Michigan Technological University
Interdisciplinary Minor in Nanoscale Science and Engineering (Nanotechnology)
Program Code IMNT, Academic Year 2024-25
Department of Physics
Total Credits Required: 18

Required Courses: 8 credits

- UN 2600 Fundamentals of Nanoscale Science and Engineering (2) Prereqs: none
- SS 3800 Energy Policy and Technology (3) Prereqs: UN1015 and (UN1025 or modern language -3000 level or higher)
  - or 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
- 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 4142 Biological Electron Microscopy*
- CH 3520 Physical Chem II - Molecular Structure (3) Prereqs: CH1122 or (CH1160 and CH1161) and MA3160 and PH2200(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 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
- 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)
Elective courses continued

- 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) \textit{Prereqs: None}
- MSE 3120 Materials Characterization I* (4) \textit{Prereqs: MY2110 or MSE2110}
- MSE 3130 Materials Characterization II* (4) \textit{Prereqs: MY2110 or MSE2110 or BE2800}
- MSE 3150 Intro to Semiconductor Materials & Devices (3) \textit{Prereqs: PH2200 and MA2160}
- MSE 3160 Electronic, Magnetic and Optical Properties of Materials (3) \textit{Prereqs: PH2200}
- MSE/EE 4240 Introduction to MEMS (4) \textit{Prereqs: None}
- MSE/PH 4292 Light and Photonic Materials (3) \textit{Prereqs: PH2200 or EE2190 or EE3140}
- MSE 4410 Science of Ceramic Materials (3) \textit{Prereqs: MY2100 or MSE2100 or BE2800}
- MSE 4530 Scanning Electron Microscopy and X-Ray Micro* (3) \textit{Prereqs: None}
- PH 3410 Quantum Physics I (3) \textit{Prereqs: PH2400 and (MA3520 or MA3521 or MA3530 or MA3560)}
- PH 3411 Quantum Physics II (3) \textit{Prereqs: PH3410}
- PH/MSE 4292 Light and Photonic Materials (3) \textit{Prereqs: PH2200(C) or EE2190 or EE3140}
- PH 5530 Selected Topics in Nanoscale Science and Tech (2) \textit{Prereqs: None}
- SS 3650 Intellectual Property Law Management (3) \textit{Prereqs: UN1015 and UN1025}

Additional electives may be selected from the courses below

- BL 2200 Genetics (3) \textit{Prereqs: BL1020 or BL1040 or BE2400 or (BL1200 and BL1210) or (BL1400 and BL1410)}
- CH 2420 Organic Chemistry II (3) \textit{Prereqs: CH2410}
- PH 2400 University Physics IV: Waves & Modern Physics (3) \textit{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