Nanotechnology Curriculum Checklist

Physics/Materials Emphasis

Title	Course	Cr.	Pre/Co-Requisites	Term	Grade
Chemistry					
General Chemistry for Engineering 1	CHEM 0960	3			
General Chemistry for Engineering 2	CHEM 0970	3	CHEM 0960		
Electrical & Computer Engineering					
Linear Circuits & Systems	ECE 0101	4	PHYS 0175, ENGR 0012 *Math 0280, 0290*		
Microelectronic Circuits & Lab	ECE 0102	4	ECE 0101		
Problem Solving in C++	ECE 0301	3	ENGR 0012		
Fabrication & Design in Nanotechnology	ECE 1251	3	ENGR 0240/ECE 1250		
General Engineering					
Introduction to Engineering Analysis	ENGR 0011	3			
Engineering Computing	ENGR 0012	3	ENGR 0011		
Materials Structures & Properties	ENGR 0022	3	PHYS 0175, MATH 0230		
Statics & Mechanics of Materials 1	ENGR 0135	3	MATH 0230, PHYS 0174		
Probability & Statistics	ENGR 0021	3	MATH 0230		
Introduction to Nanotechnology & Nanoengineering	ENGR 0240/ ECE 1250	3	MATH 0230, PHYS 0175		
Fabrication & Design in Nanotechnology	ECE 1251	3			
Humanities & Social Sciences					
Humanities Elective*		3			
Social Sciences Elective*		3			
Humanities/Social Sciences Elective*		3			
Humanities/Social Sciences Elective*		3			
Humanities/Social Sciences Elective*		3			
Humanities/Social Sciences Elective * ‡		3			
Mathematics					
Analytical Geometry & Calculus 1	MATH 0220	4			
Analytical Geometry & Calculus 2	MATH 0230	4	MATH 0220		
Analytical Geometry & Calculus 3	MATH 0240	4	MATH 0230		
Matrices & Linear Algebra	MATH 0280	3	MATH 0220		
Differential Equations	MATH 0290	3	MATH 0230		
Mechanical Engineering					

Thermodynamics of Materials	MEMS 0048	3	PHYS 0175, CHEM 0960		
Structures of Crystals	MEMS 1053	3	ENGR 0022		
Experimental Methods in MSE	MEMS 1010	3	ENGR 0022		
Micro/Nano Manufacturing	MEMS 1057	3			
Phase Equilibria	MEMS 1059	3	ENGR 0022, MEMS 0051		
Phase Transformations	MEMS 1063	3	MEMS 1053, MEMS 1059		
Physics					
Physics for Science & Engineering 1	PHYS 0174	4	*MATH 0220*		
Physics for Science & Engineering 2	PHYS 0175	4	PHYS 0174, *MATH 0230*		
Lab Physics for Science & Engineering	PHYS 0219	2	*PHYS 0175*		
Principles of Modern Physics 1	PHYS 0477	4	PHYS 0175, *MATH 0240*		
Principles of Modern Physics 2	PHYS 0481	3	PHYS 0477		
Upper-Level Physics	PHYS	3			
Upper-Level Physics	PHYS	3			
Program Specific					
Nanotechnology Program Elective		3			
Nanotechnology Program Elective		3			
Nanotechnology Program Elective		3			
Senior Design					
Senior Design 1[+]		3			
Senior Design 2[++]		3			

Upper-Level Physics: Physics courses with course numbers > 1000

[+] A senior design course offered by one of the other SSOE engineering programs is required. Alternatively, may be ENGR 1050 Product Realization, or with preapproval, a senior design project arranged with a faculty mentor and taken as ENGSCI 1801.
[++] A semester-long research experience under the supervision of a faculty advisor at Pitt, not necessarily within the Swanson School of Engineering. Note that this requirement may also be fulfilled by participation in an undergraduate research program like the MCSI URP or the SURI during the summer semester.

[‡]A University designated writing intensive course

*All Humanities and Social Science electives must be from the SSOE approved list. Two courses need to be in single area (see SSOE guidelines).

Italicized courses indicate co-requisites; courses must be taken prior to or concurrently.

Nanotechnology Curriculum Program Electives – Physics/Materials

Approved Electives include:

Bioengineering

BIOENG 1810	Biomaterials and Biocompatibility

Chemistry

CHEM 1410	Physical Chemistry 1
CHEM 1420	Physical Chemistry 2
CHEM 1480	Intermediate Physical Chemistry
CHEM 1130	Inorganic Chemistry
CHEM 1620	Atoms, Molecules & Materials – 'Introduction to Nanomaterials'

Electrical & Computer Engineering

ECE 1232	Introduction to Lasers and Optical Electronics
ECE 1238	Digital Electronics
ECE 1247	Semiconductor Device Theory

General Engineering

ENGR 1066	Introduction to Solar Cells and Nanotechnology

Industrial Engineering

IE 1012	Manufacture of Structural Nano-Materials

Mechanical Engineering

MEMS 1011	Structure and Properties Lab
MEMS 1048	Analysis and characterization at the Nano-scale
MEMS 1082	Electromechanical Sensors and Actuators
MEMS 1111	Materials for Energy Generation and Storage

Materials Science

MSE 2012	Computational Material Science

Physics

PHYS 0520	Modern Physical Measurements
PHYS 1370	Introduction to Quantum Mechanics
PHYS 1371	Introduction to Quantum Mechanics
PHYS 1375	Foundations of Nanoscience