

language for modeling and analysis of manufacturing systems. Prerequisites: IE 3320. (WI)

4399 Special Topics in Manufacturing Engineering. (3-0) This course will cover advanced topics that cannot be fitted into a regular course in the curriculum. Prerequisite: Faculty advisor approval.

4399A Reverse Engineering and Rapid Prototyping. (3-0)

4399B Introduction to Reinforced Polymer Nanocomposites in Industrial Applications. (3-0)

Department of Engineering Technology

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www.txstate.edu/technology

DEGREE PROGRAMS OFFERED

BS, major in Concrete Industry Management

BS, major in Construction Science and Management

BST, major in Engineering Technology

BST, major in Industrial Technology

BST, major in Industrial Technology (with Teacher Certification)

BST, major in Industrial Technology-Manufacturing Technology

MINOR OFFERED

Technology

The mission of the Department of Engineering Technology is to prepare students for technical/professional careers in industry and education. The mission is accomplished through a dedicated faculty offering programs in specialized areas with formal, technical focus. Upon graduation, students are prepared to assume positions of professional responsibility in the areas of manufacturing, construction, computer related fields of all types, electronics, and education. Fourteen well-equipped technical laboratories serve to educate students in the techniques and processes used by contemporary world class industries.

The BST in Engineering Technology provides students with the technical background to work with engineers in planning production processes, developing tooling, establishing quality assurance procedures, developing safety programs, establishing work methods, and setting time standards. Students can specialize in Electrical Engineering Technology, Construction Engineering Technology, Environmental Engineering Technology, Manufacturing Engineering Technology, and Mechanical Engineering Technology. The BST in Industrial Technology degree prepares students for work in industry in middle management positions. Students gain a sound knowledge and understanding of materials, processes, industrial safety, and concepts of industrial management. This degree has program majors in Construction, Manufacturing, and General Technology. The General Technology major, under Industrial Technology, can be customized to meet specific student needs offering opportunities in electronics, industrial safety, education,

etc. Students interested in exploring such opportunities should see an Engineering Technology Department advisor for more details. The BS in Concrete Industry Management (CIM) degree prepares students who are grounded in basic construction management, who are knowledgeable in concrete technology and techniques and who are able to manage people and systems to promote products and devices related to the concrete industry. CIM professionals find a wide array of opportunities in the concrete industry including positions in sales, operations, technical services and construction management.

Teacher Certification

A student seeking certification to teach at the secondary level must take RDG 3323; EDST 4681; and CI4370, 3325, 4332, 4343, and 4370. The student who has further questions should see the undergraduate advisor in Engineering Technology.

Bachelor of Science
Major Concrete Industry Management
(with Minor in Business Administration)
Minimum required: 123 semester hours

Freshman Year - 1st Semester		Freshman Year - 2nd Semester		Sophomore Year - 1st Semester		Sophomore Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
US 1100	1	ENG 1320	3	ENG Literature (see general requirement 2)	3	POSI 2320	3
ENG 1310	3	HIST 1310	3	HIST 1321	3	COMM 1310	3
POSI 2310	3	BLAW 2361	3	MATH 2321	3	ACC 2301	3
ECO 2301	3	MATH 2417	4	TECH 2342	3	TECH 2313	3
CHEM 1141, 1341	4	PHYS 1410	4	PFW one course	1	PHYS 1420	4
TECH 1260	2					PFW one course	1
Total	16	Total	17	Total	13	Total	17

Junior Year - 1st Semester		Junior Year - 2nd Semester		Senior Year - 1st Semester		Senior Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
PHIL 1305	3	ART, DAN, MU, or TH 2313	3	MKT 3343	3	ENGR 3315	3
MGT 3303	3	FIN 3325	3	CIM 3366	3	TECH 3360	3
MATH 2328	3	CIM 3330	3	CIM 4210	2	TECH 3367	3
TECH 2351	3	CIM 3340	3	TECH 4369	3	CIM 4340	3
CIM 3420	4			TECH 4345	3	CIM 4398	3
Total	16	Total	12	Total	14	Total	15

Senior Year - Summer Session	
Course	Hr
TECH 4390	3
Total	3

Bachelor of Science
Major in Construction Science and Management
Minimum required: 127 semester hours

General Requirements:

1. A minimum of 9 writing intensive hours and a total of 36 advanced hours are required to graduate. An advanced course is one that is numbered above 3000 and below 5000.
2. Departmental requirements that also satisfy the general education core curriculum requirements for the following components: mathematics- MATH 2417; natural science- CHEM 1341/1141 and PHYS 1410; humanities and visual and performing arts component- PHIL 1320; and social science- ECO 2301. See the University College section of this catalog for the English literature requirements.
3. If two years of the same language are taken in high school, then no additional language hours will be required for the degree. In the absence of such high school language, two semesters of the same modern language must be taken at the college level.
4. Effective Fall 2010: No "D" grades received at other institutions will be credited towards the major.
5. Effective Fall 2010: Students will enter the 30 semester hour Pre-Construction Curriculum, which will consist of MATH 2328, MATH 2417, CHEM 1341 & 1141, PHYS 1410, PHYS 1420, TECH 1260, TECH 2313, TECH 2342 and TECH 2360. No grade lower than a "C" will be accepted and a 2.5 GPA must be maintained in these classes before a student will be allowed to enroll in advanced level Construction courses.

Freshman Year - 1st Semester		Freshman Year - 2nd Semester		Sophomore Year - 1st Semester		Sophomore Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
TECH 1260	2	MATH 2328	3	PHYS 1420	4	COMM 1310	3
CHEM 1141, 1341	4	PHYS 1410	4	ACC 2301	3	TECH 2351	3
MATH 2417	4	TECH 2313	3	TECH 2342	3	TECH 2360	3
US 1100	1	ENG 1320	3	BLAW 2361	3	ECO 2301	3
ENG 1310	3	POSI 2320	3	PHIL 1320	3	HIST 1310	3
POSI 2310	3						
Total	17	Total	16	Total	16	Total	15

Junior Year - 1st Semester		Junior Year - 2nd Semester		Senior Year - 1st Semester		Senior Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
TECH 2160	1	TECH 3360	3	MKT 3343	3	TECH 4360	3
TECH 4313	3	TECH 3362 or 3363	3	TECH 4361	3	TECH 4364	3
TECH 2344	3	TECH 3361	3	MGT 3303	3	TECH 4368	3
TECH 3366	3	TECH 3367	3	TECH 4369	3	CIS 3317	3
ENG Literature (see gen. req. 2)	3	ART, DAN, MU, or TH 2313	3	TECH 4380	3	PFW one course	1
HIST 1320	3						
PFW one course	1						
Total	17	Total	15	Total	15	Total	13

Senior Year - Summer Session	
Course	Hr
TECH 4390	3
Total	3

Bachelor of Science in Technology
Major in Engineering Technology
(with Electrical Engineering Technology Specialization)
Minimum required: 124 semester hours

General Requirements:

1. A minimum of 9 writing intensive hours and a total of 36 advanced hours are required to graduate. An advanced course is one that is numbered above 3000 and below 5000.
2. Departmental requirements that also satisfy the general education core curriculum requirements for the following components: mathematics- MATH 2471, natural science- CHEM 1341/1141 and CHEM 1342/1142, and social science-ECO 2301. See the University College section of this catalog for the English literature requirements.
3. If two years of the same language are taken in high school, then no additional language hours will be required for the degree. In the absence of such high school language, two semesters of the same modern language must be taken at the college level.

Freshman Year - 1st Semester		Freshman Year - 2nd Semester		Sophomore Year - 1st Semester		Sophomore Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
CHEM 1141, 1341	4	CHEM 1142, 1342	4	TECH 2344	3	EE 2320	3
MATH 2471	4	ENGR 2300	3	ENGR 1313	3	MATH 2425	4
US 1100	1	MATH 2472	4	PHYS 1430	4	PHYS 2425	4
ENG 1310	3	ENG 1320	3	COMM 1310	3	CS 1428	4
POSI 2310	3	HIST 1310	3	HIST 1320	3	POSI 2320	3
PFW one course	1						
Total	16	Total	17	Total	16	Total	17

Junior Year - 1st Semester		Junior Year - 2nd Semester		Senior Year - 1st Semester		Senior Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
EE 3300	3	EE 3370	3	EE 4370	3	EE 3350	3
EE 3320	3	TECH 2351	3	EE 4390	3	ENGR 3315	3
IE 3320	3	ART, DAN, MU, or TH 2313	3	TECH 4345	3	MGT 4330	3
TECH 3364	3	ENG Literature (see gen. req. 2)	3	MGT 3303	3	MFGE 4376	3
ECO 2301	3	PHIL 1305	3				
PFW one course	1						
Total	16	Total	15	Total	12	Total	12

Senior Year -Summer Session	
Course	Hr
TECH 4390	3
Total	3

Bachelor of Science in Technology
Major in Engineering Technology
(with Construction Engineering Technology Specialization)
Minimum required: 124 semester hours

General Requirements:

1. A minimum of 9 writing intensive hours and a total of 36 advanced hours are required to graduate. An advanced course is one that is numbered above 3000 and below 5000.
2. Departmental requirements that also satisfy the general education core curriculum requirements for the following components: mathematics- MATH 2471, natural science- CHEM 1341/1141 and CHEM 1342/1142, and social science-ECO 2301. See the University College section of this catalog for the English literature requirements.
3. If two years of the same language are taken in high school, then no additional language hours will be required for the degree. In the absence of such high school language, two semesters of the same modern language must be taken at the college level.

Freshman Year - 1st Semester		Freshman Year - 2nd Semester		Sophomore Year - 1st Semester		Sophomore Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
CHEM 1141, 1341	4	PHYS 1430	4	TECH 2344	3	TECH 2351	3
MATH 2471	4	CHEM 1142, 1342	4	TECH 2342	3	PHYS 2425	4
US 1100	1	MATH 2472	4	ECO 2301	3	TECH 2313	3
ENG 1310	3	ENG 1320	3	ART, DAN, MU, or TH 2313	3	COMM 1310	3
POSI 2310	3	HIST 1310	3	HIST 1320	3	POSI 2320	3
PFW one course	1						
Total	16	Total	18	Total	15	Total	16

Junior Year - 1st Semester		Junior Year - 2nd Semester		Junior Year - Summer II		Senior Year - 1st Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
CS 1428	4	ENGR 3315	3	TECH 4360	3	TECH 3361	3
IE 3320	3	MGT 3303	3			TECH 4345	3
TECH 3364	3	TECH 2360	3			TECH 4361	3
PHIL 1305	3	ENG Literature (see gen. req. 2)	3			ENGR 3373	3
		PFW one course	1				
Total	13	Total	13	Total	3	Total	12

Senior Year - 2nd Semester		Senior Year - Summer Session	
Course	Hr	Course	Hr
MGT 4330	3	TECH 4390	3
TECH 3360	3		
TECH 3367	3		
TECH 4364	3		
TECH 4369	3		
Total	15	Total	3

Bachelor of Science in Technology
Major in Engineering Technology
(with Environmental Engineering Technology Specialization)
Minimum required: 125 semester hours

General Requirements:

1. A minimum of 9 writing intensive hours and a total of 36 advanced hours are required to graduate. An advanced course is one that is numbered above 3000 and below 5000.
2. Departmental requirements that also satisfy the general education core curriculum requirements for the following components: mathematics- MATH 2471, natural science- CHEM 1341/1141 and CHEM 1342/1142, and social science-ECO 2301. See the University College section of this catalog for the English literature requirements.
3. If two years of the same language are taken in high school, then no additional language hours will be required for the degree. In the absence of such high school language, two semesters of the same modern language must be taken at the college level.

Freshman Year - 1st Semester		Freshman Year - 2nd Semester		Sophomore Year - 1st Semester		Sophomore Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
CHEM 1141, 1341	4	CHEM 1142, 1342	4	ENGR 1313	3	CS 1428	4
MATH 2471	4	ENGR 2300	3	PHYS 1430	4	PHYS 2425	4
US 1100	1	MATH 2472	4	TECH 2344	3	ECO 2301	3
ENG 1310	3	ENG 1320	3	CHEM 2390	3	COMM 1310	3
POSI 2310	3	HIST 1310	3	HIST 1320	3	POSI 2320	3
PFW one course	1						
Total	16	Total	17	Total	16	Total	17

Junior Year - 1st Semester		Junior Year - 2nd Semester		Senior Year - 1st Semester		Senior Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
IE 3320	3	TECH 4380	3	ENGR 3373	3	ENGR 3315	3
TECH 2351	3	GEO 2410	4	TECH 4330	3	TECH 4392	3
ART, DAN, MU, or TH 2313	3	MGT 3303	3	TECH 4345	3	GEO 4313	3
ENG Literature (see gen. req. 2)	3	TECH 3364	3	TECH 4367	3	MGT 4330	3
PHIL 1305	3			TECH 4350	3		
PFW one course	1						
Total	16	Total	13	Total	15	Total	12

Senior Year - Summer Session	
Course	Hr
TECH 4390	3
Total	3

Bachelor of Science in Technology
Major in Engineering Technology
(with Manufacturing Engineering Technology Specialization)
Minimum required: 124 semester hours

General Requirements:

1. A minimum of 9 writing intensive hours and a total of 36 advanced hours are required to graduate. An advanced course is one that is numbered above 3000 and below 5000.
2. Departmental requirements that also satisfy the general education core curriculum requirements for the following components: mathematics- MATH 2471, natural science- CHEM 1341/1141 and CHEM 1342/1142, and social science-ECO 2301. See the University College section of this catalog for the English literature requirements.
3. If two years of the same language are taken in high school, then no additional language hours will be required for the degree. In the absence of such high school language, two semesters of the same modern language must be taken at the college level.
4. 6 hours of Manufacturing Engineering Technology electives – 3 hours from: TECH 1330 (fall, spring), TECH 4367 (spring), TECH 4392 (spring); and 3 hours from: TECH 4357 (spring), TECH 4374 (fall), TECH 4380 (fall, spring, summer I).

Freshman Year - 1st Semester		Freshman Year - 2nd Semester		Sophomore Year - 1st Semester		Sophomore Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
CHEM 1141, 1341	4	CHEM 1142, 1342	4	ENGR 1313	3	CS 1428	4
MATH 2471	4	ENGR 2300	3	PHYS 1430	4	PHYS 2425	4
US 1100	1	MATH 2472	4	TECH 2344	3	TECH 2310	3
ENG 1310	3	ENG 1320	3	ART, DAN, MU, or TH 2313	3	TECH 2351	3
POSI 2310	3	HIST 1310	3	PFW one course	1	COMM 1310	3
Total	15	Total	17	Total	14	Total	17

Junior Year - 1st Semester		Junior Year - 2nd Semester		Junior Year - Summer I		Senior Year - 1st Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
ENGR 3373	3	MGT 3303	3	TECH 4391	3	MFGE 4363	3
IE 3320	3	TECH 4362	3			TECH 3364	3
TECH 2330	3	ENG Literature (see gen. req. 2)	3			TECH 4330	3
ECO 2301	3	PHIL 1305	3			TECH 4345	3
HIST 1320	3	POSI 2320	3				
		PFW one course	1				
Total	15	Total	16	Total	3	Total	12

Senior Year - 2nd Semester		Senior Year - Summer Session	
Course	Hr	Course	Hr
ENGR 3315	3	TECH 4390	3
MGT 4330	3		
Manufacturing Engr Tech Electives (see gen. req. 4)	6		
Total	12	Total	3

Bachelor of Science in Technology
Major in Engineering Technology
(with Mechanical Engineering Technology Specialization)
Minimum required: 124 semester hours

General Requirements:

1. A minimum of 9 writing intensive hours and a total of 36 advanced hours are required to graduate. An advanced course is one that is numbered above 3000 and below 5000.
2. Departmental requirements that also satisfy the general education core curriculum requirements for the following components: mathematics- MATH 2471, natural science- CHEM 1341/1141 and CHEM 1342/1142, and social science-ECO 2301. See the University College section of this catalog for the English literature requirements.
3. If two years of the same language are taken in high school, then no additional language hours will be required for the degree. In the absence of such high school language, two semesters of the same modern language must be taken at the college level.

Freshman Year - 1st Semester		Freshman Year - 2nd Semester		Sophomore Year - 1st Semester		Sophomore Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
CHEM 1141, 1341	4	CHEM 1142, 1342	4	ENGR 1313	3	CS 1428	4
MATH 2471	4	ENGR 2300	3	PHYS 1430	4	PHYS 2425	4
US 1100	1	MATH 2472	4	TECH 2344	3	TECH 2310	3
ENG 1310	3	ENG 1320	3	ART, DAN, MU, or TH 2313	3	TECH 2351	3
POSI 2310	3	HIST 1310	3	PFW one course	1	COMM 1310	3
Total	15	Total	17	Total	14	Total	17

Junior Year - 1st Semester		Junior Year - 2nd Semester		Junior Year - Summer I		Senior Year - 1st Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
ENGR 3373	3	TECH 4362	3	TECH 4391	3	MATH 3323	3
IE 3320	3	MGT 3303	3			MFGE 4363	3
TECH 2330	3	ENG Literature (see gen. req. 2)	3			TECH 3364	3
ECO 2301	3	PHIL 1305	3			TECH 4345	3
HIST 1320	3	POSI 2320	3				
		PFW one course	1				
Total	15	Total	16	Total	3	Total	12

Senior Year - 2nd Semester		Senior Year - Summer Session	
Course	Hr	Course	Hr
ENGR 3315	3	TECH 4390	3
MGT 4330	3		
MFGE 4376	3		
TECH 4392	3		
Total	12	Total	3

Bachelor of Science in Technology
Major in Industrial Technology
 Minimum required: 120 semester hours

General Requirements:

1. A minimum of 9 writing intensive hours and a total of 36 advanced hours are required to graduate. An advanced course is one that is numbered above 3000 and below 5000.
2. Departmental requirements that also satisfy the general education core curriculum requirements for the following components: mathematics- MATH 1317 or 2417; natural science- CHEM 1341/1141 and PHYS 1410; and social science- ECO 2301. See the University College section of this catalog for the English literature requirements.
3. If two years of the same language are taken in high school, then no additional language hours will be required for the degree. In the absence of such high school language, two semesters of the same modern language must be taken at the college level.
4. Technology electives must be chosen in consultation with the departmental advisor. Electives outside of Technology should be chosen in consultation with the departmental or academic advisor.

Freshman Year - 1st Semester		Freshman Year - 2nd Semester		Sophomore Year - 1st Semester		Sophomore Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
US 1100	1	CHEM 1141, 1341	4	CHEM 1142, 1342	4	PHYS 1420	4
ENG 1310	3	MATH 1317 or 2417	3-4	ENGR 2300 or TECH 2342	3	TECH Electives (see gen. req. 4)	3
POSI 2310	3	TECH Elective (see gen. req. 4)	3	PHYS 1410	4	TECH 2344	3
ECO 2301	3	ENG 1320	3	TECH Electives (see gen. req. 4)	3	TECH 2351	3
COMM 1310	3	HIST 1310	3			TECH 2370	3
ART, DAN, MU, or TH 2313	3						
Total	16	Total	16-17	Total	14	Total	16

Junior Year - 1st Semester		Junior Year - 2nd Semester		Senior Year - 1st Semester		Senior Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
TECH 3364	3	TECH 4357	3	MGT 3303	3	MGT 4330	3
TECH Advanced Elective (see gen. req. 1 & 4)	6	TECH 4380	3	TECH 4345	3	TECH 4392	3
Elective (see gen. req. 4)	1-2	TECH Advanced Elective (see gen. req. 1 & 4)	3	TECH Advanced Elective (see gen. req. 1 & 4)	6	TECH Advanced Elective (see gen. req. 1 & 4)	3
HIST 1320	3	PHIL 1305	3	PFW one course	1	ENG Literature (see gen. req. 2)	3
PFW one course	1	POSI 2320	3				
Total	14-15	Total	15	Total	13	Total	12

Senior Year - Summer Session	
Course	Hr
TECH 4390	3
Total	3

Bachelor of Science in Technology
Major in Industrial Technology (with Teacher Certification)
Minimum required: 130 semester hours

General Requirements:

1. A minimum of 9 writing intensive hours and a total of 36 advanced hours are required to graduate. An advanced course is one that is numbered above 3000 and below 5000.
2. Departmental requirements that also satisfy the general education core curriculum requirements for the following components: mathematics- MATH 1317 and natural science- CHEM 1341/1141 and PHYS 1410. See the University College section of this catalog for the English literature and social science requirements.
3. If two years of the same language are taken in high school, then no additional language hours will be required for the degree. In the absence of such high school language, two semesters of the same modern language must be taken at the college level.
4. Technology electives must be chosen in consultation with the departmental advisor.

Freshman Year - 1st Semester		Freshman Year - 2nd Semester		Sophomore Year - 1st Semester		Sophomore Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
MATH 1317	3	CHEM 1141, 1341	4	ENGR 2300 or TECH 2342	3	PHYS 1420	4
US 1100	1	TECH 1330	3	CHEM 1142, 1342	4	TECH 2310	3
ENG 1310	3	ENG 1320	3	PHYS 1410	4	TECH 2351	3
POSI 2310	3	HIST 1310	3	TECH 2313	3	TECH 2370	3
COMM 1310	3	Social Science Component (see gen. req. 2)	3	TECH Electives (see gen. req. 4)	3	TECH elective (see gen. req. 4)	3
ART, DAN, MU, or TH 2313	3	PFW one course	1				
Total	16	Total	17	Total	17	Total	16

Sophomore Year - Summer I		Sophomore Year - Summer II		Junior Year - 1st Semester		Junior Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
HIST 1320	3	POSI 2320	3	TECH 2330	3	TECH 3313	3
PFW one course	1	PHIL 1305	3	TECH 2344	3	TECH 2360	3
				TECH 4374	3	TECH 4362	3
				TECH 4380	3	TECH Advanced Electives (see gen. req. 1 & 4)	3
				CI 4332	3	CI 3325	3
Total	4	Total	6	Total	15	Total	15

Junior Year - Summer I		Junior Year - Summer II		Senior Year - 1st Semester		Senior Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
ENG Literature (see gen. req. 2)	3	TECH 4360	3	MGT 3303	3	EDST 4681	6
				CI 4370	3		
				CI 4343	3		
				RDG 3323	3		
Total	3	Total	3	Total	12	Total	6

Bachelor of Science in Technology
Major in Industrial Technology-Manufacturing Technology
Minimum required: 120 semester hours

General Requirements:

1. A minimum of 9 writing intensive hours and a total of 36 advanced hours are required to graduate. An advanced course is one that is numbered above 3000 and below 5000.
2. Departmental requirements that also satisfy the general education core curriculum requirements for the following components: mathematics- MATH 1317 or 2417; natural science- CHEM 1341/1141 and PHYS 1410; and social science- ECO 2301. See the University College section of this catalog for the English literature requirements.
3. If two years of the same language are taken in high school, then no additional language hours will be required for the degree. In the absence of such high school language, two semesters of the same modern language must be taken at the college level.
4. Technology electives must be chosen in consultation with the departmental advisor. Electives outside of Technology should be chosen in consultation with the departmental or academic advisor.

Freshman Year - 1st Semester		Freshman Year - 2nd Semester		Sophomore Year - 1st Semester		Sophomore Year - 2nd Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
TECH 1330	3	CHEM 1141, 1341	3	CHEM 1142, 1342	4	PHYS 1420	4
US 1100	1	MATH 1317 or 2417	3-4	ENGR 1413	4	TECH 2310	3
ENG 1310	3	ENG 1320	3	ENGR 2300	3	TECH 2344	3
POSI 2310	3	HIST 1310	3	PHYS 1410	4	TECH 2351	3
COMM 1310	3	Elective (see gen. req. 4)	0-1	PFW one course	1	TECH 2370	3
ART, DAN, MU, or TH 2313	3						
Total	16	Total	14	Total	16	Total	16

Junior Year - 1st Semester		Junior Year - 2nd Semester		Junior Year - Summer I Session		Senior Year - 1st Semester	
Course	Hr	Course	Hr	Course	Hr	Course	Hr
TECH 2330	3	TECH 4362	3	TECH 4391	3	TECH 4345	3
TECH 3364	3	MGT 3303	3			TECH 4374	3
TECH 4330	3	ENG Literature (see gen. req. 3)	3			TECH 4380	3
ECO 2301	3	HIST 1320	3			POSI 2320	3
PHIL 1305	3					PFW one course	1
Total	15	Total	12	Total	3	Total	13

Senior Year - 2nd Semester		Senior Year - Summer Session	
Course	Hr	Course	Hr
MGT 4330	3	TECH 4390	3
TECH 4357	3		
TECH 4373	3		
TECH advanced elective (see gen. req. 1 & 4)	3		
Total	12	Total	3

Minor in Technology

A minor in Technology requires 18 hours of Technology courses, of which 9 hours must be advanced. Courses will be determined by conference with a departmental advisor or the Chair of the Department.

Driver and Traffic Safety Education Certification

Students seeking State of Texas Certification in Driver's Education must complete nine semester hours of TECH 4383, 4385, and 4393. For more information on this program contact the Director of the Traffic Safety Center.

Courses in Concrete Industry Management (CIM)

- 3330 Concrete Construction Methods. (3-0) This course covers forming, shoring, placing and reinforcing operations. Transporting, placing, consolidating, finishing, jointing and curing concrete for cast-in-place foundations, pavements, slabs on ground, structural frames, and other structural members are studied. Other topics include waterproofing concrete foundations and erecting precast concrete members. Prerequisite: CIM 3420.
- 3340 Understanding the Concrete Construction System. (3-0) A detailed look at how the concrete construction industry works. The course includes a review of model building codes, building officials and their function, concrete industry codes and standards, concrete construction processes, quality assurance systems, contract documents, estimating, construction scheduling and concrete construction markets. Prerequisite: IE 3320 and CIM 3420.
- 3366 Applications of Concrete in Construction. (3-0) This course is a detailed study of the many uses of concrete in the construction of buildings, pavements and other facilities. Emphasis will be placed on the advantages, disadvantages, and unique problems faced by materials suppliers, contractors and design professionals when concrete is chosen for specific applications. Prerequisite: CIM 3330.
- 3420 Fundamentals of Concrete: Properties and Testing. (3-2) This course examines effects of concrete-making materials (aggregates, cements, admixtures, etc.) on the properties of fresh and hardened concrete. Concrete mixture proportioning calculations and statistical analysis of strength tests are also studied. Prerequisite: TECH 1260.
- 4210 Senior Concrete Lab. (1-2) This course provides students an opportunity to further develop their technical and laboratory knowledge and pursue a project of individual interest. A formal report/presentation will be required at the conclusion of the course. Prerequisite: CIM 3340, MGT 3303, FIN 3325, and BLAW 2361.
- 4320 Issues in Concrete and Construction Industry. (3-0) This course involves a case study approach to critically analyze various historical and current events in the concrete and construction industry. Particular emphasis will be placed upon developing a managerial decision-making process incorporating ethical, legal, financial and other business perspectives. Prerequisites: CIM 3340, MGT 3303, FIN 3325, and BLAW 2361.
- 4340 Concrete Problems: Diagnosis, Prevention and Dispute Resolution. (3-0) Course involves diagnosing/preventing problems related to concrete production, testing, construction and performance. Students learn to identify causes of

fresh and hardened concrete problems, i.e. fast and slow setting, air content variations, low strength, cracking and scaling. Pre-job conferences and dispute resolution methods are examined. Prerequisite: CIM 3366 and 4210.

- 4398 Capstone. (3-0) An intensive study of a problem(s) appropriate to the major/student's career interests. Requires knowledge from previous technical/business coursework. Solution(s) for the problem(s) will be presented to an industry committee. Presentation must emphasize depth of analysis, completeness/effectiveness of solution, and presentation skills. Prerequisite: All CIM courses satisfactorily completed.

Courses in Technology (TECH)

- 1260 Introduction to the Construction and Concrete Industry. (2-0) An introductory course for Construction and Concrete Industry Management (CIM) majors. Residential, commercial, heavy, civil and highway construction is explored including the concrete industry. The role of the contractor, architect/engineer and owner are covered including contracts, careers, sustainability and economic importance of the construction industry.
- 1330 Assembly Processes. (2-2) Basic assembly process to include gas, arc, resistance, thermite, induction, and forge welding; weld-ability, weld metallurgy, weld symbology, and weld testing; brazing; soldering; mechanical fastening to include threaded fasteners, rivets, shrink and press fits, seams, staples, crimping, and structural adhesives. Principles of joint design and cost estimation. An overview of electronics assembly processes and automated assembly.
- 1413 Introduction to Architectural Graphics. (3-2) An introductory manual drafting course utilizing the tools and techniques necessary to produce architectural working drawings. Principles of orthographic and perspectives, projections, geometric relationships, shape and size description, and pictorial methods are included with emphasis on technical applications and architectural design problem solving. Prerequisite: Interior Design and non-Engineering or Technology majors only.
- 2160 Introduction to Construction Surveying and Site Layout. (1-1) Common construction surveying and site layout techniques are studied using both optical levels and total stations. Benchmarks, building lines, property lines, differential and profiling are discussed in lecture with applied exercises performed in the laboratory. Prerequisite: Pre-Construction or Instructor's Approval.
- 2310 Machine Drafting. (3-3) Introduction to the use of computer-aided drafting techniques (CAD) and application of basic principles of engineering drawing to the preparation of drawings for manufacturing processes. Emphasis includes principles of descriptive geometry, multiview projection, precision dimensioning, machine tooling, dies, production drawing, machine design and fabrication methods. Prerequisite: ENGR 1413 or consent of instructor.
- 2313 Fundamentals of Architectural Problem-Solving and Design. (2-2) Introduction to the language of architectural design. Use of the computer and CAD software in the design process. Elements of projection theory to include orthographic and perspective projection. Solving complex problems of building geometry. Section views and their relationship to

- architectural detailing. Emphasis on the successful integration of construction documents.
- 2330 Fundamentals of Material Removal. (3-0) An overview of the micro and macro structure of materials is studied. Assessment of materials with regard to their chemical and mechanical properties and how these properties relate to machining is explored. Machining conditions with regard to feed, speed, surface finish, tooling requirements, horsepower capabilities, time, and cost analysis complete the class. Prerequisite: MATH 1315.
- 2342 Construction Materials and Processes. (3-1) This course will introduce students to various types of construction materials including ceramics, ferrous, non-ferrous, and organic materials used in construction. Their properties, working characteristics, and processes used to manufacture and assemble these materials are studied. Laboratory activities are used to reinforce lecture material. Prerequisite: CHEM 1341 and 1141 and PHYS 1410.
- 2344 Power Technology. (2-2) This class deals with understanding the basic laws of thermodynamics. It probes the issues of efficiency and examines energy-converting devices from the inputs, processes, outputs model. Internal combustion engines, electric motors, hydraulic systems, pneumatic systems, wind electric systems, solar energy systems, and gearing systems are reviewed from a practical and a theoretical perspective. Fuel analysis, lubricants, and friction all comprise essential topic areas. Prerequisite: MATH 1315.
- 2351 Statics and Strength of Materials. (3-0) Course covers principles of statics and strength of materials to include forces, equilibrium, friction, centroids, and stress/strain relationships, axial stress and deformation, thermal stress and deformation, stress concentrations, factor of safety, torsional stress, beam stresses and combined stress. Prerequisite: TECH 2342 or ENGR 2300 and PHYS 1410 or 1430.
- 2360 Residential Construction Systems. (2-2) A residential construction course, which deals with interpreting plans and specifications, along with studying site work, foundations, walls, roofing, ceilings, floor, and finishing systems. Also, residential MEP systems are covered along with applicable building codes and construction financing. Prerequisite: TECH 2342 or Instructor's Approval.
- 2370 (ENGR 2305) Electricity/Electronics Fundamentals. (2-2) Fundamentals of safety, Ohm's Law, series, parallel, and series-parallel circuits, meters, relays, and basic transistor circuits.
- 3310 Industrial Design. (3-0) The fundamentals, elements, and principles of design applied in creative ways to industrial design problems emphasizing function, form, and aesthetics. Ergonomics, product life cycles, environmental concerns, and use of elementary statics for stress analysis. (WI)
- 3313 Architectural Design II. (2-2) Architectural CAD techniques and principles of residential and/or light commercial design and construction. Exterior and interior drawings and details; essentials of plans, elevations, sections, and perspective aspects of architectural documents. Structural, MEP's, ADA and green-building issues are discussed. Individual and group projects will be completed by students. Prerequisite: TECH 2313.
- 3322 Development of Technology. (3-0) The role of technology in the development of Western World culture is studied from a technical perspective. Social repercussions resulting from the introduction of foundational technical developments are reviewed. Examples of technical areas examined are agriculture, transportation, manufacturing, engineering, defense, and communications. Readings focus discussions and papers on specific topics and encourage synthesis level understanding. (WI)
- 3360 Structural Analysis. (3-0) Structural engineering fundamentals to include design loads, reactions, force systems, functions of a structure, and the analysis of statically determinate and indeterminate structures by classical and modern techniques. Prerequisite: TECH 2351.
- 3361 Commercial Building Construction Systems. (3-0) A commercial building construction systems class that deals with soils, site work, heavy foundations, steel, reinforced concrete, and pre-cast structures along with common assemblies. Commercial MEP's are studied along with CSI master format, as-built and shop drawings, schedule of values, AIA documents, and appropriate building codes. Prerequisite: Pre-Construction or Instructor's Approval.
- 3362 Industrial and Offshore Construction Systems. (3-1) Management of the design process for oil and gas production facilities with emphasis on developing projects outside the United States. Presentation of materials, methods, and techniques of industrial facility construction and marine environments centers on equipment and crew selection, productivity, cost estimation, and constructability. Required field trip. Prerequisite: Pre-Construction or Instructor's Approval.
- 3363 Heavy, Civil, and Highway Construction Systems. (3-1) Selection, acquisition, and capabilities of heavy construction equipment are presented. Applications of economics to performance characteristics and production of equipment is discussed. Sector-specific construction management methods are covered, including unit price estimating, equipment fleet design, repetitive scheduling, and major components of highways, bridges, and engineered facilities. Prerequisite: Pre-construction or Instructor's Approval.
- 3364 Quality Assurance. (3-0) This course covers the principles of quality management to include basic probability and statistics concepts, control charts for attributes and variables, sampling plans, quality audits and costs. The laboratory component of this class includes exercises that provide exposure to basic metrology and data collection.
- 3366 Soils and Foundation. (3-0) Properties of subsurface materials and the principles of subsurface construction are studied. Topics include soil classification and testing, soil mechanics and foundation systems, including site layout, excavation, caissons, piles, slurry wall, slab and spread footings. Prerequisite: Pre-Construction and TECH 2351 or instructor approval.
- 3367 Mechanical, Electrical, and Plumbing Systems. (3-1) This course covers typical Mechanical, Electrical and Plumbing (MEPs) systems found in residential and commercial construction along with design and installation methods used to conserve both energy and water in new and remodeled structures. Prerequisites: TECH 2313, 2342, and 2360 or permission from the instructor.
- 3370 Audio Frequency Communications. (2-2) A study of the characteristics of basic electronic circuits and their component

- parts. Course content includes the use of electronic test equipment, inductance, capacitance, reactance, impedance, rectification, switching, amplification, and electronic circuit fabrication. Prerequisite: TECH 2370.
- 4197 Special Problems. (1-0) The investigation of a special topic by developing the problem, researching the topic, and presenting the findings as they apply to industry/technology. This course will be applicable to all areas of technology, and must be done only with the approval of the cooperating faculty member and Department Chair. Repeatable for credit with different emphasis.
- 4310 Technical Architectural Drafting. (3-3) Architectural plans, renderings, and detailing including case, millwork and cabinet detailing concepts are taught in this class using contemporary computer aided design (CAD) software. Repeatable for credit with different emphasis. Prerequisite: ENGR 1413 or TECH 1413.
- 4313 Advanced Architectural Design. (2-2) Architectural CAD techniques and principles of commercial construction. Exterior and interior drawings and details; essentials of plans, elevations, sections, and perspective aspects of architectural documents. Structural, mechanical, electrical, plumbing, ADA and green building issues are discussed. Design and/or construction documents will be produced through group participation projects. Prerequisite: TECH 2313.
- 4321 Flight Instruction Academics. (3-0) Provides instruction necessary to pass the Federal Aviation Administration written examination in order to fulfill academic requirements for a private pilot's license. Includes instruction in: Aircraft Pre-Flight; Flight and System Controls; Federal Aviation Agency Regulations; Navigation; Weather; Weight and Balance; Radio Communications; and Airman Information Manual.
- 4330 Foundry and Heat Treatment. (3-3) The technical aspects of foundry and heat treatment of ferrous and non-ferrous metals are reviewed. Students gain proficiency with interpretation of binary phase diagrams, mathematical modeling of gate and runner systems, micro-structural analysis, process cost evaluation, sand testing, investment casting and other technical processes. Technical report writing is an important part of this class. Data collection and data analysis with experiments allow students to develop appropriate techniques for presenting technical data in report format. ENGR 2300 recommended. (WI)
- 4345 Methods Engineering and Ergonomics. (3-0) Principles and procedures of methods engineering to include concurrent engineering, charting techniques, motion analysis, principles of motion economy, human factors, direct time study, standard data systems, predetermination time standards and work sampling.
- 4357 Facilities Design. (3-0) Survey and application of the principles and methods used for solving plant layout and material handling problems in industry.
- 4360 Construction Contract Administration. (2-2) Construction contracts including lump sum and cost reimbursable are covered, along with delivery systems, insurance, bonding, AIA documents, specifications, addenda, general conditions, change orders, RFI's Mechanical, Electrical and Plumbing Systems and ethics are covered. Selected modules are designed, scheduled, and built, complete with specifications. Prerequisite: Pre-Construction or Instructor's Approval.
- 4361 Construction Estimating. (2-2) The fundamentals of construction estimating are covered including feasibility, conceptual, square feet, cubic feet, unit in place, preliminary, engineering, range and contractor's detail bid estimates. Plans and specifications are used along with contemporary estimating software to develop estimates commonly used in the construction industry. Prerequisite: Pre-Construction and TECH 3361 or Instructor's Approval.
- 4362 Manufacturing Processes I. (1-3) Application of metal cutting principles learned in 2330. Included in the requirements are steel rule dye layout, machine layout, tool life, tool wear, tool geometry and reconditioning, feed and speed principles, metal removal rates, and power consumption calculations. Machining steel as well as castings produced in the laboratory with various types of cutting tool materials and varying geometry contributes toward the wide variety of experiences included in this basic manufacturing course. Plain indexing activities complement basic machine operations in a unique and most unusual way. Prerequisite: TECH 2330.
- 4364 Construction Project Management and Scheduling. (3-1) Concepts of construction management are studied beginning with contract documents through the effective management of manpower, machines, material, and money necessary to complete construction projects on time and within budget. Gantt Charts and PERT/CPM schedules are developed, using contemporary software. Prerequisite: Pre-Construction and TECH 4361 or Instructor's Approval.
- 4367 Polymer Properties and Processing. (3-1) Structure, physical & mechanical properties, design considerations and processing methods for polymer-based materials are presented. Processing methods include: injection molding, blow molding, thermoforming, compression molding, extrusion, filament winding, lay-up methods, vacuum bag molding and poltrusion. Prerequisite: ENGR 2300.
- 4368 Environmentally Conscious Design and Construction. (3-1) Environmentally sustainable practices used in building design and construction. The LEED system will be used to guide the course, which covers aspects of sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, and the CAD design process. Prerequisite: Pre-Construction or ID 2329 and TECH 2313 or Instructor's Approval.
- 4369 Construction Contracts, Liability, and Ethics. (3-0) Legal aspects of design and construction contract documents are presented, including contract formation, interpretation, rights and duties, and changes. Legal liabilities are explored in the context of professional ethics for design firms and constructors. Prerequisite: Pre-Construction and recommended: MGT 3303 and/or MG 3360 or Instructor Approval.
- 4372 Electronic Instrumentation. (2-2) Transistor configurations, field effect transistors and circuits, voltage regulation, amplifier feedback principles, operational amplifiers and circuitry, and unijunction transistors and applications. Prerequisite: TECH 2370.

- 4373 Industrial Electronics. (2-2) A study of control systems, electrical switching, electrical generation, motors, wiring, illumination, and temperature controls as they apply to industry. Electronic product development and manufacturing are studied through classroom and laboratory activities. Prerequisite: TECH 2370.
- 4374 Digital Electronics. (2-2) Solid state digital electronics from basic concepts to current industrial needs in terms of logic gates (all types), number systems counters (all types), registers (all types), sequential control circuits, and shift register generator. Prerequisite: TECH 2370 or PHYS 2425.
- 4380 Industrial Safety. (3-0) Introduction to the field of industrial safety with emphasis on compliance with Federal and State regulations. (WI)
- 4383 Driver and Traffic Safety Education I. (3-0) Content, methods, and materials for instruction in the classroom phase of driver education in Texas. Topics include Texas traffic law; Texas Education Agency standards for high school driver education; driver behavior, attitude, and psychomotor skills; and safety in the highway transportation system.
- 4385 Driver and Traffic Safety Education II. (3-3) Content, methods and materials for instruction in the laboratory phase of driver education in Texas. Topics include in-car instruction, multi-car range, and simulation. During laboratory sessions participants will observe in-car instructors, peer teach in the car, and teach a high school student how to drive. TECH 4383 and 4385 will be taken simultaneously. Prerequisites: TECH 4383 and a good driving record.
- 4387 Motorcycle Safety and Rider Education. (3-3) Techniques and methods of teaching beginner rider education. Includes classroom techniques as well as laboratory experience in on-street and off-street riding. Not applicable to the BS in Technology program.
- 4390 Internship. (0-20) Supervised on-the-job professional learning experience in construction, manufacturing, electronics, and other technical areas. This course provides practical work experience in their particular field of interest. Repeatable for credit. Prerequisites: Consult internship coordinator. (WI)
- 4391 Manufacturing Processes II. (1-3) Involves a wide variety of advanced manufacturing techniques. Included are the following areas: differential indexing, electrical discharge machining, precision grinding, specialized thread cutting, high energy rate forming, tool grinding, tool behavior analysis, tool cost evaluation, and numerical control programming. An emphasis may be placed on certain processes mentioned above in order to meet the specific needs of various classes. Prerequisites: TECH 2330, 4362; MATH 1315.
- 4392 Microelectronics Manufacturing I. (3-0) Provides an overview of integrated circuit fabrication including crystal growth, wafer preparation, epitaxial growth, oxidation, diffusion, ion-implantation, thin film deposition, lithography, etching, device and circuit formation, packaging and testing. Lab component involves production and testing of a functional semiconductor device.
- 4393 Driver and Traffic Safety Education III. (3-3) Content, procedures, and administration of multi-phase driver education programs. Topics include scheduling, maintenance and operation of laboratory equipment, record keeping, lesson plan development, and driver education for the handicapped. Practicum in classroom and/or simulation instruction. Not applicable to the Bachelor of Science in Technology degree program. Prerequisite: TECH 4383, 4385, and TECH 4393 may be taken simultaneously.
- 4394 Microelectronics Manufacturing II. (3-0) This is an intermediate level course in integrated circuit processing. Topics covered include: atomic models for diffusion, oxidation and ion implantation; topics related to thin film processes such as chemical vapor deposition, physical vapor deposition; planarization by chemical-mechanical polishing and rapid thermal processing; and process integration for bipolar and MOS device fabrication. Students will design processes and model them using a simulation tool such as SUPREM.
- 4397 Special Problems. (3-0) The investigation of a special topic by developing the problem, researching the topic, and presenting the findings as they apply to industry/technology. This course will be applicable to all areas of technology, and must be done only with the approval of the cooperating faculty member and Department Chair. Repeatable for credit with different emphasis.
- 4399 Seminar in Technology. (3-0) The topics for this course will vary. The course will involve the identification of the topic, its nomenclature, its processes, tools, equipment or materials, and its application to technology. The topic may apply to either the certification program or technology program or to both. A final report summary or presentation will conclude each seminar. Repeatable for credit with different emphasis.

Department of Mathematics

Math/Computer Science Building 470

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www.txstate.edu/math/welcome.html

DEGREE PROGRAMS OFFERED

BS, major in Applied Mathematics

BA, major in Mathematics

BS, major in Mathematics

BS, major in Mathematics (with Teacher Certification)

MINOR OFFERED

Applied Mathematics

Mathematics

The study of mathematics is more than four thousand years old and comprises an enormous body of knowledge. Mathematics remains a very active area of research continually giving rise to new theories and questions. The knowledge accumulated and the questions being considered concern both mathematics itself and its many applications.

Mathematics is a fundamental skill required at some minimal level of all educated people, and required in depth in many professions. The teaching objective of our Department includes the development of reasoning and computations skills, and the preparation of students for careers requiring a significant mathematical background.