

ENGINEERING

Associate of Science

The Associate of Science degree with a field of study in Engineering offers students the opportunity to take a core curriculum of general education with an emphasis on Engineering. At the present time, a high percentage of all the technical and managerial positions in industry are occupied by engineers. Our engineering program prepares students for transfer to a four-year institution where they can specialize in all engineering disciplines such as:

- Aerospace Engineering
- Agriculture Engineering
- Bioengineering
- Chemical Engineering
- Civil Engineering
- Computer Engineering
- Electrical Engineering
- Environmental Engineering
- Industrial Engineering
- Manufacturing Engineering
- Mechanical Engineering
- Nuclear Engineering
- Petroleum Engineering
- Radiological Health Engineering

It is suggested that students interested in the fields of Chemical or Petroleum Engineering follow a modified Chemistry degree plan, which includes MATH 2413 Calculus I. An appointment with a faculty advisor before enrolling is strongly recommended.

The course listing for the Associate of Science degree with a field of study in Engineering closely parallels the first two years of education that one would receive at most engineering schools. Upon completion of this sequence, many students transfer to an engineering school and obtain a degree in one of the various engineering fields. However, students intending to transfer should be aware of the transfer institution's requirements.

It is possible to complete the engineering sequence in a number of ways and time periods. However, because of sensitive math and physics prerequisites, the suggested guideline should be closely followed if one hopes to complete the program in a timely manner and to smoothly transition to a four-year institution.

Students with an SAT score of 560+ (SAT II Math Level 1), 520+ (SAT II Math Level 2) or an ACT score of 28+ may also enroll directly into MATH 2413 Calculus I. Otherwise, it is recommended that students take the prerequisite MATH 2412 Pre-Calculus Math the summer prior to the start of the fall semester. Enrollment in MATH 2412 Pre-Calculus Math requires a prerequisite of MATH 1414 College Algebra or ACT scores of 25-27, SAT II Math Level I scores of 520-559, or SAT II Math Level 2 scores of 500-519.

Engineering program webpage: <https://www.southtexascollege.edu/engineering/>

Program Learning Outcomes

1. Students will identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics.

2. Students will perform experiments and will communicate analysis and interpretation of results in written reports.

3. Students will solve engineering and technical problems.

4. Students will describe professional and ethical responsibilities in the engineering profession.

5. Students will use techniques, skills, and modern engineering and technical tools necessary for professional practice.

6. Students will describe the main features of work groups and teams.

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Field of Study - 26-30 credit hours

Required for All Engineering Students (14 Credits)

ENGR 1201	Introduction to Engineering	2
MATH 2414	Calculus II	4
MATH 2415	Calculus III ¹	4
	or MATH 2420 Differential Equations	
CHEM 1409	General Chemistry for Engineering Majors ²	4
	or CHEM 1411 General Chemistry I	

Tracks

Select one of the following tracks: 12-16

General/Mechanical/Manufacturing Track (13 Credits)

ENGR 1304	Engineering Graphics
ENGR 2301	Engineering Mechanics - Statics
ENGR 2302	Engineering Mechanics - Dynamics
ENGR 2405	Electrical Circuits I

Civil Engineering Track (13 Credits)

ENGR 1304	Engineering Graphics
GEOL 1403	Physical Geology
ENGR 2301	Engineering Mechanics - Statics
ENGR 2302	Engineering Mechanics - Dynamics

Electrical Engineering Track (12 Credits)

COSC 1436	Programming Fundamentals I
ENGR 2406	Introduction to Digital Systems
ENGR 2405	Electrical Circuits I

Computer Engineering Track (16 Credits)

COSC 1436	Programming Fundamentals I
COSC 2425	Computer Organization
ENGR 2405	Electrical Circuits I
ENGR 2406	Introduction to Digital Systems

Chemical/Environmental/Petroleum Engineering Track (15 Credits)

Take all of these:

CHEM 1412	General Chemistry II
CHEM 2423	Organic Chemistry I
ENGR 2301	Engineering Mechanics - Statics

Select one of the following:

CHEM 2425	Organic Chemistry II (Chemical Engineering)
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BIOL 1406 Biology for Science Majors I (Environmental Engineering)

GEOL 1403 Physical Geology (Petroleum Engineering)

STC Core Curriculum - 33-34 credit hours

Complete a minimum of 33-34 credit hours of required Core Curriculum including the following:³ 33-34

Mathematics

MATH 2413 Calculus I

Life and Physical Sciences

PHYS 2425 University Physics I

PHYS 2426 University Physics II

*Core Component Area Option*⁴

MATH 2420 or ENGR 1304 or Component Area Option - Core Curriculum

Total Credit Hours 60-64

¹ Students following the Computer Engineering track must take MATH 2420 Differential Equations and all others must take MATH 2415 Calculus III.

² Students following the Chemical/Environmental/Petroleum engineering track must take CHEM 1411 General Chemistry I and all others must take CHEM 1409 General Chemistry for Engineering Majors. Students should see an advisor if they are unsure which course to enroll in.

³ In addition to the courses in the Field of Study, the student is required to take 33-34 credit hours from the STC Core Curriculum.

⁴ Students following the Mechanical/General/Manufacturing, Civil, or Electrical tracks must take MATH 2420 Differential Equations in order to fulfill the co-requisite requirement for ENGR 2405 Electrical Circuits I. ENGR 1304 Engineering Graphics is only for Dual Enrollment Academy Track. All others should see an Engineering Faculty Advisor to select a course based on transferring institutions and career interests.

Recommended After Completion of Degree to be Core Complete

Students may complete the courses from the following Core component areas to be core complete. Students should speak with a faculty advisor and check with the institution they intend to transfer in order to decide if these courses should be completed at South Texas College.

Social and Behavioral Sciences Elective

Recommended:

ECON 2301 Principles of Economics I - Macro

Language, Philosophy & Culture

Recommended:

PHIL 2306 Introduction to Ethics

Creative Arts Elective - Core Curriculum

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Recommended Course Sequence - Mechanical/Manufacturing/General Engineering Track

Course	Title	Credit Hours
First Year		
Fall		
ENGR 1201	Introduction to Engineering	2
ENGL 1301	Composition I	3
MATH 2413	Calculus I ¹	4
CHEM 1409	General Chemistry for Engineering Majors	4
HIST 1301 or HIST 2327	United States History I or Mexican-American History I	3
Credit Hours		16
Spring		
ENGR 1304	Engineering Graphics	3
ENGL 1302	Composition II - Rhetoric	3
PHYS 2425	University Physics I	4
MATH 2414	Calculus II	4
Credit Hours		14
Summer		
HIST 1302 or HIST 2328	United States History II or Mexican-American History II	3
Credit Hours		3
Second Year		
Fall		
ENGR 2301	Engineering Mechanics - Statics	3
PHYS 2426	University Physics II	4
GOVT 2305	Federal Government	3
MATH 2415	Calculus III	4
Credit Hours		14
Spring		
ENGR 2302	Engineering Mechanics - Dynamics	3
ENGR 2405	Electrical Circuits I	4
MATH 2420	Differential Equations	4
GOVT 2306	Texas Government	3
Credit Hours		14
Total Credit Hours		61

¹ Check catalog for course pre-requisite.

Recommended After Completion of Degree to be Core Complete

Students may complete the courses from the following Core component areas to be core complete. Students should speak with a faculty advisor and check with the institution they intend to transfer in order to decide if these courses should be completed at South Texas College.

Social and Behavioral Sciences Elective

Recommended:

ECON 2301 Principles of Economics I - Macro

Language, Philosophy & Culture

Recommended:

PHIL 2306 Introduction to Ethics

Creative Arts Elective - Core Curriculum

TSI LIABLE

Recommended Course Sequence - Computer Engineering Track

Course	Title	Credit Hours
First Year		
Fall		
ENGR 1201	Introduction to Engineering	2
ENGL 1301	Composition I	3
MATH 2413	Calculus I ¹	4
CHEM 1409	General Chemistry for Engineering Majors	4
HIST 1301 or HIST 2327	United States History I or Mexican-American History I	3
Credit Hours		16
Spring		
ENGR 2406	Introduction to Digital Systems	4
ENGL 1302	Composition II - Rhetoric	3
PHYS 2425	University Physics I	4
MATH 2414	Calculus II	4
Credit Hours		15
Summer		
HIST 1302 or HIST 2328	United States History II or Mexican-American History II	3
Credit Hours		3
Second Year		
Fall		
COSC 1436	Programming Fundamentals I	4
PHYS 2426	University Physics II	4
GOVT 2305	Federal Government	3
Component Area Option - Core Curriculum ²		3
Credit Hours		14
Spring		
GOVT 2306	Texas Government	3
COSC 2425	Computer Organization	4
ENGR 2405	Electrical Circuits I	4
MATH 2420	Differential Equations	4
Credit Hours		15
Total Credit Hours		63

¹ Check catalog for course pre-requisites.

² See an Engineering Faculty Advisor to select a course based on transferring institutions and career interests.

Recommended After Completion of Degree to be Core Complete

Students may complete the courses from the following Core component areas to be core complete. Students should speak with a faculty advisor and check with the institution they intend to transfer in order to decide if these courses should be completed at South Texas College.

Social and Behavioral Sciences Elective

Recommended:

ECON 2301	Principles of Economics I - Macro
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Language, Philosophy & Culture

Recommended:

PHIL 2306	Introduction to Ethics
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Creative Arts Elective - Core Curriculum

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Recommended Course Sequence - Petroleum Engineering Track

Course	Title	Credit Hours
First Year		
Fall		
ENGR 1201	Introduction to Engineering	2
ENGL 1301	Composition I	3
MATH 2413	Calculus I ¹	4
CHEM 1411	General Chemistry I	4
HIST 1301 or HIST 2327	United States History I or Mexican-American History I	3
Credit Hours		16
Spring		
ENGL 1302	Composition II - Rhetoric	3
PHYS 2425	University Physics I	4
CHEM 1412	General Chemistry II	4
MATH 2414	Calculus II	4
Credit Hours		15
Summer		
HIST 1302 or HIST 2328	United States History II or Mexican-American History II	3
Credit Hours		3
Second Year		
Fall		
ENGR 2301	Engineering Mechanics - Statics	3
PHYS 2426	University Physics II	4
GOVT 2305	Federal Government	3
MATH 2415	Calculus III	4
Credit Hours		14
Spring		
GEOL 1403	Physical Geology	4
GOVT 2306	Texas Government	3
CHEM 2423	Organic Chemistry I	4
Component Area Option - Core Curriculum ²		3
Credit Hours		14
Total Credit Hours		62

¹ Check catalog for course pre-requisites.

² See an Engineering Faculty Advisor to select a course based on transferring institutions and career interests.

Recommended After Completion of Degree to be Core Complete

Students may complete the courses from the following Core component areas to be core complete. Students should speak with a faculty advisor and check with the institution they intend to transfer in order to decide if these courses should be completed at South Texas College.

Social and Behavioral Sciences Elective

Recommended:

ECON 2301	Principles of Economics I - Macro
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Language, Philosophy & Culture

Recommended:

PHIL 2306	Introduction to Ethics
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Creative Arts Elective - Core Curriculum

TSI LIABLE

Recommended Course Sequence - Environmental Engineering Track

Course	Title	Credit Hours
First Year		
Fall		
ENGR 1201	Introduction to Engineering	2
ENGL 1301	Composition I	3
MATH 2413	Calculus I ¹	4
CHEM 1411	General Chemistry I	4
HIST 1301 or HIST 2327	United States History I or Mexican-American History I	3
Credit Hours		16
Spring		
ENGL 1302	Composition II - Rhetoric	3
PHYS 2425	University Physics I	4
MATH 2414	Calculus II	4
CHEM 1412	General Chemistry II	4
Credit Hours		15
Summer		
HIST 1302 or HIST 2328	United States History II or Mexican-American History II	3
Credit Hours		3
Second Year		
Fall		
ENGR 2301	Engineering Mechanics - Statics	3
PHYS 2426	University Physics II	4
GOVT 2305	Federal Government	3
MATH 2415	Calculus III	4
Credit Hours		14
Spring		
BIOL 1406	Biology for Science Majors I	4
GOVT 2306	Texas Government	3
CHEM 2423	Organic Chemistry I	4
Component Area Option - Core Curriculum ²		3
Credit Hours		14
Total Credit Hours		62

¹ Check catalog for course pre-requisites.

² See an Engineering Faculty Advisor to select a course based on transferring institutions and career interests.

Recommended After Completion of Degree to be Core Complete

Students may complete the courses from the following Core component areas to be core complete. Students should speak with a faculty advisor and check with the institution they intend to transfer in order to decide if these courses should be completed at South Texas College.

Social and Behavioral Sciences Elective

Recommended:

ECON 2301 Principles of Economics I - Macro

Language, Philosophy & Culture

Recommended:

PHIL 2306 Introduction to Ethics

Creative Arts Elective - Core Curriculum

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Recommended Course Sequence - Chemical Engineering Track

Course	Title	Credit Hours
First Year		
Fall		
ENGR 1201	Introduction to Engineering	2
ENGL 1301	Composition I	3
MATH 2413	Calculus I ¹	4
CHEM 1411	General Chemistry I	4
HIST 1301 or HIST 2327	United States History I or Mexican-American History I	3
Credit Hours		16
Spring		
ENGL 1302	Composition II - Rhetoric	3
PHYS 2425	University Physics I	4
CHEM 1412	General Chemistry II	4
MATH 2414	Calculus II	4
Credit Hours		15
Summer		
HIST 1302 or HIST 2328	United States History II or Mexican-American History II	3
Credit Hours		3
Second Year		
Fall		
PHYS 2426	University Physics II	4
CHEM 2423	Organic Chemistry I	4
GOVT 2305	Federal Government	3
MATH 2415	Calculus III	4
Credit Hours		15
Spring		
ENGR 2301	Engineering Mechanics - Statics	3
GOVT 2306	Texas Government	3
CHEM 2425	Organic Chemistry II	4
Component Area Option - Core Curriculum ²		3
Credit Hours		13
Total Credit Hours		62

¹ Check catalog for course pre-requisites.

² See an Engineering Faculty Advisor to select a course based on transferring institutions and career interests.

Recommended After Completion of Degree to be Core Complete

Students may complete the courses from the following Core component areas to be core complete. Students should speak with a faculty advisor and check with the institution they intend to transfer in order to decide if these courses should be completed at South Texas College.

Social and Behavioral Sciences Elective

Recommended:

ECON 2301 Principles of Economics I - Macro

Language, Philosophy & Culture

Recommended:

PHIL 2306 Introduction to Ethics

Creative Arts Elective - Core Curriculum

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Recommended Course Sequence - Electrical Engineering Track

Course	Title	Credit Hours
First Year		
Fall		
ENGR 1201	Introduction to Engineering	2
ENGL 1301	Composition I	3
MATH 2413	Calculus I ¹	4
CHEM 1409	General Chemistry for Engineering Majors	4
Credit Hours		13
Spring		
ENGR 2406	Introduction to Digital Systems	4
ENGL 1302	Composition II - Rhetoric	3
PHYS 2425	University Physics I	4
MATH 2414	Calculus II	4
Credit Hours		15
Summer		
HIST 1301 or HIST 2327	United States History I or Mexican-American History I	3
Credit Hours		3
Second Year		
Fall		
COSC 1436	Programming Fundamentals I	4
PHYS 2426	University Physics II	4
GOVT 2305	Federal Government	3
MATH 2415	Calculus III	4
Credit Hours		15
Spring		
GOVT 2306	Texas Government	3
HIST 1302 or HIST 2328	United States History II or Mexican-American History II	3
MATH 2420	Differential Equations	4
ENGR 2405	Electrical Circuits I	4
Credit Hours		14
Total Credit Hours		60

¹ Check catalog for course pre-requisites.

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Social and Behavioral Sciences Elective

Recommended:

ECON 2301	Principles of Economics I - Macro
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Language, Philosophy & Culture

Recommended:

PHIL 2306	Introduction to Ethics
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Creative Arts Elective - Core Curriculum

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Recommended Course Sequence - Civil Engineering Track

Course	Title	Credit Hours
First Year		
Fall		
ENGR 1201	Introduction to Engineering	2

HIST 1301 or HIST 2327	United States History I or Mexican-American History I	3
ENGL 1301	Composition I	3
MATH 2413	Calculus I ¹	4
CHEM 1409	General Chemistry for Engineering Majors	4
Credit Hours		16
Spring		
ENGR 1304	Engineering Graphics	3
ENGL 1302	Composition II - Rhetoric	3
PHYS 2425	University Physics I	4
MATH 2414	Calculus II	4
Credit Hours		14
Summer		
HIST 1302 or HIST 2328	United States History II or Mexican-American History II	3
Credit Hours		3
Second Year		
Fall		
ENGR 2301	Engineering Mechanics - Statics	3
PHYS 2426	University Physics II	4
GOVT 2305	Federal Government	3
MATH 2415	Calculus III	4
Credit Hours		14
Spring		
ENGR 2302	Engineering Mechanics - Dynamics	3
GOVT 2306	Texas Government	3
MATH 2420	Differential Equations	4
GEOL 1403	Physical Geology	4
Credit Hours		14
Total Credit Hours		61

¹ Check catalog for course pre-requisites.

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Social and Behavioral Sciences Elective

Recommended:

ECON 2301	Principles of Economics I - Macro
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Language, Philosophy & Culture

Recommended:

PHIL 2306	Introduction to Ethics
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Creative Arts Elective - Core Curriculum