Department of Chemistry

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The Department of Chemistry has as its objectives preparation and training in both scientific principles and skills for chemists seeking industrial or governmental employment; students planning graduate study in the sciences or advanced professional courses of study in medicine or engineering; science teachers in public or private schools; and for students wishing to meet institutional requirements in chemistry.

Programs in the department lead to the Bachelor of Science degree with majors or concentrations in Professional Chemistry, Chemistry, Biochemistry, or Science. The Professional Chemistry and Biochemistry Programs do not require a minor, and the other programs require a minor of at least 18 semester hours. Minors are also offered in Chemistry and Science. In addition, pre-professional programs for cytotechnology, dentistry, dental hygiene, health information management, medicine, medical technology, nuclear medicine technology, occupational therapy, pharmacy, physical therapy, radiation therapy technology, chiropractic, and diagnostic medical sonography are offered under the Health Sciences concentration.

A grade of C or better is required on all transfer credits accepted as part of a major or minor in the Department of Chemistry. Students must have a grade point average of at least 2.00 on courses counting toward a major or minor in any of the department's programs. No more than 8 hours of 1000-level chemistry, 8 hours of 1000-level biology, or 8 hours of 2000-level physics courses may count toward a Chemistry or Science major or minor. No 1000-level physics course may count toward a Science major or minor.

Laboratory safety is of primary importance in the Department of Chemistry. Students are required to follow **all** laboratory safety rules, a statement of which will be provided to all students at the first laboratory period. **Approved safety goggles must be worn at all times while in the laboratory.** Failure to comply with any of the laboratory rules may result in the student's removal from the laboratory for that laboratory period. Continued violation of safety rules can result in the withdrawal of the student from the course.

Curricular listings include General Education requirements in Communication, History, Humanities and/or Fine Arts, Mathematics, Natural Sciences, and Social/Behavioral Sciences categories as outlined on pages 64–67.

Major in Chemistry, Professional Concentration

The Professional Chemistry concentration in the Chemistry major, approved by the American Chemical Society, consists of 48 semester hours in chemistry including CHEM 1110/1111, 1120/1121, 2230/2231, 3010/3011, 3020/3021, 3530/3531 or 4500, 4230/4231, 4350/4351, 4360/4361, 4400, 4410, and 4430/4431, plus at least 4 hours (including one hour of laboratory) from CHEM 4100, 4700/4780, 4730/4731, 4000, 4510/4530, 4880, 4600, or 4610; mathematics through MATH 1920; MATH 3110 or PHYS 3150; PHYS 2010/2011, 2020/2021 (or 2110/2111, 2120/2121); BIOL 1110/1111, 1120/1121; at least 3 hours of computer science approved by advisor; and fulfillment of University General Education requirements. A minimum of 12 upper-division hours in the Chemistry major must be taken at MTSU. No minor is required for this major.

Recommended Sequence

FRESHMAN		**SOPHOMORE**	
CHEM 1110/1111 (Nat Sci)	4	CHEM 2230/2231, 3010/3011, 3020/3021	13
CHEM 1120/1121	4	PHYS 2010/2011, 2020/2021	8
MATH 1730 (Math)	4	MATH 1920	4
MATH 1910	4	ENGL 2020 or 2030 or HUM 2610 (Hum/FA)	3
BIOL 1110/1111 (Nat Sci)	4	CSCI (approved by advisor)	3
BIOL 1120/1121	4		**31**
ENGL 1010, 1020 (Comm)	6		
	30		

JUNIOR		**SENIOR**	
CHEM 4400, 4350/4351, 4360/4361 (3530/3531 or 4500)	14	CHEM 4230/4231, 4410, 4430/4431	9
COMM 2200 (Comm)	3	CHEM concentration upper-division electives	4
HIST 2010, 2020, or 2030	6	Humanities and/or Fine Arts	3
MATH 3110 or PHYS 3150	4	Social/Behavioral Sciences (2 prefixes)	6
Humanities and/or Fine Arts	3	Electives	4
	30	Upper-division elective	3
			29

Major in Chemistry

The Chemistry major consists of 36 semester hours in chemistry including CHEM 1110/1111, 1120/1121, 2230/2231, 3010/3011, 3020/3021, 4330/4331, 4340/4341 (or 4350/4351, 4360/4361), and at least 7 hours from among the upper-division electives: CHEM (3530/3531 or 4500), 3880, 4000, 4100, (4230/4231 or 4630/4631), 4400, 4510, 4530, 4600, 4610, 4700, 4780, 4880 and PSCI 4080. Also required are MATH 1910; PHYS 2010/2011, 2020/2021; BIOL 1110/1111, 1120/1121; and fulfillment of University General

Education requirements. A minimum of 12 upper-division hours in the Chemistry major must be taken at MTSU.

NOTE: *Students who wish to get jobs as chemists are strongly encouraged to take additional upper-division courses, especially CHEM 4630/4631, follow the plan for the professional major, or take more advanced chemistry courses upon graduation. The Chemistry major requires one minor of at least 18 hours. Students who plan to graduate with no more than 120 hours should consult their advisors to be sure 42 upper-division hours are included in their curriculum.*

Recommended Sequence

FRESHMAN		**SOPHOMORE**	
CHEM 1110/1111 (Nat Sci)	4	CHEM 2230/2231, 3010/3011, 3020/3021	13
CHEM 1120/1121	4	PHYS 2010/2011, 2020/2021	8
MATH 1730 (Math)	4	Minor	3
MATH 1910	4	ENGL 2020 or 2030 or HUM 2610 (Hum/FA)	3
BIOL 1110/1111 (Nat Sci)	4	Upper-Division Elective	3
BIOL 1120/1121	4		**30**
ENGL 1010, 1020 (Comm)	6		
	30		

JUNIOR		**SENIOR**	
CHEM 4330/4331, 4340/4341	8	CHEM concentration upper-division electives	7
COMM 2200 (Comm)	3	Humanities and/or Fine Arts	3
HIST 2010, 2020, or 2030	6	Social/Behavioral Sciences (2 prefixes)	6
Minor	10	Minor	5
Humanities and/or Fine Arts	3	Upper-division electives	9
	30		**30**

Minor in Chemistry

The minor in Chemistry consists of 19 semester hours of chemistry, including CHEM 1110/1111 and 1120/1121 with a maximum of 8 hours in freshman-level chemistry. At least four upper-division hours must be taken at MTSU.

Major in Biochemistry

The major in Biochemistry consists of 55 semester hours of biology and chemistry coursework. Also required are MATH 1910; PHYS 2010/2011, 2020/2021, and fulfillment of University General Education requirements. A minimum of 12 upper-division semester hours in the biochemistry major must be taken at MTSU. No minor is required.

Recommended Curriculum

FRESHMAN		**SOPHOMORE**	
CHEM 1110/1111 (Nat Sci) *(See Note 1)*	4	BIOL 2230/2231, 3250/3251	8
CHEM 1120/1121 *(See Note 2)*	4	CHEM 3010/3011, 3020/3021	8
MATH 1910 (Math)	4	ENGL 2020 or 2030 or HUM 2610 (Hum/FA)	3
ENGL 1010, 1020 (Comm)	6	Humanities/Fine Arts	6
BIOL 1110/1111 (Nat Sci)	4	COMM 2200 (Comm)	3
BIOL 1120, 1121	4	Electives	2
Electives	4		**30**
	30		

JUNIOR		**SENIOR**	
CHEM 4500, 4510	6	CHEM 4330/4331	4
HIST 2010, 2020, or 2030	6	CHEM electives	6
PHYS 2010/2011, 2020/2021	8	Social/Behavioral Sciences	6
CHEM 4550/4551	4	Upper-division electives	4-10
Upper-division electives	3	Electives	10-4
BIOL upper-division	3		**30**
	30		

Included in the electives will be the hours necessary for the completion of the required 42 upper-division hours for graduation requirements and the necessary hours to satisfy the 120-hour graduation requirement.

NOTE 1: *A student who has had little or no high school chemistry or is not satisfied with his/her high school chemistry should first take CHEM 1010/1011 before taking CHEM 1110/1111.*

NOTE 2: *A student who has a sufficiently high score on the ACT Mathematics test may begin with MATH 1910. If the background in math is weak, MATH 1710 should be taken before MATH 1730.*

Interdisciplinary Major in Environmental Science and Technology

The Department of Chemistry participates in an interdisciplinary major in Environmental Science and Technology in conjunction with Agribusiness and Agriscience, Biology, Engineering Technology, and Geosciences. A complete description of this program is found on page 80.

Teacher Licensure in Chemistry (7-12)

Students seeking a license to teach chemistry in secondary schools (grades 7-12) must complete (1) a major in Chemistry, (2) a minor in Secondary Education, and (3) a course (PSCI 1030/1031) in addition to the General Education requirements.

Secondary Education Minor Requirements

Students must contact their Secondary Education minor advisors for approval of appropriate courses.

NOTE: *See Department of Educational Leadership on page 166 for Secondary Education minor requirements.*

Teacher Licensure in Interdisciplinary Studies (K–6)

Students may become licensed to teach in grades K–6 including science by following the Interdisciplinary Studies major. The science and math courses required are PSCI 1030/1031 and 4030; BIOL 1030/1031 and 3000; and MATH (1010 or 1710), 1410, 1420, and 4010. See other requirements for majors in the Elementary and Special Education Department section.

Major in Science

The major in Science has two concentrations—General Science and Health Science. A minimum of 9 semester hours of upper-division courses in either concentration of the Science major must be taken at MTSU. The Science major requires only one minor which must include at least 3 semester hours at the upper-division level taken at MTSU.

Concentration: General Science

The General Science concentration is a broad-based science degree requiring 19 semester hours acceptable for a minor in each of two fields selected from biology, chemistry, and physics plus 8 semester hours from the third field. Each student should

work closely with his/her advisor in completing the program for the General Science concentration.

Recommended Sequence

FRESHMAN		**SOPHOMORE**	
CHEM 1110/1111 (Nat Sci)	4	Science major electives	8
CHEM 1120/1121	4	PHYS 2010/2011, 2020/2021	8
MATH 1730 (Math)	4	Electives/Minor	11
BIOL 1110/1111 (Nat Sci)	4	ENGL 2020 or 2030 or HUM 2610 (Hum/FA)	3
BIOL 1120/1121	4		**30**
ENGL 1010, 1020 (Comm)	6		
Elective/Minor	4		
	30		

JUNIOR		**SENIOR**	
Science major electives	8	Science major electives	6
COMM 2200 (Comm)	3	Humanities and/or Fine Arts	3
HIST 2010, 2020, or 2030	6	Electives/Minor	15
Electives/Minor	10	Social/Behavioral Sciences (2 prefixes)	6
Humanities and/or Fine Arts	3		**30**
	30		

Teacher Licensure in Science (7–12)

Students may become licensed to teach biology, chemistry, or physics in secondary schools (grades 7–12) by completing (1) a major in science with a General Science concentration in which biology, chemistry, or physics is, respectively, one of the 19-hour disciplines chosen; (2) courses in addition to the General Education requirements (see advisor); and (3) a minor in Secondary Education.

Students may also become licensed to teach biology, chemistry, or physics by majoring in the subject they intend to teach (see requirements listed under the specific major).

Recommended Sequence

FRESHMAN		**SOPHOMORE**	
CHEM 1110/1111 (Nat Sci)	4	Science major electives	8
CHEM 1120/1121	4	PHYS 2010/2011, 2020/2021	8
MATH 1730 (Math)	4	Electives/Sec. Ed. Minor	11
BIOL 1110/1111 (Nat Sci)	4	ENGL 2020 or 2030 or HUM 2610 (Hum/FA)	3
BIOL 1120/1121	4		**30**
ENGL 1010, 1020 (Comm)	6		
Elective/Sec. Ed. Minor	4		
	30		

JUNIOR		**SENIOR**	
Science major electives	8	Science major electives	6
COMM 2200 (Comm)	3	Humanities and/or Fine Arts	3
HIST 2010, 2020, or 2030	6	Electives/Sec. Ed. Minor	15
Electives/Sec. Ed. Minor	10	Social/Behavioral Sciences (2 prefixes)	6
Humanities and/or Fine Arts	3		**30**
	30		

Concentration: Health Science

The Health Science concentration is for students who expect to enter a professional school after completing an appropriate pre-professional curriculum. There are three groups of programs. One group leads to an MTSU degree through completion of three years of the program at MTSU, acceptance into a professional school, and successful completion of one year. These programs are referred to as three-and-one programs and result in a bachelor's degree in science from MTSU with a health science concentration. Some programs listed under health science are designed for transfer only and do not lead to a degree from MTSU while other programs require completion of a baccalaureate degree prior to entrance.

Admission to the MTSU pre-professional program does not assure admission to a professional program. In the beginning of the third year, the student should make application to the program of choice, following the procedures of the particular program. Selection for admission is competitive and is made by the admissions committee of the respective program according to its selection standards.

The limits on class size in most of the professional programs may prevent acceptance of some qualified applicants. In the event a first application is unsuccessful, the program may be easily changed to a Chemistry or Biology major leading to a B.S. degree, and then application may be made a second time.

Students should note the following:
Chemistry—Students with a weak background or no high school chemistry should enroll in CHEM 1010/1011 before taking CHEM 1110/1111.
Irregularities—Advanced placement, remedial courses, failure of required courses, or summer school may cause some students to deviate from the sequence in the recommended curriculum. Regular consultation with the advisor is most important.
Advisors—Advisors to these programs are assigned in the Clara W. Todd Pre-professional Health Science Advising Center located in the Chemistry Department. The advisor will provide a curriculum sheet as a guide for the program. Guidance is provided on the recommended courses and procedures to be followed in leading to applications to a professional program. A pre-professional evaluation committee aids the students in providing recommendations requested by the professional programs.
Degree from MTSU—Students who plan to obtain degrees from MTSU must file the Intent to Graduate Form.

Minor in Science

The minor in Science consists of 24 semester hours acceptable for a minor: 16 hours in biology, chemistry, or physics, and 8 semester hours in one of the other two. At least 4 upper-division hours in a science must be taken at MTSU. Consult your advisor to determine which courses will satisfy minor requirements.

Pre-medical Curriculum (Including optometry, osteopathy, physician assistant, or podiatry)

The pre-medical curriculum prepares students to make application to all of the medical schools in Tennessee and most of the medical schools in the United States. A student planning to enter a medical school in another state is expected to supply the advisor with a catalog from the school under consideration.

Students are encouraged to complete a baccalaureate degree prior to entering medical school. The pre-medical curriculum lists all general education requirements, pre-medical require-

ments for application to medical schools, and recommended coursework. Since students can obtain a degree of their choice, it is very important to work closely with advisors regarding recommended coursework and fulfillment of degree requirements. The following sequence of classes may not yield a degree (see advisor). Students who plan to apply for admission to a school of optometry, osteopathy, podiatry, or physician assistant should follow this general pre-medical curriculum.

Recommended Curriculum

FRESHMAN		**SOPHOMORE**	
CHEM 1110/1111 (Nat Sci)*	4	CHEM 2230/2231	5
CHEM 1120/1121*	4	CHEM 3010/3011*	4
BIOL 1110/1111 (Nat Sci)*	4	BIOL 2230/2231, 3250/3251	8
BIOL 1120/1121*	4	PHYS 2010/2011, 2020/2021*	8
ENGL 1010, 1020 (Comm)*	6	ENGL 2020 or 2030 or HUM 2610 (Hum/FA)	3
MATH 1910 (Math)	4	Humanities and/or Fine Arts	3
COMM 2200 (Comm)	3		**31**
Humanities and/or Fine Arts	3		
	32		

JUNIOR		**SENIOR**	
CHEM 3020/3021*	4	CHEM 4330/4331	4
CHEM 3530/3531 or 4500	4	CHEM 4340/4341	4
BIOL 3020/3021, 4210/4211	8	BIOL 4130/4131	4
HIST 2010, 2020, or 2030	6	Chemistry, biology, and general electives	16
Social/Behavioral Sciences (2 prefixes)	6		**28**
Upper-division elective	1		
	29		

**Denotes courses required for medical school.*

NOTE: *Electives must be selected carefully in order to assure meeting institutional requirements for graduation: (1) completion of General Education requirements; (2) completion of a minor; (3) completion of a minimum 42 semester hours of upper-division work (courses numbered 3000 and above).*

Pre-physical Therapy Curriculum

The following curriculum is proposed for students planning to make application to a physical therapy program. Students are encouraged to complete a baccalaureate degree of choice prior to entering a physical therapy (PT) school. Consult your advisor. Since different schools have different prerequisites, curriculum guide sheets for this and other PT schools in Tennessee should be obtained from the coordinator of pre-professional advising. At that time, a pre-physical therapy advisor is assigned. *Frequent contact with the advisor is essential to being properly prepared for application to the professional schools*. Volunteer work in physical therapy is required.

Recommended Curriculum

FRESHMAN		**SOPHOMORE**	
BIOL 1110/1111, 1120/1121	8	BIOL 2010/2011, 2020/2021	8
ENGL 1010, 1020	6	PHYS 2010/2011, 2020/2021	8
CHEM 1110/1111, 1120/1121	8	PSY 1410, 2300	6
MATH 1730	4	Courses from major*	
Courses from major*			

NOTE: *Other prerequisite courses: PSY 3020 (3 hrs.) or MATH 1530 (3 hrs), CSCI 1150 (3 hrs.) or INFS 2200 (3 hrs.), HIST 2010, 2020 (6 hrs.), and COMM 2200 (3 hrs.)*

Student must obtain an advisor for the physical therapy program who helps select a major in addition to meeting prerequisites for physical therapy requirements. The advisor will assist in selecting elective courses.

Three-and-One Programs

The following are programs that lead to an MTSU degree: pre-chiropractic, pre-cytotechnology, pre-dental, pre-medical technology, pre-pharmacy, pre-nuclear medicine technology, pre-radiation therapy technology, and diagnostic medical sonography.

Since acceptance into dental or pharmacy school after three years is highly competitive, most students complete the specified pre-dental or pre-pharmacy curriculum and then complete a fourth year at MTSU which will lead to a bachelor's degree in biology, chemistry, or science.

General requirements for a degree under this concentration:

1. Complete the specified three-year pre-professional curriculum consisting of at least 90 hours.
2. Apply to, be accepted in, and successfully complete either one year (30 hours) in the professional school or one year of an approved clinical or laboratory school (for which 30 hours will be granted).
3. Each program will require a minimum of 35 hours of science (biology, chemistry, physics).
4. Twenty-one (21) upper-division hours from MTSU of which 12 must be in science as approved by the advisor.
   NOTE: *Any hours granted for laboratory experience do not apply to these 21 upper-division hours.*
5. The last 30 semester hours of MTSU coursework must be in residence at MTSU.

Pre-chiropractic Curriculum

The following curriculum is proposed for students planning to enter chiropractic school after three years of study at MTSU. The course schedule below meets prerequisites for admission into a Doctor of Chiropractic (DC) program. Upon acceptance and successful completion of the first year of chiropractic school, the student will have completed requirements for a Bachelors of Science degree at MTSU.

Recommended Curriculum

FRESHMAN		**SOPHOMORE**	
CHEM 1110/1111 (Nat Sci)	4	CHEM 3010/3011, 3020/3021	8
CHEM 1120/1121	4	BIOL 2230/2231, 3250/3251	8
BIOL 1110 /1111 (Nat Sci)	4	ENGL 2020 or 2030 or HUM 2610 (Hum/FA)	3
BIOL 1120/1121	4	PSY 141 (Soc/Beh Sci)	3
ENGL 1010, 1020 (Comm)	6	Humanities and/or Fine Arts	3
MATH 1730 (Math)	4	General Elective	3
COMM 2200 (Comm)	3		**28**
Humanities and/or Fine Arts	3		
	32		

JUNIOR		**SENIOR**	
CHEM 3530/3531	4	Professional program credits (granted upon completion of first year of approved program)	30
PHYS 2010/2011, 2020/2021	8		**30**
HIST 2010, 2020, or 2030	6		
Social/Behavioral Sciences	3		
Upper-division electives	9		
	30		

Pre-cytotechnology Curriculum (CT)

The curriculum outlined for the Medical Technology program may be followed at MTSU; after successful completion of a program in a nationally accredited cytotechnology school, a B.S. degree from MTSU can be received.

Recommended Curriculum

FRESHMAN	
CHEM 1110/1111 (Nat Sci)	4
CHEM 1120/1121	4
BIOL 1110 /1111 (Nat Sci)	4
BIOL 1120/1121	4
ENGL 1010, 1020 (Comm)	6
MATH 1710 (Math)	3
PHYS 2010/2011 or 1300	4
COMM 2200 (Comm)	3
	32

SOPHOMORE	
CHEM 3010/3011, 3020/3021 or CHEM 2030/2031, 3530/3531	8
BIOL 2230/2231, 3250/3251	8
HIST 2010, 2020, or 2030	6
ENGL 2020 or 2030 or HUM 2610 (Hum/FA)	3
Humanities and/or Fine Arts (2 prefixes)	6
	31

JUNIOR	
CHEM elective*	3
BIOL 4110/4111, 4300/4301	8
BIOL elective	3
Social/Behavioral Sciences (2 prefixes)	6
Electives*	7
	27

SENIOR	
Professional program credits (granted upon completion of first year of approved program)	30
	30

**Total upper-division hours must equal at least 21; total of 90 hours prior to professional program.*

Pre-dental Curriculum

The following curriculum is proposed for students planning to enter the College of Dentistry at the University of Tennessee-Memphis and will meet the requirements for a B.S. degree from MTSU upon successful completion of one year in dental school. See page 61 for specific requirements.

NOTE: *Many applicants find that a B.S. degree is required to be competitive for acceptance; therefore, most pre-dental students usually pursue a Chemistry major and Biology minor or vice versa.*

Recommended Curriculum

FRESHMAN	
CHEM 1110/1111 (Nat Sci)	4
CHEM 1120/1121	4
BIOL 1110/1111 (Nat Sci)	4
BIOL 1120/1121	4
ENGL 1010, 1020 (Comm)	6
MATH 1910 (Math)*	4
PHYS 2010/2011	4
	30

SOPHOMORE	
CHEM 2230/2231	5
CHEM 3010/3011	4
PHYS 2020/2021	4
BIOL 3250/3251	4
ENGL 2020 or 2030 or HUM 2610 (Hum/FA)	3
HIST 2010, 2020, or 2030	6
COMM 2200 (Comm)	3
	29

JUNIOR	
CHEM 3020/3021	4
CHEM 3530/3531	4
BIOL 3020/3021, 4130/4131	8
Humanities and/or Fine Arts (2 prefixes)	6
Social/Behavioral Sciences (2 prefixes)	6
Upper-division elective	3
	31

SENIOR	
Professional program credits (granted upon successful completion of first year of approved program)	30
	30

**Prerequisite to MATH 1910 is MATH 1730 or Math ACT greater than or equal to 26.*
NOTE: *Total of 90 hours prior to professional program. Total upper-division hours must equal at least 21.*

Pre-medical Technology Curriculum (MT)

The medical technology degree program requires the successful completion of three years (minimum of 90 semester hours) academic work followed by a minimum of 12 months (30 semester hours or equivalent) in a medical technology program approved by a national accrediting agency and by Middle Tennessee State University. The academic program must fulfill all General Education requirements for a B.S. degree, include at least 21 semester hours of courses numbered 3000 or above, and at least the last two semesters (30 semester hours) must be in residence at MTSU. All other requirements for graduation given elsewhere in this catalog must be met. Specific course requirements are shown below.

Upon approval, a student with the MLT certification from a nationally accredited program at a community college or from any other nationally accredited MLT program may enroll at MTSU, follow the academic part of the medical technology curriculum, fulfill MTSU requirements for graduation, and receive credit (30 semester hours for programs with credit hours not assigned) for the MLT clinical work to be applied toward the B.S. degree. In addition to appropriate MLT certification, three years of full-time clinical laboratory experience are required, in accordance with state and national regulations.

Recommended Curriculum

FRESHMAN		**SOPHOMORE**	
CHEM 1110/1111 (Nat Sci)	4	CHEM 3010/3011, 3020/3021	8
CHEM 1120/1121	4	BIOL 2230/2231, 3250/3251	8
BIOL 1110/1111 (Nat Sci)	4	HIST 2010, 2020, or 2030	6
BIOL 1120/1121	4	ENGL 2020 or 2030 or HUM 2610 (Hum/FA)	3
ENGL 1010, 1020 (Comm)	6	COMM 2200 (Comm)	3
MATH 1710 (Math)	3	Humanities and/or Fine Arts	3
PHYS 2010/2011 or 1110/1111	4		**31**
	29		

JUNIOR		**SENIOR**	
CHEM 3530/3531	4	Professional program credits (granted upon successful completion of first year of approved program)	30
BIOL 4110/4111, 4300/4301	8		**30**
BIOL upper-division elective*	4		
Humanities and/or Fine Arts	3		
Social/Behavioral Sciences (2 prefixes)	6		
Electives	5		
	30		

Total of 90 hours prior to professional program.
**At least 1 hour must be upper division; total upper-division hours must equal at least 21.*

AFFILIATED MEDICAL TECHNOLOGY PROGRAMS

1. Vanderbilt Medical Center, Program of Medical Technology, Nashville, Tennessee
2. TSU-Meharry, Program of Medical Technology, Nashville, Tennessee
3. Austin Peay State University, Program of Medical Technology, Clarksville, Tennessee

Acceptance of work from nonaffiliated schools may also be arranged on an individual student basis.

Pre-pharmacy Curriculum

The following curriculum is proposed for students planning to enter pharmacy school after three years of study at MTSU. Well-prepared students with advanced placement credits may be able to complete pharmacy admission requirements in two years and should consult with their advisors regarding course selection. The course schedule below meets prerequisites for most pharmacy schools. Students should work closely with an advisor to ensure all course requirements are met for all pharmacy schools to which they plan to apply.

Recommended Curriculum

FRESHMAN		**SOPHOMORE**	
CHEM 1110/1111 (Nat Sci)	4	CHEM 3010/3011, 3020/3021	8
CHEM 1120/1121	4	BIOL 2010/2011, 2020/2021	8
BIOL 1110/1111 (Nat Sci)	4	MATH 1530	3
BIOL 1120/1121	4	ENGL 2020 or 2030 or HUM 2610 (Hum/FA)	3
MATH 1910 (Math)	4	PSY 1410 (Soc/Beh Sci)	3
PHYS 2010/2011	4	COMM 2200 (Comm)	3
ENGL 1010, 1020 (Comm)	6	HIST 1010, 1020, 1110, or 1120 (Hum/FA)	3
	30		**31**

JUNIOR		**SENIOR**	
CHEM 4500, 4510, 4530	8	Professional program credits (granted upon successful completion of first year of approved program)	30
BIOL 2230/2231	4		**30**
BIOL 4300/4301	4		
HIST 2010, 2020, or 2030	6		
ECON 2410 (Soc/Beh Sci)	3		
Humanities and/or Fine Arts	3		
Upper-division elective	1		
	29		

Total of 90 hours prior to professional program. Total upper-division hours must equal at least 21.

Pre-nuclear Medicine Technology Curriculum

The Nuclear Medicine Technology degree program requires a successful completion of three years (minimum of 90 semester hours) academic work at MTSU followed by a minimum of 12 months (30 semester hours or equivalent) in a nuclear medicine technology program approved by a national accrediting agency and by Middle Tennessee State University. The academic program must fulfill all General Education requirements for a B.S. degree, include at least 21 semester hours of courses numbered 3000 or above, and at least the last two semesters (junior year, 30 semester hours) must be in residence at MTSU. All other requirements for graduation given elsewhere must be met.

Recommended Curriculum

FRESHMAN		**SOPHOMORE**	
CHEM 1110/1111 (Nat Sci)	4	CHEM 3010/3011, 3020/3021 or 2030/2031, 3530/3531	8
CHEM 1120/1121	4	PHYS 2010/2011, 2020/2021	8
BIOL 2010/2011 (Nat Sci)	4	HLTH 3300	3
BIOL 2020/2021	4	ENGL 2020 or 2030 or HUM 2610 (Hum/FA)	3
MATH 1730 or 1910 (Math)	4	HIST 2010, 2020, or 2030	6
ENGL 1010, 1020 (Comm)	6	COMM 2200 (Comm)	3
PSY 1410 (Soc/Beh Sci)	3		**31**
Elective	1		
	30		

JUNIOR		**SENIOR**	
BIOL 2230/2231, 3340, 4150	10	Professional program credits (granted upon successful completion of first year of approved program)	30
CSCI 1000	1		**30**
BIOL 3350	3		
Humanities and/or Fine Arts (2 prefixes)	6		
PSY 4650	3		
SOC 4040	3		
Social/Behavioral Sciences	3		
	29		

Total of 90 hours prior to professional program. Total upper-division hours must equal at least 21.

Pre-radiation Therapy Technology Curriculum

The Radiation Therapy Technology degree program requires a successful completion of three years (minimum of 90 semester hours) academic work at MTSU followed by a minimum of 12 months (30 semester hours or equivalent) in a radiation therapy technology program approved by a national accrediting agency and by Middle Tennessee State University. The academic program must fulfill all General Education requirements for a B.S. degree, include at least 21 semester hours of courses numbered 3000 or above, and at least the last two semesters (junior year, 30 semester hours) must be in residence at MTSU. All other requirements for admission given elsewhere must be met.

Recommended Curriculum

FRESHMAN		**SOPHOMORE**	
ENGL 1010, 1020 (Comm)	6	Social/Behavioral Sciences	3
CHEM 1110/1111 (Nat Sci)	4	PHYS 2010/2011, 2020/2021	8
MATH 1730	4	BIOL 2010/2011 (Nat Sci)	4
MATH 1530 (Math)	3	BIOL 2020/2021	4
HIST 2010, 2020, or 2030	6	HLTH 3300	3
COMM 2200 (Comm)	3	HLTH 4270	3
HUM 2130	3	N FS 1240	3
	29	PSY 1410 (Soc/Beh Sci)	3
			31

JUNIOR		**SENIOR**	
BIOL 2230/2231, 3340, 4150	10	Professional program credits (granted upon successful completion of first year of approved program)	30
CSCI 1150	3		**30**
BIOL 3350	3		
PSY 4650 or SOC 4040	3		
HLTH 4280	2		
Humanities and/or Fine Arts (2 prefixes)	6		
ENGL 2020 or 2030 or HUM 2610 (Hum/FA)	3		
	30		

Total of 90 hours prior to professional program. Total upper-division hours must equal at least 21.

Diagnostic Medical Sonography Curriculum

The following curriculum is proposed for students planning to enter the Diagnostic Medical Sonography program approved by a national accrediting agency and by MTSU. Upon acceptance and successful completion of the Diagnostic Medical Sonography program, the student will have completed requirements for a B.S. degree at MTSU.

Recommended Curriculum

FRESHMAN		**SOPHOMORE**	
CHEM 1110/1111	4	BIOL 2230/2231	4
BIOL 2010/2011, 2020/2021	8	PHYS 2010/2011, 2020/2021	8
ENGL 1010, 1020 (Comm)	6	ENGL 2020 or 2030 or HUM 2610 (Hum/FA)	3
MATH 1730	4	PSY 1410	3
COMM 2200 (Comm)	3	Social/Behavioral Sciences	3
Humanities/Fine Arts	6	CSCI 1150	3
	31	MATH 1530	3
		HUM 2130	3
			30

JUNIOR		**SENIOR**	
BIOL 3350, 4150	6	Professional program credits (granted upon successful completion of first year of approved program)	30
NURS 3010	3		**30**
PSCI 4080	4		
HIST 2010, 2020, or 2030	6		
HLTH 3300, 4280	5		
HLTH 4270	3		
General elective	2		
	29		

Other Transfer Programs

The following programs do not lead to an MTSU degree: pre-dental hygiene, pre-health information management, and pre-occupational therapy. Students apply to the professional school during the second or third year.

Pre-dental Hygiene Curriculum

The following curriculum is proposed for students planning to make application to the dental hygiene program in the College of Allied Health Sciences at the University of Tennessee-Memphis. Students who plan to apply for admission to other schools of dental hygiene should consult their advisors.

Recommended Curriculum

FRESHMAN		**SOPHOMORE**	
BIOL 1110/1111	4	BIOL 2010/2011, 2020/2021, 2230/2231	12
BIOL 1120/1121 (rec.)	4	COMM 2200	3
ENGL 1010, 1020	6	HIST 2010, 2020	6
CHEM 1010/1011, 1020/1021	8	ENGL 2030	3
SOC 1010, 2010	6	Electives*	6
PSY 1410, 1420	6		**30**
	34		

**The advisor should be consulted for elective recommendations.*

Pre-health Information Management Curriculum

The pre-health information management curriculum below is recommended for students planning to enter a health information management program. Information pertaining to pre-health information management is available in DSB 241.

To gain the best first-hand knowledge about health information management, you should contact health information managers (medical record administrators), visit their facilities, and talk to them directly. Working in an office of health information management on a paid or volunteer basis is recommended.

Recommended Curriculum

FRESHMAN		**SOPHOMORE**	
BIOL 1110/1111, 1120/1121	8	BIOL 2010/2011, 2020/2021	8
ENGL 1010, 1020	6	ENGL 2030	3
PSY 1410	3	SOC or HIST or ECON	6
PSY elective*	3	COMM 2200	3
MATH 1710	3	PSY 3020	3
Electives*	6	HUM 2130	3
	29	Electives*	5
			31

JUNIOR	
INFS 2200 or 3100	3
BCEN 3010	3
BLAW 3400	3
BCEN 3510	3
BCEN 4350	3
MGMT 3610	3
Electives*	12
	30

**For admission to University of Tennessee-Memphis, a minimum of fifteen (15) upper-division hours is required. The business courses and statistics courses listed above satisfy this requirement.*

Pre-occupational Therapy Curriculum

The following curriculum is proposed for students planning to enter the occupational therapy program at the College of Allied Health Sciences, University of Tennessee-Memphis. The program requires three (3) years of study (90 semester hours) at MTSU followed by two calendar years at UT-Mem-

phis. While a bachelor's degree is not required, students are encouraged to obtain a bachelor's degree before attending the occupational therapy program at UT-Memphis. Successful completion of the program will entitle the student to receive a Master of Science degree in occupational therapy granted by UT-Memphis.

Students who plan to apply for admission to other schools of occupational therapy should consult with their advisors.

Recommended Curriculum

FRESHMAN		**SOPHOMORE**	
BIOL 1110/1111, 1120/1121	8	BIOL 2010/2011, 2020/2021	8
ENGL 1010, 1020	6	SOC 1010	3
Social Sciences elective	3	CSCI 1150	3
CHEM 1110/1111*	4	PHYS 2010/2011	4
PSY 1410	3	PSY 2300, 3230	6
COMM 2200	3	HUM 2130	3
Elective**	3	ANTH 2010	3
	30		**30**

JUNIOR	
HUM 2130	3
PSY 3020	3
Humanities elective (note)	9
Electives**	15
	30

NOTE: *Ninety semester hours must be completed prior to matriculation to include additional hours from ANTH (3), Social Sciences (3), and 9 hours of humanities.*
**Students with a weak background in chemistry should take CHEM 1010/1011 before taking CHEM 1110/1111.*
***Recommended electives: computer/technology skills, kinesiology, education, technical or critical writing, fine and performing arts, language and communication systems, philosophy, and up to 4 hours in activity-based courses (e.g., photography).*

Courses in Chemistry [CHEM]
See back of catalog for course descriptions.

Courses in Chemical Instrumentation Techniques [CHEM]
See back of catalog for course descriptions.

Courses in General Physical Science [PSCI]
See back of catalog for course descriptions.

Honors College
The Department of Chemistry offers the following courses in Honors: CHEM 1110/1111 and 1120/1121 and PSCI 1030/1031. See current online class schedule and Honors information in this catalog.

Graduate Study
The Department of Chemistry offers the Master of Science degree. The Graduate Catalog has degree requirements and course listings.