; likewise 4 hours for the MatSE Ph.D. degree.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 38361 | conference | U | 04:00 PM - 04:50 PM | T | room 165 Everitt Elec and Comp Engr Lab | Luijten, E |

583 ***Dynamics of Complex Fluids*** credit: 3 or 4 hours.
A modern, microscopic statistical treatment of the structure and dynamics of polymers, colloids, gels and other soft materials. Fundamental connections between molecular architecture, intermolecular forces, collective fluid structure and time-dependent phenomena are developed. Theoretical concepts and experimental behavior are presented in an integrated manner. Specific topics covered include Brownian motion and Langevin equation theory, viscoelasticity and diffusion in colloidal suspensions, gels, and glasses, and the dynamics of polymer solutions and melts. Prerequisite: One of CHBE 321, CHEM 444, MSE 401, PHYS 427.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 48166 | lecture-discussion | A | 09:00 AM - 10:20 AM | TR | room 305 Materials Science and Eng Bld | Schweizer, K |

584 ***Point and Line Defects*** credit: 4 hours.
Formation and interactions of point and line defects in solids including metals, semiconductors, dielectrics, and ionic conductors. Theoretical treatments include thermal equilibrium and non-equilibrium conditions. Applications include impurity diffusion, ion irradiation, dislocation generation and motion, ionic conductivity, and deep level electronic defects. Prerequisite: MSE 401 or MSE 501; PHYS 460 or PHYS 560.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 43412 | lecture-discussion | A | 02:00 PM - 03:20 PM | MW | room 305 Materials Science and Eng Bld | Trinkle, D |

590 ***Research Seminars*** credit: 0 to 1 hours.
Discussions and lectures on current research under the direction of individual staff members. Approved for both letter and S/U grading. May be repeated. A maximum of 2 hours of MSE 529, MSE 559, and MSE 590 may count toward the MatSE M.S. degree; likewise 4 hours for the MatSE Ph.D. degree. Prerequisite: Consent of instructor.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 10568 | independent study | | ARRANGED | | | |
| 10568: Instructor Approval Required | | | | | | |
| 10568: Individual Advisor course reference numbers (CRN) are posted in 201 MSEB. Do not use the number listed above. | | | | | | |

591 ***Laboratory Investigations*** credit: 0 to 8 hours.
Special investigations in materials providing an opportunity for instruction in experimental methods of research. Approved for both letter and S/U grading. May be repeated to a maximum of 8 hours. For non-thesis M.S. students only. Prerequisite: Consent of instructor.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 10565 | independent study | | ARRANGED | | | |
| 10565: Instructor Approval Required | | | | | | |
| 10565: The individual advisor course reference number (CRN) is available in 201 MSEB. Do not use the number listed above. | | | | | | |

595 ***Materials Colloquium*** credit: 0 to 1 hours.
Presentation of (i) cutting-edge materials research given by visiting lectures from academia as well as national and industrial research laboratories and (ii) some of the current research conducted in the Department. Students meet with visitors for questions and discussion. Required of all graduate students in the department during their first two years. Approved for both letter and S/U grading. May be repeated. A maximum of 2 hours of MSE 590 may count toward the MatSE M.S. degree; likewise 4 hours for the MatSE Ph.D. degree.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 38367 | lecture | H | 04:00 PM - 05:20 PM | M | room 151 Everitt Elec and Comp Engr Lab | Trinkle, D |

597 ***Independent Study*** credit: 1 to 4 hours.
Individual study of any topic in materials science and engineering under the supervision of a member of the faculty. May be repeated to a maximum of 4 hours. Prerequisite: Consent of instructor.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 10566 | independent study | | ARRANGED | | | |
| 10566: Instructor Approval Required | | | | | | |
| 10566: Individual Advisor course reference numbers (CRN) are posted in 201 MSEB. Do not use the number listed above. | | | | | | |

599 ***Thesis Research*** credit: 0 to 16 hours.
Individual research in specialized problems under the supervision of members of the staff. Results of research may be used for graduate thesis. Approved for S/U grading only. May be repeated.

| CRN | Type | Section | Time | Days | Location | Instructor |
|---|---|---|---|---|---|---|
| 10570 | independent study | | ARRANGED | | | |
| 10570: Instructor Approval Required | | | | | | |
| 10570: Individual Advisor course reference numbers (CRN) are posted in 201 MSEB. Do not use the number listed above. | | | | | | |