

Department of Mathematics, Chemistry and Physics

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Faculty: Ambrose, Carlisle, Combs, Craig, Cruz, Fisher, Gill, Lawler, Lockwood-Cooke, Olsen, Seth, Tao, Woodyard.

The Department of Mathematics, Chemistry and Physics combines the varied disciplines of chemistry, 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 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.

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 "Department of Education" section of this catalog.

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 "Department 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.

Discipline	Course Prefix
Chemistry	CHEM
Mathematics and Physical Science	MPS
Mathematics	MATH
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.

Department of Mathematics, Chemistry and Physics

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 120 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 or 2412; 2413, 2414, 3340.
- PHYS 2425, 2426 and two hours of 3095.
- MPS 4370.
- Additional advanced hours to provide a minimum of 36 hours selected from chemistry, physics or mathematics.
- 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. Core code 60..... 3 hrs. 13-14 hrs.	Semester 2 CHEM 14124 hrs. MATH 24134 hrs. Core code 10...3 hrs. SCOM 1315 1318 or 1321 ...3 hrs. Core code 90..... 1-3 hrs. 15-17 hrs.	Semester 1 CHEM 25235 hrs. MATH 24144 hrs. Core code 60...3 hrs. Core code 70...3 hrs. 15 hrs.	Semester 2 CHEM 25255 hrs. PHYS 24254 hrs. Visual/Performing arts core3 hrs. Humanities core 3 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. MPS 4370 ... 3 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. Core code 60...3 hrs. CHEM 1411 4 hrs. 13-14 hrs.	Semester 2 Core code 10...3 hrs. MATH 24134 hrs. SCOM 1315 1318 or 1321 ...3 hrs. Visual/Performing arts core3 hrs. CHEM 14124 hrs. Core code 90..... 1-3 hrs. 18-21 hrs.	Semester 1 Core code 60...3 hrs. Core code 70...3 hrs. MATH 2414.....4 hrs. CHEM 2523 5 hrs. 15 hrs.	Semester 2 CHEM 25255 hrs. PHYS 24254 hrs. Humanities core3 hrs. Elective 3 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. Elective 6 hrs. 14 hrs.	Semester 1 CHEM 43233 hrs. CHEM 44314 hrs. CHEM 4223L ...2 hrs. POSC 23063 hrs. Elective 4 hrs. 16 hrs.	Semester 2 CHEM 43973 hrs. CHEM 44114 hrs. Social/Behavioral core3 hrs. MPS 43703 hrs. Elective 3 hrs. 13 hrs.
Elective hours to be determined based on hours remaining to complete degree.			

Department of Mathematics, Chemistry and Physics

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 and 4222L; 4324 and 4224L; 4431.
- MATH 1316 or 2412; 2413, 2414.
- PHYS 1401 or 2425, 1402 or 2426.
- MPS 4370.
- Additional advanced hours to provide a minimum of 36 hours selected from chemistry, mathematics, biology, computer science, 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. Core code 60.....3 hrs. Core code 90..... <u>1-3 hrs.</u> 14-17 hrs.	Semester 2 CHEM 14124 hrs. MATH 24134 hrs. Core code 10...3 hrs. SCOM 1315 1318 or 1321 ...3 hrs. Visual/Performing arts core <u>3 hrs.</u> 17 hrs.	Semester 1 CHEM 25235 hrs. MATH 24144 hrs. Core code 60...3 hrs. Core code 70... <u>3 hrs.</u> 15 hrs.	Semester 2 CHEM 25255 hrs. PHYS 1401 or 24254 hrs. Social/Behavioral core3 hrs. B.A. requirement ... <u>3-4 hrs.</u> 15-16 hrs.
Third Year		Fourth Year	
Semester 1 CHEM 35115 hrs. PHYS 1402 or 24264 hrs. POSC 23063 hrs. Adv. elective ... <u>3 hrs.</u> 15 hrs.	Semester 2 CHEM*4-5 hrs. Elective**3-6 hrs. Humanities core3 hrs. B.A. requirement .. <u>3-4 hrs.</u> 13-18 hrs.	Semester 1 CHEM*4-5 hrs. Adv. elective3 hrs. Adv. elective3 hrs. B.A. requirement ... <u>3-4 hrs.</u> 13-15 hrs.	Semester 2 CHEM*4-5 hrs. Adv. elective3 hrs. MPS 43703 hrs. B.A. requirement ... <u>3-4 hrs.</u> 13-15 hrs.
*Choose three—CHEM 3521, 3522, 4411, 4323/4223L, 4324/4224L, 4431. **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. Core code 90..... <u>1-3 hrs.</u> 14-17 hrs.	Semester 2 Core code 10...3 hrs. MATH 24134 hrs. SCOM 1315, 1318 or 1321 ...3 hrs. Visual/Performing arts core3 hrs. CHEM 1412 .. <u>4 hrs.</u> 17 hrs.	Semester 1 HIST 13023 hrs. Core code 70...3 hrs. MATH 24144 hrs. CHEM 2523 ... <u>5 hrs.</u> 15 hrs.	Semester 2 CHEM 25255 hrs. PHYS 1401 or 24254 hrs. Elective3 hrs. POSC 2306..... <u>3 hrs.</u> 15 hrs.
Third Year		Fourth Year	
Semester 1 PHYS 1402 or 24264 hrs. Elective1 hr. CHEM 35115 hrs. Adv. elective3 hrs. Adv. elective ... <u>4 hrs.</u> 17 hrs.	Semester 2 CHEM*4-5 hrs. Humanities core3 hrs. Elective***3-4 hrs. Adv. elective <u>3 hrs.</u> 13-15 hrs.	Semester 1 CHEM*4-5 hrs. Social/Behavioral core3 hrs. Adv. elective3 hrs. Adv. elective <u>3 hrs.</u> 13-14 hrs.	Semester 2 CHEM*4-5 hrs. MPS 43703 hrs. Elective** ... <u>0-4 hrs.</u> 7-12 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.			

Department of Mathematics, Chemistry and Physics

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 or 2412; 2413.
- PHYS 1401 or 2425; 1402 or 2426.
- MPS 4370.
- MATH 2414 is recommended.
- Additional advanced hours to provide a minimum of 36 hours selected from chemistry, mathematics, biology, computer science, 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 Core code 10...3 hrs. MATH 24134 hrs. BIOL 1407 or 14114 hrs. CHEM 14124 hrs. Core code 90..... 1-3 hrs. 16-18 hrs.	Semester 1 BIOL 25725 hrs. Social/Behavioral core3 hrs. CHEM 25233 hrs. 13 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. SCOM 1315, 1318 or 13213 hrs. 12-13 hrs.	Semester 1 CHEM 43233 hrs. CHEM 4223L2 hrs. Social/Behavioral core3 hrs. Social/Behavioral core3 hrs. B.A. requirement ... 3-4 hrs. 14-15 hrs.	Semester 2 CHEM 43243 hrs. CHEM 4224L2 hrs. B.A. requirement ...3-4 hrs. Social/Behavioral core3 hrs. MPS 43703 hrs. B.A. requirement ... 3-4 hrs. 18-19 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 24134 hrs. BIOL 1407 or 14114 hrs. Core code 10...3 hrs. Core code 90..... 1-3 hrs. 16-18 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. Elective2 hrs. 14 hrs.
Third Year		Fourth Year	
Semester 1 BIOL 34024 hrs. PHYS 1402 or 24264 hrs. CHEM 3511 ... 3 hrs. 13 hrs.	Semester 2 BIOL 3440 or 43753-4 hrs. Social/Behavioral core3 hrs. Visual/Performing arts core3 hrs. Adv. elective ...3 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. Adv. elective3 hrs. 14 hrs.	Semester 2 CHEM 43243 hrs. CHEM 4224L2 hrs. Social/Behavioral core3 hrs. Social/Behavioral core3 hrs. MPS 43703 hrs. Adv. elective* 1-2 hrs. 15-16 hrs.
*Elective hours to be determined based on hours remaining to complete degree.			

Department of Mathematics, Chemistry and Physics

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 120 semester credit hours to include at least 36 advanced hours.

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

- MATH 1316 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.)
- 41–42 semester hours, including core courses listed above, MATH 3311, 4341 and 18 semester hours from 3321, 3340, 3342, 3343, 4310, 4340, 4361, 4362.
- MPS 4370.
- PHYS 1401 or 2425; 1402 or 2426 (select for University Core Curriculum requirements).
- Additional advanced hours to meet the minimum University requirements for a degree.

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 13213 hrs. 15 hrs.	Semester 2 Core code 10...3 hrs. MATH 1316 or 24123-4 hrs. Social/Behavioral core3 hrs. Elective3 hrs. Core code 90.....1-3 hrs. 13-16 hrs.	Semester 1 Humanities core3 hrs. Social/Behavioral core3 hrs. B.A. requirement ..3-4 hrs. MATH 24134 hrs. PHYS 1401 or 24254 hrs. 17-18 hrs.	Semester 2 Social/Behavioral core 3 hrs. B.A. requirement ..3-4 hrs. MATH 24144 hrs. PHYS 1402 or 24264 hrs. 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 core3 hrs. 18-19 hrs.	Semester 2 MATH*3 hrs. MATH*3 hrs. B.A. requirement ..3-4 hrs. Adv. elective3 hrs. Elective3 hrs. 15-16 hrs.	Semester 1 MATH*3 hrs. MATH*3 hrs. Adv. elective ...3 hrs. 9 hrs.	Semester 2 MATH 43413 hrs. MATH*3 hrs. Elective4 hrs. MPS 43703 hrs. 13 hrs.
Elective hours to be determined based on hours remaining to complete degree. *Choose six courses—MATH 3321, 3340, 3342, 3343, 4310, 4340, 4361, 4362.			

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 core3 hrs. 15 hrs.	Semester 2 Core code 10...3 hrs. MATH 1316 or 24123-4 hrs. SCOM 1315, 1318 or 1321...3 hrs. Social/Behavioral core3 hrs. Core code 90.....1-3 hrs. 13-16 hrs.	Semester 1 Humanities core3 hrs. Elective3 hrs. MATH 24134 hrs. PHYS 1401 or 24254 hrs. 17 hrs.	Semester 2 Elective3 hrs. Social/Behavioral core 3 hrs. MATH 24144 hrs. PHYS 1402 or 24264 hrs. 14 hrs.
Third Year		Fourth Year	
Semester 1 MATH 3306 or 33163 hrs. MATH 33113 hrs. MATH*3 hrs. Elective3 hrs. Social/Behavioral core3 hrs. 15 hrs.	Semester 2 MATH*3 hrs. MATH*3 hrs. Elective3 hrs. Elective3 hrs. 12 hrs.	Semester 1 MATH*3 hrs. MATH*3 hrs. Adv. elective3 hrs. Adv. elective3 hrs. Elective4 hrs. 16 hrs.	Semester 2 MATH 43413 hrs. MATH*3 hrs. Adv. elective3 hrs. MPS 43703 hrs. Elective3 hrs. 15 hrs.
Elective hours to be determined based on hours remaining to complete degree. *Choose six courses—MATH 3321, 3340, 3342, 3343, 4310, 4340, 4361, 4362.			

Department of Mathematics, Chemistry and Physics

Major in Physics (Major Code: 118)

A student must complete a minimum of 120 semester credit hours to include at least 36 advanced hours.

University Core Curriculum Requirements

Refer to the "University Core Curriculum" section of this catalog. Select CHEM 1411 and 1412 to satisfy core curriculum requirements.

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.
- IDM 1315.
- MPS 4370.
- Additional hours to meet the minimum University requirements for a degree.

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 core.....3 hrs. Visual/Performing arts core.....3 hrs. Core code 90..... <u>1-3 hrs.</u> 18-20 hrs.	Semester 2 Core code 10...3 hrs. MATH 24144 hrs. CHEM 14124 hrs. PHYS 2425 ... <u>4 hrs.</u> 15 hrs.	Semester 1 IDM 13153 hrs. SCOM 1315, 1318 or 1321 ...3 hrs. PHYS 24264 hrs. MATH 3342 ... <u>3 hrs.</u> 13 hrs.	Semester 2 Humanities core3 hrs. MATH 33403 hrs. PHYS 2427 4 hrs. PHYS 3320** ...3 hrs. Social/ Behavioral core <u>3 hrs.</u> 16 hrs.
Third Year		Fourth Year	
Semester 1 B.A. requirement3 hrs. PHYS 3330** ...3 hrs. PHYS 3340** ...3 hrs. MATH 3311* ...3 hrs. Social/ Behavioral core <u>3 hrs.</u> 15 hrs.	Semester 2 PHYS 4330***3 hrs. PHYS 4340***3 hrs. B.A. requirement3 hrs. Social/ Behavioral core <u>3 hrs.</u> 12 hrs.	Semester 1 PHYS 3310***3 hrs. PHYS**6 hrs. MPS 43703 hrs. Social/ Behavioral core <u>3 hrs.</u> 15 hrs.	Semester 2 PHYS 4320***3 hrs. B.A. requirement ..6-8 hrs. PHYS** ... <u>3 hrs.</u> 12-14 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 core.....3 hrs. Core code 90..... <u>1-3 hrs.</u> 18-20 hrs.	Semester 2 Core code 10 ...3 hrs. MATH 24144 hrs. CHEM 14124 hrs. PHYS 2425 ... <u>4 hrs.</u> 15 hrs.	Semester 1 IDM 13153 hrs. SCOM 1315, 1318 or 1321 ...3 hrs. PHYS 24264 hrs. MATH 3342 ... <u>3 hrs.</u> 13 hrs.	Semester 2 Humanities core3 hrs. MATH 33403 hrs. PHYS 24274 hrs. PHYS 3320**3 hrs. Social/Behavioral core <u>3 hrs.</u> 16 hrs.
Third Year		Fourth Year	
Semester 1 PHYS 3330** ...3 hrs. PHYS 3340** ...3 hrs. MATH 3311* ...3 hrs. Elective3 hrs. Social/Behavioral core <u>3 hrs.</u> 15 hrs.	Semester 2 PHYS 4330***3 hrs. PHYS 4340***3 hrs. Elective3 hrs. MATH 4310* ...3 hrs. Social/Behavioral core <u>3 hrs.</u> 15 hrs.	Semester 1 PHYS 3310***3 hrs. PHYS**3 hrs. Elective3 hrs. Social/Behavioral core <u>3 hrs.</u> 12 hrs.	Semester 2 PHYS 4320***3 hrs. PHYS**3 hrs. PHYS**3 hrs. MPS 43703 hrs. Elective <u>4 hr.</u> 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.

