

Department of Mathematics, Physical Sciences and Engineering

Dr. Daniel Seth, department head

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Faculty: Ambrose, Carlisle, Chen, Combs, Craig, Cruz, Davis, Fisher, Gill, Hunt, Issa, Lockwood-Cooke, Mitra, Moreland, Murty, Olsen, Palamara, Ratheal, Seth, Van Doren, G. Walls, R. Walls, Woodyard.

The Department of Mathematics, Physical Sciences and Engineering combines the varied disciplines of chemistry, engineering, engineering technology, mathematics and physics. Commitment to excellence in classroom instruction designed for producing society-ready graduates in these disciplines is the primary goal of the department. The department has a broad range of talented faculty with expertise in specific areas of science and technology that demand quality graduates.

Students may pursue degree programs in the traditional scientific or technical disciplines within the department or they may pursue integrated programs in areas such as biochemistry, pre-medicine, pre-engineering or specific teaching fields. Secondary teacher certification in the areas of mathematics and physical science are a vital part of the departmental program. The department frequently integrates its programs with other programs within the University to produce a study track that will meet the individual student's desired educational goals.

Chemistry

The chemistry discipline provides excellent instruction and hands-on experience to a diverse group of majors. In addition to science and technology in the classroom, there is ample opportunity for laboratory research and special topic studies at the undergraduate level. Whether a student's final employment goal is chemistry, biochemistry, medical school, graduate school or industry, students will be well prepared with a degree in chemistry from this program. The chemistry program also offers courses to support secondary education certification in physical science.

Engineering Technology

The engineering technology curriculum combines an emphasis on understanding engineering and technical fundamentals with real-life applications in manufacturing and industry. Two options are available within the engineering technology degree program. The first option prepares students for careers in industry and manufacturing. The second option contains much of the same technical background but adds emphasis in management and marketing, thus preparing students for careers in industrial management and sales. Engineering technology majors can participate in a cooperative education program that combines classroom study with a planned program of related work experience with industry or government agencies in the Texas

Panhandle area. Students may also participate in industrial internships arranged through the engineering technology internship program.

Mathematics

Mathematics faculty are involved in both pure and applied mathematics research along with grant activities using inquiry-based mathematics instruction. Students pursuing traditional mathematics or mathematics education programs are encouraged to develop strong computer proficiencies to meet the mathematical needs of a technological society. For more information, refer to the "Division of Education" section of this catalog.

Mechanical Engineering

The mechanical engineering program prepares students for careers in industry involving design and development of mechanical systems. This curriculum provides the mathematics and physical science background required for all engineering programs, as well as specialization courses in mechanical engineering.

Pre-Engineering Program

The pre-engineering program prepares students for transfer to another four-year university to complete their degree in engineering disciplines other than mechanical engineering. Curriculum in pre-engineering emphasizes thorough grounding in mathematics, physics and chemistry, universally required by all engineering programs. Environmental science majors can structure their degree plan to include pre-engineering curriculum to pursue a degree in environmental engineering.

Physics

The physics program offers both algebra-based and calculus-based introductory physics courses that are required by several university degree programs. A full-range of upper-level physics courses taught by members of The Texas A&M University System can be taken to meet the bachelor of science degree in physics or as electives by majors in other technically demanding fields. The physics program also offers courses to support secondary education certification in physical science. For more information, refer to the "Division of Education" section of this catalog.

Faculty specializations include dielectric properties, physics education and astronomy. Physics majors may find employment, study and research opportunities at the internationally respected Alternative Energy Institute (AEI). AEI is located on the WTAMU campus and maintains a wind- and solar-energy test site north of the campus. Science education and physics majors interested in careers in teaching may gain experience both in traditional and technology-based instruction as undergraduate teaching assistants in physics laboratories.

Department of Mathematics, Physical Sciences and Engineering

Discipline	Course Prefix
Chemistry	CHEM
Engineering	ENGR
Engineering Technology	ET
Mathematics and Physical Science	MPS
Mathematics	MATH
Mechanical Engineering	MENG
Natural Sciences	NSCI
Physics	PHYS

NOTE: See the “Academic Courses and Abbreviations” and “Course Descriptions” sections of this catalog for a complete list of courses offered by the University.

Bachelor of Arts (B.A.)/ Bachelor of Science (B.S.) Degree

Requirements

May be either depending on option selected; see the “Requirement for Baccalaureate Degrees” section of this catalog.

Major in Chemistry (Major Code: 104)

A student must complete a minimum of 123 semester credit hours to include at least 36 advanced hours.

University Core Curriculum Requirements

Refer to the “University Core Curriculum” section of this catalog.

Option I—Professional Chemistry

This option follows course recommendations of the American Chemical Society and prepares students for positions in industry, government and education. It is recommended for students planning to do graduate study in chemistry or seeking employment as chemists in industry.

- CHEM 1411, 1412, 2523, 2525, 3511, 3521, 3522, 4411, 4323, 4223L, 4431, 4397.
- MATH 1316, 1348 or 2412; 2413, 2414, 3340.
- PHYS 2425, 2426 and two hours of 3095.
- Additional hours to meet the minimum University requirement for a degree.

Curriculum Guide (suggested course sequence)			
Major in Chemistry—Option I Bachelor of Arts Degree			
First Year		Second Year	
Semester 1 CHEM 14114 hrs. MATH 1316 or 24123-4 hrs. ENGL 13013 hrs. HIST 13013 hr. 13-14 hrs.	Semester 2 CHEM 14124 hrs. MATH 24134 hrs. ENGL 13023 hrs. SCOM 1315 1318 or 1321...3 hrs. Visual/Performing arts core3 hrs. PHED 11111 hr. 18 hrs.	Semester 1 CHEM 25235 hrs. MATH 24144 hrs. HIST 13023 hrs. POSC 23053 hrs. 15 hrs.	Semester 2 CHEM 25255 hrs. PHYS 24254 hrs. Humanities core3 hrs. Elective3 hrs. 15 hrs.
Third Year		Fourth Year	
Semester 1 CHEM 35215 hrs. PHYS 24264 hrs. CHEM 35115 hrs. PHYS 30952 hrs. 16 hrs.	Semester 2 CHEM 35225 hrs. MATH 33403 hrs. B.A. requirement...6-8 hrs. 14-16 hrs.	Semester 1 CHEM 43233 hrs. CHEM 44314 hrs. CHEM 4223L...2 hrs. POSC 23063 hrs. B.A. requirement...3-4 hr. 15-16 hrs.	Semester 2 CHEM 43973 hrs. CHEM 44114 hrs. Social/Behavioral core3 hrs. B.A. requirement ..3-4 hrs. Elective3 hrs. 16-17 hrs.
Elective hours to be determined based on hours remaining to complete degree.			

Curriculum Guide (suggested course sequence)			
Major in Chemistry—Option I Bachelor of Science Degree			
First Year		Second Year	
Semester 1 ENGL 13013 hrs. MATH 1316 or 24123-4 hrs. HIST 13013 hrs. CHEM 14114 hrs. 13-14 hrs.	Semester 2 ENGL 13023 hrs. MATH 24134 hrs. SCOM 1315 1318 or 1321...3 hrs. Visual/Performing arts core3 hrs. CHEM 14124 hrs. PHED 11111 hr. 18 hrs.	Semester 1 HIST 13023 hrs. POSC 23053 hrs. MATH 24144 hrs. CHEM 25235 hrs. 15 hrs.	Semester 2 CHEM 25255 hrs. PHYS 24254 hrs. Humanities core3 hrs. Elective3 hrs. 15 hrs.
Third Year		Fourth Year	
Semester 1 CHEM 35215 hrs. CHEM 35115 hrs. PHYS 24264 hrs. PHYS 30952 hrs. 16 hrs.	Semester 2 CHEM 35225 hrs. MATH 33403 hrs. Elective6 hrs. 14 hrs.	Semester 1 CHEM 43233 hrs. CHEM 44314 hrs. CHEM 4223L...2 hrs. POSC 23063 hrs. Elective4 hrs. 16 hrs.	Semester 2 CHEM 43973 hrs. CHEM 44114 hrs. Social/Behavioral core3 hrs. Elective6 hrs. 16 hrs.
Elective hours to be determined based on hours remaining to complete degree.			

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Option II—General Chemistry

This option provides a background for students whose career goals are to enter education or chemistry-related fields.

- CHEM 1411, 1412, 2523, 2525, 3511, three courses from 3521, 3522, 4411, 4323, 4223L, 4324, 4224L, 4431.
- MATH 1316, 1348 or 2412; 2413, 2414.
- PHYS 1401 or 2425, 1402 or 2426.
- Additional advanced hours to provide a minimum of 36 hours selected from chemistry, mathematics, biology, computer information systems, physics, environmental science or geology.
- Additional hours to meet the minimum University requirement for a degree.

Curriculum Guide (suggested course sequence)			
Major in Chemistry—Option II Bachelor of Arts Degree			
First Year		Second Year	
Semester 1 CHEM 14114 hrs. MATH 1316 or 24123-4 hrs. ENGL 13013 hrs. HIST 13013 hrs. PHED 1111 1 hr. 14-15 hrs.	Semester 2 CHEM 14124 hrs. MATH 24134 hrs. ENGL 13023 hrs. SCOM 1315 1318 or 1321 ...3 hrs. Visual/Performing arts core 3 hrs. 17 hrs.	Semester 1 CHEM 25235 hrs. MATH 24144 hrs. HIST 13023 hrs. POSC 23053 hrs. 15 hrs.	Semester 2 CHEM 25255 hrs. PHYS 1401 or 24254 hrs. Social/Behavioral core3 hrs. B.A. requirement ... 3-4 hrs. 15-16 hrs.
Third Year		Fourth Year	
Semester 1 CHEM 35115 hrs. PHYS 1402 or 24264 hrs. POSC 23063 hrs. Adv. elective ... 3 hrs. 15 hrs.	Semester 2 CHEM*4-5 hrs. Elective***3-6 hrs. Humanities core3 hrs. B.A. requirement ... 3-4 hrs. 13-18 hrs.	Semester 1 CHEM*4-5 hrs. Adv. elective3 hrs. Adv. elective3 hrs. Elective**3 hrs. B.A. requirement ... 3-4 hrs. 16-18 hrs.	Semester 2 CHEM*4-5 hrs. Adv. elective3 hrs. Adv. elective3 hrs. B.A. requirement ... 3-4 hrs. 13-15 hrs.

*Choose three—CHEM 3521, 3522, 4411, 4323/4323L, 4324/4324L, 4431.
 **Elective hours to be determined based on hours remaining to complete degree.
 ***May need to be advanced depending on other course selections.

Curriculum Guide (suggested course sequence)			
Major in Chemistry—Option II Bachelor of Science Degree			
First Year		Second Year	
Semester 1 ENGL 13013 hrs. MATH 1316 or 24123-4 hrs. HIST 13013 hrs. CHEM 14114 hrs. PHED 1111 1 hr. 14-15 hrs.	Semester 2 ENGL 13023 hrs. MATH 24134 hrs. SCOM 1315, 1318 or 1321 ...3 hrs. Visual/Performing arts core3 hrs. CHEM 1412 ... 4 hrs. 17 hrs.	Semester 1 HIST 13023 hrs. POSC 23053 hrs. MATH 24144 hrs. CHEM 25235 hrs. 15 hrs.	Semester 2 CHEM 25255 hrs. PHYS 1401 or 24254 hrs. Elective6 hrs. POSC 23063 hrs. 18 hrs.
Third Year		Fourth Year	
Semester 1 PHYS 1402 or 24264 hrs. Elective6 hrs. Adv. elective3 hrs. Adv. elective ... 4 hrs. 17 hrs.	Semester 2 CHEM*4-5 hrs. Humanities core3 hrs. Elective***3-6 hrs. Adv. elective3 hrs. elective 3 hrs. 13-17 hrs.	Semester 1 CHEM*4-5 hrs. Social/Behavioral core3 hrs. Adv. elective3 hrs. Adv. elective3 hrs. Elective** 2 hrs. 15-16 hrs.	Semester 2 CHEM*4-5 hrs. Elective3 hrs. Elective3 hrs. Elective** 0-4 hrs. 10-15 hrs.

*Choose three—CHEM 3521, 3522, 4411, 4323/4223L, 4324/4224L, 4431.
 **Elective hours to be determined based on hours remaining to complete degree.
 ***May need to be advanced depending on other course selections.

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Option III—Biochemistry

This option is for students planning careers using chemistry applied to medical science, including pre-medical students and other pre-professional students.

- CHEM 1411, 1412, 2523, 2525, 3511, 4323, 4223L, 4324, 4224L.
- BIOL 1406 or 1413, 1407 or 1411, 2572, 3301, 3402 and one course from 3440 or 4375.
- MATH 1316, 1348 or 2412; 2413.
- PHYS 1401 or 2425; 1402 or 2426.
- MATH 2414 is recommended.
- Additional advanced hours to provide a minimum of 36 hours selected from chemistry, mathematics, biology, computer information systems, physics, environmental science or geology.
- Additional hours to meet the minimum University requirement for a degree.

For information about the master of science (M.S.) degree in chemistry, refer to the “Graduate School” section of this catalog.

Curriculum Guide (suggested course sequence)			
Major in Chemistry—Option III, Biochemistry Bachelor of Arts Degree			
First Year		Second Year	
Semester 1 ENGL 13013 hrs. MATH 1316 or 24123-4 hrs. BIOL 1406 or 14134 hrs. CHEM 14114 hrs. 14-15 hrs.	Semester 2 ENGL 13023 hrs. MATH 24134 hrs. BIOL 1407 or 14114 hrs. CHEM 14124 hrs. PHED 1111 ...1 hr. 16 hrs.	Semester 1 BIOL 25725 hrs. Social/Behavioral core3 hrs. CHEM 25235 hrs. Elective3 hrs. 16 hrs.	Semester 2 Humanities core3 hrs. BIOL 33013 hrs. CHEM 25255 hrs. PHYS 1401 or 24254 hrs. 15 hrs.
Third Year		Fourth Year	
Semester 1 BIOL 34024 hrs. PHYS 1402 or 24264 hrs. CHEM 35115 hrs. Adv. elective3-4 hrs. 16-17 hrs.	Semester 2 BIOL 3440 or 43753-4 hrs. Social/Behavioral core3 hrs. Visual/Performing arts core3 hrs. Adv. elective3 hrs. SCOM 1315, 1318 or 13213 hrs. 15-16 hrs.	Semester 1 CHEM 43233 hrs. CHEM 4223L2 hrs. Social/Behavioral core3 hrs. Social/Behavioral core3 hrs. B.A. requirement3-4 hrs. 14-15 hrs.	Semester 2 CHEM 43243 hrs. CHEM 4224L2 hrs. B.A. requirement3-4 hrs. Social/Behavioral core3 hrs. Adv. elective*1-2 hrs. B.A. requirement3-4 hrs. 15-18 hrs.

*Elective hours to be determined based on hours remaining to complete degree.

Curriculum Guide (suggested course sequence)			
Major in Chemistry—Option III, Biochemistry Bachelor of Science Degree			
First Year		Second Year	
Semester 1 CHEM 14114 hrs. MATH 1316 or 24123-4 hrs. BIOL 1406 or 14134 hrs. ENGL 13013 hrs. 14-15 hrs.	Semester 2 CHEM 14124 hrs. MATH 2413 ...4s hrs. BIOL 1407 or 14114 hrs. ENGL 13023 hrs. PHED 1111 ...1 hr. 16 hrs.	Semester 1 CHEM 25235 hrs. BIOL 25725 hrs. Elective3 hrs. Humanities core3 hrs. 16 hrs.	Semester 2 CHEM 25255 hrs. BIOL 33013 hrs. PHYS 1401 or 24254 hrs. Elective3 hrs. 15 hrs.
Third Year		Fourth Year	
Semester 1 BIOL 34024 hrs. PHYS 1402 or 24264 hrs. CHEM 35115 hrs. Adv. elective3 hrs. 16 hrs.	Semester 2 BIOL 3440 or 43753-4 hrs. Social/Behavioral core3 hrs. Visual/Performing arts core3 hrs. Adv. elective3 hrs. SCOM 1315, 1318 or 23213 hrs. 15-16 hrs.	Semester 1 CHEM 43233 hrs. CHEM 4223L2 hrs. Social/Behavioral core3 hrs. Social/Behavioral core3 hrs. Elective**3 hrs. Adv. elective3 hrs. 17 hrs.	Semester 2 CHEM 43243 hrs. CHEM 4224L2 hrs. Social/Behavioral core3 hrs. Social/Behavioral core3 hrs. Elective4 hrs. Adv. elective*1-2 hrs. 16-17 hrs.

*Elective hours to be determined based on hours remaining to complete degree.
***May need to be advanced depending on other course selections.

Department of Mathematics, Physical Sciences and Engineering

Major in Mathematics (Major Code: 115)

University Core Curriculum Requirements

Refer to the “University Core Curriculum” section of this catalog. A student must complete a minimum of 123 semester credit hours to include at least 36 advanced hours.

NOTE: MPS 4097 and 4398 may be applied to the major in physics. MPS 4393 is the honors course for the department.

- MATH 1316, 1348 or 2412; 2413, 2414 and 3306 or 3316.
- Mathematics majors seeking teacher certification must take MATH 3306, and those not seeking teacher certification must take MATH 3316.
- MATH—38 semester hours, including core courses listed above, 3311, 4341 and 18 semester hours from 3321, 3340, 3342, 3343, 4310, 4340, 4361, 4362.
- PHYS 1401 or 2425; 1402 or 2426.

Curriculum Guide (suggested course sequence)			
Major in Mathematics Bachelor of Arts Degree			
First Year		Second Year	
Semester 1 ENGL 13013 hrs. MATH 13143 hrs. Social/Behavioral core3 hrs. Visual/Performing arts core3 hrs. SCOM 1315, 1318 or 1321 <u>3 hrs.</u> 15 hrs.	Semester 2 ENGL 13023 hrs. MATH 1316 or 24123-4 hrs. Social/Behavioral core3 hrs. Elective3 hrs. PHED 1111 <u>1 hr.</u> 13-14 hrs.	Semester 1 Humanities core3 hrs. Social/Behavioral core3 hrs. B.A. requirement ..3-4 hrs. MATH 24134 hrs. PHYS 1401 or 2425 <u>4 hrs.</u> 17-18 hrs.	Semester 2 Social/Behavioral core 3 hrs. B.A. requirement ..3-4 hrs. MATH 24144 hrs. PHYS 1402 or 2426 <u>4 hrs.</u> 14-15 hrs.
Third Year		Fourth Year	
Semester 1 MATH 3306 or 33163 hrs. MATH 33113 hrs. B.A. requirement ..3-4 hrs. Adv. elective3 hrs. MATH*3 hrs. Social/Behavioral core <u>3 hrs.</u> 18-19 hrs.	Semester 2 MATH*3 hrs. MATH*3 hrs. B.A. requirement ..3-4 hrs. Adv. elective3 hrs. Elective <u>3 hrs.</u> 15-16 hrs.	Semester 1 MATH*3 hrs. MATH*3 hrs. Adv. elective3 hrs. Elective <u>6 hrs.</u> 15 hrs.	Semester 2 MATH 43413 hrs. MATH*3 hrs. Elective3 hrs. Elective** <u>3-7 hrs.</u> 12-16 hrs.
*Choose six courses—MATH 3321, 3340, 3342, 3343, 4310, 4340, 4361, 4362. **Elective hours to be determined based on hours remaining to complete degree.			

Curriculum Guide (suggested course sequence)			
Major in Mathematics Bachelor of Science Degree			
First Year		Second Year	
Semester 1 ENGL 13013 hrs. MATH 13143 hrs. Social/Behavioral core6 hrs. Visual/Performing arts core <u>3 hrs.</u> 15 hrs.	Semester 2 ENGL 13023 hrs. MATH 1316 or 24123-4 hrs. SCOM 1315, 1318 or 1321 ...3 hrs. Social/Behavioral core3 hrs. PHED 1111 <u>1 hr.</u> 13-14 hrs.	Semester 1 Humanities core3 hrs. Elective3 hrs. Elective3 hrs. MATH 24134 hrs. PHYS 1401 or 2425 <u>4 hrs.</u> 17 hrs.	Semester 2 Elective3 hrs. Social/Behavioral core 3 hrs. MATH 24144 hrs. PHYS 1402 or 2426 <u>4 hrs.</u> 14 hrs.
Third Year		Fourth Year	
Semester 1 MATH 3306 or 33163 hrs. MATH 33113 hrs. MATH*3 hrs. Elective3 hrs. Elective3 hrs. Social/Behavioral core <u>3 hrs.</u> 18 hrs.	Semester 2 MATH*3 hrs. MATH*3 hrs. Elective3 hrs. Elective <u>3 hrs.</u> 15 hrs.	Semester 1 MATH*3 hrs. MATH*3 hrs. Adv. elective3 hrs. Elective <u>4 hrs.</u> 16 hrs.	Semester 2 MATH 43413 hrs. MATH*3 hrs. Adv. elective3 hrs. Elective3 hrs. Elective <u>3 hrs.</u> 15 hrs.
*Choose six courses—MATH 3321, 3340, 3342, 3343, 4310, 4340, 4361, 4362. **Elective hours to be determined based on hours remaining to complete degree.			

Department of Mathematics, Physical Sciences and Engineering

Engineering Mathematics Option

- MATH 1316, 1348 or 2412; 2413, 2414, 3311, 3316, 3321, 3340, 3342, 4340, 4341, 4361, 4362.
- CHEM 1411, 1412.
- Two advanced CIS courses.
- ENGR 1304.
- PHYS 1401 or 2425; 1402 or 2426 and six hours from advanced physics.

For more information about the master of science (M.S.) degree in mathematics, refer to the “Graduate School” section of this catalog.

Curriculum Guide (suggested course sequence)			
Major in Mathematics—Engineering Mathematics Option			
Bachelor of Arts Degree			
First Year		Second Year	
Semester 1 ENGL 13013 hrs. MATH 13143 hrs. ENGR 13043 hrs. Social/Behavioral core6 hrs. 15 hrs.	Semester 2 ENGL 13023 hrs. MATH 1316 or 24123-4 hrs. SCOM 1315, 1318 or 13213 hrs. Social/Behavioral core3 hrs. CHEM 14114 hrs. PHED 11111 hr. 17-18 hrs.	Semester 1 Humanities core3 hrs. CHEM 14124 hrs. CIS 13153 hrs. MATH 24134 hrs. PHYS 1401 or 24254 hrs. 18 hrs.	Semester 2 Social/Behavioral core3 hrs. MATH 24144 hrs. B.A. requirement ...3-4 hrs. PHYS 1402 or 24264 hrs. 14-15 hrs.
Third Year		Fourth Year	
Semester 1 MATH 33163 hrs. MATH 33423 hrs. Adv. CIS3 hrs. Adv. PHYS3 hrs. MATH 4340 or 43623 hrs. 15 hrs.	Semester 2 MATH 33403 hrs. Adv. CIS3 hrs. Adv. PHYS3 hrs. MATH 3321 or 43613 hrs. Visual/Performing arts core3 hrs. 15 hrs.	Semester 1 MATH 33113 hrs. MATH 4340 or 43623 hrs. B.A. requirement ...3-4 hrs. Social/Behavioral core3 hrs. 12-13 hrs.	Semester 2 MATH 3321 or 43613 hrs. MATH 43413 hrs. Elective3 hrs. B.A. requirement ...6-8 hrs. 15-17 hrs.
Elective hours to be determined based on hours remaining to complete degree.			

Curriculum Guide (suggested course sequence)			
Major in Mathematics—Engineering Mathematics Option			
Bachelor of Science Degree			
First Year		Second Year	
Semester 1 ENGL 13013 hrs. MATH 13143 hrs. ENGR 13043 hrs. Social/Behavioral core6 hrs. 15 hrs.	Semester 2 CHEM 14114 hrs. ENGL 13023 hrs. MATH 1316 or 24123-4 hrs. SCOM 1315, 1318 or 13213 hrs. Social/Behavioral core3 hrs. PHED 11111 hr. 17-18 hrs.	Semester 1 CIS 13153 hrs. MATH 24134 hrs. CHEM 14124 hrs. PHYS 1401 or 24254 hrs. 15 hrs.	Semester 2 Humanities core3 hrs. Visual/Performing arts core3 hrs. MATH 24144 hrs. PHYS 1402 or 24264 hrs. 14 hrs.
Third Year		Fourth Year	
Semester 1 MATH 33163 hrs. MATH 33423 hrs. Adv. CIS3 hrs. Adv. PHYS3 hrs. MATH 4340 or 43623 hrs. 15 hrs.	Semester 2 MATH 33403 hrs. Adv. CIS3 hrs. Adv. PHYS3 hrs. MATH 3321 or 43613 hrs. Elective3 hrs. 15 hrs.	Semester 1 MATH 33113 hrs. MATH 4340 or 43623 hrs. Social/Behavioral core3 hrs. Elective6 hrs. 15 hrs.	Semester 2 MATH 3321 or 43613 hrs. MATH 43413 hrs. Social/Behavioral core3 hrs. Elective6 hrs. Elective2 hrs. 17 hrs.
Elective hours to be determined based on hours remaining to complete degree.			

Department of Mathematics, Physical Sciences and Engineering

Major in Physics (Major Code: 118)

A student must complete a minimum of 123 semester credit hours to include at least 36 advanced hours.

University Core Curriculum Requirements

Refer to the "University Core Curriculum" section of this catalog.

Physics Requirements

- PHYS 2425, 2426, 2427, 3310, 3320, 3330, 3340, 4320, 4330, 4340.
- Nine hours from PHYS 3342, 3450, 4310, 4350, 4360, 4370 and 4380.
- MATH 2413, 2414, 3340, 3342.
- CIS 1315.

Recommended Courses

- MATH 3311, 4310.

Curriculum Guide (suggested course sequence)			
Major in Physics Bachelor of Arts Degree			
First Year		Second Year	
Semester 1 ENGL 13013 hrs. MATH 24134 hrs. CHEM 14114 hrs. Social/Behavioral core3 hrs. Visual/Performing arts core3 hrs. PHED 11111 hr. 18 hrs.	Semester 2 ENGL 13023 hrs. MATH 24144 hrs. CHEM 14124 hrs. PHYS 24254 hrs. 15 hrs.	Semester 1 CIS 13153 hrs. SCOM 1315, 1318 or 1321 ...3 hrs. PHYS 24264 hrs. MATH 33423 hrs. 13 hrs.	Semester 2 Humanities core3 hrs. MATH 33403 hrs. PHYS 24274 hrs. PHYS 3320*** ...3 hrs. Social/Behavioral core3 hrs. 16 hrs.
Third Year		Fourth Year	
Semester 1 B.A. requirement ..3-4 hrs. PHYS 3330*** ..3 hrs. PHYS 3340*** ..3 hrs. MATH 3311*3 hrs. Social/Behavioral core3 hrs. 15-16 hrs.	Semester 2 PHYS 4330***3 hrs. PHYS 4340***3 hrs. B.A. requirement ..3-4 hrs. MATH 4310*3 hrs. Social/Behavioral core3 hrs. 15-16 hrs.	Semester 1 PHYS 3310***3 hrs. PHYS**6 hrs. Elective3 hrs. Social/Behavioral core3 hrs. 15 hrs.	Semester 2 PHYS 4320***3 hrs. PHYS**3 hrs. B.A. requirement ..6-8 hrs. Elective2 hrs. 14-16 hrs.

*Recommended.
 **Choose three courses from PHYS 3342, 3450, 4310, 4350, 4360, 4370 and 4380.
 ***These courses are offered on a two-year rotation by TTVN. Check rotation schedule for courses to be offered during given semester.

Curriculum Guide (suggested course sequence)			
Major in Physics Bachelor of Science Degree			
First Year		Second Year	
Semester 1 ENGL 13013 hrs. MATH 24134 hrs. CHEM 14114 hrs. Social/Behavioral core3 hrs. Visual/Performing arts core3 hrs. PHED 11111 hr. 18 hrs.	Semester 2 ENGL 13023 hrs. MATH 24144 hrs. CHEM 14124 hrs. PHYS 24254 hrs. 15 hrs.	Semester 1 CIS 13153 hrs. SCOM 1315, 1318 or 1321 ...3 hrs. PHYS 24264 hrs. MATH 33423 hrs. 13 hrs.	Semester 2 Humanities core3 hrs. MATH 33403 hrs. PHYS 24274 hrs. PHYS 3320***3 hrs. Social/Behavioral core3 hrs. 16 hrs.
Third Year		Fourth Year	
Semester 1 PHYS 3330*** ..3 hrs. PHYS 3340*** ..3 hrs. MATH 3311*3 hrs. Elective3 hrs. Social/Behavioral core3 hrs. 15 hrs.	Semester 2 PHYS 4330***3 hrs. PHYS 4340***3 hrs. Elective3 hrs. MATH 4310*3 hrs. Social/Behavioral core3 hrs. 15 hrs.	Semester 1 PHYS 3310***3 hrs. PHYS**3 hrs. Elective6 hrs. Social/Behavioral core3 hrs. 15 hrs.	Semester 2 PHYS 4320***3 hrs. PHYS**3 hrs. PHYS**3 hrs. Elective4 hr. 16 hrs.

*Recommended.
 **Choose three courses from PHYS 3342, 3450, 4310, 4350, 4360, 4370 and 4380. These courses are offered on a two-year rotation by TTVN. Check rotation schedule for courses to be offered during a given semester.

Department of Mathematics, Physical Sciences and Engineering

Bachelor of Science (B.S.) Degree

Major in Engineering Technology (Major Code: 112)

A student must complete a minimum of 123 semester credit hours to include at least 36 advanced hours.

University Core Curriculum Requirements

Refer to the “University Core Curriculum” section of this catalog. Students must take PHYS 1401 and 1402, and MATH 1314 (Option I) or 1324 (Option II).

Option I—Industrial/Manufacturing

- ENGR 1301, 1304, 1375, 2301, 2302.
- ET 2371, 2372, 2375, 3301, 3360, 4314, 4370, 4380 and four courses from 3315, 3330, 4301, 4311, 4325, 4330.
- CHEM 1411, 1412; ENGL 2311; MATH 1316, 1348 or 2412; MATH 2413.
- Select four courses from upper-level ET electives (or math, CIS, management, ENGR or other courses after consulting with an adviser).
- Additional hours to meet the minimum University requirement for a degree.

Option II—Distribution

- ENGR 1301, 1304, 1375, ET 2371, 2372, 4380.
- ET 3301, 3360, 4311, 4314, 4340, 4370 and four courses from 3315, 3330, 4301, 4325, 4330.
- CHEM 1411, 1412; ENGL 2311; MATH 1325.
- Select four courses from MGT 3330, 3332, 3335, 4311, 4330, MKT 3340, 3342, 3350, 4340, 4346.
- Additional hours to meet the minimum University requirement for a degree.

Teacher Certification

Consult the “Division of Education” section of this catalog for general education and certification major requirements related to programs offered by this department.

For information about the master of science (M.S.) degree in engineering technology, refer to the “Graduate School” section of this catalog.

Curriculum Guide (suggested course sequence)			
Major in Engineering Technology—Option I			
First Year		Second Year	
Semester 1	Semester 2	Semester 1	Semester 2
ENGL 13013 hrs. MATH 13143 hrs. or 13243 hrs. ENGR 13753 hrs. ENGR 13043 hrs. Social/Behavioral core3 hrs. 15 hrs.	ENGL 13023 hrs. MATH 13163-4 hrs. or 24123-4 hrs. ENGR 13013 hrs. CHEM 14114 hrs. Visual/Performing arts3 hrs. 16-17 hrs.	MATH 24134 hrs. SCOM 1315, 1318 or 1321 ...3 hrs. ET 23713 hrs. Social/Behavioral core3 hrs. CHEM 14124 hrs. 17 hrs.	ET 23753 hrs. ENGL 23113 hrs. ET 23723 hrs. PHYS 14014 hrs. PHED 11111 hr. 14 hrs.
Third Year		Fourth Year	
Semester 1	Semester 2	Semester 1	Semester 2
ET 33603 hrs. PHYS 14024 hrs. Specialization**3 hrs. ENGR 23013 hrs. Social/Behavioral core3 hrs. 16 hrs.	ET 33013 hrs. ET*3 hrs. Specialization**3 hrs. ENGR 23023 hrs. Humanities core3 hrs. 15 hrs.	ET 43143 hrs. ET*3 hrs. ET*3 hrs. Specialization**3 hrs. Social/Behavioral core3 hrs. 15 hrs.	ET 43703 hrs. ET 43803 hrs. ET*3 hrs. Specialization**3 hrs. Social/Behavioral core3 hrs. 15 hrs.
*Choose four courses: ET 3315, 3330, 4301, 4311, 4325, 4330.			
**Choose four courses: ET, MATH, CIS, MGT advanced elective by advisement.			

Curriculum Guide (suggested course sequence)			
Major in Engineering Technology—Option II			
First Year		Second Year	
Semester 1	Semester 2	Semester 1	Semester 2
ENGL 13013 hrs. MATH 13243 hrs. ENGR 13753 hrs. Social/Behavioral core6 hrs. 15 hrs.	ENGL 13023 hrs. MATH 13253 hrs. ENGR 13013 hrs. ENGR 13043 hrs. CHEM 14114 hrs. 16 hrs.	Social/Behavioral core3 hrs. SCOM 1315, 1318 or 1321 ...3 hrs. ENGL 23113 hrs. ET 23713 hrs. CHEM 14124 hrs. 16 hrs.	Social/Behavioral core3 hrs. Visual/Performing arts core3 hrs. ET 23723 hrs. ET 33013 hrs. PHYS 14014 hrs. PHED 11111 hr. 17 hrs.
Third Year		Fourth Year	
Semester 1	Semester 2	Semester 1	Semester 2
ET 33603 hrs. ET*3 hrs. MGT/MKT**3 hrs. PHYS 14024 hrs. 13 hrs.	ET 43113 hrs. ET*3 hrs. MGT/MKT**3 hrs. Humanities core3 hrs. Elective3 hrs. 15 hrs.	ET 43143 hrs. ET 43403 hrs. ET*3 hrs. MGT/MKT**3 hrs. Elective4 hrs. 16 hrs.	ET 43703 hrs. ET 43803 hrs. ET*3 hrs. MGT/MKT**3 hrs. Social/Behavioral core3 hrs. 15 hrs.
*Choose four courses—ET 3315, 3330, 4301, 4325, 4330.			
**Choose four courses—MGT 3330, 3332, 3335, 4311, 4330, MKT 3340, 3342, 3350, 4340, 4346.			

Department of Mathematics, Physical Sciences and Engineering

Major in Mechanical Engineering (Major Code: 129)

Mechanical Engineering Requirements

- ENGR 1301, 1302, 1304, 1375, 2301, 2302, 3302; MENG 3320, 3340, 3350, 3360, 4304, 4350, 4350, 4352, 4360, 4362, 4380.
- CHEM 1411, ET 2371 or 2372, MATH 2414, 3340, 3342, 4361.
- Two MENG electives (6 SCH). One upper-level MATH/PHYS elective (3 SCH). One elective in ENGR, ET or MENG (3 SCH). Required University Core Curriculum selections for mechanical engineering majors: Refer to the "University Core Curriculum" section of this catalog.
 - PHYS 2425, 2426 (Engineering Physics I and II) from natural sciences.
 - MATH 2413 (Calculus I) from mathematics.

Program Outcomes

Faculty uses the program educational outcomes to develop the topics covered and assignments in each course. By the time of graduation, mechanical engineering students will be able to:

- Apply science, mathematics, and modern engineering tools and techniques to identify, formulate and solve engineering problems.
- Design thermal/fluid, mechanical, and electro-mechanical components or systems, individually or on interdisciplinary teams, and effectively communicate those designs in both technical and non-technical forums.
- Collect, analyze and interpret data from prescribed and self-designed experimental procedures and formally communicate the results.
- Apply a broad-based educational experience to understand the interaction of engineering solutions with contemporary business, economic and social issues.
- Recognize that ethical behavior and continuous acquisition of knowledge are fundamental attributes of successful mechanical engineering professionals.
- Pass the Fundamentals of Engineering examination.

Admission Requirements for Pre-Engineering and Mechanical Engineering

All mechanical engineering students must meet West Texas A&M University's admission standards as outline in this catalog. Upon admission to the University, all WTAMU students would be eligible to engage in and complete the first two years of the Engineering Program. In the semester during which the student would complete the pre-engineering sequence (cited below), the student may petition for admittance into the Mechanical Engineering Program. Every student enrolled in upper-level

mechanical engineering courses must first be admitted into the Mechanical Engineering Program or receive special permission from the Engineering Program coordinator.

Criteria for admission into the Mechanical Engineering Program:

- Overall GPA of at least 2.25.
- GPA in mathematics/physics/engineering courses of at least 2.75.
- Completion of the pre-engineering sequence—MATH 2413, 2414, PHYS 2425, 2426, ENGR 1301, 2301, 2302.
- Successfully complete the entrance interview.

Students pursuing a mechanical engineering degree who do not meet the aforementioned criteria are to be listed as pre-engineering (Major Code 128) students.

Students may appeal Admissions Committee decisions, first to the committee and then to the Engineering Program coordinator. Exceptions, resulting in conditional admission, will be considered on an individual basis by the Engineering Program coordinator.

Curriculum Guide (suggested course sequence)			
Major in Mechanical Engineering Bachelor of Science Degree			
First Year		Second Year	
Semester 1	Semester 2	Semester 1	Semester 2
ENGR 13013 hrs. ENGR 13043 hrs. CHEM 14114 hrs. MATH 24134 hrs. ENGL 13013 hrs. 17 hrs.	ENGR 13023 hrs. ENGR 13753 hrs. MATH 24144 hrs. PHYS 24254 hrs. ENGL 13023 hrs. 17 hrs.	ENGR 23013 hrs. MATH 33423 hrs. PHYS 24264 hrs. ET 23713 hrs. SCOM 13153 hrs. 16 hrs.	ENGR 23023 hrs. MATH 33403 hrs. MENG 33403 hrs. Humanities core3 hrs. Visual/Performing arts core3 hrs. PHED 11111 hr. 16 hrs.
Third Year		Fourth Year	
Semester 1	Semester 2	Semester 1	Semester 2
MENG 43043 hrs. MENG 33203 hrs. ENGR 33023 hrs. MENG 33503 hrs. HIST 13013 hrs. 15 hrs.	MENG 33603 hrs. MENG 43603 hrs. MENG 43503 hrs. MATH 43613 hrs. HIST 13023 hrs. 15 hrs.	MENG 43523 hrs. MENG 43623 hrs. Math/physical science elective*3 hrs. POSC 23053 hrs. Elective**3 hrs. 15 hrs.	MENG 43803 hrs. MENG elective3 hrs. MENG elective3 hrs. POSC 23063 hrs. Social/Behavioral core3 hrs. 15 hrs.
*Must be upper-level. **Choose from ENGR, ET or MENG.			