

NANOSYSTEMS ENGINEERING

Louisiana Tech University

Curriculum as of July 2018

Name _____

Date _____

CWID _____

Email _____@latech.edu

COURSE	PREREQUISITE	SCH	QTR	GRADE	
NSE 202	CHEM 102, PHYS 201	3	W	R*	
300	ENGR 122, MATH 243	3	Sp	R	
302	CHEM 251, CHEM 253, NSE 201 or 202	2	Sp	R*	
406	NSE 302, ENGR 220, 221, 222, MATH 245	1	F	R*	
407	NSE 406	1	W	R*	
408	NSE 407	1	Sp	R	
410	MSE 404	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 \geq 2.0	2	FW	R	
MEMT 201	ENGR 122	2	FW	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		R	
ELECTIVES					
Fine Arts Appr. (ART 290, KINE 280, MUGN 290, or THTR 290)		3			
BISC 130 or 225		3		5	
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		

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 NSE rubric
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:
4	Students pursuing BIEN concentration take BISC 225. All other students take BISC 130.

ADDITIONAL COMMENTS	

Advisor Signature _____

NANOSYSTEMS ENGINEERING, Louisiana Tech University
Concentrations and Directed Electives, as of July 2018

BIOMEDICAL ENGINEERING CONCENTRATION						
COURSE	COURSE	SCH	GRADE			PREREQUISITE
BIEN	202 or 203	1	R			MATH 241
	225	3	R			ENGR 221, MATH 244
	235	3	R			MEMT 201
	301	3	R			BIEN 202, ENGR 222, MATH 241-245 GPA \geq 2.0
	401 or 430	3	R			BIEN 301, MATH 245
	Biomechanics		R			BIEN 235, 301, ENGR 220
Engr, Sci, or ENGL 363		3	R			
300-level or higher		2	R			
TOTAL		18				

CHEMICAL ENGINEERING CONCENTRATION						
COURSE	COURSE	SCH	GRADE			PREREQUISITE
CMEN	202	3	R			MATH 241, ENGR 122 ^o
	304	3	R			CMEN 313, MATH 245, MATH 241-245 GPA \geq 2.0
	313	3	R			CMEN 202, 213 ENGR 222, MATH 245
	402	3	R			Senior Standing
Engr, Sci, or ENGL 363		3	R			
300-level or higher		3	R			
TOTAL		18				

ELECTRICAL ENGINEERING CONCENTRATION						
COURSE	COURSE	SCH	GRADE			PREREQUISITE
ELEN	223	3	R			ENGR 221
	224	3	R			ELEN 223, MATH 245 ^o
	335	3	R			ELEN 224, 334
	336	3	R			ELEN 335
Engr, Sci, or ENGL 363		3	R			
300-level or higher		3	R			
TOTAL		18				

MECHANICAL ENGINEERING CONCENTRATION						
COURSE	COURSE	SCH	GRADE			PREREQUISITE
MEEN	350	1	R			ENGR 220, MATH 241-244 GPA \geq 2.0
	353 or 361	3	R			ENGR 222, MATH 245, 313 ^o , MEEN 350
MEMT	203	3	R			MEEN 350, MEMT 211 or MEMT 212
	212	3	R			ENGR 220
	313	3	R			ENGR 220, MATH 241-243 GPA \geq 2.0
Engr, Sci, or ENGL 363		3	R			ENGR 222, MEMT 203, MATH 241-244 GPA \geq 2.0
300-level or higher		2	R			
TOTAL		18				

MICROSYSTEMS ENGINEERING CONCENTRATION						
COURSE	COURSE	SCH	GRADE			PREREQUISITE
MSE	401	3	R			PHYS 202, MATH 245
	405	3	R			
	407	3	R			MSE 401
	457	3	R			
Engr, Sci, or ENGL 363		3	R			
300-level or higher		3	R			
TOTAL		18				

Nanosystems Engineering
Louisiana Tech University
Biomedical Concentration, as of July 2018

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 Communication	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 Eng & Science	3
						BIEN 202	Biomedical Engr Principles I	1
						or BIEN 203 (Offered in Fall)		12
		11			11			
SOPHOMORE YEAR								
Fall Quarter		Hr	Winter Quarter		Hr	Spring Quarter		Hr
ENGR 222	* Thermodynamics	3	ENGR 221	* Electrical Engr & Circuits I	3	ENGR 220	Statistics 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	* Intro to Nanosystems Engr	3	NSE 300	Programming for Engr & Sci	3
PHYS 202	* Physics for Engr & Sci II	3	BIEN 235	Applied Biomaterials	3	ENGL 102	Freshman Composition II	3
		11			12			12
JUNIOR YEAR								
Fall Quarter		Hr	Winter Quarter		Hr	Spring Quarter		Hr
BIEN 225	Biomedical Signals & Systems	3	BIEN 301	Biomed Fluid Mechanics	3	NSE 302	* Nanomanufacturing	2
ELEN 334	* Solid State Electronics	3	MSE 402	* MEMS and NEMS	3	NSE 490	Nanosystems Modeling	3
CHEM 250	* Organic Chemistry	2	MSE 404	* Micro/Nanomaterials	3	MSE 406	* Micro/Nano Measurements	3
BISC 225	Human Anat & Physiology I	3	CHEM 251	* Organic Chemistry	2	Fine Arts Appreciation		3
			CHEM 253	* Organic Chemistry Lab	1			
		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	BIEN 401	Biomed Mass Transp	3
MEEN 382	Basic Measurement	2	Social Science Elective**		3	or BIEN 430 (Offered in Fall)		
PHYS 412	Solid State Physics	3	Social Science Elective**		3	HIST		3
ENGL 303	Technical Writing	3				Directed Elective◇		2
		12			10			9

Neither Math 240 nor CHEM 100 count towards the Nanosystems Engineering degree.

* Requires grade of "C" or higher.

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

□ **Must be taken within first year of enrollment.**

◇ Directed Electives chosen by the student in consultation with faculty advisor and approved by the Program Chair.

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

Nanosystems Engineering
Louisiana Tech University
Chemical Engineering Concentration, as of July 2018

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 & Science	3
		11			11			11
SOPHOMORE YEAR								
Fall Quarter		Hr	Winter Quarter		Hr	Spring Quarter		Hr
ENGR 220	Statics for 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 & Science	3	NSE 202	* Introduction to Nanosystems En	3	NSE 300	Programming for Engr & Sci	3
History		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	Fine Arts Appreciation		3
ELEN 334	* Solid State Electronics	3	CHEM 253	* Organic Chemistry Lab	1	MSE 406	* Micro/Nano Measurements	3
BISC 130	Biological Principles	3	CMEN 313	Unit Operations-Design II	3	NSE 490	Nanosystems Modeling	3
CMEN 202	Chemical Engr Calculations	3	or MEEN 353	Heat Transfer		NSE 302	* Nanomanufacturig	2
			MSE 402	* MEMS and NEMS	3			
			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	ENGL 303	Technical Writing	3	CMEN 304	Transport Phenomena	3
CMEN 402	Chemical Reaction Engineering	3	Social Science**		3	Social Science**		3
PHYS 412	Solid State Physics	3	Directed Elective***		3	Directed Elective***		3
MEEN 382	Basic Measurements	2						
		12			10			10

Neither MATH 240 nor CHEM 100 count towards the Nanosystems Engineering degree.

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Nanosystems Engineering, Louisiana Tech University
Electrical Engineering Concentration, as of July 2018

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 & Science	3
		11			11			11
SOPHOMORE YEAR								
Fall Quarter		Hr	Winter Quarter		Hr	Spring Quarter		Hr
ENGR 220	Statics for 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 & Science	3	NSE 202	* Intro. to Nanosystems Engr	3	NSE 300	* Intro Programming for Engr & Sc	3
MEMT 201	* Engineering Materials	2	ENGL 102	Freshman Composition II	2	ELEN 223	Electrical Circuits I	3
		11			11			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 Measurements	3
ELEN 334	* Solid State Electronics	3	ELEN 335	Electronic Circuits I	3	NSE 490	Nanosystems Modeling	3
BISC 130	Biological Principles	3	MSE 402	* MEMS and NEMS	3	NSE 302	* Nanomanufacturig	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	History		3	Fine Arts Appreciation		3
ENGL 303	Technical Writing	3	Social Science**		3	Social Science**		3
PHYS 412	Solid State Physics	3	Directed Elective***		3	Directed Elective***		3
MEEN 382	Basic Measurements	2						
		12			10			10

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Nanosystems Engineering
Louisiana Tech University
Mechanical Engineering Concentration, as of July 2018

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 & Science	3
		11			11			11
SOPHOMORE YEAR								
Fall Quarter		Hr	Winter Quarter		Hr	Spring Quarter		Hr
ENGR 220	Statics for 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 En	3	NSE 300	Programming for Engr & Sci	3
PHYS 202	* Physics for Engr & Science	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 Measurements	3
ELEN 334	* Solid State Electronics	3	CHEM 253	* Organic Chemistry Lab	1	NSE 490	Nanosystems Modeling	3
BISC 130	Biological Principles	3	MSE 402	* MEMS and NEMS	3	NSE 302	* Nanomanufacturig	2
MEEN 350	Computer Aided Design	1	MSE 404	* Micro/Nanomaterials	3	Fine Arts Appreciation		3
MEMT 203	Dynamics	3	MEMT 212	Intermed Statics & Mech of Mat	3			
		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	ENGL 303	Technical Writing	3	MEEN 353	Heat Transfer or	3
PHYS 412	Solid State Physics	3	Social Science**		3	or MEEN 361	Advanced Mechanics of Materials	
MEEN 382	Basic Measurements	2	Directed Elective***		2	Social Science**		3
MEMT 313	Elementary Fluid Dynamics	3				Directed Elective***		3
		12			9			10

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Nanosystems Engineering, Louisiana Tech University
Microsystems Concentration, as of July 2018

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 and 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	□	Principle of Communication	3	CHEM 103	*	General Chemistry Lab	1	CHEM 104	*	General Chemistry Lab	1
FYE 100		Freshman Year Experience	1	ENGL 101		Freshman Composition I	3	PHYS 201	*	Physics for Engr & Science 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	NSE 300	*	Intro to Progr for Engr & Sci	3
MEMT 201	*	Engineering Materials	2	NSE 202	*	Introduction to Nanosystems Eng	3	MATH 245	*	Differential Equations	3
PHYS 202	*	Physics for Engr & Sciece II	3	ENGL 102		Freshman Composition II	3	History			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	*	Fund. Microfabrication Process.	3	CHEM 253	*	Organic Chemistry Lab	1	MSE 406	*	Micro/Nano Measurements	3
ELEN 334	*	Solid State Electronics	3	MSE 402	*	MEMS and NEMS	3	NSE 302	*	Nanomanufacturing	2
BISC 130		Biological Principles	3	MSE 404	*	Micro/Nanomaterials	3	NSE 490		Nanosystems Modeling	3
			11	Fine Arts Appreciation			3				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
MEEN 382		Basic Measurements	2	Social Science Elective**			3	Directed Elective◊			3
PHYS 412		Solid State Physics	3	Directed Elective◊			3	Social Science Elective**			3
ENGL 303		Technical Writing	3								
			12				10				10

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