

# GENERAL ENGINEERING (BS)

## Program Description

The BS in General Engineering degree combines the fundamentals of electrical, mechanical, and computer engineering with a focused depth in one of these areas. It also allows you freedom to choose more engineering courses (for instance to focus on robotics or energy) or more computer science.

The BS in General Engineering degree is accredited by the Engineering Accreditation Commission of ABET (<http://www.abet.org/>).

## Entering and Completing the Major

In order to earn a degree, you must complete at least one academic major. SPU encourages students to explore various academic paths, so if you change your mind about a major, or want to include an additional program, you are able to do so, as outlined below.

Note that the University encourages you to enter your chosen major(s) as soon as you have determined it and are eligible to join it, especially by the start of your junior year. Students who transfer as juniors and seniors should enter a major within their first two quarters at SPU.

- If this is your first quarter at SPU and you identified a major in this department as your first choice on your application for admission to the University, you have gained entry to the major. To change or add a major, follow these instructions (<https://spu.atlassian.net/1/cp/a3th1keb>).
- If you are an SPU student with an SPU cumulative GPA of 2.0 or better, follow these instructions (<https://spu.atlassian.net/1/cp/a3th1keb>) to enter a major in this department.
- The University requires a grade of C- or better in all classes that apply to a major; however, programs may require higher minimum grades in specific courses. You may repeat an SPU course only once for a higher grade.
- To advance in this program, meet with your faculty advisor regularly to discuss your grades, course progression, and other indicators of satisfactory academic progress. If your grades or other factors indicate that you may not be able to successfully complete the major or minor, your faculty advisor can work with you to explore options, which may include choosing a different major.
- You must complete the major requirements that are in effect in the SPU Undergraduate Catalog for the year you enter the major.

## General Engineering (BS)

115 Credits Minimum, Including 30 Upper Division (UD)

Code	Title	Credits
<b>Mathematics Requirements</b>		
MAT 1234	Calculus I	5
MAT 1235	Calculus II	5
MAT 1236	Calculus III	5
Section Credits Required		15
<b>Science Requirements</b>		
CHM 1211	General Chemistry I	5
	or CHM 1310 Survey of General Chemistry	
PHY 1121	Physics for Science and Engineering	5
PHY 1122	Physics for Science and Engineering	5

PHY 1123	Physics for Science and Engineering	5
Section Credits Required		20

<b>Math/Science Breadth Requirement</b>		
BIO 2202	General Biology II	
CHM 1212	General Chemistry II	
CHM 1330	Survey of Organic Chemistry	
CHM 1360	Survey of Biological Chemistry	
MAT 1720	Mathematics for Computer Science	
MAT 2200	Engineering Probability and Statistics	
	or MAT 236C Introduction to Statistics for the Sciences	
MAT 2401	Linear Algebra	
MAT 3237	Differential Equations	
MAT 3238	Vector Calculus	
PHY 3110	Mechanical Modeling and Analysis	
PHY 3315	Electricity and Magnetism I	
PHY 3321	Modern Physics	

Section Credits Required		10
--------------------------	--	----

<b>Engineering and Computer Science Core Requirements</b>		
CSC 1250	Introductory Problem Solving and Programming	5
& CSC 1260	and Structured Programming <sup>1</sup>	
	or CSC 2230 Computer Programming for Engineers	
EE 1502	Electrical and Computer Engineering Fundamentals	1
EE 2726	Electric Circuits I	5
EE 2728	Electric Circuits II - Expanded	5
	or EGR 3800 Biomedical Engineering I	
EGR 1501	Computer Aided Design Applications for Engineers	1
EGR 1503	Engineering Tools and Systems	1
EGR 3810	General Engineering Design	5
EGR 4811	Engineering Senior Design I	3
	or EE 4211 Electrical Engineering Senior Design I	
EGR 4812	Engineering Senior Design II	3
	or EE 4212 Electrical Engineering Senior Design II	
EGR 4899	Engineering Capstone and Senior Design	3
	or EE 4899 Electrical Engineering Capstone and Senior Design	
EGR 4941	Engineering Professional Experience <sup>2</sup>	1
GS 3001	Internship and Job Search Strategies	1
ME 2891	Statics	4
ME 3310	Mechanics of Materials	4
Section Credits Required		42

### Engineering Emphasis Requirements (select one of the following sets of courses)

#### Computer Engineering

EE 1210	Introduction to Logic System Design	
& CSC 2430	and Object Oriented Programming	
& EE 3760	and Computer Organization and Assembly	
& EE 3280	Language	
	and Microcontroller System Design	

#### Electronics

EE 3721 & 3721L & EE 3722 & EE 3722L & EE 2728 or EE 3500	Electronics I - Analog Devices and Circuits and Electronics I - Analog Devices and Circuits Lab and Electronics II Analog Electronics and Electronics II Analog Electronics Lab and Electric Circuits II - Expanded <sup>3</sup> Power Systems Fundamentals
<b>Thermofluids</b>	
ME 3500 & ME 3501 & ME 3502 & EGR 1502	Thermal Science I: Thermodynamics and Thermal Science II: Fluid Mechanics and Thermal Science III: Heat Transfer and Machining and Fabricating
<b>Mechanical Engineering</b>	
ME 3400 & ME 3430 & ME 4410 & EGR 1502	Dynamics and System Dynamics and Mechanical Design and Machining and Fabricating
<b>Robotics and Controls: EE</b>	
EE 3410 & EE 2728 & EE 4450 or EGR 3250	Signal and System Analysis and Electric Circuits II - Expanded and Control System Design <sup>4</sup> Introduction to Robotics
<b>Robotics and Controls: ME</b>	
ME 3400 & ME 3430 & EGR 1502 & EGR 4450 or EGR 3250	Dynamics and System Dynamics and Machining and Fabricating and Control Systems Design <sup>5</sup> Introduction to Robotics
Section Credits Required	15
<b>Electives<sup>6</sup></b>	<b>13</b>
<b>Total Credits</b>	<b>115</b>

<sup>1</sup> For clarity, the student must take either both CSC 1250 AND CSC 1260, OR the student can take just CSC 2230.

<sup>2</sup> A approved tech internship or professional experience must be completed before passing EGR 4941.

<sup>3</sup> For clarity, since the Engineering and Computer Science Core requirements include a choice of either EE 2728 or EGR 3800, if EGR 3800 is not completed, then EE 2728 must be required as part of the Core requirements. In that case, EE 3500 is required in place of EE 2728 here in the engineering emphasis requirements.

<sup>4</sup> For clarity, since the Engineering and Computer Science Core requirements include a choice of either EE 2728 or EGR 3800, if EGR 3800 is not completed, then EE 2728 must be required as part of the Core requirements. In that case, both EGR 3250 and EE 4450 are required in place of EE 2728 here in the engineering emphasis requirements. If EGR 3800 is completed, then one of EGR 3250 or EE 4450 is required.

<sup>5</sup> For clarity, one of EGR 3250 or EE 4450 is required.

<sup>6</sup> Electives must be chosen from approved EGR, CPE, EE, ME or CSC courses not completed as part of the requirements listed above. These courses will be selected to meet the student's goals and must be approved by the Chair of General Engineering. Any engineering and computer science credits from the Engineering Emphasis category beyond the required 15 credits can be applied to the Electives category.

## Suggested Course Sequence

Course	Title	Credits
<b>Freshman</b>		
<b>Variable</b>		
EGR 1502	Machining and Fabricating	1
TCOR 1000	The Christian Faith	5
WRI 1000	Academic Inquiry and Writing Seminar	5
<b>Credits</b>		<b>11</b>
<b>Autumn</b>		
EGR 1501	Computer Aided Design Applications for Engineers	1
FYS 1000	First Year Seminar <sup>1</sup>	3
MAT 1234	Calculus I	5
PHY 1121	Physics for Science and Engineering	5
<b>Credits</b>		<b>14</b>
<b>Winter</b>		
EE 1502	Electrical and Computer Engineering Fundamentals	1
MAT 1235	Calculus II	5
PHY 1122	Physics for Science and Engineering	5
<b>Credits</b>		<b>11</b>
<b>Spring</b>		
EGR 1503	Engineering Tools and Systems	1
MAT 1236	Calculus III	5
PHY 1123	Physics for Science and Engineering	5
<b>Credits</b>		<b>11</b>
<b>Sophomore</b>		
<b>Variable</b>		
Common Curriculum ( <a href="https://catalog.spu.edu/undergraduate/degree-requirements/baccalaureate-degree-requirements/common-curriculum/">https://catalog.spu.edu/undergraduate/degree-requirements/baccalaureate-degree-requirements/common-curriculum/</a> ) and Exploratory Curriculum ( <a href="https://catalog.spu.edu/undergraduate/degree-requirements/baccalaureate-degree-requirements/exploratory-curriculum/">https://catalog.spu.edu/undergraduate/degree-requirements/baccalaureate-degree-requirements/exploratory-curriculum/</a> )		
Work with advisor to plan which of the courses below will be taken during sophomore year vs junior year.		
<b>Credits</b>		<b>0</b>
<b>Autumn</b>		
EE 2726 & 2726L	Electric Circuits I and Electric Circuits I Lab	5
ME 2891	Statics	4
Choose one of the following <sup>2</sup>		5
CSC 2230 or CSC 1250	Computer Programming for Engineers <sup>3</sup> or Introductory Problem Solving and Programming	
EE 1210	Introduction to Logic System Design	
<b>Credits</b>		<b>14</b>
<b>Autumn or Winter</b>		
MAT 3237	Differential Equations	3
<b>Credits</b>		<b>3</b>
<b>Winter</b>		
CHM 1310 or CHM 1211	Survey of General Chemistry or General Chemistry I	5
EE 2728	Electric Circuits II - Expanded	5
ME 3310	Mechanics of Materials	4
<b>Credits</b>		<b>14</b>
<b>Spring</b>		
Engineering Concentration Course 1		4-5
MAT 2200	Engineering Probability and Statistics	3
MAT 2401	Linear Algebra	3
Math or Science Breadth Course <sup>4</sup>		3
<b>Credits</b>		<b>13-14</b>
<b>Junior</b>		
<b>Variable</b>		
Engineering Concentration Sequence Courses 2 & 3 <sup>5</sup>		9-10
Approved Internship <sup>6</sup>		
Approved Electives <sup>7</sup>		

Common Curriculum (<https://catalog.spu.edu/undergraduate/degree-requirements/baccalaureate-degree-requirements/common-curriculum/>) and Exploratory Curriculum (<https://catalog.spu.edu/undergraduate/degree-requirements/baccalaureate-degree-requirements/exploratory-curriculum/>)

		Credits	9-10
<b>Autumn</b>			
GS 3001	Internship and Job Search Strategies		1
ME 3500	Thermal Science I: Thermodynamics		5
		<b>Credits</b>	<b>6</b>
<b>Spring</b>			
EGR 3810 or EE 3730	General Engineering Design or Engineering Design		5
		<b>Credits</b>	<b>5</b>
<b>Senior</b>			
<b>Variable</b>			
Approved Electives <sup>7</sup>			18
EGR 4941	Engineering Professional Experience <sup>8</sup>		1
Common Curriculum ( <a href="https://catalog.spu.edu/undergraduate/degree-requirements/baccalaureate-degree-requirements/common-curriculum/">https://catalog.spu.edu/undergraduate/degree-requirements/baccalaureate-degree-requirements/common-curriculum/</a> ) and Exploratory Curriculum ( <a href="https://catalog.spu.edu/undergraduate/degree-requirements/baccalaureate-degree-requirements/exploratory-curriculum/">https://catalog.spu.edu/undergraduate/degree-requirements/exploratory-curriculum/</a> )			20
		<b>Credits</b>	<b>39</b>
<b>Autumn</b>			
EGR 4811	Engineering Senior Design I		3
		<b>Credits</b>	<b>3</b>
<b>Winter</b>			
EGR 4812	Engineering Senior Design II		3
		<b>Credits</b>	<b>3</b>
<b>Spring</b>			
EGR 4899	Engineering Capstone and Senior Design		3
		<b>Credits</b>	<b>3</b>
		<b>Total Credits</b>	<b>159-161</b>

Code	Title	Credits
<b>Common Curriculum</b>		
TCOR 2000	Christian Scripture	5
TCOR 3100	Christian Theology	5
UCOR 2100	World History, Faith, and Reconciliation	5
UCOR 3000	Faith, Philosophy, and Science	5
<b>Exploratory Curriculum</b>		
WK-Arts, WK-Hum, WK-Social Science, (and CUE) With DTA or AA see Advisor		20

## Technical Electives/Concentrations

See the Requirements (p. 1) tab for a complete list of technical concentration options and technical electives requirements.

- <sup>1</sup> FYS 1000 First Year Seminar should be the section taught by an engineering faculty member, if one is available.
- <sup>2</sup> CSC 2230 should be taken if the technical emphasis area will be more mechanical engineering focused. CSC 1250 should be taken if the technical emphasis area will be more computer-engineering focused. If EE 1210 is not taken in the sophomore year, then it will need to be taken in a later year. CSC 1250 may be taken in Winter quarter.
- <sup>3</sup> Note that CSC 1250 is a pre-req for some optional later courses.
- <sup>4</sup> See Degree Requirements list in the catalog, and discuss these with faculty advisor.
- <sup>5</sup> Relevant prereqs will depend on concentration sequence.
- <sup>6</sup> This is also a prerequisite for EGR 4941 Engineering Professional Experience. See ECS Intern Canvas site for details.
- <sup>7</sup> To be taken in junior or senior year. See link at the bottom of this page for a list.
- <sup>8</sup> Must be taken AFTER completing or WHILE pursuing an approved internship or an approved certification.