

NANOSYSTEMS ENGINEERING

Louisiana Tech University

Curriculum as of 2016

Name _____

Date _____

CWID _____

Email _____@latech.edu

COURSE	PREREQUISITE	SCH	QTR	GRADE
NSE 202	CHEM 102, PHYS 201	3	W	R*
300	ENGR 122	3	Sp	R*
302	CHEM 251, CHEM 253, NSE 201	2	Sp	R*
406	NSE 302, ENGR 220, 221, 222	1	F	R*
407	NSE 406	1	W	R*
408	NSE 407	1	Sp	R*
410	NSE 490, MSE 402, 404, 406	3	F	R*
490	CHEM 251	3	Sp	R*
CHEM 101	CHEM 100 (or by placement)	2		*
102	CHEM 101	2		*
103	CHEM 101 ^o	1		*
104	CHEM 103	1		*
250	CHEM 102	2		*
251	CHEM 250, 253 ^o	2		*
253	CHEM 102, 251 ^o	1		*
COMM 101		3		□
ELEN 334	MATH 244, ENGR 221, PHYS 202	3	F	R*
ENGL 101		3		
102	ENGL 101	3		
303	ENGL 102	3		
ENGR 120	MATH 240 ^o	2		*
121	ENGR 120, MATH 241 ^o	2		*
122	ENGR 121, MATH 242 ^o	2		*
220	ENGR 122, MATH 242, PHYS 201	3		R*
221	ENGR 122, MATH 242, PHYS 201	3		R*
222	ENGR 122, MATH 242	3		R*
MATH 241	MATH 240	3		*
242	MATH 241	3		*
243	MATH 242	3		*
244	MATH 243	3		*
245	MATH 244	3		*
MEEN 382	ENGR 221, MATH 241-244 GPA > 2.0	2	F,W	R
MEMT 201	ENGR 122	2		R*
MSE 402	ELEN 334	3	W	R*
404	MEMT201, ELEN 334	3	W	R*
406	PHYS 202	3	Sp	R*
PHYS 201	MATH 241	3		*
202	PHYS 201, MATH 242	3		*
412	PHYS 202	3	F	R
ELECTIVES				
Fine Art (ART 290, KINE 280, MUGN 290, or THTR 290)		3		
BISC 130 or 225		3		
Directed Elective		3		R
Directed Elective		3		R
Directed Elective		3		R
Directed Elective		3		R
Directed Elective		3		R
Directed Elective		3		R
HIST		3		
Social Science		3		
Social Science		3		
TOTAL SEMESTER HOURS		128		

SUBSTITUTIONS		
COURSE	SCH	GRADE
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

ADDITIONAL COURSES		
COURSE	SCH	GRADE
1		
2		
3		
4		
5		

GPA	
Rubric GPA	_____
MATH 241-244 GPA	_____

NOTES	
*	requires grade of "C" or higher
o	credit or registration in
R	course in rubric
□	must be completed within first year of enrollment
1	Directed electives must be selected in consultation with advisor.
2	Petitions must be filed for substitutions.
3	A student must have a minimum 2.0 GPA on all hours pursued in courses designated "R"
4	All students must complete an International Education Requirement (IER). Courses acceptable: HIST 102, GEOG 205, and GEOG 210.
5	Students pursuing BIEN concentration take BISC 225. All other students take BISC 130.

ADDITIONAL COMMENTS	

IER requirement met

Advisor: _____

NANOSYSTEMS ENGINEERING
Louisiana Tech University
Concentrations and Directed Electives

BIOMEDICAL ENGINEERING CONCENTRATION						
COURSE			SCH	GRADE		PREREQUISITE
BIEN	202 or	Biomed Principles I	1	R		MATH 241
	203	Biomed Principles II		R		MATH 241
	225	Biomedical Signals and Systems	3	R		ENGR 221, MATH 244
	230	Biomaterials	2	R		MEMT 201
	301	Fluid Mechanics & Energy Transfer	3	R		BIEN 202, ENGR 222, and 2.0 GPA in MATH 241-245
	401 or	Biomed Mass Transport	3	R		BIEN 301, MATH 245
	430	Biomechanics		R		BIEN 235, 301, ENGR 220
Engr, Sci, or ENGL 363			3	R		
300-level or higher			3	R		
TOTAL			18			

CHEMICAL ENGINEERING CONCENTRATION						
COURSE			SCH	GRADE		PREREQUISITE
CMEN	202	Chemical Engineering Calculations	3	R		MATH 241, ENGR 122**
	304	Transport Phenomena	3	R		CMEN 213, 313, 413, MATH 245
	313	Unit Operations-Design II	3	R		CMEN 213, MATH 244
	402	Chemical Reactions Engineering	3	R		CMEN 304
Engr, Sci, or ENGL 363			3	R		
300-level or higher			3	R		
TOTAL			18			

ELECTRICAL ENGINEERING CONCENTRATION						
COURSE			SCH	GRADE		PREREQUISITE
ELEN	223	Electrical Circuits II	3	R		ENGR 221
	224	Electrical Circuits III	3	R		ELEN 223, MATH 245**
	335	Electronic Circuits I	3	R		ELEN 224
	336	Electronic Circuits II	3	R		ELEN 335
Engr, Sci, or ENGL 363			3	R		
300-level or higher			3	R		
TOTAL			18			

MECHANICAL ENGINEERING CONCENTRATION						
COURSE			SCH	GRADE		PREREQUISITE
MEEN	350	Computer-Aided Modeling	1	R		ENGR 220, MATH GPA>2.0
	353 or	Heat Transfer	3	R		MATH 313, MEEN 350
	361	Advanced Mechanics of Materials		R		MEEN 350 and MEMT 212
MEMT	203	Dynamics	3	R		ENGR 220
	212	Inter Statics & Mech of Materials	3	R		ENGR 220, MATH GPA>2.0
	313	Elementary Fluid Mechanics	3	R		ENGR 222, MEMT 203, MATH GPA>2.0
Engr, Sci, or ENGL 363			2	R		
300-level or higher			3	R		
TOTAL			18			

MICROSYSTEMS ENGINEERING CONCENTRATION						
COURSE			SCH	GRADE		PREREQUISITE
MSE	401	Fund of Microfabrication Process	3	R		PHYS 202, MATH 245
	405	Nanotechnology Principles	3	R		
	407	Advanced Microfabrication	3	R		MSE 401
	457	Spec Topics: Micro System Engr	3	R		
Engr, Sci, or ENGL 363			3	R		
300-level or higher			3	R		
TOTAL			18			

* requires grade of "C" or higher.

** indicates co-requisite

Nanosystems Engineering (rv. 2016)
Louisiana Tech University
Biomedical Engineering Concentration

FRESHMAN YEAR											
Fall Quarter			Hr	Winter Quarter			Hr	Spring Quarter			Hr
ENGR 120*	Engr Problem Solving I	2	ENGR 121*	Engr Problem Solving II	2	ENGR 122*	Engr Problem Solving III	2			
MATH 240*	Math for Engr & Science	3	MATH 241*	Calculus I	3	MATH 242*	Calculus II	3			
CHEM 100*	General Chemistry	2	CHEM 101*	General Chemistry	2	CHEM 102*	General Chemistry	2			
COMM 101	Principles of Comm Studies	3	CHEM 103*	General Chemistry Lab	1	CHEM 104*	General Chemistry Lab	1			
FYE 100	Freshman Year Experience	1	ENGL 101	Freshmen Composition	3	PHYS 201*	Physics for Engr & Sci. I	3			
						BIEN 202	Biomedical Engr Principles I	1			
						or BIEN 203	(offered in Fall)				
		11			11					12	

SOPHOMORE YEAR											
Fall Quarter			Hr	Winter Quarter			Hr	Spring Quarter			Hr
ENGR 222*	Thermodynamics	3	ENGR 221*	Electrical Engr & Circuits I	3	ENGR 220*	Statics and Mechs of Materials	3			
MATH 243*	Calculus III	3	MATH 244*	Calculus IV	3	MATH 245*	Differential Equations	3			
MEMT 201*	Engineering Materials	2	NSE 202*	Intoduction to Nanosystems Engr	3	NSE 300	Intro to Programming for Engr & Sc	3			
PHYS 202*	Physics for Engr & Sci II	3	BIEN 230	Biomaterials	2	ENGL 102	Freshmen Composition II	3			
BIEN 203	Biomedical Engr Principles II										
or BIEN 202	(offered in Spring)										
		11			11					12	

JUNIOR YEAR											
Fall Quarter			Hr	Winter Quarter			Hr	Spring Quarter			Hr
BIEN 225	Biomedical Systems	3	BIEN 301	Biomed Fluid Mechanics	3	NSE 302*	Nanomanufacturing	2			
ELEN 334*	Solid State Electronics	3	MSE 402*	Microsystems Principles	3	NSE 490*	Nanosystems Modeling	3			
CHEM 250*	Organic Chemistry	2	MSE 404*	Micro/Nanomaterials	3	MSE 406*	Micro/Nano Measurments	3			
BISC 225	Human Anat & Physiol I	3	CHEM 251*	Organic Chemistry	2	BIEN 401	Biomed. Mass Trasp.	3			
			CHEM 253*	Organic Chemistry Lab	1	or BIEN 430	in Fall				
		11			12					11	

SENIOR YEAR											
Fall Quarter			Hr	Winter Quarter			Hr	Spring Quarter			Hr
NSE 406*	Senior Design I	1	NSE 407*	Senior Design II	1	NSE 408	Senior Design III	1			
NSE 410	Nanosystems & Devices	3	Directed Elective**		3	ART	See options under "Electives"	3			
MEEN 382	Basic Measurments	2	Social Science***		3	HIST#		3			
PHYS 412	Solid State Physics	3	Social Science***		3	Directed Elective**		3			
ENGL 303	Technical Writing	3									
		12			10					10	

Neither MATH 240 nor CHEM 100 count towards the nanosystems engineering degree.

* requires grade of "C" or higher.

**Directed electives are chosen in consultation with advisor and approved by the Program Chair. Eng. or Sci. 300 or 400 level courses or ENGL 363.

Courses in **bold** are typically offered only once per year.

Social Science electives can be selected from Anthropology, Criminal Justice, Economics, Geography, International Studies, Interdisciplinary, Political Science, Psychology, and Sociology.

Humanities electives can be selected from Classical Studies, Communications, Foreign Languages, History, Literature, Philosophy, Religious Studies, Interdisciplinary

All students must complete an International Education Requirement prior to graduation. A list of courses can be found in the university catalog.

Courses that do not have any pre-requisite requirement are: GEOG 205, GEOG 210, HIST 102.

Nanosystems Engineering (rv. 2016)
Louisiana Tech University
Chemical Engineering Concentration

FRESHMAN YEAR											
Fall Quarter			Hr	Winter Quarter			Hr	Spring Quarter			Hr
ENGR 120*	Engr Problem Solving I	2	ENGR 121*	Engr Problem Solving II	2	ENGR 122*	Engr Problem Solving III	2			
MATH 240*	Math for Engr & Science	3	MATH 241*	Calculus I	3	MATH 242*	Calculus II	3			
CHEM 100*	General Chemistry	2	CHEM 101*	General Chemistry	2	CHEM 102*	General Chemistry	2			
COMM 101	Principles of Comm Studies	3	CHEM 103*	General Chemistry Lab	1	CHEM 104*	General Chemistry Lab	1			
FYE 100	Freshman Year Experience	1	ENGL 101	Freshman Composition	3	PHYS 201*	Physics for Engr & Sci I	3			
			11				11				11

SOPHOMORE YEAR											
Fall Quarter			Hr	Winter Quarter			Hr	Spring Quarter			Hr
ENGR 220	Statics and Mechs of Materials	3	ENGR 221*	Electrical Engr & Circuits I	3	ENGR 222*	Thermodynamics	3			
MATH 243*	Calculus III	3	MATH 244*	Calculus IV	3	MATH 245*	Differential Equations	3			
PHYS 202*	Physics for Engr & Sci II	3	NSE 202*	Introduction to Nanosystems Engr	3	NSE 300*	Intro to Progammng for Engr & Sci	3			
CMEN 202*	Chemical Engr Calculations	3	MEMT 201*	Engineering Materials	2	ENGL 102	Freshman Composition II	3			
			12				11				12

JUNIOR YEAR											
Fall Quarter			Hr	Winter Quarter			Hr	Spring Quarter			Hr
CHEM 250*	Organic Chemistry	2	CHEM 251*	Organic Chemistry	2	CMEN 304	Transport Phenomena	3			
HIST#		3	CHEM 253*	Organic Chemistry Lab	1	MSE 406*	Micro/Nano Measurments	3			
ELEN 334*	Solid State Electronics	3	CMEN 313	Unit Operations-Design II	3	NSE 490*	Nanosystems Modelling	3			
BISC 130	Biological Principles	3	MSE 402*	Microsystems Principles	3	NSE 302*	Nanomanufacturing	2			
			MSE 404*	Micro/Nanomaterials	3						
			11				12				11

SENIOR YEAR											
Fall Quarter			Hr	Winter Quarter			Hr	Spring Quarter			Hr
NSE 406*	Senior Design I	1	NSE 407*	Senior Design II	1	NSE 408	Senior Design III	1			
NSE 410	Nanosystems & Devices	3	Social Science***		3	Directed Elective**		3			
CMEN 402	Chemical Reaction Engineering	3	Directed Elective**		3	ART		3			
MEEN 382	Basic Measurments	2	ENGL 303	Technical Writing	3	Social Science***		3			
PHYS 412	Solid State Physics	3									
			12				10				10

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Nanosystems Engineering -
Louisiana Tech University
Electrical Engineering Concentration

FRESHMAN YEAR											
Fall Quarter			Hr	Winter Quarter			Hr	Spring Quarter			Hr
ENGR 120*	Engr Problem Solving I	2	ENGR 121*	Engr Problem Solving II	2	ENGR 122*	Engr Problem Solving III	2			
MATH 240*	Math for Engr & Science	3	MATH 241*	Calculus I	3	MATH 242*	Calculus II	3			
CHEM 100*	General Chemistry	2	CHEM 101*	General Chemistry	2	CHEM 102*	General Chemistry	2			
COMM 101	Principles of Comm Studies	3	CHEM 103*	General Chemistry Lab	1	CHEM 104*	General Chemistry Lab	1			
FYE 100	Freshman Year Experience	1	ENGL 101	Freshman Composition	3	PHYS 201*	Physics for Engr & Sci I	3			
			11				11				11

SOPHOMORE YEAR											
Fall Quarter			Hr	Winter Quarter			Hr	Spring Quarter			Hr
ENGR 220	Statics and Mechs of Materials	3	ENGR 221*	Electrical Engr & Circuits I	3	ENGR 222	Thermodynamics	3			
MATH 243*	Calculus III	3	MATH 244*	Calculus IV	3	ELEN 223	Electrical Circuits I	3			
MEMT 201*	Engineering Materials	2	NSE 202*	Introduction to Nanosystems Engr	3	MATH 245*	Differential Equations	3			
PHYS 202*	Physics for Engr & Sci II	3	ENGL 102	Freshman Composition II	3	NSE 300*	Intro to Progammig for Engr & Sci	3			
			11				12				12

JUNIOR YEAR											
Fall Quarter			Hr	Winter Quarter			Hr	Spring Quarter			Hr
CHEM 250*	Organic Chemistry	2	CHEM 251*	Organic Chemistry	2	ELEN 336	Electronic Circuits II	3			
ELEN 224	Electrical Circuits III	3	CHEM 253*	Organic Chemistry Lab	1	MSE 406*	Micro/Nano Measurments	3			
ELEN 334*	Solid State Electronics	3	ELEN 335	Electronic Circuits I	3	NSE 302*	Nanomanufacturing	2			
BISC 130	Biological Principles	3	MSE 402*	Microsystems Principles	3	NSE 490*	Nanosystems Modelling	3			
			11				12				11

SENIOR YEAR											
Fall Quarter			Hr	Winter Quarter			Hr	Spring Quarter			Hr
NSE 406*	Senior Design I	1	NSE 407*	Senior Design II	1	NSE 408	Senior Design III	1			
NSE 410	Nanosystems & Devices	3	Social Science***		3	ART		3			
MEEN 382	Basic Measurements	2	HIST		3	Social Science		3			
PHYS 412	Solid State Physics	3	Directed Elective **		3	Directed Elective **		3			
ENGL 303	Technical Writing	3									
			12				10				10

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Nanosystems Engineering -
Louisiana Tech University
Mechanical Engineering Concentration

FRESHMAN YEAR											
Fall Quarter			Hr	Winter Quarter			Hr	Spring Quarter			Hr
ENGR 120*	Engr Problem Solving I	2	ENGR 121*	Engr Problem Solving II	2	ENGR 122*	Engr Problem Solving III	2			
MATH 240*	Math for Engr & Science	3	MATH 241*	Calculus I	3	MATH 242*	Calculus II	3			
CHEM 100*	General Chemistry	2	CHEM 101*	General Chemistry	2	CHEM 102*	General Chemistry	2			
COMM 101	Principles of Comm Studies	3	CHEM 103*	General Chemistry Lab	1	CHEM 104*	General Chemistry Lab	1			
FYE 100	Freshman Year Experience	1	ENGL 101	Freshman Composition	3	PHYS 201*	Physics for Engr & Sci I	3			
			11				11				11

SOPHOMORE YEAR											
Fall Quarter			Hr	Winter Quarter			Hr	Spring Quarter			Hr
ENGR 220*	Statics and Mechs of Materials	3	ENGR 221*	Electrical Engr & Circuits I	3	ENGR 222*	Thermodynamics	3			
MATH 243*	Calculus III	3	MATH 244*	Calculus IV	3	MATH 245*	Differential Equations	3			
MEMT 201*	Engineering Materials	2	NSE 202*	Introduction to Nanosystems Engr	3	NSE 300*	Intro to Progamming for Engr & Sci	3			
PHYS 202*	Physics for Engr & Sci II	3	ENGL 102	Freshman Composition II	3	HIST#		3			
			11				12				12

JUNIOR YEAR											
Fall Quarter			Hr	Winter Quarter			Hr	Spring Quarter			Hr
CHEM 250*	Organic Chemistry	2	CHEM 251*	Organic Chemistry	2	MSE 406*	Micro/Nano Measurments	3			
MEEN 350	Computer Aided Design	1	CHEM 253*	Organic Chemistry Lab	1	NSE 302*	Nanomanufacturing	2			
ELEN 334*	Solid State Electronics	3	MEMT 212	Intermediate Statics & Mech of Mat.	3	NSE 490*	Nanosystems Modelling	3			
MEMT 203	Dynamics	3	MSE 402*	Microsystems Principles	3	MEEN 353	Heat Transfer or	3			
BISC 130	Biological Principles	3	MSE 404*	Micro/Nanomaterials	3	or MEEN 361	Advanced Mechanics of Materials				
			12				12				11

SENIOR YEAR											
Fall Quarter			Hr	Winter Quarter			Hr	Spring Quarter			Hr
NSE 406*	Senior Design I	1	NSE 407*	Senior Design II	1	NSE 408*	Senior Design III	1			
NSE 410	Nanosystems & Devices	3	Directed Elective **			2	ART		3		
MEMT 313	Elementary Fluid Dynamics	3	Social Science***			3	Social Science***		3		
MEEN 382	Basic Measurments	2	ENGL 303	Technical Writing	3	Directed Elective **			3		
PHYS 412	Solid State Physics	3									
			12				9				10

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Nanosystems Engineering -
Louisiana Tech University
Microsystems Engineering Concentration

FRESHMAN YEAR											
Fall Quarter			Hr	Winter Quarter			Hr	Spring Quarter			Hr
ENGR 120*	Engr Problem Solving I	2	ENGR 121*	Engr Problem Solving II	2	ENGR 122*	Engr Problem Solving III	2			
MATH 240*	Math for Engr & Science	3	MATH 241*	Calculus I	3	MATH 242*	Calculus II	3			
CHEM 100*	General Chemistry	2	CHEM 101*	General Chemistry	2	CHEM 102*	General Chemistry	2			
COMM 101	Principles of Comm Studies	3	CHEM 103*	General Chemistry Lab	1	CHEM 104*	General Chemistry Lab	1			
FYE 100	Freshman Year Experience	1	ENGL 101	Freshman Composition	3	PHYS 201*	Physics for Engr & Sci I	3			
			11				11				11

SOPHOMORE YEAR											
Fall Quarter			Hr	Winter Quarter			Hr	Spring Quarter			Hr
ENGR 220	Statics and Mechs of Materials	3	ENGR 221*	Electrical Engr & Circuits I	3	ENGR 222	Thermodynamics	3			
MATH 243*	Calculus III	3	MATH 244*	Calculus IV	3	MATH 245*	Differential Equations	3			
MEMT 201*	Engineering Materials	2	NSE 202*	Introduction to Nanosystems Engr	3	NSE 300*	Intro to Progammig for Engr & Sci	3			
PHYS 202*	Physics for Engr & Sci II	3	ENGL 102	Freshman Composition II	3	HIST#		3			
			11				12				12

JUNIOR YEAR											
Fall Quarter			Hr	Winter Quarter			Hr	Spring Quarter			Hr
CHEM 250*	Organic Chemistry	2	CHEM 251*	Organic Chemistry	2	MSE 405	Nanosystems Principles	3			
MSE 401*	Microsystems Principles	3	CHEM 253*	Organic Chemistry Lab	1	MSE 406*	Micro/Nano Measurments	3			
ELEN 334*	Solid State Electronics	3	MSE 402*	Microsystems Principles	3	NSE 302*	Nanomanufacturing	2			
BISC 130	Biological Principles	3	MSE 404*	Micro/Nanomaterials	3	NSE 490*	Nanosystems Modelling	3			
				Directed Elective**	3						
			11				12				11

SENIOR YEAR											
Fall Quarter			Hr	Winter Quarter			Hr	Spring Quarter			Hr
NSE 406*	Senior Design I	1	NSE 407*	Senior Design II	1	NSE 408	Senior Design III	1			
NSE 410	Nanosystems & Devices	3	MSE 407	Advanced Microfabrication	3	MSE 457	Spec. Topics: Micro Sys. Engr.	3			
ENGL 303	Technical Writing	3	Social Science***		3	ART		3			
MEEN 382	Basic Measurments	2	Directed Elective**		3	Social Science***		3			
PHYS 412	Solid State Physics	3									
			12				10				10

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