

## **MATERIALS SCIENCE AND ENGINEERING (0750)**

### **Teaching Schedule 2019-2020**

| <b><u>Course No.</u></b> | <b><u>Title</u></b>                            | <b><u>Fall</u></b>           | <b><u>Winter</u></b>         | <b><u>Spring</u></b>    |
|--------------------------|------------------------------------------------|------------------------------|------------------------------|-------------------------|
| <b>GT 106</b>            | Freshman Design and Communications             |                              |                              |                         |
| <b>298/398</b>           | IDEA                                           |                              |                              |                         |
| <b>101</b>               | Modern Materials                               |                              |                              |                         |
| <b>190</b>               | MS&E Freshman Projects                         | TTh 2:00<br>Dravid           |                              |                         |
| <b>201</b>               | Principles of the Properties of Materials      | TTh 9:30<br>Emery/Wolverton  | MWF 10:00<br>Chung/Olvera    | TTh 9:30<br>Emery/Huang |
| <b>301</b>               | Chemical Aspects of Engineering Materials      | MWF 12:00<br>Emery/Wolverton |                              | TTh 9:30<br>Emery/Huang |
| <b>314</b>               | Thermodynamics of Materials                    | MTWF 3:00<br>Barnett         |                              |                         |
| <b>315</b>               | Phase Equilibria and Diffusion in Materials    |                              | MTWF 2:00<br>Wolverton/Emery |                         |
| <b>316-1</b>             | Microstructural Dynamics                       |                              |                              | MTWF 1:00<br>Joester    |
| <b>316-2</b>             | Microstructural Dynamics                       | MWThF 1:00<br>Joester        |                              |                         |
| <b>318</b>               | Materials Selection                            |                              | MWF 11:00<br>Carr            | MWF 3:00<br>Carr        |
| <b>331</b>               | Soft materials                                 |                              |                              | MWF 12:00<br>Huang      |
| <b>332</b>               | Mechanical Behavior of Solids                  |                              | MWF 1:00<br>Shull            |                         |
| <b>333</b>               | Composites                                     |                              |                              |                         |
| <b>336</b>               | Chemical Synthesis of Materials                |                              |                              |                         |
| <b>337</b>               | Conducting Polymers                            |                              | MWF 10:00<br>Huang           |                         |
| <b>340</b>               | Ceramic Processing                             |                              |                              | MWF 12:00<br>Barnett    |
| <b>341</b>               | Intro to Modern Ceramics                       |                              |                              |                         |
| <b>351-1</b>             | Intro Physics of Materials                     | MWF 10:00<br>Snyder          |                              |                         |
| <b>351-2</b>             | Intro Physics of Materials                     |                              |                              |                         |
| <b>353</b>               | Bioelectronics                                 |                              |                              | TTh 9:30<br>Rogers      |
| <b>354</b>               | Bioelectronics Lab                             |                              |                              |                         |
| <b>355</b>               | Electronic Materials                           |                              |                              |                         |
| <b>357</b>               | Nanomagnetic Materials for Information Storage |                              |                              |                         |

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| 358 | Electronic and Thermal Properties of Materials                                       |  |                         |                      | MWF 3:00<br>Snyder    |
| 360 | Electron Microscopy                                                                  |  |                         |                      | TTh 12:30 L.<br>Marks |
| 361 | Crystallography & Diffraction                                                        |  |                         | MWF 12:00<br>Bedzyk  |                       |
| 362 | Point, Line & Planar Imperfections                                                   |  |                         |                      |                       |
| 370 | BioMaterials                                                                         |  |                         |                      |                       |
| 371 | Biomaterials:<br>Hierarchical Architecture and Function                              |  |                         | TTh 12:30<br>Joester |                       |
| 376 | Nanomaterials                                                                        |  |                         |                      |                       |
| 380 | Intro to Surface Science & Spectroscopy                                              |  |                         |                      |                       |
| 381 | Materials for Energy-Efficient Technology                                            |  | TTh 11:00<br>Dunand     |                      |                       |
| 382 | Fuel Cells                                                                           |  |                         |                      |                       |
| 385 | Electronic and Thermal Properties of Materials                                       |  |                         |                      | MWF 3:00<br>Snyder    |
| 390 | Materials Design                                                                     |  |                         |                      | MWF 11:00<br>Shull    |
| 391 | Process Design                                                                       |  | MWF 3:00<br>Chung       |                      |                       |
| 394 | Honors Project                                                                       |  | TBA                     | TBA                  | TBA                   |
| 395 | Magnetic Properties of Materials                                                     |  |                         |                      |                       |
| 395 | Mechanical Modeling                                                                  |  |                         |                      |                       |
| 395 | Special Topics: Engineering Strategies in Tissue Engineering & Regenerative Medicine |  |                         |                      |                       |
| 395 | Special Topics: Materiality in Art and Architecture                                  |  |                         |                      |                       |
| 395 | Special Topics: Organic Materials                                                    |  |                         |                      |                       |
| 395 | Special Topics                                                                       |  | MWF 12:00<br>Rondinelli |                      |                       |
| 395 | Special Topics                                                                       |  |                         |                      |                       |
| 395 | Special Topics                                                                       |  |                         |                      | Rogers                |
| 396 | Senior Project MS&E                                                                  |  | W 2:00<br>Stair         | W 2:00<br>Stair      | W 2:00<br>Stair       |
| 398 | Introduction to Plasma Sci. and Processing Tech.                                     |  |                         |                      |                       |
| 399 | Special Projects MS&E                                                                |  | TBA                     | TBA                  | TBA                   |

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| 401 | Chemical and Statistical Thermodynamics of Materials                         |  | MWThF 10:00<br>Luijten/Lauhon    |                                    |                          |
| 402 | Structure of Crystalline and Noncrystalline Materials                        |  | TTh 11:00, F 11:00<br>Rondinelli |                                    |                          |
| 404 | Imperfections in Materials                                                   |  |                                  | MWF 2:00<br>Seidman/Haile          |                          |
| 405 | Physics of Solids                                                            |  |                                  |                                    | MTWF 1:00<br>Hersam      |
| 406 | Symmetry and Mechanical Properties of Materials                              |  |                                  |                                    | MWF 2:00<br>Dunand/Emery |
| 408 | Phase Transformations in Materials                                           |  |                                  | MWF 3:00<br>Voorhees               |                          |
| 411 | Phase Transformations in Crystalline Materials                               |  |                                  |                                    | MW 4:00<br>Voorhees      |
| 415 | Fundamentals of Thin Film Materials                                          |  |                                  |                                    |                          |
| 416 | Kinetics                                                                     |  |                                  |                                    | TTh 2:00<br>Seidman      |
| 434 | Fracture of Brittle Solids                                                   |  |                                  |                                    |                          |
| 435 | High Temperature Materials                                                   |  |                                  | TTh 10:00<br>Dunand                |                          |
| 444 | Organic Nanomaterials                                                        |  | TTh 5:00<br>Gianneschi           |                                    |                          |
| 445 | High Polymer Science                                                         |  | MW 4:00<br>Olvera                |                                    |                          |
| 451 | Physics of Materials                                                         |  | MTWF 1:00<br>Hersam              |                                    |                          |
| 452 | Special Topics in Solid State Physics of Materials: Optoelectronic Materials |  |                                  |                                    | TTh 9:30<br>Rondinelli   |
| 455 | Phycsis of Nanostructures                                                    |  |                                  |                                    |                          |
| 456 | Functional Metamaterials                                                     |  |                                  |                                    |                          |
| 458 | Computational Materials Science                                              |  |                                  | MWF 9:00<br>Wolverton              |                          |
| 460 | Electron Microscopy                                                          |  |                                  | TTh 2:00<br>(MatSci only) L. Marks |                          |
| 461 | Diffraction Methods in Materials Science                                     |  |                                  |                                    |                          |

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| 465 | Advanced Electron Microscopy and Diffraction                   |  | TTh 9:30 Marks | L.             |                  |
| 466 | Analytical Electron Microscopy                                 |  |                |                | TTh 11:00 Dravid |
| 485 | Electronic and Thermal Properties of Materials                 |  |                |                | MWF 3:00 Snyder  |
| 495 | Materials Biology                                              |  |                |                |                  |
| 495 | Solar Energy Conversion                                        |  |                | MW 11:00 Chang |                  |
| 495 | Mechanics of the Cell                                          |  |                |                |                  |
| 495 | Mechanics of Soft Matter                                       |  |                |                |                  |
| 495 | Solid State Electrochemistry for Energy Storage and Conversion |  |                |                | MW 9:30 Haile    |
| 498 | Statistical Mechanics                                          |  |                |                |                  |
| 499 | Projects                                                       |  | TBA            | TBA            | TBA              |
| 510 | Special Topics Computational                                   |  |                |                |                  |
| 590 | Research                                                       |  | TBA            | TBA            | TBA              |

**Some Non-MSE Courses of Interest (not an exhaustive list)**

|                      |                                             |    |                            |                      |                    |
|----------------------|---------------------------------------------|----|----------------------------|----------------------|--------------------|
| <b>CIV_ENV 430</b>   | Cohesive Fracture and Scaling               |    |                            | MWF 4:00-5:50 Bazant |                    |
| <b>CIV_ENV 415</b>   | Theory of Elasticity                        |    |                            | Brinson              |                    |
| <b>ES_APPM 311-1</b> | Methods in Applied Math                     | 20 | MWF 12:00 Olmstead         |                      |                    |
| <b>ES_APPM 311-1</b> | Methods in Applied Math                     | 21 | MWF 11:00 Olmstead         |                      |                    |
| <b>ES_APPM 495</b>   | Modeling of Soft Materials                  |    |                            |                      |                    |
| <b>ES_APPM 495</b>   | Intro to Statistical Mechanics              |    |                            |                      |                    |
| <b>Chem 360</b>      | Nanopatterning                              |    |                            | TTh 1:00 Odom        |                    |
| <b>Chem 407</b>      | Materials and Nanochemistry                 |    | Tu-Th 11:00-12:20 Schaller |                      |                    |
| <b>Chem_Eng 361</b>  | Introduction to Polymers                    |    | MTWF 10:00 Torkelson       |                      |                    |
| <b>Chem_Eng 451</b>  | Applied Molecular Modeling                  |    |                            |                      |                    |
| <b>Chem_Eng 462</b>  | Viscoelasticity and Flow in Polymer Systems |    |                            |                      |                    |
| <b>Chem_Eng 475</b>  | Cell-Material Interactions                  |    |                            | MW 4:00-5:30 Shea    |                    |
| <b>Chem_Eng 478</b>  | Advances in Biotechnology                   |    |                            |                      | W 12-2, F 1-2 Shea |
| <b>BME 343</b>       | Biomaterials and Medical Devices            |    |                            |                      |                    |

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| <b>ME 445</b> | Micromanufacturing                                           |  | TuTh 9:30-11<br>Cao         |                                                                                                          |                             |
| <b>ME 456</b> | Mechanics of<br>Advanced Materials                           |  |                             |                                                                                                          |                             |
| <b>ME 495</b> | Nanoengineered<br>Materials for<br>Mecanobiology             |  |                             |                                                                                                          |                             |
| <b>ME 495</b> | Nuvention: Medical<br>Innovation                             |  | TBA 6:00-9:00 PM<br>Marasco | <b>Note:</b> Interested students can<br>contact Kevin Henderson (current<br>MSE grad student) for advice |                             |
| <b>ME 381</b> | Intro to Micro-electro-<br>mechanical systems                |  | MWF 11:00<br>Espinosa       |                                                                                                          |                             |
| <b>ME 382</b> | Experiments in Micro-<br>and nano-science<br>and Engineering |  |                             |                                                                                                          | TuTh 12:30-1:50<br>Espinosa |

requirement for Ph.D. Program

satisfies 400-level (graduate) MSE requirement