Michigan Technological University
Interdisciplinary Minor in Nanoscale Science and Engineering (Nanotechnology)
Program Code IMNT, Academic Year 2023-24
Department of Physics
Total Credits Required: 18

Required Courses: 8 credits
- UN 2600 Fundamentals of Nanoscale Science and Engineering (2) Prereqs: none
- SS 3801 Science Technology & Society (3) Prereqs: UN1015 and UN1025
- Independent Study/Research/Co-op/Enterprise (3) Must be nano-related and approved by the minor advisor

Elective Courses: 10 credits
Choose at least six credits that are not in your major (as defined by the course prefix). Courses that are cross-listed with your major are considered as being in your major. At least six of the 10 credits must be taken at the 3000- or 4000-level.
*Denotes an instrumentation-related course. Students are encouraged, though not required, to take at least one course related to instrumentation.
- BE 3800 Biomaterials II: Properties and Biological Interactions (3) Prereqs: BE2700(C) and BE2800
- BE 4300 Polymeric Biomaterials (3) Prereqs: BE3800
- BE 4330 Biomimetic Materials (3) Prereqs: BE3350 and BE3800
- BE 4335 Smart Polymers (3) Prereqs: BE3350 and BE3800
- BE 4670 Micro & Nano Technologies (3) Prereqs: BE3700
- BE 4700 Biosensors: Fabrication and Apps (3) Prereqs: BE3700 and BE3701
- BE 4800 Biomaterials Interfaces (3) Prereqs: BE3800
- BL 3020 Biochemistry I (3) Prereqs: (BL1020 or BL1040 or BE2400) or (BL1200 and BL1210) or (BL1400 and BL1410) and (CH2410 or CH2420)
- BL 4020 Biochemistry II (3) Prereqs: BL3020
- BL 4030 Molecular Biology (3) Prereqs: BL1020 or BL1040 or (BL1200 and BL1210) or (BL1400 and BL1410) and (BL3020 or CH4710)
- BL 4035 Bioimaging* (2) Prereqs: none
- BL 4042 Scanning Electron Microscopy Bio Specimens* (2) Prereqs: BL4035
- BL 4062 Transmission Electron Microscopy of Bio Specimens* (2) Prereqs: BL4035
- CH 3520 Physical Chem II - Molecular Structure (3) Prereqs: CH1122 or (CH1160 and CH1161) and MA3160 and PH2200(C)
- CH 4212 Instrumental Analysis* (5) Prereqs: CH2212 and CH3510(C) and CH3511(C)
- CH 4310 Inorganic Chemistry I (3) Prereqs: CH3520
- CH 4320 Inorganic Chemistry II (3) Prereqs: CH4310
- CH 4560 Computational Chemistry (3) Prereqs: CH3520
- CH/CM 4610 Intro to Polymer Science (3) Prereqs: CH1122 or (CH1160 and CH1161)
  - or MSE 4110 Intro to Polymer Engineering (3) Prereqs: (MY2100 or MSE2100 or BE2800) and CH1160
- CH 4620/CM4620 Polymer Chemistry (3) Prereqs: CH2420 or CH2440
- CH 4631/CM4631 Polymer Science Laboratory (2) Prereqs: CH4610(C) or CM4610(C) or BE4300(C) or MY4600(C) or MSE4110(C)
- CH 4640 Synthesis of Nanoparticles (3) Prereqs: (CH2410 or CH2430) and CH2411
- CH 4720 Biomolecular Chemistry II (3) Prereqs: BL3020 or CH4710
- CM/ENT 3979 Alternative Energy Technology (1) Prereqs: CH1112 or (CH1150 and CH1151) and (MA1160 or MA1161 or MA1121)
- CM 4710 Biochemical Processes (3) Prereqs: BL2100 or CH2410 or BL3020
Elective courses continued

- EE 3290 Photonic Material Devices and Apps (4)
- EE 4231 Physical Electronics (3)
- EE/MSE 4240 Introduction to MEMS (4)
- EE 5470 Semiconductor Fabrication (3)
- EE 5840 Advanced MEMS (4)
- EET 3131 Instrumentation (3)
- FW 3075 Introduction to Biotechnology (3)
- FW 4099 Programmable Skills for Bioinformatics (3)
- MEEM 4260 Fuel Cell Technology (3)
- MEEM 4405 Intro to Finite Element Method (3)
- MEEM 4640 Micromanufacturing Processes (3)
- MEEM 5130 Nanoscale Science and Technology (3)
- MGT 3800 Entrepreneurship (3) Prereqs: None
- MSE 3120 Materials Characterization I* (4) Prereqs: MY2110 or MSE2110
- MSE 3130 Materials Characterization II* (4) Prereqs: MY2110 or MSE2110 or BE2800
- MSE 3150 Intro to Semiconductor Materials & Devices (3) Prereqs: PH2200 and MA2160
- MSE/EE 4240 Introduction to MEMS (4) Prereqs: None
- MSE/PH 4292 Light and Photonic Materials (3) Prereqs: PH2200 or EE2190 or EE3140
- MSE 4410 Science of Ceramic Materials (3) Prereqs: MY2100 or MSE2100 or BE2800
- MSE 4510 Contact Mechanics and Nanoindentation (3) Prereqs: (MY2100 or MSE2100 or BE2800) and (MA3521 or MA3520 or MA3530) and MEEM2150
- MSE 4530 Scanning Electron Microscopy and X-Ray Micro* (3) Prereqs: None
- MSE 5580 Intro to Scanning Probe Microscopy* (2) Prereqs: None
- PH 3410 Quantum Physics I (3) Prereqs: PH2400 and (MA3520 or MA3521 or MA3530 or MA3560)
- PH 3411 Quantum Physics II (3) Prereqs: PH3410
- PH/MSE 4292 Light and Photonic Materials (3) Prereqs: PH2200(C) or EE2190 or EE3140
- PH 5530 Selected Topics in Nanoscale Science and Tech (2) Prereqs: None
- SS 3650 Intellectual Property Law Management (3) Prereqs: UN1015 and UN1025

Additional electives may be selected from the courses below

- BL 2100 Principles of Biochemistry (3) Prereqs: BL1020 or BL1040 or BE2400 or (BL1200 and BL1210) or (BL1400 and BL1410) and CH1112 or (CH1150 and CH1151)
- BL 2200 Genetics (3) Prereqs: BL1020 or BL1040 or BE2400 or (BL1200 and BL1210) or (BL1400 and BL1410)
- CH 2420 Organic Chemistry II (3) Prereqs: CH2410
- PH 2400 University Physics IV: Waves & Modern Physics (3) Prereqs: PH2200 or PH2260

Other appropriate electives (including those at the graduate level) may be chosen with written permission by the Nanotechnology minor faculty advisor. Graduate level courses may require department or instructor permission.