

# Micro- and Nano- Engineering Concentration

## Woodruff School of Mechanical Engineering, Georgia Institute of Technology

### Introduction

- Concentrations are optional, not required.
- Concentrations are 15 hours and the classes satisfy the Design Elective, the ME Elective and 9 hours of free electives.
- Concentrations are different than minors because they allow students to specialize in a particular area within ME.
- Classes used for a concentration may not also be used towards a minor or an additional concentration.

**Concentration Requirements** - To satisfy a concentration, students must do each of the following:

- Declare your concentration in OSCAR. [http://www.degreeworks.gatech.edu/images/training/concentration\\_mgt.pdf](http://www.degreeworks.gatech.edu/images/training/concentration_mgt.pdf)
- Complete all of the required classes and the correct number of elective classes in the table listed below. The classes required for the concentration will satisfy the Design Elective, an ME Elective and 9 hours free electives.
- Students may use a maximum of 3 hours of approved 4699 hours towards the concentration. The research MUST relate to the concentration and be approved by the concentration area faculty advisor.

Course Number and Name	Credit Hours	Lab <sup>3</sup>	Pre-Requisites and Co-Requisites*	ME Elective	Projected Offering (Fall, Spring or Summer) <sup>1</sup>		
					Fall	Spr	Sum
<b>Required Class</b>							
<b>ME 4315</b> Energy Systems Analysis and Design	3		ME 2110, ME 3345	Design	X	X	
<b>Elective Classes (Choose 4, one must be an ME Elective)</b>							
<b>ME 4766</b> Nanoscale Devices <sup>6</sup>	3		ME 3322	X	X <sup>2</sup>		
<b>ME 4803</b> Multiscale Thermal Engineering <sup>4,5</sup>	3		ME 3322, ME 3345*	X	X <sup>2</sup>		
<b>ME 4699</b> Undergraduate Research (in MEMS or Nano)	3		Professor Dependent		X	X	X
<b>MSE 4325</b> Thin Film Materials Science <sup>4</sup>	3		MSE 2001			X <sup>2</sup>	
<b>MSE 4330</b> Fundamentals of Nanomaterials and Nanotechnology	3		MSE 2001		X <sup>2</sup>		
<b>MSE 4335</b> Soft Nano Bio Materials	3		MSE 2001			X <sup>2</sup>	
<b>CHBE 4020</b> Chemical Engineering in Nanoscale Systems	3		Senior Standing		X <sup>2</sup>		
<b>CHBE 4050</b> The Science and Engineering of Microelectronic Fabrication			CHBE 3200, CHBE 3130 <sup>7</sup>				
<b>CHEM 3412</b> Physical Chemistry II	3		CHEM 1212K, PHYS 2212		X	X	
<b>PHYS 4262</b> Solid State Physics	3		PHYS 3143			X	

### Notes

1. This chart is a projected schedule of class offerings and may change at any time. Students should check OSCAR for exact class offerings during each semester. This table should only be used as a guide.
2. This class is sometimes offered during this semester.
3. This indicates that the course contains a lab component.
4. These classes are not offered on a regular basis. Students need to check OSCAR to see when the classes will be offered.
5. ME 4803 Multiscale Thermal Engineering was previously taught as both ME 4803 Nano-engineering Energy Technologies and ME 4803 Nanoscale Heat Transfer. Students can only receive credit for one of these three ME 4803 classes.
6. This class was previously offered as ME 4803 N, Fabrication of Nanoscale Devices. Students can only receive credit for ME 4803 N or ME 4766, not both.
7. ME 3322, ME 3340 and ME 3345 can be substitutes for the CHBE 3200 and CHBE 3130 pre-req classes.

### Pre-Requisite Information for Non- ME Classes

- **PHYS 4262 Pre-Req Chain:** MATH 2552 and PHYS 2212 -> PHYS 3143 -> PHYS 4262
- **CHEM 3412 Pre-Req Chain:** CHEM 1211K or CHEM 1310 -> CHEM 1212K