

# **KANSAS TECH**

## **1987-1988**

### **GENERAL BULLETIN**

**Kansas Tech**

**2409 Scanlan Avenue  
Salina, Kansas 67401**

1987-1988  
KTI



## LETTER FROM THE PRESIDENT

Welcome to the Kansas Tech community. This is a community of outstanding faculty, staff and administrators committed to serving the needs of our students plus industry and society in general.

Kansas Tech is truly a unique institution, being the state college of technology serving under the control and supervision of the Kansas Board of Regents.

In addition to our regular Certificate and Associate degree programs as outlined in this catalog, Kansas Tech stands ready to serve the needs of the local citizenry as well as statewide business and industry. This service includes continuing education, workshops, seminars, custom designed short courses and consulting offered on-campus and on-site throughout the state.

As you review the catalog, I am sure that you will realize the currency of our program offerings as they relate to high technology. We are very proud of our close relationship with industry to assist us in maintaining state-of-the-art programs. Of great importance to the employers of our graduates, all of our programs are designed using the criteria and guidelines developed by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology, recognized as the "Good Housekeeping Seal of Approval" for engineering technology programs.

As you peruse through the catalog, should you have any questions, please feel free to contact me or any of our dedicated personnel who are pleased to respond.



**President Anthony Tilmans**

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## HISTORY AND DEVELOPMENT OF KANSAS TECH

Kansas Tech was created in 1965 by an act of the Kansas Legislature. The bill provided for the establishment of a state technical institute offering two-year programs of Science and Engineering Technology. Originally called Schilling Institute, the campus was developed on property that was formerly a part of Schilling Air Force Base.

Enrollment of 93 students in four fields of study for the fall semester of 1966 was the start of an educational opportunity new to Kansas.

January 19, 1969, the Kansas Legislature dissolved the State Education Authority creating the State Board of Education and changing the College's name to Kansas Technical Institute.

In 1976, the Legislature transferred the responsibility for the College to the Kansas Board of Regents. Kansas Technical Institute became the seventh state institution under the control and supervision of the Kansas Board of Regents.

Located on 149 acres, Kansas Tech is adjacent to the Salina Municipal Airport in the Industrial Park area of southwestern Salina.

The College's active 18 buildings include an administration building, co-educational residence hall, cafeteria/conference center, gymnasium, classrooms, laboratories, and two aircraft hangars. The Technology Center, opened in 1985, has 30,000 square feet housing classrooms, laboratories, a library/resource center, computer center, faculty offices, and a lounge.

All programs of study are two-year Associate of Technology degree or certificate programs. All programs have been designed to assure standards of excellence. The Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET) accredits the Electronic Engineering Technology, Mechanical Engineering Technology, Civil Engineering Technology, and Computer Engineering Technology degree programs. The College is also accredited by the Commission on Institutions of Higher Education of the North Central Association of Colleges and Schools. The certificate program in Airframe and Powerplant Maintenance has been continuously certified by the Federal Aviation Agency since its start in 1966.

The reputation of the programs and the strong affiliation the College maintains with professional and technical associations has been a major factor in the success of and high regard held for Kansas Tech graduates.

## MISSION OF THE COLLEGE

"Kansas Technical Institute shall provide education of technicians and technologists in the fields of engineering technology, information technology and science technology. The Institute may also provide education or training in related technical and occupational fields. Educational programs shall include degree curricula and certificate programs as approved by the Board of Regents, and special institutes, seminars, short courses and workshops at appropriate locations in Kansas."

Kansas Technical Institute has identified major areas of responsibility necessary to the fulfillment of its mission. These responsibilities are primarily concerned with the intellectual and personal development of the student. The Institute shall provide:

1. instruction in theory, skills, and applications within the student's chosen technology.
2. general education in mathematics, science, communications, business, and related subjects to enhance the student's overall professional value.
3. opportunities for continuing education to those adults who desire to develop, or reinforce, technical and personal competencies through appropriate seminars, workshops, short courses or conferences.
4. an atmosphere that encourages students to develop intellectual discipline, integrity, and positive attitudes toward work and self-improvement.
5. encouragement and support for faculty members to improve their professional and academic abilities.
6. regular opportunities for communication and cooperation with industry, for the primary purpose of assessing current industry needs and maintaining educational programs appropriate to those needs.
7. resources, equipment and facilities to support, supplement and promote excellence in instruction.
8. academic and student support services: advising, enrollment, records, financial aid assistance, resident housing, transfer credit assistance, counseling and referral, supplemental training in basic skills, and placement assistance.
9. opportunities and encouragement for student involvement in activities, associations, and student government.
10. information that promotes the college's activities and programs to constituents, including friends, alumni, prospective students, families of students, industry, the local community and the general populace of Kansas.
11. procedures for accountability and continued accreditation."

## OBJECTIVES OF THE KANSAS TECH EDUCATION

The Kansas Tech technical education has been designed and planned to meet the following objectives:

To provide students with a MARKETABLE knowledge. The skills and knowledge required by a given technology are identified by working with employers in the community and state. Programs are intended to be broad enough to encompass skills and knowledge needed in technical occupations of the future.

To develop in the student certain social competencies which may make employment possible, permanent, and profitable.

It is also recognized that the college must assume a responsibility to help meet the technology manpower needs of the state's business and industry, contributing to the welfare of Kansas.

## THE TECHNICAL COLLEGE GRADUATE

Technical College graduates are individuals who help turn ideas and theories into actual results. They work with engineers and scientists, business and government, and industry to provide important services, skills, and products necessary in today's society.

## THE KANSAS TECH TECHNICAL EDUCATION

An important aspect of technical education lies in the ability of an institution to tailor the curricula to meet the specific needs of the community it serves. Kansas Tech serves the entire state of Kansas and develops educational programs, methods, and resources for students, business, and industry statewide.

At Kansas Tech, Industry/Community Advisory Committees composed of representatives of the area's business, industry, and community agencies meet frequently with the administrative and instructional personnel. They review and suggest revisions in the content of the regular technical programs, guide and assist in the development of new programs and courses, and aid in the placement of graduates. Kansas Tech is committed to developing a dynamic relationship between the College and the business and industrial firms in Kansas that ultimately hire graduates.





## ADMISSION REQUIREMENTS

Applications are to be sent to the Office of Admissions. All applicants must have either graduated from a state accredited high school or have passed the General Educational Development Test (G.E.D.). Residents of Kansas who graduate from an accredited Kansas high school are automatically admissible to Kansas Technical Institute.

The following procedures should be followed to apply for admission:

1. Submit a completed application form.
2. Applicants still in high school or a recent graduate should have scores from the American College Testing (A.C.T.) exam or the Scholastic Aptitude Test (S.A.T.) send to the Office of Admissions. The A.C.T. is preferred. (This requirement may be waived in some instances.)
3. Have sent directly from the high school attended a transcript of all courses taken. If you are not a high school graduate, then an official copy of the scores attained on the G.E.D. test must be provided.
4. Applicants who have attended other colleges must have sent directly to the Registrar's Office official transcripts of all college-level work completed.
5. Should have followed a traditional college preparatory program in high school.

Each applicant will be notified by mail as to his or her status. Applicants will not be formally accepted until the above entry criteria have been met. Requests for applications and/or information should be sent to the address below:

Kansas Technical Institute  
Office of Admissions  
2409 Scanlan Ave.  
Salina, Kansas 67401

## PRE-ADMISSION TESTING

All applicants still in high school, and those having graduated within the last three calendar years, are required to take the American College Testing (A.C.T.) test or the Scholastic Aptitude Test (S.A.T.) prior to enrollment. The A.C.T. is preferred. High school students should arrange with their counselor or principal to take the tests during their junior or senior year and request that these scores be sent to the Kansas Technical Institute Office of Admissions. Other applicants may contact a local high school or the Admissions Office for information on the American College Testing program. Residual testing is administered at Kansas Tech during the fall enrollment period. The A.C.T. college code number assigned to Kansas Technical Institute is 1453.

Prior to their initial enrollment, all new students will be offered Mathematics and English placement tests administered by Kansas Tech. These tests help in advis-

ing whether a student should enroll in one of the developmental courses offered by Kansas Tech. Students entering with transfer credits in Mathematics and/or English equivalent to Kansas Tech entry level courses may not need to take these tests.

## ADMISSION AS A TRANSFER STUDENT

Applicants for admission as transfer students from a regionally accredited university or college may be accepted if their records indicate the ability to successfully pursue the courses in their chosen curriculum.

The procedure for a transfer student is as follows:

1. Submit a completed application form.
2. Provide an official transcript from each post-secondary school attended and a copy of the high school transcript.
3. If transfer of courses is desired prior to enrollment, it is advisable to submit all of the above information to the Registrar's Office no later than thirty days before the intended enrollment date. All credits will be evaluated to determine how they relate to Kansas Tech courses in the chosen field of study. Those courses that do relate and meet the necessary criteria of content and success level will be recommended for approval. A Credit Validation form will be processed through appropriate department heads, and Academic Dean. All courses approved on the Credit Validation form will become part of the student's official transcript when they matriculate. Only courses with a grade of "C" or better will transfer.
4. Transfer students should have a "C" average in courses specific to the intended major, an overall "C" average from all colleges attended, and be eligible to return to the last college attended.



## OUT-OF-STATE APPLICANTS

Out-of-state applicants for admission to Kansas Tech should follow the application procedures stated previously. They will be required to pay non-resident fees. Generally, applicants must have at least a "C" average in all courses taken, have an academic rank in the upper 50% of their graduating class, and have an A.C.T. composite score of at least 15. The G.E.D. is acceptable subject to State of Kansas criteria. The residence of students entering Kansas Technical Institute is determined by the Kansas State Board of Regents policy:

"Persons entering the state educational institutions who, if adults, have not been, or if minors, whose parents have not been residents of the state of Kansas for twelve (12) months prior to matriculation in the state educational institutions, are non-residents for the purpose of payment of matriculation and incidental fees." Requests for a complete copy of the Kansas residency requirements may be sent to:

Kansas Technical Institute  
Registrar's Office  
2409 Scanlan Ave.  
Salina, Kansas 67401

## FOREIGN APPLICANTS

Foreign applicants should contact the Director of Admissions for information concerning enrollment procedures. Correspondence should begin no less than six (6) months prior to the desired enrollment date. Foreign students will be considered as out-of-state applicants for the purpose of paying student fees. They will also be required to document that they have adequate funds to meet their cost of education. Any foreign applicants for which English is not a native language must supply scores on the Test of English as a Foreign Language (T.O.E.F.L.). To be admitted, an applicant must have scored 550 or above on this exam.

Requests for information should be sent to:  
Kansas Technical Institute  
Director of Admissions  
2409 Scanlan Ave.  
Salina, Kansas 67401

## FEES AND EXPENSES

The amount a student spends and the actual cost of obtaining an education at the college are two different items. A student can anticipate certain fixed expenses such as enrollment fees, but beyond that, financial outlays depend to a considerable extent on the personal habits and management ability of the student. Request a current fee schedule and expenses estimate from:

Kansas Technical Institute  
Student Financial Aid Office  
2409 Scanlan Ave.  
Salina, Kansas 67401

## ENROLLMENT FEES

Fees are established by the State Board of Regents and will be published periodically. Students enrolled in twelve (12) or more regular semester hours are full-time students for fee purposes. Students enrolled in eleven (11) regular semester hours or less are part-time students for fee purposes and will be assessed on a per credit semester hour basis according to the part-time schedule. Fees are subject to change.

### REFUNDS (Fees other than Residence Hall and Food Service)

A student who enrolls at Kansas Tech who finds it necessary to withdraw from school, is entitled to a refund of enrollment fees as determined by the Business Office.

<u>Regular Semester</u>	<u>Refund</u>
Through Friday of the first class week	100%
Through Friday of the second class week	75%
Through Friday of the third class week	50%
After the third class week and through the 20th class day	25%
After the 20th class day	0%
<u>Summer Session</u>	
Through the first class day	100%
Through Friday of the first class week	50%
Through Friday of the second class week	25%
After Friday of the second class week	0%

Special and Off-Campus Sessions  
Percentage of refund will be determined by the Registrar.

## INCIDENTAL FEES (Tuition)

The Incidental Fee is used to pay, in part, costs of administration, operation, maintenance, equipment, library books, and other supplies. A complete fee schedule may be obtained by contacting the Admissions Office.

## STUDENT ACTIVITY FEES

The Student Activity Fees are used to financially support student activities, including intramural sports, student organizations, and student events.

## STUDENT UNION FEE

This fee is collected to help support the Student Union operation expenses. This is a self-funded operation that does not receive any State funding support. This fee and the profit revenue from the sale of concessions provide funds for the development, improvement and operation of the Student Union.





## **VEHICLE REGISTRATION FEES**

Students enrolled at the College who plan to operate motor vehicles on the campus must register those vehicles and pay the registration fee in the Business Office in the Administration Building. The student will be issued an identification sticker permitting parking in all non-restricted parking areas. Violation of traffic and parking regulations will result in fines. These funds are used to maintain and repair the parking lots on campus.

## **ACADEMIC ADVISING**

An important factor in the success of a student is the quality of relationship between student and advisor. The advising process is an integral part of the education experience at the College and includes: career planning; college adjustment guidance; individual counseling; referrals; and selection of courses in developing a program of study consistent with the student's goals, interests, and abilities.

Students majoring in a program of study will be assigned an academic advisor to meet with regularly to determine needs and direction toward achievement of personal goals in his education.

## **LENGTH OF ACADEMIC PROGRAMS**

The academic year consists of two sixteen-week semesters. All degree programs are designed so that students may complete a degree over four regular semesters, assuming they carry the prescribed full time credit load and do not need developmental coursework.

Students beginning programs in the spring semester may be unable to complete their degrees in the normal two-year timeframe due to the sequencing of required courses.

Summer sessions are not included in the normal two-year sequence, although many students choose to enroll during the summers to take extra courses or to make up courses missed previously. Summer sessions are eight weeks in duration.

## **SEMESTER CREDIT HOURS**

The unit of measurement for completed course work is the "semester credit hour." Each course carries an assigned value of semester credit hours. For each credit hour of lecture or recitation credit a course carries, there will be one 50 minute class meeting per week. In addition, the student can normally expect to spend two hours of out-of-class study or homework per week for each 50 minute class meeting. For most courses carrying laboratory credit hours, there will be a one hour and 50 minute meeting per week for each credit hour, with some possible additional outside assignments.

Some laboratory courses meet two hours and 50 minutes per week for each credit hour.

## **FULL-TIME STATUS**

The minimum load for a student to be considered a full-time student is 12 semester credit hours.

## **STUDENT LOAD**

A student may enroll in up to 18 semester credit hours of course work without special permission. Those who desire to enroll in more than 18 semester credit hours must obtain written permission from the Academic Dean. Generally, a student may not enroll in more than 18 semester credit hours their first semester.

## SCHEDULING OF CLASSES

A schedule of classes is established by the Academic Dean and the faculty for each semester and the summer session. A copy of the class schedule can be obtained from the Admissions Office and Academic departments.

Classes are generally scheduled Monday through Friday between 8:00 a.m. and 5:00 p.m. A number of classes may be scheduled in the evenings to extend the services of instruction to persons who cannot attend daytime classes.

## PRE-ENROLLMENT

Students planning to attend the College for the first time are encouraged to pre-enroll for courses at any of the times announced by the Admissions Office.

Pre-enrollment allows students and advisors to plan courses early to reduce the possibility of encountering closed classes, and to reduce the time involved in the registration process prior to the start of the semester.

Students are encouraged to select courses for the following semester during the announced pre-enrollment times.

## AUDITING COURSES

Auditing is attending a class regularly without the requirement of participating in class work and without receiving academic credit.

A student may enroll in a course for audit with permission from the instructor and upon payment of the course fee. Courses taken for audit will be posted to the student's transcript as audit (AU). A student may not switch from regular enrollment to audit in a course after the Friday of the eighth week of the regular semester.

## SPECIAL STUDENTS

The "special student" classification is given to students who are not seeking a degree. Normally, the student who enrolls part-time in regular or continuing education courses would be classified as a special student. High school students allowed to take courses prior to their graduation are automatically classed as special students. Special students are generally not required to submit high school and college transcripts. They are not considered to be fully admitted, degree-seeking students, and may not apply for candidacy for a degree.

Special students are subject to the same regulations, fees and attendance responsibilities as regular students.

Students desiring to work toward a degree but are uncertain about their major may opt for the "undeclared" classification. These students must meet all admission requirements.

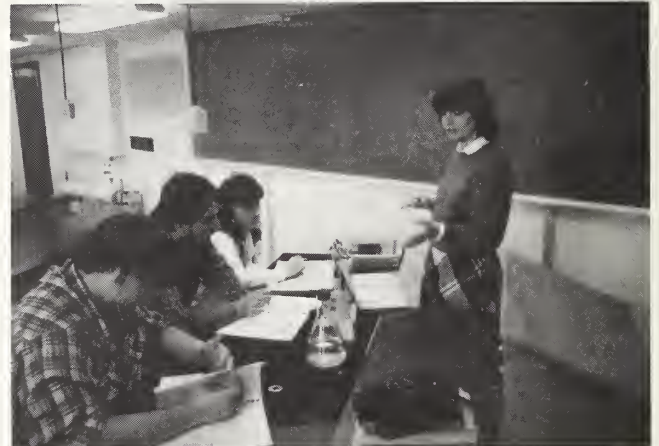
## FRESHMAN/SOPHOMORE STANDING

A regular student who has graduated from high school or earned equivalence is considered a freshman. A student is considered a sophomore upon completion of 30 earned semester credit hours. Special students are not classified.

## CLASS ATTENDANCE

Regular and punctual class attendance is important to a high standard of work. The student is expected to recognize the importance of regular class attendance.

Each instructor is responsible for advising the students of the attendance and tardiness criteria in his class. The student is expected to know and comply with each instructor's regulations. It is the student's responsibility to make up all work missed due to the absence.



## EXAMINATIONS

Examinations play a vital part in determining a student's performance in class. Each instructor will schedule a sufficient number of examinations to determine the student's progress in the course.

Final examinations are considered a part of each course and are generally scheduled during the last week in each semester and the summer session. All students are expected to take a final examination in each course during the scheduled period. In emergency cases, a student may take a final examination by arrangement.



## GRADING SYSTEM

The Institute uses the following grade and point system:

Grade	Type of Performance	Quality (Grade) Points
A	Superior	4
B	Above average	3
C	Average	2
D	Below average	1
F	Failure to earn credit	0
I	Incomplete	0
AU	Audit	0
S	Satisfactory (Pass)	0
U	Unsatisfactory (Fail)	0
WP	Withdrew Passing	0
WF	Withdrew Failing	0

A grade of "I" (Incomplete) may be given in special cases where a student was unable to complete all work in a course. If, in the opinion of the instructor, justifiable reasons exist to explain unfinished work, a report of Incomplete (I) may be given along with a tentative grade. Generally, the grade earned if the unfinished work was not completed. Incomplete grades from the spring and summer semesters must be removed prior to the beginning of the registration period for the following fall semester. Incompletes from the fall semester must be removed prior to the beginning of registration for the following spring semester. If the work is not completed by these deadlines, the tentative grade will be recorded as the permanent course grade. If no tentative grade is given, an "F" will become the permanent grade.

Quality point average (QPA) and grade point average may be used interchangeably on campus and college records. The quality (grade) point average (QPA) for each student is reported for each semester and is a cumulative average for the entire period of attendance. This average is computed by dividing the total number of quality points earned by the total number of semester credits.

For example, five courses worth three credits each would be a total of 15 semester credit hours. If final grades of one "A", two "B's" and two "C's" are earned, than a total of 42 quality points are accumulated. To determine the quality point average (QPA or GPA), multiply credit hours by the quality point value assigned each letter grade and divide that total by the semester credit hours.

$$42 \div 15 = 2.80$$

Grades are reported to the address provided by the student at the beginning of each semester. A student should consult periodically with his instructor to check their academic progress.

## PRESIDENT'S HONOR ROLL

Any student carrying a full-time load (12 hours or more) and earning a 3.750 quality point average with no grade below a "C" will be listed on the President's Honor Roll for that semester.

## DEAN'S HONOR ROLL

Any student carrying a full-time load (12 hours or more) and earning a 3.250 to 3.750 quality point average with no grade below a "C" will be listed on the Dean's Honor Roll for that semester.

## CREDIT BY QUALIFYING EXAMINATION

Any student who feels that past education has provided the basic knowledge that is equivalent to a course may request to be given a qualifying examination for that course.

Credit may be granted by examination. Permission to take a qualifying examination should be initiated through the department head who requests a credit by qualifying examination form from the Registrar's Office.

The fee for taking a qualifying examination for course credit is three dollars (\$3.00) per semester credit hour.

After successfully completing the qualifying examination, the form will then become part of the student's permanent file and the particular courses noted on the student's transcript.

## COLLEGE LEVEL EXAMINATION PROGRAM

CLEP provides an excellent means of obtaining college credit for skills or knowledge obtained through experience in areas outside of the formal college environment. Any student has the opportunity to utilize for credit experience gained through employment, formal and informal study, military experience and training, and many other areas where knowledge or skill is acquired.

CLEP examinations are administered at test centers throughout the country at specific periods during the year. Students wishing to take a CLEP examination must complete an application form and submit it, along with the appropriate test fees, to the center of their choice.

The College accepts for waiver of credit many of the CLEP subject examinations. Interested persons should contact the Admissions Office for details.

## WITHDRAWAL FROM CLASS

Students are responsible for completing all courses in which they enroll. They may withdraw from any course within the limits provided below. It is the student's responsibility to insure that all withdrawal procedures are completed.



1. If a withdrawal is completed prior to Friday (5 p.m.) of the eighth week of the regular semester, no record of the class will appear on the individual's transcript.
2. A withdrawal after Friday (5 p.m.) of the eighth week thru Friday (5 p.m.) of the thirteenth week of the regular semester will result in a grade of "WP" (withdrew-passing) or "WF" (withdrew-failing) depending on the class standing at the time of withdrawal.
3. For summer session drop dates, consult the bulletin supplement.

Students wishing to withdraw from a class shall initiate such action with their major advisor. They will then be advised of the procedure they are to follow to complete the withdrawal action. Refer to academic calendar for specific dates.

## **ACADEMIC PROBATION AND DISMISSAL**

Students are expected to attend class regularly and maintain normal progress toward the completion of their program. Students who meet the grade standards of the institution will remain in "good standing." Students failing to meet minimum grade standards will be subject to "academic probation" or "academic dismissal" according to the following rules:

Students presently in good standing who complete seven credits or more in a given semester will be placed on academic probation if their semester quality (grade) point average is below 1.800, regardless of their cumulative q.p.a. Students on academic probation completing seven credits or more in a given semester will be dismissed if their semester q.p.a. is below 2.000. Students on academic probation will be returned to good standing status when they have earned a q.p.a. of 2.000 or greater for a semester and when their cumulative q.p.a. is 2.000 or greater. Students completing six credits or less in a given semester will not be placed on academic probation or dismissed, regardless of their semester q.p.a.

Students dismissed for academic performance will not be allowed to re-enroll except with the special permission of, and under conditions established by, the Academic Standards Committee.

## **REINSTATEMENT**

Students who have been dismissed for academic reasons may petition for reinstatement.

A student desiring to be reinstated will be advised of the procedure by the Academic Dean's office. Official action will be taken on the request prior to each enrollment period.

Students who are reinstated will be on academic probation for the semester in which they are reinstated and may be required to carry a reduced course load.

## **REPETITION OF COURSES**

A course may be repeated to improve a grade. All grades received in a given course will be shown on the student's transcript. However, the grade received the last time the course is completed will be the grade used for computing the cumulative quality (grade) point average.

## **TRANSCRIPT**

The transcript is the official record of courses taken and is a record that colleges and employers use to evaluate a student or graduate of Kansas Tech. It must be certified by the Registrar before it will be used as an official record.

Transcript copies may be obtained by contacting the Registrar. Each student is entitled to five transcripts free of charge. A fee of one dollar (\$1.00) is charged for each additional transcript.

Transcripts and/or grades will not be released to a student indebted to the college.

## **DIRECTORY INFORMATION**

Directory information may be released for any purpose at the discretion of the institution. Directory information includes the following information relating to a student: the student's name, address, telephone number, major field of study, participation in officially recognized activities and sports, dates of attendance, degrees, certificate and awards received, and most recent previous educational institution attended.

Directory information may be released upon inquiry according to the institution's guidelines unless the student, within 10 days after registering each semester, requests in writing the specific items for non-disclosure.

## **APPLICATION FOR GRADUATION**

Kansas Tech awards degrees only once per year, at commencement ceremonies following the spring semester. Each candidate for graduation shall file a diploma application with the Academic Dean's Office prior to the end of the second week of classes of his or her final semester of enrollment.

Any petition which the student wishes to present in connection with his or her candidacy for graduation should be submitted prior to enrollment for the final term.

## GRADUATION REQUIREMENTS

The Board of Regents is authorized by the Legislature to empower the President to grant Associate of Technology Degrees/or certificates by type and title as approved by the Board of Regents. Any student who plans to obtain the degree/certificate should be aware of the following criteria used by the faculty for recommending degree/certificate candidates to the President:

The candidates for the degrees/certificates must:

1. successfully complete or obtain a credit validation for each course in their field of study.
2. earn a 2.000 overall quality point average in all courses in their study.
3. be screened and recommended for graduation by the Academic Standards Committee, and
4. attend commencement exercises or obtain written permission for graduation in absentia.\*

\* A written request for graduation in absentia will be made as soon as the candidate becomes aware of circumstances which will prevent attendance at commencement. Such request will be directed to the Academic Dean.

Any student to be considered for graduation shall have successfully completed their final fifteen (15) semester credits in residence at the College.



## GRADUATION WITH HONORS

Students maintaining a high level of academic achievement are recognized at graduation by Honors and High Honors recognition.

The requirement for graduation with High Honors is that the student shall earn an overall quality point average of 3.850 or above based on a 4.000 point system, and a 3.900 in course work in the major field.

The requirement for graduation with Honors is that the student shall earn an overall quality point average of 3.750 or above, and a 3.800 in all course work in the major field.

A grade of "D" or "F" in any course will eliminate any recognition of Honors or High Honors.

## LIBRARY SERVICES

Kansas Tech's Library/Resource Center is located in the Technology Center Building. The library meets standards set for college libraries by the American Library Association, the American Association of Community and Junior Colleges, and the Junior College Association for Educational Communications and Technology.

It contains a collection of authoritative, up-to-date technical information. It provides supplementary reference materials which offers a wide range of modern technological subject matter.

The Resource Center houses a wide range of general information and technical periodicals, newspapers, fiction books, a reading room/lounge, typewriters, computers, a copy center, and audio/visual resource center.

An inviting atmosphere is offered in the well-lighted and attractive library. The staff is available to assist students in locating materials and in the general use of the facility.

Library services are available during normal College operating hours including some evenings and Saturdays.

## CONTINUING EDUCATION

The Continuing Education Division offers special courses to meet the needs of individuals, groups, and organizations.

Workshops, seminars, short-term and full-term courses are Kansas Tech's reply to the State's challenge to provide educational and developmental opportunities in the fields of technology.

Credit and non-credit courses reflect the interests and needs of the individual community or state and cover a wide variety of subjects, providing information for both occupational and personal use. Instructors are leading professional men and women on the institute's faculty. For many of these classes there are no entrance requirements and class schedules are set for the convenience of the students during both daytime and evening hours.

Special courses can be designed to meet the needs of individuals, groups, and organizations. The Continuing Education staff is eager to cooperate with firms that wish to arrange for courses, workshops or seminars in conjunction with their own training programs. These services can be provided on-campus, in-plant or in the respective communities where technical services are needed but not readily available. Continuing Education Units (C.E.U.'s) may be granted in appropriate cases. Continuing education credit course will be indicated by code and course number. Example: AP 1911—Advanced Photography. This course is an adult education program course offered by Continuing Education.



# CONTINUING EDUCATION COURSES

## (Adult Program)

Unique and timely courses of special interest to individuals, business and industry are offered on a regular basis. While these courses are not required by a specific curriculum they carry the same high quality and Kansas Tech touch as those offered through major departments.

## Continuing Education Course Descriptions

### AP 1321 Wordstar 2000

An introduction to the uses, applications and commands of Wordstar 2000 word processing software. Each enrollee will have a one-to-one use of a microcomputer throughout the course. Enrollment per section is limited. No previous computer knowledge is required. (1-0-1) Prerequisite: None

### AP 1331 Wordstar 3.3

An introduction to the uses, applications and commands of Wordstar word processing software. Each enrollee will have one-to-one use of a microcomputer throughout the course. Enrollment per section is limited. No previous computer knowledge is required. (1-0-1) Prerequisite: None

### AP 1351 LOTUS 1-2-3

An introduction to the use, application and commands of LOTUS 1-2-3. Includes applications of spreadsheet, database and graphic problems. Hands-on use of microcomputer can be expected. (1-0-1) Prerequisite: Some knowledge of microcomputers helpful.

### AP 1361 Review of Software

This course is designed to familiarize the student with commercial software for microcomputers. The student will be given "hands-on" exposure of typical applications on software packages to include word processors, electronic spreadsheets and integrated software packages. Software to be examined includes Wordstar, Multiplan, Wordpro, Lotus 1-2-3, Symphony, dBASE and etc. (1-0-1) Prerequisite: None

### AP 1371 dBASE III Plus

An introduction to a database management program. Use, application, and commands will be covered in a hands-on setting. (1-0-1) Prerequisite: Some knowledge of microcomputers helpful.

### AP 1412 Computer Fundamentals

This course is designed for adults seeking to develop a broad, basic familiarity with computer technology. The course covers: 1) basic computer literacy, i.e. terminology, operations, hardware, and peripherals, selection

criteria, 2) an introduction to the BASIC programming language and programming logic, and 3) analysis of common software, including spreadsheets, word processing and database programs. (2-0-2) Prerequisite: None

### AP 1422 Computer-Numerical-Controlled Machine Processes

This course is designed to give students exposure to basic CNC programming and machining operations. There are no prerequisites to this course although a background in fundamental metal machining processes as well as algebra and right angle trigonometry would be helpful. (0-2-2)

### AP 1432 Computer-Aided Drafting

Applications and understanding of microcomputers in technical drafting and design. Topics include generative graphics hardware and software terminology, point plotting and line drafting, graphics, programming, geometric figures, dimensioning and annotating, and finished drawings. (0-2-2) Prerequisite: Knowledge of drafting.

### AP 1721 Skills for College Survival

Designed to aid the student who sees a need or is perceived to need help or information in study skills such as note-taking, time management, test-taking, and reading comprehension. Other topics covered are career planning, placement, word processing, social adjustment, and survival skills for college. (1-0-1) Prerequisite: None

### AP 1812 Basic Astronomy

Selected topics from basic astronomy will be discussed to encourage a general interest and basic knowledge. Will include field work, including the study and use of telescopes. Topics include the earth/moon system, solar system, our galaxy, external galaxies, nebulae, meteors, comets, and interstellar matter and movements. (2-0-2) Prerequisites: None

### AP 1901 Basic 35mm Photography

This course is designed for those who wish to advance beyond the "snapshot" stage of photography. Topics include camera types and care, lens types and use, film characteristics and use, composition, indoor and outdoor lighting, filters, close-ups, and macros. (1-0-1) Prerequisite: None

### AP 6030 First-Line Management

This course is for supervisors who have had little or no previous supervisory training. It is designed to enhance one's managerial abilities and promotional possibilities. The class focuses on developing an understanding of the supervisor's insights into directing the work of others and coping with problem situations. (2-0-2) Prerequisite: None



## STUDENT SERVICES

Kansas Tech prepares its student for rewarding and satisfying careers in chosen areas of specialization. The College not only provides educational opportunities in the classroom and laboratories, but also provides the means whereby students can develop individual talents and meet many non-academic needs.

Students are considered to be mature individuals who are responsible for their own behavior. High standards of personal, ethical, and moral conduct are expected of all students, on campus and off campus.

Students are expected to use the campus facilities with consideration, and to conduct themselves with decorum. Those who refuse to conform to accepted standards of conduct will be dismissed.



## COUNSELING

Faculty are available to advise students in their educational programs and to help those who seek career guidance.

Each student is assigned a faculty advisor who will work with the student to help solve any academic problems that may arise.

Personal and non-academic counseling services are available through the Student Services Office. Every effort will be made to help students through personal counseling and referral while they are enrolled at the college.

## FINANCIAL AID

Financial aid for college attendance is in the process of undergoing some major changes. The current economic times are forcing reductions in the amount of aid available to college students.

It is the policy of the Financial Aid Office at Kansas Tech to provide financial assistance to students who qualify under the federal regulations governing the aid programs. Such aid is based on demonstrated financial need without regard to sex, creed, color or ethnic background.

Because there are limited funds available for some types of aid, it is advisable to apply for financial aid early. The office prefers that the application for aid be received by March 15th, however all applicants will be considered for all types of aid. When financial aid awards are mailed out, they will include three copies of an acceptance letter. These acceptance letters should be signed by the students and returned to the Financial Aid Office within two weeks of receipt of the award letter. Failure to return the letter within the allotted time will be considered rejection of the award. A student may accept or reject any portion of the financial aid package offered in the award letter.

### Student's Rights in Financial Aid

You have the right to know what financial assistance is available, including information on all federal, state and institutional Financial Aid Programs.

You have the right to know the deadlines for submitting applications for each of the financial aid programs available.

You have the right to know the criteria used by the institution to select financial aid recipients.

You have the right to know how the college determines your financial need. This process includes how costs for tuition and fees, room and board, travel, books and supplies, personal and miscellaneous expenses, etc. are considered in your budget.

You have the right to know how much of your financial need, as determined by the institution, has been met.

You have the right to request from the financial aid office an explanation of the various programs in your student aid package. If you believe you have been treated unfairly, you have the right to request reconsideration of the award which was made to you.

You have the right to know what portion of the financial aid you received must be repaid, and what portion is grant aid. If the aid is loan, you have the right to know what the rate of interest is, the payback procedures, the length of time you have to repay the loan, and when payment is to begin.

You have the right to know how the college determines whether you are making satisfactory progress, and what happens if you are not.

### **Student's Responsibilities in Financial Aid**

It is your responsibility to review and consider all information about the college's program before you enroll.

It is your responsibility to complete all application forms accurately and submit them on time to the right place.

It is your responsibility to pay special attention to, and accurately complete, your application for student financial aid. Errors can result in long delays in your receipt of financial aid. Intentional misreporting of information on application forms for federal financial aid is a violation of law and is considered a criminal offense subject to penalties under the U.S. Criminal Code.

It is your responsibility to return all additional documentation, verification, corrections, and/or new information requested by either the financial aid office or the agency to which you submitted your application.

It is your responsibility to read and understand all forms that you are asked to sign, and keep copies of them.

It is your responsibility to accept responsibility for all agreements you sign.

It is your responsibility to know and comply with the deadlines for application or reapplication for aid.

It is your responsibility to know and comply with your college's refund procedures.

It is your responsibility to keep the college informed about scholarships and loans accepted or pending from other sources, such as business foundations, private organizations, and state scholarship programs. Failure to do so may result in forfeiture of all aid received from the college.

## **FINANCIAL AID PROGRAMS**

### **Pell Grant Program**

This is a federally funded program available to eligible students attending any approved post-secondary institution. The amount of the individual non-repayable grants varies, depending on financial need, living arrangements, marital status, and dependent/independent status. An undergraduate student who has not received a bachelor's degree and is enrolled on at least a half-time basis is eligible to apply.

### **College Work-Study Program**

The College Work-Study Program was established to assist students of low-income families by providing jobs on campus. These jobs are available in various departments and will permit a student to earn part of his educational expenses. The total amount a student may earn depends on the financial need shown. A student may not work more than the approved number of hours per week while school is in session. The pay rate is equal to minimum wage as established by law. The school and the federal government share the cost of the College Work-Study Program.

### **Supplemental Educational Opportunity Grant (SEOG) Program**

This federally funded program is for students who have exceptionally high financial need as exhibited through the "Application Procedures" outlined above. An SEOG award could range from \$100 to \$2000 per year and does not have to be repaid. To be eligible students must be enrolled at least half-time or accepted for enrollment. The grants are awarded by the Financial Aid Office.

### **Scholarships/Sponsorships**

A limited number of scholarships are made available to students from interested individuals, businesses, and organizations. Eligibility requirements vary according to the scholarships. The regular "Application Procedures" should be followed to apply for any of these scholarships; some sponsorships will require additional application procedures. Selection is made by the Financial Aid Committee. The Financial Aid Office should be consulted to obtain a listing of the scholarships/sponsorships available. Applications are available through the Financial Aid Office and must be submitted prior to March 15th for consideration to any of the Kansas Tech money. Scholarships are awarded by the Financial Aid Committee.



## Higher Education Assistance Foundation (HEAF)

The HEAF program enables students to borrow directly from local banks or participating lenders who are participating in the GSL program.

Repayment of the loan is guaranteed by the federal government. The maximum loan per academic year is \$2,625, with repayment normally beginning six to nine months after graduation or withdrawal from post-secondary education. Maximum annual interest is currently 8% on the unpaid balance. Students borrowing for the first time in 1987 will experience the interest rate of 8% during the student's first four (4) years of repayment. Commencing with the student's fifth year of repayment the interest rate will increase to 10%.

Those students finding themselves unable to locate a local lender for a Guaranteed Student Loan should contact the Financial Aid Office for a list of possible lenders. The maximum total amount that can be borrowed by an individual student during undergraduate studies is \$17,250.

Students interested in this loan program should contact their local banks or the Office of Financial Aid.

### Financial Aid Application Procedures

1. A student must be enrolled or accepted for admission before he will be considered for financial aid. (See Admission Requirements)
2. A Kansas Student Data Form must be completed and submitted to the Kansas Tech Office of Financial Aid.
3. The American College Testing Program (A.C.T.) "Family Financial Statement", code 1453, must be completed for processing. A fee specified on the form is charged to process this financial need analysis. A financial need analysis must be on file before any financial aid may be awarded.
4. Students applying for a Pell Grant only may apply directly to the federal program without paying a processing fee. However, due to the complexities of reporting, it is highly suggested to utilize A.C.T. Special application forms are available in the Financial Aid Office. The student will receive a student aid report as a result of this application which will include instructions to forward the report to the Financial Aid Office.

After the applications have been processed, the detailed financial aid need analysis will be used by the Financial Aid Committee in determining the student's financial need and corresponding "financial aid package" for that student.

Although no specific application deadline exists for these programs, it is recommended that students interested in financial aid have all completed forms submitted by March 15 for fall semester enrollment. Students should be aware that Kansas Tech scholarships or sponsorships may have specific application deadlines.



## RESIDENCE HALL

Recognizing the benefits to be gained from experience in group living, Kansas Tech provides a coed residence hall as well as dining facilities for all students.

All single freshmen students who live beyond commuting distance will be required to live in the Residence Hall for two (2) semesters, summer school not included as an academic semester.

The following types of students are permitted to take residence elsewhere:

1. A student who has attended another institution of higher learning for two (2) semesters.
2. A student who is a veteran.
3. A student who is twenty-one years of age or older.
4. Special cases include the following:
  - a. Students living with relatives who live within commuting distance of Salina. This will require a signed, notarized statement from the student's parent. This form must be obtained from the Dean of Students.
  - b. Medical reasons, which require a doctor's certification.
  - c. Other similar situations.

All exceptions in this category require approval by the Dean of Students.

Residence Hall rooms are reserved by paying a deposit of \$25.00 annually which is not refundable. Reservations, including the deposit, should be made as early as possible to insure availability of housing. As soon as an applicant's reservation has been confirmed to Kansas Tech, contracts for room and board will be sent to applicants for their signature. Housing regulations and campus rules will be sent to all residents with the contract.

The residence hall contract is an annual commitment. Any student planning to cancel this contract should first read the Contract Addendum (Residence Hall Handbook). No cancellation will be considered without written notification to the Dean of Students.



A damage deposit of \$50.00 is required when a student moves into the residence hall. This deposit will be refunded, if there is no damage to the room, when the resident moves from the hall.

Residence Hall facilities are designed to accommodate two (2) students per room. All rooms are equipped with single beds, adequate storage, dresser, desk, and chair. Bedding, pillows, and other incidental room furnishings must be supplied by occupants.



## OFF-CAMPUS AND MARRIED STUDENT HOUSING

Students who are not required to live in campus housing and who wish to seek residence in the local community should coordinate their search for housing through the Student Services Office. That office will post any known vacancies and if an adequate supply of vacancies is not available the Office of Student Services will refer students seeking housing to a local realtor for assistance.

## FOOD SERVICE

The campus cafeteria/conference center is located adjacent to the residence hall. The preparation of food is under the supervision of a professional food service manager to insure balanced and wholesome meals. In addition to hall residents, all other students are encouraged to use the meal plans available through the Business Office.

## HEALTH SERVICE

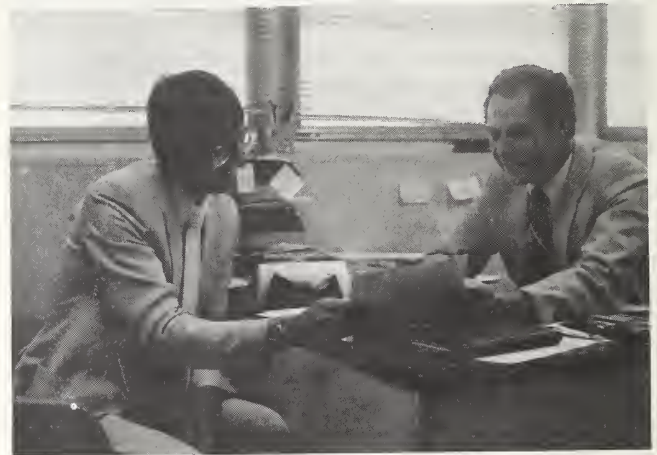
Injuries or illnesses which require the attention of a physician are referred to Salina clinics which perform any medical service required by a student at the college. The cost of this service will be assumed by the student.

A special student health and accident program is available to all students under 26 years of age enrolling at Kansas Tech. This program is optional but deserves serious consideration from students who are not covered under some form of medical insurance. For more information on the health program, contact the Student Services Office.

## VETERANS AFFAIRS

Veterans assistance is arranged through the Student Services Office. Any questions should be channeled through that office. This includes questions on entitlement, counseling, and the numerous other areas which are specific to the veterans needs.

K.S.A. 73-1216, 73-1217 and 73-1218 provides that, "The board of trustees of every community junior college, the board of regents of Washburn University of Topeka, the board of control of every area vocational school and the governing body of every other institution of post-high school education which is supported by any state moneys shall provide for enrollment without charge of tuition or fees for any dependent of a prisoner of war, a person missing in action, or a dependent of a person who died as a result of a service-connected disability suffered during the Vietnam Conflict, so long as such dependent is eligible, but not to exceed twelve (12) semesters of instruction or the equivalent thereof at all such institutions for any person."



## CAREER PLANNING AND PLACEMENT SERVICE

The Career Planning and Placement Center is centrally located on campus in the Tullis Building.

Services include employment vacancy referrals, resume preparation, interview workshops, career counseling, video self-evaluation, and employer workshops.

Career planning is conducted through the use of a computerized system of guidance and information that helps students gather occupational information, and develop strategies for occupational and professional goals.

The Career Planning and Placement Center maintains close contact with numerous industries and business firms interested in graduates of technical colleges as prospective employees. Students taking advantage of the Placement Center are given the opportunity to discuss their employment goals with representatives of firms during the final year of their educational programs.

These discussions may take place on campus, or if feasible, the student is provided the opportunity to visit the site of the firm in order to obtain a clear picture of the business operations.

Files of information for resource materials are maintained to use in the job pursuit process. References are available on industries and businesses in many cities in the United States, and some international locations.

Kansas Tech assists students in finding part-time employment. The office works with the Department of Personnel Services of Kansas and other employment services to assist students in finding part-time employment, and graduates in finding full-time employment.

Degree candidates, as well as those earning two-year certificates, are encouraged to visit with the Placement Director early in their academic program in order that their field of interest can be explored.

Career Planning and Placement offers services, free of charge, to students and recent graduates. Counseling and placement services are available to alumni at a nominal fee.

Follow-up studies and surveys are conducted with graduates and alumni to determine the effectiveness of career planning, training, and placement.



## STUDENT UNION

The Student Union provides recreational activities, a well-equipped snack bar, meeting rooms for campus organizations, and a quiet room for study.

The Union is supported financially by the fees paid by all students during each enrollment period.

## KANSAS TECH BOOKSTORE

The campus bookstore is located in the Student Union building. A complete inventory of textbooks and supplies are maintained. Other items include gifts, greeting cards, reference books, calculators, backpacks, and imprinted clothing.



## OUTLINE OF ACTIVITIES

A wide range of activities is provided for the enjoyment and development of the student. Students, regardless of personal interests, may find a group or club which will appeal to their special interests.

Students are urged to take an active role in the Student Governing Association (SGA). The SGA participates in the development of basic codes of conduct, disciplinary measures, campus activities, and other facets of administrative organization and control.

Various events will be scheduled throughout the year for the social development and enjoyment of students. In most cases, the planning and organization of social activities will be the responsibility of the SGA.

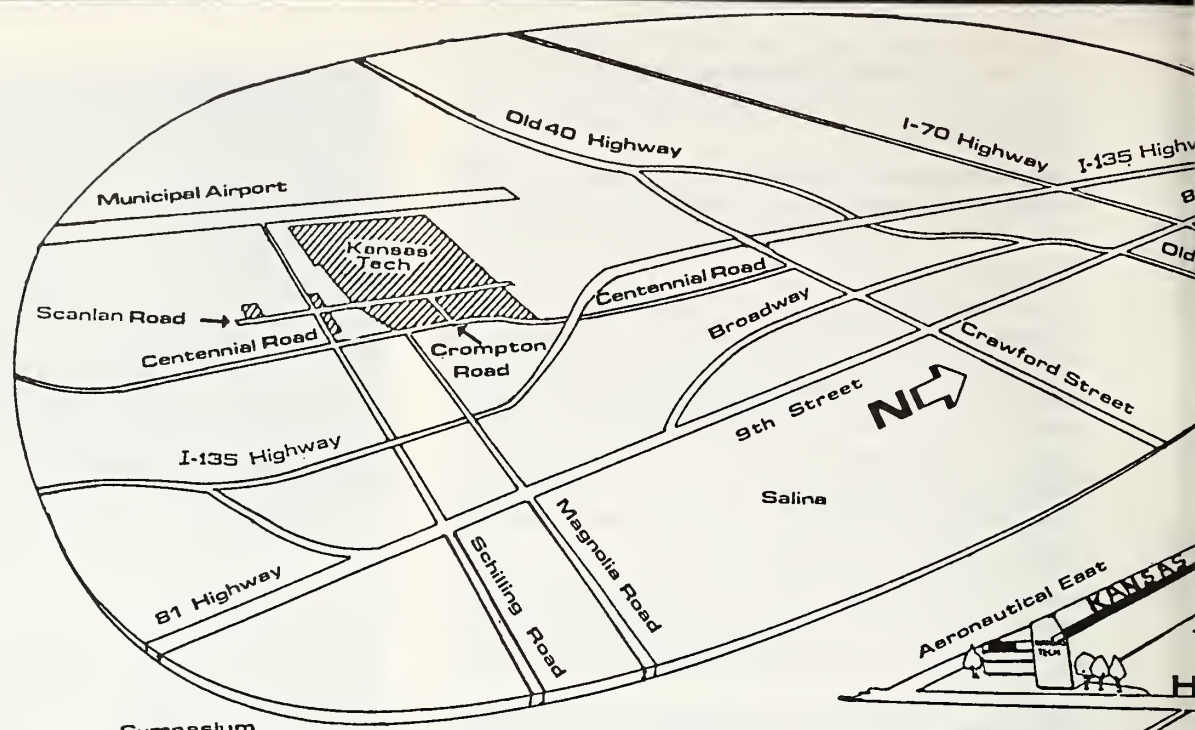
Students who receive a semester quality point average (QPA) of 3.25 or above for twelve or more semester credits are eligible for membership in the honor society, Tau Omicron Tau. The society performs helpful and honorable services on the campus and gives students an opportunity for leadership and service.

Campus activities have included: photography club, student yearbook, student newspaper, student ambassadors, Circle K, ham radio, modelers, airplane club, and others that may be of interest to student groups.

## PARTICIPATION

Students may participate in all activities sponsored by school organizations. Individual participation is subject to the policies and regulations of the organization in which the student is involved.





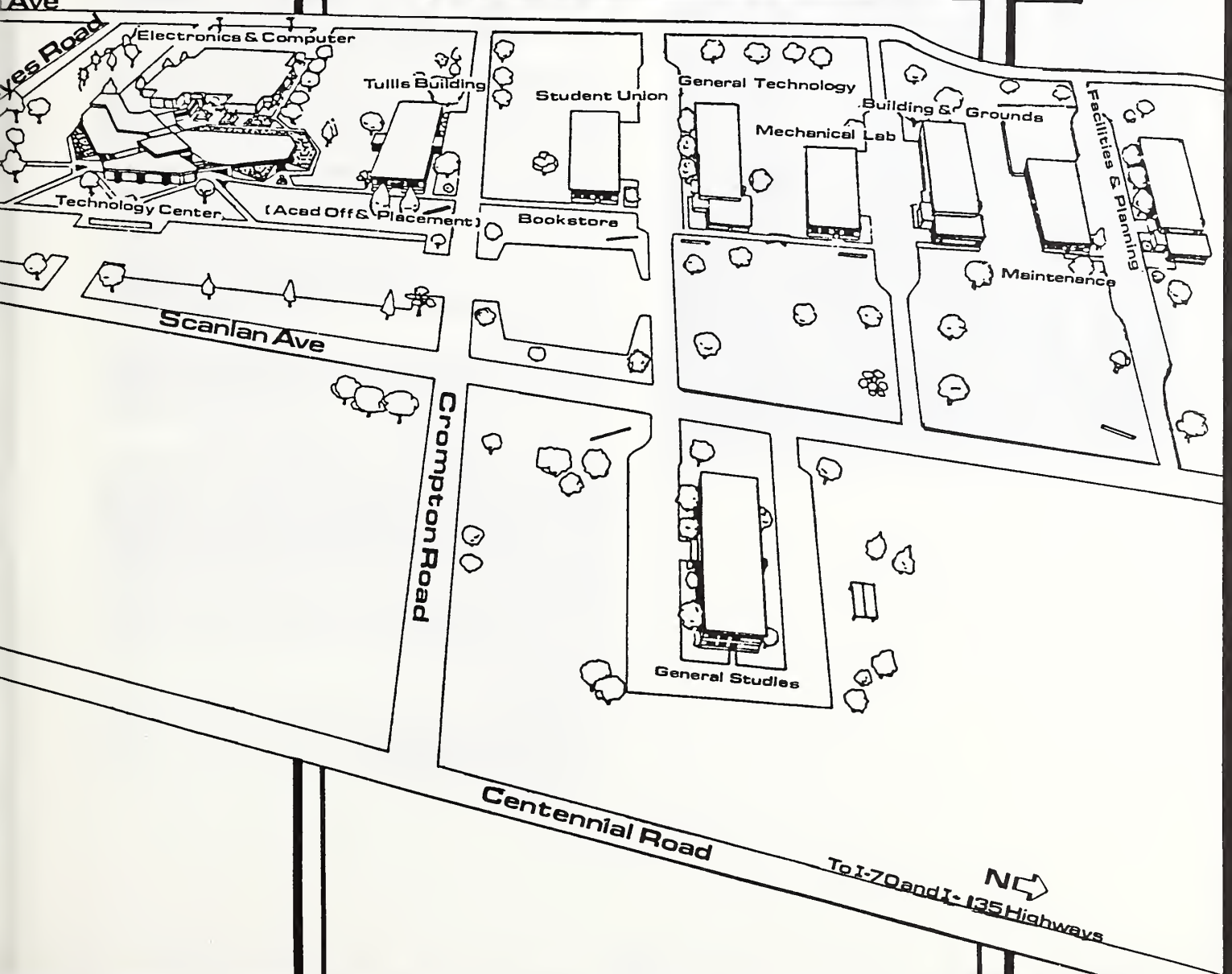


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# KANSAS TECH



Salina, Kansas



## RECREATION AND INTRAMURALS

Recognizing the benefits to be derived from activities other than those connected with formal instruction, Kansas Tech has facilities for a well-rounded program of recreation and entertainment for its students.

Students may participate in intramural competition in a wide variety of sports. In some instances, a small fee may be assessed for participating teams or individuals to defray the cost of trophies and other awards of achievement.

Students may participate in intramural competition in a variety of sports, including flag football, basketball, volleyball, racquetball, bowling, and softball.



## ALUMNI ASSOCIATION

The first graduating class at Kansas Tech consisted of 10 students in 1968. Today, over 1,300 individuals hold a degree or certificate from Kansas Tech. These graduates carry with them the responsibility of representing their alma mater. They work as science and engineering technicians all over the United States and in several foreign countries.

Each student entering the College becomes a potential alumnus. The Kansas Tech Alumni Association is vitally concerned with the student's progress, achievements, and problems.

The primary purpose of the Association is to provide services and benefits to each individual graduate, and to the College. The Association helps students become successful graduates.

Graduates of Kansas Tech are given a free (with completed application) two-year membership in the Alumni Association. New members are encouraged to attend Alumni functions and seek positions as Alumni Association committee members and seats of the Board of Directors.

For more information about the Kansas Tech Alumni Association contact:

Mike Rogers  
President  
Kansas Tech Alumni Association  
2409 Scanlan Avenue  
Salina, Kansas 67401

## ACADEMIC DEPARTMENTS

Kansas Tech is authorized to provide a wide range of instruction in the field of science and engineering technology. A standing committee reviews the needs for technology education in Kansas and works to develop a program specifically designed to meet those needs.

Presently there are six departments of instruction at the College:

- Aeronautical Technology
- Civil Engineering Technology
- Computer Science Technology
- Electronic Engineering Technology
- General Engineering Technology and General Studies
- Mechanical Engineering Technology

Detailed curricula and course descriptions are provided in this bulletin for each of the programs of study taught by these departments.

## ACCREDITATION AND CERTIFICATION

The College is accredited by the Commission on Institutions of Higher Education of the North Central Association of Colleges and Schools.

The Technology Accreditation Commission of the Accreditation Board for Engineering and Technology accredits the following degrees:

- Civil Engineering Technology
- Computer Science Technology
- Electronic Engineering Technology
- Mechanical Engineering Technology

The Aircraft Maintenance Program is certified as an "Aviation Maintenance Technician School No. 3344" by the Federal Aviation Administration.

## PROGRAM OPTIONS

A variety of program alternatives can be obtained to suit the specific interest of the student. Students should discuss those special interest subject areas with faculty members/department heads to explore options. A specific program of study can then be selected for the student at the earliest possible time to insure progress toward a degree objective with the least delay.

## MATHEMATICS TRANSITION PROGRAM

A large number of men and women have the interest and capabilities for a satisfactory career as an engineering technician. For various reasons many of these persons have not considered such a career during their high school experience. Frequently, new students have not completed the mathematics courses that would be most helpful to them in pursuing work in this career field.

The College faculty has developed a transition program in mathematics to assist those who have, for some reason, recognized that their mathematics skills need to be upgraded.

A combination of basic mathematics applications courses and laboratory exercises assist in developing mathematical competence in students who have only fundamental working ability in math. Students will be offered a Mathematics Placement. If desired, special help will be supplied to insure students develop competence in mathematics. This allows students to be successful in the math sequence in the technology of their choosing. If a competency in math is exhibited they may move directly into the prescribed math sequence without having to participate in the Mathematics Transition Program.

## ENGLISH AND READING PROFICIENCY PROGRAMS

Like the Mathematics Transition Program, the English and Reading Proficiency Programs are designed to aid students whose level of competency in these areas may be below the normal college level.

Proficiency examinations can be administered to help identify those students who need developmental work in English and reading. The students may then enroll in Developmental English and/or Developmental Reading to prepare them for the more advanced work they will encounter. These developmental courses may be taken concurrently with other communication and technical courses.





## KEY TO MAJOR PROGRAMS OF STUDY

Majors are listed alphabetically by curricular code as follows:

- AM—Aviation Maintenance
- AT—Aviation Maintenance Technology
- CH—Chemical Engineering Technology
- CL—Civil Engineering Technology
- CP—Computer Science Technology
- CT—Computer Engineering Technology
- DP—Electronic Data Processing Technology
- ET—Electronic Engineering Technology
- GT—General Engineering Technology
- MT—Mechanical Engineering Technology
- PF—Professional Pilot Flight Technology
- SV—Surveying Technology

others:

- SP—Special
- UN—Undeclared
- AP—Adult Program

The format of the course numbers is the curricular code plus a four digit number. The digits are explained in the following example:

SC 1124

SC—Department Code

- 1—Course Level by Year
- 1—Department Use Code
- 2—Department Use Code
- 4—Total Semester Credit

Parentheses at the end of a course description indicate the amount of recitation, laboratory, and semester credits for that course. The GT 1124 example has (3-1-4) which means there are three (3) semester credits of recitation, one (1) semester credit of laboratory, and four (4) semester credit course total.

Information following the semester credit block indicates prerequisites or concurrence, where they may exist. The prerequisite courses must be taken before the course being described may be taken. Concurrence means that the course may be taken at the same time as the course being described.

EXAMPLE: MA 1224 has prerequisites of MA 1212 and MA 1213 which means that before taking MA 1224 (Analytic Geometry and Calculus) the student must have completed MA 1212 (Plane Trigonometry) and MA 1213 (College Algebra).

EXAMPLE: CL 1124 has concurrent course MA 1212 meaning that CL 1124 (Plane Surveying) may be taken at the same time as MA 1212 (Plane Trigonometry).

The ensuing departmental course descriptions are representative of the courses taught at the College. Kansas Tech reserves the right to alter course offerings and content as it deems appropriate.

# AERONAUTICAL TECHNOLOGY

Career opportunities have expanded in the aviation industry in recent years. The programs at Kansas Tech provide high quality preparation for a variety of entry level positions in the aviation and related fields.



## PROFESSIONAL PILOT Two year associate degree

The Cessna Pilot Center integrated flight training program is utilized to obtain a private, commercial, instrument, certified flight instructor and multi-engine ratings. The two-year associate degree emphasizes business courses as a complement to the english, math, and science requirements. Professional pilot graduates may fly as certified flight instructors, charter, business, corporate, or airline pilots.

This program requires additional cost above the standard tuition, books, and supplies. See Bulletin Supplement.



## Professional Pilot (PF)

### First Year—Fall Semester

Course No.	Course Name	Semester		Credits
		R	L	
PF 1114	Private Pilot	4	0	4
PF 1111	Private Pilot Flight Lab	0	1	1
CP 1212	Introduction to Computer Techniques	1	1	2
AM 1213	Aircraft Standards	2	1	3
MA 1213	College Algebra	3	0	3
AC 1513	Financial Accounting	3	0	3
Total Credits				16

### First Year—Spring Semester

Course No.	Course Name	Semester		Credits
		R	L	
PF 1123	Professional Pilot I	3	0	3
PF 1122	Professional Pilot I Flight Lab	0	2	2
MA 1212	Plane Trigonometry	2	0	2
EN 1713	Written Communications	3	0	3
BU 1423	Introduction to Business	3	0	3
EC 1413	Economics	3	0	3
Total Credits				16

### Second Year—Fall Semester

Course No.	Course Name	Semester		Credits
		R	L	
PF 2133	Professional Pilot II	3	0	3
PF 2233	Professional Pilot II Flight Lab	0	3	3
SH 1312	Oral Communications	2	0	2
SC 1124	Physics I	3	1	4
PF 1312	Preventive Maintenance	2	0	2
BU 1433	Marketing	3	0	3
Total Credits				17

### Second Year—Spring Semester

Course No.	Course Name	Semester		Credits
		R	L	
PF 2143	Certified Flight Instructor	3	0	3
PF 2141	Certified Flight Instructor Flight Lab	0	1	1
EN 2713	Technical Writing	3	0	3
BU 1443	Business Law	3	0	3
BU 1413	Supervisory Management	3	0	3
PF 2242	Multi-Engine Rating Certification	1	1	2
	Elective (with PF 2242)	2	0	
	Elective (without PF 2242)	4	0	
Total Credits				15

Total Semester Credits required to complete the degree . . . . . 66

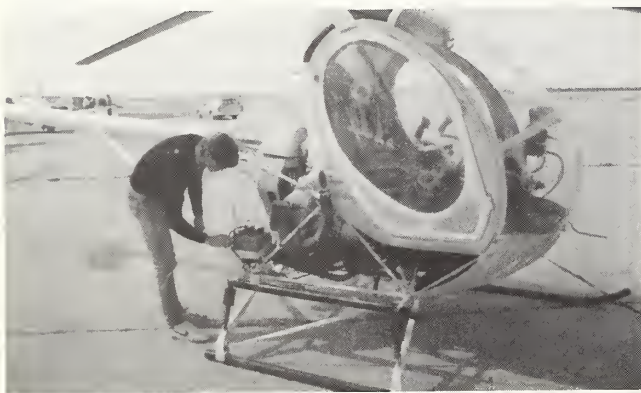
R-recitation or lecture credit; L—laboratory credit



## AVIATION MAINTENANCE FAA A & P Certificate Program

This two-year program prepares students for the Federal Aviation Administration Airframe and Powerplant Certificates. The aircraft maintenance program is fully certified as an "Aviation Maintenance Technician School No. 3344" as designated in Federal Aviation Regulation Part 147. A student who satisfactorily completes this two-year aviation maintenance program will be awarded a Certificate of Completion. Upon passing the FAA exams, given periodically in the program, the graduate will be a certified Airframe and Powerplant maintenance technician.

Airframe and powerplant mechanics inspect, repair, modify and maintain aircraft for manufacturers, commercial airlines, business, corporations, and general aviation operators.



## Airframe & Powerplant Curriculum (AM)

### First Year—Fall Semester

Course No.	Course Name	Semester		Credits
		R	L	
MA 1253	Elementary Functions	2	1	3
AM 1211	Aircraft Drawings	0	1	1
AM 1215	Aircraft Science	3	2	5
AM 1213	Aircraft Standards	2	1	3
AM 1114	Aircraft Basic Electricity	3	1	<u>4</u>
Total Credits . . . . .				16

### First Year—Spring Semester

Course No.	Course Name	Semester		Credits
		R	L	
AM 1112	Aircraft Welding	1	1	2
AM 1324	Airframe Systems	2	2	4
AM 1325	Airframe Structures and Repair	3	2	5
AM 1323	Aircraft Fluid Power	2	1	3
AM 1724	Airframe & Powerplant Electrical Systems	2	2	<u>4</u>
Total Credits . . . . .				18

### Second Year—Fall Semester

Course No.	Course Name	Semester		Credits
		R	L	
AM 2423	Navigation Aids and Communications Systems	2	1	3
AM 2335	Inspection and Assembly	3	2	5
AM 2333	Aircraft Finish and Fabrication	1	2	3
AM 2534	Powerplant Fundamentals	3	1	4
AM 2533	Powerplant Ignition Systems	1	2	<u>3</u>
Total Credits . . . . .				18

### Second Year—Spring Semester

Course No.	Course Name	Semester		Credits
		R	L	
AM 2643	Powerplant Induction and Fuel Systems	1	2	3
AM 2542	Aircraft Propellers	1	1	2
AM 2543	Powerplant Operation and Troubleshooting	1	2	3
AM 2644	Powerplant Overhaul	1	3	4
AM 2544	Gas Turbine Powerplants	2	2	<u>4</u>
Total Credits . . . . .				<u>16</u>

Total semester credits required to complete certificate requirements (includes 2080 contact hours of instruction) . . . . . 68

R—recitation or lecture credit; L—laboratory credit



## AVIATION MAINTENANCE TECHNOLOGY (Associate Degree)

In addition to the Aviation Maintenance Certificate program, 25 additional credits in math, english, and science fulfill requirements for an associate degree in aviation maintenance. Airlines, large corporations, and aircraft companies are supporting an associate degree requirement for their supervisory positions.

### Aviation Maintenance Technology Curriculum

Course No.	Course Name	Semester		Credits
		R	L	
MA 1213	College Algebra	3	0	3
MA 1212	Plane Trigonometry	2	0	2
EN 1713	Written Communications	3	0	3
SH 1312	Oral Communications	2	0	2
EN 2713	Technical Writing	3	0	3
SC 1124	Physics I	3	1	4
EC 1413	Economics	3	0	3
BU 1413	Supervisory Management	3	0	3
CP 1212	Introduction to Computer Techniques	1	1	2

Total semester credits required for Associate of Technology Degree beyond the Aviation Maintenance certificate . . . . 25

## HELICOPTER MAINTENANCE OPTION

The student will receive instruction and experience on a variety of helicopters. Servicing, component repair, reconstruction, and troubleshooting techniques using the latest in tracking and balancing equipment will be performed.

Reciprocating and turbine powered helicopters that are flown regularly are used in the curriculum.

Students will take AT 2857 Helicopter Maintenance Summer Semesters only.

Course No.	Course Name	Semester		Credits
		R	L	
AM 2857	Helicopter Maintenance	3	4	7



## AERONAUTICAL COURSE DESCRIPTIONS

### AM 1112 Aircraft Welding

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. Additional studies will be made in the following areas: welding magnesium, welding stainless steels, brazing, soldering, silver soldering. (1-1-2) Prerequisite: None

### AM 1114 Basic Aircraft Electricity

A basic concept of D.C. and A.C. circuits, with basic laws relating to the following: measuring 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. (3-1-4) Prerequisite: None

### AM 1211 Aircraft Drawings

The course is designed to teach the student how to recognize and identify each kind of line as it appears in drawings, to interpret the meaning of the lines as they relate to surfaces and details in drawings. The student will make drawings illustrating major repairs or alterations, and study the reading and interpretations of blueprints. (0-1-1) Prerequisite: None

### AM 1213 Aircraft Standards

A survey of the organization of the Federal Aviation Administration and Civil Aeronautics Board. Emphasis will be placed on the regulations, standards, and specifications of each of these organizations. A detailed study of weight and balance procedures will be conducted in the classroom and in the laboratory. (2-1-3) Prerequisite: None

### AM 1215 Aircraft Science

A survey of aircraft nomenclature, Basic Physics, theory of flight and aerodynamics, aircraft ground operation and servicing, and aircraft hardware, materials and processes. (3-2-5) Prerequisite: None

### AM 1323 Aircraft Fluid Power

A study of basic fluid mechanics as it applies to practical applications in aircraft systems. Compressible and incompressible fluid systems will be studied. (2-1-3) Prerequisites: AM 1214-Aircraft Science, MA 1253-Elementary Functions

### AM 1324 Airframe Systems

A study of the airframe systems and components to include: pressurization, heating and cooling, structural de-ice, etc. (2-2-4) Prerequisite: AM 1215-Aircraft Science

### AM 1325 Airframe Structures and Repair

A study of materials commonly used in airframe structures and the associated study of making structural repairs according to recommended procedures. Skills in sheetmetal are stressed. (3-2-5) Prerequisite: AM 1215-Aircraft Science

### AM 1724 Airframe/Powerplant Electrical Systems

An advanced study of DC/AC circuit laws relating to circuit analysis and a detailed study of measuring instruments. Advanced study of relays, switches, alternator, and other devices encountered in circuit analysis, troubleshooting and repair. (2-2-4) Prerequisite: AM 1114-Basic Aircraft Electricity

### AM 2333 Aircraft Finish and Fabrication

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. (1-2-3) Prerequisite: None

### AM 2335 Aircraft Inspection and Assembly

A study of assembly and manufacturing procedures, and inspection of aircraft components. This course covers in detail annual and 100 hour inspections. (3-2-5) Prerequisites: MA 1253-Elementary Functions, AM 1211-Aircraft Drawings, AM 1215-Aircraft Science, AM 1213-Aircraft Standards

### AM 2423 Navigational Aids and Communications Systems

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. (2-1-3) Prerequisite: 1114-Basic Aircraft Electricity

### AM 2533 Powerplant Ignition Systems

A study of battery, magneto high and low tension ignition systems including turbine ignitors for today's aircraft powerplants. Emphasis will be placed on troubleshooting, repair, and timing of aircraft ignition systems. (1-2-3) Prerequisite: AM 1114-Basic Aircraft Electricity

### AM 2534 Powerplant Fundamentals

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. (3-1-4) Prerequisite: AM 1213 A/C Standards, AM 1215 A/C Science

### AM 2542 Aircraft Propellers

A study of the use, maintenance, and inspection of propellers and their related control systems. (1-1-2)



### **AM 2543 Powerplant Operation and Troubleshooting**

Experience in installation, operation, and removal of reciprocating engines. Engine analysis and diagnosis of malfunctions, including methods of remedy are performed on airworthy engines. (1-2-3) Prerequisite: AM 2534-Powerplant Fundamentals

### **AM 2544 Gas Turbine Powerplant**

Advanced study of the fundamentals of gas turbine powerplants including operation, studies of supporting systems, and inspection methods are fundamental to this course. (2-2-4) Prerequisite: AM 2534-Powerplant Fundamentals

### **AM 2643 Powerplant Induction and Fuel Systems**

A study of aircraft induction and fuel metering systems including fuels, carburetors, fuel injection systems, superchargers and other induction system components used to insure a dependable and accurate fuel supply at any flight configuration and attitude. (1-2-3) Concurrent: AM 2534-Powerplant Fundamentals

### **AM 2644 Powerplant Overhaul**

Practical experience in overhauling reciprocating engines. Some experience will be gained on radial engines; however, emphasis will be placed on airworthy small opposed engines of current popular variety. Attention will be devoted to various inspection methods, allowable tolerances, replacement procedures, and assembly. Engines are assembled and operationally checked in lab. (1-3-4) Prerequisite: AM 2534-Powerplant Fundamentals

### **AM 2857 Helicopter Maintenance**

A study of airframe, rotor, transmission and engine components of turbine and recip engine helicopters. Also includes a detailed study of required maintenance historical records, and inspection of components. Attention will be directed to safety, sound maintenance practices, assembly and rigging of rotor and engine controls. Chadwick Helm Stobex is used on airworthy helicopters for ground and in-flight balance/track procedures. (3-4-7) Prerequisite: A & P Student or consent of department

### **AM 2930 Problems in Aeronautical**

A course in which advanced study is done in a specific area chosen by the instructor. (1 to 6) Prerequisite: Instructor's consent.

### **PF 1111 Private Pilot Flight Lab**

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. (0-1-1) Prerequisite: None

### **PF 1114 Private Pilot**

The subject areas necessary for completion and passing the FAA Private Pilot Written Examination are presented. A partial listing of these subject areas include: basic aerodynamics, flight control and procedures, communication/navigation, aircraft performance, weight and balance, Federal Aviation Regulations. (4-1-5) Prerequisite: None

### **PF 1122 Professional Pilot Flight Lab**

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 his commercial FAA flight test. (0-2-2) Prerequisite: PF 1111-Private Pilot Flight Lab

### **PF 1123 Professional Pilot I**

A continuation of PF 1114-Private Pilot knowledge for the preparation to pass the FAA Commercial Pilot Written examination. Subjects include: FAR, AIM, charts, high performance aircraft, extended cross-country and meteorology planning, precision flight maneuvers. (3-0-3) Prerequisite: PF 1114-Private Pilot

### **PF 1312 Preventive Maintenance**

This course will give the student hands on experience with the twenty-five maintenance tasks allowed under FAR 43 entitled preventive maintenance. Legal aspects of aviation maintenance, aircraft systems, powerplant operation, considerations in buying an airplane, and annual inspections are additional subject areas included. (2-0-2) Prerequisite: None

### **PF 2133 Professional Pilot II**

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 Written Examination. (3-0-3) Prerequisite: PF 1114-Private Pilot

### **PF 2141 Certified Flight Instructor Flight Lab**

The needed flight skills and proper display of teaching ability will be emplaced. The demonstration of flight maneuvers with recognition of common errors in students performing the demonstrated maneuvers is stressed. Safety above all is the key to flight instruction. (0-1-1) Prerequisite: PF 2233-Professional Pilot II Flight Lab

### **PF 2143 Certified Flight Instructor Ground School**

Instruction techniques, practices and procedures necessary to provide skill in organizing and presenting lessons. Presenting the aeronautical knowledge and developing the skills necessary for teaching will successfully prepare the student for the FAA Certified Instructor Written Examination. (3-0-3) Prerequisite: PF 1123-Professional Pilot I



### **PF 2233 Professional Pilot II Flight Lab**

Instructional flight training necessary to maneuver the aircraft safely in actual or simulated instrument meteorological conditions within the national airspace system. Thorough use and understanding of ATC procedures, safety, and aircraft control will be stressed. (0-3-3)  
Prerequisites: PF 1111-Private Pilot Flight Lab, PF 1122-Professional Pilot Flight Lab

### **PF 2242 Multi-Engine Certification**

Instruction and flight experience in a multi-engine aircraft to develop the aeronautical skill and knowledge to meet the requirements for a multi-engine land class rating to the student's existing pilot certificate. (1-1-2)  
Prerequisites: PF 2233-Professional Pilot II Flight Lab, PF 1122-Professional Pilot Flight Lab



# CIVIL ENGINEERING TECHNOLOGY

The Civil Engineering Technology program is available at the Kansas Tech campus in Salina as a day program, and available as an evening and weekend program in Wichita (in cooperation with Wichita State University).

As a result of the information explosion and the use of micro-electronics and computers, the field of Civil Engineering Technology has required better trained technicians to act as communicators between the graduate engineer and the craftsperson in production and construction.

The Civil Engineering Technician is required to stay current with these advances and must acquire the knowledge not only of current procedures and equipment, but also a knowledge of sources of information from current technical publications. The technician is equipped and prepared with knowledge of construction, materials sampling and testing, construction equipment and practice, principles of surveying, structural design and fabrication, transportation systems as well as a foundation in mathematics, physical science, communications, and personnel relations.

A Civil Engineering Technician performs functions in the area of control and layout of horizontal and vertical elevations for proposed construction of buildings, bridges, and transportation facilities. This would include preliminary and final surveys, assisting in design and detailing stage, or supervision of construction to maintain quality control.

Some job titles or positions that could be filled by a graduate are: designer, project inspector, detail draftsman, construction supervisor, materials technician, technical representative, testing lab technician, surveyor trainer, engineering aide, field technician, and utility network services supervisor.

The program will equip and prepare the civil technician for employment in industries dealing with the design and construction of highways, bridges, railroads, airports, water supply and distribution projects, and other projects ranging from small scale construction jobs to those involving tremendous capital expenditures. Civil Engineering Technicians have varied employment opportunities in each of these areas.

## Civil Engineering Technology Curriculum (CL)

This curriculum is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC/ABET).

		First Year—Fall Semester		
Course No.	Course Name	Semester		Credits
		R	L	
MA 1213	College Algebra	3	0	3
MA 1212	Plane Trigonometry	2	0	2
CL 1312	Materials Sampling and Testing	0	2	2
MT 1112	Technical Drafting	0	2	2
EN 1713	Written Communications	3	0	3
CP 1212	Introduction to Computer Techniques	1	1	2
	* Business/Humanities/Social Science Elective			2
Total Credits . . . . .				16

		First Year—Spring Semester		
Course No.	Course Name	Semester		Credits
		R	L	
SC 1124	Physics I	3	1	4
MA 1224	Analytic Geometry and Calculus	4	0	4
CL 1124	Plane Surveying	2	2	4
CL 1222	Civil Technology Drafting	0	2	2
EN 2713	Technical Writing	3	0	3
Total Credits . . . . .				17

		Second Year—Fall Semester		
Course No.	Course Name	Semester		Credits
		R	L	
CL 2435	Statics and Strength of Materials	5	0	5
MT 2533	Fluid Mechanics	2	1	3
CL 2134	Route and Construction Surveying	2	2	4
CL 2322	Soils and Foundations	1	1	2
CL 2532	Construction Methods and Estimating	1	1	2
Total Credits . . . . .				16

		Second Year—Spring Semester		
Course No.	Course Name	Semester		Credits
		R	L	
SH 1312	Oral Communication	2	0	2
CL 2445	Structural Design	3	2	5
CL 2444	Transportation Systems	2	2	4
SC 1114	* Chemistry I			
	OR			
SC 2334	Physics II	3	1	4
	Business/Humanities/Social Science Elective			3
Total Credits . . . . .				18
Total semester credits required for Associate of Technology Degree . . . . .				67

R—recitation or lecture credit; L—laboratory credit.

\* May be interchanged with proper mathematic background.

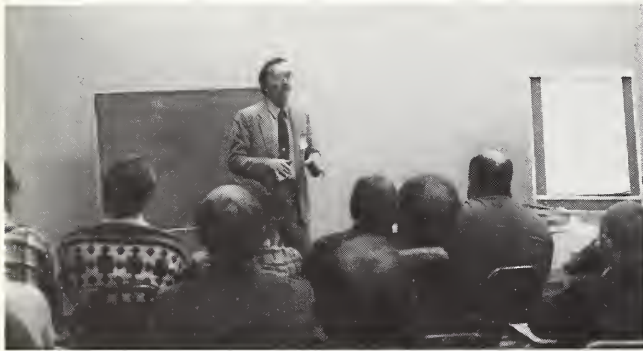
## CONSTRUCTION OPTION

The construction aspects of Civil Engineering Technology are stressed allowing students to specialize in this career area. Courses are taught on contracts and specifications, construction surveying, print reading, and general knowledge of building electrical and mechanical systems. Emphasis will be in the area of heavy construction.

### Construction Option Curriculum

To receive an Associate of Technology Degree in the Construction Option students must still complete 67 semester credit hours. In lieu of CL 1222, Civil Technology Drafting, and CL 2444, Transportation Systems, the following courses must be substituted to complete the Construction Option:

Course No.	Course Name	Semester Credits		
		R	L	Total
CL 1132	Construction Surveying	1	1	2
CL 1211	Print Reading for Civil Construction	0	1	1
CL 2523	Mechanical and Electrical Systems	2	1	3
CL 2521	Contracts and Specifications	1	0	1



## SURVEYING TECHNOLOGY

Surveying is necessary for the planning, design, and layout of all major engineering projects. Surveys are used for subdivisions, buildings, bridges, railroads, highways, airports, canals, dams, irrigation and drainage projects, and in the preparation of any type of map.

The tremendous amount of physical development has created a need for qualified surveyors at a faster rate than schools have been able to produce. Graduates for the Surveying Technology option may seek employment in the areas of construction, as government surveyors (federal, state, county and municipal), engineering consulting, and private surveying.

It is important to note that any person who goes into private practice must be licensed. This program combined with the necessary work experience will help the individual qualify to take the Registered Land Surveyor's Examination.

## Surveying Technology Curriculum (SV)

### First Year—Fall Semester

Course No.	Course Name	Semester Credits		
		R	L	Total
MA 1213	College Algebra	3	0	3
MA 1212	Plane Trigonometry	2	0	2
MT 1112	Technical Drafting	0	2	2
EN 1713	Written Communications	3	0	3
CP 1212	Introduction to Computer Techniques	1	1	2
SH 1312	Oral Communications	2	0	2
	Technical Elective **			<u>3</u>
Total Credits				17

### First Year—Spring Semester

Course No.	Course Name	Semester Credits		
		R	L	Total
CL 1222	Civil Technology Drafting	0	2	2
SC 1124	Physics I	3	1	4
MA 1224	Analytic Geometry and Calculus	4	0	4
CL 1124	Plane Surveying	2	2	4
CL 1123	Land Surveys	2	1	<u>3</u>
Total Credits				17

### Second Year—Fall Semester

Course No.	Course Name	Semester Credits		
		R	L	Total
CL 2435	Statics and Strength of Materials	5	0	5
CL 2134	Route and Construction Surveying	2	2	4
CL 2133	Surveying Astronomy	2	1	3
EN 2713	Technical Writing	3	0	3
	Business/Humanities/Social Science Elective			<u>2</u>
Total Credits				17

### Second Year—Spring Semester

Course No.	Course Name	Semester Credits		
		R	L	Total
CL 2444	Transportation Systems	2	2	4
CL 2143	Surveying Law	3	0	3
	OR			
SC 2334	Physics II	3	1	4
	Business/Humanities/Social Science Elective			3
CL 2142	Advanced Surveying	1	1	2
SC 1114	Chemistry I			
Total Credits				<u>16</u>

Total Semester Credits required for Associate of Technology Degree . . . . . 67

R—recitation or lecture credit; L—laboratory credit  
 \*\* Civil Electives—minimum of 3 credits from the following courses: CL 1312-Materials Sampling and Testing, CL 2322-Soils and Foundations, MT 1111-Descriptive Geometry, CL 1522-Construction Surveying, CL 2532-Construction Methods and Estimating.



## **CIVIL ENGINEERING TECHNOLOGY COURSE DESCRIPTIONS**

### **CL 1123 Land Surveys**

A course dealing with the procedures for researching records, conducting surveys, formulating descriptions, and producing plats which relate to the surveying of land. (2-1-3) Prerequisite or concurrent: CL 1124-Plane Surveying

### **CL 1124 Plane Surveying**

This is a course in the theory and practice of obtaining field measurements for surveying. Emphasis is placed on accuracy and how to avoid or minimize errors and mistakes. (2-2-4) Prerequisite or concurrent: MA 1212-Plane Trigonometry

### **CL 1132 Construction Surveying**

A study of the vertical and horizontal alignment required and methods of establishing and maintaining control on a construction site. Emphasis is placed on practical methods and problems encountered in actual construction. (1-1-2) Prerequisite: CL 1124-Plane Surveying

### **CL 1211 Print Reading for Civil Construction**

A course to teach methods of getting information from Civil Construction plans in order to build the project, or parts of it. Plans are included for streets, water distribution and treatment, sanitary sewer systems, storm sewer and highway drainage, highway, architectural and building plans, site grading, bridges, and mechanical and electrical systems. (0-1-1) Prerequisite: None

### **CL 1222 Civil Technology Drafting**

This course consists of making and studying the various types of drawings and maps common to Civil Technology: Ownership plats, plan profile, contour maps, certification. Photogrammetry procedures are studied and structural detail drawings are examined. (0-2-2) Prerequisite: MT 1112-Technical Drafting

### **CL 1312 Materials Sampling and Testing**

A study of aggregates and concreting materials as used in asphalt and portland cement construction. The course includes sampling techniques and methods of testing which conform to American Society of Testing Materials and the American Association of State Highway and Transportation Officials. Mix designs are emphasized both in the laboratory and field use. The course concludes with elements of asphalt testing. (0-2-2) Prerequisite: None

### **CL 2133 Surveying Astronomy**

A study of spherical trigonometry and its application to astronomical calculations that will be used in the determination of bearing, azimuth, latitude, longitude and time from solar, polar, and stellar observations. (2-1-3) Prerequisite: CL 1124-Plane Surveying

### **CL 2134 Route and Construction Surveying**

A study of the geometry involved in vertical and horizontal alignment of roads and streets. The effects of the alignment on grades, design speed and sight distance are considered. In the laboratory the knowledge is used to perform the staking necessary for preliminary studies as well as construction. (2-2-4) Prerequisite: CL 1124-Plane Surveying

### **CL 2142 Advanced Surveying**

A study of the advanced areas of surveying with primary emphasis on control networks, state plane systems, tachometry, geodetic surveying and the use of electronic surveying equipment. (1-1-2) Prerequisite: CL 1124-Plane Surveying

### **CL 2143 Surveying Law**

A study of the legal aspects that apply to the surveying profession, and the role of the surveyor within the judicial frame work of our court system. (3-0-3) Prerequisite: CL 1123-Land Surveys

### **CL 2322 Soils and Foundations**

This course covers the criteria used in the selection, design and construction of the elements of a structure that transfers its total load to the underlying formation. Physical characteristics of compacted and uncompacted soils, soil bearing qualities and an insight into the design for footings, walls, piers and piling used for foundation purposes. (1-1-2) Prerequisite: MA 1224-Analytic Geometry and Calculus

### **CL 2432 Statics**

A study of forces and their effects on the bodies upon which they act. (2-0-2) Prerequisite: SC 1124-Physics I

### **CL 2435 Statics and Strength of Materials**

A study of forces, stresses, structures, and design characteristics of a variety of engineering components. (5-0-5) Prerequisite: SC 1124-Physics I

### **CL 2443 Strength of Materials**

A study of the internal resistance to external forces. The course also deals with the resulting changes in the dimensions and shapes of bodies produced by outside forces. (3-0-3) Prerequisite: CL 2432-Statics

### **CL 2444 Transportation Systems**

A study of the design of transportation systems with emphasis on highways, urban roadways, and railroads and airports. General topics included are roadway alignment, drainage structures and pavements. (2-2-4) Prerequisite: CL 2134-Route and Construction Surveying

### **CL 2445 Structural Design**

A course combining the design of structures in reinforced concrete and structural steel. Basic stress calculations and design concepts are studied for use in either a design or inspection role. (3-2-5) Prerequisite: CL 2435-Statics and Strength of Materials

### **CL 2521 Contracts and Specifications**

A study of the way a set of contracts and specifications are put together and how they act as a source of data on a construction job. The course stresses the way information is gained from documents with speed and accuracy. Specifications are studied and matched with plan sets. Among sections discussed are structural, mechanical, electrical, earthwork and concrete. Among items examined and discussed are bid proposals, bonding procedures, change orders, periodic and final payments. (1-0-1) Prerequisites: CL 1211-Print Reading for Civil Construction, CL 1132-Construction Surveying

### **CL 2523 Mechanical and Electrical Systems**

A study of the way Mechanical and Electrical systems are used in the construction of a building by a contractor. Systems include plumbing, heating, ventilation and air conditioning. Motor, load, circuit breakers and telemetry systems are studied. The course's purpose is to increase the future supervisor's knowledge of installation and operation of these systems. (2-1-3) Prerequisites: MA 1212-Plane Trigonometry, SC 1124-Physics I, CL 2532-Construction Methods and Estimating

### **CL 2532 Construction Methods and Estimating**

A study of the basic equipment needs, usage, costs, and quantity determinations for planning and estimating construction projects. Field trips through construction sites and visitations with the inspectors assist in developing reporting procedures and inspection responsibilities. (1-1-2) Prerequisite: MA 1213-College Algebra

### **CL 2743 Structural Steel Design**

A course covering the basic fundamentals of structural steel design. Stress calculations and design concepts are studied for use in either a design or inspection role. (2-1-3) Prerequisite: CL 2435-Statics and Strength of Materials

### **CL 2753 Reinforced Concrete Design**

A course covering the basic fundamentals of reinforced concrete design. Stress calculations and design concepts are studied for use in either a design or inspection role. (2-1-3) Prerequisite: CL 2435-Statics and Strength of Materials

### **CL 2930 Problems in Civil**

A course in which advanced study is done in a specific area chosen by the student. (1 to 6) Prerequisite: Instructor's consent





# COMPUTER SCIENCE TECHNOLOGY

Advances in computer technology have made the use of computers a feasible reality for virtually all types of businesses and industries. This rapid growth in the computer industry has created a strong demand for workers with special training in the computer science field and information systems environment.

The Computer Technology Department offers programs leading to challenging careers in two areas: Computer Science Technology and Electronic Data Processing Technology. In addition, the department's course offerings are utilized by the other departments on campus, since computer usage has become a very important tool in nearly all areas of technology.

Kansas Tech students in Computer Science and Data Processing have opportunity to obtain experience with the programming and operation of state-of-the-art computers which are comparable to systems used in business and industry today. Hands-on experience is obtained on a Harris H-800 computer system, an IBM 34 computer system and various microcomputer systems available in several laboratories, as well as digital logic test equipment for experimentation in computer hardware.

The Computer Science Technology curriculum offers training in the use of computers for solution of scientific and engineering problems. Many industries including aircraft companies, energy companies, agricultural research organizations, as well as large computer manufacturers employ computer science technicians as computer programmers and programmer/analysts in these scientific areas.

The computer programmer works closely with the systems analyst who develops mathematical models of scientific and engineering problems for solution by the computer. The programmer helps define the problem, including input and output requirements, and prepares the actual set of instructions the computer must follow to solve the problem. As a programmer/analyst the computer science graduate would do most of the mathematical formulation as well as the actual programming necessary to solve a problem. Programmer/analysts frequently work directly with scientists and engineers in developing solutions to problems.

Training in the Computer Science Technology curriculum includes a strong coverage of science and mathematics as well as courses in computer programming and advanced applications of computers in scientific areas.

## Computer Science Technology Curriculum (CP)

### First Year—Fall Semester

Course No.	Course Name	Semester		Credits
		R	L	
MA 1213	College Algebra	3	0	3
MA 1212	Plane Trigonometry	2	0	2
EN 1713	Written Communications	3	0	3
SH 1312	Oral Communications	2	0	2
CP 1313	Computer Systems Principles	3	0	3
CP 1133	BASIC	2	1	3
Total Credits . . . . .				16

### First Year—Spring Semester

Course No.	Course Name	Semester		Credits
		R	L	
SC 1124	Physics I	3	1	4
MA 1224	Analytic Geometry and Calculus	4	0	4
CP 1323	FORTRAN	2	1	3
CP 1223	Introduction to Microprocessors	2	1	3
CP 2233	Statistics for Computer Science	2	1	3
Total Credits . . . . .				17

### Second Year—Fall Semester

Course No.	Course Name	Semester		Credits
		R	L	
CP 2123	Pascal	2	1	3
CP 2133	Numerical Methods Business/Social Science Electives	2	1	5
CP 2433	Assembly Language Programming	2	1	3
EN 2713	Technical Writing	3	0	3
Total Credits . . . . .				17

### Second Year—Spring Semester

Course No.	Course Name	Semester		Credits
		R	L	
SC 1114	Chemistry I			
	OR			
SC 2334	Physics II	3	1	4
CP 2232	Computer Graphics	0	2	2
ET 1513	Basic Electricity	2	1	3
CP 1123	COBOL I	2	1	3
CP 2342	Data Structures	1	1	2
CP 2442	Computer Science Technology Seminar	1	1	2
Total Credits . . . . .				16
Total semester credits required for Associate of Technology Degree				66

R—recitation or lecture credit; L—laboratory credit

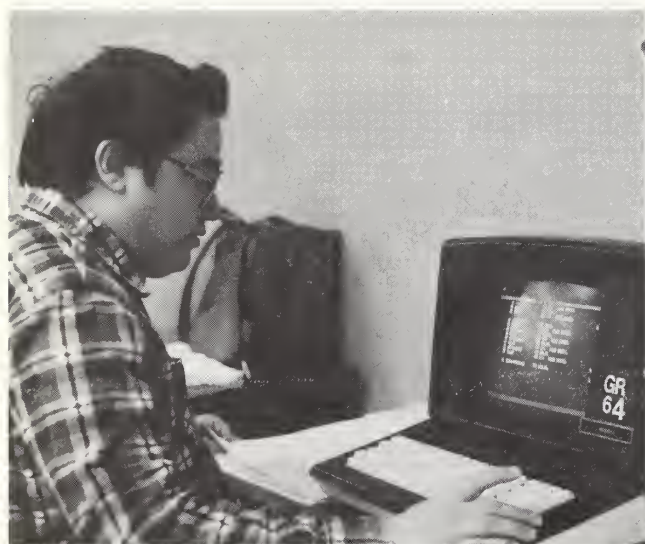


## ELECTRONIC DATA PROCESSING TECHNOLOGY

Applications of computers in the business world presently affect persons in all walks of life. Financial transactions including bank statements, credit card purchases, customer billing, payroll checks, and even grocery store cash registers are now computerized. The demand for skilled computer programmers and programmer/analysts in the business world continues to grow with each new application that arises.

The programmers and computer analysts in the Electronic Data Processing field apply knowledge of computer programming, accounting and management methods to the solution of business-oriented problems. Training in the Electronic Data Processing curriculum includes work in business-oriented computer languages and techniques, accounting, business practices, and management. Fundamental mathematics and communications skills are included to enhance the individual's capabilities in the business world.

Graduates from the data processing curriculum are employed in a great variety of business with information systems function and may include accounting firms, manufacturing companies, public agencies, schools, hospitals, and marketing firms to name a few.



## Electronic Data Processing Technology Curriculum (DP)

### First Year—Fall Semester

Course No.	Course Name	Semester		Credits
		R	L	
AC 1513	Financial Accounting	3	0	3
MA 1213	College Algebra	3	0	3
SH 1312	Oral Communications	2	0	2
EN 1713	Written Communications	3	0	3
CP 1313	Computer Systems Principles	3	0	3
CP 1133	BASIC	2	1	3
Total Credits . . . . .				17

### First Year—Spring Semester

Course No.	Course Name	Semester		Credits
		R	L	
CP 1123	COBOL I	2	1	3
AC 1523	Managerial Accounting	3	0	3
BU 1423	Introduction to Business	3	0	3
CP 1323	FORTRAN	2	1	3
CP 1223	Introduction to Microprocessors	2	1	3
EC 1413	Economics	3	0	3
Total Credits . . . . .				18

### Second Year—Fall Semester

Course No.	Course Name	Semester		Credits
		R	L	
BU 1622	Accounting Application for Micro Computers	1	1	2
EN 2713	Technical Writing	3	0	3
CP 2223	RPG	2	1	3
CP 2333	COBOL II	2	1	3
CP 2233	Statistics for Computer Science	2	1	3
	Technical/Business Elective			2
Total Credits . . . . .				16

### Second Year—Spring Semester

Course No.	Course Name	Semester		Credits
		R	L	
CP 2434	Commercial Software Analysis	1	1	2
CP 2132	System Analysis & Design	1	1	2
CP 2433	Assembly Language Programming	2	1	3
CP 2242	Data Base Concepts	1	1	2
BU 1413	Supervisory Management	3	0	3
	Technical/Business Elective			3
Total Credits . . . . .				15
Total semester credits required for Associate of Technology Degree				66

R—recitation or lecture credit; L—laboratory credit

## COMPUTER COURSE DESCRIPTIONS

### CP 1212 Introduction to Computer Techniques

Study of computer techniques and applications for the non-Computer Technology majors. Emphasis on problem solving using the BASIC programming language. Scientific programming assignments in the student's major field of study are performed on the central on-campus computer system and on microcomputer systems. (1-1-2) Prerequisite: None

### CP 1133 BASIC

Introduction to the BASIC programming language as an initial language will include novice through intermediate concepts. Logic design, structure and style will be stressed through coding assignments. Selected advanced topics will be covered and carry through to the next programming course (2-1-3) Prerequisite: None

### CP 1123 COBOL I

Introduction and study of fundamental aspects of the techniques, devices and procedures of the COBOL language with emphasis on business application. Includes coverage of Input/Output operations, arithmetic operations, editing, output formatting, control break processing, validity testing and introduction of Report Writer. Laboratory work consists of solving business related problems using COBOL. (2-1-3) Prerequisite: CP 1133-BASIC

### CP 1313 Computer System Principles

Introductory Study of how computers are used. History, representation, storage concepts, input/output devices, and data communications are covered as well as the programming task, system documentation, physical system design, and feasibility analysis. Specific computer systems that demonstrate underlying principles are studied. (3-0-3) Prerequisite: None

### CP 1323 FORTRAN

Study of the computer language FORTRAN and its application to scientific and engineering problem solution. Includes study of input/output techniques, arithmetic and logic processes, non-numeric data handling, arrays and subprograms. In the laboratory students write, process, and debug scientific programs using the FORTRAN-77 compiler. (2-1-3) Prerequisite: CP 1133-BASIC

### CP 1223 Introduction to Microprocessors

The course is designed to introduce students to terminology, mathematics, and basic theory pertaining to microprocessors. Emphasis is placed on programming and software design via the 6502 instruction set. A weekly laboratory will furnish hands-on experience through use of 6502 single-board and microcomputers. (2-1-3) Prerequisites: CP 1313-Computer Systems Principles, CP 1133-BASIC

### CP 2123 Pascal

Introduction to the strongly typed, highly structured language Pascal will be accomplished through lecture and laboratory assignments. Course assignments will be aimed toward the computer science technician with concepts of the data structuring and manipulation being emphasized. A major program will be developed near the final portion of the course allowing students to pursue individual interests. (2-1-3) Prerequisite: CP 1133-BASIC

### CP 2133 Numerical Methods

Study of numerical methods for solution of mathematical algorithms on main frame using FORTRAN. Topics include numerical solutions and approximations to polynomials, nonpolynomials, linear systems of equation, matrices, cubic spline, finite differences, integration and differentiation. Laboratory work includes an emphasis on efficient use of computer time for processing with appropriate algorithms. (2-1-3) Prerequisites: CP 1323-FORTRAN, MA 1224-Analytical Geometry and Calculus

### CP 2433 Assembly Language Programming

Programming of the digital computer at the machine language and assembly language levels. Includes numerical processing, data storage considerations, macros, and linkages with higher-level languages. Laboratory work includes the solution of several assembly language programming problems on the Harris computer system. (2-1-3) Prerequisite: CP 1223-Introduction to Microprocessors

### CP 2223 RPG

This course introduces the student to the Report Program Generator (RPG) programming language, used primarily for generation of business reports such as payroll, statistical studies, accounts receivable, accounts payable, inventory and material accounting, and other business oriented applications. Lab work includes solution of several business report problems using IBM System 34. (2-1-3) Prerequisite: None

### CP 2232 Computer Graphics

Study of the use of the computer to process and output graphic information. Includes overview of various computer graphics hardware including plotters, digitizers, and graphics display terminals. Laboratory work includes design of software for generation of charts, graphs, and mechanical drawings. Also included are mathematical concepts needed for three-dimensional drawings, projections, and animation. (0-2-2) Prerequisites: MA 1212-Plane Trigonometry; CP 1323-FORTRAN



### **CP 2233 Statistics for Computer Science**

An introduction to elementary statistics with emphasis on applications using the computer. Topics include description and representation of sample data, probability, theoretical distributions, sampling, estimating, correlation, regression, and computer statistical software packages. (2-1-3) Prerequisites: MA-1213-College Algebra; CP 1133-BASIC

### **CP 2123 Systems Analysis and Design**

An opportunity for the student to merge concepts learned in previous programming courses. Initiation of a system project up through the final implementation stage will be covered along with a section on hardware selection. Laboratory work will include the analysis and design of a computer system for a fictitious business using advanced COBOL. (1-1-2) Prerequisite: CP 2333-COBOL II

### **CP 2242 Data Base Concepts**

This course is designed to introduce the students with terms and programming procedures used by programmers to implement various Data Base packages. Relational, Hierarchical and Network Data Bases will be discussed with examples of each. Students will be required to establish practical applications of a Data Base and become familiar with capabilities and limitations. Software packages similar to D BASE II will be examined and used. (1-1-2) Prerequisites: CP 1133-BASIC; CP 1313-Computer Systems Principles

### **CP 2333 COBOL II**

Further, in-depth study of the COBOL language. Table processing report writer, COBOL sort, file merging and updating will be covered. Laboratory work includes several business applications using the COBOL language. (2-1-3) Prerequisites: CP 1123-COBOL I

### **CP 2342 Data Structures**

Utilizing the Pascal programming language, students will investigate pointers, linked lists, queues, stacks, rings and their controlling algorithms. Emphasis will be placed on concrete applications with advanced topics including tree structures, graphs, hashing and other search strategies along with their controlling algorithms. (1-1-2) Prerequisite: CP 2123-Pascal

### **CP 2432 Commercial Software Analysis**

This course is designed to familiarize the student with Commercial Software for mainframe and microcomputers. Students will be introduced to industry programming procedures for implementing and developing software packages. The student will be given "hands-on" experience and application on software packages to include Word Processors, Electronic Spreadsheets and Integrated Software Packages. Software to be examined include Wordpro, Wordstar, Multiplan and Lotus 1-2-3. (1-1-2) Prerequisites: CP 1133-BASIC; CP 1223-Introduction to Microprocessors

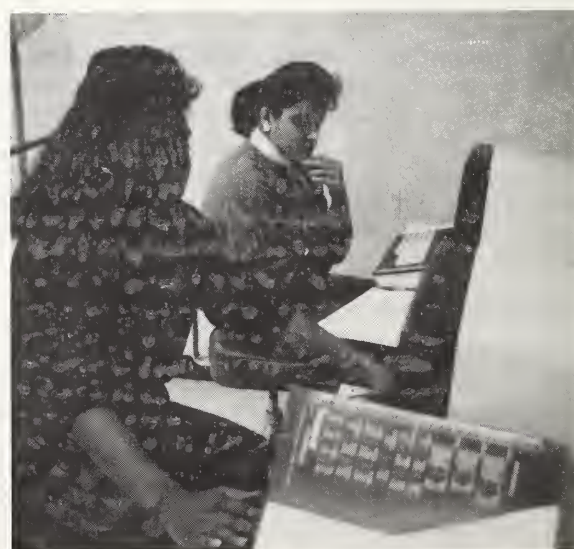


### **CP 2442 Computer Science Technology Seminar**

A practical application of numerical methods in solving problems. Course includes topics in solutions to differential equations, applications of cubic spline techniques, and comparison of digital techniques through problem solving. Additional topics in communications with peripherals, job selection criteria and personal presentation for interviewing will be presented to enhance the students capability to cope with real world situations. This course is the capstone course for the computer science student. (1-1-2) Prerequisite: CP 2133-Numerical Methods

### **CP 2930 Problems in Computer**

Opportunity for advanced study and practical experience with specific problems selected jointly by the instructor and student in the field of Computer Technology. (1 to 6) Prerequisite: Instructor's Consent





# ELECTRONIC ENGINEERING TECHNOLOGY

Developments in the electronics field have expanded into every major industry and affects the daily lives of every citizen of our country. The advances in electronics have resulted in the creation of a number of new industries and accelerated the growth of others.

Positions requiring education and training in electronics exist in medicine, geology, public safety, aeronautics, law enforcement, automation, home entertainment, national defense, and in computerized controls. The applications in these fields have only scratched the surface of the potential uses for electronics. Because of the rapid growth, individuals choosing electronics as a career field have many opportunities for advancement in a challenging endeavor.

The many facets of the electronics field have produced a need for technicians to perform a variety of jobs worldwide. To qualify for these jobs, technicians must have a good understanding of the uses of instruments and basic electronics including both theory and practice of DC and AC circuits, electronic devices, digital systems including microcomputers and linear electronics, and communications systems. Qualified graduates frequently advance to supervisory positions where technical knowledge is a necessary element of the managerial process.

Instruction in electronics is balanced between theory and practice with approximately half of the class time taking place in a "hands on" laboratory setting working with equipment similar to that found in industry. In addition to the electronics courses the student is expected to successfully complete coursework in mathematics, science, technical writing and social studies.

Students desiring a concentration in electronic communications may select an optional track of courses that permit a more intensive preparation in this area.



## Electronic Engineering Technology Curriculum (ET)

This curriculum is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC/ABET).

### First Year—Fall Semester

Course No.	Course Name	Semester		Credits
		R	L	
EN 1713	Written Communications	3	0	3
MT 1112	Technical Drafting	0	2	2
MA 1213	College Algebra	3	0	3
MA 1212	Plane Trigonometry	2	0	2
CP 1212	Introduction to Computer Techniques	1	1	2
ET 1114	Direct Current Circuits	3	1	4
SH 1312	Oral Communications	2	0	<u>2</u>
Total Credits . . . . .				18

### First Year—Spring Semester

Course No.	Course Name	Semester		Credits
		R	L	
SC 1124	Physics I	3	1	4
MA 1224	Analytic Geometry and Calculus	4	0	4
ET 1224	Alternating Current Circuits	2	2	4
ET 1324	Semiconductor Electronics	2	2	<u>4</u>
Total Credits . . . . .				16

### Second Year—Fall Semester

Course No.	Course Name	Semester		Credits
		R	L	
ET 2434	Electronic Measurements	2	2	
OR				
ET 2634	Communication Circuits I	3	1	4
ET 2535	Linear Circuit Design	3	2	5
ET 2631	Electronic Seminar I	0	1	1
CT 1223	Digital Electronics and Microprocessors	2	1	3
EN 2713	Technical Writing	3	0	<u>3</u>
Total Credits . . . . .				16

### Second Year—Spring Semester

Course No.	Course Name	Semester		Credits
		R	L	
ET 2944	RF Communications Systems	3	1	
OR				
ET 2644	Communication Circuits II	2	2	4
ET 2041	Electronic Seminar II	0	1	1
CT 2144	Digital System Design I	2	2	4
SC 1114	Chemistry I			
OR				
SC 2334	Physics II	3	1	4
	Business/Humanities/Social Science Electives	5	0	<u>5</u>
Total Credits . . . . .				<u>18</u>

Total Semester Credits required for Associate of Technology Degree . . . . . 68

R—recitation or lecture credit; L—laboratory credit.

# Computer Engineering Technology

New advances in electronics including the development of the microprocessor—an actual computer smaller than a postage stamp—have created a need for skilled individuals capable of working with this new technology. The Computer Engineering Technology program offers training in computer related areas.

The computer engineering technician must understand not only the electronic or “hardware” aspect of the computer, also the programming or “software” aspects. By understanding both hardware and software, the computer engineering technician can be employed in one of many computer and computer support areas including: computer hardware design, computer maintenance, factory automation, computer manufacturing and testing, computer sales and servicing. The computer engineering technician will often work closely with computer engineers, electrical engineers, and computer scientists to assist in the design and development of computers and computer-based products. Job responsibilities might include: the design and programming of computerized manufacturing equipment, the construction of the “prototype” (first working model) of a new computer, the installation of new computer systems to include training the customer in use and the after sale servicing of computers at the customer’s place of business.



# Computer Engineering Technology Curriculum (CT)

This curriculum is accredited by the Technology Accreditation Commission of the Accreditation Board of Engineering and Technology (TAC/ABET).

## First Year—Fall Semester

Course No.	Course Name	Semester		Credits
		R	L	
ET 1114	Direct Current Circuits	3	1	4
MA 1213	College Algebra	3	0	3
MA 1212	Plane Trigonometry	2	0	2
EN 1713	Written Communications	3	0	3
CP 1313	Computer Systems Principles	3	0	3
CP 1133	BASIC	2	1	<u>3</u>
Total Credits . . . . .				18

## First Year—Spring Semester

Course No.	Course Name	Semester		Credits
		R	L	
ET 1224	Alternating Current Circuits	2	2	4
ET 1324	Semiconductor Electronics	2	2	4
MA 1224	Analytic Geometry and Calculus	4	0	4
SH 1312	Oral Communications	2	0	2
CT 1223	Digital Electronics and Microprocessors	2	1	<u>3</u>
Total Credits . . . . .				17

## Second Year—Fall Semester

Course No.	Course Name	Semester		Credits
		R	L	
ET 2434	Electronic Measurements	2	2	4
SC 1124	Physics I	3	1	4
CT 2144	Digital System Design I	2	2	4
CP 2433	Assembly Language Programming	2	1	3
Business/Humanities/Social Science Elective				<u>2</u>
Total Credits . . . . .				17

## Second Year—Spring Semester

Course No.	Course Name	Semester		Credits
		R	L	
SC 1114	Chemistry I			
OR				
SC 2334	Physics II	3	1	4
CT 2244	Digital System Design II	2	2	4
EN 2713	Technical Writing	3	0	3
MT 1112	Technical Drafting	0	2	2
Business/Humanities/Social Science Elective				<u>3</u>
Total Credits . . . . .				<u>16</u>

Total semester credits required for Associate of Technology Degree . . . . . 68

R—recitation or lecture credit; L—laboratory credit



## **ELECTRONIC COURSE DESCRIPTIONS**

### **ET 1021 Direct Current Circuits Review**

Provides a coverage of D.C. Circuits. Includes a review of current and voltage concepts, resistance, power, series and parallel circuit techniques, mesh and nodal analysis, delta-wye, Thevenin's and Norton's Theorems, capacitance and inductance, (1-0-1) Prerequisites: ET 1513-Basic Electricity or equivalent, ET 1021-Direct Current Circuits Review and ET 1513-Basic Electricity may be substituted for ET 1114-Direct Current Circuits with departmental permission

### **ET 1114 Direct Current Circuits**

A beginning course in basic circuit theory. Concepts of voltage, current, resistance, and inductance are applied to various electric circuits to analyze their behavior. Covers electrical sources, Ohm's law, power, resistance, series and parallel circuits. Attention is paid to the application of Thevenin's and Norton's Theorems, loop and nodal circuit analysis. Includes capacitive and inductive time constant circuits. Laboratory exercises emphasize the use of basic measuring instruments, as well as the characteristics of passive circuits and components. (3-1-4) Prerequisite: Concurrent with MA 1213-College Algebra or MA 1215-College Algebra/Math Review

### **ET 1224 Alternating Current Circuits**

A study of Alternating Current circuits. Includes an analysis of the sine wave, polar and rectangular algebra, inductive and capacitive reactance, impedance networks, power factor correction, resonant circuits, and transformer theory. Also includes an introduction to three phase power distribution. Laboratory exercises reinforce key concepts. (2-2-4) Prerequisites: ET 1114-Direct Current Circuits, concurrent with MA 1212-Plane Trigonometry

### **ET 1324 Semiconductor Electronics**

A survey of the family of active electronic devices. Analysis includes both graphic and mathematical models. Includes basic semiconductor theory, junction diodes, and transistors. Also includes field effect transistors, Zener diodes, optoelectronic devices, silicon controlled rectifiers, unijunction transistors and others. Laboratory periods are devoted to the measurement of device characteristics in basic circuit configurations. (2-2-4) Prerequisite: ET 1114-Direct Current Circuits

### **ET 1513 Basic Electricity**

A survey course designed to provide the non-electronics major with an overview of basic Direct Current and Alternating Current Circuits. Topics of study include Ohm's law, series and parallel alternating current and direct current circuits, magnetism, capacitance, inductance, the use of polar and rectangular notation, AC power, resonance, and transformers. Laboratory exercises reinforce circuit theory and provide skills in the use of common electrical instruments. (2-1-3) Prerequisite: Concurrent with MA 1253-Elementary Functions or equivalent

### **ET 2434 Electronic Measurements**

A study of theory and operation of basic electronic instruments. Includes DC and AC ammeters, voltmeters, impedance bridges, attenuators, filters, etc. Also includes a study of amplifiers as related to sensitive AC electronic voltmeters, sensitive DC electronic voltmeters, oscilloscopes, etc. Includes an introduction to digital instrumentation along with characteristics of various transducers and sensors. Laboratory exercises provide experience in the selection of proper equipment for making measurements in electrical and electronic systems as well as interpretation of these measurements. (2-2-4) Prerequisites: ET 1224-Alternating Current Circuits, ET 1324-Semiconductor Electronics

### **ET 2535 Linear Circuit Design**

The application of electron devices to amplifiers. Emphasis is placed on analysis and design of RC-coupled, transformer coupled, and direct coupled amplifiers. Load line analysis, equivalent circuit analysis and frequency response are studied. Principles of bias stabilization and characteristics of feedback circuits are included. Operational amplifiers and their applications are introduced. The family of feedback oscillators, tuned circuit coupling and power amplifiers are covered. Laboratory exercises emphasize principles of circuit operation. (3-2-5) Prerequisites: ET 1224-Alternating Current Circuits, ET 1324-Semiconductor Electronics

### **ET 2631 Electronic Seminar I**

An industry related course to prepare the student for his first position. The student designs an electronic circuit to a set of specifications. Includes techniques of electronic chassis construction and printed circuit board techniques. A report is prepared describing the circuits, applications and testing methods. (0-1-1) Prerequisites: ET 1224-Alternating Current Circuits, ET 1324-Semiconductor Electronics

### **ET 2041 Electronics Seminar II**

The report developed for ET 2631-Electronic Seminar I is used by the student to develop the electronic hardware to a finished model. The model is tested to the original specifications. A report is prepared showing test results, design changes, and instructions on the use of the equipment. (0-1-1) Prerequisite: ET 2631-Electronic Seminar I



### **ET 2634 Communications Circuits I**

A study of transmission lines, antennas, and the propagation of electromagnetic radio frequency waves. The use of the Smith chart is emphasized in its applications to transmission line problems. Methods and principles of the various systems of modulation are also studied, along with the circuitry incorporated in typical transmitters and receivers. Laboratory work involves the design, construction, and testing of an antenna for the FM broadcast band. Other laboratory work is devoted to matching methods for transmission lines and alignment and testing procedures for typical transmitters and receivers. (3-1-4) Prerequisites: ET 1224-Alternating Current Circuits, ET 1324-Semiconductor Electronics

### **ET 2644 Communications Circuits II**

A study of RF circuit design, including resonant circuits, filter networks, matching networks, and transistor radio frequency amplifier design, using both "Y" and "S" parameters. Laboratory work concentrates on the practical applications of design theory and the use of modern test equipment in the measurement, analysis, and optimization of circuits. (2-2-4) Prerequisite: ET 2634-Communications Circuits I

### **ET 2944 RF Communications Systems**

A survey of electronic communication techniques and systems. Includes amplitude modulation, frequency modulation, single-side band and pulse modulation techniques. Transmission line and antenna theory are included along with the effects of noise. The use of the Smith chart is emphasized. Laboratory work involves design and measurement along with field trips to representative sites. (3-1-4) Prerequisites: ET 2434-Electronic Measurements, ET 2535-Linear Circuit Design

### **ET 2930 Problems in Electronics**

A course in which outside study is performed in a specific area selected by the student under the supervision of the assigned faculty member. (1 to 6) Prerequisite: Consent of instructor

### **CT 1223 Digital Electronics & Microprocessors**

Microprocessor operation and architecture, stressing industrial applications. Topics include numbering systems, logic circuits, Boolean algebra, machine and assembly language programming, peripheral device interfacing, and microprocessor applications. Also, use of microprocessor system development tools and hardware/software debugging techniques. (2-1-3) Prerequisites: ET 1114-Direct Current Circuits, CP 1133-BASIC or CP 1212-Introduction to Computer Techniques

### **CT 2144 Digital System Design I**

An extension of the material covered in CT 1223-Digital Electronics and Microprocessors. Covers techniques of sequential logic, analog to digital and digital to analog conversion, display systems, and microprocessors as system elements, also, the use of microprocessors for control applications. Hardware/software tradeoffs are discussed. Lab work includes system design, testing, and troubleshooting using a logic analyzer. (2-2-4) Prerequisites: CT 1223-Digital Electronics & Microprocessors, ET 1324-Semiconductor Electronics

### **CT 2244 Digital System Design II**

An industry-related course used to acquaint the student with industrial project design and development. Small group research, design, and building of projects to implement computer based tasks specified by instructor. Written reporting including hardware and software design description, testing methods, test results, and design revision is required. (2-2-4) Prerequisites: CT 2144-Digital System Design I, ET 2434-Electronic Measurements



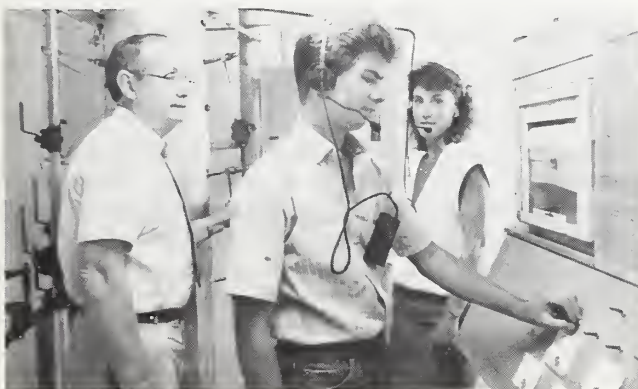


## GENERAL ENGINEERING TECHNOLOGY

General (Industrial) Engineering Technology offers a flexible program of study that draws courses from several curricula. Ten of the 67 hours required for graduation are electives, allowing students to choose courses of specific interest to the individual.

Jobs such as inspector, estimator, detail draftsman, test technician, technical writer, production planner, and many others require a versatile technician with a broad-based education. The General Engineering Technology program provides graduates with a diversified background which includes study in the fields of electronics, civil, computer, mechanical, and chemical engineering technologies to meet the needs of industry.

Technicians must have the ability to visualize objects, to make sketches or drawings and possess an aptitude in science and/or mathematics. Often jobs require some familiarity with one or more of the skilled trades, although not the ability to perform as a craftsman. Some jobs demand extensive knowledge of industrial machinery, tools, equipment, and processes. Many jobs held by these technicians are supervisory and require both technical knowledge and the ability to supervise people.



## General Engineering Technology Curriculum (GT)

### First Year—Fall Semester

Course No.	Course Name	Semester		Credits
		R	L	
MA 1212	Plane Trigonometry	2	0	2
MA 1213	College Algebra	3	0	3
CP 1133	Basic	2	1	3
MT 1112	Technical Drafting	0	2	2
EN 1713	Written Communications	3	0	3
SC 1114	Chemistry I	3	1	4
Total Credits				17

### First Year—Spring Semester

Course No.	Course Name	Semester		Credits
		R	L	
ET 1513	Basic Electricity	2	1	3
MA 1224	Analytic Geometry & Calculus	4	0	4
SC 1124	Physics I	3	1	4
CP 1323	FORTTRAN	2	1	3
	Technical Elective *	2	0	2
Total Credits				16

### Second Year—Fall Semester

Course No.	Course Name	Semester		Credits
		R	L	
GT 2643	Electric Power & Devices	1	2	3
CL 2435	Statics and Strength of Materials	5	0	5
SC 2334	Physics II	3	1	4
	Technical Elective *	5	0	5
Total Credits				17

### Second Year—Spring Semester

Course No.	Course Name	Semester		Credits
		R	L	
MT 1722	Thermodynamics	2	0	2
EN 2713	Technical Writing	3	0	3
GT 2633	System Analysis & Quality Control	3	0	3
SH 1312	Oral Communications	2	0	2
	Technical Elective *	2	0	2
	Business/Humanities/Social Science Elective	5	0	5
Total Credits				17

Total semester credits required for Associate of Technology Degree . . . . . 67

\* Technical Electives: (9 required) Students may choose from any technology courses taught at Kansas Tech, however, all electives must be approved by General Technology Division Head and the student's faculty advisor.

R-recitation or lecture credit; L—laboratory credit.



## GENERAL TECHNOLOGY COURSE DESCRIPTIONS

### GT 2633 System Analysis and Quality Control

An introductory course in system analysis and statistical quality control, including work in the areas of basic logic, control charts, and methods for determining necessary requirements for specific levels of finished product quality. The basic rules of reason are explored as fundamental concepts. (3-0-3) Prerequisite: MA 1213-College Algebra or MA 1215-College Algebra with Math Review

### GT 2643 Electric Power and Devices

An approach to technical understanding of the concepts and uses of alternating current power in industry. Strong alternating current theory with emphasis on motor speed controls, phase shifts, control systems. The course is taught with heavy emphasis on the laboratory approach. Various forms of transducers are examined. Field trips are made to study representative motors and load control systems. (1-2-3) Prerequisite: ET 1513-Basic Electricity

## GENERAL EDUCATION COURSE DESCRIPTION

### DEVELOPMENTAL STUDIES

#### DS 1101 Skills for College Survival

A course designed to aid the student who sees a need or is perceived to need help or information in study skills such as note-taking, time management, test-taking, and reading comprehension. Other topics covered are career planning, placement, word processing, social adjustment, and survival skills for college. (0-1-1) Prerequisite: None

#### DS 1512 Reading Improvement Lab

Supervised self-study in reading skills for students who have special problems in reading, and for students who wish to achieve an above average proficiency in reading. A voluntary course earning two hours of credit. (0-2-2) Prerequisite: None

### MATHEMATICS

#### MA 1101 Technical Science

A 1-hour non-degree credit course that coordinates the principles in Technical Mathematics with selected physical science activities. The students will collect and analyze the data from each physical science activity long hand and with the aid of microcomputers. (0-1-1) Prerequisite: None

#### MA 1515 Technical Mathematics

A five-hour non-degree credit course in the principles of Mathematics. The course includes a review of arithmetic, fractions, percents, beginning of intermediate algebra; and an introduction to trigonometric concepts. (5-0-5) Concurrent: Recommendation MA 1101-Technical Science

#### MA 1212 Plane Trigonometry

The fundamentals of College Trigonometry with emphasis on applications to engineering technology. Course content includes right and oblique triangle solutions, vectors, polar coordinates, angular velocities, use of trigonometry in surveying, tool and machine design, sine and cosine law uses, introduction to identities and solutions of trigonometry equations. Students are placed in this course on the basis of their score on the Kansas Tech Math Placement Exam or A.C.T. score. (2-0-2) Prerequisite: None

#### MA 1213 College Algebra

The fundamentals of Algebra, as taught at the college level, modified to emphasize applications and de-emphasize theoretical developments. In particular, certain properties and theorems are stated without proof. Course content includes identifying number sets up to and including complex numbers, fundamental concepts of exponents and radicals, logarithms, linear equations, linear functions and graphs, systems, systems of equations, determinants, matrices, quadratic equations, and solutions involving higher degree equations. Students are placed in this course on the basis of their score on the Kansas Tech Placement Exam or A.C.T. score. (3-0-3) Prerequisite: None

#### MA 1215 College Algebra/Math Review

A reduced pace College Algebra course with five contact hours per week. The course will cover the same material as MA 1213 College Algebra with approximately the first two weeks emphasizing Basic Mathematics. The student will receive 5 hours of credit, 3 of which will count towards graduation. Students are placed in this course on the basis of their score on the Kansas Technical Institute Math Placement Exam or ACT scores. (5-0-5) Prerequisite: None

#### MA 1224 Analytic Geometry and Calculus

A unified presentation dealing with the emphasis on elementary topics in Calculus and certain selected topics from more advanced areas. These have been selected due to their application in the technologies. The topics are developed in a non-rigorous and intuitive manner, with emphasis being placed on the interpretation of applications of material presented. (4-0-4) Prerequisites: MA 1213-College Algebra or MA 1215-College Algebra with Math Review and MA 1212-Plane Trigonometry



## **MA 1253 Elementary Functions**

A three credit hour course composed of lecture (2 credit hours) and laboratory (1 credit hour). The lecture portion includes basic concepts in mathematics, algebra, geometry and trigonometry. The purpose of the laboratory is to provide individual help in a supervised problem solving session. (2-1-3) Prerequisite: None

## **SCIENCE**

### **SC 1114 Chemistry I**

A study of the arrangement of matter, the atomic structure, the concepts of chemistry as shown through problem solutions, and energy balances related to interaction of elements. Physical chemistry concepts are included along with an introduction to simplified laboratory procedure in chemical analysis. (3-1-4) Prerequisite: None. Concurrent recommendation: MA 1213-College Algebra or MA 1215 College Algebra with Math Review

### **SC 1324 Chemistry II**

Investigation of chemical analysis which includes equilibrium in solutions, gravimetric analysis, solubility product constant, buffer solutions, acid-base and oxidation-reduction titrations, statistical evaluation of chemical analysis data and an introduction to analytical automation. Laboratory work involves qualitative and quantitative determinations using wet and instrumental methods. (2-2-4) Prerequisite: SC 1114-Chemistry I

### **SC 1124 Physics I**

A quantitative investigation into the fundamentals of mechanics and heat. The class work and the supportive laboratory are specifically designed to provide the student with an understanding of and a proficiency in measurement and calculation with these principles as they are applied to the solution of technical problems. (3-1-4) Prerequisites: MA 1213-College Algebra and MA 1212-Plane Trigonometry

### **SC 2334 Physics II**

A quantitative investigation of thermodynamics, wave motion, sound, magnetism, light and atomic physics. The class work and the supporting laboratory are specifically designed to provide the student with an understanding of, and a proficiency in measurement and calculation with these principles as they are applied to the solution of technical problems. (3-1-4) Prerequisite: SC 1124-Physics I.

## **ENGLISH/COMMUNICATIONS**

### **EN 1101 Publications Practice I**

Students will learn the basic aspects of newspaper publication from news writing to photography, layout, design, editing and interviewing. Students will also learn the use of Wordstar 2000 and basic darkroom procedures. One hour of lab time will be required each week to give students hands-on experience with the Campus Newspaper. (0-1-1) Prerequisite: None

### **EN 1201 Publications Practice II**

Students will learn the basic aspects of magazine and yearbook production from feature writing to editing, layout and design. Students will also become familiar with basic Desk Top Publishing and learn Page Maker on the MacIntosh computer. One hour of lab time will be required each week to give students hands-on experience working on the campus magazine Erasmus and the Yearbook. (0-1-1) Prerequisites: None

### **EN 1123 Literature and Technology**

Literature and Technology is a three hour elective course. Students will read literature about technology from a variety of perspectives. The literature will include novels, short stories, articles, and excerpts from other types of writing. A final paper, in which the student presents his/her own view of technology and its role in civilization, is required. (3-0-3) Prerequisite: EN 1713-Written Communications or EN 1714-Written Communication/Developmental English

### **EN 1713 Written Communications**

Written Communications is designed to acquaint the student with grammatical and rhetorical skills. Topics covered include vocabulary growth, sentence structure, punctuation, spelling, modes of development (definition, description, classification, and etc.), aims of discourse (expression, persuasion, and etc.), and paragraph and essay structure. (3-0-3) Prerequisite: None

### **EN 1714 Written Communications/Developmental English**

Completion of this course is equivalent to EN 1713-Written Communications. Students will be tested early in the semester so that their individual weaknesses can be identified. The two hours of lab will be individualized instruction, during which the student's particular weaknesses in the areas of grammar, spelling, and punctuation will be addressed. The rest of the class time will be given to rhetorical subjects as in EN 1713-Written Communications: invention, arrangement, and style. (3-1-4) Prerequisite: None

### **EN 2713 Technical Writing**

Technical Writing applies rhetorical skills to the special writing requirements of business and industry. Course writings will include letter of application, operation manual, proposal, feasibility report, progress report, and research report. (3-0-3) Prerequisite: EN 1713-Written Communications

### **SH 1312 Oral Communications**

Oral Communications teaches the student how to present information persuasively and enjoyably to an audience through the oral medium. The student will plan and give informative, expressive, entertaining, and persuasive reports. (2-0-2) Prerequisite: None

## **BUSINESS/ACCOUNTING/ECONOMICS**

### **BU 1413 Supervisory Management**

An analysis of the responsibilities of the supervisor, with an examination of the skills and practices helpful in developing effective relations with people in a work setting. Topics studied include employee motivation and satisfaction, work group behavior, management processes, employee training and appraisal, handling discipline and resistance to change, and methods of improving productivity. (3-0-3) Prerequisite: None

### **BU 1423 Introduction to Business**

This course surveys the objectives, decisions, and activities within the business organization. Topics include a study of management responsibilities and controls, organizational structures, marketing activities, production operation decisions, finance and accounting, human resources administration and business law. (3-0-3) Prerequisite: None

### **BU 1433 Marketing**

Study of coordination and control of marketing activities in relation to management and society. Applied economics, psychology, and sociology found in market segmentation and research, and in strategic and tactical management of product development and pricing, promotion and distribution. (3-0-3) Prerequisite: BU 1413-Supervisory Management

### **BU 1443 Business Law**

This course introduces the student to the rules of common law under which the business world operates as well as the basic understanding of the legal rights and duties arising from common business transactions. Also, this course introduces the student to legal terminology, principles, and analysis. Topics covered include contracts, personal property, real property, insurance, estates, and agency. (3-0-3) Prerequisite: None



### **BU 1622 Accounting Applications for Microcomputers**

The primary objective of the text and supplementary materials is to focus the teaching of fundamental accounting principles and the use of a computerized accounting system in the laboratory. (1-1-2) Prerequisite: BU 1513-Financial Accounting

### **AC 1513 Financial Accounting**

Study of business such as alternative forms of business organization; typical business practices; legal instruments such as notes, bonds, and stocks; and financial statements and analysis. The main objective is to provide information to stockholders, creditors, and others who are outside an organization. (3-0-3) Prerequisite: Concurrent with MA 1213-College Algebra.

### **AC 1523 Managerial Accounting**

Study of the uses of accounting data internally by managers in directing the affairs of business and nonbusiness organizations. Costing, segmental reporting, controlling activities, budgeting, and decisions are topics covered. The main objective is to provide information to managers and others who are within the organization. (3-0-3) Prerequisite: AC 1513-Financial Accounting

### **EC 1413 Economics**

An examination of how economic decisions are made, both on the national and industrial levels of our economic system. This includes an introduction to the topics of market structure, the price mechanism, business cycles, inflation, monetary and fiscal policy. (3-0-3) Prerequisite: None

## **SOCIAL SCIENCE**

### **PY 1113 Psychology**

Study of psychological principles and developments to improve understanding of interpersonal relations, motivation, feelings, perceptions, learnings, and emotions for increased personal efficiency and effectiveness of performance in whatever activities are carried out. (3-0-3) Prerequisite: None

### **HI 1312 History of Technology**

This course presents an overview of the development of technology from ancient times to the modern complex of our technological society. Emphasis is placed on the technology explosion of the twentieth century including the interrelationship between the various branches. Perspectives on the impact of technology on the quality of life will be explored.

Methods of instruction include the lecture, discussion, and library assignments including the preparation of short reports by the student. (2-0-2) Prerequisite: None



## CHEMICAL ENGINEERING TECHNOLOGY

Chemical Engineering Technology relates to industrial processes in which raw materials are changed chemically or physically into useful products. Fuels, plastics, synthetic fibers, pharmaceuticals, food additives, inorganic chemicals and organic chemicals are examples of the wide variety of products of the chemical industry.

Graduates of this program are qualified to perform in chemical production plants, pilot plants, analytical laboratories, research and development laboratories and sales related to chemicals or chemical manufacturing equipment. Job responsibilities of a chemical engineering technician frequently involve providing support to chemical engineers in process development and design, plant operation, operator-training, compilation of performance reports, pilot-plant set up and preparation of information for computer analysis.

Chemical Engineering Technology students gain laboratory experience in instrumental analysis, organic chemistry, unit operations and process control laboratories. In addition, students are encouraged to pursue summer internship in the chemical industry, when such positions are available.

Salaries offered in the chemical industry rank among the highest of all industries. The continued need for a clean environment, energy sources, plastics, health care products and many other chemical products clearly indicates that challenging and rewarding careers lie ahead for chemical engineering.



## Chemical Engineering Technology Curriculum (CH)

### First Year-Fall Semester

Course No.	Course Name	Semester		Credits
		R	L	
CP 1133	BASIC	2	1	3
MT 1112	Technical Drafting	0	2	2
EN 1713	Written Communications	3	0	3
MA 1212	Plane Trigonometry	2	0	2
MA 1213	College Algebra	3	0	3
SC 1114	Chemistry I	3	1	4
Total Credits				17

### First Year-Spring Semester

Course No.	Course Name	Semester		Credits
		R	L	
CH 1423	Material and Energy Balances	3	0	3
MA 1224	Analytic Geometry and Calculus	4	0	4
SC 1124	Physics I	3	1	4
	Business/Humanities/Social Science Elective	3	0	3
SC 1324	Chemistry II	2	2	4
Total Credits				18

### Second Year—Fall Semester

Course No.	Course Name	Semester		Credits
		R	L	
CH 2414	Unit Operations I	2	2	4
CH 2312	Chemical Reaction Kinetics	1	1	2
CH 2134	Organic Chemistry	3	1	4
CH 2524	Industrial Processes	2	2	4
GT 2643	Electric Power and Devices	1	2	3
Total Credits				17

### Second Year—Spring Semester

Course No.	Course Name	Semester		Credits
		R	L	
CH 2424	Unit Operations II	2	2	4
CH 2522	Instrumentation & Control	1	1	2
CH 2622	* Process Design Lab	0	2	2
SH 1312	Oral Communications	2	0	2
	Business/Humanities/Social Science Elective	2	0	2
CH 2612	Plant Engineering Technology	2	0	2
EN 2713	Technical Writing	3	0	3
Total Credits				17

Total semester credits required for Associate of Technology Degree . . . . . 69

\* Enrollment in either Internship or Process Design Lab is required. Internship may be undertaken in Summer Session between the first and second year or in the Summer Session following Semester 4.

R—recitation or lecture credit; L—laboratory credit

## CHEMICAL COURSE DESCRIPTIONS

### CH 1423 Material & Energy Balances

Material balance problem solutions including recycle, bypass and reactive systems. First law of thermodynamics and energy balances on reactive processes. Additional study topics include ideal and real gases, steam tables, pressure, temperature, heats of reaction and combustion. (3-0-3) Prerequisites: SC 1114-Chemistry I, MA 1213-College Algebra

### CH 2134 Organic Chemistry

A study of the reaction mechanism of industrially important reactions, including: alkylation, aromatization, dehydration, halogenation, hydrogenation, isomerization, nitration, oxidation-reduction, pyrolysis and polymerization. Applications of these reactions in the study of hydrocarbons, alcohols, ethers, aldehydes, ketones, carboxylic acids and carbohydrates. Laboratory work emphasizes the analysis and synthesis of representative organic compounds. (3-1-4) Prerequisite: SC 1114-Chemistry I

### CH 2312 Chemical Reaction Kinetics

Review of fundamental kinetic and thermodynamic relations. Batch reactors, flow reactors and reactors with simultaneous and consecutive reactions. Effect of temperature, pressure and equilibrium constants and introduction to reactor design. (2-0-2) Prerequisites: MA 1224-Analytic Geometry & Calculus, CH 1423-Material & Energy Balances

### CH 2414 Unit Operations I

Fluid flow topics include friction losses in pipe, valves and fittings, pump characteristics, methods of flow measurement, fans, blowers and compressors. Heat transfer topics include conduction, natural and forced convection, film and overall heat transfer coefficients, radiation and evaporation. Laboratory work includes experimentation with fluid flow and heat exchanger equipment. (2-2-4) Prerequisites: SC 1124-Physics I, CH 1423-Material & Energy Balances

### CH 2424 Unit Operations II

Phase equilibria and its application to the study of distillation, liquid extraction and gas absorption. Additional topics include humidification, dehumidification, filtration and drying operations and their application in industry. Laboratory involves experimental work in the unit operations studied in lecture. (2-2-4) Prerequisite: CH 2414-Unit Operations I

### CH 2522 Instrumentation & Control

Principles of measurement and control. Systems for controlling processes include temperature, pressure, liquid-level, flow rate and concentration considerations. Laboratory involves experimental work with instruments used in process control and with control systems. (1-1-2) Prerequisite: MA 1224-Analytic Geometry and Calculus



### CH 2524 Industrial Processes

A broad survey of chemical process industries with emphasis on process flowsheet interpretation. Course work includes study of petroleum refining, natural gas processing, chlor-alkali, ammonia, fertilizer, fermentation and nuclear industries, municipal water and wastewater treatment, industrial water and wastewater treatment and solid waste management. Laboratory includes field trips to industries studied in lecture and completion of industrial test procedures including Orsat Gas Analysis, ASTM Distillation, Flash Point, Karl Fisher Titration and Viscosity Measurement. (2-2-4) Prerequisite: SC 1114-Chemistry I

### CH 2612 Summer Internship

Student works as a summer intern in chemical or allied industry. A report detailing duties performed and tasks accomplished required at the end of the internship period. (0-2-2) Prerequisite: None. Recommended between first and second year.

### CH 2622 Process Design Lab

Student is assigned a project which requires design, equipment procurement and assembly, experimentation, data collection and calculations preferably done on computer. A project report is required. (0-2-2) Prerequisites: CH 2414-Unit Operations I, concurrent with CH 2424-Unit Operations II

### CH 2712 Plant Engineering Technology

Introduction to unit operations and chemical processing equipment. Additional study topics include corrosion; materials of construction; solid, liquid and gas storage and handling; plant utilities; safety and cost estimating. (2-0-2) Prerequisite: SC 1114-Chemistry I. Recommended for 2nd year students.



# MECHANICAL ENGINEERING TECHNOLOGY

The Mechanical Engineering Technology program prepares the graduate for a position in mechanical and/or manufacturing industries. This program embraces the design, manufacture and production of mechanical products and the tools, machines and processes by which they are made. It also deals with sales and maintenance of such products, tools and machines. The two-year program is designed to develop the student's ability to proceed in an independent manner to use both trade and technical literature to solve technical problems.

The first year of study finds the mechanical technology student developing a strong base in the areas of mathematics, physical science, manufacturing processes, written and graphic communications. During the second year, the student develops abilities in such areas as materials of industry, fluid mechanics, mechanisms, CNC machine processes and designs of mechanical elements.

Mechanical Technology, though not a new science, has continually been an exciting and rewarding field involved with development of products. New product ideas in energy, transportation, product manufacturing, and other areas involving mechanical devices indicate rapid advances in the field.

The mechanical engineering technician is concerned with the development, testing, evaluation detailing and design of machinery, equipment, instruments and other mechanical devices. The technician's duties may involve drafting, use of handbooks and tables, calculations of strength and reliability, selection of materials, and cost estimating for the development or modification of the design of almost any type of machine or mechanism. Technicians may conduct performance and endurance tests on various mechanical devices and report the results.

## MECHANICAL ENGINEERING TECHNOLOGY CURRICULUM (MT)

This curriculum is accredited by the Accreditation Board for Engineering and Technology (TAC/ABET).

### First Year—Fall Semester

Course No.	Course Name	Semester		Credits
		R	L	
MA 1212	Plane Trigonometry	2	0	2
MA 1213	College Algebra	3	0	3
MT 1111	Descriptive Geometry	0	1	1
MT 1112	Technical Drafting	0	2	2
MT 1212	Manufacturing Methods I	1	1	2
EN 1713	Written Communications	3	0	3
CP 1212	Introduction to Computer Techniques	1	1	2
Total Credits				15

### First Year—Spring Semester

Course No.	Course Name	Semester		Credits
		R	L	
SC 1124	Physics I	3	1	4
MT 1323	Metallurgy	2	1	3
MT 1122	Mechanical Detailing	0	2	2
MT 1223	Manufacturing Methods II	1	2	3
EN 2713	Technical Writing	3	0	3
	Business/Social Science Elective			3
Total Credits				18

### Second Year—Fall Semester

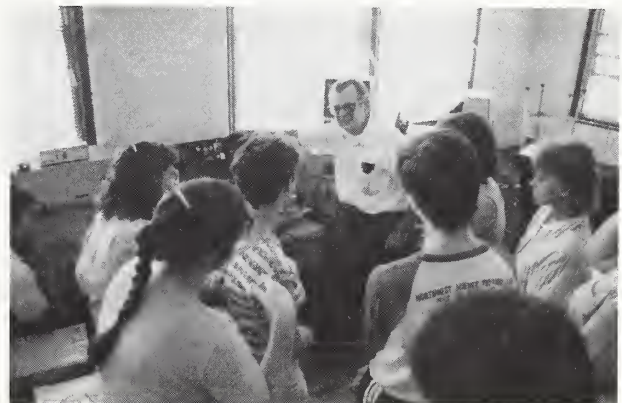
Course No.	Course Name	Semester		Credits
		R	L	
SC 1114	Chemistry I			
	OR			
SC 2334	Physics II	3	1	4
CL 2435	Statics and Strength of Materials	5	0	5
MT 2533	Fluid Mechanics	2	1	3
MT 2433	Elements of Mechanisms	3	0	3
MT 2432	Design Technology I	1	1	2
MT 2141	Introduction to Computer Aided Drafting	0	1	1
Total Credits				18

### Second Year—Spring Semester

Course No.	Course Name	Semester		Credits
		R	L	
MA 1224	Analytic Geometry and Calculus	4	0	4
SH 1312	Oral Communications	2	0	2
MT 2341	Mechanical Testing Lab	0	1	1
MT 1722	Thermodynamics I	2	0	2
ET 1513	Basic Electricity	2	1	3
MT 2444	Design Technology II	2	2	4
	Business/Social Science Elective			2
Total Credits				18

Total semester credits required for Associate of Technology Degree . . . . 69

R—recitation or lecture credit; L—laboratory credit



## MECHANICAL COURSE DESCRIPTIONS

### MT 1111 Descriptive Geometry

Orthographic solution involving the point, line, and plane projections, intersections, and surface development of solids, bearings, slope, true length, and true size using descriptive geometry. (0-1-1) Prerequisite: Concurrent with MT 1112-Technical Drafting

### MT 1112 Technical Drafting

Lettering, freehand sketching, use of drafting equipment. Theory and applications of orthographic projection and pictorial drawings. Standards for symbols, section views, and dimensioning included. The student is also introduced to the CAD systems. (0-2-2) Prerequisite: None

### MT 1122 Mechanical Detailing

Preparation of shop drawings for manufacturing, fabrication or assembly. Specifications of size, shape, material and manufacture. Specifications of standard fasteners, including threads, rivets, keys, splines. Allowance specifications for mating parts and surface quality. Introduction to graphic illustration. CAD is used in conjunction with this course. (0-2-2) Prerequisite: MT 1112-Technical Drafting

### MT 1212 Manufacturing Methods I

Study and practice in gas, arc, TIG welding, spot weld, weld testing, cost estimation. Introduction to welding metallurgy and special welding processes. (1-1-2) Prerequisite: None

### MT 1223 Manufacturing Methods II

Laboratory practice in performing basic machine shop operations on lathes, milling machines, drill presses. Use of hand tools, metal cutting machines and grinders included. The student is introduced to foundry provisions and CNC machine processes. (1-2-3) Prerequisite: None

### MT 1323 Metallurgy

Basic principles of physical metallurgy. Structure of metals and alloys. Phase transformations of ferrous and non-ferrous metals. Testing and microscopic examination of metals. (2-1-3) Prerequisite: None

### MT 1722 Thermodynamics I

Thermodynamic laws and equations. Use of tables and charts for properties of important fluids. Applications to systems used for producing, transforming, and applying heat and mechanical energy. Brief introduction to heat transfer. (2-0-2) Prerequisite: MA 1213-College Algebra

### MT 2141 Introduction to Computer Aided Drafting

This course introduces the use of computers as an aid to solving technical drafting and design problems. Topics covered include generative graphics, hardware and software, point plotting and line drawing, graphics programming, equation programmed figures, dimensioning and annotations, and the production of finished drawings. (0-1-1) Prerequisite: MT 1112-Technical Drafting

### MT 2341 Mechanical Testing Laboratory

Principles of mechanical testing. Instrumentation and measurement in the areas of loads, stresses, deformations, heat flow, and other qualities. Preparation of written laboratory reports. (0-1-1) Prerequisite: CL 2435-Statics and Strength of Materials

### MT 2432 Design Technology I

A study of the design process. Use of handbooks and industrial catalogs to select components including belts, chains, gears, springs, clutches and bearings to satisfy design requirements. Introduction to the use of computers in solving design problems. (1-1-2) Prerequisite or concurrent: MT 2433-Elements of Mechanisms

### MT 2433 Elements of Mechanisms

Fundamental motion concepts of displacement, velocity and acceleration. Analytical and graphical analysis and synthesis of linkages, gear trains, cams, pulleys and combinations of these elements. (3-0-3) Prerequisites: SC 1124-Physics I and MT 1112-Technical Drafting

### MT 2444 Design Technology II

Continued study of design process. Investigation of theories of failure, stress analysis, stress concentration, deflections, materials and costs relating to machine design. Group laboratory design projects requiring application of previously learned concepts and methods in detailing, manufacturing, mechanisms, and other courses relative to machine design. (2-2-4) Prerequisites: CL 2435-Statics and Strength of Materials and MT 2432-Design Technology I

### MT 2533 Fluid Mechanics

Fundamental concepts of fluid mechanics. Study of buoyancy, energy equation, viscosity, flow measurement. Selected applications of fluid mechanics to civil and mechanical fields. Basic language programming exercises are included in this course. (2-1-3) Prerequisites: MA 1212-Plane Trigonometry and MA 1213-College Algebra

### MT 2930 Problems in Mechanical

Opportunity for advanced study and practical experience with specific problems of the student's choice in the field of Mechanical Technology. (1-6) Prerequisite: Instructor's Consent



## NON-DESTRUCTIVE TESTING AND INSPECTION TECHNOLOGY (Wichita Location Only)

Various industries in the Wichita area have a strong need in the area of technical training to support the rapid growth in composite materials utilization. While composite materials have been utilized in commercial products for an extended period of time (re: fiber glass boats), there has been a recent rapid growth in utilization of this class of materials in a large range of commercial products extending from office furniture, residential construction, through military and commercial aircraft. The demand for non-destructive testing and inspection has increased as these materials are growing in structural applications.

A team effort between Kansas Tech and Wichita industry has provided this unique program. General education and some technical related courses can be taken through Wichita State University while other technical related support courses and technical speciality courses will be taught by Kansas Tech at Wichita location.

Most of the graduates of this program are expected to be placed with industry in the non-destructive testing and inspection field while they are students of this program. Therefore, it is anticipated that rather than new career placement, graduation from this program will lead to promotions and new assignments in the field.

## NON-DESTRUCTIVE TESTING AND INSPECTION TECHNOLOGY (Wichita Location Only)

### GENERAL COURSES \*\*

Wichita State University

Course No.	Course Name	Semester Credits		
		R	L	Total
MATH 123	College Trigonometry	3	0	3
MATH 111	College Algebra	3	0	3
ENG 101	College English I	3	0	3
SPCH 111	Basic Public Speaking	3	0	3
MATH 242Q	Calculus I	5	0	5
PHYS 213Q	General College Physics I	4	1	5
ECON 201Q	Principles of Economics I	3	0	3
STAT 360Q	Elementary Probability	3	0	3
STAT 370	Elementary Statistics	3	0	3
	General and Social Studies Courses as provided	3	0	3
Total Credits . . . . .				34

### Kansas Technical Institute Equivalent

Course No.	Course Name	Semester Credits		
		R	L	Total
MA 1212	Plane Trigonometry	2	0	2
MA 1213	College Algebra	3	0	3
EN 1713	Written Communications	3	0	3
SH 1312	Oral Communications	2	0	2
MA 1224	Analytic Geometry & Calculus	4	0	4
SC 1124	Physics I	3	1	4
EC 1413	Economics	3	0	3
	General Course Electives (Includes Math, Science, Business and Social Studies as approved)			13
Total Credits . . . . .				34

### TECHNICAL RELATED COURSES \*\*

Course No.	Course Name	Semester Credits		
		R	L	Total
IE 110	Engineering Graphics I	0	2	2
IE 213	Engineering Graphics II	0	2	2
CS 200Q	Introduction to Programming (Kansas Tech) Technical Writing	0	2	2
EN 2713	(Kansas Tech) Technical Writing	3	0	3
Total Credits . . . . .				9

Course No.	Course Name	Semester Credits		
		R	L	Total
MT 1112	Technical Drafting	0	2	2
MT 1122	Mechanical Detailing	0	2	2
CP 1212	Introduction to Computer Techniques	1	1	2
EN 2713	Technical Writing	3	0	3
Total Credits . . . . .				9

\*\* The above courses may be taken from Wichita State University or other accredited college of higher education and transferred. See your Kansas Tech advisor or request more information on this program.

### TECHNICAL SPECIALTY COURSES

Course No.	Course Name	Semester Credits		
		R	L	Total
MT 1712	Introduction to Non-Destructive Evaluation	2	0	2
MT 1723	Surface Testing	2	1	3
SC 1114	Chemistry I			
	OR			
SC 2334	Physics II	3	1	4
MT 1722	Radiation Safety	2	0	2
MT 2724	Eddy Current Testing	3	1	4
MT 2714	Radiography	3	1	4
MT 2716	Ultrasonic Testing	4	2	6
	Technical/Science Elective			1
Total Credits . . . . .				26
Total semester credits required for Associate of Technology Degree . . . . .				69

## NON-DESTRUCTIVE TESTING COURSE DESCRIPTIONS

### MT 1712 Introduction to Non-destructive Evaluation

Introduces the student to the need for and the rationale of non-destructive testing and evaluation. Defines different types of tests such as radiography, surface testing, Eddy current testing, and ultrasonic testing. Advantages and disadvantages of each type of testing are discussed. (2-0-2) Prerequisite: None

### MT 1722 Radiation Safety

The hazards of radioactive materials are defined and the methods of detecting radiation are explained. Techniques of protection such as shielding are presented. Federal regulations concerning radiation are reviewed and methods of compliance are discussed. (2-0-2) Prerequisites: MT 1712-Introduction to Non-destructive Evaluation, SC 1124 (or WSU 213Q)-College Physics I

### MT 1723 Surface Testing

Various methods of surface testing and inspection are introduced, such as surface finish, microscopic inspection, dye penetrant methods and chemical spot testing. Laboratory exercises are conducted to familiarize the student with the handling of equipment and chemicals. (2-1-3) Prerequisite: MT 1712-Introduction to Non-destructive Evaluation

### MT 2714 Radiography

The theory of industrial radiography is presented. Students will be presented actual x-ray film of industrial parts along with interpretation methods and techniques. Students will also be exposed to the industrial laboratory environment. (3-1-4) Prerequisites: MT 1712-Introduction to Non-destructive Evaluation, MT 1722-Radiation Safety

### MT 2716 Ultrasonic Testing

The theory of ultrasonic testing is presented. Various techniques of excitation are discussed along with advantages and disadvantages of each method. Student is presented with actual industrial scans of components along with interpretations. The student is exposed to laboratory environment where actual components are in the process of evaluation. (4-2-6) Prerequisites: MT 1712-Introduction to Non-destructive Evaluation, MT 1213 (or WSU 111)-College Algebra, MA 1212 (or WSU 123)-College Trigonometry, SC 1124 (or WSU 213Q)-College Physics I

### MT 2724 Eddy Current Testing

The theory of Eddy Current Testing is presented. The student receives hands-on experience in the operation of Eddy Current Testing equipment and the evaluation of results. (3-1-4) Prerequisites: MT 1712-Introduction to Non-destructive Evaluation, MA 1213 (or WSU 111)-College Algebra, SC 1124 (or WSU 213Q)-College Physics I





## BOARD OF CONTROL

The governing board of the College is the Kansas State Board of Regents. It consists of nine members appointed by the Governor. The board elects its own chairman. The President of Kansas Technical Institute, who is charged by statute with the general management of the College, is appointed by the Board of Regents.

### Board of Regents

Frank J. Becker, El Dorado  
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Richard W. Dodderidge, Mission Woods  
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A D D E N D U M

Below are corrections, deletions, and additions to the Kansas College of Technology General Bulletin.

Page 18 -

Change "The Technology Accreditation Commission of the Accreditation Board of Engineering and Technology..." to "The Technology Accreditation Commission of the Accreditation Board for Engineering and Technology..." This same correction should be made on page 42.

Delete last line of last paragraph, "These developmental courses..."

Page 20 -

After first sentence of second paragraph insert, "The flight training program is an FAR 141 Approved Flight School."

Change Course Names of "Professional Pilot I" to "Professional Commercial Pilot," "Professional Pilot I Flight Lab," to "Professional Commercial Pilot Flight Lab," "Professional Pilot II" to "Professional Instrument Pilot" and "Professional Pilot II Flight Lab" to "Professional Instrument Pilot Flight Lab."

Add at bottom of page:

"ADDITIONAL RATINGS: \*(possible electives)

PF 2842 Certified Instrument Flight Instructor  
PF 2852 Certified Multi-engine Flight Instructor  
PF 2942 Airplane Transport Pilot  
PF 2863 Helicopter Pilot (add-on)  
PF 2873 Certified Flight Instructor Helicopter

Page 25 -

Change PF 1122 Commercial Pilot Flight Lab to PF 1122 Professional Commercial Pilot Flight Lab.

Under PF 2141 Certified Flight Instructor Flight Lab, change prerequisite to "PF 2233 Professional Instrument Pilot Flight Lab."

Under PF 2143 Certified Flight Instructor Ground School, change prerequisite to PF 1123 Professional Commercial Pilot.



Under PF 2242 Multi-Engine Certification, change prerequisites to "PF 2233 Professional Instrument Pilot Flight Lab, PF 1122 Professional Commercial Pilot Flight Lab.

Add following course descriptions:

**PF 2861 Helicopter Pilot (add on)**

Provide the student with the aeronautical skills and experience necessary to meet the requirements for the addition of a Rotorcraft helicopter rating to his/her pilot certificate. (1-0-1) Prerequisites: PF 1114 Private Pilot and PF 1111 Private Pilot Flight Lab, or Private Pilot certificate Airplane Single Engine Land, or Commercial Pilot Certificate Airplane Single Engine Land.

**PF 2863 Helicopter Pilot (add on) Flight Lab**

Provide the student with the aeronautical skills and experience necessary to meet and demonstrate the skills requirements for the addition of a rotorcraft-helicopter rating to his/her pilot's certificate. (0-3-3) Prerequisites: PF 1114 Private Pilot and PF 1111 Private Pilot Flight Lab, or Private Pilot certificate Airplane Single Engine Land, or Commercial Pilot Certificate Airplane Single Engine Land.

**PF 2872 Certified Flight Instructor Helicopter Flight Lab**

This course provides the student with the necessary flight training leading to an FAA Certified Flight Instructor Certificate in helicopters. The course involves dual flight instruction covering all maneuvers necessary for teaching private and commercial certificate requirements. (0-2-2) Prerequisites: PF 2863, Helicopter Pilot (add on) and PF 2862 Helicopter Pilot (add on) Flight Lab, or Commercial Pilot Rotorcraft-Helicopter rating, concurrent with PF 2873 Certified Flight Instructor.

**PF 2873 Certified Flight Instructor Helicopter**

Provides the student with the basic information leading to the helicopter flight instructor certificate. The course is divided into two sections: The first section consists of the fundamentals of teaching and learning, which includes effective teaching methods, aerodynamics helpful to flight instruction, considerations of the flight training syllabus, and flight instructors responsibilities. The second section is concerned with the analysis of the helicopter flight maneuvers involved in the private, commercial and flight instructor certificates. (3-0-3) Prerequisites: PF 2863, Helicopter Pilot (add on), PF 2862 Helicopter Pilot (add on) Flight Lab, concurrent with PF 2872 Certified Helicopter

Flight Instructor Flight Lab or Commercial Pilot certificate, Rotorcraft-Helicopter rating.

Page 26 -

Delete second paragraph, "As a result of..."

Third paragraph, fourth line, change "source" to "sources."

Under Second Year -- Fall Semester---change name of course CL 2134 "Route and Construction Surveying" to "Route Surveying." This same name change should be made on pages 27, 28 and 29.

Page 27 -

Delete Second Year--Spring Semester block and replace with the following:

Course No.	Second Year - Spring Semester Course Name	Semester		Credits <u>Total</u>
		R	L	
CL 2444	Transportation Systems	2	2	4
CL 2143	Surveying Law	3	0	3
SC 1114	Chemistry I			
	OR			
SC 2334	Physics II	3	1	4
	Business/Humanities/Social Science Elective			3
CL 2142	Advanced Surveying	1	1	<u>2</u>
Total Credits . . . . .				16

Total Semester Credits required for Associate of Technology Degree . . . . . 67

R--recitation or lecture credit; L--laboratory credit  
 \*\* Civil Electives--minimum of 3 credits from the following courses: CL 1312-Materials Sampling and Testing, CL 2322-Soils and Foundations, MT 1111-Descriptive Geometry, CL 1522-Construction Surveying, CL 2532-Construction Methods and Estimating.

Page 38 -

Under "CT 1223 Digital Electronics & Microprocessors," change CP 1133 BASIC to CP 1323 FORTRAN

To last paragraph add "(2-2-4) Prerequisite: CT 2144 Digital Systems Design I, ET 2434 Electronic Measurements."

Page 39 -

The total number of credits for First Year -- Spring



Semester should be "18," not "16." The total number of semester credits required for Associate of Technology Degree should be "68," not "66."

The last sentence under ENTRY LEVEL JOBS should read "The list of job descriptions would include: Quality Control Technician, Time and Motion Study Technician, Engineering Technician (Safety), Engineering Specification Technician, Cost Estimator Technician, Order Analyst Technician, Plant Layout Technician and Maintenance Technician."

IN 2643 Electric Power and Devices course description should read as follows:

An approach to technical understanding of the concepts and uses of alternating current power in industry. Theory of Direct and Alternating Currents with emphasis on motor speed controls, phase shifts, transmission of power and switching devices. Industrial applications of various electric power devices include concepts of controllability, efficiency and reliability. (1-2-3)  
Prerequisite: MA 1212 Plane Trigonometry

Page 41

Change the following course descriptions to read as follows:

#### CH 1423 Material & Energy Balances

Material balance problem solutions including recycle, bypass and reactive systems. First law of thermodynamics and energy balances on reactive processes. Additional study topics include ideal and real gases, steam tables, pressure, temperature and heats of reaction and combustion. (3-0-3)  
Prerequisites: SC 1114 Chemistry I and MA 1213 College Algebra

#### CH 2312 Chemical Reactions

Study of fundamental kinetic and thermodynamic relations. Energy balances with chemical reaction, batch reactors and flow reactors are studied. Effect of temperature, pressure and concentration on equilibrium conversion. Relationship between equilibrium constants and introduction to reactor design. Laboratory experiments investigate topics covered in lecture. (1-1-2) Prerequisite: MA 1224 Analytic Geometry and Calculus and CH 1423 Material and Energy Balances.

#### CH 2414 Unit Operations I

Fluid flow topics include friction losses in pipe, valves and fittings, pump characteristics, methods of flow measurement, fans, blowers and compressors. Heat transfer topics include conduction, natural and forced convection, film and overall heat transfer coefficients, radiation and evaporation. Laboratory work includes experimentation with fluid flow and heat exchanger equipment. (2-2-4) Prerequisites: SC 1124 Physics I and CH 1423 Material and Energy Balances

#### CH 2522 Instrumentation and Control

Basic principles of industrial control processes and the instrumentation used to affect control. Consideration is given to controlled variables such as temperature, pressure, liquid level, and flow rate. The instruments used to monitor and control such variables are studied as well as how such instrumentation is used and how it affects the variable. Laboratory work relates directly to the principles discussed in the lecture periods. (1-1-2) Prerequisite: SC 1224 Physics I, MA 1224 Analytical Geometry and Calculus

#### CH 2524 Industrial Processes

A broad survey of chemical process industries with emphasis on process flowsheet interpretation. Course work includes study of petroleum refining, natural gas processing, chlor-alkali, ammonia, fermentation and nuclear industries, municipal water and wastewater treatment and solid waste management. The laboratory includes field trips to representative industries and execution of industrial test procedures including ASTM distillation, flash point determination, Karl Fischer titration and viscosity measurement. (2-2-4) Prerequisite: SC 1114 Chemistry I

#### CH 2612 Internship

The student works as an intern in a chemical or allied industry. A report describing duties performed and tasks accomplished is required at the end of the internship period. Enrollment in either Internship or Process Design Lab is required. (0-2-2) Prerequisite: None. Recommended between first and second year.

#### CH 2622 Process Design Lab

The student is assigned a project which requires design, equipment procurement and assembly, experimentation, data collection and calculations preferably done on the computer. Weekly progress



report memos and a final report are required. Enrollment in either Internship or Process Design Lab is required. (0-2-2) Prerequisite: CH 2414 Unit Operations I, Concurrent: CH 2424 Unit Operations II

#### CH 2712 Plant Engineering Technology

Introduction to unit operations and chemical processing equipment. Additional study topics include corrosion; materials of construction; solid, liquid and gas storage and handling; plant utilities; safety and cost estimating. (2-0-2) Prerequisite: SC 1114 Chemistry I. Recommended for second year students.

Page 46 - Course description should read as follows:

#### EN 1713 English Composition I

English Composition I is designed to teach students effective writing skills. Topics covered include writing style, methods of paragraph development, discovering your writer's voice, selecting topics, writing thesis statements, outlining, the common forms of writing such as comparison, definition, analysis, and argumentative writing. Students will use AT&T's Writer's Workbench, a computer-assisted writing analysis program. (3-0-3) Prerequisite: None

Page 47 -

Under AC 1513 Financial Accounting, change "Prerequisite: Concurrent with MA 1213 College Algebra" to "Prerequisite: None."

Delete first paragraph, left-hand column, BU 1422 Capital Investment Analysis.

Changes under ADMINISTRATION/FACULTY

Page 50 -

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Page 52 -

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Under "Shepard, Max...." add "and Missouri."

- Following Shreves, Dennis D., change "Assistant" to "Associate."

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The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry should be supported by a valid receipt or invoice. This ensures transparency and allows for easy verification of the data.

In the second section, the author outlines the various methods used to collect and analyze the data. This includes both primary and secondary data collection techniques. The primary data was gathered through direct observation and interviews with key stakeholders. Secondary data was obtained from existing reports and databases.

The analysis of the data revealed several key trends and patterns. One of the most significant findings was the impact of external factors on the internal processes. This suggests that organizations should be more proactive in monitoring their environment and adjusting their strategies accordingly.

Finally, the document concludes with a series of recommendations for future research and implementation. It suggests that further studies should focus on the long-term effects of these findings and explore new ways to optimize the processes discussed.





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