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<td>Mathematics courses</td>
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<td>Mechanical Engineering Technology courses</td>
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<td>Philosophy courses</td>
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<td>Political science courses</td>
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<td>Professional pilot courses</td>
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<td>Psychology courses</td>
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<td>Science courses</td>
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<tr>
<td>Graduate Level Course Descriptions</td>
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</table>
Accreditation and certification
The bachelor’s degree in engineering technology - electronic and computer engineering technology option and mechanical option are accredited by the Engineering Technology Accreditation Commission of ABET; 111 Market Place, Suite 1050; Baltimore, MD., 21202-4012, 410-347-7700, www.abet.org.

The aircraft maintenance program is certified as an “Aviation Maintenance Technician School No. BZ9T052R” by the Federal Aviation Administration. The professional pilot program is certified as an approved “Pilot School Number KKCS017” by the Federal Aviation Administration. The baccalaureate degree program in professional pilot is accredited by the Aviation Accreditation Board International, 3410 Skyway Drive, Auburn, AL 36830. 334-844-2431, www.aabi.aero.

Kansas State University is fully accredited by the Higher Learning Commission of the North Central Association of Colleges and Schools; 30 N. LaSalle St., Suite 2400, Chicago, IL 60602, 1-800-621-7440, www.ncahlc.org. Credit earned at K-State is transferable to other institutions.

Prerequisite courses
Before attempting a course originating at K-State Polytechnic, a grade of “C” or better must be earned in the prerequisite courses.

Minors and Secondary Majors
Students at K-State Polytechnic are eligible for any of the minors and secondary majors offered by Kansas State University. Students completing all requirements for a minor and/or secondary major will receive official recognition on their academic transcript.

The Polytechnic campus offers all courses required for the business minor. See Business Minor (RBUSI) for more information.

Beginning Spring 2020, the Polytechnic Campus will offer a minor in Applied Business. The Applied Business minor is available to non-Business and non-Applied Business and Technology majors who will graduate from K-State.

The Polytechnic campus offers a minor in aviation safety and in unmanned aircraft systems. The aviation safety minor is available to students seeking or having earned a K-State bachelor or graduate degree. The unmanned aircraft systems minor is available to non-UAS flight majors seeking or having earned a bachelor or graduate degree. See Aviation Safety Minor (RAVSAF) and Unmanned Aircraft Systems Minor (RUAS) for complete details.

Reserve Officer Training Corps (ROTC)
Students at K-State Polytechnic campus may participate in Air Force ROTC or Army ROTC to become officers in the U.S. Air Force or U.S. Army. Complete details for the Air Force ROTC program may be found at: http://www.k-state.edu/usaf
e-mail: airotc@k-state.edu

Army ROTC information is available at: http://www.k-state.edu/armyrotc
e-mail: armyrotc@ksu.edu
Academic and Student Services

Academic Advising
Kansas State University is committed to providing effective advising services to students as an essential component of their educational experience. Academic Advisors assist students with academic planning, course sequencing, review of curriculum requirements, academic policies and procedures, and major exploration.

Each student at K-State Polytechnic is assigned an academic advisor. Students are responsible for initiating advising contact and preparing for advising sessions. Advisors can help connect students with campus resources in support of their academic and career goals.

K-State Polytechnic Library
The library, located in the Technology Center, meets standards set for the college libraries by the American Library Association and Engineering Technology Accreditation Commission of ABET. The library contains more than 20,000 volumes and provides access to nearly 90 online databases, as well as a collection of up-to-date technical information and reference materials (paper and electronic) covering technological subjects. The library offers Peer-Tutoring services and quiet study spaces. The library also has computer workstations containing all software found in the college’s computer labs.

Professional Education and Outreach
Kansas State Polytechnic Professional Education and Outreach expands the academic offerings of the Polytechnic campus beyond its physical boundaries through responsive learning experiences and serves individuals and organizations seeking knowledge and skills in focused areas of expertise. The unit serves as the leading force in online learning, off campus and professional training programs, and testing services for the College of Technology and Aviation.

Student Life
Student Life promotes the educational experience by enhancing the opportunities, safety, and growth of the campus community. Student Life provides and supports campus services, programs, and activities in an effort to strengthen the quality of life within a supportive atmosphere. Student Life also encourages and motivates lifelong healthy choices through the college experience. Student Life encompasses the following areas: Residence Life, Recreational Services, Counseling Services, Student Governing Association, Programming Board, student clubs/organizations.

Student Support Services
K-State Polytechnic also has a Student Support Services program. Student Support Services is a part of TRiO, a federally funded program to help fulfill the potential of students regardless of gender, race, income level, marital status, or disabilities. SSS provides personal, academic, and professional assistance to eligible participants. SSS services include: counseling/mentoring, tutoring, advocacy, referral services, financial literacy and study skills workshops, and cultural enrichment activities. Student Support Services also has two computer lab locations on campus and assists in the facilitation of the K-State Polytechnic Writing Center.

Writing Center
The K-State Polytechnic Writing Center provides one-on-one tutoring services for students across disciplines, free of charge. Trained peer tutors are available to consult over writing assignments, proposals, and professional resumes. Tutors can discuss all stages of the writing process from topic development to final editing. The Writing Center’s primary objective is to help students develop their college-level writing abilities. Students are encouraged to sign up for appointments in advance to guarantee that a tutor will be available at their convenience. For additional information, visit http://www.polytechnic.k-state.edu/writingcenter or stop by Technology Center Room 102.
K-State 8 General Education Program

Objective of the K-State 8
The K-State 8 General Education Program encourages students to be intellectual explorers. Students and advisors will plan programs of study to promote exposure to a breadth of learning that includes the eight areas below. The emphasis and the amount of study in each area will vary for each student, depending upon his/her choice of major and other interests.

The K-State 8 Areas:
- Aesthetic Interpretation
- Empirical and Quantitative Reasoning
- Ethical Reasoning and Responsibility
- Global Issues and Perspectives
- Historical Perspectives
- Human Diversity within the U.S.
- Natural and Physical Sciences
- Social Sciences

Overview of K-State 8 requirements
The intent of The K-State 8 is for students to explore the perspectives of disciplines that may be quite different from those of their own majors. For that reason, a minimum of four different course prefixes (e.g., AGEC, MATH, FSHS) must be represented to fulfill K-State 8 requirements.

Each student must successfully complete credit-bearing courses to cover all of the K-State 8 areas. Some of the K-State 8 areas may be covered in the student's major.

Departments have decided which courses to designate for one or two K-State 8 areas. K-State 8 designations are noted both in the Undergraduate Catalog and in KSIS.

When a course is tagged for two K-State 8 areas, the student may count that course toward both areas. However, students are strongly encouraged to enroll in a variety of courses and experiences that offers them a genuine breadth of perspective.

K-State 8 policy for changing majors
Changing majors will not affect students' general education requirements in the K-State 8.

K-State 8 policy for double majors and dual degrees
A student must meet K-State 8 requirements for only one degree/major.

Transfer students
Transfer students are required to cover all eight (8) of the K-State 8 areas and should check with their academic advisors to determine how best to apply transfer credits to the K-State 8.

More information about The K-State 8 is available at: http://www.k-state.edu/kstate8/.
University Honors Program
The Kansas State University Honors Program is intended to recognize high achievement of outstanding students who go beyond the curriculum requirements for a given degree program to meet the challenges of completing advanced study, scholarship, leadership, and citizenship activities. The Honors Program requires the completion of a minimum of 15 credit hours.

Admission to the University Honors Program requires the submission of an application, the details of which can be found at http://www.k-state.edu/ksuhonors/application.

I. University Level (7 credit hours)

   RETREAT for new students prior to fall semester (optional)

   COT 020 Students enroll in program each semester (0 credit hour)

   COT 189 Introduction to University Honors Program (1 credit hour)

   Other Requirements (6 credit hours)
   • University honors courses generated by the University Honors Program Director each semester. These courses can be honors sections of required courses or elective seminars (most are 3 credit hours).
   • K-State Polytechnic students may utilize the “contract for applying hours to honors program” form to incorporate honors elements into a regular, non-honors course or activity. In order to ensure appropriate rigor, the specific activities and goals must be created in consultation with the University Honors Program Director, the College Honors Program Coordinator, and the instructor teaching the requested course.
   • Alternative opportunities (e.g., study abroad) to generate university level honor credit hours must be approved by both the Director of the University Honors Program and the college coordinator (or appropriate college representative). Under no circumstances will students be allowed to arrange for credit after the experience is completed.

II. K-State Polytechnic Requirements (8 credit hours or equivalent required)

   Required experiences for all K-State Polytechnic University Honors Program Students:

   A. COT 299 Conducting Honors Research (1 credit hour)
   *Recommended enrollment during Sophomore/2nd year*

   This seminar experience is designed to help students learn more about possible options for Honors Projects and academia. When designed with career plans in mind, this experience can also be an excellent opportunity to prepare students for graduate or professional school.

   B. COT 299 Honors Project (3 credit hours)
   Capstone research or creative project - including presentation of findings to faculty and/or students. Requires supervision by a faculty mentor.

   Additional optional experiences that can be used to meet UHP College requirements:

   C. Professional Development Units (PDU) 2-4 PDUs

   The activities shown in the following list are only intended as examples by which professional development units may be earned. Final approval of an activity and the PDUs that can be earned for that activity are solely at the discretion of the UHP Director and K-State Polytechnic Honors Program Coordinator. Note that no one activity can be repeated for PDUs.
   • International study abroad or national student exchange (3).
• Faculty-led study tour (1).
• Summer professional internship (2).
• Community service including activities (1 to 2).
• Submission of a design or written paper or poster for regional and/or national student competition (2). Personally presenting the paper or poster at a national meeting, add (1).
• Student organization leadership position (local chapter president or equivalent) (1).
• K-State Polytechnic Student Ambassador (1).
• Application for nationally competitive scholarship awards (Rhodes, Marshall, Truman, Goldwater, Udall, or equivalent) (2).
• Graduate coursework (1 PDU for each credit hour of 700 level or higher taken for graduate credit).
• Completion of an "Honors Experience" within a regular course (Students may contract with the instructor of any KSU undergraduate course to complete an additional "Honors Experience" within the course beyond the regular course requirements).

* Requires a UHP plan, approved by UHP Director and CHE Honors Program Coordinator, submitted prior to the activity and a follow-up evaluation/self-reflection to be counted as an honors activity.
University Minors offered at K-State Polytechnic Campus

Applied Business (RABA)
18 hours required (Beginning January 2020)

The Applied Business minor is available to non-Business and non-Applied Business and Technology majors who will graduate from K-State. At least four of the six required courses must be completed at Kansas State University. Students must achieve a cumulative 2.50 GPA (K-State and transfer grades) in the six required courses to complete the minor. Note: Transfer grade of a "D" does not transfer.

Upon graduation, most students will be involved in organizations, both profit or nonprofit, that will use business concepts and principles to improve their services or products. To complete the Applied Business Minor, students must complete the business courses listed below:

<table>
<thead>
<tr>
<th>Required (18 credit hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS 251  Financial Accounting 3</td>
</tr>
<tr>
<td>BUS 252  Managerial Accounting 3</td>
</tr>
<tr>
<td>BUS 400  Marketing Techniques and Applications 3</td>
</tr>
<tr>
<td>BUS 420  Management Perspectives 3</td>
</tr>
<tr>
<td>BUS 450  Integrated Finance 3</td>
</tr>
<tr>
<td>BUS 520  Integrated Technology Management Capstone 3</td>
</tr>
</tbody>
</table>

Aviation Safety Minor (RAVSAF)
15 hours required

The Aviation Safety minor is designed to provide students with a knowledge of practices and procedures used in establishing and maintaining an effective safety program and to promote a safety culture. Students completing all requirements for the Aviation Safety minor will receive official recognition in their academic records.

The Aviation Safety minor is available to students seeking and having earned any K-State bachelor or graduate degree. Students must have a minimum of a 2.5 K-State GPA to qualify for entry into the minor program. Fifteen hours of designated course work with a grade of "C" or better for these courses are needed to complete the minor.

<table>
<thead>
<tr>
<th>Required Courses (6 credit hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVT 340  Human Factors in Aviation 3</td>
</tr>
<tr>
<td>AVT 450  Aviation Safety Management 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Elective Courses (9 credit hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVT 250  Safety and Security of Airport Ground Operations 3</td>
</tr>
<tr>
<td>AVT 420  Aviation Accident Investigation 3</td>
</tr>
<tr>
<td>AVT 451  System Safety 3</td>
</tr>
<tr>
<td>PPIL 387  Crew Resource Management I 3</td>
</tr>
</tbody>
</table>

Business Minor (RBUSI)
15 hours required

K-State Polytechnic offers all courses required in the business minor (awarded by the College of Business Administration), which is available to all students seeking or having earned a non-business K-State bachelor or graduate degree. Students must achieve a cumulative 2.5 grade point average in the five courses that comprise the business minor. At least three of the five courses must be completed at K-State, and transfer courses must be from accredited business colleges. Students should work with their advisor to complete the minor application. Courses required for the business minor include:
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS 251</td>
<td>Financial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>BUS 252</td>
<td>Managerial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>FINAN 450</td>
<td>Principles of Finance</td>
<td>3</td>
</tr>
<tr>
<td>MANGT 420</td>
<td>Principles of Management</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 400</td>
<td>Introduction to Marketing</td>
<td>3</td>
</tr>
</tbody>
</table>
Unmanned Aircraft Systems Minor (RUAS)

18 hours required

Intended for students not majoring in unmanned aircraft systems (UAS), the UAS minor provides a solid grounding in topics that include the current regulatory environment, multirotor field operations, and acquisition of data using low-altitude aerial platforms. UAS are interdisciplinary tools relevant in many disciplines and industries, therefore students will have the opportunity to select six credit hours of UAS-related coursework that they deem most appropriate to their field of study as electives in the minor. Additionally, students will complete a UAS-focused internship or research project at the end of the UAS minor to highlight the skills they obtained in the program.

Students pursuing majors in areas such as manned aviation, agriculture, biology, civil engineering, criminal justice, ecology, emergency management, environmental sciences, geography, geology, landscape architecture, and wildlife science may benefit from completion of this academic minor, particularly those individuals whose academic interests or career goals include the use of remotely sensed data products for research or commercial applications. This minor is not available to students pursuing a Bachelor of Science in Aeronautical Technology – Unmanned Aircraft Systems option (BATN-US).

Students must achieve a minimum GPA of 2.5 and a grade of "C" or better is required in all coursework.

<table>
<thead>
<tr>
<th>Required Courses (10 credit hours)</th>
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<tbody>
<tr>
<td>UAS 115       Multi-rotor Flight Lab</td>
<td>1</td>
</tr>
<tr>
<td>UAS 270       Introduction to Unmanned Aircraft Systems</td>
<td>3</td>
</tr>
<tr>
<td>UAS 272       UAS Safety Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>UAS 474       Introduction to the Processing of Remotely Sensed Data</td>
<td>3</td>
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<table>
<thead>
<tr>
<th>Elective Courses (6 credit hours)</th>
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</thead>
<tbody>
<tr>
<td>AGRON 655     Site Specific Agriculture</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 508      Geographic Information Systems I</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 605      Remote Sensing of the Environment</td>
<td>3</td>
</tr>
<tr>
<td>MC 469        Drone Photography and Video</td>
<td>3</td>
</tr>
<tr>
<td>UAS 373       Small Unmanned Aircraft Design and Construction for</td>
<td>3</td>
</tr>
<tr>
<td>Non-Aviators</td>
<td></td>
</tr>
<tr>
<td>UAS 463       Introduction to Autopilots and Mission Planning for</td>
<td>3</td>
</tr>
<tr>
<td>Non-Aviators</td>
<td></td>
</tr>
<tr>
<td>UAS 475       Data Acquisition and Post-processing</td>
<td>3</td>
</tr>
</tbody>
</table>

Other courses may be used if approved by the UAS minor program coordinator.

<table>
<thead>
<tr>
<th>Research Project or Internship (Minimum 2 hours)</th>
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<tbody>
<tr>
<td>COT 495       Advanced Industrial Internship</td>
<td>2</td>
</tr>
<tr>
<td>COT 497       Undergraduate Research Experience</td>
<td>2</td>
</tr>
</tbody>
</table>
University Degree Offerings Available at K-State Polytechnic

Social Work (BSOCWK-BS)
Bachelor of Science
120 hours required for graduation
http://www.polytechnic.ksu.edu/socialwork

The K-State department of Sociology, Anthropology, and Social Work offers its Social Work bachelor's degree program on the K-State Polytechnic campus.

Social work is concerned with the interaction between people and their social environments. Social workers help people deal with other people, cope with the many social and environmental forces that affect and control daily life, and help solve problems that inhibit growth and development.

The undergraduate social work program is accredited by the Commission on Accreditation of the Council on Social Work Education to educate entry-level, generalist social work practitioners. The social work major is required for students who intend to pursue a career in social work in Kansas and in many other states.

The bachelor's degree in social work is recognized as a beginning-level professional degree. Students graduating from the social work program are eligible for licensure as bachelor degree social workers in Kansas and numerous other states. No other bachelor's degree is recognized, or necessary, for such eligibility. Students who wish to pursue graduate studies in social work will be eligible for advanced standing in many masters of social work programs throughout the United States.

The intervention tasks performed by social workers are derived from a common base of knowledge, values, and skills. Thus, social workers are uniquely qualified to provide resources, services, and opportunities to individuals, groups, families, organizations, and communities. Students are required to complete a field practice placement during their senior year to integrate classroom material with practice experience in a professional setting.

Students wishing to declare a major in social work may enroll directly in curriculum SOCWK. This is a provisional admission to the social work program. Students must complete SOCWK 100, SOCWK 315, and SOCWK 510 before formal evaluation and admission to the program can occur. It is also recommended that students complete at least one of the two restricted Social Work electives (3 credits) prior to formal evaluation and admission to the program.

Formal evaluation occurs prior to admission to SOCWK 560 Social Work Practice I, taken during the junior year. At that time each student completes a personal statement and undergoes a formal review of academic and classroom performance by the program admissions committee. Students must have a 2.5 overall GPA and a 3.0 GPA in the core courses. Students successfully passing this review may enter the first course in the practice sequence, SOCWK 560. Students must maintain the admissions GPA standards throughout the three semester practice sequence and must have a C or better in core Social Work classes to move forward in each of their 3 final semesters in the program.

Failure to meet and maintain the standards of the program will result in dismissal from the social work major. A student may be allowed to remain in the major on conditional or probationary status, but he or she must meet the standards of the program to complete the major.

General requirements (53 credit hours)

<table>
<thead>
<tr>
<th>Communications (9 credit hours)</th>
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</thead>
<tbody>
<tr>
<td>COMM 106 Public Speaking I 3</td>
</tr>
<tr>
<td>ENGL 100 Expository Writing I 3</td>
</tr>
<tr>
<td>ENGL 200 Expository Writing II 3</td>
</tr>
</tbody>
</table>

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<tr>
<th>Humanities electives (12 credit hours)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Philosophy (3 credit hours)</td>
<td></td>
</tr>
<tr>
<td>PHILO 390    Business Ethics</td>
<td>3</td>
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<tr>
<td></td>
<td></td>
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<tr>
<td>Western Heritage (3 credit hours)</td>
<td></td>
</tr>
<tr>
<td>HIST 320    History of Technology</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Literary or Rhetorical Arts (3 credit hours)</td>
<td></td>
</tr>
<tr>
<td>COMM 480    Intercultural Communication</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 251    Introduction to Literature</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 302    Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Fine Arts (3 credit hours)</td>
<td></td>
</tr>
<tr>
<td>COT 105     Managing Academic Conversations</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Natural Science (14 credit hours)</th>
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</thead>
<tbody>
<tr>
<td>Life Sciences (4 credit hours)</td>
<td></td>
</tr>
<tr>
<td>BIOL 198    Principles of Biology</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Science (4 credit hours)</td>
<td></td>
</tr>
<tr>
<td>CHM 110     General Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHM 111     General Chemistry Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>GEOL 100    Earth in Action</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 103    Geology Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>PHYS 113    General Physics I</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional Life or Physical Sciences (3 credit hours)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Either Life or Physical Science (3 credit hours)</td>
<td></td>
</tr>
<tr>
<td>1 course with a prerequisite in the same department</td>
<td></td>
</tr>
<tr>
<td>BIOL 397     Topics in Biology: Ecology</td>
<td>3</td>
</tr>
<tr>
<td>GEOL 102     Earth Through Time (online)</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Quantitative and Abstract Formal Reasoning (3 credit hours)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 100     College Algebra</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Social Science (15 credit hours)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 200  Introduction to Cultural Anthropology</td>
<td>3</td>
</tr>
<tr>
<td>ECON 110  Principles of Macroeconomics</td>
<td>3</td>
</tr>
<tr>
<td>or ECON 120  Principles of Microeconomics</td>
<td>3</td>
</tr>
<tr>
<td>POLSC 110 Introduction to Political Science</td>
<td>3</td>
</tr>
<tr>
<td>or POLSC 115  US Politics</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 110 General Psychology</td>
<td>3</td>
</tr>
<tr>
<td>SOCIO 211 Introduction to Sociology</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Professional Studies (45 credit hours)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SOCWK 100  Social Work: The Helping Profession</td>
<td>3</td>
</tr>
<tr>
<td>SOCWK 315  Human Behavior in the Social Environment</td>
<td>3</td>
</tr>
<tr>
<td>SOCWK 330  Social Work Research Methods and Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>SOCWK 510  Social Welfare as a Social Institution</td>
<td>3</td>
</tr>
<tr>
<td>SOCWK 530  Social Work Research Methods and Analysis II</td>
<td>3</td>
</tr>
<tr>
<td>SOCWK 550  Field Practicum Preparation</td>
<td>3</td>
</tr>
<tr>
<td>SOCWK 560  Social Work Practice I</td>
<td>3</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
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<tr>
<td>-------------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>SOCWK 561</td>
<td>Social Work Practice II</td>
</tr>
<tr>
<td>SOCWK 562</td>
<td>Field Experience</td>
</tr>
<tr>
<td>SOCWK 564</td>
<td>Social Work Professional Seminar</td>
</tr>
<tr>
<td>SOCWK 565</td>
<td>Social Policy</td>
</tr>
<tr>
<td>SOCWK 568</td>
<td>Macro Practice and Theory</td>
</tr>
<tr>
<td>SOCWK 570</td>
<td>Social Work with Groups</td>
</tr>
</tbody>
</table>

**Social Work Restricted Electives (6 credit hours)**

Choose from SOCWK 200, SOCWK 320, SOCWK 340-501, or SOCWK 610-700.

**Unrestrictive Electives (16 credit hours)**
**Technology Education (UEDPPSTC)**
Bachelor of Science
121 credit hours required for gradation
[https://polytechnic.k-state.edu/academics/degree-options/teched/](https://polytechnic.k-state.edu/academics/degree-options/teched/)

Teach the next generation of technology trailblazers when you earn a bachelor’s degree in secondary education with a technology education endorsement at Kansas State Polytechnic.

In collaboration with K-State’s College of Education, this technology education degree option is designed to serve individuals interested in instructing technology at the high school level. Currently, there is a nationwide initiative to prepare more people to become STEM, or science, technology, engineering and math, educators, and this degree helps you make a contribution to that need.

Enrolled students study a combination of technology content focused in mechanical, electronic and computer systems curriculum. Many of the courses – which cover topics such as basic electronics, computing principles, hardware and software fundamentals, machine design and manufacturing methods – include lab time and project-based assignments, so students have a better understanding of the material and can use hands-on demonstrations in their own classrooms.

The secondary education pedagogy is taught through video conferencing by professors from the College of Education. Students get the opportunity to create and implement technology education lessons while teaching at a local high school for one semester. An official licensure will be earned upon completion of the bachelor’s degree and passing of the state Praxis test.

<table>
<thead>
<tr>
<th>Core Courses (60 credit hours)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CHM 110 General Chemistry</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CMST 103 Computing Principles</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CMST 250 Hardware and Network Fundamentals</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CMST 252 System and Software Fundamentals</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ECET 100 Basic Electronics</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>ECET 304 Electric Power and Devices</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>EDSEC 620 Principles and Philosophy of Career and Technical Education</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>EDSEC 621 Program Planning in Career and Technical Education</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ETB 492 Special Topics – Energy Systems and Construction Technology</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MATH 150 Plane Trigonometry</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MET 111 Technical Graphics</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MET 121 Manufacturing Methods</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MET 211 Statics</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MET 230 Automated Manufacturing Systems I</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MET 231 Physical Materials and Metallurgy</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MET 252 Fluid Power Technology</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>MET 264 Machine Design Technology I</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>MET 325 Additive Manufacturing</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PHYS 113 General Physics I</td>
<td>4</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Education Courses (37 credit hours)</th>
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<th></th>
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<tbody>
<tr>
<td>DED 075 Orientation to Teacher Education at KSU</td>
<td>0</td>
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<tr>
<td>EDCEP 315 Educational Psychology</td>
<td>3</td>
<td></td>
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<tr>
<td>EDCEP 525 Interpersonal Relations in the Schools</td>
<td>1</td>
<td></td>
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<tr>
<td>EDCI 200 Teaching as a Career</td>
<td>1</td>
<td></td>
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<tr>
<td>EDCI 230 Early Field Experience</td>
<td>1</td>
<td></td>
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<tr>
<td>EDCI 310 Foundations of Education</td>
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<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credit Hours</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>EDCI 318</td>
<td>Educational Technology for Teaching &amp; Learning</td>
<td>1</td>
</tr>
<tr>
<td>EDCI 320</td>
<td>Core Teaching Skills</td>
<td>3</td>
</tr>
<tr>
<td>EDSEC 405</td>
<td>Middle-Level Education</td>
<td>2</td>
</tr>
<tr>
<td>EDSEC 455</td>
<td>Teaching in a Multicultural Society</td>
<td>1</td>
</tr>
<tr>
<td>EDSEC 477</td>
<td>Content Area Literacies &amp; Diverse Learners</td>
<td>2</td>
</tr>
<tr>
<td>EDSEC 548</td>
<td>Technology Education Methods for Secondary &amp; Middle School</td>
<td>3</td>
</tr>
<tr>
<td>EDSEC 549</td>
<td>Technology Education Practicum for Secondary &amp; Middle School</td>
<td>2</td>
</tr>
<tr>
<td>EDSEC 586</td>
<td>Teaching Internship in Secondary Schools</td>
<td>12</td>
</tr>
<tr>
<td>EDSP 323</td>
<td>Exceptional Students in the Secondary School</td>
<td>2</td>
</tr>
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</table>

**Additional Requirements (12 credit hours)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 106</td>
<td>Public Speaking I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 100</td>
<td>Expository Writing I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 200</td>
<td>Expository Writing II</td>
<td>3</td>
</tr>
<tr>
<td>STAT 325</td>
<td>Introduction to Statistics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives (12 credit hours)**

Choose from the following:

- Fine Arts Appreciation Elective | 3
- Global Issue Elective         | 3
- Human Development Elective    | 3
- Literature Elective           | 3

---

**K-State Polytechnic Undergraduate Program Offerings**

**School of Integrated Studies**

*Dr. Terri Gaeddert, Director of Academic Operations*

Professors: Ackerman, Barnhart, K. Brockway, T. Brockway, Dandu, Genereux, Gross, Guzek, Harding, Jackson, Khan, Oh, E. Shappee, A. Smith, Starkey, and Zajac  
Associate Professors: Bower, Joseph, Morse, Plett, L. Shappee, and Stephens  
Assistant Professors: DeGreeff, Jones, Mirtz, and Pritchard  
Teaching Assistant Professors: Bloomquist, Burchfield, Dahl, Locklear, Oetken, and Von Bergen  
Professor of Practice: Kleinbeck and Nichols  
Instructors: Bailey, Calhoun, Hartman, Higdon, Irvin, Knopp, Lorson, Matthews, Mawhirter, Scott, Spare, Walden, and Zerr  
Emeriti Professors: Ahlvers, Barnard, Delker, Farmer, Hassan, Heublein, Homolka, Keating, King, Kinsler, Kissick, Riblett, and Splichal  
Emeriti Associate Professors: Anderson, Collins, Mertz, and Wilson  
Emeriti Assistant Professors: Barnes, Mosier, and Simmonds

785-826-2672  
[www.polytechnic.k-state.edu/academics](http://www.polytechnic.k-state.edu/academics)

Kansas State Polytechnic provides a small campus atmosphere with a professional learning environment built on theory, research and industry application in the classroom. Students can choose from 17 undergraduate programs and a Professional Master of Technology, making the university an equally diverse community of traditional and nontraditional students. Kansas State Polytechnic is proud to be one of four campuses in the Kansas State University system.
Certificates

Applied Manufacturing Certificate (CAPMNF)
17 hours required for completion

The Certificate of Applied Manufacturing provides entry-level or career-changing students the option of immersing themselves in the principles and practice of manufacturing. The certificate can be issued as a stand-alone qualification, or can be used to gain entry to the Associate’s, or Bachelor’s, degree in engineering technology, mechanical engineering technology option.

Required Courses (17 credit hours)
- MET 111  Technical Graphics 3
- MET 117  Mechanical Modeling and Detailing 3
- MET 121  Manufacturing Methods 3
- MET 125  Computer-Numerical-Controlled Machine Processes 2
- MET 231  Physical Materials and Metallurgy 3
- MET 325  Additive Manufacturing 3

Aviation Electronics Technology Certificate (CAVETC)
20 hours required for completion

This certificate program provides the education and practical experience needed for careers in the rapidly growing avionics segment of the aviation maintenance industry. Topic coverage includes systems found in advanced aircraft, such as glass cockpits and other advanced avionics systems. Those completing the program will find applications for these skills in aircraft design, operation, maintenance, inspection, repair, and alteration.

This program meets the standards set by the National Center for Aircraft Technician Training (NCATT). This certificate prepares students to seek the industry’s Aviation Electronics Technician (AET) certificate.

Required Core Courses (13 credit hours)
- **AVM 305  Introduction to Aircraft Avionics and Instrument Systems 3
- AVT 315  Advanced Avionics 3
- AVT 327  Avionics Repair 3
- *ECET 100  Basic Electronics 4

Elective Courses (7 credit hours)
- AVT 330  Avionics Troubleshooting 4
- AVT 429  Avionics Maintenance 3
- AVT 430  Advanced Avionics Installation 4

*Students with an FAA Airframe (A) Certificate may test out of this course.
**Students with an FAA Airframe (A) Certificate or an FAA Private Pilot Certification may test out of this course.

Composite Repair Certificate (CCOMRC)
12 hours required for completion

This certificate provides the education and practical experience needed for placement in the rapidly growing composite repair field. In addition, the certificate provides current aviation maintenance workers an avenue through which they may expand their knowledge of and experience with modern composite repair materials and techniques.

Fall Semester (5 credit hours):
AVT 317  Composites I  3
AVT 318  Composites I Laboratory  2

Spring Semester (7 credit hours):
AVT 400  Composites II  4
AVT 417  Composites III  3

**Associate Degrees**

**Applied Business (AABA)**

Associate of Science

61 hours required for graduation

This associate degree enables the graduate to succeed in an entry-level business position or continue with a bachelor’s degree in one of many different business fields; including finance, marketing, accounting, and management.

**Communications (12 credit hours)**

COMM 106  Public Speaking I  3
ENGL 100  Expository Writing I  3
ENGL 200  Expository Writing II  3
ENGL 302  Technical Writing  3
or
*Communications Elective  3

**Quantitative (9 credit hours)**

MATH 100  College Algebra  3
MATH 205  General Calculus and Linear Algebra  3
Computer Elective  3

**Economics (6 credit hours)**

ECON 110  Principles of Macroeconomics  3
ECON 120  Principles of Microeconomics  3

**Social Science Electives (6 credit hours)**

GEOG  All courses except those that count as humanities or natural science electives are acceptable
HDFS  All courses
POLSC  All courses
PSYCH  All courses
SOCIO  All courses

**Humanities Electives (6 credit hours)**

ART  All courses
COT 150  The Humanities Through the Arts
ENGL  All literature courses
HIST  All courses
PHILO  All courses

**Natural Science Electives (7 credit hours)**

One lab course required. Choose two courses from the following list:
BIOL  All courses
CHM  All courses
GEOL  All courses
PHYS  All courses
Business Core Courses (15 credit hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS 110</td>
<td>Introduction to Business</td>
<td>3</td>
</tr>
<tr>
<td>BUS 251</td>
<td>Financial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>BUS 252</td>
<td>Managerial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>BUS 315</td>
<td>Supervisory Management</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Including 3 credit hours from:</td>
<td></td>
</tr>
<tr>
<td>MANGT 366</td>
<td>Information Technology for Business</td>
<td>3</td>
</tr>
<tr>
<td>or</td>
<td>MKTG 400</td>
<td>3</td>
</tr>
</tbody>
</table>

*Marked electives must be upper-level courses, 300 and above.

Aviation (ASAPP)

Associate of Science

60 hours required for graduation

Students may pursue studies in professional pilot to obtain the Associate of Science degree in Aviation.

The K-State Polytechnic flight training program is FAR 141 approved. Flight training is conducted in Cessna 172s and Beechcraft Barons. Both standard and full graphics simulators are used for additional training benefit.

The lab times reflected in the pilot courses are minimum times. Significant time commitment is necessary for labs and flight training. This program requires additional costs above the standard tuition, books, and supplies. Students must possess a current medical certificate issued by an aviation medical examiner prior to starting flight training.

**Freshman**

**Fall semester (14 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVT 100</td>
<td>Introduction to Aviation</td>
<td>3</td>
</tr>
<tr>
<td>MATH 100</td>
<td>College Algebra</td>
<td>3</td>
</tr>
<tr>
<td>PPIL 111</td>
<td>Private Pilot</td>
<td>4</td>
</tr>
<tr>
<td>PPIL 113</td>
<td>Private Pilot Flight Lab</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Humanities/Social Science/Business Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

**Spring semester (16 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVT 242</td>
<td>Aviation Meteorology</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 100</td>
<td>Expository Writing I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 150</td>
<td>Plane Trigonometry</td>
<td>3</td>
</tr>
<tr>
<td>PPIL 112</td>
<td>Professional Instrument Pilot</td>
<td>3</td>
</tr>
<tr>
<td>PPIL 114</td>
<td>Professional Instrument Pilot Flight Lab</td>
<td>1</td>
</tr>
<tr>
<td>PSYCH 110</td>
<td>General Psychology</td>
<td>3</td>
</tr>
</tbody>
</table>

**Sophomore**

**Fall semester (15 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVT 386</td>
<td>Aerodynamics</td>
<td>3</td>
</tr>
<tr>
<td>COMM 106</td>
<td>Public Speaking I</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 113</td>
<td>General Physics I</td>
<td>4</td>
</tr>
<tr>
<td>PPIL 211</td>
<td>Professional Commercial Pilot</td>
<td>3</td>
</tr>
<tr>
<td>PPIL 212</td>
<td>Professional Commercial Pilot Flight Lab I</td>
<td>2</td>
</tr>
</tbody>
</table>

**Spring semester (17 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVT 340</td>
<td>Human Factors in Aviation</td>
<td>3</td>
</tr>
<tr>
<td>PPIL 210</td>
<td>Aviation Safety</td>
<td>3</td>
</tr>
</tbody>
</table>
The associate of technology degree options in Engineering Technology emphasize the application of scientific and engineering principles. These options allow students to specialize in digital media technology, electronic and computer engineering technology, mechanical engineering technology, and web development technology. Each program option gives students a strong foundation in mathematics, communications, and computer applications, plus option-specific technical courses and electives prepare graduates for many diverse occupations in business and industry. The significant amount of laboratory work assures that students will be immediately productive upon graduation.

Electronic and Computer Engineering Technology option (AETA-EC)
62 hours required for graduation

The electronic and computer engineering technology curriculum emphasizes the theory and application of electronic circuits, instrumentation, and systems. Numerous laboratory experiences reinforce the concepts taught in the classroom. Course work in this curriculum includes a strong foundation in basic circuit theory, semiconductor applications, digital systems, microprocessor programming and interfacing, plus essential concepts in mathematics, science, and interpersonal communications.

Electronic and computer engineering technicians work in all areas of the electronics industry, including industrial control electronics, communications, and digital systems. These individuals work closely with electronic engineering technologists, electrical engineers, computer scientists, and other professionals in the design, development, marketing, and maintenance of electronic products and systems.

**Freshman**

**Fall semester (16 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COT 105</td>
<td>Mastering Academic Conversations</td>
<td>3</td>
</tr>
<tr>
<td>ECET 100</td>
<td>Basic Electronics</td>
<td>4</td>
</tr>
<tr>
<td>ECET 250</td>
<td>Digital Logic</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 100</td>
<td>Expository Writing I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 100</td>
<td>College Algebra</td>
<td>3</td>
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</table>

**Spring semester (16 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHM 110</td>
<td>General Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHM 111</td>
<td>General Chemistry Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CMST 250</td>
<td>Hardware and Network Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>COMM 106</td>
<td>Public Speaking I</td>
<td>3</td>
</tr>
<tr>
<td>ECET 101</td>
<td>Direct Current Circuits</td>
<td>3</td>
</tr>
<tr>
<td>MATH 150</td>
<td>Plane Trigonometry</td>
<td>3</td>
</tr>
</tbody>
</table>

**Sophomore**

**Fall semester (16 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECET 110</td>
<td>Semiconductor Electronics</td>
<td>4</td>
</tr>
<tr>
<td>ECET 201</td>
<td>Alternating Current Circuits</td>
<td>4</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Analytic Geometry and Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 113</td>
<td>General Physics I</td>
<td>4</td>
</tr>
</tbody>
</table>
Spring semester (14 credit hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECET 240</td>
<td>Electronic Manufacturing</td>
<td>3</td>
</tr>
<tr>
<td>ECET 335</td>
<td>Industrial Control Topics</td>
<td>1</td>
</tr>
<tr>
<td>ECET 350</td>
<td>Microprocessor Fundamentals</td>
<td>4</td>
</tr>
<tr>
<td>ENGL 302</td>
<td>Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>MET 382</td>
<td>Industrial Instrumentation and Controls</td>
<td>3</td>
</tr>
</tbody>
</table>

Mechanical Engineering Technology option (AETA-MT)

61 hours required for graduation

The mechanical engineering technology program prepares graduates for applied mechanical and manufacturing engineering-related careers with a hands-on, practical approach. The program emphasizes understanding how engineering principles are applied in practice, rather than purely the mathematical methods used.

The mechanical engineering technology program is built upon a strong foundation of science, mathematics, and applied technical courses designed to meet the diverse needs of the industrial workforce. Mechanical engineering technology concepts are used in all types of industry and are directly applied to product design and manufacturing. Courses in technical graphics with CAD, manufacturing processes, materials, material strength and testing, computer numerical control, automated manufacturing systems, machine design, quality control, and economics provide the student with a broad range of expertise for a career in mechanical engineering technology.

Graduates of the mechanical engineering technology program work within engineering teams in applied design, project management, product development, testing, manufacturing, plant operations, maintenance, or technical sales. Associate degree graduates accept jobs as engineering technicians, engineering aides, plant operation and maintenance staff, layout staff, production assistants, and technical sales staff.

Freshman

Fall semester (16 credit hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECET 100</td>
<td>Basic Electronics</td>
<td>4</td>
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<tr>
<td>MATH 100</td>
<td>College Algebra</td>
<td>3</td>
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<tr>
<td>MET 111</td>
<td>Technical Graphics</td>
<td>3</td>
</tr>
<tr>
<td>MET 121</td>
<td>Manufacturing Methods</td>
<td>3</td>
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<tr>
<td></td>
<td>Humanities/Social Science Elective</td>
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</tr>
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</table>

Spring semester (15 credit hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHM 110</td>
<td>General Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHM 111</td>
<td>General Chemistry Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 100</td>
<td>Expository Writing I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 150</td>
<td>Plane Trigonometry</td>
<td>3</td>
</tr>
<tr>
<td>MET 117</td>
<td>Mechanical Modeling and Detailing</td>
<td>3</td>
</tr>
<tr>
<td>MET 125</td>
<td>Computer-Numerical-Controlled Machine Processes</td>
<td>2</td>
</tr>
</tbody>
</table>

Sophomore

Fall semester (17 credit hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 106</td>
<td>Public Speaking I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Analytic Geometry and Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MET 211</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>MET 252</td>
<td>Fluid Power Technology</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 113</td>
<td>General Physics I</td>
<td>4</td>
</tr>
</tbody>
</table>

Spring semester (13 credit hours)
Web Development Technology option (AETA-WD)
61 hours required for graduation

The web development technology program builds a foundation in computer science and applies these concepts to the world of e-commerce and website development. All students take introductory classes in operating systems and program design. The program also includes courses in programming and network administration.

Students interested in programming-oriented careers will find the curriculum challenging and rewarding. Students obtain experience with client-side programming, server-side programming, video and audio streaming, as well as database integration and other ways to make the web an effective tool for business. Students also learn project management and the use of timetables and other organizational techniques. Software tools including Flash, DreamWeaver, and Javascript are utilized, but the main curriculum emphasis is on programming solutions to actual problems.

Major Requirements (33 credit hours)
CMST 103 Computing Principles 3
CMST 135 Web Fundamentals 3
CMST 180 Introduction to Database Systems 3
CMST 183 Computer Systems Studio I 1
CMST 185 Computer Systems Studio II 1
CMST 247 Programming I 3
CMST 250 Hardware and Network Fundamentals 3
CMST 252 System and Software Fundamentals 3
CMST 283 Computer Systems Studio III 1
CMST 315 Introduction to System Administration 3
CMST 332 Web Development Project 3
CMST 335 Programming II 3
DIGME 137 Fundamentals of Visual Literacy 3

Other courses may be used if approved by the AETA-WD program coordinator.

Other Requirements (28 credit hours)
COMM 106 Public Speaking I 3
ENGL 100 Expository Writing I 3
ENGL 302 Technical Writing 3
Humanities/Social Science/Business Elective 3
Humanities/Social Science/Business Elective 3
Humanities/Social Science/Business Elective 3
*Mathematics Requirement 3
Science Elective 4
Unrestricted Elective 3

*Choose from MATH 100, MATH 150, MATH 205 or MATH 220.

Bachelor Degrees
Aeronautical Technology (BATN)
Bachelor of Science
The Bachelor of Science degree program in Aeronautical Technology focuses on a curriculum core and technically specific curriculum of theory, development, and application in the areas of options.

**Airport Management (BATN-AP)**

120 hours required for graduation

This option of study prepares students for rewarding careers in airport management. Coursework will provide a foundation of study in aircraft flight to provide foundational knowledge for further study in this career field. Coursework will continue with study of airport environmental regulations, airport law, and aviation/airport funding structures. Students will graduate with the Certified Member designation from the American Association of Airport Executives (AAAE).

### Freshman

#### Fall semester (17 credit hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVT 100</td>
<td>Introduction to Aviation</td>
<td>3</td>
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<tr>
<td>CMST 108</td>
<td>PC Desktop Software</td>
<td>3</td>
</tr>
<tr>
<td>EDCEP 111</td>
<td>The University Experience</td>
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</tr>
<tr>
<td>ENGL 100</td>
<td>Expository Writing I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 100</td>
<td>College Algebra</td>
<td>3</td>
</tr>
<tr>
<td>PPIL 111</td>
<td>Private Pilot</td>
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#### Spring semester (15 credit hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS 110</td>
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<td>3</td>
</tr>
<tr>
<td>COMM 106</td>
<td>Public Speaking I</td>
<td>3</td>
</tr>
<tr>
<td>ECON 110</td>
<td>Principles of Macroeconomics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 150</td>
<td>Plane Trigonometry</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 110</td>
<td>General Psychology</td>
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### Sophomore

#### Fall semester (16 credit hours)

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
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<td>Airport Management</td>
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<tr>
<td>ENGL 200</td>
<td>Expository Writing II</td>
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<tr>
<td>PHILO 105</td>
<td>Introduction to Critical Thinking</td>
<td>3</td>
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<tr>
<td>PHYS 113</td>
<td>General Physics I</td>
<td>4</td>
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<tr>
<td>STAT 325</td>
<td>Introduction to Statistics</td>
<td>3</td>
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</table>

#### Spring semester (15 credit hours)

<table>
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<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>AVT 250</td>
<td>Safety and Security of Airport Ground Operations</td>
<td>3</td>
</tr>
<tr>
<td>AVT 380</td>
<td>Airport Operations</td>
<td>4</td>
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<tr>
<td>BUS 251</td>
<td>Financial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>BUS 315</td>
<td>Supervisory Management</td>
<td>3</td>
</tr>
<tr>
<td>MANGT 366</td>
<td>Information Technology for Business</td>
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### Junior

#### Fall semester (15 credit hours)

<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>AVT 340</td>
<td>Human Factors in Aviation</td>
<td>3</td>
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<tr>
<td>ENGL 302</td>
<td>Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>MANGT 390</td>
<td>Business Law I</td>
<td>3</td>
</tr>
<tr>
<td>PHILO 390</td>
<td>Business Ethics</td>
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</tr>
<tr>
<td></td>
<td>Humanities/Social Science Elective</td>
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#### Spring semester (15 credit hours)

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<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>AVT 480</td>
<td>Airport Global Networks</td>
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<tr>
<td>MANGT 420</td>
<td>Principles of Management</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 400</td>
<td>Introduction to Marketing</td>
<td>3</td>
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</tbody>
</table>
Humanities/Social Science Elective 3
Natural Science Elective 3

Senior

Fall semester (13 credit hours)
AVT 360  Airport Law 3
AVT 361  Airport Environmental Studies 3
AVT 462  Airport Planning 4
AVT 482  Aviation Ethics and Leadership 3

Spring semester (14 credit hours)
AVT 464  Airport Certified Manager 1
AVT 560  Airport Design 4
MANGT 531  Human Resource Management 3
*Restricted Elective 3

Choose one of the following:
AVT 448  Aviation Legislation 3
or
COT 495  Industrial Internship 3

*Choose from BUS 252 or MANGT 530.

Aviation Maintenance Management (BATN-AM)
121 hours required for graduation

The Bachelor of Science option in aviation maintenance management is designed for the maintenance technician with supervisory or management goals such as shop foreman, lead technician, director of maintenance and other leadership positions.

There are multiple opportunities for advanced education and training through aviation electives and advanced maintenance courses addressing the non-destructive testing of aviation parts and aircraft, and the use of advanced composites in the larger transport category, corporate, and military aircraft.

Freshman

Fall semester (15 credit hours)
AVM 101  Introduction to Aircraft Materials and Tooling Standards 3
AVM 102  Aviation Regulations, Compliance and Operations 2
AVM 111  Basic Aircraft Electricity 4
MATH 100  College Algebra 3
MET 111  Technical Graphics 3

Spring semester (15 credit hours)
AVM 205  Aircraft Landing Gear and Fluid Power Systems 3
AVM 207  Aircraft Electrical Systems 3
AVT 100  Introduction to Aviation 3
COMM 106  Public Speaking I 3
ENGL 100  Expository Writing I 3

Sophomore

Fall semester (15 credit hours)
AVM 303  Introduction to Aircraft Composite Structures 3
AVM 305  Introduction to Aircraft Avionics and Instrument Systems 3
CMST 108  PC Desktop Software 3
ENGL 200  Expository Writing II 3
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 150</td>
<td>Plane Trigonometry</td>
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**Spring semester (16 credit hours)**

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<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AVM 201</td>
<td>Aircraft Metallic Primary Structures</td>
<td>3</td>
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<tr>
<td>AVM 203</td>
<td>Aircraft Environmental and Fire Protection Systems</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 113</td>
<td>General Physics I</td>
<td>4</td>
</tr>
<tr>
<td>STAT 325</td>
<td>Introduction to Statistics</td>
<td>3</td>
</tr>
<tr>
<td>Humanities/Social Science Elective</td>
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</table>

**Junior**

**Fall semester (15 credit hours)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>AVM 214</td>
<td>Introduction to Aircraft Propulsion Theory, Design and Systems</td>
<td>3</td>
</tr>
<tr>
<td>AVM 216</td>
<td>Aircraft Propulsion Drive Systems</td>
<td>3</td>
</tr>
<tr>
<td>AVM 370</td>
<td>Advanced Aircraft Avionics and Instrument Systems</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 302</td>
<td>Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>PHILO 390</td>
<td>Business Ethics</td>
<td>3</td>
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</table>

**Spring semester (15 credit hours)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>AVM 301</td>
<td>Advanced Reciprocating Powerplant Technology</td>
<td>3</td>
</tr>
<tr>
<td>AVM 304</td>
<td>Aircraft Fuel Management and Metering Systems</td>
<td>3</td>
</tr>
<tr>
<td>AVM 322</td>
<td>Powerplant Operation and Troubleshooting</td>
<td>3</td>
</tr>
<tr>
<td>AVT 340</td>
<td>Human Factors in Aviation</td>
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<tr>
<td>MANGT 366</td>
<td>Information Technology for Business</td>
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**Senior**

**Fall semester (15 credit hours)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AVM 306</td>
<td>Rotary and Fixed Wing Aircraft Design and Assembly</td>
<td>3</td>
</tr>
<tr>
<td>AVT 482</td>
<td>Aviation Ethics and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>BUS 251</td>
<td>Financial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>BUS 315</td>
<td>Supervisory Management</td>
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<tr>
<td>Humanities/Social Science/Business Elective</td>
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**Spring semester (15 credit hours)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AVM 402</td>
<td>Advanced Gas Turbine Powerplant Technology</td>
<td>3</td>
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<tr>
<td>MANGT 420</td>
<td>Principles of Management</td>
<td>3</td>
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<tr>
<td>*Aviation Elective</td>
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<tr>
<td>Natural Science Elective</td>
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</tr>
<tr>
<td>**Restricted Elective</td>
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</table>

*Marked electives must be upper-level courses, 300 and above.  
**Restricted Electives

Choose from the following:

<table>
<thead>
<tr>
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<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BUS 252</td>
<td>Managerial Accounting</td>
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<tr>
<td>MANGT 390</td>
<td>Business Law I</td>
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</tr>
<tr>
<td>MANGT 530</td>
<td>Industrial and Labor Relations</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 400</td>
<td>Introduction to Marketing</td>
<td>3</td>
</tr>
</tbody>
</table>

**Professional Pilot (BATN-PP)**

120 hours required for graduation

Students may pursue studies in the professional pilot option to obtain the Bachelor of Science degree in aeronautical technology.
The Cessna/King CPC integrated flight training program is utilized to obtain private, instrument, commercial, certified flight instructor, and multi-engine ratings.

The student will receive the instrument flight instructor certificate in addition to advanced classes rooted in aviation applications. The flight training program is FAR 141 approved. The approval allows students to meet the commercial instrument minimum-flight-hour requirement in 190 hours instead of 250 hours.

Flight training is conducted in Cessna 172s, Beechcraft Bonanzas, and Beechcraft Barons. Both standard and full graphics simulators are used for additional training benefit.

The lab times reflected in the pilot courses are minimum times. Significant time commitment is necessary for labs and flight training. This program requires additional costs above the standard tuition, books, and supplies. Students must possess a current medical certificate issued by an aviation medical examiner prior to starting flight training.

### Freshman

#### Fall semester (14 credit hours)

- AVT 100 Introduction to Aviation 3
- ENGL 100 Expository Writing I 3
- MATH 100 College Algebra 3
- PPIL 111 Private Pilot 4
- PPIL 113 Private Pilot Flight Lab 1

#### Spring semester (16 credit hours)

- AVT 242 Aviation Meteorology 3
- COMM 106 Public Speaking I 3
- MATH 150 Plane Trigonometry 3
- PPIL 112 Professional Instrument Pilot 3
- PPIL 114 Professional Instrument Pilot Flight Lab 1
- PSYCH 110 General Psychology 3

### Sophomore

#### Fall semester (15 credit hours)

- ENGL 200 Expository Writing II 3
- PHYS 113 General Physics I 4
- PPIL 210 Aviation Safety 3
- PPIL 211 Professional Commercial Pilot 3
- PPIL 212 Professional Commercial Pilot Flight Lab I 2

#### Spring semester (17 credit hours)

- AVT 340 Human Factors in Aviation 3
- AVT 386 Aerodynamics 3
- ENGL 302 Technical Writing 3
- PPIL 213 Professional Commercial Pilot Flight Lab II 2
- Computer Elective 3
- Economics Elective 3

### Junior

#### Fall semester (15 credit hours)

- PPIL 312 Certified Flight Instructor Ground School 6
- PPIL 325 Advanced Aircraft Systems 3
- Humanities/Social Science Elective 3
- Natural Science Elective 3

#### Spring semester (14 credit hours)
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS 315</td>
<td>Supervisory Management</td>
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<td>PHILO 390</td>
<td>Business Ethics</td>
<td>3</td>
</tr>
<tr>
<td>PPIL 262</td>
<td>Multi-Engine Ground School</td>
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<tr>
<td>PPIL 263</td>
<td>Multi-Engine Flight Lab</td>
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<td>Aviation Elective</td>
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<tr>
<td></td>
<td>Humanities/Social Science Elective</td>
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### Senior

**Fall semester (14 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 400</td>
<td>Introduction to Marketing</td>
<td>3</td>
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<tr>
<td>PPIL 387</td>
<td>Crew Resource Management I</td>
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<tr>
<td>STAT 325</td>
<td>Introduction to Statistics</td>
<td>3</td>
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<tr>
<td></td>
<td>*Aviation Elective</td>
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<tr>
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<td>*Aviation Elective</td>
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**Spring semester (15 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>AVT 440</td>
<td>Air Carrier Operations</td>
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<tr>
<td>AVT 445</td>
<td>Aviation Law</td>
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**Culminating Experience:**

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>AVT 497</td>
<td>Senior Capstone</td>
<td>3</td>
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</tbody>
</table>

*Marked electives must be upper-level courses, 300 and above.

### Unmanned Aircraft Systems (BATN-AS)

120 hours required for graduation

This option of study prepares students for careers in the field of unmanned aircraft systems (UAS) or remotely piloted aircraft. This is a rapidly growing area of aviation and students will be prepared to safely deploy UAS vehicles in response to emerging challenges and opportunities. Coursework includes foundational courses in aviation flight and maintenance necessary for UAS operation and specific courses designed to enable commercially available payload to platform integration and to enable students to think critically in a rapidly developing technical field. Students will be prepared for technical and/or entry-level managerial positions and will be required to successfully defend a portfolio of accumulated learning prior to graduation.

### Freshman

**Fall semester (17 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>AVT 100</td>
<td>Introduction to Aviation</td>
<td>3</td>
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<tr>
<td>COT 105</td>
<td>Mastering Academic Conversations</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 100</td>
<td>Expository Writing I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 100</td>
<td>College Algebra</td>
<td>3</td>
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<tr>
<td>PPIL 111</td>
<td>Private Pilot</td>
<td>4</td>
</tr>
<tr>
<td>PPIL 113</td>
<td>Private Pilot Flight Lab</td>
<td>1</td>
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**Spring semester (16 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ECON 110</td>
<td>Principles of Macroeconomics</td>
<td>3</td>
</tr>
<tr>
<td>MATH 205</td>
<td>General Calculus and Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>PPIL 112</td>
<td>Professional Instrument Pilot</td>
<td>3</td>
</tr>
<tr>
<td>PSYCH 110</td>
<td>General Psychology</td>
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<td>Multi-rotor Flight Lab</td>
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<tr>
<td>UAS 270</td>
<td>Introduction to Unmanned Aircraft Systems</td>
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### Sophomore

**Fall semester (14 credit hours)**
<table>
<thead>
<tr>
<th>Course Code</th>
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<td>Basic Electronics</td>
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<td>MATH 150</td>
<td>Plane Trigonometry</td>
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</tr>
<tr>
<td>UAS 312</td>
<td>Unmanned Aircraft Flight Instructor Ground School</td>
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<td>UAS 314</td>
<td>Multi-rotor Instructor Flight Lab</td>
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<tr>
<td>UAS 370</td>
<td>Small Unmanned Aircraft Systems Design and Construction</td>
<td>3</td>
</tr>
</tbody>
</table>

**Spring semester (15 credit hours)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVT 340</td>
<td>Human Factors in Aviation</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 200</td>
<td>Expository Writing II</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 113</td>
<td>General Physics I</td>
<td>4</td>
</tr>
<tr>
<td>UAS 275</td>
<td>Small Unmanned Aircraft Maintenance I</td>
<td>3</td>
</tr>
<tr>
<td>UAS 357</td>
<td>Unmanned Aircraft Fixed-wing Flight Lab</td>
<td>2</td>
</tr>
</tbody>
</table>

**Junior**

**Fall semester (14 credit hours)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS 110</td>
<td>Introduction to Business</td>
<td>3</td>
</tr>
<tr>
<td>COMM 106</td>
<td>Public Speaking I</td>
<td>3</td>
</tr>
<tr>
<td>UAS 367</td>
<td>Advanced Unmanned Aircraft Fixed-wing Flight Lab</td>
<td>2</td>
</tr>
<tr>
<td>UAS 387</td>
<td>Crew Resource Management for Unmanned Aircraft Systems</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>*Aviation/Electronics/Computer Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

**Spring semester (14 credit hours)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS 315</td>
<td>Supervisory Management</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 302</td>
<td>Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td>STAT 325</td>
<td>Introduction to Statistics</td>
<td>3</td>
</tr>
<tr>
<td>UAS 417</td>
<td>Fixed-wing Instructor Flight Lab</td>
<td>2</td>
</tr>
<tr>
<td>UAS 461</td>
<td>Autonomous Flight Simulation Lab</td>
<td>1</td>
</tr>
<tr>
<td>UAS 465</td>
<td>Autopilot Integration</td>
<td>2</td>
</tr>
</tbody>
</table>

**Senior**

**Fall semester (15 credit hours)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVT 450</td>
<td>Aviation Safety Management</td>
<td>3</td>
</tr>
<tr>
<td>UAS 300</td>
<td>Unmanned Aircraft Systems Powerplant Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>UAS 470</td>
<td>Flight and Field Operations</td>
<td>3</td>
</tr>
<tr>
<td>UAS 474</td>
<td>Introduction to Processing Remotely Sensed Data</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>*Aviation/Electronics/Computer Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

**Spring semester (15 credit hours)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVT 445</td>
<td>Aviation Law</td>
<td>3</td>
</tr>
<tr>
<td>UAS 475</td>
<td>Data Acquisition and Post-processing</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Humanities/Social Science/Business Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Natural Science Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

**Culminating Experience (choose 3 hours from the following):**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVT 497</td>
<td>Senior Capstone</td>
<td>3</td>
</tr>
<tr>
<td>COT 495</td>
<td>Industrial Internship</td>
<td>3</td>
</tr>
<tr>
<td>ETB 480</td>
<td>UAS Senior Design I</td>
<td>1</td>
</tr>
<tr>
<td>ETB 481</td>
<td>UAS Senior Design II</td>
<td>2</td>
</tr>
</tbody>
</table>

*Marked electives must be upper-level courses, 300 and above.

**Applied Business and Technology**

Bachelor of Science (Effective January 2020)
The Bachelor of Science in Applied Business and Technology provides students with knowledge and skills designed to enhance their employability and upward mobility in the technical field of their choice. Students take courses in the diverse areas of management, accounting, and marketing; as well as in other essential business areas. The technology concentration courses can be done in any of a number of technical disciplines. Graduates are prepared for supervisory and management positions in a variety of technical areas, ranging from aviation and manufacturing to sales and product development.

The Technology Management Option allows students transferring from two-year institutions to apply up to 45 credit-hours of their technical specialty, as well as general education courses, for a total of 60 credit-hours transferrable to Kansas State. The Applied Business Option allows students to build a more integrated business focus, with additional studies in mathematics and applied business electives.

**Applied Business option (XXXX)**

120 hours required for graduation

**Area of Concentration (29 credit hours)**

This block of courses may include course work in one area of concentration, or related multiple certificates, options, or specialization areas other than business. Courses accepted for transfer to K-State must be academic college-level courses.

**General Education (55 credit hours)**

**Communications (15 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 106</td>
<td>Public Speaking I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 100</td>
<td>Expository Writing I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 200</td>
<td>Expository Writing II</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 302</td>
<td>Technical Writing</td>
<td>3</td>
</tr>
</tbody>
</table>

*Communication elective 3

**Quantitative (15 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 100</td>
<td>College Algebra</td>
<td>3</td>
</tr>
<tr>
<td>MATH 205</td>
<td>General Calculus and Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>STAT 325</td>
<td>Introduction to Statistics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Computer elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Computer elective</td>
<td>3</td>
</tr>
</tbody>
</table>

**Natural Sciences Electives (7 credit hours)**

Choose two natural science elective courses. One course must include a lab component.

**Humanities/Social Sciences (18 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 110</td>
<td>Principles of Macroeconomics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 120</td>
<td>Principles of Microeconomics</td>
<td>3</td>
</tr>
</tbody>
</table>

*Humanities/Social Science elective 3

**Business and Management (36 credit hours)**

**Required (30 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS 110</td>
<td>Introduction to Business</td>
<td>3</td>
</tr>
<tr>
<td>BUS 251</td>
<td>Financial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>BUS 252</td>
<td>Managerial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>BUS 315</td>
<td>Supervisory Management</td>
<td>3</td>
</tr>
<tr>
<td>BUS 366</td>
<td>Management with Information Technology</td>
<td>3</td>
</tr>
<tr>
<td>Course</td>
<td>Title</td>
<td>Credits</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>BUS 390</td>
<td>Foundations of Business Law</td>
<td>3</td>
</tr>
<tr>
<td>BUS 400</td>
<td>Marketing Techniques and Applications</td>
<td>3</td>
</tr>
<tr>
<td>BUS 420</td>
<td>Management Perspectives</td>
<td>3</td>
</tr>
<tr>
<td>BUS 450</td>
<td>Integrated Finance</td>
<td>3</td>
</tr>
<tr>
<td>BUS 520</td>
<td>Integrated Technology Management Capstone</td>
<td>3</td>
</tr>
</tbody>
</table>

**Choose 6 credit hours from the following:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS 410</td>
<td>Managerial and Project Economics</td>
<td>3</td>
</tr>
<tr>
<td>BUS 421</td>
<td>Applied Operations Management</td>
<td>3</td>
</tr>
<tr>
<td>BUS 530</td>
<td>Practices of Industrial and Labor Relations</td>
<td>3</td>
</tr>
<tr>
<td>BUS 531</td>
<td>Strategic Human Resources Management</td>
<td>3</td>
</tr>
<tr>
<td>BUS 542</td>
<td>Personal Selling and Sales Management</td>
<td>3</td>
</tr>
<tr>
<td>COT 450</td>
<td>Polytechnic International Experience **</td>
<td>3</td>
</tr>
<tr>
<td>COT 495</td>
<td>Advanced Industrial Internship</td>
<td>3</td>
</tr>
</tbody>
</table>

*Marked electives must be upper-level courses, 300 and above

**Repeatable with approval of School of Integrated Studies Director.

**Technology Management option (XXXX)**

120 hours required for graduation

**Area of Concentration (39-45 credit hours)**

This block of courses may include coursework in one area of concentration, or related multiple certificates, options, or specialization areas other than business. Courses accepted for transfer to K-State must be academic college-level courses.

**General Education (28 credit hours)**

**Communications (12 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 106</td>
<td>Public Speaking I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 100</td>
<td>Expository Writing I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 200</td>
<td>Expository Writing II</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 302</td>
<td>Technical Writing</td>
<td>3</td>
</tr>
</tbody>
</table>

**Quantitative (6 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 100</td>
<td>College Algebra</td>
<td>3</td>
</tr>
<tr>
<td>STAT 325</td>
<td>Introduction to Statistics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Natural Science (4 credit hours)**

Science Elective with Lab 4

**Economics (6 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 110</td>
<td>Principles of Macroeconomics</td>
<td>3</td>
</tr>
<tr>
<td>ECON 120</td>
<td>Principles of Microeconomics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Restricted Electives (17-23 credit hours)**

Choose from the following areas:

- Advanced Industrial Internship
- Communication Studies
- Computer Systems Technology
- Digital Media
- Humanities/Social Science
- Mathematics
- Natural Science
Statistics

Business and Management (30 credit hours)
Required (18 credit hours)
BUS 251 Financial Accounting 3
BUS 252 Managerial Accounting 3
BUS 315 Supervisory Management 3
BUS 366 Management with Information Technology 3
BUS 420 Management Perspectives 3
BUS 520 Integrated Technology Management Capstone 3

Choose 12 credit hours from the following:
BUS 390 Foundations of Business Law 3
BUS 400 Marketing Techniques and Applications 3
BUS 410 Managerial and Project Economics 3
BUS 421 Applied Operations Management 3
BUS 450 Integrated Finance 3
BUS 530 Practices of Industrial and Labor Relations 3
BUS 531 Strategic Human Resources Management 3
BUS 542 Personal Selling and Sales Management 3
COT 450 Polytechnic International Experience * 3
COT 495 Advanced Industrial Internship 3

*Repeatable with approval of School of Integrated Studies Director.

Engineering Technology (BETB)
Bachelor of Science

The Bachelor of Science degree program in engineering technology extends beyond the scope of the associate degree program to include additional emphasis on the theory, development, and application. The six degree options in the program allow students to specialize in computer systems technology, digital media technology, electronic and computer engineering technology, mechanical engineering technology, robotics and automation, and unmanned aircraft systems. Each program option adds depth to students’ understanding of mathematics, science, and communications. Students also develop their abilities to work as team members in industry-related design projects. Graduates work in many business and industrial settings. Career opportunities include product design and development, industrial automation, manufacturing systems, technical sales, and project management.

Computer Systems Technology option (BETB-CP)
120 hours required for graduation

The computer systems technology curriculum places strong emphasis on the areas of programming, networking, computer hardware, and commercial software. The curriculum’s technical elective block provides the opportunity to select courses in a wide range of computer technology topics. The curriculum emphasizes program design skills to develop fundamental problem solving in multiple computer programming languages. Practical computer applications are developed using structured design and programming methodologies. Networking and related classes emphasize application and implementation of current technology. Class assignments and a significant amount of laboratory work prepare students for real-life projects.

Major Requirements (60 credit hours)
CMST 103 Computing Principles 3
CMST 135 Web Fundamentals 3
CMST 180 Introduction to Database Systems 3
CMST 183  Computer Systems Studio I  1
CMST 185  Computer Systems Studio II  1
CMST 247  Programming I  3
CMST 250  Hardware and Network Fundamentals  3
CMST 252  System and Software Fundamentals  3
CMST 283  Computer Systems Studio III  1
CMST 315  Introduction to System Administration  3
CMST 332  Web Development Project  3
CMST 333  Computer Systems Portfolio Defense  0
CMST 335  Programming II  3
CMST 383  Programming and Data Structures Studio  3-6
CMST 385  Systems and Database Administration Studio  3-6
CMST 460  Software Engineering  3
CMST 483  Emerging Technologies Studio  3-6
CMST 485  Computer Systems Senior Capstone Project  6
DIGME 137  Fundamentals of Visual Literacy  3

*Other courses may be used if approved by the BETB-CP program coordinator.*

**Math Requirements (9 credit hours)**
MATH 100  College Algebra  3
MATH 150  Plane Trigonometry  3
MATH 205  General Calculus and Linear Algebra  3
MATH 220  Analytic Geometry & Calculus I  4
MATH 221  Analytic Geometry and Calculus II  4
MATH 222  Analytic Geometry and Calculus III  4

*Other math courses may be used if approved by the BETB-CP program coordinator.*

**Other Requirements (51 credit hours)**
COMM 106  Public Speaking I  3
EDCEP 111  The University Experience  1
ENGL 100  Expository Writing I  3
ENGL 200  Expository Writing II  3
ENGL 302  Technical Writing  3
PHILO 105  Introduction to Critical Thinking  3
PHILO 390  Business Ethics  3
STAT 325  Introduction to Statistics  3
Business Elective  3
Business Elective  3
Humanities/Social Science Elective  3
Humanities/Social Science Elective  3
**Humanities/Social Science/Business Elective**  3
Science Elective with lab  4
Science Elective with lab  4
Unrestricted Elective  3
Unrestricted Elective  3

* Students may substitute up to 9 credits of studio with appropriate courses as approved by the BETB-CP program coordinator.

** Marked electives must be upper-level courses, 300 and above.

**Digital Media Technology option (BETB-DM)**
120 hours required for graduation

Students in the digital media technology program option study becoming effective users of digital media technology for communicating with a global audience. Subjects studied include video, audio, photography,
computer graphics and animation. Add in a healthy dose of computer technologies such as Web development, computer programming, mobile application development and networking technologies, and it makes a unique blend of skills for launching an exciting and lucrative career.

Many degree programs provide the opportunity to study visual communications with computer graphics or to study computer programming, but few offer the opportunity to study both of these areas. That is what makes K-State Polytechnic’s digital media option unique. For example, digital media students who combine an interest in designing computer graphics with an interest in computer programming will propel themselves into an elite segment of the work force. There not enough people who understand both visual design and computer programming to keep up with market demand. Those who master both skill sets can find themselves working in cutting edge industries including entertainment, education, sales and new media companies.

Opportunities in digital media technology are continually growing. Jobs that currently use digital media technology include technical writer, Web page designer, computer graphics designer, librarian, news reporter, art director, animation effects programmer, electronic sound effects producer, computer game developer, photographer, educational technologist, and videographer. Many people in these fields are self-employed consultants and entrepreneurs while others work for a wide range of businesses and industries.

Major Requirements (57 credit hours)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMST 103</td>
<td>Computing Principles</td>
<td>3</td>
</tr>
<tr>
<td>CMST 135</td>
<td>Web Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>CMST 180</td>
<td>Introduction to Database Systems</td>
<td>3</td>
</tr>
<tr>
<td>CMST 183</td>
<td>Computer Systems Studio I</td>
<td>1</td>
</tr>
<tr>
<td>CMST 185</td>
<td>Computer Systems Studio II</td>
<td>1</td>
</tr>
<tr>
<td>CMST 247</td>
<td>Programming I</td>
<td>3</td>
</tr>
<tr>
<td>CMST 250</td>
<td>Hardware and Network Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>CMST 252</td>
<td>System and Software Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>CMST 283</td>
<td>Computer Systems Studio III</td>
<td>1</td>
</tr>
<tr>
<td>CMST 315</td>
<td>Introduction to System Administration</td>
<td>3</td>
</tr>
<tr>
<td>CMST 332</td>
<td>Web Development Project</td>
<td>3</td>
</tr>
<tr>
<td>CMST 333</td>
<td>Computer Systems Portfolio Defense</td>
<td>0</td>
</tr>
<tr>
<td>CMST 335</td>
<td>Programming II</td>
<td>3</td>
</tr>
<tr>
<td>CMST 483</td>
<td>Emerging Technologies Studio</td>
<td>3-6**</td>
</tr>
<tr>
<td>DIGME 137</td>
<td>Fundamentals of Visual Literacy</td>
<td>3</td>
</tr>
<tr>
<td>DIGME 366</td>
<td>Visual Communication Studio</td>
<td>3-6**</td>
</tr>
<tr>
<td>DIGME 386</td>
<td>Digital Media Production Studio</td>
<td>3-6**</td>
</tr>
<tr>
<td>DIGME 456</td>
<td>Digital Media Senior Capstone Project</td>
<td>3-6**</td>
</tr>
</tbody>
</table>

Other courses may be used if approved by the BETB-DM program coordinator.

Math Requirements (9 credit hours)

Choose from:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 100</td>
<td>College Algebra</td>
<td>3</td>
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<tr>
<td>MATH 150</td>
<td>Plane Trigonometry</td>
<td>3</td>
</tr>
<tr>
<td>MATH 205</td>
<td>General Calculus and Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Analytic Geometry and Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>STAT 325</td>
<td>Introduction to Statistics</td>
<td>3</td>
</tr>
</tbody>
</table>

Other Requirements (40 credit hours)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 106</td>
<td>Public Speaking I</td>
<td>3</td>
</tr>
<tr>
<td>DIGME 256</td>
<td>Digital Literacy</td>
<td>3</td>
</tr>
<tr>
<td>DIGME 376</td>
<td>Digital Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>DIGME 406</td>
<td>Social Media</td>
<td>3</td>
</tr>
<tr>
<td>ECON 110</td>
<td>Principles of Macroeconomics</td>
<td>3</td>
</tr>
<tr>
<td>EDCEP 111</td>
<td>The University Experience</td>
<td>1</td>
</tr>
</tbody>
</table>
ENGL 100  Expository Writing I 3
ENGL 200  Expository Writing II 3
ENGL 302  Technical Writing 3
MANGT 366  Information Technology for Business 3
MKTG 400  Introduction to Marketing 3
PHILO 105  Introduction to Critical Thinking 3
PHILO 390  Business Ethics 3
PSYCH 110  General Psychology 3

Other electives (14 credit hours)
*COMM 300+ Elective 3
*Humanities/Social Science/Business Elective 3
*Science Elective 4
*Science Elective 4

*Electives to be chosen in consultation with advisor as appropriate to project topic.
**Students may substitute up to 12 credits of these courses with other appropriate courses as approved by the BETB-DM program coordinator.

Electronic and Computer Engineering Technology option (BETB-EC)
122 hours required for graduation

Students may continue their studies in electronic and computer engineering technology beyond the associate degree level to obtain the Bachelor of Science degree. The baccalaureate degree typically requires two years of study beyond the associate degree.

Coursework in the junior and senior years of the baccalaureate degree program provides additional depth of understanding of circuit analysis techniques, digital systems, data communications, and industrial electronics. Individual and group project assignments are emphasized. Additional mathematics, science, and elective courses provide a strong background with which graduates are prepared for the technical professions of tomorrow.

Graduates work as electronic and computer engineering technologists in many industrial settings. Career activities include product design and development, industrial automation, technical sales, and project management.

The bachelor’s degree program in electronic and computer engineering technology is accredited by the Engineering Technology Accreditation Commission of ABET, 111 Market Place, Suite 1050; Baltimore, MD, 21202-4012. 410-347-7700. www.abet.org.

Freshman

Fall semester (16 credit hours)
COT 105  Mastering Academic Conversations 3
ECET 100  Basic Electronics 4
ECET 250  Digital Logic 3
ENGL 100  Expository Writing I 3
MATH 100  College Algebra 3

Spring semester (16 credit hours)
CHM 110  General Chemistry 3
CHM 111  General Chemistry Laboratory 1
CMST 250  Hardware and Network Fundamentals 3
COMM 106  Public Speaking I 3
ECET 101  Direct Current Circuits 3
MATH 150  Plane Trigonometry 3
Sophomore

Fall semester (16 credit hours)
ECET 110  Semiconductor Electronics  4
ECET 201  Alternating Current Circuits  4
MATH 220  Analytic Geometry and Calculus I  4
PHYS 113  General Physics I  4

Spring semester (15 credit hours)
ECET 240  Electronic Manufacturing  3
ECET 335  Industrial Control Topics  1
ECET 350  Microprocessor Fundamentals  4
MATH 221  Analytic Geometry and Calculus II  4
MET 382  Industrial Instrumentation and Controls  3

Junior

Fall semester (16 credit hours)
CMST 302  Applications in C Programming for Engineering Technology  3
ECET 304  Electric Power and Devices  3
ECET 352  Digital Circuits and Systems  4
ENGL 200  Expository Writing II  Humanities/Social Science Elective  3
  3

Spring semester (14 credit hours)
BUS 315  Supervisory Management  3
ECET 320  Electronic Communication Systems  4
ENGL 302  Technical Writing  Science Elective with Lab  3
  4

Senior

Fall semester (14 credit hours)
ECET 430  Signals and Systems  3
ECET 450  Digital Systems and Computer Architecture  4
ECET 480  Electronic Design I  Humanities/Social Science Elective  3
  Technical Elective  3

Spring semester (15 credit hours)
ECET 420  Communication Circuits Design  4
ECET 481  Electronic Design II  Humanities/Social Science Elective  3
*Humanities/Social Science Elective  Technical Elective  3

* Marked electives must be upper-level courses, 300 and above.

Mechanical Engineering Technology option (BETB-MT)
122 hours required for graduation

Students may continue with the mechanical engineering technology program toward a Bachelor of Science degree in mechanical engineering technology. The bachelor’s degree typically requires two years of study beyond the associate degree.
Graduates of the bachelor’s degree program fill a wide variety of industrial positions and are employed by local and national companies in engineering-related design, production, maintenance, supervisory, and sales positions.

The courses in the upper-level portion of the curriculum provide greater rigor and depth in mechanical theory and applications. Additional study of science, mathematics, communications, social sciences, humanities, business, and industrial operations provides complementary breadth of knowledge beyond the student’s major concentration.

The bachelor’s degree program in mechanical engineering technology is accredited by the Engineering Technology Accreditation Commission of ABET, 111 Market Place, Suite 1050; Baltimore, MD; 21202-4012. Phone: 410-347-7700, www.abet.org.

**Freshman**

**Fall semester (16 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECET 100</td>
<td>Basic Electronics</td>
<td>4</td>
</tr>
<tr>
<td>MATH 100</td>
<td>College Algebra</td>
<td>3</td>
</tr>
<tr>
<td>MET 111</td>
<td>Technical Graphics</td>
<td>3</td>
</tr>
<tr>
<td>MET 121</td>
<td>Manufacturing Methods</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Humanities/Social Science Elective</td>
<td>3</td>
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</tbody>
</table>

**Spring semester (15 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHM 110</td>
<td>General Chemistry</td>
<td>3</td>
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<tr>
<td>CHM 111</td>
<td>General Chemistry Laboratory</td>
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</tr>
<tr>
<td>ENGL 100</td>
<td>Expository Writing I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 150</td>
<td>Plane Trigonometry</td>
<td>3</td>
</tr>
<tr>
<td>MET 117</td>
<td>Mechanical Modeling and Detailing</td>
<td>3</td>
</tr>
<tr>
<td>MET 125</td>
<td>Computer-Numerical-Controlled Machine Processes</td>
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</table>

**Sophomore**

**Fall semester (17 credit hours)**

<table>
<thead>
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<tbody>
<tr>
<td>COMM 106</td>
<td>Public Speaking I</td>
<td>3</td>
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<tr>
<td>MATH 220</td>
<td>Analytic Geometry and Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>MET 211</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>MET 252</td>
<td>Fluid Power Technology</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 113</td>
<td>General Physics I</td>
<td>4</td>
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**Spring semester (16 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENGL 200</td>
<td>Expository Writing II</td>
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<td>MET 230</td>
<td>Automated Manufacturing Systems I</td>
<td>3</td>
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<tr>
<td>MET 231</td>
<td>Physical Materials and Metallurgy</td>
<td>3</td>
</tr>
<tr>
<td>MET 245</td>
<td>Material Strength and Testing</td>
<td>3</td>
</tr>
<tr>
<td>MET 264</td>
<td>Machine Design Technology I</td>
<td>4</td>
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</table>

**Junior**

**Fall semester (15 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ECET 304</td>
<td>Electrical Power and Devices</td>
<td>3</td>
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<tr>
<td>ETB 310</td>
<td>Applied Data Analysis and Tools</td>
<td>3</td>
</tr>
<tr>
<td>MET 246</td>
<td>Dynamics of Machines</td>
<td>3</td>
</tr>
<tr>
<td>MET 314</td>
<td>Finite Element Analysis and Design Modeling</td>
<td>3</td>
</tr>
<tr>
<td>MET 365</td>
<td>Machine Design Technology II</td>
<td>3</td>
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</table>

**Spring semester (15 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENGL 302</td>
<td>Technical Writing</td>
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</tbody>
</table>
**Technical Elective 3**

**Senior**

**Fall semester (13 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MET 462</td>
<td>Senior Design Project I</td>
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<tr>
<td>MET 471</td>
<td>Thermodynamics and Heat Transfer</td>
<td>3</td>
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<tr>
<td>MET 481</td>
<td>Automated Manufacturing Systems II</td>
<td>3</td>
</tr>
<tr>
<td><strong>Computer Elective</strong></td>
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</tr>
<tr>
<td>Humanities/Social Science Elective</td>
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</table>

**Spring semester (15 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MET 464</td>
<td>Senior Design Project II</td>
<td>2</td>
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<tr>
<td>Business Elective</td>
<td>3</td>
<td></td>
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<tr>
<td><strong>Math/Science elective</strong></td>
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</tr>
<tr>
<td><strong>Humanities/Social Science Elective</strong></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Technical Elective</strong></td>
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</tbody>
</table>

* Suggested Computer Elective (Choose One):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CMST 302</td>
<td>Applications in C Programming for Engineering Technology</td>
<td>3</td>
</tr>
<tr>
<td>CMST 310</td>
<td>Visual Basic Programming</td>
<td>3</td>
</tr>
<tr>
<td>CMST 341</td>
<td>C++ Programming</td>
<td>3</td>
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</tbody>
</table>

**Marked electives must be upper-level courses, 300 and above.**

***MATH 221, PHYS 114 or approved Math/Science elective.***

**Robotics and Automation option (BETB-RA)**

120 hours required for graduation

The Robotics and Automation Engineering Technology degree option responds to the need for skilled engineering technology professionals in the thriving and growing fields of robotics and automation. Robotics and automation engineering technology applies mechanical engineering technology, electronics engineering technology, and computer systems technology to the design, building, programming, functional use and maintenance of controlled machinery or systems. The nature of the field requires that workers not only have solid technical engineering knowledge, but also know how to communicate and apply the knowledge in hands-on laboratory and factory settings.

**Core Courses (62 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMST 302</td>
<td>Applications in C Programming for Engineering Technology</td>
<td>3</td>
</tr>
<tr>
<td>CMST 305</td>
<td>Robotics Programming</td>
<td>3</td>
</tr>
<tr>
<td>CMST 357</td>
<td>Machine Vision</td>
<td>3</td>
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<tr>
<td>ECET 100</td>
<td>Basic Electronics</td>
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<tr>
<td>ECET 250</td>
<td>Digital Logic</td>
<td>3</td>
</tr>
<tr>
<td>ECET 304</td>
<td>Electric Power and Devices</td>
<td>3</td>
</tr>
<tr>
<td>ECET 350</td>
<td>Microprocessor Fundamentals</td>
<td>4</td>
</tr>
<tr>
<td>ECET 352</td>
<td>Digital Circuits and Systems</td>
<td>4</td>
</tr>
<tr>
<td>ECET 385</td>
<td>Programmable Logic Controllers</td>
<td>3</td>
</tr>
<tr>
<td>ETB 310</td>
<td>Applied Data Analysis and Tools</td>
<td>3</td>
</tr>
<tr>
<td>ETB 482</td>
<td>Senior Design Project I</td>
<td>1</td>
</tr>
<tr>
<td>ETB 483</td>
<td>Senior Design Project II</td>
<td>2</td>
</tr>
<tr>
<td>MET 111</td>
<td>Technical Graphics</td>
<td>3</td>
</tr>
</tbody>
</table>
MET 121  Manufacturing Methods  3  
MET 211  Statics  3  
MET 230  Automated Manufacturing Systems I  3  
MET 245  Materials Strength and Testing  3  
MET 246  Dynamics of Machines  3  
MET 264  Machine Design Technology I  4  
MET 382  Industrial Instrumentation and Controls  3  

Math Requirements (14 credit hours)  
MATH 100  College Algebra  3  
MATH 150  Plane Trigonometry  3  
MATH 220  Analytic Geometry and Calculus I  4  
MATH 221  Analytic Geometry and Calculus II  4  

Other Requirements (24 credit hours)  
CHM 110  General Chemistry  3  
CHM 111  General Chemistry Laboratory  1  
COMM 106  Public Speaking I  3  
ENGL 100  Expository Writing I  3  
ENGL 200  Expository Writing II  3  
ENGL 302  Technical Writing  3  
PHYS 113  General Physics I  4  
PHYS 114  General Physics II  4  

Technical Electives (9 credit hours)  
Choose from the following:  
CMST 250  Hardware and Network Fundamentals  3  
CMST 270  Introduction to Unix  3  
ECET 430  Signals and Systems  3  
MET 117  Mechanical Modeling and Detailing  3  
MET 125  Computer-Numerical-Controlled Machining Processes  2  
MET 252  Fluid Power Technology  3  
MET 346  Elements of Mechanisms  3  
MET 481  Automated Manufacturing Systems II  3  
STAT 325  Introduction to Statistics  3  

Other electives may be used if approved by program faculty.  

Other Electives (12 credit hours)  
Business Elective  3  
Humanities/Social Science Elective  3  
*Humanities/Social Science Elective  3  
*Humanities/Social Science/Business Elective  3  

*Marked electives must be upper-level courses, 300 or above.  

Unmanned Aircraft Systems option (BETB-US) 
120 hours required for graduation  
The engineering technology degree with a UAS option gives students the opportunity to immerse themselves in the fascination technology of unmanned systems, or commonly known as drones, while focusing specifically on their design and implementation – no flight ratings are required. 

Through coursework tailored to combine computer science, electronic engineering and mechanical engineering with unmanned systems, students in this program will explore the intricacies of UAS subsystems and components, such as software design, computer networking, firmware and hardware, sensors and
actuators, and camera systems and other payloads. Students will be expected to execute critical thinking, problem solving and research skills while engaging in classes about electronic circuits, communication systems, control systems, machine design, manufacturing technology, materials technology and fundamentals of UAS operations.

**Major Requirements (68 credit hours)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVT 120</td>
<td>Flight Familiarization</td>
<td>1</td>
</tr>
<tr>
<td>AVT 317</td>
<td>Composites I</td>
<td>3</td>
</tr>
<tr>
<td>AVT 450</td>
<td>Aviation Safety Management</td>
<td>3</td>
</tr>
<tr>
<td>CMST 103</td>
<td>Computing Principles</td>
<td>3</td>
</tr>
<tr>
<td>CMST 250</td>
<td>Hardware and Network Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>CMST 302</td>
<td>Applications in C Programming for Engineering</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Technology</td>
<td></td>
</tr>
<tr>
<td>ECET 100</td>
<td>Basic Electronics</td>
<td>4</td>
</tr>
<tr>
<td>ECET 101</td>
<td>Direct Current Circuits</td>
<td>3</td>
</tr>
<tr>
<td>ECET 110</td>
<td>Semiconductor Electronics</td>
<td>4</td>
</tr>
<tr>
<td>ECET 201</td>
<td>Alternating Current Circuits</td>
<td>4</td>
</tr>
<tr>
<td>ECET 250</td>
<td>Digital Logic</td>
<td>3</td>
</tr>
<tr>
<td>ECET 320</td>
<td>Electronic Communication Systems</td>
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<tr>
<td>ETB 480</td>
<td>UAS Senior Design I</td>
<td>1</td>
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<tr>
<td>ETB 481</td>
<td>UAS Senior Design II</td>
<td>2</td>
</tr>
<tr>
<td>MET 111</td>
<td>Technical Graphics</td>
<td>3</td>
</tr>
<tr>
<td>MET 211</td>
<td>Statics</td>
<td>3</td>
</tr>
<tr>
<td>MET 245</td>
<td>Material Strength and Testing</td>
<td>3</td>
</tr>
<tr>
<td>MET 246</td>
<td>Dynamics of Machines</td>
<td>3</td>
</tr>
<tr>
<td>UAS 270</td>
<td>Introduction to Unmanned Aircraft Systems</td>
<td>3</td>
</tr>
<tr>
<td>UAS 300</td>
<td>Unmanned Aircraft Systems Powerplant Fundamentals</td>
<td>3</td>
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<tr>
<td>UAS 373</td>
<td>Small Unmanned Aircraft Design and Construction</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>for Non-Aviators</td>
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</tr>
<tr>
<td>UAS 463</td>
<td>Introduction for Autopilots and Mission Planning</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>for Non-Aviators</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*UAS/ECET elective</td>
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</table>

**Technical Electives (10 credit hours, 6 credits upper level)**

Choose from the following electives:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AVT 400</td>
<td>Composites II</td>
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</tr>
<tr>
<td>AVT 417</td>
<td>Composites III</td>
<td>3</td>
</tr>
<tr>
<td>CMST 315</td>
<td>Introduction to System Administration</td>
<td>3</td>
</tr>
<tr>
<td>CMST 344</td>
<td>Internetworking</td>
<td>3</td>
</tr>
<tr>
<td>ECET 350</td>
<td>Microprocessor Fundamentals</td>
<td>4</td>
</tr>
<tr>
<td>ECET 352</td>
<td>Digital Circuits and Systems</td>
<td>4</td>
</tr>
<tr>
<td>ECET 430</td>
<td>Signals and Systems</td>
<td>3</td>
</tr>
<tr>
<td>ECET 450</td>
<td>Digital Systems and Computer Architecture</td>
<td>4</td>
</tr>
<tr>
<td>MET 117</td>
<td>Mechanical Modeling and Detailing</td>
<td>3</td>
</tr>
<tr>
<td>MET 121</td>
<td>Manufacturing Methods</td>
<td>3</td>
</tr>
<tr>
<td>MET 231</td>
<td>Physical Materials and Metallurgy</td>
<td>3</td>
</tr>
<tr>
<td>MET 252</td>
<td>Fluid Power Technology</td>
<td>3</td>
</tr>
<tr>
<td>MET 353</td>
<td>Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>MET 471</td>
<td>Thermodynamics and Heat Transfer</td>
<td>3</td>
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</tbody>
</table>

Other electives may be used if approved by the option lead or advisor.

**Math Requirements (10 credit hours)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 100</td>
<td>College Algebra</td>
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<td>MATH 150</td>
<td>Plane Trigonometry</td>
<td>3</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Analytic Geometry and Calculus I</td>
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</table>
## Science Requirements (8 credit hours)

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<tr>
<th>Course</th>
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<tbody>
<tr>
<td>CHM 110</td>
<td>General Chemistry</td>
<td>3</td>
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<tr>
<td>CHM 111</td>
<td>General Chemistry Laboratory</td>
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</tr>
<tr>
<td>PHYS 113</td>
<td>General Physics I</td>
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## Other Requirements (15 credit hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>COMM 106</td>
<td>Public Speaking I</td>
<td>3</td>
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<tr>
<td>COT 105</td>
<td>Mastering Academic Conversations</td>
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<tr>
<td>ENGL 100</td>
<td>Expository Writing I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 200</td>
<td>Expository Writing II</td>
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</tr>
<tr>
<td>ENGL 302</td>
<td>Technical Writing</td>
<td>3</td>
</tr>
</tbody>
</table>

## Other Electives (9 credit hours)

* Business elective : 3
* Humanities/Social science elective : 3
* Humanities/Social science elective : 3

*Marked electives must be upper-level courses, 300 and above.

### Technology Management (BTCMG)

121 hours required for graduation (*Last semester offering Fall 2019*)

Technology management combines a marketable skill learned at the university level with the management education necessary to allow for rapid advancement in the industry. Technology management students take courses in management, accounting, and marketing; as well as other critical elements of business. The "technology concentration" consists of university-level education in nearly any skill area except business.

#### Area of Concentration (39 credit hours)

This block of courses may include course work in one area of concentration, or related multiple certificates, options, or specialization areas other than business. Courses accepted for transfer to K-State must be academic college-level courses.

#### Arts and Sciences (55 credit hours)

**Communications (15 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>COMM 106</td>
<td>Public Speaking I</td>
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<tr>
<td>ENGL 100</td>
<td>Expository Writing I</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 200</td>
<td>Expository Writing II</td>
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</tr>
<tr>
<td>ENGL 302</td>
<td>Technical Writing</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>*Communication elective</td>
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</table>

**Quantitative (15 credit hours)**

<table>
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<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MATH 100</td>
<td>College Algebra</td>
<td>3</td>
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<tr>
<td>MATH 205</td>
<td>General Calculus and Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>STAT 325</td>
<td>Introduction to Statistics</td>
<td>3</td>
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<tr>
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<td>Computer elective</td>
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<tr>
<td></td>
<td>Computer elective</td>
<td>3</td>
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</tbody>
</table>

**Natural Sciences Electives (7 credit hours)**

Choose two natural science elective courses. One course must include a lab component.

#### Social Sciences (12 credit hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ECON 110</td>
<td>Principles of Macroeconomics</td>
<td>3</td>
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<tr>
<td>ECON 120</td>
<td>Principles of Microeconomics</td>
<td>3</td>
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<tr>
<td></td>
<td>Social Science elective</td>
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</tbody>
</table>
Social Science elective  

**Humanities Electives (6 credit hours)**

**Business and Management (27 credit hours)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS 251</td>
<td>Financial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>BUS 252</td>
<td>Managerial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>BUS 315</td>
<td>Supervisory Management</td>
<td>3</td>
</tr>
<tr>
<td>MANGT 366</td>
<td>Information Technology for Business</td>
<td>3</td>
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<tr>
<td>MANGT 420</td>
<td>Principles of Management</td>
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</tbody>
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*Choose 12 credit hours from the following:*

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BUS 410</td>
<td>Managerial and Project Economics</td>
<td>3</td>
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<tr>
<td>FINAN 450</td>
<td>Principles of Finance</td>
<td>3</td>
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<tr>
<td>MANGT 390</td>
<td>Business Law</td>
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<tr>
<td>MANGT 421</td>
<td>Introduction to Operations Management</td>
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<td>MANGT 530</td>
<td>Industrial and Labor Relations</td>
<td>3</td>
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<td>MANGT 531</td>
<td>Human Resources Management</td>
<td>3</td>
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<tr>
<td>MKTG 400</td>
<td>Introduction to Marketing</td>
<td>3</td>
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<tr>
<td>MKTG 542</td>
<td>Fundamentals of Professional Selling</td>
<td>3</td>
</tr>
</tbody>
</table>

*Marked electives must be upper-level courses, 300 and above*
School of Integrated Studies: Undergraduate Level Course Descriptions

**Aviation Maintenance courses**

**AVM 101. Introduction to Aircraft Materials and Tooling Standards.** (3) Fall. Skills and techniques essential to understanding aircraft material properties and fabrication techniques. Emphasizes knowledge and practical experiences involving: shop safety, organization and human factors associated with shop practices, basic aircraft structural materials and hardware familiarization, fluid lines and fittings, hand tool selection and use, and aviation-specific dimensional inspection tools and techniques, aircraft hardware identification and applications, cleaning and corrosion control, aircraft metal selection an applications, and aircraft material inspection fundamentals. Two hours lecture and three hours lab a week.

K-State 8:
- Empirical and Quantitative Reasoning

**AVM 102. Aviation Regulations, Compliance and Operations.** (2) Spring. A review of the role and organizational structure of the Federal Aviation Administration (FAA) as it relates to the certification and continued airworthiness of aircraft and its operation in general, business, and commercial aviation environments. Emphasis on the privileges and limitations of certificated personnel who maintain aircraft systems in the context of the FAA regulations. Includes practical applications of aircraft weight and balance, effective completion of maintenance record entries, accurate use of graphs and charts to determine critical performance values, and the servicing, starting, ground operations, and security of aircraft. Students demonstrate the ability to read, comprehend, and apply information contained in FAA and manufacturers’ aircraft maintenance specifications, data sheets, manuals, publications, and related Federal Aviation Regulations, Airworthiness Directives, and Advisory material. Includes laboratory activities involving student flight of aircraft. Two hours lecture and two hours lab a week.

K-State 8:
- Ethical Reasoning and Responsibility

**AVM 111. Basic Aircraft Electricity.** (4) Fall. Basic concepts of DC/AC circuits, with basic laws relating to the following: Voltage, current, resistance, continuity, and leakage; relationship of voltage, current, and resistance in electrical circuits; reading and interpretation of electrical circuit diagrams; electrical devices, and inspection and servicing of batteries. Introduction to digital numbering systems and digital logic functions. Three hours lecture and one hour lab a week.

K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Science

**AVM 112. Aircraft Welding.** (2) Spring. Theory and skill development in aircraft welding processes. Exercises in gas welding processes as applied to ferrous and nonferrous materials. Oxygen/acetylene, inert gas, and resistance welding processes are to be studied. One hour rec. and three hours lab a week.

K-State 8:
- Natural and Physical Science

**AVM 121. Aircraft Drawings.** (1) Fall. The course is designed to teach the student how to recognize and identify each kind of line as it appears in aircraft drawings and to interpret the meaning of the lines as they relate to surfaces and details in drawings. Three hours lab a week.

K-State 8:
- Aesthetic Interpretation
- Empirical and Quantitative Reasoning

**AVM 131. Aircraft Standards.** (4) Fall. A survey of the organization of the Federal Aviation Administration. Emphasis will be placed on regulations, standards, specifications, procedures and the practice of using charts, graphs and drawings. Also included are the introduction to air transport maintenance procedures, weight and balance procedures, aircraft ground operations and the introduction to flight training to include several flights. Flight lab fees required. Two hours lecture and six hours lab a week.
K-State 8:
- Empirical and Quantitative Reasoning
- Ethical Reasoning and Responsibility

**AVM 132. Aircraft Fluid Power.** (3) Spring. A study of basic fluid mechanics as it applies to practical applications in aircraft systems. Compressible and incompressible fluid systems will be studied. Two hours recitation and three hours lab a week.

K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Science

**AVM 141. Aircraft Science.** (3) Fall. This is a study of applied mathematics and basic physics. Section one: mathematics will provide the learner with the tools needed to perform the calculations normally confronted by the aviation maintenance technician. Section two: the study of basic science will enable the student to better understand the operation of aircraft and the many complex systems needed to sustain safe flight. Three hours recitation a week.

K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Science

**AVM 142. Airframe Systems.** (4) Spring. A study of the airframe systems and components to include: pressurization, heating, and cooling, and structural device. Two hours lecture and six hours lab a week.

K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Science

**AVM 151. Aviation Maintenance Fundamentals.** (3) Fall. This course is designed to permit the student to learn and practice those skills and techniques essential to the career development of the aviation maintenance technician. The subjects included are: shop safety, aircraft general familiarization, fluid lines and fittings, hand tools and measuring devices, aircraft hardware, cleaning and corrosion control, aircraft metals, inspection fundamentals, ground operation and servicing, and support equipment. One hour recitation and six hours lab a week.

K-State 8:
- Empirical and Quantitative Reasoning
- Ethical Reasoning and Responsibility

**AVM 152. Airframe Structures and Repair.** (5) Spring. A study of materials commonly used in airframe structures and the associated study of making structural repairs according to recommended procedures. Skills in sheet metal are stressed. Three hours recitation and six hours lab a week.

K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Science

**AVM 162. Airframe Electrical Systems.** (4) Spring. An advanced study of DC/AC circuits law relating to circuit analysis and a detailed study of measuring instruments. Advanced study of relays, switches, alternators, and other devices encountered in circuit analysis, troubleshooting, and repair. Theory of operation and fault isolation on solid-state devices in aircraft circuitry. Inspection of aircraft electrical systems, including wire inspections and the types of repairs allowed, using appropriate technical manuals. Two hours lecture and six hours lab a week. Pr.: AVM 111 or ECET 100.

K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Science
AVM 201. Aircraft Metallic Primary Structures. (3) Fall. A study of aircraft metal primary structures and materials commonly used in the design and construction of airframes including fuselages, wings, and control surfaces. Students gain theoretical knowledge and practical experience associated with the structural properties of materials used in the manufacturing process as well as the methods used to fabricate and repair those structures. Students practice structural metal repairs according to FAA approved data and manufacturer’s recommended procedures. Skills in aluminum sheet metal fabrication and repairs are stressed. Two hours lecture and four hours lab a week. Pr.: AVM 101 and MET 121.

K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Science

AVM 203. Aircraft Environmental and Fire Protection Systems. (3) Spring. An in-depth study in small and large air vehicle environmental and fire detection and extinguishing systems. Emphasis on cabin pressurization and temperature climate control, supplemental oxygen, airframe and propulsion fire detection and extinguishing systems, crew visibility enhancement, and air toxicity detection. Students gain extensive practical experiences related to system design, operation, inspection, maintenance methodology, and fault analysis for both airframe and powerplant systems using manufacturer’s technical instructions. Three hours lecture and four hours lab a week.

K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Science

AVM 205. Aircraft Landing Gear and Fluid Power Systems. (3) Spring. A study of the design and application of compressible and incompressible fluid power systems used in both simple and complex aircraft flight control, auxiliary, emergency, and landing gear systems. Emphasis on landing gear and deceleration systems to include components, structures, operation, and fault analysis of shock struts, position and warning, single and multiple disk brakes, anti-skid, wheel assemblies, retraction and extension systems and methods of emergency landing gear extension. Topics include landing gear door operation and sequencing. Students practice inspection, servicing, repair and troubleshooting of key fluid power and landing gear systems necessary to ensure continued airworthiness of these systems. Three hours lecture and four hours lab a week.

K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Science

AVM 207. Aircraft Electrical Systems. (3) Spring. A review and advanced study of DC/AC circuits, and laws relating to circuit analysis and a detailed study of measuring instruments applied to aircraft. Study of relays, switches, alternators, and other devices encountered in circuit analysis, troubleshooting, and repair. Theory of operation and fault isolation on solid-state devices in aircraft circuitry. Inspection of aircraft electrical systems, including wire inspections and the types of repairs allowed using appropriate technical manuals. A study of battery, magneto high and low tension ignition systems, including turbine igniters. Also a study of powerplant starting and charging systems and related components. Emphasis on effective fault diagnostics, repair, and timing of aircraft ignition systems. Three hours lecture and six hours lab a week. Pr.: ECET 100 or AVM 111.

K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Science

AVM 214. Introduction to Aircraft Propulsion Theory, Design and Systems. (3) Fall. A broad introductory study in the theory of operation of heat engines utilizing principles of the Otto and Brayton cycles found in aircraft reciprocating and gas turbine powerplants. Students gain a solid understanding of the basic principles of the construction, design, lubrication, cooling, and exhaust systems, including maintenance practices of reciprocating and gas turbine powerplants installed in aircraft. Thrust reverser operation of gas turbine engines is also included. The course has a practical component that includes the inspection, fault
analysis, servicing and repair of key engines systems covered in the course. Three hours lecture and three hours lab a week.
K-State 8:
• Ethical Reasoning and Responsibility
• Natural and Physical Science

AVM 216. Aircraft Propulsion Drive Systems. (3) Spring. A detail study of aircraft propulsion drive systems that convert engine power to thrust necessary for sustained flight. Drive systems include propellers, unducted fans (open rotor), and rotor-blades found on small, medium, and large fixed, and rotary-wing aircraft. Emphasis on fixed and controllable-pitch propellers applications as well as rotor-blades, and rotor-hubs assemblies found on helicopters. Topics include theory of operation, dynamic and static balancing, vibration analysis, design characteristics, materials, and maintenance practices. Students practice inspection, servicing, balance, maintenance and repair of propeller and rotor systems. Three hours lecture and four hours lab a week.
K-State 8:
• Empirical and Quantitative Reasoning

AVM 231. Aircraft Finish and Fabrication. (3) Fall. This course is designed to acquaint the student with the wood and fabric coverings and procedures used on aircraft, and methods used in preparation for and application of paint finishes to aircraft surfaces. One hour recitation and six hours lab a week.
K-State 8:
• Empirical and Quantitative Reasoning
• Natural and Physical Science

AVM 241. Navigational Aids and Communication Systems. (3) Fall. A survey study of the aids to navigation and communications used in light and intermediate class aircraft. Operation and installation of the various types of equipment will be stressed. Two hours lecture and three hours lab a week. Pr.: AVM 111 or ECET 100.
K-State 8:
• Empirical and Quantitative Reasoning
• Natural and Physical Science

AVM 261. Aircraft Inspection and Assembly. (5) Fall. A study of assembly and manufacturing procedures and inspection of aircraft components. This course also covers in detail annual and 100-hour inspections. Three hours recitation and six hours lab a week. Pr.: AVM 121, AVM 131.
K-State 8:
• Empirical and Quantitative Reasoning
• Ethical Reasoning and Responsibility

AVM 290. Problems in Aviation. (Var) Fall, Spring, Summer. Advanced study in a specific area chosen by the instructor. Pr.: Consent of instructor.

AVM 301. Advanced Reciprocating Powerplant Technology. (3) Fall. Advanced study in the theory, operation, construction, design, and maintenance of reciprocating powerplants installed in aircraft. Topics include emerging trends in the design and application of reciprocating heat engines including aviation diesel engines. Emphasize the disassembly and inspection of modern reciprocating engines found in single and twin engine aircraft using visual, dimensional and non-destructive techniques. Maintenance tasks include engine removal, installation and troubleshooting to an airworthy standard. Three hours lecture and six hours lab a week. Pr.: AVM 214.
K-State 8:
• Empirical and Quantitative Reasoning
• Natural and Physical Science
AVM 303. Introduction to Aircraft Composite Structures. (3) Spring. Introduces composite materials used in the design and production of legacy and modern aircraft. Emphasizes material characteristics, fabrication, inspection, and repair of non-metallic primary and secondary structures and materials including fabric, wood, fiberglass, plastics, honeycomb, and others using manufacturer's instructions. Students practice the selection, installation and removal of special fasteners used in these structures, and to appropriately and economically apply protective coatings. Modern composite structure fabrication, inspection and repair are emphasized within laboratory exercises. Two hours lecture and four hours lab a week.

K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Sciences

AVM 304. Aircraft Fuel Management and Metering Systems. (3) Spring. A comprehensive study of airframe and propulsion engine fuel systems associated with fuel storage, management, transfer and metering as applied to both reciprocating and turbine powered aircraft. Lecture topics include systems operation, maintenance methods, procedures and safety precautions associated with aircraft fueling and defueling for over-the-wing and pressure fueling systems. Fuel quantity, pressure and temperature indicating and warning systems, fuel dump, and detail reciprocating and turbine engine fuel metering systems including carburetor overhaul, electronic engine fuel controls (EEC and FADEC) are covered. Students practice the inspection, check, service, troubleshooting and repair of the various fuel systems found on board the aircraft to a level that assures continued airworthiness and safety. Two hours lecture and six hours of lab a week. Pr.: AVM 214.

K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Science

AVM 305. Introduction to Aircraft Avionics and Instrument Systems. (3) Fall. Introduces basic flight instrument systems and navigation/communication electronic aids installed on General Aviation aircraft that weigh less than 12,500 lbs. The course includes both lecture and practical applications of these systems to include operation, inspection, fault analysis and repair. The student will be exposed to mechanical and electronic airframe and powerplant indication equipment including flight instrument systems for heading, speed, altitude, temperature, pressure, RPM, and position indicating. Emphasis will be placed on NAV/COMM systems found in modern light aircraft and associated antenna applications and installation methods. Pitot/Static instruments and systems are also discussed. Students practice inspection, service, fault analysis, installation and repair of these systems. Three hours lecture and three hours lab a week. Pr.: ECET 100 or AVM 111.

K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Science

AVM 306. Rotary and Fixed Wing Aircraft Design and Assembly. (3) Spring. A detailed study of the purpose of fixed-wing and rotary-wing aircraft designs and aerodynamic characteristics, their construction methods and assembly procedures. The course provides an insight critical maintenance tasks performed that impact the safe operation of the aircraft as well as exposure to the manufacture and assembly of aircraft. Students practice the rigging, assembly, jacking, weighing, and balancing of aircraft and flight control surfaces according to manufacturer’s technical manuals; and making accurate record entries for tasks performed in accordance with FARs. Three hours lecture and four hours lab a week. Pr.: AVM 101 and MET 111.

K-State 8:
- Empirical and Quantitative Reasoning
- Ethical Reasoning and Responsibility

AVM 312. Aircraft Propellers. (2) Spring. A study of the use, maintenance, and inspection of propellers and their related control systems. One hour recitation and three hours lab a week.

K-State 8:
- Empirical and Quantitative Reasoning
AVM 321. Powerplant Fundamentals. (4) Fall. A study of the principles of operation, design features, and operating characteristics of reciprocating aircraft engines. Includes overhaul inspection procedures on current horizontal opposed and radial engines. Three hours recitation and three hours lab a week. Pr.: AVM 131.

K-State 8:
- Ethical Reasoning and Responsibility
- Natural and Physical Science

AVM 322. Powerplant Operation and Troubleshooting. (3) Spring. Experience in installation, operation, and removal of aircraft engines. Engine analysis and diagnosis of malfunctions, including methods of remedy, are performed on airworthy engines. One hour recitation and six hours lab a week. Pr.: AVM 214 or AVM 321.

K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Science

AVM 332. Gas Turbine Powerplant. (5) Spring. Advanced study of the fundamentals of gas turbine powerplants including operation, studies of supporting systems and inspection methods are fundamental to this course. Two hours recitation and nine hours lab a week. Pr.: AVM 321.

K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Science

AVM 342. Powerplant Induction and Fuel Systems. (4) Spring. A study of aircraft induction and fuel metering systems including fuels, carburetors, fuel injection systems, superchargers, and other induction system components used to ensure a dependable and accurate fuel supply at any flight configuration and attitude. Two hours recitation and six hours lab a week. Coreq: AVM 321.

K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Science

AVM 351. Powerplant Ignition and Electrical Systems. (3) Fall. A study of battery, magneto high and low tension ignition systems, including turbine igniters for today's aircraft. Also a study of powerplant starting and charging systems and related components. Emphasis will be placed on troubleshooting, repair, and timing of aircraft ignition systems. Two hours recitation and three hours lab a week. Pr.: AVM 111.

K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Science

AVM 352. Powerplant Overhaul. (3) Spring. Practical experience in overhauling reciprocating engines. Engines are assembled and operationally checked in lab. One hour lecture and six hours lab a week. Pr.: AVM 321.

K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Science

AVM 370. Advanced Aircraft Avionics and Instrument Systems. (3) Fall. Advanced study of flight instrument systems and navigation/communication electronic aids installed on large Corporate and Transport Category aircraft. The course includes both lecture and practical applications of these systems to include operation, inspection, fault analysis and repair. The course includes flight management systems, and GPWS, TAWS, laser gyro and advanced Comm/Nav applications. Two hours lecture and three hours lab a week. Pr.: AVM 305.

K-State 8:
- Empirical and Quantitative Reasoning
AVM 390. Problems in Aviation. (Var.) Fall, Spring, Summer. To provide the student the opportunity for advanced study in a specific topic area or to apply aviation education to the improvement of skills previously learned. Topics are selected jointly by the student and the instructor. Pr.: Consent of instructor.

AVM 401. Aircraft Airworthiness, Conformity, and Quality Assurance. (3) Spring. A capstone course requiring students to tie all previous coursework associated with airframe and powerplant systems maintenance and operations together to perform an effective and safe inspection of the entire aircraft in compliance with manufacturer’s recommendations and FAR requirements. This course emphasizes practical experiences necessary to inspect the aircraft for continued airworthiness. Aircraft is weighed and conformity inspections are performed. All work and inspection status is recorded and documented using approved maintenance entries. Part 145 operational requirements are included in the course experience and work team scheduling and coordination is emphasized. Three hours lecture and four hours lab a week. Pr.: Senior standing and instructor consent.

K-State 8:
• Empirical and Quantitative Reasoning
• Ethical Reasoning and Responsibility

AVM 402. Advanced Gas Turbine Powerplant Technology. (3) Fall. Advanced study in the theory, operation, construction, design, and maintenance of small and large gas turbine powerplants installed in corporate and transport category aircraft. Topics include emerging trends in the design and application of gas turbine engines as well as engine test cell operations. Practical experiences emphasize the disassembly and inspection of small turboprop/turboshaft engines commonly found on turbine twin-engine aircraft and helicopters. Maintenance tasks include engine removal, installation and troubleshooting to an airworthy standard. This course has a research and presentation requirement. Three hours lecture and six hours lab a week. Pr.: AVM 214.

K-State 8:
• Empirical and Quantitative Reasoning
• Natural and Physical Science

Aviation Technology courses

AVT 100. Introduction to Aviation. (3) Fall, Spring. This course will examine the history of aviation and a look at the future. Students discuss the attributes of an aviation professional, careers, career planning, and pilot certification. Students will consider historical events and their relationship to current aviation aspects. The interdependency and synergy in the development of military aircraft, the space program, as well as the growth of commercial and general aviation is discussed. Students use the Internet for various research projects concerning the past, present, and future of aviation.

K-State 8:
• Historical Perspectives
• Human Diversity within the U.S.

AVT 120. Aeronautical Programs Flight Familiarization. (1) Fall. Spring, Summer. An introduction to the fundamentals of flight in various types and categories of aircraft. A familiarization of piloting skills and knowledge, a demonstration of aircraft capabilities, and the National Airspace System. Coreq.: PPIL 111.

AVT 240. Introduction to Air Traffic Control. (3) Spring. An introductory air traffic control (ATC) course that focuses on Terminal, Enroute, and FSS ATC procedures. The course examines the role of an air traffic controller at the various operational positions throughout the ATC system. The course gives an overview of the current U.S. National Airspace System as it relates to ATC procedures. In addition, the course looks at the use of future technologies and how they enhance the ATC system. Off-campus trips contribute to experiential learning. Two hours lecture and two hours lab a week. Pr.: PPIL 111.

K-State 8:
• Empirical and Quantitative Reasoning
• Ethical Reasoning and Responsibility
**AVT 242. Aviation Meteorology.** (3) Fall, Spring. Basic aviation–related meteorology concepts through the study of atmospheric elements and how they generally affect the weather. Introduction to the subject, water in the atmosphere, variables which cause local weather changes, specific aviation-associated hazards, understanding meteorological reports and forecasts, meteorological techniques used in predicting weather patterns.

K-State 8:
- Natural and Physical Sciences

**AVT 243. Aircraft Electrical, Navigational, and Communication Systems.** (3) Provides students the basic knowledge of aircraft electrical systems, including navigation, communications, instruments, and power systems. Pr.: AVM 111.

K-State 8:
- Empirical and Quantitative Reasoning

**AVT 250. Safety and Security of Airport Ground Operations.** (3) Spring. This course discusses general aviation airport ground operations, particularly from the mechanic, pilot, and ramp worker perspective. Focus will be on increasing awareness of airport operations. Attention will be given to improving airport safety by creating an enhanced awareness of rules, policies, procedures, and potential hazards that affect all individuals working in and around the airport ground operations environment. Some topics included are: aircraft marshaling procedures, airfield security issues, ground vehicle operations, and security and accident/incident response reporting.

K-State 8:
- Historical Perspectives
- Human Diversity within the U.S.

**AVT 315. Advanced Avionics.** (3) Fall. This course covers the latest developments and trends in navigation and communication systems. Topics include Future Aviation Navigation Systems (FANS), fiber optics, enhanced vision, ADS-B, the FAA’s NextGen, as well as other advancements in avionics. Coreq.: AVM 241 or AVM 242.

K-State 8:
- Empirical and Quantitative Reasoning

**AVT 316. AET and FCC Training.** (1) Fall, Spring. This course is a self-paced lab that allows students to study for their Aviation Electronics Technician certificate and their Federal Communication Commission license in Elements 1, 3 and 8. This is a credit/no-credit course and will not affect the student’s GPA. Two hours lab a week.

**AVT 317. Composites I.** (3) Fall. Introduction to composite materials used in aircraft production, detailed description of different composite materials, the procedures for installing an antenna to bonded aircraft structures.

K-State 8:
- Empirical and Quantitative Reasoning

**AVT 318. Composites I Laboratory.** (2) Fall. An optional laboratory course introducing the use of equipment and materials utilized in the advanced composites industry. Four hours lab a week. Coreq.: AVT 317.

**AVT 327. Avionics Repair.** (3) Fall. An in depth overview of aircraft wiring. Procedures in terminating, repairing, testing and troubleshooting of aircraft wiring, as well as aging wiring inspections. One hour lecture and four hours lab a week.

K-State 8:
- Empirical and Quantitative Reasoning
AVT 330. Avionics Troubleshooting. (4) Spring, in even years. An in-depth troubleshooting project, requiring critical thinking to analyze the problem and provide the correct repairs. One hour lecture and six hours lab a week. Pr.: AVT 327.

AVT 340. Human Factors in Aviation. (3) Fall, Spring. Explores the physical environment and physiology limitations imposed on the aviation professional. Health, fatigue, human behavior and errors, communication, team building, leadership, situation awareness, crew resource management, judgment, and aeronautical decision making are studied to achieve safe and efficient operation. Pr.: PPIL 111 or AVT 100, or junior standing.

K-State 8:
• Natural and Physical Sciences
• Social Sciences

AVT 360. Airport Law. (3) Fall. A study of how the U.S. regulatory and legal systems work in relation to airport management. This course emphasizes contract law related to the Federal Aviation Administration Airport covenants and restrictions, Federal Aviation Regulation compliance and airport operator liability. Pr.: Junior standing.

K-State 8:
• Ethical Reasoning and Responsibility

AVT 361. Airport Environmental Studies. (3) Fall. Introduction to responsibilities, liabilities and public relations when dealing with environmental issues in day-to-day airport operations. Includes strategies for addressing airport and aircraft noise, wildlife hazard mitigation, compatible land use, wetlands, historical properties and impacts of construction. Federal regulations and enforcement are studied with emphasis on the Clean Water Act, Clean Air Act, Resource Conservation and Recovery Act, Pollution Prevention Act, and National Historic Preservation Act as they apply to airports. Pr.: MATH 100, “B” or better in ENGL 100 and ENGL 200.

K-State 8:
• Ethical Reasoning and Responsibility

AVT 380. Airport Operations. (3) Spring. A study of the daily operations of an airfield in compliance with regulatory agencies, understanding the role of liaison to airport staff regarding operations, development of department budgets, knowledge of effective supervisory practices and principles, ability to plan and carry out airport operations and development programs under airport management matrix. Three hours lecture and three hours lab per week. Pr.: “B” or better in ENGL 100 and ENGL 200 or Airport Management Program Lead approval for transfer students.

AVT 386. Aerodynamics. (3) Spring. This course covers incompressible flow theory and wing theory well as calculations of stall speed, drag, and basic performance criteria. This course also examines configuration changes, high and low speed conditions, and special flight operations. Stability and control, weight and balance, and operational data are also examined. Aerodynamic performance of aircraft powered by reciprocating, turboprop, and jet turbine engines are considered. The student will be introduced to aircraft design and high-speed aerodynamics. Pr.: MATH 100; and PPIL 111 or AVM 141.

K-State 8:
• Empirical and Quantitative Reasoning
• Natural and Physical Sciences

AVT 389. Problems in Aviation. (1 – 18) Fall, Spring, Summer. Provides the student an opportunity to apply their aviation education to the improvement of skills previously learned as designated by the instructor.

AVT 400. Composites II. (4) Spring. A continuation of AVT 317 Composites I, with an emphasis on repair procedures for composites. Involves hands-on repair projects that develop repair techniques, such as vacuum bagging and hot bonding. Pr.: AVT 317.

K-State 8:
• Empirical and Quantitative Reasoning

**AVT 405. Introduction to Non-destructive Testing.** (2) Spring. Introduction to non-destructive testing (NDT) and inspection methods commonly used to detect material anomalies in diverse industries. NDT methods used in aviation/mechanical structures and components is emphasized. Students gain practice using Visual, x-ray (radiographic, magnetic particle, ultra-sound, eddy current and dye penetrant), NDT methods and techniques on test samples. Serviceability of the components is determined using approved manufacturers service limits. Two hours lecture and three hours lab a week. Pr.: MET 121, or MET 231 and MET 245.

K-State 8:
• Empirical and Quantitative Reasoning

**AVT 410. Aviation Maintenance Management.** (3) Fall. Provides an understanding of general aviation and commercial aviation maintenance programs. Includes regulations, maintenance levels, technical publications, quality assurance, inspections, human factors, and unions. Provides an understanding of the difficulties of managing a line operation. Case studies of maintenance scenarios are used.

K-State 8:
• Ethical Reasoning and Responsibility
• Global Issues and Perspectives

**AVT 417. Composites III.** (3) Spring. Emphasis on advanced composite inspection techniques, special hardware, and the repair of composite structural components. Involves hands-on repair techniques. One hour lecture and four hours lab a week. Coreq.: AVT 400.

K-State 8:
• Empirical and Quantitative Reasoning

**AVT 420. Aviation Accident Investigation.** (3) Spring, in even years. This course is designed to provide a general understanding of the methods and procedures used in aviation accident investigation. Students in this course will learn methods used to gather and analyze facts of accidents as well as determine probable cause and contributing factors. Procedures and techniques used to determine accident causes will also be analyzed. Historical accident reports from National Transportation Safety Board (NTSB) and other organizations will be examined. Pr.: AVT 340 and junior standing.

K-State 8:
• Empirical and Quantitative Reasoning
• Ethical Reasoning and Responsibility

**AVT 429. Avionics Maintenance.** (3) Fall, in odd years. Provides the basic knowledge to repair and install pitot-static systems including practical experience in troubleshooting and using maintenance test equipment. One hour lecture and six hours lab a week. Pr.: AVM 241 or AVM 242.

K-State 8:
• Empirical and Quantitative Reasoning

**AVT 430. Advanced Avionics Installation.** (4) Spring, in odd years. Provides practical knowledge of avionics suite installation, to include Garmin. Students will gain additional experience in operational checks, troubleshooting and software loading on the Garmin G100/900X. This course is an individual semester long project. One hour lecture and six hours lab a week. Pr.: AVT 327.

K-State 8:
• Empirical and Quantitative Reasoning

**AVT 435. Air Transportation.** (3) Summer. This interactive course examines the development of the United States air transportation system, current issues, and the competitive strategies of past and present airline executives; examines the many attributes of starting and operating a successful airline in a competitive market; and explores the role of airport operations and the commercial and corporate aircraft that challenge the air transportation system. Pr.: Junior standing.
AVT 440. Air Carrier Operations. (3) Spring. A study of Federal Aviation Regulations that influence air carrier and commercial operators. Students will gain an appreciation of the variety of regulatory issues involved in air carrier operations such as certification, training, and operational safety and security requirements. Students will also gather the background information necessary to correlate and apply relevant regulations to daily aviation operations. The course focuses on FAR Part 61, 91, 119, 121, and 135. Pr.: AVT 100 or PPIL 111, and junior standing.


K-State 8:
- Ethical Reasoning and Responsibility

AVT 445. Aviation Law. (3) Fall, Spring. A study of how the U.S. regulatory and legal systems work in relation to aviation activities. It is designed to help those in the aviation industry understand their rights, liabilities, and responsibilities and avoid common legal pitfalls. Emphasis will also be placed on aircraft ownership, registration, and insurance. Pr.: Junior standing.

K-State 8:
- Ethical Reasoning and Responsibility

AVT 446. Corporate and Business Aviation Management. (3) Spring. A study of the history of corporate and business aviation, the regulation of the industry, and the operation and management of corporate and business flight departments. Students receive an overview of the social, economic, and political effects of business aviation. Aircraft selection and utilization, maintenance responsibilities, fiscal considerations, fractional ownership, and passenger and crew safety and security measures are also studied. Pr.: Junior standing.

AVT 448. Aviation Legislation. (3) Spring. Students are required to take part in the University Aviation Association's Annual Seminar on Establishing Aviation Policy during the first full week of January in Washington, D.C. Students prepare for the seminar with required reading assignments. Pr.: Junior standing.

K-State 8:
- Ethical Reasoning and Responsibility

AVT 450. Aviation Safety Management. (3) Fall. A course designed to assist the student to develop an attitude and philosophy for accident prevention. The course includes ideal and practical, personal and organizational safety procedures and goals; safety philosophies; aircraft accident reports; human factors; principles of accident investigation; accident prevention program and accident statistics; current events; NTSB special studies. The safety program is analyzed from the theoretical and philosophic points of view. A safety program is developed with an examination of safety concepts, the human elements of accidents, managing a safety office in an organization, and current events. Pr.: Junior standing.

K-State 8:
- Empirical and Quantitative Reasoning

AVT 451. System Safety. (3) Spring, in odd years. This course is designed to provide an understanding of the system safety discipline. Students will learn how the system safety process is used in accident prevention and examine its role in management. Students will also examine various aircraft systems for overall safety of operation. Pr.: AVT 450.

K-State 8:
- Empirical and Quantitative Reasoning

AVT 455. Current Trends and Issues in Aviation. (3) Spring. This course explores current trends and issues in the aviation industry. Emphasis is placed on discussing current issues that are impacting the world aviation marketplace. Students address these issues and trends from the standpoint of application to their career, relevance to the economic viability of the industry, and the impact such trends place on aircraft operators and manufacturers. Pr.: Senior standing.
K-State 8:
- Global Issues and Perspectives

**AVT 461. Airport Management.** (3) Fall. An in depth study of both landside and airside airport business management, utilizing the American Association of Airport Executives’ Body of Knowledge modules. Includes a study of the role of the airport in community development. Studio format incorporating lecture and lab elements. Pr.: PPIL 111 and “B” or better in ENGL 100 or Airport Management Program Lead approval for transfer students.

**AVT 462. Airport Planning.** (4) Fall. A study of airport planning and practices to understand FAR Regulation part 139 airport design standard as well as a study of both landside and airside planning issues utilizing the American Association of Airport Executive's Body of Knowledge modules. Studio format incorporating lecture and lab elements. Pr.: AVT 461.

**AVT 464. Airport Certified Manager.** (1) Spring. The study and preparation for various forms of certification within the AAAE realm including the opportunity to study and take the Airport Certified Employee (ACE) exams and the Certified Member (CM) exam. One hour lab a week. Pr.: AVT 250, AVT 360, AVT 446.

**AVT 480. Airport Global Networks.** (3) Spring. An introduction to the economic, political, and civic challenges that impact the profitability of airports worldwide and the steps being taken by the airport industry and international governing bodies to address them. Pr.: AVT 380 and junior standing and “B” or better in ENGL 302 or Airport Management Program Lead approval for transfer students.

K-State 8:
- Global Issues and Perspectives

**AVT 482. Aviation Ethics and Leadership.** (3) Fall. Students acquire an understanding of core leadership values demanded by the aviation industry, understand leadership challenges facing the aviation industry, and identify personal leadership styles and their most effective implementation within industry.

K-State 8:
- Ethical Reasoning and Responsibility

**AVT 485. Helicopter Maintenance.** (3) Summer. An advanced study of the major components of rotary-winged aircraft to include airframe, rotor, transmission and engine components of turbine and reciprocating engine helicopters. Also includes a detailed study and validation of all Federal Aviation Administration required documentation related to maintenance, historical records, and inspection of components. Two hours lecture and four hours lab per week. Pr.: AVM 111, 121, 131, 141, 151 or consent of instructor.

K-State 8:
- Ethical Reasoning and Responsibility

**AVT 497. Senior Capstone.** (3) Fall, Spring. This culminating experience is a sustained occasion when students will put into independent practice the intellectual, creative, and expressive skills/knowledge they have cultivated in their undergraduate curriculum. In this course students integrate discipline-specific knowledge in addition to communication and inquiry methods to solve problems and communicate mastery of their respective area of interest. Pr.: Senior standing and instructor consent.

**AVT 498. Research Project.** (1-9) Fall, Spring, Summer. Research, scholarly and creative activities in the aviation field. Working with faculty on a current research project. The specific course content varies in accordance with current projects. Pr.: Junior or senior standing.

**AVT 560. Airport Design.** (4) Spring. Student teams with faculty and industry advisors prepare to enter their work in the Airport Cooperative Research Program’s (ACRP) national design competition for universities addressing issues relating to airports and the National Airspace System. The competition focuses on design solutions in the following broad areas: Airport Operation and Maintenance, Runway Safety/Runway

K-State 8:
• Global Issues and Perspectives

**Business courses**

**BUS 110. Introduction to Business.** (3) Fall, Spring. This course surveys the objectives, decisions, and activities within a business organization. Topics include a study of management responsibilities and controls, organizational structures, and marketing activities.

K-State 8:
• Social Sciences

**BUS 251. Financial Accounting.** (3) Fall, Spring. Study of business topics such as alternative forms of business organizations; typical business practices; legal instruments such as notes, bonds, and stocks; and financial statements and analysis. The main objective is to develop the ability to provide information to stockholders, creditors, and others who are outside an organization.

K-State 8:
• Empirical and Quantitative Reasoning
• Ethical Reasoning and Responsibility

**BUS 252. Managerial Accounting.** (3) Fall, Spring. This course outlines the use of internal accounting data by managers in directing the affairs of business and non-business organizations. Pr.: BUS 251.

K-State 8:
• Empirical and Quantitative Reasoning

**BUS 315. Supervisory Management.** (3) Fall, Spring, Summer. An analysis of the responsibilities and work environment of a supervisor, with an examination of skills, practices, and concepts helpful in developing effective relations with people in today's changing environment. The course includes an international emphasis using South Asia as a case study. Pr.: ENGL 100 and COMM 105 or COMM 106.

K-State 8:
• Ethical Reasoning and Responsibility
• Global Issues and Perspectives

**BUS 320. Total Quality Management for Technology.** (3) This course addresses the commitment of management and the organization as a whole to the cultural changes necessary to implement quality improvements throughout the organization. Topics include quality organization and philosophy, quality audit and ISO 9000 series, integration of functional areas, team building, management principles, quality costs, and other associated interactive facets of Total Quality Management. The main concern is to provide the student with a working knowledge of conventional TQM tools. Three hours recitation a week.

K-State 8:
• Empirical and Quantitative Reasoning

**BUS 366. Management with Information Technology.** (3) Spring. A comprehensive view of the role of information technology in satisfying organizations’ information requirements. Problems and techniques concerning the management of responsive information systems with special attention to managers’ use of systems outputs. Cases and hands-on exercises emphasizing the use of information systems in decision making, information gathering and organizing, use of modeling techniques, and presentation of information. Pr.: Experience with PC software.

K-State 8:
• Empirical and Quantitative Reasoning

**BUS 390. Foundations of Business Law.** (3) Fall, Spring. A study of law as it relates to business, including court procedures and systems, contracts, torts, agency and employment law, and business crimes. Pr.: Junior standing.
K-State 8:
- Ethical Reasoning and Responsibility
- Social Sciences

BUS 400. Marketing Techniques and Applications. (3) Fall, Spring. A general study of marketing principles which lead to the development of marketing strategy. A review of environmental influences and key analytical tools used in formulating marketing plans. Product or service design, distribution, pricing, and promotional programs. Pr.: ECON 110 or 120.

K-State 8:
- Social Sciences

BUS 410. Managerial and Project Economics. (3) Fall. Economic analysis of problems as applied to managerial decision making. Students consider the economic viability of solutions in engineering and a variety of other kinds of projects common in technology-oriented businesses. Pr.: MATH 100. Cross-listed as MET 410.

K-State 8:
- Social Sciences

BUS 420. Management Perspectives. (3) Fall, Spring. Provides an introduction to the four basic managerial functions of planning, organizing, leading and controlling and their application to today's complex work environment. An emphasis is placed on the roles and responsibilities of managers that help them to successfully meet organizational objectives by effectively leading employees and optimizing processes.

K-State 8:
- Social Sciences

BUS 421. Applied Operations Management. (3) Fall. Description and analysis of problems related to the output of goods and services, operations planning and control, and systems management. Pr.: STAT 325.

K-State 8:
- Empirical and Quantitative Reasoning

BUS 450. Integrated Finance. (3) Spring. Study of the basic principles of finance, including discounted cash flow analysis, risk-return tradeoff, asset pricing models, and financial and real asset valuation. Applications of these concepts to the firm's investment and financing decisions and performance analysis will be discussed. Pr.: BUS 251. Co.Req.: ECON 110 or ECON 120, STAT 325.

K-State 8:
- Empirical and Quantitative Reasoning

BUS 520. Integrated Technology Management Capstone. (3) Fall, Spring. A capstone course which integrates the functional areas of business, including management, marketing, finance, accounting, operations and production. The course uses business strategy simulation and case studies to apply acquired knowledge across various areas of concentration for successful business management. Pr.: Senior Standing

K-State 8:
- Empirical and Quantitative Reasoning

MANGT 531. Human Resources Management. (3) Spring. This course provides an overview of the human resource systems and processes needed to achieve organizational effectiveness and strategic success. All key functional areas including human resource planning, staffing, performance management, employee development, and compensation are addressed. Pr.: MANGT 420.

K-State 8:
- Human Diversity within the U.S.
- Social Sciences
**MKTG 542. Fundamentals of Professional Selling.** (3) Spring. Focuses on interpersonal communications between buyers and sellers, both oral and written. The mechanics and intricacies of personal sales presentations, which will be developed through practice. Coreq.: MKTG 400.
K-State 8:
- Social Sciences

**Communications courses**

**COMM 106. Public Speaking I.** (3) Fall, Spring, Summer. Principles and practice of message preparation, audience analysis, presentational skills, and speech criticism permitting greater practice in oral presentation. Credit not granted for both COMM 105 and 106.

**COMM 311. Business and Professional Speaking.** (3) Fall, Spring. Principles and practice of speaking in an organizational setting. Areas of emphasis will be oral reports, interviewing, interpersonal communication, and working in groups. Pr.: COMM 105 or 106.
K-State 8:
- Aesthetic Interpretation
- Ethical Reasoning and Responsibility

**COMM 322. Interpersonal Communication.** (3) Fall. Examination of the dynamics of face-to-face interpersonal interaction. Focus is on applying principles of relational communication. Pr.: COMM 105 or 106.
K-State 8:
- Human Diversity within the U.S.
- Social Sciences

**COMM 480. Intercultural Communication.** (3) Spring. A study of the relationship between language and culture and its impact on human communication. Examines how language and culture differ among people and how differences are handled through the process of communication.
K-State 8:
- Global Issues and Perspectives
- Human Diversity within the U.S.

**Computer Systems Technology courses**

**CMST 103. Computing Principles.** (3) Fall, Spring. Fundamental concepts of computer science and computational thinking. Topics include the use of abstraction, problem analysis, data representation, algorithms and programming. Students learn to use creative processes to develop computational artifacts. Student activities are designed to appeal to a broad audience. Pr.: Experience with PC software.
K-State 8:
- Empirical and Quantitative Reasoning

**CMST 104. Database Management.** (2) Fall, Spring. An introduction to using a database management system on a personal computer. Students begin with elementary database commands and progress to more sophisticated database applications. Students are required to complete assignments on the computer, some of which are completed outside of class.
K-State 8:
- Empirical and Quantitative Reasoning

**CMST 108. PC Desktop Software.** (3) Fall, Spring. The use and application of popular software application packages. Topics include word processors, electronic spreadsheets, database management systems, and presentation software. Students are required to complete assignments on the computer, some of which are completed outside of class.
K-State 8:
- Empirical and Quantitative Reasoning
CMST 110. Introduction to Visual Basic. (3) Fall. Computer programming using Visual Basic for students who are not majoring in computer systems technology or web development technology. Topics include variable and constant declarations, data types, arithmetic expressions, decision structures, repetition structures, sequential files and arrays. Emphasis on problem solving and program structure. Coreq.: MATH 100.

K-State 8:
- Empirical and Quantitative Reasoning

CMST 115. Graphics Software Applications. (3) Fall, Spring. Introduction to popular graphics software application packages. Emphasis is on design concepts, color usage, image and concept development and creative problem solving using graphics software. Students are required to complete assignments on the computer, some of which are completed outside of class. Pr.: Experience with PC software.

K-State 8:
- Empirical and Quantitative Reasoning

CMST 135. Web Fundamentals. (3) Fall, Spring. Concepts of communications across the Internet, differences in browsers, and the technology required to create web pages. Topics include ethical use of the web and accessibility issues for disabled visitors. In-depth coverage of web page construction and styling. Pr.: Experience with PC software.

K-State 8:
- Aesthetic Interpretation
- Empirical and Quantitative Reasoning

CMST 146. Digital Photography. (3) Fall, Spring. Introduces basic photographic techniques and computer assisted image manipulation. Topics include: basic camera functions, basic digital image processing, visualization and design skills and digital manipulation techniques needed in today's market place. Students have opportunities to create portfolio pieces. Pr.: Experience with PC software.

K-State 8:
- Aesthetic Interpretation
- Empirical and Quantitative Reasoning

CMST 180. Introduction to Database Systems. (3) Fall, Spring. An introduction to properties and design principles of relational databases. Topics include database terms, E-R Modeling, relational table design and normalization, the relational algebra, Structured Query Language, and the database life cycle. Laboratory work includes the design and implementation of a database. Pr.: Experience with PC software.

K-State 8:
- Empirical and Quantitative Reasoning

CMST 183. Computer Systems Studio I. (1) Fall. Students begin a portfolio of projects that connect the topics covered in CMST 103, CMST 135, required general education courses, and other relevant subjects. Two hours studio per week. Coreq.: CMST 103 and CMST 135.

CMST 185. Computer Systems Studio II. (1) Spring. Students add to their portfolios projects that connect the topics covered in CMST 250, CMST 247, past required CMST and general education courses, and other relevant subjects. Two hours studio per week. Pr.: CMST 183. Coreq.: CMST 247 and CMST 250.

CMST 216. Digital Media I. (3) Spring. Hands-on experience dealing with the elements and principles of digital communications working with industry-standard software for photo editing, illustration, and page layout. Students have the opportunity to produce portfolio pieces. Pr.: CMST 115 and CMST 137.

K-State 8:
- Aesthetic Interpretation
- Empirical and Quantitative Reasoning
CMST 247. Programming I. (3) Spring. The syntax and semantics of a modern programming language. Topics include expressions, control statements, objects, classes, methods, event handling, arrays, inheritance, and polymorphism. Students are expected to apply the computational thinking and creative processes learned in CMST 103 to the development of computer programs. Pr.: CMST 103. Coreq.: MATH 100. K-State 8:
- Empirical and Quantitative Reasoning

CMST 250. Hardware and Network Fundamentals. (3) Fall, Spring. An introduction to computer systems with an emphasis on the internal workings of computer and network hardware. Hardware topics include data representation in binary, digital logic and the Von-Neumann architecture. Network topics include local-area and wide-area networks, topology, protocols and transmission media. Student activities include proper hardware configurations for various applications. Two hours lecture and two hours lab a week. Pr.: Experience with PC software. K-State 8:
- Empirical and Quantitative Reasoning
- Historical Perspectives

CMST 252. System and Software Fundamentals. (3) Spring. An introduction to computer systems with an emphasis on systems software. Systems topics include operating systems, low-level and high-level programming languages, virtualization and an introduction to the theory of computation. Two hours lecture and two hours lab a week. Pr.: CMST 250. K-State 8:
- Empirical and Quantitative Reasoning
- Historical Perspectives

CMST 270. Introduction to Unix. (3) Fall. An introduction to using the Unix operating system for programming and system administration. Topics include using the Unix command line interface, file attributes, editing text files, and programming with shell script and other interpreted languages. Two hours lecture and two hours lab a week. Pr.: CMST 102 and CMST 247. K-State 8:
- Empirical and Quantitative Reasoning

CMST 283. Computer Systems Studio III. (1) Fall. Students add to their portfolios projects that connect the topics covered in CMST 180, CMST 335, past required CMST and general education courses, and other relevant subjects. Two hours studio per week. Pr.: CMST 185. Coreq: CMST 180 and CMST 335.

CMST 299. Topics in Computer Systems Technology. (Var.) Fall, Spring, Summer. Provides an opportunity for faculty to present computer systems technology topics. Pr.: Consent of instructor. K-State 8:
- Empirical and Quantitative Reasoning

CMST 302. Applications in C Programming for Engineering Technology. (3) Fall. An introduction to structured program design and implementation using the C programming language. Topics include use of the C language in calculations, input, output, and file handling. Students design, implement, and test programs applicable to engineering technology majors. Pr.: Experience with PC software. K-State 8:
- Empirical and Quantitative Reasoning

CMST 305. Robotics Programming. (3) Spring. Concepts and practices related programming robotic systems emphasizing the unique input/output (I/O) and concurrency requirements of robotics. Students learn about sensors, actuators, kinematics, control systems, teleoperated operation and autonomous algorithms. Students write programs that run on a robot as well as a drive station computer with network communication to a robot. Pr.: CMST 247 or CMST 302. Coreq.: MATH 150 or MATH 151. K-State 8:
• Empirical and Quantitative Reasoning
• Natural and Physical Sciences

CMST 310. Visual Basic Programming. (3) An in-depth study of Visual Basic as an object-oriented language for students having had previous college-level computer programming courses. Topics include advanced database manipulation, MDI programming, creation of controls, web forms, and help files. Assignments focus on large programming projects. Students design, implement, and present a final capstone course project. Pr.: CMST 180 and CMST 247 or equivalent.

K-State 8:
• Empirical and Quantitative Reasoning

CMST 315. Introduction to System Administration. (3) Spring. An in-depth study of network and server administration. Topics include network design, hardware and software selection, server and client installation, management of network services, file and network resource administration, configuration of permissions and policies, and server monitoring and tuning. Two hours lecture and two hours lab a week. Coreq.: CMST 252.

K-State 8:
• Empirical and Quantitative Reasoning

CMST 317. C# Programming. (3) Fall. An in-depth study of the Microsoft C# language and its applications. C# is a development tool within the .NET framework. Students use the language to develop a wide variety of applications including stand-alone applications and those providing access to databases and Web services. Pr.: CMST 247.

K-State 8:
• Empirical and Quantitative Reasoning

CMST 323. Game Programming. (3) Fall. An introduction to computer game programming. Topics include game mathematics and physics, tile-based virtual worlds, artificial intelligence, and game graphics. Students design, develop, and present a functioning computer game as a capstone course project. Pr.: CMST 247 and PHYS 113.

K-State 8:
• Aesthetic Interpretation
• Empirical and Quantitative Reasoning

CMST 326. Page Layout and Type. (3) Fall. An intermediate course dealing with typographic design concepts, color usage, image development, idea development, and creative problem solving. Addresses typographic principles, techniques and development of a personal style to create typographic designs that are technically sound and visually interesting. Pr.: CMST 216.

K-State 8:
• Aesthetic Interpretation
• Empirical and Quantitative Reasoning

CMST 332. Web Development Project. (3) Spring. Each student implements a major web site. Students apply system analysis concepts to design a working website using graphics, security, and information processing. Pr.: CMST 335.

K-State 8:
• Aesthetic Interpretation
• Empirical and Quantitative Reasoning

CMST 333. Computer Systems Portfolio Defense. (0) Spring. Each student must orally present and defend his or her portfolio of projects to the faculty. Satisfactory completion of this course is required for a student to continue in the BETB-CP degree. Pr.: CMST 283. Co.: CMST 332.
K-State 8:
• Empirical and Quantitative Reasoning

CMST 336. Digital Media Project. (3) Spring. Provides sophomores with the capstone experience of developing a professional quality project in digital media. Students learn problem solving through the design process used in digital media development. Pr.: CMST 216 and sophomore standing.
K-State 8:
• Aesthetic Interpretation
• Empirical and Quantitative Reasoning

CMST 341. C++ Programming. (3) An in-depth study of C++ as an object-oriented programming language for students having had previous college-level computer programming courses. Students write Windows applications using classes, MFC, and managed and unmanaged code. Programs involve Windows interfacing, exception handling, database access, COM and the creation of DLLs. Each student individually completes a final capstone course project. Pr.: CMST 247.
K-State 8:
• Empirical and Quantitative Reasoning

CMST 344. Internetworking. (3) Spring. Concepts and principles of internetworking with TCP/IP. Topics include IP addressing, subnetting, transport services, internet architecture, routing strategies, and TCP/IP applications. Students implement and analyze various internet topologies and router configurations through hands-on activities. Two hours lecture and two hours lab a week. Pr.: CMST 250.
K-State 8:
• Empirical and Quantitative Reasoning

CMST 347. Java Programming II. (3) Fall. An in-depth study of Java as a web programming language. Topics include exception handling, file I/O, advanced programming techniques and data structures, Java applets, multithreaded programming, client/server communication, and database and web connectivity. Students design, implement, and present a final capstone course project. Pr.: CMST 247.
K-State 8:
• Empirical and Quantitative Reasoning

CMST 350. Unix Administration. (3) Spring. The essentials of administering the Unix operating system. Topics include Unix installation, an in-depth look at its file system, software installation, user configuration, handling security, networking, and configuration of network services. Two hours lecture and two hours lab a week. Pr.: CMST 250 and CMST 270.
K-State 8:
• Empirical and Quantitative Reasoning

CMST 355. Network Programming. (3) Summer. Concepts and techniques of developing computer programs that communicate over a network using the TCP/IP and UDP/IP protocols. The course examines the use of sockets to communicate between a client and a server focusing on application-layer protocols commonly used on the Internet. Application layer topics and protocols studied include DNS, web (HTTP, HTML, and XML), electronic mail (SMTP, MIME, POP, and IMAP) and secure communication (SSL and TLS). Asynchronous and multi-threaded programming technologies are studied as client and server applications are developed. Pr.: CMST 247 and CMST 250.
K-State 8:
• Empirical and Quantitative Reasoning
CMST 356. Motion Graphics Technology. (3) Fall. A continuation of previous digital media courses. Includes an exploration of the various tools and processes associated with creating digital video, animation, and motion graphics. Students have the opportunity to produce portfolio pieces. Pr.: CMST 336.
K-State 8:
• Aesthetic Interpretation

CMST 357. Machine Vision. (3) Spring. Introduction to practical concepts and techniques for image processing and computer vision emphasizing the fundamental algorithms applicable to robotics, automation and unmanned aerial systems. Major topics covered include: MATLAB programming, image acquisition, geometric and intensity transformations, spatial and frequency domain filtering, image enhancement and restoration, morphological transformations, edge detection, segmentation, compression, feature extraction, and pattern recognition. Pr.: ETB 310, or CMST 302, or CMST 247.

CMST 370. Applied Data Structures. (3) Fall. A systematic study of data structures and algorithms organized around the unifying concept of data abstraction. Topics include abstract data types, stacks, queues, linked lists, trees, hash tables, heaps, sorting, and searching. The implementations of these data types using object-based constructs are studied and compared with respect to algorithms running times. Pr.: CMST 247.
K-State 8:
• Empirical and Quantitative Reasoning

CMST 383. Programming and Data Structures Studio. (3-6) Fall. Students complete projects that tie together topics related to large application programming. Content topics include tools and methodologies for large program development, testing strategies, data structures and other relevant subjects. Nine hours studio per week. Pr.: CMST 333.

CMST 385. Systems and Database Administration Studio. (3-6) Spring. Students complete projects that tie together topics related to systems and database administration. Content topics include advanced database, network infrastructure, security, multi-platform support, systems integration and other relevant subjects. Nine hours studio per week. Pr.: CMST 383.

CMST 410. Operating Systems. (3) Fall. An in-depth study of the concepts of basic operating systems and the services they provide. Topics include memory and file management, process control, input, output, and control of computer hardware. The features of modern, popular operating systems are highlighted. Coreq.: CMST 370.
K-State 8:
• Empirical and Quantitative Reasoning

CMST 420. Advanced Database Systems. (3) Spring. An in-depth study of the theoretical foundations of database design, implementation, and management as well as social and ethical issues associated with database design. Topics include the enhanced E-R model, object-oriented model, distributed databases, advanced SQL, security, data warehousing and mining. Students design, implement, and present a capstone course project. Pr.: CMST 180 and level 2 programming language elective.
K-State 8:
• Empirical and Quantitative Reasoning

CMST 445. Network Security. (3) Fall. An in-depth study of the information and skills needed to design, install, configure, secure, and administer the interface between a LAN and the Internet. Emphasis is on designing and implementing secure systems communicating within a TCP/IP environment. Two hours lecture and two hours lab a week. Pr.: CMST 315 or CMST 350.
K-State 8:
• Empirical and Quantitative Reasoning

CMST 460. Systems Engineering. (3) Fall. An in-depth study of software engineering methodologies for the analysis, design, and implementation of software systems. Topics include project management, structured
analysis and design, object-oriented analysis and design, implementation and testing strategies, and software principles and metrics. Pr.: CMST 383; and senior standing.

K-State 8:
• Empirical and Quantitative Reasoning

**CMST 470. Applied Algorithm Design.** (3) Spring. Techniques of algorithm design including greedy, divide and conquer, dynamic programming, backtracking and branch-and-bound. Covers algorithmic solutions to problems from a variety of application areas including games, graphs and encryption. Emphasis is on programming assignments that enable students to develop their problem-solving and algorithm design skills. Pr.: CMST 370 and level 2 programming language elective.

K-State 8:
• Empirical and Quantitative Reasoning

**CMST 483. Emerging Technologies Studio.** (3-6) Fall. Students practice life-long learning and research methods by completing projects that combine previously learned material with newly emerging technologies that the students must research and analyze. Nine hours studio per week. Pr.: Senior standing.

**CMST 485. Computer Systems Senior Capstone Project.** (6) Spring. A sequel to CMST 460 in which students work individually or in teams to develop a significant project in their area of interest. Students are expected to apply the software engineering methodologies from CMST 460, write project documentation, and make verbal presentations. Whenever feasible, real-world projects are solicited from local businesses. Nine hours studio per week. Pr.: CMST 460.

K-State 8:
• Empirical and Quantitative Reasoning
• Ethical Reasoning and Responsibility

**CMST 499. Advanced Topics in Computer Systems Technology.** (1-18) Fall, Spring, Summer. Provides an opportunity for faculty to present advanced computer systems technology topics. Repeatable. Pr.: Consent of instructor.

K-State 8:
• Empirical and Quantitative Reasoning

**Digital Media Technology courses**

**DIGME 137. Fundamentals of Visual Literacy.** (3) Fall. An examination of the elements of visual design essential to communication with digital technology. Topics include design elements, color theory, graphics creation and optimization, and multimedia. Students receive hands-on experience with the elements and principles of visual literacy and working with 2-D organization. Pr.: Experience with PC software.

K-State 8:
• Aesthetic Interpretation

**DIGME 256. Digital Literacy.** (3) Fall. Effective digital communications using industry standard technologies to create and edit various media including photographs, videos, sound recordings, websites and other forms of print and online media. Students analyze, evaluate and participate in digital culture. Digital publishing topics include media access, censorship, copyright, fair use, mashups and remixes. Pr.: Experience with PC software.

K-State 8:
• Aesthetic Interpretation
• Empirical and Quantitative Reasoning

**DIGME 366. Visual Communication Studio.** (3-6) Fall. Students complete portfolio projects that tie together topics related to visual communications design. Content topics include creating graphics, animations, photographs, videos and other relevant visual elements to be viewed in print and digital formats. Up to nine hours studio per week. Pr.: CMST 333.
DIGME 376. Digital Rhetoric. (3) Spring. Provides students with the theoretical and applied understanding of how rhetoric works in online environments. Rhetorical strategies employed in media are explored with a close analysis of genre, digital literacy and the basics of design. Topics include new media, genre, digital literacy and rhetoric. Pr.: ENGL 200.

DIGME 386. Digital Media Production Studio. (3-6) Spring. Students complete portfolio projects that tie together topics related digital media production. Content topics include digital manipulation of media with audio editing, video editing, and photo editing tools and techniques. Up to nine hours studio per week. Pr.: CMST 333.

DIGME 406. Social Media. (3) Spring. An exploration of the social media aspects of producing and consuming digital media content; including blogging, podcasting, and vodcasting. Diversity of the human condition is emphasized. Students will develop and publish an online portfolio of their best digital media work. Pr.: Experience with PC software.

K-State 8:
• Aesthetic Interpretation
• Human Diversity within the U.S.

DIGME 456. Digital Media Senior Capstone Project. (3-6) Spring. Provides seniors with the capstone experience of developing a professional quality project in digital media. Students work individually or in teams to develop a significant project in their area of interest. Students are expected to apply the production techniques covered in previous digital media courses, write project documentation, and make verbal presentations. Whenever feasible, real-world projects are solicited from local businesses. Up to nine hours per studio a week. Pr.: DIGME 386 and senior standing.

K-State 8:
• Aesthetic Interpretation

Economics courses

ECON 110. Principles of Macroeconomics. (3). Fall, Spring. Basic facts, principles, and problems of economics; determination of the level of employment, output, and the price level; the monetary and banking system; problems and policies of economic instability, inflation, and growth; principles of economic development; other economic systems. Pr.: Probability of a grade of C or higher (PROB ≥ C) of at least 40 percent according to the economics component of the ACT Student Profile, a score of 18 or higher on the Math Placement Exam, or a grade of B or higher in MATH 010.

K-State 8:
• Global Issues and Perspectives
• Social Sciences

ECON 120. Principles of Microeconomics. (3) Fall, Spring. Basic facts, principles, and problems of economics including study of the determination of prices; the determination of wages, rent, interest, and profit; theory of the firm; monopoly and government regulation; international economic relations. Pr.: Probability of a grade of C or higher (PROB ≥ C) of at least 40 percent according to the economics component of the ACT Student Profile, a score of 18 or higher on the Math Placement Exam, or a grade of B or higher in MATH 010.

K-State 8:
• Social Sciences

Electronic and Computer Engineering Technology courses

ECET 100. Basic Electronics. (4) Fall, Spring. A survey course designed to provide an overview of basic direct and alternating current circuits and an introduction to linear and digital electronics. Laboratory exercises reinforce circuit theory and provide skills in the use of common electronic instruments. Three hours lecture and two hours lab a week. Coreq.: MATH 100 or consent of instructor.

K-State 8:
• Empirical and Quantitative Reasoning
• Natural and Physical Sciences

**ECET 101. Direct Current Circuits.** (3) Spring. An introductory course in basic circuit theory emphasizing the analysis of passive circuit networks containing resistance, capacitance, and inductance operating in direct current conditions. Topics include equivalent circuits, network theorems, capacitance, RC-circuit response, inductance, RL-circuit response, and computer simulation. Two hours lecture and two hours lab a week. Pr.: ECET 100.
K-State 8:
• Empirical and Quantitative Reasoning
• Natural and Physical Sciences

**ECET 110. Semiconductor Electronics.** (4) Fall. An introductory course in electronic devices. Topics include PN-junction theory, diodes, transistors, transistor biasing, transistor modeling, operational amplifiers, voltage regulators, and field-effect transistors (FET). Three hours lecture and two hours lab a week. Pr.: MATH 100.
Coreq.: ECET 101 and MATH 150.
K-State 8:
• Empirical and Quantitative Reasoning
• Natural and Physical Sciences

**ECET 201. Alternating Current Circuits.** (4) Fall. Analysis of passive networks containing resistance, capacitance, and inductance operating in alternating current conditions. Includes sinusoidal waveforms, polar and rectangular complex algebra, inductive and capacitive reactance, impedance networks, power factor correction, resonance, magnetic circuits, and an introduction to three-phase power distribution. Three hours lecture and two hours lab a week. Pr.: ECET 100 and MATH 150.
K-State 8:
• Empirical and Quantitative Reasoning
• Natural and Physical Sciences

**ECET 210. Linear Circuit Applications.** (4) Fall. Analysis and design of analog circuits including differential amplifiers, oscillators, linear and switching power amplifiers, applications of operational amplifiers, advanced semiconductor devices, and heat sinks. Three hours lecture and two hours lab a week. Pr.: ECET 110. Coreq.: ECET 201.
K-State 8:
• Empirical and Quantitative Reasoning
• Natural and Physical Sciences

**ECET 240. Electronic Manufacturing.** (3) Spring. A practical course in the details of electronic system design and fabrication. Topics include 2D CAD; printed-circuit board design, layout, and fabrication; electronic-system design principles; fabrication, packaging and assembly techniques for electronic systems; and through-hole and surface-mount technologies. Two hours lecture and two hours lab a week. Pr.: ECET 110.
K-State 8:
• Empirical and Quantitative Reasoning
• Natural and Physical Sciences

**ECET 250. Digital Logic.** (3) Fall. Study of basic logic elements including gates, flip-flops, counters, and registers. Includes Boolean algebra, logic reduction methods, and digital logic applications. Emphasis on computer simulation and PLD implementation of logic circuits. Two hours lecture and two hours lab a week. Coreq.: ECET 100.
K-State 8:
• Empirical and Quantitative Reasoning
ECET 299. Topics in Electronic and Computer Engineering Technology. (1-18) Fall, Spring, Summer. Provides an opportunity for faculty to present electronic and computer engineering technology topics. Repeatable. Pr.: Consent of instructor.
K-State 8:
- Empirical and Quantitative Reasoning

ECET 304. Electric Power and Devices. (3) Fall. Industrial applications of direct and alternating power, devices, and systems. Topics include electrical and electronic power devices, controllers, servomechanisms, and actuators; DC and AC motors and generators, motor speed control and drive systems; electrical power distribution, and industrial electronics applications. Two hours lecture and two hours lab a week. Pr.: ECET 100 and MATH 150.
K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Sciences

K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Sciences

ECET 330. Industrial Controls. (4) Spring. A study of electronic circuits and systems encountered in industrial environments. Topics include power control devices and applications, power system design, sensors, transducers, PLCs, computer-based data acquisition, and automatic control concepts. Three hours lecture and two hours lab a week. Coreq.: ECET 350.
K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Sciences

ECET 335. Industrial Control Topics. (1) Spring. Study of the applications of electronic circuits and systems in industrial environments. Topics include control systems and devices, control system modeling and simulation. Two hours lab a week. Pr.: ECET 100.

ECET 350. Microprocessor Fundamentals. (4) Spring. Concepts of microprocessor architecture, programming, and interfacing. Topics include assembly language programming, data conversion methods, and microprocessor-based system development tools. Three hours lecture and two hours lab a week. Pr.: ECET 250.
K-State 8:
- Empirical and Quantitative Reasoning

ECET 352. Digital Circuits and Systems. (4) Fall. Study of digital circuits and systems, i.e. systems controlled by microprocessors and microcontrollers. Students design and build digital circuits for the solution of engineering problems. Digital circuit design, interfacing techniques, and embedded systems programming are emphasized. Three hours lecture and two hours lab a week. Pr.: ECET 350. Coreq.: CMST 302.
K-State 8:
- Empirical and Quantitative Reasoning

ECET 385. Programmable Logic Controllers. (3) Spring. Study of the applications of programmable logic controllers (PLCs) in industrial environments. Topics include hardware, wiring, configuration, programming, documentation, troubleshooting, and maintenance of PLC systems. Two hours lecture and two hours lab a week. Pr.: ECET 100 and ECET 335 or MET 230.
K-State 8:
**ECET 414. Electromagnetic Applications.** (4) Spring. Emphasizes the physical understanding and visualization of Maxwell's Equations leading to the design of linear bilateral circuit components, waveguides and passive sensors for use in the radio-frequency (RF) regime. Three hours lecture and two hours lab. Pr.: ECET 320 and MATH 220.

K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Sciences

**ECET 420. Communication Circuits Design.** (4) Spring. An introduction to the theory and design of electronic circuits for communications emphasizing the implementation and analysis of common radio-frequency (RF) building blocks. Topics include s-parameters, the Smith chart, component behavior, RF test equipment, computer simulation, filter design, impedance matching, amplifiers, oscillators, mixers, and demodulators. Three hours lecture and two hours lab a week. Pr.: ECET 320.

K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Sciences

**ECET 421. Telecommunication Systems.** (4) Fall. An introduction to data communications and a survey of modern communication systems. Topics include Fourier analysis, data encoding, data link control, fiber-optic systems, cellular systems, satellite systems, and the modern telephone system. Three hours lecture and two hours lab a week. Pr.: ECET 320, CMST 250, and MATH 221.

K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Sciences

**ECET 430. Signals and Systems.** (3) Fall. A study of various network topics including Laplace transforms, signal flow graph models, transfer functions, network response, and differential equations and linear approximations of physical systems. The theory of control systems and their applications are discussed. Three hours lecture a week. Pr.: ECET 330 or MET 382. Coreq.: MATH 221.

K-State 8:
- Empirical and Quantitative Reasoning

**ECET 450. Digital Systems and Computer Architecture.** (4) Fall. Development of advanced digital design techniques. Topics include VHDL-based design, simulation, and synthesis; testing and validation; system-level interfacing; and computer architecture. Three hours lecture and two hours lab a week. Pr.: ECET 350.

K-State 8:
- Empirical and Quantitative Reasoning

**ECET 480. Electronic Design I.** (1) Fall. Application of electronic principles and the design methodology to solving a significant design problem in a team context. Includes determining customer requirements, exploring and choosing design alternatives, scheduling, and project management. Significant milestones are the project's conceptual, preliminary, and critical design reviews, which require written and oral presentations. Two hours lab a week. Pr.: ECET 320, ECET 352, and ENGL 302. Coreq.: ECET 430.

K-State 8:
- Empirical and Quantitative Reasoning

**ECET 481. Electronic Design II.** (2) Spring. A continuation of ECET 480. Includes the implementation, testing, and delivery of the project initiated in ECET 480 Electronic Design I. Significant milestones are the project prototype, design report, and final presentation. Four hours lab a week. Pr.: ECET 480.

K-State 8:
- Empirical and Quantitative Reasoning
ECET 499. Advanced Topics in Electronic and Computer Engineering Technology. (1-18) Fall, Spring, Summer. Provides an opportunity for faculty to present advanced electronic and computer engineering technology topics. Repeatable. Pr.: Consent of instructor.
K-State 8:
• Empirical and Quantitative Reasoning

**Engineering Technology courses**

ETA 020. Engineering Technology Seminar. (0) Fall, Spring. An introduction to university life and the skills necessary for personal and professional success after college. Activities include discussions, hand-on projects, and opportunities to meet and learn from professionals. Topics explore the responsibilities of a college student and the benefits of a university education. Approximately 16 contact hours during the semester. Repeatable.

ETA 292. Problems in Engineering Technology. (1-18) Fall, Spring, Summer. Independent study in specific topics in engineering technology. Pr.: Consent of instructor.
K-State 8:
• Empirical and Quantitative Reasoning

ETB 310. Applied Data Analysis and Tools. (3) Fall. An introduction to numerical computing, data analysis, and visualization with emphasis on the use of software tools and programming to model, analyze, and solve a variety of science and engineering problems. Two hours lecture and two hours lab a week. Pr.: MATH 150.
K-State 8:
• Empirical and Quantitative Reasoning

ETB 480. UAS Senior Design I. (1) Fall. Application of UAS principles and design methodology to solving a significant design problem in a team context. Includes determining customer requirements, exploring and choosing design alternatives, scheduling, and project management. Significant milestones are the project’s conceptual, preliminary, and critical design reviews, which require written and oral presentations. One hour lecture a week.

ETB 481. UAS Senior Design II. (2) Spring. A continuation of ETB 480. Includes the implementation, testing, and delivery of the project initiated in ETB 480 UAS Senior Design I. Significant milestones are the project prototype, design report, and final presentation. Four hours lab a week. Pr.: ETB 480.

ETB 482. Senior Design Project I. (1) Fall. Application of engineering principles and design methodology to solve a significant design problem in a team context. Includes determining customer requirements, exploring and choosing design alternatives, scheduling, and project management. Significant milestones are the project’s conceptual, preliminary, and critical design reviews, which require written and oral presentations. Pr.: ECET 350, MET 382, and senior standing.
K-State 8:
• Empirical and Quantitative Reasoning

ETB 483. Senior Design Project II. (1-3) Spring. A continuation of ETB 482. Includes the implementation, testing, and delivery of the project initiated in ETB 482 Senior Design I. Significant milestones are the project prototype, design report, and final presentation. Typically four hours lab a week when taken as 2 credit hours. Pr.: ETB 482.

ETB 492. Advanced Problems in Engineering Technology. (1-18) Fall, Spring, Summer. Advanced independent study in specific topics in engineering technology. Pr.: Consent of instructor.
K-State 8:
• Empirical and Quantitative Reasoning
**English courses**

**ENGL 080. Developmental English.** (3) Fall, Spring. Basics of standard edited (written) English with emphasis on grammar, usage, and sentence structure. This course does not fulfill requirements for the associate degree. Three hours recitation a week.

**ENGL 100. Expository Writing I.** (3) Fall, Spring, Summer. Introduction to expressive and informative writing. Frequent discussions, workshops, and conferences. Offers extensive practice in the process of writing: getting ideas, drafting, analyzing drafts, revising, and editing.

**ENGL 200. Expository Writing II.** (3) Fall, Spring, Summer. Introduction to writing persuasively and in response to literature. As with ENGL 100, uses discussion, workshops, and conferences, and emphasizes the writing process. Pr.: ENGL 100 and sophomore standing.

**ENGL 251. Introduction to Literature.** (3) Fall, Spring. Study of fiction, poetry, drama, and non-fiction.

K-State 8:
- Aesthetic Interpretation

**ENGL 302. Technical Writing.** (3) Fall, Spring, Summer. This writing course will provide students from a number of business, technology and aviation disciplines with intensive practice writing the kinds of documents that are common in their future professional lives. Three hours recitation a week. Pr.: ENGL 100 and sophomore standing.

K-State 8:
- Aesthetic Interpretation
- Empirical and Quantitative Reasoning

**ENGL 325. Literature and Technology.** (3) Students will read literature in a variety of literary, civic, and professional genres about technology and its effect on society; through writing, understand technology in terms of humanistic themes. Three hours lecture a week. Pr.: ENGL 100.

K-State 8:
- Aesthetic Interpretation
- Historical Perspectives

**ENGL 420. Topics in Film.** (3) Spring. Selected studies in film analysis. May be repeated once with change of topic. Pr.: ENGL 200 or 210.

K-State 8:
- Aesthetic Interpretation

**ENGL 450. Literature and Society.** (3) Fall, Spring. Literature in relation to social and cultural patterns and influences. May be repeated once. Pr.: ENGL 200 or 210.

K-State 8:
- Aesthetic Interpretation

**Finance courses**

**FINAN 450. Principles of Finance.** (3) Spring. Study of the basic principles of finance, including discounted cash flow analysis, risk-return tradeoff, asset pricing models, and financial and real asset valuation. Applications of these concepts to the firm’s investment and financing decisions and performance analysis will be discussed. Pr.: ECON 120, STAT 350, and ACCTG 231.

K-State 8:
- Empirical and Quantitative Reasoning

**History courses**

**HIST 320. History of Technology.** (3) Fall. This course focuses on the development of technology from ancient times to modern day, with emphasis on technology and its impact on American society from colonial
times to present. Students will prepare a portfolio project that will feature a research or service learning component. Pr.: ENGL 100.

K-State 8:
- Historical Perspectives

Management courses

**MANGT 366. Information Technology for Business.** (3) Spring. A comprehensive view of the role of information technology in satisfying organizations’ information requirements. Problems and techniques concerning the management of responsive information systems with special attention to managers’ use of systems outputs. Cases and hands-on exercises emphasizing the use of information systems in decision making, information gathering and organizing, use of modeling techniques, and presentation of information. Pr.: GENBA 166 or CIS 101, 102, and 103.

K-State 8:
- Empirical and Quantitative Reasoning

**MANGT 390. Business Law I.** (3) Fall, Spring. A study of law as it relates to business, including court procedures and systems, contracts, torts, agency and employment law, and business crimes. Pr.: Junior standing.

K-State 8:
- Ethical Reasoning and Responsibility
- Social Sciences

**MANGT 420. Principles of Management.** (3) Fall, Spring. Provides an introduction to the four basic managerial functions of planning, organizing, leading and controlling and their application to today’s complex work environment. An emphasis is placed on the roles and responsibilities of managers that help them to successfully meet organizational objectives by effectively leading employees and optimizing processes.

K-State 8:
- Social Sciences

**MANGT 421. Introduction to Operations Management.** (3) Fall. Description and analysis of problems related to the output of goods and services, operations planning and control, and systems management. Pr.: STAT 325 or STAT 350.

K-State 8:
- Empirical and Quantitative Reasoning

**MANGT 531. Human Resources Management.** (3) Spring. This course provides an overview of the human resource systems and processes needed to achieve organizational effectiveness and strategic success. All key functional areas including human resource planning, staffing, performance management, employee development, and compensation are addressed. Pr.: MANGT 420.

K-State 8:
- Human Diversity within the U.S.
- Social Sciences

Marketing courses

**MKTG 400. Introduction to Marketing.** (3) Fall, Spring. A general study of marketing principles which lead to the development of marketing strategy. A review of environmental influences and key analytical tools used in formulating marketing plans. Product or service design, distribution, pricing, and promotional programs. Pr.: ECON 110 or 120.

K-State 8:
- Social Sciences

**MKTG 542. Fundamentals of Professional Selling.** (3) Spring. Focuses on interpersonal communications between buyers and sellers, both oral and written. The mechanics and intricacies of personal sales presentations, which will be developed through practice. Coreq.: MKTG 400.
K-State 8:
• Social Sciences

**Mathematics courses**

**MATH 010. Intermediate Algebra.** (3) Fall, Spring. Preparatory course for MATH 100. Includes arithmetic (signed numbers, polynomials, algebraic fractions, exponents, and roots), solutions to equations (linear, quadratic, polynomial, root, and fractional), graphs (linear, quadratic, polynomial, root, and fractional), and geometry (area, perimeter, and the Pythagorean Theorem). Pr.: Two units of mathematics in grades 9-12 and a Mathematics ACT score of 16 or higher; or a Mathematics Algebra Placement Exam score of 15 or higher.

**MATH 011. Intermediate Algebra Review.** (2) Fall, Spring. Supplemental algebra lab that is required to be taken in conjunction with MATH 010. The student will receive 2 hours credit, which will not count towards graduation. Two hours rec. a week.

**MATH 020. College Algebra Review.** (2) Fall, Spring, Summer. Supplemental algebra lab to be taken in conjunction with MATH 100 for students who need additional instruction in algebra. Students are placed in this course on the basis of their score on the placement exam. The student will receive 2 hours credit, which will not count toward graduation. Two hours rec. a week.

**MATH 100. College Algebra.** (3) Fall, Spring, Summer. Fundamental concepts of algebra; algebraic equations and inequalities; functions and graphs; zeros of polynomial functions; exponential and logarithmic functions; systems of equations and inequalities. Pr.: B or better in Math 010; or two years of high school algebra and a Mathematics ACT score of 23 or higher; or two years of high school algebra and a Mathematics Algebra Placement Exam score of 21 or higher.

K-State 8:
• Empirical and Quantitative Reasoning

**MATH 150. Plane Trigonometry.** (3) Fall, Spring, Summer. Trigonometry and inverse trigonometric functions, trigonometric identities and equations; applications involving right triangles and applications illustrating the laws of sines and cosines. Pr.: C or better in MATH 100; or two years of high school algebra and a Mathematics ACT score of 23 or higher; or two years of high school algebra and a Mathematics Algebra Placement Exam score of 21 or higher.

K-State 8:
• Empirical and Quantitative Reasoning

**MATH 205. General Calculus and Linear Algebra.** (3) Spring. Introduction to calculus and linear algebra concepts that are particularly useful to the study of economics and business administration with special emphasis on working problems. Pr.: C or better in MATH 100; or two years of high school algebra and a Mathematics ACT score of 26 or higher; or two years of high school algebra and a Mathematics Algebra Placement Exam score of 40 or higher.

K-State 8:
• Empirical and Quantitative Reasoning

**MATH 220. Analytic Geometry and Calculus I.** (4) Fall, Spring, Summer. Analytic geometry, differential and integral calculus of algebraic and trigonometric functions. Pr.: B or better in MATH 100 and C or better in MATH 150; or three years of college preparatory mathematics including trigonometry and an Mathematics ACT score of 28 or higher; or a Mathematics Calculus Placement Exam score of 21 or higher.

K-State 8:
• Empirical and Quantitative Reasoning
MATH 221. Analytic Geometry and Calculus II. (4) Fall. Continuation of MATH 220 to include transcendental functions, techniques of integration, and infinite series. Pr.: C or better in MATH 220; or a Mathematics Calculus Placement Exam score of 40 or higher.
K-State 8:
• Empirical and Quantitative Reasoning

Mechanical Engineering Technology courses
MET 111. Technical Graphics. (3) Fall, Spring. Introduction to applications in sketching and 2D computer-aided design applied to geometric development and engineering communication. Techniques are applied to produce finished drawings and schematics to national and international standards. Theory and applications of orthographic and auxiliary projection and pictorial drawing. Standards for symbols, section views, and dimensioning included.
K-State 8:
• Empirical and Quantitative Reasoning

K-State 8:
• Empirical and Quantitative Reasoning

MET 121. Manufacturing Methods. (3) Fall. Introduction to contemporary manufacturing processes and practices, including precision measurement and inspection, machining, forming, casting, and welding processes. Recitation and laboratory experience in manufacturing practices, including metrology and basic setup and operation of manufacturing equipment. Observation of applications in local industry. One hour lecture and four hours lab a week.
K-State 8:
• Empirical and Quantitative Reasoning

K-State 8:
• Empirical and Quantitative Reasoning

MET 211. Statics. (3) Fall. A study of forces and their effects on the bodies upon which they act. Three hours lecture a week. Coreq.: PHYS 113.
K-State 8:
• Empirical and Quantitative Reasoning
• Natural and Physical Science

MET 230. Automated Manufacturing Systems I. (3) Spring. A general survey of the various components and systems in automated manufacturing, including material handling, electro-pneumatic control, programmable logic control, robotics, tooling, inspection and quality control, CNC, and other production processes. Two hours lecture and two hours lab a week. Pr.: ECET 100.
K-State 8:
• Empirical and Quantitative Reasoning

MET 231. Physical Materials and Metallurgy. (3) Fall. A broad view of materials used in industry, including structures of materials, how they react to stress and temperature, how the polyphase structures form, and how they are controlled to produce optimum properties. Students examine through study and laboratory experimentation ferrous and nonferrous metals, polymers, composites, and ceramics. Two hours lecture and two hours lab a week.
K-State 8:
• Empirical and Quantitative Reasoning

MET 245. Material Strength and Testing. (3) Spring. Calculations of material strength and deformation are complemented with principles and practice of mechanical testing including instrumentation and measurement in the areas of loads, stresses, deformations, thermal stresses, and other quantities. Two hours lecture and two hours lab a week. Pr.: MET 211.
K-State 8:
• Ethical Reasoning and Responsibility
• Natural and Physical Sciences

MET 246. Dynamics of Machines. (3) Fall. Velocities, accelerations, and forces in existing mechanisms to produce motions. Work, energy, impulse and momentum concepts in kinetics. Vibrations in machine parts. Three hour lecture a week. Pr.: MATH 220 and PHYS 113.
K-State 8:
• Empirical and Quantitative Reasoning
• Natural and Physical Sciences

MET 252. Fluid Power Technology. (3) Fall. Study, design, analysis, operation, maintenance, and applications of hydraulic and pneumatic power systems and components. Pr.: MATH 100 and MATH 151.
K-State 8:
• Empirical and Quantitative Reasoning
• Natural and Physical Sciences

MET 264. Machine Design Technology I. (4) Spring. Introduction to application and selection of machine elements to design mechanical systems. Covers primary machine elements such as shafts and shaft components, screws and fasteners, welded joints, springs, bearings, gears, clutches and brakes. Three hours lecture and two hours lab a week. Coreq.: MET 245.
K-State 8:
• Empirical and Quantitative Reasoning
• Historical Perspectives

MET 299. Topics in Mechanical Engineering Technology. (Var.) Fall, Spring, Summer. Provides an opportunity for faculty to present mechanical engineering technology topics. Pr.: Consent of instructor.
K-State 8:
• Empirical and Quantitative Reasoning

MET 314. Finite Element Analysis and Design Modeling. (3) Fall. Introduction to finite element analysis applied to mechanical design. Study and application of advanced computer-aided modeling techniques. One hour lecture and four hours lab a week. Pr.: MET 117 and MET 245.
K-State 8:
• Empirical and Quantitative Reasoning

MET 325. Additive Manufacturing. (3) Fall. The course develops an understanding of additive manufacturing (AM) principles and applications combined with a problem-based learning project which develops design, manufacturing and maintenance skill sets for AM practitioners. Two hours lecture and three hours lab per week.

MET 333. Advanced Material Science. (3) Spring. A continuation of MET 231 Physical Materials and Metallurgy. Emphasizes the understanding of material properties used to give various materials their function. Theory and laboratory work focus on controlling and testing material properties. Ferrous and non-ferrous metals, polymers and adhesives, composites, smart materials, effects of corrosion, failure analysis, and selection techniques for design. Two hours lecture and two hours lab a week. Pr.: CHM 110, CHM 111, and MET 231.
K-State 8:
• Empirical and Quantitative Reasoning
• Natural and Physical Sciences

MET 346. Elements of Mechanisms. (3) Spring. Fundamental motion concepts of displacement, velocity, and acceleration are studied, as well as analytical and graphical analysis and synthesis of linkages, gear trains, cams, pulleys, and combinations of these elements. Pr.: MET 117 and MET 246.

K-State 8:
• Empirical and Quantitative Reasoning
• Natural and Physical Sciences


K-State 8:
• Empirical and Quantitative Reasoning
• Natural and Physical Sciences


K-State 8:
• Empirical and Quantitative Reasoning

MET 381. Quality Control. (3) Spring. An introductory course in quality concepts and techniques used in industry. Topics include fundamentals of statistics and probability, statistical process control charts, and quality improvement tools. Three hours lecture a week. Pr.: Junior standing or consent of instructor.

K-State 8:
• Empirical and Quantitative Reasoning

MET 382. Industrial Instrumentation and Controls. (3) Spring. An introduction to process control systems for industrial applications. Course topics include concepts and terminology, first- and second-order systems, measurement of motion, gauges and transducers, signal processing, and measurement of properties. Two hours lecture and two hours lab a week. Pr.: ECET 201 or ECET 304.

K-State 8:
• Empirical and Quantitative Reasoning

MET 410. Managerial and Project Economics. (3) Fall. Economic analysis of problems as applied to managerial decision making. Students consider the economic viability of solutions in engineering and a variety of other kinds of projects common in technology-oriented businesses. Pr.: MATH 100. Same as BUS 410.

K-State 8:
• Social Sciences


K-State 8:
• Empirical and Quantitative Reasoning
• Natural and Physical Sciences
MET 462. Senior Design Project I. (1) Fall. Selection, definition, and analysis of a project supervised by faculty. Includes consideration of project parameters, trade-off studies, alternative solutions, and justification of selected solution. Completion and presentation of a written project proposal included. Two hours lab a week. Pr.: MET 365 and senior standing.

K-State 8:
• Empirical and Quantitative Reasoning

MET 464. Senior Design Project II. (2) Spring. Development and implementation of project proposal submitted in MET 462. Construction, packaging, and testing of project culminating in a senior design project report which may include full documentation and performance specifications, functional description, theoretical analysis, schematics, cost analysis, parts list, drawings, etc. Project results will be presented orally to a select committee at the end of the course. Four hours lab a week. Pr.: MET 462 and senior standing.

K-State 8:
• Ethical Reasoning and Responsibility

MET 471. Thermodynamics and Heat Transfer. (3) Fall. This course emphasizes thermodynamic laws and equations and the use of tables and charts for properties of important fluids. Applications to systems used for producing, transforming, and applying heat and mechanical energy are also studied. Conduction, convection, and radiation heat transfer processes are investigated. Three hours lecture a week. Pr.: MET 353.

K-State 8:
• Empirical and Quantitative Reasoning
• Natural and Physical Sciences

MET 481. Automated Manufacturing Systems II. (3) Fall. Covers systems for manufacturing operations including facilities, supplies, materials, procedures, and control. Topics include design, programming, feedback for manufacturing, production set-up, automated work cells, and decision issues. Two hours lecture and two hours lab a week. Pr.: MET 125, MET 230, and MET 382.

K-State 8:
• Empirical and Quantitative Reasoning
• Global Issues and Perspectives

MET 490. Industrial Work Internship. (Var.) Fall, Spring, Summer. The student will work as an intern with business and industry in mechanical engineering technology field. A report detailing duties performed and tasks accomplished is required at the end of the internship period. Pr.: Sophomore standing and consent of MET program coordinator.

K-State 8:
• Empirical and Quantitative Reasoning

MET 499. Advanced Topics in Mechanical Engineering Technology. (Var.) Fall, Spring, Summer. Provides an opportunity for faculty to present advanced mechanical engineering technology topics. Pr.: Consent of instructor.

K-State 8:
• Empirical and Quantitative Reasoning

Philosophy courses

PHILO 105. Introduction to Critical Thinking. (3) Fall, Spring. A basic introduction to both deductive and inductive reasoning. Emphasis is placed on constructing, analyzing, and evaluating arguments.

K-State 8:
• Empirical and Quantitative Reasoning

PHILO 390. Business Ethics. (3) Fall, Spring. An examination of the principles of ethics as applied to situations and practices in modern American business.

K-State 8:
• Ethical Reasoning and Responsibility

**Political science courses**

**POLSC 115. U.S. Politics.** (3) Fall. The national government with emphasis on constitutional principles, basic structure, functions, and the political process.

K-State 8:
• Historical Perspectives
• Social Sciences

**Professional pilot courses**

**PPIL 109. Private Pilot Glider.** (3) Spring. The subject areas necessary for completion and passing of the FAA Private Pilot Written Knowledge Test for Gliders are presented.

K-State 8:
• Empirical and Quantitative Reasoning
• Natural and Physical Sciences

**PPIL 111. Private Pilot.** (4) Fall, Spring. The subject areas necessary for completion and passing of the FAA Private Pilot Knowledge Test are presented. Four hours recitation a week.

K-State 8:
• Empirical and Quantitative Reasoning
• Ethical Reasoning and Responsibility

**PPIL 112. Professional Instrument Pilot.** (3) Fall, Spring. A study of the procedures, regulations, and techniques required to safely fly in instrument meteorological conditions within our national airspace system. The course will prepare the student to pass the FAA Instrument Airplane Knowledge Test. Pr.: PPIL 111. Coreq.: MATH 100.

K-State 8:
• Empirical and Quantitative Reasoning
• Ethical Reasoning and Responsibility

**PPIL 113. Private Pilot Flight Lab.** (1) Fall, Spring, Summer. An introduction of the fundamentals of flight. Solo flights to include all flight operations and maneuvers necessary for meeting the aeronautical experience for the FAA Private Pilot Certificate. Six hours lab a week. Coreq.: PPIL 111.

**PPIL 114. Professional Instrument Pilot Flight Lab.** (1) Fall, Spring, Summer. Instructional flight training necessary to maneuver the aircraft safely in actual or simulated instrument meteorological conditions within the national airspace system. Six hours lab a week. Pr.: PPIL 111, 113. Coreq.: PPIL 112.

**PPIL 115. Private Pilot Helicopter Flight Lab.** (1) Fall, Spring, Summer. An introduction to the flight operations and maneuvers necessary to meet the aeronautical experience for the private pilot rotorcraft helicopter class rating. Six hours lab a week. Coreq.: PPIL 111.

**PPIL 116. Instrument Helicopter Pilot Flight Lab.** (1) Fall, Spring, Summer. Flight training necessary to maneuver a helicopter safely in actual or simulated instrument meteorological conditions within the national airspace system. Six hours lab a week. Pr.: PPIL 115. Coreq.: PPIL 112.

**PPIL 196. VFR Pilot Proficiency Lab.** (1) Fall, Spring, Summer. Instruction and flight training necessary to safely operate an aircraft to meet the Federal Aviation Regulations. This course provides the student the opportunity to review and demonstrate proficiency to satisfactorily meet the FAA regulations for the current ratings held.

**PPIL 197. IFR Pilot Proficiency Lab.** (1) Fall, Spring, Summer. Instruction, simulator, and flight training necessary to safely operate an aircraft, to meet and maintain the Federal Aviation Regulations currency requirement of Instrument Competency, and maintain instrument currency and proficiency.
PPIL 210. Aviation Safety. (3) Fall, Spring. This course provides an introduction to the field of aviation safety with an emphasis on promoting a safety culture. Various safety programs and their relevance in the field of aviation are discussed. Students will examine numerous accident reports and discuss safety issues facing the aviation industry today.

K-State 8:
• Ethical Reasoning and Responsibility

PPIL 211. Professional Commercial Pilot. (3) Fall, Spring. The subject areas necessary for passing the FAA Commercial Pilot Knowledge Test. Three hours rec. a week. Pr.: PPIL 112, 114.

K-State 8:
• Empirical and Quantitative Reasoning
• Ethical Reasoning and Responsibility

PPIL 212. Professional Commercial Pilot Flight Lab I. (2) Fall, Spring, Summer. Instructional cross country flight training necessary to maneuver the aircraft safely in actual or simulated instrument meteorological conditions within the national airspace system. Six hours lab a week. Pr.: PPIL 112, 114. Coreq.: PPIL 211.

PPIL 213. Professional Commercial Pilot Flight Lab II. (2) Fall, Spring, Summer. An introduction to complex airplane operations and a review of those operations required of a commercial pilot. The completion of this course readies the student to take the commercial FAA practical test. Six hours lab a week. Pr.: PPIL 212.

PPIL 214. Extended Cross Country. (1) A characteristic of aviation is that aircraft can cover a large geographic area. Aircraft operations in other geographic areas may differ greatly from a student’s training base. The experience of long-range navigation can be a great learning experience as well as a confidence booster. Selection of a destination that allows the student to increase their knowledge of aviation also aids in producing a more well-rounded, responsible professional. Pr.: PPIL 113.

PPIL 215. Mountain Flying. (1) A characteristic of aviation is that aircraft can cover a large geographic area. Aircraft operations in mountainous areas may differ greatly from a student’s training. The experience of reduced aircraft performance caused by high-density altitudes can be a great training into operations with aircraft exhibiting marginal performance. Learning of weather patterns, hypoxia, and survival allows the student to increase their knowledge of aviation and also aids in producing a more well-rounded, responsible professional. Pr.: PPIL 113.

PPIL 216. Altitude Chamber. (1) Fall, Spring. This course offers a 1-day aviation physiology course for civil aviation pilots through the CAMI’s Aeromedical Education Division in Oklahoma City, OK. In addition to the basic academic contents, this course offers practical demonstrations of rapid decompression and hypoxia in a hypobaric chamber, as well as a practical demonstration of spatial disorientation. Upon completion of the course students will receive a certificate noting that they have completed the FAA’s Physiological Training course. The FAA requires a current Aviation Medical Certificate.

PPIL 217. Glider Towing. (1) Fall. Instruction and flight training necessary to obtain a logbook endorsement in the techniques and procedures for the safe towing of gliders. Pr.: PPIL 113.

PPIL 218. Commercial Pilot Helicopter Ground School. (3) Fall, Spring, Summer. Ground instruction covering helicopter aircraft to develop the aeronautical knowledge to meet the ground school requirements for a commercial pilot rotorcraft helicopter class rating. Pr.: PPIL 115.

K-State 8:
• Ethical Reasoning and Responsibility
• Natural and Physical Sciences
PPIL 219. Single Engine Seaplane Transition. (1) Spring. Instruction and flight training necessary to add the seaplane rating to the commercial pilot certificate. Course requires a one-week trip to a specified contract training location. One hour lecture a week. Pr.: PPIL 213.

PPIL 221. Preventive Maintenance. (2) Fall, Spring. This course will give the student hands-on experience with the maintenance tasks allowed under FAR 43 entitled preventive maintenance. One hour lecture and two hours lab a week.

K-State 8:
• Ethical Reasoning and Responsibility


PPIL 223. Commercial Pilot Helicopter Flight Lab II. (1-2) Fall, Spring, Summer. Flight instruction and experience in a helicopter to develop the aeronautical skills to meet the requirements for a Commercial Pilot rotorcraft helicopter class rating. Six hours lab a week. Pr.: PPIL 222.

PPIL 230. Private Pilot Glider Transition. (1) Instruction and flight training in the design, performance, operating characteristics, and flight proficiency for the safe operation of glider aircraft that will lead to a Private Pilot glider certificate. This course provides students the opportunity to enhance and develop their skills in this segment of aviation. Pr.: PPIL 113.

K-State 8:
• Natural and Physical Sciences

PPIL 231. Commercial Pilot Glider Transition. (1) Instruction and flight training in the design, performance, operating characteristics, and flight proficiency for the safe operation of glider aircraft that will lead to a commercial pilot glider certificate. This course provides students the opportunity to enhance and develop their skills in this segment of aviation. Pr.: PPIL 213 and PPIL 230.

K-State 8:
• Natural and Physical Sciences

PPIL 251. Private Pilot Helicopter Ground School. (1) Fall, Spring, Summer. Ground instruction covering helicopter aircraft to develop the aeronautical knowledge to meet the ground school requirements for a private pilot rotorcraft helicopter class rating. Pr.: PPIL 111.

PPIL 262. Multi-Engine Ground School. (1) Fall, Spring, Summer. Ground instruction covering multi-engine aircraft to develop the aeronautical knowledge to meet the ground school requirements for a multi-engine land class rating. Pr.: PPIL 211.

PPIL 263. Multi-Engine Flight Lab. (1) Fall, Spring, Summer. Flight instruction and experience in a multi-engine aircraft to develop the aeronautical skills to meet the requirements to add a multi-engine land class rating to the student's existing pilot certificate. Three hours lab a week. Coreq.: PPIL 262.

K-State 8:
• Natural and Physical Sciences

PPIL 281. Instrument Helicopter Pilot Ground School. (1) Fall, Spring, Summer. Ground instruction covering helicopter aircraft to develop the aeronautical knowledge to meet the ground school requirements for an instrument-helicopter rating. Pr.: PPIL 251.

K-State 8:
• Ethical Reasoning and Responsibility

PPIL 290. Multi-Engine Crew Coordination. (1) Instruction, simulator and flight training necessary to operate a multi-engine aircraft as a member of a crew. Enhances multi-engine, instrument and cross country skills. Pr.: PPIL 211, 263.
PPIL 295. Tailwheel Transition. (1) Instruction and flight training in the design, performance, operating characteristics, and flight proficiency for the safe operation of conventional-gearred (tailwheel) aircraft that will lead to an endorsement allowing the student to act as pilot-in-command. This course provides students the opportunity to enhance and develop their skills in this segment of aviation. Pr.: PPIL 113.  
K-State 8:  
• Natural and Physical Sciences

PPIL 312. Certified Flight Instructor Ground School. (6) Fall, Spring. Instruction techniques, practices, and procedures necessary to provide skill in organizing and presenting lessons. This course will prepare the student for the FAA Certified Instructor Knowledge Test. Six hours rec. a week. Pr.: PPIL 211.  
K-State 8:  
• Empirical and Quantitative Reasoning  
• Ethical Reasoning and Responsibility

PPIL 314. Certified Flight Instructor Flight Lab. (2) Fall, Spring, Summer. The needed flight skills and proper display of teaching ability will be emphasized. The demonstration of flight maneuvers with recognition of common errors in students performing the demonstrated maneuvers is stressed. Six hours lab a week. Pr.: PPIL 213. Coreq.: PPIL 312.

PPIL 315. Certified Flight Instructor Glider. (1) Summer. Instruction techniques, practices, and procedures necessary to provide skill in organizing and presenting lessons. Prepares the student for the FAA Certified Instructor Knowledge Test Glider. One hour lecture a week. Pr.: PPIL 314.

PPIL 316. Certified Flight Instructor Glider Flight Lab. (1) Summer. Provides the opportunity to apply and demonstrate concepts learned in the flight instructor glider ground instruction course (PPIL 315). Requires demonstration of flight maneuvers and the ability to recognize common errors in student performance. One hour lab a week. Pr.: PPIL 231. Coreq.: PPIL 314.

PPIL 325. Advanced Aircraft Systems. (3) Fall, Spring. Electrical, environmental, hydraulic, fuel, ignition, and lubrication systems, including theory of operation and calculations. Principles, systems, analysis, operation, and limitations of advanced electronic navigation, flight director, and automatic flight control systems, including Inertial Navigation Systems, GPS. Pr.: PPIL 211.  
K-State 8:  
• Empirical and Quantitative Reasoning  
• Natural and Physical Sciences

PPIL 351. Flight Instructor Helicopter. (1) Fall, Spring, Summer. Ground instruction covering helicopter aircraft to develop the aeronautical knowledge to meet the ground school requirements for a certified flight instructor rotorcraft helicopter class rating. Pr.: PPIL 312 and PPIL 291.  
K-State 8:  
• Ethical Reasoning and Responsibility

PPIL 352. Flight Instructor Helicopter Flight Lab. (1) Fall, Spring, Summer. Flight instruction and experience in a helicopter to develop the aeronautical skills to meet the requirements for a helicopter instructor rating. Six hours lab a week. Pr.: PPIL 223. Coreq.: PPIL 312.

PPIL 353. Helicopter Turbine Transition Lab. (1) Instruction and flight training in the design, performance, operating characteristics, and flight proficiency, for the safe operation of a turbine-powered helicopter. This course provides students the opportunity to enhance their knowledge and skills related to an entry-level turbine helicopter. Three hours lab a week. Pr.: PPIL 223 or PPIL 292.

PPIL 354. Night Vision Goggle Lab. (1) Instruction and flight training in order to increase safety, situational awareness and mission operational capabilities during night flight while wearing night vision goggles. Upon completing FAA requirements, students may obtain a logbook or training record endorsement certifying they
have completed the flight and ground training required to act as pilot in command of an aircraft using night vision goggles. Three hours lab a week. Pr.: PPIL 223 or PPIL 292.

**PPIL 365. Environmental Helicopter Operations.** (3) Spring. Foundational instruction for helicopter operations in varying terrain and environmental conditions. Topics include helicopter flight in diverse terrain and climate, principles of flight close to the earth, and avoidance of both natural and man-made hazards. Emphasis on aeronautical decision making and cockpit resource management. Pr.: Junior standing or instructor consent.

**PPIL 379 Turbine Transition.** (3) Fall, Spring. To provide required knowledge to meet FAA requirements to operate as second-in-command in KSU transportation aircraft. Covers systems performance and emergency procedures for turbine aircraft. In conjunction with simulator training, students will be qualified to operate as co-pilots on university transportation trips. Pr.: PPIL 213.

**K-State 8:**
- Empirical and Quantitative Reasoning
- Natural and Physical Sciences

**PPIL 385. Airline Transport Pilot Rating.** (2) By appt. Provides the student with the aeronautical knowledge necessary to prepare for the FAA Airline Transport Pilot Knowledge Test. The demonstration of flight maneuvers, with recognition of proper control of emergencies in compliance of the Airline Transport Pilot Practical Test Standards will be stressed. One hour lecture and three hours lab a week.

**PPIL 387. Crew Resource Management I.** (3) Fall. This course involves using all available resources for a safe and efficient flight. Aircraft crew performance is reviewed to include the background and philosophy of Crew Resource Management (CRM) communication, decision behavior, team building, workload management, and situational awareness. Students accomplish two flight scenarios using a Canadair Regional Jet advanced aircraft training device. Two hour lecture and four hours lab a week. Pr.: PPIL 262, PPIL 325.

**K-State 8:**
- Ethical Reasoning and Responsibility
- Human Diversity within the U.S.

**PPIL 389. Problems in Aviation.** (1–18) Fall, Spring, Summer. To provide the student an opportunity to apply aviation education to the improvement of skills previously learned as designated by the instructor.

**PPIL 396. Introduction to Upset Training and Recovery.** (1) Instruction and flight training necessary to develop an understanding and flight proficiency in basic upset flight attitudes. This course provides the student the opportunity to develop a better understanding of aircraft and safety of flight in other than normal flight attitudes. Pr.: PPIL 114.

**K-State 8:**
- Natural and Physical Sciences

**PPIL 416. Crew Resource Management II.** (3) Spring. Utilizing a Canadair Regional Jet advanced aircraft training device, special emphasis is placed on systems knowledge, flight profiles and cockpit flows of the CRJ 200. Students fly four Line Orientated Flight Training (LOFT) missions and self critique their performance. One hour lecture and five hours lab a week. Pr.: PPIL 387 and AVT 340.

**K-State 8:**
- Ethical Reasoning and Responsibility
- Social Sciences

**PPIL 482. Certified Instrument Flight Instructor Ground School.** (1) Fall, Spring, Summer. Instrument instruction techniques, practices, and procedures necessary to provide skills in organizing and presenting lessons in instrument flying procedures. This course will prepare the student for the FAA Certified Instrument Flight Instructor Knowledge Test. One hour rec. per week. Pr.: PPIL 312.

**K-State 8:**
• Ethical Reasoning and Responsibility

PPIL 483. Certified Instrument Flight Instructor Lab. (1) Fall, Spring, Summer. Instrument instruction techniques, practices, and procedures necessary to provide skills in organizing and presenting lessons in instrument flying procedures. This course will prepare the student for the FAA Certified Instrument Flight Instructor practical test. Three hours lab per week. Pr.: PPIL 314. Coreq.: PPIL 482.


PPIL 492. Certified Multi-Engine Flight Instructor Ground School. (1) Fall, Spring. Provides the student with the aeronautical knowledge necessary to meet the requirements for the addition of an airplane, multi-engine rating to the flight instructor certificate. One hour rec. a week. Pr.: PPIL 312, 314.

PPIL 493. Certified Multi-Engine Flight Instructor Lab. (1) Fall, Spring, Summer. Provides the student with the aeronautical skills and experience necessary to meet the requirements for the addition of an airplane, multi-engine rating to the flight instructor certificate. Three hours lab a week. Pr.: PPIL 314. Coreq.: PPIL 492.

PPIL 494. Helicopter Operations. (3) Spring. The in-depth study of helicopter operations in civil operations. Topics will include helicopter operations in law enforcement, EMS, petroleum industry, etc. Advanced helicopter systems, multi-crew and multi-engine helicopter operations will also be addressed. Pr.: Junior standing or instructor consent.

Psychology courses

PSYCH 110. General Psychology. (3) Fall, Spring, Summer. An introductory survey of the general content areas of psychology, including methods, data, and principles.
K-State 8:
• Empirical and Quantitative Reasoning
• Social Sciences

PSYCH 290. Innovative Studies in Psychology. (1-6) Fall, Spring. Topics selected in consultation with the instructor. To be used for interdisciplinary and innovative approaches to psychological topics. Pr.: Consent of instructor.
K-State 8:
• Social Sciences

PSYCH 505. Abnormal Psychology. (3) Fall. An introductory study of behavior pathologies, with emphasis on their etiology and treatment. Note: 500-level psychology courses cannot be taken for graduate credit by students in psychology graduate programs. Pr.: Junior standing, PSYCH 110.
K-State 8:
• Empirical and Quantitative Reasoning
• Social Sciences

Science courses

BIOL 198. Principles of Biology. (4) Fall, Spring, Summer. An introductory course for majors and non-majors focusing on plants, animals, and microbes. Specific areas covered include biological molecules, cells, genetics, energy flow, physiology, ecology, and evolution. Studio format incorporating lecture, lab, and rec. elements in two two-hour sessions per week.
K-State 8:
• Empirical and Quantitative Reasoning
• Natural and Physical Sciences
**BIOL 397. Topics in Biology.** (1-6) Fall, Spring, Summer. Special course offering in an area of faculty expertise and/or supervised independent study projects.

**CHM 110. General Chemistry.** (3) Fall, Spring, Summer. Principles, laws, and theories of chemistry; important metallic and nonmetallic substances. (An optional laboratory course, CHM 111, is available for an additional hour of credit.) Three hours lecture a week. Pr.: MATH 010 or at least one year of high school algebra.
K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Sciences

**CHM 111. General Chemistry Laboratory.** (1) Fall, Spring, Summer. An optional laboratory course to supplement the material of CHM 110. Three hours lab a week. Coreq.: CHM 110.
K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Sciences

**CHM 210. Chemistry I.** (4) Fall, Spring, Summer. First course of a two-semester study of the principles of chemistry and the properties of the elements and their compounds. Concurrent enrollment in CHM 210 lab is required. Three hours lecture and three hours lab a week. Pr.: One year of high school chemistry and MATH 100 (or two years of high school algebra).
K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Sciences

**GEOL 100. Earth In Action.** (3) Fall, Spring. The earth's physical, structural, and dynamic features; the most common minerals and rocks; processes affecting the earth. Three hours rec. a week.
K-State 8:
- Historical Perspectives
- Natural and Physical Sciences

**GEOL 103. Geology Laboratory.** (1) Fall, Spring. Laboratory investigation of rocks and minerals; use of geologic and topographic maps; understanding of stream and groundwater processes and landforms. Coreq.: GEOL 100, GEOL 102, or GEOL 125.
K-State 8:
- Natural and Physical Sciences

**GEOL 125. Natural Disasters.** (3) Spring. Discussion of geological phenomena such as earthquakes, volcanic eruptions, landslides, and floods, with particular emphasis on their causes, effects, and significance as hazards.
K-State 8:
- Natural and Physical Sciences
- Social Sciences

**PHYS 113. General Physics I.** (4) Fall, Spring, Summer. A basic development of the principles of mechanics, heat, fluids, oscillations, waves, and sound. Emphasis is on conceptual development and numerical problem solving. Two hours lecture, one hour rec., one hour quiz, and two hours lab a week. Pr.: MATH 150 or one-half units of high school algebra and one unit high school trigonometry.
K-State 8:
- Empirical and Quantitative Reasoning
- Natural and Physical Sciences

**PHYS 114. General Physics II.** (4) Fall, Spring, Summer. The continued treatment of the fundamentals of electricity and magnetism, light and optics, atomic and nuclear physics. These concepts are used to
understand D.C. and A.C. circuits, motors, and generators. Emphasis is placed on conceptual development and
problem solving. Two hours lecture, one hour rec., one hour quiz, and two hours lab a week. Pr.: PHYS 113.
K-State 8:
• Empirical and Quantitative Reasoning
• Natural and Physical Sciences

Social Work courses

ANTH 200. Introduction to Cultural Anthropology. (3) Fall, Spring. Introduction to ethnology and
ethnography; analysis and comparison of technological, social, and religious characteristics of cultural
systems. Note: Not available for credit to students who have credit in ANTH 204.
K-State 8:
• Global Issues and Perspectives
• Social Sciences

SOCWK 100. Social Work: The Helping Profession. (3) Fall, Spring. An introduction to the profession of
social work and the various fields of social service by observing, experiencing, and analyzing social work and
its place in society. An opportunity for the student to test social work as a possible career choice.
K-State 8:
• Historical Perspectives
• Social Sciences

SOCWK 200. Basic Skills for Working with People. (3) Fall, Spring. Course develops basic skill components
for the helping professions. Students learn fundamentals of interpersonal communication.
K-State 8:
• Ethical Reasoning and Responsibility

SOCWK 310. Topics in Social Work. (1-3) Fall, Spring. Supervised independent study projects.

SOCWK 315. Human Behavior in the Social Environment I. (3) Fall, Spring. An introduction to the
relationship among biological, social, psychological, and cultural systems as they affect or are affected by
human behavior as it relates to social world models of practice. Emphasis on social systems understanding of
human development. Pr.: Two courses in the social sciences and sophomore standing.
K-State 8:
• Human Diversity within the U.S.
• Social Sciences

Emphasis on social work research methodology and statistical analysis of small sample data sets. Content
examines the ethics and processes of research. Pr.: SOCWK 100 and MATH 100; Social work majors only.
K-State 8:
• Empirical and Quantitative Reasoning

SOCWK 510. Social Welfare as a Social Institution. (3) Fall, Spring. The development and present status of
social welfare in meeting changing human needs and the requirements in other parts of our social system; the
analysis of present-day philosophy and the functions of social welfare. Pr.: One course in each of the following
areas: sociology, economics, and political science.
K-State 8:
• Historical Perspectives
• Human Diversity within the U.S.

SOCWK 530. Social Work Research Methods and Analysis II. (3) Fall. Second of two research methods
courses. Emphasis on designing and conducting social work research projects appropriate for baccalaureate
social work practice. Attention given to research strategies for the evaluation of social work practice. Pr.:
SOCWK 330; Social work majors only.
**K-State 8:**
- Empirical and Quantitative Reasoning

**SOCWK 550. Field Practicum Preparation.** (2) Fall, Spring. Social work majors take this course in the semester before enrollment in SOCWK 562 Field Experience, in preparation for the field practice experience. Students explore various fields of practice and social work settings and work with the instructor to plan their practicum for the following semester. Pr.: senior standing; instructor consent; social work majors only.

**SOCWK 560. Social Work Practice I.** (3) Fall, Spring. Continued development of social work practice skills. The social systems perspective is used to guide the development of a problem-solving methodology with attention to information gathering, assessment, and problem identification. Values clarification and self awareness are emphasized and the skills needed for intervention, termination, and evaluation are introduced. Pr.: SOCWK 100, 200, 315, 510; junior standing; instructor consent; social work majors only.

**SOCWK 561. Social Work Practice II.** (3) Fall, Spring. Continuation of SOCWK 560 with emphasis on skill development in intervention techniques, and practice evaluation from a social systems perspective. A variety of intervention strategies and techniques is presented with emphasis on the development of a social work frame of reference. Pr.: SOCWK 560; senior standing; instructor consent; social work majors only.

**SOCWK 562. Field Experience.** (10) Spring, Summer. Supervised field experience in community agencies and programs as a practical application of social work knowledge and skills gained from major course work. Emphasis on direct work with clients, whether individuals, groups, or communities. Seminars make use of student's experiences to analyze social work theory and practice. Pr.: SOCWK 550, 561; senior standing; instructor consent; social work majors only.

**SOCWK 564. Social Work Professional Seminar.** (2) Spring, Summer. A review of various theories in the behavioral sciences which influence the practice of social work. Primary focus of the course is on the use of these theories in implementing change in various client systems. Coreq.: SOCWK 562; social work majors only.

**SOCWK 565. Social Policy.** (3) Fall, Spring. Examination of policies and programs developed to cope with various social problems. Emphasis will be placed on analysis of existing programs and policies and the formulation of alternative policies. Attention will be given to policy change through organizational and legislative action. Pr.: SOCWK 510; one course in each of the following areas: sociology, economics, and political science; and one course in social science research methods.

**Sociology courses**
**SOCIO 211. Introduction to Sociology.** (3) Fall, Spring, Summer. Development, structure, and functioning of human groups; social and cultural patterns; and the principal social processes.
K-State 8:
- Human Diversity within the U.S.
- Social Sciences

Statistics courses
STAT 325. Introduction to Statistics. (3) Fall, Spring, Summer. A project-oriented first course in probability and statistics with emphasis on computer analysis of data. Examples selected primarily from social sciences, natural sciences, education, popular culture. Descriptive statistics, probability, sampling, tests of hypothesis and confidence intervals for means and proportions, design and analysis of simple comparative studies, chi-square test for association, correlation and linear regression. Pr.: Math 100. Cannot be taken for credit if credit has been received for STAT 340, 350, or comparable courses.

K-State 8:
- Empirical and Quantitative Reasoning

Unmanned Aircraft Systems courses
UAS 115. Multi-rotor Flight Lab. (1) Spring. Ab initio through advanced flight training on multi-rotor unmanned aircraft, beginning with small quad-copters and progressing to larger, more complex multi-rotor platforms. This course establishes the foundation for additional training necessary to become a multi-rotor flight instructor. Students will also receive training in the regulations contained in 14 CFR Part 107 (commercial rules for small UAS), and will be required to earn their Remote Pilot Certificate with sUAS rating during the course.

UAS 270. Introduction to Unmanned Aircraft Systems. (3) Spring. Introduction to the history of Unmanned Aircraft Systems and survey of current UAS platforms, terminology, challenges to airspace integration and operational theory.

K-State 8:
- Ethical Reasoning and Responsibility
- Historical Perspectives

UAS 272. UAS Safety Fundamentals. (3) Spring. Introduction to the history of Unmanned Aircraft Systems and survey of current UAS platforms, terminology, challenges to airspace integration and operational theory.

K-State 8:
- Ethical Reasoning and Responsibility
- Historical Perspectives

UAS 275. Small Unmanned Aircraft Maintenance I. (3) Spring. This course provides students with the knowledge and skill necessary to repair and maintain both fixed- and rotary-wing aircraft during field operations and to ensure continued airworthiness throughout the service life of the aircraft. Instruction emphasizes safe practices, provide an introduction to basic shop tools and machinery used in maintaining sUAS, and develop fundamental skills in platform fabrication and the troubleshooting/repair of the circuits, subsystems and components typically found on sUAS aircraft. Studio format incorporating lecture and lab elements. Pr.: ECET 100.

UAS 285. Small Unmanned Aircraft Maintenance II. (3) Fall. This course provides students with advanced knowledge and a high level of skill in the maintenance and repair of both fixed- and rotary-wing unmanned aircraft and associated systems. The concept of continued airworthiness is emphasized. Topics include advanced techniques in the fabrication and repair of small unmanned aircraft systems and airframes, maintenance of ground support systems and principles of electronics and integrated circuit maintenance, troubleshooting and repair. Studio format incorporating lecture and lab elements. Pr.: UAS 275.

UAS 300. Unmanned Aircraft Systems Powerplant Fundamentals. (3) Fall. A study of the principles of operation, design features, and operating characteristics of various powerplants used in unmanned aircraft vehicles. Includes inspection procedures and operational theory of current electric, piston, hybrid, and turbine propulsion systems. Two hours lecture and three hours lab per week.
K-State 8:
- Ethical Reasoning and Responsibility
- Natural and Physical Science

**UAS 312. Unmanned Aircraft Flight Instructor Ground School.** (3) Fall. Intended to prepare the student for the role of UAS flight instructor. Focuses on the fundamentals of flight instruction. Lecture topics cover the techniques and the procedures necessary to generate, organize and present lessons in instructional environment while building necessary skills and emphasizing aspects of instruction necessary to ensure student competencies in the areas of UAS field and flight operations. Pr.: PPIL 113, UAS 115.

**UAS 314. Multi-rotor Instructor Flight Lab.** (1) Fall. This course refines advanced multi-rotor skills and provides the practical experience necessary to produce competent multi-rotor flight instructors. Two hours of lab per week. Pr.: PPIL 1113, UAS 115.

**UAS 353. Command and Control Links and Circuitry.** (3) Fall. This course provides a detailed examination of the theory and design of UAS command and control (2C) systems and applies this knowledge to develop a thorough understanding of the principles used in the design, maintenance and repair of 2C circuits and subsystem components. Topics include design choices in component selection, circuit and overall system design concepts and troubleshooting. Studio format incorporating lecture and lab elements. Pr.: UAS 275 or consent of instructor.

**UAS 357. Unmanned Aircraft Fixed-wing Flight Lab.** (2) Spring. Provides an introduction to the use of an external pilot (EP) console to control fixed-wing unmanned aircraft systems (UAS). In the event of a lost communications link, avionics or autopilot failure or other emergency, the external pilot is critical to human-in-the-loop operation of the UAS in effecting a successful recovery of the aircraft. This course develops the skills necessary to ensure students are capable of conducting safe EP operation of fixed-wing UAS during adverse flight conditions. Four hours of lab per week. Pr.: UAS 314 and PPIL 114.

**UAS 367. Advanced Unmanned Aircraft Fixed-wing Flight Lab.** (2) Fall. The UAS pilot-in-command (PIC), also referred to as the operator-in-command (OIC), is the person responsible for safe and successful flight operations. At times, the PIC/OIC also assumes the duties of the air vehicle operator (AVO) stationed at the ground control station. Not only must the PIC/OIC/AVO demonstrate the highest proficiency as a pilot, but also be knowledgeable in all aspects of field operations, including standard operating procedures (SOPs), applicable regulation and aircraft performance. The individual acting in this capacity is also a manager and field general, responsible for the activities of the others participating in flight operations. This course prepares the student to oversee professional flight operations of the PIC. Four hours of lab per week. Pr.: UAS 357 and UAS 312.

**UAS 370. Small Unmanned Aircraft Systems Design and Construction.** (3) Fall. Topics include: Unmanned Aircraft System platform, payload and component design and interfacing, system and vehicle maintenance, and systems integration. Studio format incorporating lecture and lab elements. Pr.: PPIL 113. Coreq.: UAS 270.

K-State 8:
- Empirical and Quantitative Reasoning
- Ethical Reasoning and Responsibility

**UAS 373. Small Unmanned Aircraft Design and Construction for Non-Aviators.** (3) Fall. Topics include: Unmanned Aircraft System platform, payload and component design and interfacing, system and vehicle maintenance, and systems integration. Intended for non-pilot majors and those without the FAA certifications and ratings required for AVT 370. Studio format incorporating lecture and lab elements. Coreq.: UAS 270.

**UAS 387. Crew Resource Management for Unmanned Aircraft Systems.** (3) Fall. This course provides students majoring in unmanned aircraft systems the ability to use all available resources to ensure safe and efficient flight. During the first eight weeks of the semester, aircraft crew performance is reviewed to include the background and philosophy of crew resource management (CRM) communication, decision behavior,
team building, workload management, and situational awareness. The second eight weeks of the semester is devoted to those aspects of CRM that are unique to the unmanned aircraft systems field operations and flight environments. Topics include an introduction to pilot-in-command/air vehicle operator-payload operator communications in a simulated multi-crew member flight and ground station environment. Pr.: UAS 115 and PPIL 113.

UAS 417. Fixed-wing Instructor Flight Lab. (2) Spring. This is the culminating course intended to prepare students for roles as fixed-wing unmanned aircraft flight instructors. This course further develops and refines the flying skills necessary to assume control of the aircraft during adverse circumstances or unusual aircraft attitudes induced by a less experienced pilot. The fixed-wing instructor-in-training is required to demonstrate, in practice, the skills and knowledge obtained in earlier courses covering crew resource management and flight instruction as well as achievement of a high level of piloting skills. Upon successful completion of this course, the student is qualified as a K-State instructor on fixed-wing platforms and as pilot-in-command/operator-in-command during research missions authorized by the unmanned aircraft systems program. Four hours of lab per week. Pr.: UAS 367.

UAS 461. Autonomous Flight Simulation Lab. (1) Spring. This course provides the student with simulation on high-end, sophisticated, proprietary autopilot systems in preparation for field operations flying aircraft equipped with similar autopilot/avionics packages. Two hours of lab per week. Pr.: UAS 370. Coreq: UAS 465.

UAS 463. Introduction to Autopilots and Mission Planning for Non-Aviators. (3) Spring. Focus is on mission planning and operations within the context of the simulated environment. Students are introduced to commercial, open source and/ or proprietary autopilots and are required to complete simulated training missions with the ultimate goal of demonstrating skills competency and knowledge acquisition through evaluations of proficiency (e.g., through “check-outs” or “check-rides”). Students integrate autopilots into selected fixed-wing platforms. Intended for non-UAS majors and those without the FAA certifications and ratings required for UAS 370, UAS 461 and UAS 465. Studio format incorporating lecture and lab elements. Pr.: UAS 373.

UAS 465. Autopilot Integration. (2) Spring. Using open source ground station software and commercial-off-the-shelf (COTS), open source autopilot firmware and hardware, students learn techniques for integrating autopilots into their selected fixed-wing platform and for exploring precision autonomous flight in preparation for conducting field operations to acquire remotely sensed data. Studio format incorporating lecture and lab elements. Pr.: UAS 370. Coreq.: UAS 461.

UAS 467. Small Unmanned Aircraft Systems Payloads. (3) Fall. Course content covers various types of sUAS sensor packages and appropriate applications, preparing the student to properly select sensors based on mission profile, data needs and mission objectives. Students develop, design and construct a payload for integration into previously constructed aircraft in preparation for conducting missions to obtain data for post-flight processing. Studio format incorporating lecture and lab elements. Pr.: UAS 465.

UAS 470. Flight and Field Operations. (3) Fall. Emphasis is on advanced unmanned aircraft systems operations in the live flight environment with a focus on safety and crew resource management. Emphasis is on experiential learning. Students are required to travel to an area designated for flight operations. Studio format incorporating predominantly lab components with less emphasis on lecture. Pr.: UAS 461 and UAS 465.

UAS 474. Introduction to Processing Remotely Sensed Data. (3) Fall. Students are introduced to basic theory, history, and practical applications of remote sensing technology, with an emphasis on high spatial resolution multispectral aerial imagery collected using unmanned aircraft systems. Other topics include geographic information systems, aerial image interpretation, sensor resolution, orthomosaicing, georegistration, vegetation indices, and image classification. Pr.: UAS 461 and UAS 465; or UAS 463; or instructor consent.
UAS 475. Data Acquisition and Post-processing. (3) Spring. Students build upon the basic image processing skills gained in the previous course, expanding their knowledge of common aerial image data processing tasks using industry-standard software packages. Aerial data collection methodologies are introduced, including consideration of aerial mission flight parameters. Pr.: UAS 474.

UAS 476. Flow Altitude Remote Sensing Project Development. (3) Fall. Students gain practical experience collecting and processing their own high resolution aerial datasets using multirotor and/or fixed-wing UAS, and are instructed in proven workflows for successful commercial UAS mapping operations. The topic of payload selection and integration will enable a project to collect data for subsequent processing. Pr.: UAS 475.

College of Technology and Aviation Dean’s Office Courses

General

COT 105. Mastering Academic Conversations. (3) Fall, Spring. Actively engage students in the process of becoming successful students, scholars, and citizens. Introduction to a successful university experience through participation in interactive seminar classes and co-curricular events. Events and topics include a broad survey of the humanities, examining the impact on culture, society, and the human condition. Pr.: Freshman standing or instructor consent.

K-State 8:
• Aesthetic Interpretation

COT 150. The Humanities Through the Arts. (3) Spring. A general introduction to the humanities, focusing on what they are and their basic importance. Painting, sculpture, architecture, literature, drama, music, dance, film, and photography will be explored. Emphasis will be on participation, involvement, guest speakers, tours, and appreciation.

K-State 8:
• Aesthetic Interpretation
• Historical Perspectives

COT 295. Introductory Industrial Internship. (0-6) Fall, Spring. Introductory experiential learning program in an off-campus setting. Written documentation and oral presentation of project goals, experiences, and accomplishments. Pr.: Approval of faculty internship advisor and sponsoring company.

COT 299. Problems in Arts, Sciences, and Business. (Var.) Fall, Spring, Summer. Opportunity for advanced independent study in specific subject areas in Department of Arts, Sciences, and Business. Pr.: Consent of instructor.

K-State 8:
• Empirical and Quantitative Reasoning
• Ethical Reasoning and Responsibility

COT 450. Polytechnic International Experience. (0-6) Fall, Spring. Seminar and travel course including faculty-led international field experience focused on Polytechnic Campus students’ area of interest, with travel followed by a final project. The course is designed to enhance students’ global and cultural awareness while adding knowledge and skill in topical issues. In addition, students will be introduced to and immersed in historical components, both disciplinary and cultural. Pr.: Instructor consent.

K-State 8:
• Global Issues and Perspectives

COT 480. Professional Conduct, Ethics, and Analysis. (3) Fall, Spring. Examines the ethical foundations of professional conduct and decision-making in the workplace. Through reading and discussing ethical works, case studies, and contemporary ethical policies/procedures, students will develop the skills necessary for analysis, discourse, and ethical decision-making in a professional work setting. Pr.: Sophomore standing.

K-State 8:
• Ethical Reasoning and Responsibility
COT 490. Survey of Cryptography Development, Principles and Practice. (3) Fall. A practical survey of the principles and practice of cryptography with respect to business / government / private applications and commercial computer security systems. Benefits of cryptography as a strategic and tactical tool for effective computer security in the commercial theater of operations. Addresses current topics such as personal privacy, cryptocurrency and blockchain. Students interact with selected cryptographic machines, codes, hand-techniques and computer products developed since the beginning of writing.

COT 495. Advanced Industrial Internship. (0-6) Fall, Spring, Summer. Advanced experiential learning program in an off-campus setting. Written documentation and oral presentation of project goals, experiences, and accomplishments. Pr.: Approval of faculty internship advisor and sponsoring company.

COT 497. Undergraduate Research Experience. (0-3) Fall, Spring, Summer. Open to students pursuing undergraduate research projects. Requires consent of instructor.

COT 499. Advanced Problems in Arts, Sciences, and Business. (Var.) Fall, Spring, Summer. Opportunity for advanced independent study in specific subject areas in Department of Arts, Sciences and Business. Pr.: Consent of instructor.

University Honors Program
COT 020. University Honors Program. (0) Fall, Spring. This course is for record keeping purposes to allow the University Honors Program and the College of Technology and Aviation to monitor and track students who are a part of the Honors Program.

COT 189. Introduction to University Honors Program. (1) Fall, Spring. An overview of the University Honors Program including directions, goals, and student requirements for completion of the program. Pr.: Acceptance into the College Honors Program.

K-State 8:
- Ethical Reasoning and Responsibility
Graduate Program

Graduate Faculty: Ackerman, Barnhart, Dandu, DeGreeff, F. Guzek, Jackson, Joseph, Khan, Oh, Starkey, Von Bergen, and Zajac.

http://www.polytechnic.k-state.edu/pmt

Graduate Certificate

Unmanned Aircraft Systems – Information Assurance

15 credit hours required for completion

The graduate certificate program in UAS - Information Assurance is designed to provide both working professionals and graduate students a strong educational foundation and career potential in an increasingly important industry to both civilian and military organizations all over the United States. The market for Information Assurance jobs remains bright. The primary emphasis of the graduate certificate program is to prepare the workforce to understand the protection of UASs from cyber-attacks by negligent and hostile means and teaching Information Assurance risk assessment principles to practitioners involved with UAS operations on land, sea, air, or satellite platforms.

The program will be offered via K-State Online or face-to-face at K-State Polytechnic in eight-week segments in fall, spring, and summer semesters to meet the needs of both on-campus and off-campus learners. Courses are delivered using a course management system to provide an interactive, web-based classroom to students. Thus, the delivery of the certificate provides for occupational work demands and schedules. The Graduate Certificate in UAS – Information Assurance may be completed in one year. Two courses each in the fall and spring semesters and one course in the summer semester.

Required Courses (15 credit hours)

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>COT 680</td>
<td>Unmanned Aircraft Systems and Risk Analysis</td>
<td>3</td>
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<tr>
<td>COT 682</td>
<td>Open Source Cyber Surveillance</td>
<td>3</td>
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<tr>
<td>COT 684</td>
<td>Advanced Topics in Cyber Data Fusion</td>
<td>3</td>
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<tr>
<td>COT 686</td>
<td>Risk Management for Unmanned Aircraft Systems</td>
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<td></td>
<td>Operators, Pilots, and Ground Personnel</td>
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<tr>
<td>COT 688</td>
<td>Sense and Avoid Technologies in Unmanned Aircraft Systems</td>
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Professional Master of Technology (MPMT)

Master of Technology

30 hours required for graduation

Kansas State University's Professional Master of Technology Degree is designed to enable professionals from diverse technology fields to thrive in rapidly changing work environments. As a professional program, the PMT degree provides advanced skills and knowledge in the areas of communication, leadership, project management, and teamwork. It also provides unique opportunities for students to arrange programs with concentrated study in the broad areas of aeronautical technology, engineering technology, and technology management. Qualified faculty work cooperatively with each graduate student to develop highly individualized plans of study. As one of the first Professional Master of Technology degree in the state of Kansas, this program provides unique educational opportunities for college graduates and industry personnel from a variety of backgrounds.

Common Core Courses (18-21 credit hours)

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>COT 701</td>
<td>Advanced Technical Communications</td>
<td>3</td>
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<tr>
<td>COT 703</td>
<td>Project Management for Professionals</td>
<td>3</td>
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<td>COT 704</td>
<td>Managerial Finances, Metrics, and Analytics</td>
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<td>COT 705</td>
<td>Transformational Leadership for Technology</td>
<td>3</td>
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<tr>
<td>COT 706</td>
<td>Informatics and Technology Management</td>
<td>3</td>
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Elective Courses (9-12 credit hours)

- COT 632 Radio Frequency Technology for Unmanned Systems 3
- COT 650 Analytical and Computational Tools for Unmanned Systems 3
- COT 663 UAS Flight Operations Management 3
- COT 664 UAS Program Management 3
- COT 674 Processing Techniques for Low-Altitude Remotely Sensed Data 3
- COT 675 Acquisition and Advanced Processing of LARS Data 3
- COT 676 Low-Altitude Remote-Sensing Product/Project Development 3
- COT 680 Unmanned Aircraft Systems and Risk Analysis 3
- COT 682 Open Source Cyber Surveillance 3
- COT 684 Advanced Topics in Cyber Data Fusion 3
- COT 686 Risk Management for Unmanned Aircraft Systems Operators, Pilots, and Ground Personnel 3
- COT 688 Sense and Avoid Technologies in Unmanned Aircraft Systems 3
- COT 720 Application of Lean Six Sigma Methods 3
- COT 721 Reliability Centered Maintenance of Plant Equipment 3
- COT 731 Electromagnetics for Unmanned Systems 3
- COT 741 Aerospace Manufacturing and Materials 3
- COT 750 Professional Master of Technology International Experience 0-6
- COT 770 Material Properties of Bulk Solids 3
- COT 771 Storage and Flow of Bulk Solids 3
- COT 772 Pneumatic Conveying of Bulk Solids 3
- COT 773 Instrumentation and Safety of Bulk Solids Handling 3
- COT 774 Mechanical Conveying of Bulk Solids 3
- COT 792 Problems in Professional Master of Technology 0-3
- COT 799 Special Topics in Professional Master of Technology 0-6
- ECON 640 Industrial Organization and Public Policy 3
- IMSE 680 Quantitative Problem Solving Techniques 3
- MANGT 810 Operations and Supply Chain Management 3
- MANGT 820 Behavioral Management Theory 3

*Other Kansas State University graduate courses may be used as electives if approved in the student’s PMT program of study.*

Students may enroll in relevant graduate level courses on the Manhattan campus to fulfill elective requirements if approved as part of their formal program of study.
**Graduate Level Course Descriptions**

**COT 611. Introduction to and Overview of Aircraft Certification.** (3) Fall. Provides an overview of the FAA certification process relating how the certification process contributes to a safe National Airspace System. Application of relevant Federal Aviation Regulations. Covers both aircraft type and production certification to include airframe, engine, and component certification.

**COT 622. Aircraft Type Certification.** (3) Fall. A detailed examination of the type conformity certification process leading to the issuance of airworthiness certification. Covers FAA and international conformity standards and regulating bodies as well as relevant Minimum Operating Performance Standards to include DO 160, 178, and 254. Presents the supplemental type certification process, continuing airworthiness process, airworthiness directives, the relationship of manufacturer service bulletins, and the type certification change process.

**COT 632. Radio Frequency Technology.** (3) Spring. An introduction to the theory and design of electronic circuits for communications emphasizing the implementation and analysis of common radio-frequency (RF) building blocks. Topics include s-parameters, the Smith chart, component behavior, RF test equipment, computer simulation, filter design, impedance matching, amplifiers, oscillators, mixers, and demodulators. A report will be required of all graduate students. Pr.: Consent of instructor.

**COT 634. Aircraft Production Certification.** (3) Spring. A detailed examination of the elements of the aircraft production certification process; including FAA surveillance designations, the application and approval process, the parts manufacturer approval process, production approval procedures, certificate management of production approval holders, and the technical standard order program. Pr.: COT 611.

**COT 636. Aircraft Certification Project.** (3) Spring. An applied project focused on aircraft type or production certification. This course is designed to improve the demonstration of professional knowledge of aircraft certification processes. Pr.: COT 611 and COT 622.

**COT 650. Analytical and Computational Tools for Unmanned Systems.** (3) Fall. Ordinary differential equations, vector algebra, vector calculus, partial differential equations and the separation of variables technique for solving wave equations. Students also perform simulation and analysis using software tools including MATLAB and MATHCAD applied to Unmanned Systems. Pr.: One previous calculus course and consent of instructor.

**COT 660. Airport Law.** (3) Spring. A detailed study of how the U.S. regulatory and legal systems work in relation to airport management. This course emphasizes contract law related to the Federal Aviation Administration Airport covenants and restrictions, Federal Aviation Regulation compliance, and airport operator liability.

**COT 661. Airport Planning and Management.** (3) Fall. An overview of the Federal Aviation Regulation part 139 airport design standard and airport master planning process. Includes a study of the role of the airport in community development. Advanced course project required. Pr.: Consent of instructor.

**COT 662. Aviation Management.** (3) Fall. Provides the Professional Master of Technology student with the opportunity to gain a thorough understanding of basic aviation industry management practices in use today combined with historical perspectives. Includes case study analysis.

**COT 663. UAS Flight Operations Management.** (3) Fall. Best practices for managing complex operations of Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS) including topics on: personnel and training, regulatory/policy considerations, airspace access, operating procedures, mission planning, system acquisitions, safety, customer relations, application-specific considerations, and data handling. Emphasis on the handling of unexpected delays and challenges to normal operations.
COT 664. UAS Program Management. (3) Spring. Best practices for top-level management of an Unmanned Aircraft Systems (UAS) program, including topics on: strategic planning, business model development, proposals, marketing, customer and government relations, personnel management, data handling and security, export control, regulatory environment, and operating procedures.

COT 674. Processing Techniques for Low-Altitude Remotely Sensed Data. (3) Fall. Students learn techniques for exploring remotely sensed data using geographic information systems and image processing software. Topics include manipulation of vector and raster data, management of spatial databases, image stitching, georeferencing, orthorectification, and techniques in the use and interpretation of metadata and development of spatial analysis models useful in remote sensing applications. Pr.: AVT 460 or AVT 463 or consent of instructor.

COT 675. Acquisition and Advanced Processing of LARS Data. (3) Spring. Topics begun in COT 674 are further developed. Advanced topics include: multi-spectral data acquisition and processing, exploitation of full-motion video, interpretation of geospatial and remotely sensed data, geostatistical methods of data analysis, photogrammetric measurements, and an introduction to big data concepts. Pr.: COT 674.

COT 676. Low-Altitude Remote-Sensing Product/Project Development. (3) Fall. Building on the skills acquired in COT 674 and 675, students fly a low-altitude remote-sensing mission to obtain geospatial data to process, manipulate, and analyze as the means of developing a finished product in areas of interest to the student. Potential areas of investigation include: precision agriculture, environmental remediation, fire management, wildlife studies, or stewardship of managed ecosystems. Pr.: COT 675.

COT 680. Unmanned Aircraft Systems and Risk Analysis. (3) Fall. An introductory course in Unmanned Aircraft Systems (UAS) history, elements, US Aviation regulations, operations, use of geospatial data; automation, safety issues; detect and avoid systems; sensors and payloads, human factors, and future. Special attention to UAS Cyber Security Risks, Threats, Impact, Vulnerabilities, and Countermeasures will be identified. The Ryan-Nichols Risk Assessment equations will be used for qualitative risk analysis of Threats so identified.

COT 682. Open Source Cyber Surveillance. (3) Spring. This course is scenario-based applying cyber surveillance techniques and analysis of collected data, to realistic, terrain-oriented problems. Topics include the digital soldier and sailor, 360-degree battlefield awareness and the use of unmanned, semiautonomous technologies. Risk Assessment and Cyber Security countermeasures are the "glue" to successful implementation of data fusion techniques. The Ryan-Nichols Risk Assessment equations and other methods will be used for qualitative risk analysis of identified Cyber Threats.

COT 684. Advanced Topics in Cyber Data Fusion. (3) Fall. One of the key public concerns for safe integration of Unmanned Aircraft Systems (UAS) into the National Air Space (NAS) is privacy. This course questions the technical gaps, Intelligence Community (IC) assumptions, and important legal issues related to open source cyber surveillance with emphasis on UAS activities/deployment. Topics addressed include the responsible, legal, and ethical use of data and information gathered from the use of unmanned, semiautonomous systems, web data mining, social networks, and other modern technological systems.

COT 686. Risk Management for Unmanned Aircraft Systems Operators, Pilots, and Ground Personnel. (3) Spring. Unmanned Aircraft Systems (UAS) Operators, Pilots, and Ground Personnel must be committed to safety if the goal of UAS integration into National Air Space (NAS) is to be accomplished. The best tool for assessment and determination of safest possible flight is Risk Management. This course introduces three risk assessment tools for UAS Operators, Pilots, and Ground Personnel to manage the workloads associated with each phase of flight.

COT 688. Sense and Avoid Technologies in Unmanned Aircraft Systems. (3) Fall. An advanced course in Sense and Avoid (SAA) technologies for Unmanned Aircraft Systems (UAS). SAA is an extremely important concept and is the main obstacle for wider application of UAS in non-segregated airspace related to traffic safety in civilian and military/defense domains. This course presents the state-of-the-art research results
from British, American, Australian and European universities, as well as corporate organizations such as Boeing and MITRE.

**COT 701. Advanced Technical Communication.** (3) Fall. Intensive writing practice, applying rhetorical principles to a number of genres common to non-academic professions and workplaces, including oral presentations. Introduction to allied topics such as document design and editing, crafting technical presentations. Application of global information literacy and research methods, culminating in the preparation of a master’s project proposal. Pr.: Consent of instructor.

**COT 702. Applied Research Skills and Methods.** (3) Spring. Survey of qualitative and quantitative research methods; use of a range of tools to develop applied research skills focusing on literature reviews. Examines applied research concepts, methods, and skills to foster enlightened decision making in professional practice.

**COT 703. Project Management for Professionals.** (3) Fall. This course focuses on applied project management methodology, tools, and techniques. Topics include career aspects of project management; business factors affecting the project; project organization, planning, execution, and communications; the project life cycle; risk analysis; and best practices in project management.

**COT 704. Managerial Finances, Metrics, and Analytics.** (3) Spring. Provides an overview of an organization’s financial statements, with an emphasis on the interaction between people in management positions and those statements, as well as an examination of the business investment decision-making process. Explores the use of metrics and analytics to measure and improve managerial performance.

**COT 705. Transformational Leadership for Technology.** (3) Fall. Study and application of leadership styles and common leader traits, skills and behaviors needed in technology industries and dynamic environments where innovation is a key success factor. Includes application in virtual team environments, and introduces concepts of transformational leadership. This course enables students to build group vision, values, and commitment and to make connections between diverse organizational cultures, leadership styles, and business strategies that enable success in a rapidly changing technology world. Students develop lifelong learning networks and information sources that enable them to continue to grow as leaders.

**COT 706. Informatics and Technology Management.** (3) Spring. Provides theoretical and practical experience in using information technology to support organizational decision-making processes. Provides tools in areas such as statistics, research methods, data mining, and information technology to develop solutions tailored to business problems.

**COT 713. Advanced Aviation Safety Management.** (3) Spring. An examination of the development of safety and how safety management has become an important part of any company. Discusses Safety Management Systems and how this blueprint is becoming an integral part of most organizations, emphasizing specific governmental and corporate programs. Topics include management tools and techniques to aid in systematically controlling risk and developing a safety culture mind-set. Pr.: Consent of instructor.

**COT 720. Application of Lean Six Sigma Methods.** (3) Spring. Six sigma and lean tools within an enterprise to improve product and process development, production operations, and service activities. Pr.: Consent of instructor.

**COT 721. Reliability Centered Maintenance of Plant Equipment.** (3) Spring. Reliability modeling and assessment, reliability-centered maintenance, condition monitoring technologies, and computer tools. Pr.: Graduate standing.

**COT 731. Electromagnetics for Unmanned Systems.** (3) Spring. Fundamentals of electromagnetic wave phenomena primarily using transmission line theory to study practical applications such as antennas, cables, and waveguides. Includes a treatment EMI and related issues. Pr.: Consent of instructor.

COT 750. Professional Master of Technology International Experience. (0-6) Fall, Spring. Seminar and travel course including faculty-led international field experience focused on Professional Master of Technology students' area of interest, with travel followed by a final project. The course is designed to enhance students' global and cultural awareness while adding knowledge and skill in topical issues. In addition, students will be introduced to and immersed in historical components, both disciplinary and cultural. Repeatable for credit. Pr.: Consent of instructor.

COT 770. Material Properties of Bulk Solids. (3) Fall. Covers material properties related to bulk solids handling such as particle density, bulk density, particle hardness, surface area, particle size and shape and its distribution, porosity and permeability. Additional material property topics include moisture content, temperatures, RH, explosiveness, cohesion and adhesion, angle of internal friction, wall friction, angle of repose, time consolidation, unconfined yield strength, shear strength and more. Sampling and measurement techniques of materials are also included. Pr.: Industry experience or consent of instructor.

COT 771. Storage and Flow of Bulk Solids. (3) Fall. Covers topics related to storage and flow of bulk solids which include design of hopper, bin, chute, and feeders. A study of solid flow problems such as cohesive arching, ratholing, bridging, and shear tester operational principles is included. Pr.: Industry experience or consent of instructor.

COT 772. Pneumatic Conveying of Bulk Solids. (3) Fall. Covers topics such as types and components of pneumatic conveying systems and its design principles. Trouble shooting, pipe wear and attrition, dust control are included. Pr.: Industry experience or consent of instructor.

COT 773. Instrumentation and Safety of Bulk Solids Handling. (3) Spring. Examines various instrumentation used in bulk solids handling operation such as measurement of airflow, pressure, temperature, level and measuring techniques. Different type valves, PLC control and safety are included. Pr.: Industry experience or consent of instructor.

COT 774. Mechanical Conveying of Bulk Solids. (3) Summer. Covers topics such as types and components of bucket elevator, screw conveyor, drag and belt conveying systems and their design principles. Different aspects of designing each component of these systems with examples and troubleshooting will be discussed. Pr.: Industry experience or consent of instructor.

COT 780. UAS and High Altitude Platforms (HAPS) for Wireless Communications. (3) Spring. An introductory course to HAPS technology applied in the civilian UAS sector. Covers technologies, communications, and protection of those computer communications from hostile intent. HAPS technology provides wireless narrowband and broadband telecommunications and broadcasting services to users using either aircraft (unmanned (UAS/UAV) or manned) or lighter-than-airships (LTA). Research indicates UAS to be the best alternative. These platforms are reusable and positioned at stratospheric altitudes, from approximately 12.4 miles to 31 miles (20 to 50 km). Pr.: Graduate status.

COT 781. Capstone Experience for Professional Master of Technology. (1-6) Fall, Spring, Summer. Students formulate, research and execute a project for industry partners to gain hands-on experience under expert guidance while integrating knowledge to solve complex problems. Students write a convincing proposal for a capstone experience, gather and analyze data, draw conclusions and present results. Teams of first and second-year students may form to work on real-world projects. Pr.: Consent of instructor.

COT 792. Problems in Professional Master of Technology. (0-3) Fall, Spring, Summer. Opportunity for advanced independent study of a specific topic in one of the following areas: Aviation safety, engineering
technology, or technology management. Topics selected jointly by student and the instructor. Pr.: Consent of instructor.

**COT 799. Special Topics in Professional Master of Technology.** (0-6) Fall, Spring, Summer. Offered on sufficient demand. Advanced topics in Professional Master of Technology. Pr.: Varies with announced topic.

**ECON 640. Industrial Organization and Public Policy.** (3) Spring. An examination of measures and determinants of industrial concentration, and an analysis of market structure, conduct, and performance, and policies related to performance. Pr.: ECON 120.

**IMSE 680. Quantitative Problem Solving Techniques.** (3) Survey of decision making techniques. Topics covered include: Linear, Integer and Nonlinear Programming, Network Flows and Stochastic Processes. A focus of the course will include modeling and the use of software to solve these problems. Pr.: MATH 205. Note: Three hours of lecture a week.

**MANGT 810. Operations and Supply Chain Management.** (3) Spring. The study of the role of operations systems in the provision of value for the customer. Operations systems design, capacity determination, resource requirements planning and control, theory of constraints, supply chain management, quality management and control and project management are discussed and analyzed. Pr.: STAT 351 or STAT 702.

**MANGT 820. Behavioral Management Theory.** (3) Fall, Summer. An in-depth analysis of the development of the behavioral bases of individual and group behavior in business, governmental, educational, and other organizations with emphasis on current research literature and applications. Pr.: Open only to students in graduate business degree or certificate programs or with permission of the instructor.