

# BACHELOR OF SCIENCE, MAJOR IN PHYSICS/ENGINEERING DUAL DEGREE\*

Code	Title	Hours
<b>Bachelor of Science, Major in Physics/Engineering Dual Degree</b>		
<b>Core Curriculum</b> ( <a href="http://catalog.shsu.edu/undergraduate/academic-policies-procedures/degree-requirements-academic-guidelines/core-curriculum/">http://catalog.shsu.edu/undergraduate/academic-policies-procedures/degree-requirements-academic-guidelines/core-curriculum/</a> )		
	Component Area I (Communication)	6
	Component Area II (Mathematics) <sup>1</sup>	3
	Component Area III (Life and Physical Science) <sup>2</sup>	8
	Component Area IV (Language, Philosophy, and Culture)	3
	Component Area V (Creative Arts)	3
	Component Area VI (U.S. History)	6
	Component Area VII (Political Science/Government)	6
	Component Area VIII (Social and Behavioral Sciences)	3
	Component Area IX (Component Area Option) <sup>1</sup>	4
<b>Degree Specific Requirements</b>		
CHEM 1411	General Chemistry I <sup>2</sup>	4
CHEM 1412	General Chemistry II <sup>2</sup>	4
COSC 1436	Programming Fundamentals I	4
ENGL 3330	Introduction to Technical Writing	3
ETDD 1361	Engineering Graphics	3
	Advanced Elective	3
<b>Major: Foundation</b>		
PHYS 1401	Physics Boot Camp	4
PHYS 1411	Introduction To Physics I	4
PHYS 1422	Introduction To Physics II	4
PHYS 3370 & PHYS 4110	Introduction to Theoretical Physics and Advanced Undergraduate Laboratory I	4
PHYS 3391 & PHYS 3111	Modern Physics I and Modern Physics Laboratory I	4
PHYS 3395 & PHYS 3115	Electronics & Circuit Analysis and Electronics and Circuit Analysis Lab	4
<b>Major: Prescribed Electives</b>		
	PHYS Advanced Electives (see list below)	6-8
MATH 1420	Calculus I <sup>1</sup>	4
MATH 1430	Calculus II	4
MATH 2440	Calculus III	4
MATH 3376	Differential Equations	3
MATH 3377	Introduction to Linear Algebra and Matrices	3
<b>Minor: Not Required</b> <sup>3,4</sup>		
<b>Total Hours</b>		<b>99-101</b>

<sup>1</sup> MATH 1420 satisfies the Core Curriculum requirement for Component Area II (Mathematics), one semester credit hour of Component Area IX (Component Area Option), and the Degree Specific requirement.

<sup>2</sup> CHEM 1411 and CHEM 1412 satisfy the Core Curriculum requirement for Component Area III (Life and Physical Science).

<sup>3</sup> A minor is not required for this degree program; however, a student has the option to add a minor, but to do so additional semester credits hours will be needed above the degree program's stated total semester credit hours.

<sup>4</sup> The following minor cannot be paired with this degree program: Minor in Physics.

**Note:** Fourth Year at university with recognized accredited degree program.

Code	Title	Hours
<b>Major: Prescribed Electives</b>		
PHYS Advanced Electives		
PHYS 3360	Statics And Dynamics	3
PHYS 4333 & PHYS 4113	Light And Optics and Light And Optics	4
PHYS 4366	Introduction to Quantum Mechanics	3
PHYS 4368	Electricity And Magnetism	3
PHYS 4370	Classical Mechanics	3
PHYS 4371	Thermodynamics and Statistical Mechanics	3

**Notes**

Students must earn a 2.0 minimum overall GPA in all coursework.

Students must meet a 2.0 minimum overall major GPA in all major coursework.

Students must earn a 2.0 minimum SHSU GPA in all coursework.

Students must meet a 2.0 minimum SHSU major GPA in all major coursework.

While SHSU does not offer degrees in Engineering, the Department of Physics and Astronomy does provide several options for Pre-Engineering. Physics and Engineering go together very well; because, so much of Engineering Design is built upon the underlying foundation of Physics.

Pre-Engineering includes more Math (especially Calculus) than Engineering Technology does, and it leads to very different careers. The Accreditation Board for Engineering and Technology (ABET) says that Engineering programs often focus on theory and conceptual design, while Technology programs usually focus on application and implementation. Engineers often do work involving original research and development, and many continue on to Masters or Doctoral programs in Engineering. Technologists are most likely to work in construction, manufacturing, product design, testing, or technical services and sales.

\*In the Dual Degree, or "3+2" program, students earn degrees in both Physics and Engineering. This starts with three years at SHSU, completing the Core Curriculum, the Calculus and Physics introductory sequence, and a portion of the upper division Physics Curriculum. Students then apply to any accredited Engineering program at an institution of their choice for the last two years of degree work. One option is UT Tyler (either the main campus or the Houston Engineering Center), where a transfer agreement guarantees admission for students with a 2.5 GPA. After completion of the Engineering Degree, credits are retroactively transferred back to SHSU so that the Physics Degree can be awarded simultaneously.

The "2+2" Pre-Engineering Tracks in Civil, Mechanical, and Electrical Engineering are four-year degrees where students transfer to an accredited Engineering Program (such as UT Tyler) after completing two years at SHSU.

The Department of Chemistry offers a similar "3+2" program combining Bachelor's of Science degrees in Chemistry (from SHSU) and Chemical Engineering (from an accredited program).

All students interested in Physics or Pre-Engineering enroll in the Physics Bootcamp (PHYS 1401 (<http://catalog.shsu.edu/search/?P=PHYS%201401>)) during their first semester on campus. This lets interested students see what physics is all about as early as possible, with no prerequisites. It ensures that they have math skills required in the next two years and helps them understand what those skills are good for in Physics and Engineering. It develops confidence, teamwork, camaraderie, and a sense of belonging in the department. A weekly group-based problem-solving practice session is integrated. The Bootcamp is typically offered each Fall and Spring term.

**For more information on the Pre-Engineering programs at SHSU contact:**

Department Chair  
Physics and Astronomy (<http://www.shsu.edu/academics/physics/>)  
Sam Houston State University  
Huntsville, Texas 77341-2267  
(936) 294-1601

Students entering a Pre-Engineering program must consult with an academic advisor in the Department of Physics and Astronomy to ensure that their degree plan meets all admission requirements of programs into which they seek to transfer.

**First Year**

Fall	Hours	Spring	Hours
CHEM 1411 <sup>1</sup>		4 CHEM 1412 <sup>1</sup>	4
ENGL 1301 <sup>2</sup>		3 ENGL 1302 <sup>2</sup>	3

HIST 1301 <sup>3</sup>	3 HIST 1302 <sup>3</sup>	3
MATH 1420 <sup>4</sup>	4 MATH 1430	4
PHYS 1401	4 PHYS 1411	4
<b>18</b>		<b>18</b>

**Second Year**

Fall	Hours	Spring	Hours
Component Area IV ( <a href="http://catalog.shsu.edu/undergraduate/academic-policies-procedures/degree-requirements-academic-guidelines/core-curriculum/#componentareaiv">http://catalog.shsu.edu/undergraduate/academic-policies-procedures/degree-requirements-academic-guidelines/core-curriculum/#componentareaiv</a> )		3 Component Area IX ( <a href="http://catalog.shsu.edu/undergraduate/academic-policies-procedures/degree-requirements-academic-guidelines/core-curriculum/#componentareaix">http://catalog.shsu.edu/undergraduate/academic-policies-procedures/degree-requirements-academic-guidelines/core-curriculum/#componentareaix</a> )	3
ETDD 1361		3 COSC 1436	4
MATH 2440		4 ENGL 3330	3
PHYS 1422		4 PHYS 3370 & PHYS 4110	4
POLS 2305 <sup>5</sup>		3 POLS 2306 <sup>5</sup>	3
<b>17</b>		<b>17</b>	

**Third Year**

Fall	Hours	Spring	Hours
Component Area VIII ( <a href="http://catalog.shsu.edu/undergraduate/academic-policies-procedures/degree-requirements-academic-guidelines/core-curriculum/#componentareaviii">http://catalog.shsu.edu/undergraduate/academic-policies-procedures/degree-requirements-academic-guidelines/core-curriculum/#componentareaviii</a> )		3 Component Area V ( <a href="http://catalog.shsu.edu/undergraduate/academic-policies-procedures/degree-requirements-academic-guidelines/core-curriculum/#componentareav">http://catalog.shsu.edu/undergraduate/academic-policies-procedures/degree-requirements-academic-guidelines/core-curriculum/#componentareav</a> )	3
Advanced Elective		3 MATH 3377	3
PHYS 3111		1 PHYS 3115	1
PHYS 3391		3 PHYS 3395	3
MATH 3376		3 PHYS Advanced Electives <sup>6</sup>	3-4
PHYS Advanced Electives <sup>6</sup>		3-4	
<b>16-17</b>		<b>13-14</b>	

**Fourth Year**

Fall	Hours	Spring	Hours
University with Accredited Degree Program		0 University with Accredited Degree Program	0
<b>0</b>		<b>0</b>	

**Total Hours: 99-101**

- <sup>1</sup> Satisfies Core Curriculum requirement for Component Area III (Life and Physical Science).
- <sup>2</sup> Satisfies Core Curriculum requirement for Component Area I (Communications).
- <sup>3</sup> Satisfies Core Curriculum requirement for Component Area VI (U.S. History).
- <sup>4</sup> MATH 1420 satisfies the Core Curriculum requirement for Component Area II (Mathematics), one semester credit hour of Component Area IX (Component Area Option), and the Degree Specific requirement.
- <sup>5</sup> Satisfies Core Curriculum requirement for Component Area VII (Political Science/Government).

**Note:** Fourth Year at university with recognized accredited degree program.

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Advanced PHYS Electives		
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The Texas Higher Education Coordinating Board (THECB) marketable skills initiative is part of the state's **60x30TX plan** and was designed to help students articulate their skills to employers. Marketable skills are those skills valued by employers and/or graduate programs that can be applied in a variety of work or education settings and may include interpersonal, cognitive, and applied skill areas.

The BS in Physics/Engineering Dual Degree is designed to provide graduates with the following marketable skills:

- [Ability to creatively solve real-world problems.](#)
- [Sophisticated understanding of applied mathematics.](#)
- [Capacity to analyze and interpret complex data.](#)
- [Quantitative understanding of mechanical, electrical, and thermal systems.](#)
- [Model complex interactions with computer programming and technology.](#)