



RENSSELAER POLYTECHNIC INSTITUTE
School of Engineering

ENGINEERING

SUMMER ARCH

TEMPLATES

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Biomedical Engineering – Summer Arch Template (flexible)

First Year

Fall		Credit hours	Spring		Credit hours
ENGR 1100	Intro to Engineering Anal	4	ENGR 1300	Engineering Processes	1
CHEM 1100	Chemistry I	4	MATH 1020	Calculus II	4
MATH 1010	Calculus I	4	PHYS 1100	Physics I	4
	HASS Elective ¹	4	BIOL 2120	Intro to Cell & Mol Biology	4
ENGR 1200	Eng Graphics & CAD ⁶	1		HASS Elective ¹	4

Second Year

Fall		Credit hours	Spring		Credit hours
CSCI 1190	Begin. Prog. for Engrs.	1	ENGR 2600	Mod. & Analysis of Uncertainty	3
PHYS 1200	Physics II	4	BMED 2100	Biomaterials Science and Eng	4
MATH 2400	Intro to Differential Eq	4	BMED 2540	Biomechanics	4
ENGR 2050	Intro to Eng Design	4	BMED 2300	Bioimaging and Bioinstrument	4
MATH 2010	Multi. Calc and Mat Alg.	4			

Third Year

Course		Credit hrs	Spring		Credit hours
BMED 4200	Modeling of Biomed Sys	4	BMED 4500	Advanced Systems Physiology	4
BMED 4010	Bioengineering Lab	4		Concentration II	4
BMED XXX	Concentration I	4		Free Elective ⁴	3
	HASS Elective	4		HASS Elective ¹	4
				Concentration II	4
				Professional Development II ²	2

Fourth Year

Fall		Credit hours	Spring		Credit hours
BMED 4260	BME Prod. Dev & Com	3	BMED 4600	BME Design ⁵	3
	Concentration III	3	ENGR 4010	Professional Development III	1
	Concentration IV	3		Concentration V	3
	Free Elective ⁴	3		HASS Elective ¹	4
	Free Elective ⁴	3		Free Elective ⁴	3

The minimum number of credit hours for the degree is 128

¹ Placement of humanities and social science electives can be varied with free electives. The courses counted as free electives must show a minimum of twelve (12) credit hours.

² Professional Development II will be fulfilled from a published list at the start of each semester and can be taken either semester. Professional Development III can be taken either semester of the senior year. Professional Development I is part of ENGR 2050.

³ BMED 4010 may be taken in either Spring Year 3 or Fall Year 4.

⁴ The minimum total credit hours of free electives is twelve (12), with no restrictions on the included number of 3 and 4 credit hour courses.

⁵ Capstone writing-intensive course.

⁶ ENGR 1400 may be taken as alternative to ENGR 1200. This course may be taken either semester.

Chemical & Biological Engineering

NAME: _____

E-mail: _____

Fall			Spring			
CHME-1010	Intro to Chemical Engineering ^{1,2}	1		BIOL-1010	Intro to Cell & Molecular Biology & Lab	4
CHEM-1110	Chemistry I with Advanced Lab	4		ENGR-1100	Intro to Eng. Analysis	4
MATH-1010,1969	Calculus I, Quiz Block	4		ENGR-1400	Engineering Communications ^{1,2}	1
PHYS-1100	Physics I	4		MATH-1020	Calculus II	4
	Hum., Arts or Soc. Sci. El.	4			Hum., Arts or Soc. Sci. El.	4
Fall			Spring			
CHME-2010	Material, Energy, and Entropy Balances	4		CHME-2020	Energy, Entropy, and Equilibrium	4
CHEM-2250	Organic Chemistry I	3		CHEM-2260	Organic Chemistry II	3
CSCI-1190	Beginning C Programming for Engineers	1		ENGR-2600	Modeling and Analysis of Uncertainty	3
MATH-2400	Intro to Differential Equations	4			Hum., Arts or Soc. Sci. El.	4
PHYS-1200	Physics II	4			Free Elective	4
	Summer Arch Semester				Fall or Spring	
CHME-4010	Transport Phenomena I	4		CHME-4020	Transport Phenomena II	4
CHME-4030	Chemical Process Dynamics and Control	4		CHEM-4420	Microscopic Physical Chemistry	3
	Free Elective	4		CHEM-4530	Modern Techniques in Chemistry	4
	Hum., Arts or Soc. Sci. El.	4			Hum., Arts or Soc. Sci. El.	4
					Professional Development II ³	2
Fall			Spring			
CHME-4040	Chemical Engineering Separations	3		CHME-4050	Chemical Process Design	4
CHME-4150	Chemical Engineering Lab I	3		CHME-4160/4170	Chemical Engineering Lab II OR Bioprocessing Lab ⁴	3
CHME-4500	Chemical Reactor Design	3		ENGR-4010	Professional Development III	1
CHME	Chemical Engineering Elective	3		ENGR	Engineering Elective	4
	Free Elective	4		CHEM	Chemistry Elective	3
Electives	<i>The chemistry elective must be in advanced chemistry or advanced chemistry-related subject.</i>			Footnote¹	<i>These required courses may be taken in either order.</i>	
	<i>The chemical engineering elective must be in chemical engineering or</i>			Footnote²	<i>May be replaced by ENGR 1300, although CHME 1010 is recommended.</i>	
	<i>in an approved, advanced chem eng subject.</i>			Footnote³	<i>Choice of STSS-4840 or PSYC-4170</i>	
	<i>The engineering elective cannot be a chemical engineering course; it must be at least 2000-level and contain four credits of engineering topics.</i>			Footnote⁴	<i>Choice of CHME-4160 or CHME-4170</i>	
	<i>The engineering elective cannot be ENVE 2110 or ENGR 2250</i>					
	<i>The curriculum clearance officer, who maintains a list of appropriate courses, must approve selection of these three constrained electives. The three free electives are completely unconstrained.</i>					

Electrical Engineering

First Year						
CSCI-1100	Computer Science I	4		ENGR-1200 OR ENGR-1400	Eng. Graphics & CAD ¹ OR Eng. Communications ¹	1
MATH-1010	Calculus I	4			Science Elective ⁵	4
ENGR-1100	Intro. to Eng. Analysis	4		MATH-1020	Calculus II	4
	Hum., Arts or Soc. Sci. El.	4		PHYS-1100	Physics I	4
					Hum., Arts or Soc. Sci. El.	4
Second Year						
MATH-2400	Intro. to Differential Eqns.	4		ENGR-2350	Embedded Control	4
PHYS-1200	Physics II	4		ECSE-2010	Electric Circuits	4
	Multidisciplinary Elective ¹	4		ECSE-2610	Cptr. Comp. & Operations	4
	Hum., Arts or Soc. Sci. El.	4		MATH-2010	Multivar Calc & Matrix Alg	4
SUMMER ARCH SEMESTER		Third Year			Fall or Spring	
ENGR-2050	Intro. to Eng. Design	4		ECSE-2900	ECSE Enrichment Seminar	1
ECSE-2050	Intro. to Electronics	4		ECSE-2100	Fields & Waves I	4
ECSE-2410	Signals & Systems	3		ECSE-2210	Microelectronics Tech.	3
ECSE-2500	Engineering Probability	3		ECSE-2110	Electrical Energy Systems	3
					Free Elective ²	3-4
					Professional Devel. II ^{1,3}	2
Fourth Year						
ENGR-4010	Professional Devel. III ¹	1			Restricted Elective ^{1,4,6}	3
	Design Elective ¹	3			Restricted Elective ^{1,4,6}	3
	Lab Elective ^{1,4}	3-4			Free Elective ^{1,2}	3-4
	Technical Elective ^{1,4,6}	3-4			Free Elective (if needed) ²	3-4
	Free Elective ^{1,2}	3-4			Hum., Arts or Soc. Sci. El.	4
	Hum., Arts or Soc. Sci. El.	4				

1 May be taken either term.

2 The free electives must total to at least 12 credits.

3 This course will be fulfilled from a list published at the start of each semester.

4 It is recommended that students use electives to form a concentration. See the ECSE Web page for concentration listings.

5 Students who wish to take ENGR 1600 as their Multidisciplinary Elective must take CHEM 1100.

6 No more than one Independent Study course may be used when satisfying the combined Technical and Restricted Elective requirements.

129 credits minimum

RESTRICTED ELECTIVE

Any 3 or 4 credit hour course with the designation ECSE-4xxx or ECSE-6xxx.

TECHNICAL ELECTIVE

Any 3- or 4-credit-hour course in engineering, mathematics, or science at the 4000 level or higher.

MULTIDISCIPLINARY ELECTIVES

ENGR-1600 Materials Science for Eng.
ENGR-2090 Engineering Dynamics
ENGR-2250 Thermal & Fluids Eng. I
ENGR-2530 Strength of Materials

LAB ELECTIVES

ENGR-4710 Adv. Manufacturing Lab I
ECSE 4090 Mechatronics
ECSE-4130 Electric Power Eng. Lab
ECSE-4220 VLSI Design

ECSE-4760 Real-Time Cntrl & Comm.
ECSE-4770 Cptr H^ware Design
ECSE-4790 Microprocessor Systems

SCIENCE ELECTIVE

CHEM-1100 Chemistry I
BIOL-1010 Introduction to Biology
BIOL-2120 Cell and Molecular Bio.

DESIGN ELECTIVES

MANE-4220 Inventor's Studio (F, S)
ECSE-4900 ECSE Design (F, S)

Computer & Systems Engineering

First Year							
CSCI-1100	Computer Science I	4		CSCI-1200	Data Structures	4	
ENGR-1100	Intro. to Eng Analysis	4		MATH-1020	Calculus II	4	
ENGR-1200 OR ENGR-1400	Eng. Graphics & CAD ¹ OR Eng. Communications ¹	1			Science Elective	4	
MATH-1010	Calculus I	4			Hum., Arts or Soc. Sci. El.	4	
	Hum., Arts or Soc. Sci. El.	4					
Second Year							
CSCI-2200	Foundations of Comp. Sci.	4		CSCI-2300	Intro to Algorithms	4	
ECSE-2610	Cptr. Comp. & Operations	4		ECSE-2660	Cptr Arch, Nets, & Op Sys	4	
ENGR-2350	Embedded Control	4		MATH-2400	Intro. to Differential Eqns	4	
PHYS-1100	Physics I	4		PHYS-1200	Physics II	4	
	Summer Arch Semester			Third Year	Fall or Spring		
ECSE-2010	Electric Circuits	4		ECSE-2050	Intro. to Electronics	4	
ENGR-2050	Intro. to Eng. Design	4		ECSE-2410	Signals & Systems	3	
MATH-2010	Multivar Calc & Matrix Alg.	4		ECSE-2500	Engineering Probability	3	
	Hum., Arts or Soc. Sci. El.	4			Free Elective ²	3-4	
					Hum., Arts or Soc. Sci. El.	4	
				ECSE-2900	Enrichment Seminar	1	
Fourth Year							
ENGR-4010	Professional Devel. III ¹	1			Professional Devel. II ^{1,3,4}	2	
	Technical Elective ^{1,5,6}	3-4			Restricted Elective ^{1,5,6}	3-4	
	Restricted Elective ^{1,5,6}	3-4			Design Elective ¹	3	
	Computer Eng Elective ⁴	3-4			Free Elective ^{1,2}	3-4	
	Free Elective ^{1,2}	3-4			Hum., Arts or Soc. Sci. El.	4	
					Free Elective (if needed) ²	3-4	

1 May be taken either term.

2 The free electives must total at least 12 credits.

3 This course will be fulfilled from a list published at the start of each semester.

4 May be taken in the third year.

5 It is recommended that students use electives to form a concentration. See the ECSE Web page for concentration listings.

6 No more than one Independent Study course may be used when satisfying the combined Technical and Restricted Elective requirements.

130 credits minimum

RESTRICTED ELECTIVE

Any 3 or 4 credit hour course with the designation ECSE-4xxx or ECSE-6xxx.

TECHNICAL ELECTIVE

Any 3- or 4-credit-hour course in engineering, mathematics, or science at the 4000 level or higher.

COMPUTER ENGINEERING ELECTIVES

ECSE-4670 Comp. Comm. Networks
 ECSE-4750 Computer Graphics
 ECSE-4770 Computer Hardware Desgn
 ECSE-4790 Microprocessor Systems
 CSCI-4380 Database Systems
 CSCI-4440 Software Dsg & Doc

SCIENCE ELECTIVE

BIOL-1010 Introduction to Biology
 BIOL-2120 Cell and Molecular Bio.
 CHEM-1100 Chemistry I

DESIGN ELECTIVES

ECSE-4900 ECSE Design (F, S)
 MANE-4220 Inventor's Studio (F, S)

Industrial and Management Engineering

Fall Semester				Spring Semester			
		FIRST		YEAR			
CHEM-1100	Chemistry I ¹	4		ENGR-1200	Engineering Graphics & CAD ²	1	
ENGR-1100	Intro to Eng Analysis	4		MATH-1020	Calculus II	4	
ENGR-1300	Engineering Processes ²	1		PHYS-1100	Physics I	4	
MATH-1010	Calculus I	4			Computer Science Elective ³	4	
	Hum. or Soc. Sci. Elective	4			Hum. or Soc. Sci. Elective	4	
		SECOND		YEAR			
ENGR 2050	Intro to Engineering Design	4		ENGR 2600	Modeling & Analysis of Uncertainty	3	
PHYS 1200	Physics II	4		ISYE-2210	Prod & Ops Mgt & Cost Acctg. ⁵	4	
MATH 2400	Intro. to Differential Equations	4		MATH-2010	Multivariable Calc & Mat Algebra	4	
	Hum., Arts or Soc. Sci. Elective	4			Science Elective ⁴	4	
Summer Arch Semester		THIRD		YEAR		Fall or Spring	
ISYE-4140	Statistical Analysis	4		ISYE-4250	Discrete Event Simulation	4	
ISYE-4600	Operations Research Methods	4			Technical Elective ⁷	3	
	Technical Elective ⁷	3			Technical Elective ⁷	3	
	Professional Development II ⁶	2			Free Elective I	4	
	Hum., Arts or Soc. Sci. Elective	4			Hum., Arts or Soc. Sci. Elective	4	
		FOURTH		YEAR			
ISYE-4530	Information Systems ¹	4		ISYE-4270	IME Design	3	
ENGR-4760	Eng. Economics	3		ISYE-4210	Design & Anal of Supply Chains	3	
	Technical Elective ⁷	3		ENGR-4010	Professional Development III	4	
	Free Elective II	4			Technical Elective ⁷	3	
					Free Elective III	4	

- This course is only offered in the fall semester.*
- For these two courses, order does not matter. ENGR 1300 may be replaced with ISYE 1100 Introduction to Industrial and Systems Engineering. ENGR 1200 may be replaced with ENGR 1400 Engineering Communications.*
- IME majors must take CSCI 1010 Introduction to Computer Programming or CSCI 1100 Computer Science I for the Computer Science Elective.*
- IME majors may select any 4-credit course with the designation ASTR, BCBP, BIOL, CHEM, EARTH, MATH, or PHYS to satisfy the science elective requirement.*
- This course is only offered in the spring semester.*
- This course can be fulfilled by taking a 2-credit course from a list of courses published at the start of each semester.*
- IME majors must select five courses from the following list of technical electives. The selected courses must include a minimum of three ISYE numbered courses and at least two courses from among: ISYE 4200, ISYE 4230, ISYE 4240, ISYE 4250 and ISYE 4280:*

<i>ENGR 1600 Materials Science for Engineers</i>	<i>ENGR 2090 Engineering Dynamics</i>
<i>ENGR 2250 Thermal and Fluids Engineering I</i>	<i>ENGR 2300 Electronic Instrumentation</i>
<i>ENGR 2350 Embedded Control</i>	<i>ENGR 2530 Strength of Materials</i>
<i>ENGR 2710 General Manufacturing Processes</i>	<i>ENGR 4710 Advanced Manufacturing Laboratory I</i>
<i>ENGR 4720 Advanced Manufacturing Laboratory II</i>	<i>ISYE 4200 Design and Analysis of Work Systems</i>
<i>ISYE 4230 Quality Control</i>	<i>ISYE 4240 Engineering Project Management</i>
<i>ISYE 4250 Facilities Design & Industrial Logistics</i>	<i>ISYE 4280 Decision Focused Systems Engineering</i>

Other approved technical elective options:

<i>ISYE 4220 Optimization Algorithms and Applications</i>	<i>ISYE 4260 Human Performance Modeling and Support</i>
<i>ISYE 4300 - Complex Systems Models for Industrial and Systems Engineering</i>	<i>ISYE 4320 Theory of Scheduling</i>
<i>ISYE 4310 - Ethics of Modeling for Industrial and System Engineering</i>	<i>ISYE 4760 Mathematical Statistics</i>
<i>ISYE-4330 Design of Experiments</i>	
<i>ISYE 4810 Computational Intelligence</i>	

Special undergraduate sections or regular graduate sections of 6000-level ISYE courses can also serve as technical electives except for ISYE 6600, ISYE 6610 and ISYE 6620.

Materials Science & Engineering

Fall Semester				Spring Semester			
		FIRST		YEAR			
CHEM 1100	Chemistry I	4		MATH 1020	Calculus II	4	
MATH 1010	Calculus I	4		PHYS 1100	Physics I	4	
ENGR 1100	Intro. to Engineering Analysis	4		ENGR 1600	Materials Science for Engs ¹	4	
MTLE 1200	Intro to Materials Science ²	1			Hum., Arts or Soc. Sci. Elective	4	
	Hum., Arts or Soc. Sci. Elective	4					
		SECOND		YEAR			
ENGR 1200	Engineering Graphics & CAD ³	1		ENGR 2250	Thermal and Fluids Eng. I	4	
MTLE 2100	Structure of Engineering Materials	4		ENGR 2050	Intro to Engineering Design	4	
PHYS 1200	Physics II	4		CSCI 1190	Beginning C Progrmg for Engs	1	
MATH 2400	Intro. to Differential Equations	4		MTLE 4200	Electrical & Optical Prop of Mtls	4	
	Hum., Arts or Soc. Sci. Elective	4			Hum., Arts or Soc. Sci. Elective	4	
Summer Arch Semester		THIRD		YEAR		Spring	
MTLE 4250	Mechanical Props of Materials	4		MTLE 4100	Thermodynamics of Materials	4	
MTLE XXX	Skills in Materials Engineering	1		MTLE 4910	Materials Selection	3	
ENGR 2600	Modeling & Analysis of Uncertainty	3			Science Elective	4	
	Restricted Elective	4			Professional Development II ⁴	2	
	Hum., Arts or Soc. Sci. Elective	4			Free Elective I	4	
		FOURTH		YEAR			
MTLE 4500	Computational Materials Design	3		MTLE 4400	Materials Synthesis & Processes	4	
ENGR 4010	Professional Development III	1		MTLE 4920	Multidisciplinary Capstone Design ¹	3	
	Materials Elective I ¹	3			Free Elective III	4	
MTLE 4150	Kinetics in Materials Sys.	4			Materials Elective II	3	
	Free Elective II	4					

128 credits minimum

RESTRICTED ELECTIVES

- ECSE 2010 - Electric Circuits 4 credit hours (Fall & Spring)
- ENGR 2090 - Engineering Dynamics 4 credit hours (Fall & Spring)
- ENGR 2300 - Electronic Instrumentation 4 credit hours (Fall & Spring)
- ENGR 2350 - Embedded Control 4 credit hours (Fall & Spring)
- ENGR 2530 - Strength of Materials 4 credit hours (Fall & Spring)
- BMED 2540 - Biomechanics⁵ 4 credit hours (Fall)

MATERIALS ELECTIVES

- | | |
|---|--|
| MTLE 4030 - Glass Science Credit Hours: 3 | MTLE 4050 - Introduction to Polymers Credit Hours: 3 |
| MTLE 4310 - Corrosion Credit Hours: 3 | MTLE 4430 – Fundamentals Alloy Systems Credit Hours: 3 |
| MTLE 4440 – Thin Films Credit Hours: 3 | MTLE 4460 – Materials for Energy Credit Hours: 3 |
| MTLE 4470 – Processing of Biomaterials Credit Hours: 3 | MTLE 4520 – Materials Extreme Cond. Credits: 3 |
| MTLE 4960 - Topics in Materials Engineering Credit Hours: 3 | |

Note: The courses in the Materials Electives list may be substituted with any MTLE 4000- or 6000-level course. In order to take a 6000-level course, students may be required to obtain formal approval from the Office of Graduate Education, as specified in the course catalog. The free electives must total at least 12 credits.

1. This course can be taken in either semester.
2. May be replaced by ENGR 1300 or another engineering exploration course.
3. May be replaced by ENGR 1400.
4. This course will be fulfilled from a list published at the start of each semester.
5. This restricted elective option is available to dual MTLE/BMED majors only.

Aeronautical/Aerospace Engineering

Minimum credit hour requirements for the Bachelor's Degree in Aeronautical Engineering: 128

FIRST YEAR					
	FALL	Credits		SPRING	Credits
CHEM-1100	Chemistry I	4	ENGR-1300	Engineering Processes	1
ENGR-1100	Introduction to Engineering Analysis	4	MANE-2060	Fundamentals of Flight	3
ENGR-1200	Engineering Graphics & CAD ¹	1	MATH-1020	Calculus II	4
MATH-1010	Calculus I	4	PHYS-1100	Physics I	4
HASS	Hum. or Soc. Sci. Elective	4	HASS	Hum. or Soc. Sci. Elective	4
		17			16
SECOND YEAR					
	FALL	Credits		SPRING	Credits
ENGR-2530	Strength of Materials	4	ENGR-2050	Introduction to Engineering Design	4
MATH-2400	Introduction to Differential Equations	4	ENGR-2090	Engineering Dynamics	4
PHYS-1200	Physics II	4	ENGR-2250	Thermal and Fluids Engineering I	4
HASS	Hum. or Soc. Sci. Elective	4	CSCI- 1190	Beginning Programming for Engineers	1
			MATH-2010	Multivariable Calculus and Matrix Algebra	4
		16			17
THIRD YEAR ²					
	Summer Arch Semester	Credits		Fall or Spring	Credits
MANE-4060	Aerospace Structures and Materials	4	ENGR-2600	Modeling and Analysis of Uncertainty	3
MANE-4070	Aerodynamics I	3	MANE-4050	Modeling & Control of Dynamic Systems	4
MATH-4800	Numerical Computing	4	MANE-4900	Aeroelasticity and Structural Vibration	3
HASS	Hum. or Soc. Sci. Elective	4	MANE-4920	Aerospace Structures and Controls Lab	2
			HASS	Hum. or Soc. Sci. Elective	4
		15			16
FOURTH YEAR					
	FALL	Credits		SPRING	Credits
ENGR-4010	Professional Development III	1		Capstone Design Elective ⁵	3
MANE-4080	Propulsion Systems	4		Free Elective	4
MANE-4800	Boundary Layers and Heat Transfer	3		Free Elective	4
MANE-4910	Fluid Dynamics Lab	2		Free Elective	4
	Flight Mechanics Elective ³	4			
	Professional Development II ⁴	2			
		16			15

1. Choice of: ENGR-1200 Engineering Graphics & CAD or ENGR-1400 Engineering Communication.
2. AE students should start planning for their Flight Mechanics/Capstone track during third year. Those on the Space Flight track must take MANE-4100 Spaceflight Mechanics during spring semester of third year to assure timely graduation. In such cases, MANE 4050 or ENGR 2600 can be delayed until spring semester of fourth year.
3. Choice of: MANE-4090 Flight Mechanics, MANE-4200 Rotorcraft Performance, Stability & Control, or MANE-4100 Spaceflight Mechanics (as noted, the latter must be taken in spring semester of third year to assure timely graduation).
4. For a list of courses that satisfy the PD II requirement refer to the link "Courses which satisfy the PD II requirement" on the SIS home page.
5. Choice of: MANE-4230 Air Vehicle Design, MANE-4850 Space Vehicle Design, or MANE-4860 Intro to Helicopter Design (students on the Space Flight track take MANE 4850 in fall of fourth year).

Mechanical Engineering

Minimum credit hour requirements for the Bachelor's Degree in Mechanical Engineering: 129

FIRST YEAR					
	FALL	Credits		SPRING	Credits
ENGR-1100	Introduction to Engineering Analysis	4	ENGR-1300	Engineering Processes	1
ENGR-1200	Engineering Graphics & CAD ¹	1	ENGR-1600	Materials Science for Engineers	4
CHEM-1100	Chemistry I	4	MATH-1020	Calculus II	4
MATH-1010	Calculus I	4	PHYS-1100	Physics I	4
HASS	Hum. or Soc. Sci. Elective	4	HASS	Hum. or Soc. Sci. Elective	4
SECOND YEAR					
	FALL	Credits		SPRING	Credits
ENGR-2530	Strength of Materials	4	ENGR-2050	Introduction to Engineering Design	4
MATH-2400	Introduction to Differential Equations	4	ENGR-2090	Engineering Dynamics	4
PHYS-1200	Physics II	4	ENGR-2250	Thermal and Fluids Engineering I	4
HASS	Hum. or Soc. Sci. Elective	4	CSCI- 1190	Beginning Programming for Engineers	1
			MATH-2010	Multivariate Calculus & Matrix Algebra	4
THIRD YEAR					
	Summer Arch Semester	Credits		Fall or Spring	Credits
ENGR-2300	Electronic Instrumentation	4	ENGR-2350	Embedded Control	4
ENGR-2600	Modeling and Analysis of Uncertainty	3	MANE-4030	Elements of Mechanical Design	4
MANE-4010	Thermal and Fluids Core Module ²	4	MANE 4040	Mechanical Systems Lab	2
MANE-4020	Thermal and Fluids Engineering II (TFE II) Thermal and Fluids Lab (concurrent or after TFE II)	2			
HASS	Hum. or Soc. Sci. Elective	4	MANE-4050	Modeling & Control of Dyn. Syst.	4
				Professional Development II ³	2
FOURTH YEAR					
	Fall	Credits	Spring	Spring	Credits
ENGR-4010	Professional Development III	1	MANE XXX	Technical Elective I	3
MANE 4260	Design of Mechanical Engr Sys.	3	MANE-XXX	Technical Elective II	3
	Free Elective	4		Science Elective	3
	Free Elective	4		Free Elective	4
HASS	Hum. or Soc. Sci. Elective	4			

- Choice of: ENGR-1200 Engineering Graphics & CAD or ENGR-1400 Engineering Communication.
- The laboratory component of each Core Module (MANE-4020/-4040) must be taken concurrent with or after the theoretical component (MANE-4010/-4030). The laboratory courses have lecture components to review the theory, so there is no disadvantage to taking the laboratory in any later semester.
- For a list of courses that satisfy the PD II requirement, refer to the link "Courses which satisfy PD II requirement" on the SIS home page.
- The Science Elective may be selected from any 2000-level or above course in the School of Science with an ASTR, BCBP, BIOL, CHEM, EARTH, MATH, or PHYS prefix. An independent study course may not be used to satisfy this requirement. The Science Elective may not be taken on a Pass/No Credit basis.
- The Technical Electives shall be two upper level (4000 or above) MANE courses. An independent study course may not be used to satisfy this requirement. The Technical Electives may not be taken on a Pass/No Credit basis. ME students are encouraged to use their technical electives, science elective, and possibly free electives to develop a mechanical engineering concentration (e.g., in applied mechanics, energy systems, manufacturing and design, mechatronics, aerospace systems, nuclear systems, etc.) they can market themselves with.

Nuclear Engineering

Minimum credit hour requirements for the Bachelor's Degree in Nuclear Engineering: 130

FIRST YEAR					
	FALL	Credits		SPRING	Credits
ENGR-1100	Introduction to Engineering Analysis	4	ENGR-1200	Engineering Graphics & CAD	1
PHYS-1100	Physics I	4	PHYS-1200	Physics II	4
MANE-1961	Introduction to Nuclear Engineering ¹	1	MATH-1020	Calculus II	4
MATH-1010	Calculus I	4	CHEM-1100	Chemistry I	4
HASS	Hum. or Soc. Sci. Elective	4	HASS	Hum. or Soc. Sci. Elective	4
		17			17
SECOND YEAR					
	FALL	Credits		SPRING	Credits
MATH-2400	Introduction to Differential Equations	4	CSCI- 1190	Beginning Programming for Engineers	1
ENGR-1600	Materials Science for Engineers	4	MANE-2400	Fundamentals of Nuclear Engineering	4
	Free Elective I	4	MANE-4350	Nuclear Instrumentation & Measurement	3
MANE-2830	Nuclear Phenomena for Eng.	4	MATH-2010	Multivariable Calculus and Matrix Algebra	4
			HASS	Hum. or Soc. Sci. Elective	4
		16			17
THIRD YEAR					
	Summer Arch Semester	Credits		FALL	Credits
ENGR-2250	Thermal and Fluids Engineering I	4	MANE-4400	Nuclear Power Systems Engineering	4
ENGR-2050	Introduction to Engineering Design	4	MANE-4470	Radiological Engineering	3
ENGR-2600	Modeling and Analysis of Uncertainty	3	MANE-4480	Physics of Nuclear Reactors	4
HASS	Hum. or Soc. Sci. Elective	4		Professional Development II ²	2
			HASS	Hum. or Soc. Sci. Elective	4
		15			16
FOURTH YEAR					
	FALL	Credits		SPRING	Credits
MANE-4050	Modeling & Control of Dynamic Systems	4	MANE-4390	NE Senior Design Project II	2
MANE-4370	Nuclear Engineering Lab	4	MANE-4440	Critical Reactor Laboratory	3
MANE 4380	NE Senior Design Project I	1		Technical Elective ⁴	3
ENGR-4010	Professional Development III	1		Restricted Elective II ³	3
	Restricted Elective I ³	3		Free Elective III	4
	Free Elective II	4			
		17			15

¹ Other 1-credit Engineering Exploration courses, such as ENGR-1300 Engineering Processes, may be substituted.

² For a list of courses that satisfy the PD II requirement, refer to the link "Courses which satisfy PD II requirement" on the SIS home page.

³ Restricted Electives focus on a student's technical interests or area of specialization within the Nuclear Engineering field. Restricted electives are MANE 4000-level or higher courses related to Nuclear Engineering that are taken for 3 credits or more. If you have questions regarding whether a specific course satisfies your Restricted Elective requirements, please consult with your advisor. Restricted Electives may not be taken on a Pass/No Credit basis.

⁴ The Technical Elective can be any 2000-level or higher School of Engineering or School of Science course taken for 3 credits or more. Technical Electives may not be taken on a Pass/No Credit basis.