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Certificate Programs 1988-1990 New Jersey Institute of Technology Division of Technology

New Jersey Institute of Technology

CERTIFICATE PROGRAMS 1988-1990

New Jersey Institute of Technology

DIVISION OF TECHNOLOGY

Contents

Fall 1987

Tradition and Change

NJIT was founded in 1881, created by industry, the city, and the state to serve a growing industrial center. Students were attracted by the opportunity to work closely with faculty who had experience in business and government. They graduated into good jobs, and had the pleasure of using their skills to help create a strong base of American manufacture and commerce.

Today, a renewed emphasis on manufacturing and the need for innovation in all sectors have led industry and government to form new partnerships with NJIT. These alliances have enabled the state's technological university to grow in breadth and depth.

New programs have been developed under the guidance of industry, and with the strong support of organizations such as the New Jersey Commission on Science and Technology and the National Science Foundation. Corporations have contributed scholarships and fellowships, research grants, and, most spectacularly, equipment. NJIT is one of the leading computing-intensive campuses in the nation. During the past two years alone, companies have contributed more than $7 million worth of new scientific and engineering equipment to the university.

Diversification, new funding, and new opportunities for growth have attracted outstanding students and faculty. NJIT's researchers are doing important work in information age technology, the protection and management of air and water resources, the management of hazardous and toxic substances, computer conferencing, biotechnology, microelectronics, building engineering and architecture, and a host of other fields.

Over 12,000 students are served by NJIT, from students in precollege programs, to certificate, bachelor's and graduate degree candidates and professionals in continuing education.

NJIT now includes three colleges, with a fourth under development: Newark College of Engineering (1919); the School of Architecture (1974); and the College of Science and Liberal Arts (1982). Our newest unit will be the School of Industrial Management.

Accreditation

NJIT is accredited by the Middle States Association of Colleges and Schools. The architecture program is accredited by the National Architectural Accrediting Board. The B.S. program in computer science is accredited by the Computing Sciences Accreditation Board. The engineering programs of chemical engineering, civil engineering, electrical engineering, industrial engineering, and mechanical engineering are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET). The Engineering Technology program is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC/ABET). ABET publications of accredited colleges and universities will be made available to students who are interested in verifying that the programs of Newark College of Engineering are accredited by EAC/ABET or TAC/ABET.

Bachelor's Degree Programs

Bachelor's degree programs are offered in engineering, engineering technology, the sciences, management and architecture. Full descriptions of these programs appear in a separate catalog.

Certificate Programs

The Division of Technology at New Jersey Institute of Technology offers certificate programs and courses in the fields of:

- Architectural Technology
- Computer Aided Drafting Technology
- Computer Technology
- Construction Technology
- Electrical Technology
- Mechanical Technology
- Plastics Technology

These programs are for men and women who are employed in business and industry, and seek additional expertise in their fields. Frequently, their completion of a certificate program serves as the initial step for achieving a baccalaureate degree.

The certificate programs are supervised by the associate or assistant chairperson for engineering technology of each department and are generally taught by part-time lecturers and specialists from industry.

The certificate programs were initially established in 1881 to help individuals employed in local industries acquire technical proficiency. The present certificate programs were developed as the Special Courses Division after World War II to prepare returning veterans re-entering the post-war job market. In 1974, the curriculum was further revised. All courses now bear college credit. As new skills and knowledge are found to be essential in the light of changing technology, programs are revised and new areas of study are introduced.

Certificate programs and courses and related information about NJIT and the Division of Technology are described in the pages that follow.

For further information please contact:

Office of Admissions
New Jersey Institute of Technology
Newark, New Jersey 07102
(201) 596-3300

or

Division of Technology
(201) 596-3228

In New Jersey: 1 (800) 222-NJIT

The Campus and Student Life

The NJIT campus is located in the heart of Newark's expanding educational community. The university offers its students a wide variety of academic and social opportunities and is within close proximity to the city's cultural and business districts. The 36 acre campus has an array of modern facilities, including state-of-the-art laboratories and studios, a sophisticated chemical engineering complex and a Mechanical Engineering Center. An Information Technologies (InfoTech) building is planned to house the Computer Integrated Manufacturing Center, the Computerized Conferencing and Communications Center, and the Center for Information Age Technology. Construction of a major building to house the National Science Foundation research center for the management of hazardous and toxic substances is in progress. Funding for the building is being provided by the New Jersey Commission on Science and Technology.

Students, faculty, staff, alumni and invited guests often meet at the Hazell Center, a comfortable place to study, socialize or relax. At the Center you'll find the Pub, cafeteria, Bookstore, game room, lounges and offices for student organizations. The Center is also the location for art exhibits, films and concerts.

Extracurricular programs at NJIT include sports, professional societies and cultural activities. Entwisle Gymnasium has courts for basketball, volleyball and badminton, as well as an Olympic-size swimming pool and weight-lifting equipment.

Students may take advantage of the cultural resources available in the New York-New Jersey area. NJIT is located only 20 minutes from both midtown and downtown Manhattan, and the campus is easily accessible by bus, train, or car. NJIT is also within walking distance of Rutgers University, Essex County College, and the University of Medicine and Dentistry of New Jersey.

Library Services

The university's Robert W. Van Houten Library, centrally located on the campus, provides facilities for study, research, and browsing. Approximately 130,000 volumes are available for student use, and 1,400 periodical subscriptions are received. Also on file are many indexing and abstracting services which give access to the literature of engineering, science, management, architecture, and other subject areas.

To supplement the resources of the Van Houten Library, students have the privilege of borrowing material from the Newark Public Library and the libraries of Rutgers University-Newark Campus, the University of Medicine and Dentistry and the eight state colleges of New Jersey. Interlibrary loan arrangements with more distant institutions are also available. Other services provided are online literature searches, orientation tours and instruction in the use of reference works.

Included among the Library's resources is a small museum containing items developed and manufactured by Edward Weston, scientist, prolific inventor, and a founding member of the board of trustees of the university. Dr. Weston's rare book collection is also maintained by the Library and is available to scholars and others interested in the history of science and technology.

The Architectural Information Center houses a collection of 65,000 slides, a core collection of architecture books, rare books, journals, drawings and maps.

Student Services

The office of the Dean of Student Services administers and coordinates the activities of the Division of Student Services which includes the Hazell Center, the Counseling Center, Placement, Health Services and Residence Life. Also included are services to evening students, international students and disabled students. The office also administers special programs for women students. The office of the Dean is located on the third floor of Eberhardt Hall, Room 33E. The phone number is (201) 596-3466.

The following supportive services are available to students in the DOT programs. Detailed information may be obtained by contacting the respective directors.

Hazell Center

The Center is the location for a wide variety of events, such as lectures, films and concerts. On the lower level there is a recreation area with billiards, ping pong, bowling, video games, and pinball as well as student organization offices and the Bookstore. A photo laboratory is also available to qualified students. On the main level the Center information desk provides information about the campus and community events, public transportation parking tokens and I.D. cards. The Institute telephone directory and discount tickets for musical, theatrical, and sporting events are located at the Center's desk. The Center is open Monday through Friday from 8 a.m. to 10 p.m. The phone number is (201) 596-3605.

Food Services

Two separate food operations are available in the Center. The cafeteria is an institute-operated dining facility providing breakfasts, lunches and dinners. The Pub, a non-profit corporation, offers mod-

erately priced sandwiches and snacks. Beer and wine are available to those 21 years of age and older.

Counseling Center

The Counseling Center is available to any student seeking confidential personal, academic, or career counseling. In addition to the professional counseling staff, a psychiatrist is available for consultation as needed. The Counseling Center also conducts various group workshops, maintains a library of career and graduate school information, and administers supportive testing. Students are welcome to come in and browse through the informational materials or speak with a counselor. Counseling services are also available to evening students who may have concerns about academic, personal, family or employment issues. The Center is on the third floor of Eberhardt Hall, Room 37E. Office hours are Monday through Thursday from 8 a.m. to 6:30 p.m. and Friday from 8:30 a.m. to 5 p.m. The phone number is (201) 596-3414.

Stop-In Center

The Stop-In Center, staffed by trained student-counselors, provides on-the-spot information and assistance about all aspects of college life. Peer counselors are prepared to talk with fellow students about any questions or concerns, academic or personal, as well as provide general information. If they are unable to resolve a problem directly, they refer students to the person or office that can help. No appointment is necessary and students are invited to stop by (downstairs in the Hazell Center, Room 124) and become familiar with the staff and services available. The phone number is (201) 596-3422, 3421, and the Stop-In Center is open weekdays from 8 a.m. to 6:30 p.m. (Fridays to 5 p.m.).

Tutoring

A tutoring program is available both day and evening to help students understand basic concepts and develop those skills necessary for academic success. The program is designed principally to assist new students in their math, physics, reading, writing, and chemistry courses, but some help is available for other courses. Students who wish to receive tutoring should contact the tutoring coordinator in the Humanities Building, Room 101. Office hours Monday through Thursday 8:30 a.m. to 6:30 p.m. and Friday from 8:30 a.m. to 5:30 p.m. The phone number is (201) 596-2992.

Placement

The Placement Office is designed to assist students and alumni who are seeking or wish to obtain advice about employment. Among the services offered are: providing extensive information and counseling concerning career planning, job opportunities, employer characteristics, and employment trends; scheduling of interviews with employers visiting the campus; maintaining an active list of full-time employment opportunities for evening students and alumni; compiling a continuous listing of summer and part-time jobs; and conducting appropriate surveys of alumni career progress. It is the function of the placement office to help students achieve career goals consistent with their interests, initiative, and ability.

The Placement Office is located on the second floor of Cullimore Hall (Room 212M) and is open: Monday through Thursday, 8:30 a.m. to 6:30 p.m.; Friday, 8:30 a.m. to 4:30 p.m. The phone number is (201) 596-3645.

Disabled Students

The institute provides the following services to disabled students: counseling services in the Counseling Center for general information and assistance in problem-solving, legal issues, parking and registration; instructional aids, such as the Kurzweill reading machine at the library, available to blind and learning disabled students; and the mechanical engineering department's Macro Lab facility, open to disabled and non-disabled students who wish to make necessary modifications in their labs.

Health Services

The Office of Health Services is located on the second floor of the Entwisle Physical Education Building and is responsible for providing health services for the NJIT community.

Professional medical services are available as follows:

Physician Consultations— both on- and off-campus by arrangement through Health Services.

Emergency Medical Technician—(201) 596-3622, between 8 a.m. and 9 p.m. weekdays. Public Safety, 596-3111, between 9 p.m. and 8 a.m. weekdays and on a 24-hour basis on weekends (restricted to emergency transportation to local hospitals).

Certified Athletic Trainer—(201) 596-3623, between 3 p.m. and 9 p.m. (restricted to intercollegiate athletics).

Information—about the nature of service rendered can be obtained by contacting Health Services at (201) 596-3622, between 8 a.m. and 4 p.m.

Health and Accident Insurance

The Institute offers health and accident insurance coverage to students at low cost. International students are provided with basic accident coverage as part of their student fee.

Further information may be obtained from the Office of Health Services. The phone number is (201) 596-3622.

Parking

Parking is available on a first-come basis in lots maintained by the Institute. It is the student's responsibility to properly register his or her car and to display on the car a valid parking permit. Parking tokens must be deposited in the meters in the lots and may be purchased at various locations on the campus.

Property Loss

The Institute is not responsible for loss of property by fire or theft in its buildings or grounds.

Physical Education and Athletics

The Division of Physical Education and Athletics encourages the use of its facilities which include tennis courts, an olympic-size pool and fitness equipment. Recreational areas are open from 7 a.m. to 9:30 p.m. Monday through Friday and from 9 a.m. to 4 p.m. on Saturdays, with limited availability on Sundays. For information contact the division office in the Entwisle Physical Education Building. The phone number is (201) 596-3636. The activities of the division are administered by the Office of Academic Affairs.

Admissions, Costs and Financial Aid

Admission Requirements and Procedures

Applicants to the Division of Technology certificate programs are expected to have a high school diploma or a New Jersey High School Equivalency Certificate, and have satisfactorily completed one year of high school college-preparatory algebra with grade C or better.

Application to the programs or courses of the Division of Technology is made through the NJIT Office of Admissions. In addition to the Application for Admission, all candidates must submit an official copy of their high school and college transcripts. Questions regarding admissions procedures should be directed to the Office of Admissions. Individual and group interviews as well as campus tours may be arranged by calling (201) 596-3300.

Financial Aid

Scholarships

A number of tuition scholarships are available in all Division of Technology programs. These scholarships are based on financial need and academic potential. For tuition scholarship applications, contact the Division of Technology (201) 596-3228 or the Office of Admissions (201) 596-3300.

A number of partial scholarships are available to students in the plastics technology program and are awarded annually by the Newark section of the Society of Plastics Engineers. Applications are available in the DOT office. For further information students may contact the Division of Technology.

Grants and Loans

Pell grants and Guaranteed Student Loans are also available to students. For information on these programs contact: Office of Financial Aid (201) 596-3179.

Veterans Benefits

Students who are veterans and are eligible for educational benefits under the auspices of the Veterans Administration may apply for a certificate of eligibility from the Office of Veterans Affairs at NJIT or from the Veterans Administration. When approved, benefits will include monthly stipends or payment-in-part for the costs of enrollment. The office is ready to assist veterans with advice and information concerning problems with their benefits. Students may obtain additional information from the Office of Financial Aid.

Tuition and Fees

New Jersey Institute of Technology reserves the right to revise its charges for tuition and fees as required by increased educational costs. Tuition includes charges for services other than instruction, such as library, publications, counseling, placement, etc., but does not cover the cost of damage to or loss of Institute property. Fees also provide funds for the operation of health services, student services and activities, intercollegiate athletics, and various other facilities and services.

As of September 1987 the charges for tuition and fees for certificate programs are as follows:

Part-time	N.J. Resident	Non Resident
(1-11 credits/semester)	$85/credit	$170/credit

Fees are based on the number of credits for which a student is registered according to the following schedule:

12 or more credits	$290
2-11 credits	$26/credit

Late Payment Fee

Students may be charged a late payment fee of $45 if they do not pay all tuition and fee charges by the deadline noted in the payment instructions.

Late Registration Fee

Students must register for each semester. A fee of $35 is required of those students who register late.

Maintaining Registration Fee

Students enrolled in certificate programs who find it necessary to discontinue their studies temporarily can maintain their registration by paying a $20 fee each semester. Students maintaining their registration will not be required to reapply for admission and will be allowed to register in advance.

Schedule Change Fee

A schedule change fee of $10 is charged when students change their schedule after the beginning of a semester.

Refund of Tuition

Students who notify the Registrar of their withdrawal in writing will be eligible for a refund of tuition based upon the following schedule:

During the first week of the semester	100%
During the second week	80%
During the third week	60%
During the fourth week	40%
During the fifth week	20%
During the remainder of session	0%

The calculation of refunds will be based upon the date of receipt of a written notification of withdrawal. Refunds are issued only for withdrawals submitted during the first five weeks of the semester.

Book Purchases

Students are advised to defer purchase of books until the official list of text books has been posted at the Institute Bookstore.

Policies and Procedures

Registration

Registration periods are set for specified times at the beginning of each semester. All prospective students who have filed application forms are notified in advance of registration dates. Registration may be completed by mail following published instructions. Evening hours during registration week are announced each semester.

Advanced Standing

Students requesting advanced standing in certificate programs must submit official transcripts from an accredited college-level institution, showing satisfactory completion of subject matter of equivalent scope and quality as the courses offered in these programs. Advanced standing must be approved by the associate or assistant chairperson for engineering technology of the respective departments or the associate dean of engineering for engineering technology.

Course Substitutions

In individual cases, students may wish to vary their regular certificate program by substituting a limited number of alternate courses. Such requests for substitutions will be considered only when the student presents evidence of their value to their employment and must be approved in writing by the associate or assistant chairperson for engineering technology of the respective department or the associate dean of engineering for engineering technology.

Each of the program descriptions indicates the recommended number of courses for normal progression. However, because of their working or living situations, students may find it advantageous to take fewer than the prescribed number of courses in any one semester.

Drop/Add

Students may opt to add or drop a course by completing a Drop/Add Form within the first week of class. If this completed form is submitted to the Registrar within the first five class days of the semester, the dropped course does not appear on the student's record.

Students who add a course to their program will be charged the full tuition and fees for the course added regardless of the date on which the addition takes place. If students drop a course, they must fill out the form provided and see to it that it is authorized by the appropriate associate or assistant chairperson for engineering technology. Charges will then be recalculated and, if a student is entitled to a refund, the refund will be made.

Additions to a semester's program may be made if the course desired can be scheduled and all prerequisites have been fulfilled.

Withdrawal from Course(s)

Registration for a course places a responsibility upon the student to carry the course through to conclusion and to receive the grade earned. However, it is recognized that in exceptional cases withdrawal by a student may be necessary. In order to do so, students must complete an official Drop/Add Form in the Registrar's office and have that form authorized by the instructor of the course. The receipt of the notice by the Registrar will be considered to be the date of withdrawal. After the first five class days of the semester, any program change will be considered a withdrawal and a grade of "W" will be recorded.

Refunds are issued only for withdrawals submitted during the first five weeks of the semester. After the ninth week, the student will receive the grade earned for the entire semester's work in that course. In cases where the student has not initiated proper action for withdrawal, an instructor will give a grade of "0".

Students withdrawing from a course, or from the Division, should adhere strictly to the general regulations as stated above.

Withdrawal from Institute

Students wishing to withdraw entirely from the Institute may do so without penalty by the end of the twelfth week of the semester. A Schedule Change Form must be completed and submitted to the Registrar by this deadline. Failure to do so will result in grades other than "W".

Readmission

Students seeking readmission must apply to the Office of Admissions on the form provided. Applications must be accompanied by a nonrefundable fee of $20 and received by:

For the fall semester	June 1
For the spring semester	November 1
For the summer session	April 1

Applicants will be informed of their readmission status by the Office of Admissions. Those who are advised of acceptance for readmission will be sent registration instructions by the Registrar.

Dean's List Evening Division

To qualify for Dean's List in the Evening Division, matriculated students must be taking a minimum of six credits in a regular program of study, maintain a weighted average of 3.0 and have no grade lower than 2.0.

Academic Suspension

The academic record of students will be reviewed by the Committee on Academic Standing, and students will be subject to suspension from the Institute whenever they have been placed on probation for two successive semesters or earn a GPA of less than 1.5 in their most recent semester.

When the record of a student has been reviewed, the Committee on Academic Standing may: assign the academic status of "probation"; suspend the student from the Institute; stipulate specific requirements which the student will be obliged to fulfill in order to retain the privilege of initiating or maintaining registration in any following semester.

Academic Standing

Grades

The following grades will be used:

Grade		Significance
4.0	(A)	Superior
3.5	(B+)	Excellent
3.0	(B)	Very Good
2.5	(C+)	Good
2.0	(C)	Acceptable
1.0	(D)	Minimum
0.0	(F)	Inadequate
AUD		Audit
INC		Grade deferred—given in rare instances to students who would normally have completed the course work but who could not do so because of special circumstances. If this grade is not removed during the next regular semester, a grade of 0 will result. Once a grade of 0 has been issued, it cannot be changed. The course must be repeated.
W		Withdrawn
S		Satisfactory
U		Unsatisfactory

Grade Reports

The Registrar mails a grade report to each student at the end of each semester.

Credit by Examination

Examinations to earn credit are available for certain courses. Students who believe they have the background covered in a given course should consult with the associate dean of engineering for engineering technology to see whether an examination is offered. To receive credit by examination, a student must perform at a level

equivalent to a grade of 2.0 in the course. Students who have failed a course may not take an examination for credit in that course. A fee of $35 is charged for the examination.

Transcript of Grades

Students who wish to obtain a transcript issued on their behalf must submit a request in writing to the Recorder. (Only unofficial copies will be supplied directly to students.) Transcript requests must be accompanied by a fee for each copy of $1. Please allow 5-10 days to process the request. Transcripts will not be issued to or on behalf of a student with outstanding financial obligation to the Institute.

Certificate Requirements

Candidates for a certificate award must complete all of the courses in their certificate program. A maximum of eight (8) courses may be transferred from another accredited collegiate institution to the three year evening program. For the program of computer aided drafting only three (3) courses may be transferred. In order to earn a certificate, students must attain a grade point average of 2.0.

Graduation

A candidate for any certificate program shall appear in person upon the appointed commencement day to receive the certificate, unless excused by the president of the Institute. Graduates of the certificate program are also expected to participate in the university's commencement exercises held in late May of each year.

Student Conduct

The policies and procedures governing the student conduct code are contained in a separate publication, Log NJIT, and are deemed incorporated into this catalog. A copy of Log NJIT may be obtained from the Office of the Dean of Student Services.

Attendance

When registering for a course, students assume a responsibility to regular attendance at scheduled classes. If students are forced to be absent because of an illness or a serious problem of another nature, they must make arrangements with their instructor(s) to complete the work missed.

When a student's absences seriously jeopardize his/her chances of satisfactorily completing the course, an academic warning notice will be mailed to the student's home. It is the student's responsibility to respond to this notice and indicate his/her intentions.

Progress

If students do not maintain satisfactory academic progress they may be denied opportunity to continue in their program. Additional guidance will be available for students at that time.

Behavior

NJIT expects students to conduct themselves with decorum and to adhere to high standards of ethical and professional behavior. Instances of alleged unethical or unprofessional conduct will be brought to the attention of appropriate university authorities for investigation and action. The Institute has adopted and requires all students to comply with a "Code of Professional Conduct." No student may give or receive unauthorized aid in tests or assigned materials.

Family Educational Rights and Privacy Act

The Federal Family Educational Rights and Privacy Act of 1974 gives students the right to inspect educational records maintained about them by the Institute, the right to a hearing to challenge the contents of these records, and the right to make explanation for challenged information. The law also requires the Institute to maintain the confidentiality of student records except with respect to special cases noted in the legislation.

The Registrar of New Jersey Institute of Technology is responsible for student records. Educational records include transcripts, admission files and registration forms. Students wishing to review their files must make a written request to the Registrar listing the items of interest. Student health records are maintained by the Director of Health Services and may only be examined by a health professional of the student's choice. Files covered by the Act will be made available within 45 days of the request. Students may have copies made of their records at their own expense at reasonable rates to be determined by the records custodian. A catalog of educational records maintained by the Institute is available from the Registrar. Exceptions to the right of inspection include financial aid records and records of institutional, supervisory and administrative personnel, and educational personnel ancillary thereto, which are in the sole possession of the maker.

Within the Institute community, only those members acting in the student's interest are allowed access to student files. These include personnel in the Registrar's, admissions, student services, and finance offices; and academic personnel within the limitations of their need to know.

With the exceptions stated in the Act, no one outside the Institute shall have access to a particular student's educational record without the written consent of the student, except in extraordinary circumstances such as emergencies. Accrediting agencies carrying out their accrediting function and certain state and federal officials are permitted access. A record of, and reasons for, granting access will be kept by the Institute and will be available to the student.

The Institute at its discretion may provide directory information, in accordance with the provisions of the Act, to include: the student's name, address, telephone listing, date and place of birth, major field of study, participation in officially recognized activities and sports, weight and height of members of athletic teams, dates of attendance, class schedule, degrees and awards received, and the most recent previous educational agency or institution attended by the student. Students who desire directory information to be withheld should notify the Registrar in writing within the first two weeks of initial registration.

Request for non-disclosure will be honored by the Institute for ONLY ONE ACADEMIC YEAR. Therefore, authorization to withhold directory information must be filed annually in the Office of the Registrar.

Students who disagree with an entry should attempt to resolve the question with the Office of the Registrar. Failing this, either the school or the student may request a formal hearing. In accordance with the Act's requirements, the hearing will be held within 30 days of the request, and will be conducted by a school official or other person without a direct interest in the outcome. Students will be given a full and fair opportunity to present relevant evidence and to provide their own counsel.

Students may include a written statement in their file explaining a disputed entry following an unfavorable determination of an appeal. A written decision will be rendered within 15 working days after the hearing of an appeal.

Students who believe that the adjudication of their challenge was unfair or contrary to the provisions of the Act may request, in writing, assistance from the President of the Institute. Further, students who believe that their rights have been abridged may file complaints with the appropriate federal agency.

Affirmative Action

NJIT does not discriminate on the basis of sex, race, age, religion, natural origin, or handicap in its educational programs, activities, or employment policies. The Institute has committed itself to a program of affirmative action and is in compliance with Title IX.

Certificate Programs and Courses

The completion of a certificate program usually requires a minimum of three years of evening classes with the exception of computer aided drafting, which requires only one year. Upon graduation, the student will have acquired a well-rounded background in mathematics, mechanics, and communications and increased knowledge and competence in his/her chosen technical field. With this preparation, a graduate should be better able to compete for positions and advancement in industries which are experiencing rapid technological change.

Students who do not wish to take a full certificate program may apply for any of the courses offered by the division. Submission of an application, high school or college transcript, and appropriate course prerequisites are required for admission. Certificate program courses are designed with current industrial needs in mind.

NJIT reserves the right to cancel any course for which there is not a sufficient number of students registered to warrant its presentation, or to make such substitutions which may seem pratical.

Key to Course Titles. The numbers after each course (e.g. 3-3-4) represent the recitation hours, laboratory hours, and credits, respectively.

Bachelor of Science in Engineering Technology

A program leading to the Bachelor of Science in Engineering Technology (B.S.E.T.) is available both day and evening for college level students. Qualified graduates of certificate programs may pursue a B.S.E.T. degree by first completing the additional courses needed for an A.A.S. degree at a community college or by taking additional course work in specific areas in an individually designed bridge program with the approval of the departmental associate chairperson for engineering technology. The bridge program is described in this catalog. Additional information on the B.S.E.T. program may be found in the undergraduate catalog.

Architectural Technology

Offered by the Department of Civil and Environmental Engineering, Dr. Eugene Golub, Chairperson
For advisement contact: Prof. Walter Konon, Associate Chairperson for Engineering Technology
Telephone: (201) 596-2444/Location: 203 Campbell Hall

FIRST YEAR—*1st Semester*		*2nd Semester*	
TS 111	Technical Mathematics I (3-0-3)	TS 112	Technical Mathematics II (3-0-3)
TA 121	Construction Methods (3-0-3)	TS 114	Mechanics I (3-0-3)
TA 101	Construction Drawing (1-2-2)	TA 102	Architectural Drawing I (1-2-2)

SECOND YEAR—*1st Semester*		*2nd Semester*	
TH 101	Effective Communications (3-0-3)	TH 102	Technical Writing (3-0-3)
TC 133	Surveying I (3-3-4)	TA 124	Building Structures (3-0-3)
TS 117	Mechanics of Materials (3-1-4)	TA 127	Architectural Drawing II (1-2-2)
CIS 101	Computer Programming and Problem Solving (2-1-2)	TD 124	Computer Aided Drafting I (1-2-2)

THIRD YEAR—*1st Semester*		*2nd Semester*	
TA 229	Architectural Drawing III (1-2-2)	TC 132	Quantity Surveys and Estimates (3-0-3)
TA 225	Building Equipment (3-0-3)	TC 238	Construction Supervision (3-0-3)
TA 227	Construction Law and Building Codes (3-0-3)	TC 230	Masonry and Reinforced Concrete Construction (3-0-3)

Computer Aided Drafting Technology

Computer Aided Drafting is a one-year evening certificate program specifically designed to train practicing draftspersons in the use of the computer as a drafting tool.

Offered by the Department of Mechanical Engineering, Dr. Bernard Koplik, Chairperson
For advisement contact: Dr. Benedict Sun, Associate Chairperson for Engineering Technology
Telephone: (201) 596-3328/Location: 208 Mechanical Engineering Center

1st Semester		*2nd Semester*	
TD 124	Computer Aided Drafting I (1-2-2)	TH 101	Effective Communications (3-0-3)
TS 111	Technical Mathematics I (3-0-3)	TS 112	Technical Mathematics II (3-0-3)
CIS 101	Computer Programming and Problem Solving (2-1-2)	TD 128	Computer Aided Drafting II (1-2-2)

Computer Technology

Offered by the Department of Electrical Engineering, Dr. Jacob Klapper, Chairperson
For advisement contact: Prof. Norbert Yankielun, Associate Chairperson for Engineering Technology
Telephone: (201) 596-3512/Location: 150 Tiernan Hall

FIRST YEAR—*1st Semester*		*2nd Semester*	
TS 111	Technical Mathematics I (3-0-3)	TS 112	Technical Mathematics II (3-0-3)
TE 151	DC and AC Circuits (3-0-3)	TE 152	Circuit Analysis (3-0-3)
TM 101	Technical Drawing I (1-2-2)	CIS 202	Computer Programming and Business Problems (3-1-3)

SECOND YEAR—*1st Semester*		*2nd Semester*	
TH 101	Effective Communications (3-0-3)	TH 102	Technical Writing (3-0-3)
TE 153	Electronic Fundamentals (3-0-3)	TE 155	Electric Circuits Laboratory (0-3-2)
TE 154	Electronic Laboratory (0-3-2)	TCE 201	Circuit Measurements I (1-3-2)

THIRD YEAR—*1st Semester*		*2nd Semester*	
TE 264	Digital Circuits (3-0-3)	TE 263	Control Systems Technology (2-2-3)
TCE 221	Microprocessor Principles (2-2-3)	TCE 231	Microprocessor Systems and Instrumentation (3-0-3)
CIS 213	Introduction to Computer Science (3-0-3)	Elective	(3-0-3)

Construction Technology

Offered by the Department of Civil and Environmental Engineering, Dr. Eugene Golub, Chairperson
For advisement contact: Prof. Walter Konon, Associate Chairperson for Engineering Technology
Telephone: (201) 596-2444/Location: 203 Campbell Hall

FIRST YEAR—*1st Semester*		*2nd Semester*	
TS 111	Technical Mathematics I (3-0-3)	TS 112	Technical Mathematics II (3-0-3)
TA 121	Construction Methods (3-0-3)	TA 102	Architectural Drawing I (1-2-2)
TA 101	Construction Drawing (1-2-2)	TS 114	Mechanics I (3-0-3)

SECOND YEAR—*1st Semester*		*2nd Semester*	
TH 101	Effective Communications (3-0-3)	TH 102	Technical Writing (3-0-3)
TS 117	Mechanics of Materials (3-1-4)	TC 132	Quantity Surveys and Estimates (3-0-3)
TC 133	Surveying I (3-3-4)	TC 134	Surveying II (3-3-4)
CIS 101	Computer Programming and Problem Solving (2-1-2)		

THIRD YEAR—*1st Semester*		*2nd Semester*	
TH 225	Building Equipment (3-0-3)	TC 230	Masonry and Reinforced Concrete Construction (3-0-3)
TC 233	Hydraulics and Drainage (3-0-3)	TC 238	Construction Supervision (3-0-3)
TA 227	Construction Law and Building Codes (3-0-3)	TA 124	Building Structures (3-0-3)

Electrical Technology

Offered by the Department of Electrical Engineering, Dr. Jacob Klapper, Chairperson
For advisement contact: Prof. Norbert Yankielun, Associate Chairperson for Engineering Technology
Telephone: (201) 596-3512/Location: 150 Tiernan Hall

FIRST YEAR—*1st Semester*		*2nd Semester*	
TS 111	Technical Mathematics I (3-0-3)	TS 112	Technical Mathematics II (3-0-3)
TE 151	DC and AC Circuits (3-0-3)	TE 152	Circuit Analysis (3-0-3)
TM 101	Technical Drawing I (1-2-2)	TS 114	Mechanics I (3-0-3)

SECOND YEAR—*1st Semester*		*2nd Semester*	
TH 101	Effective Communications (3-0-3)	TH 102	Technical Writing (3-0-3)
TE 153	Electronic Fundamentals (3-0-3)	TE 156	Electrical Energy Conversion (3-0-3)
TE 155	Electric Circuits Laboratory (0-3-1)	TE 154	Electronic Fundamentals Laboratory (0-3-2)
CIS 101	Computer Programming and Problem Solving (2-1-2)		

THIRD YEAR—*1st Semester*		*2nd Semester*	
TE 255	Integrated Circuit Electronics (3-0-3)	TE 256	Electronic Applications (3-0-3)
TE 257	Integrated Circuit Electronics Laboratory (0-3-2)	TE 258	Electronic Applications Laboratory (0-3-2)
TE 259	Energy Conversion Laboratory (0-3-2)	TE 264	Digital Circuits (3-0-3)

Mechanical Technology

Offered by the Department of Mechanical Engineering, Dr. Bernard Koplik, Chairperson
For advisement contact: Dr. Benedict Sun, Associate Chairperson for Engineering Technology
Telephone: (201) 596-3328/Location: 208 Mechanical Engineering Center

FIRST YEAR—*1st Semester*		*2nd Semester*	
TS 111	Technical Mathematics I (3-0-3)	TS 112	Technical Mathematics II (3-0-3)
TH 101	Effective Communications (3-0-3)	TH 102	Technical Writing (3-0-3)
TM 101	Technical Drawing I (1-2-2)	TM 102	Technical Drawing II (1-2-2)

SECOND YEAR—*1st Semester*		*2nd Semester*	
TS 114	Mechanics I (3-0-3)	TS 117	Mechanics of Materials (3-1-4)
TE 151	DC and AC Circuits (3-0-3)	TS 118	Mechanics II (3-0-3)
CIS 101	Computer Programming and Problem Solving (2-1-2)	TS 113	Principles of Chemistry (1-2-2)

THIRD YEAR—*1st Semester*		*2nd Semester*	
TM 277	Machine Design I (3-0-3)	TM 278	Machine Design II (2-1-2)
TM 283	Shop Production Methods (1-2-2)	TM 279	Mechanisms (3-0-3)
*Elective	(3-0-3)	*Elective	(3-0-3)

***Electives**
Computer Aided Design I & II, Tool and Die I & II, Heating and Ventilating Design, Air Conditioning Design, Refrigeration Design, Properties of Plastics, Applied Calculus I & II, Safety, Technology of Materials.

Plastics Technology

Offered by the Department of Mechanical Engineering, Dr. Bernard Koplik, Chairperson
For advisement contact: Dr. Benedict Sun, Associate Chairperson for Engineering Technology
Telephone: (201) 596-3328/Location: 208 Mechanical Engineering Center:

FIRST YEAR—*1st Semester*		*2nd Semester*	
TS 111	Technical Mathematics I (3-0-3)	TS 112	Technical Mathematics II (3-0-3)
TH 101	Effective Communications (3-0-3)	TH 102	Technical Writing (3-0-3)
TM 101	Technical Drawing I (1-2-2)	TM 102	Technical Drawing II (1-2-2)
SECOND YEAR—*1st Semester*		*2nd Semester*	
TS 114	Mechanics I (3-0-3)	TS 117	Mechanics of Materials (3-1-4)
TP 191	Properties of Plastics (3-0-3)	TP 193	Plastics Molding (3-0-3)
TS 113	Principles of Chemistry (2-1-2)	CIS 101	Computer Programming and Problem Solving (2-1-2)
THIRD YEAR—*1st Semester*		*2nd Semester*	
TM 277	Machine Design I (3-0-3)	TE 151	DC and AC Circuits (3-0-3)
TP 194	Extrusions of Plastics (3-0-3)	TP 298	Plastics Manufacturing Lab (1-2-2)
*Elective	(3-0-3)	*Elective	(3-0-3)

***Electives**
Tool and Die I & II, Mechanisms, Shop Production Methods, Plastics Application Techniques, Plastics Mold Designing, Basics of Supervision, Safety, Technology of Materials.

Certificate Program Electives

Except for electrical technology, students may take electives in the third year. Students in construction technology may substitute a third year course (with the exception of TC 233 Hydraulics and Drainage) with one of the electives listed below. Students in architectural technology may substitute any third year course with one of the electives listed below. Students in computer technology fill the open elective slot in their program with one of the electives listed below. Students in mechanical technology and plastics technology choose their elective from the lists that appear at the end of the respective program outlines. Electives must be approved by the associate or assistant chairperson for engineering technology for each program.

Electives without prerequisites:

TA	121	Construction Methods	(3-0-3)
TA	227	Construction Law and Building Codes	(3-0-3)
TC	230	Masonry and Reinforced Concrete Construction	(3-0-3)
TC	238	Construction Supervision	(3-0-3)
CIS	101	Computer Programming and Problem Solving	(2-1-2)
TE	262	National Electric Code and Practice	(3-0-3)
TM	175	Heating and Ventilating Design	(3-0-3)
TM	176	Air Conditioning Design	(3-0-3)
TM	276	Refrigeration Design	(3-0-3)
TM	283	Shop Production Methods	(1-2-2)
TP	191	Properties of Plastics	(3-0-3)
TP	192	Plastics Application Techniques	(3-0-3)
TS	113	Principles of Chemistry	(2-1-2)
TS	210	Basics of Supervision	(3-0-3)
TS	211	Safety	(3-0-3)

Electives with prerequisites:

TA	220	Architectural Presentation	(1-2-2)
TA	230	Advanced Architectural Drawing	(1-2-2)
TC	126	Structural Steel Drafting	(1-2-2)
TC	236	Waste and Environment	(3-0-3)
TCE	221	Microprocessor Principles and Applications	(2-2-3)
TCE	231	Microprocessor Systems and Instrumentation	(2-2-3)
TE	151	DC and AC Circuits	(3-0-3)
TE	263	Control Systems Technology	(3-0-3)
TE	264	Digital Circuits	(3-0-3)
TM	173	Tool and Die I	(1-2-2)
TM	174	Tool and Die II	(1-2-2)
TS	115	Applied Calculus I	(3-0-3)
TS	116	Applied Calculus II	(3-0-3)
TS	216	Technology of Materials	(3-0-3)

Certificate Courses

Architectural Technology

TA 101
Construction Drawing 1-2-2
Basic training in graphic communications through intensive use of drafting instruments, scales, readings, common symbols, conventions, dimensioning systems. Lectures and drafting exercises concerning representing of architectural objects by three-view, isometric, and sectional drawing are given. The student is introduced to construction working drawings by having to execute plot and grading plans, floor plans, elevations, and sections of a simple predesigned wood frame and concrete block structure. Emphasis is placed on developing correct techniques in line work, methods of dimensioning, and architectural lettering style.

TA 102
Architectural Drawing I 1-2-2
Prerequisite: TA 101—Construction Drawing or equivalent. Principles of descriptive geometry introduce the student to the method of representing objects in space: perspective drawing derived from three-view drawings and free hand perspective derived from direct observation. The fundamentals of casting shades and shadows are applied and exercised on drawings with pencil and ink.

TA 121
Construction Methods 3-0-3
This course develops background in light construction methods and terminology; preparation of building sites, footings, and foundations. Conventional wood frame, plank and beam, plywood skin, and mill construction; brick and stone veneer, solid masonry, and cavity wall construction; exterior finish material including roof types and roof coverings; insulation, vapor barriers, and ventilation of frame structures.

TA 124
Building Structures 3-0-3
Prerequisite: TS 117—Mechanics of Materials. This course is planned to enable the student to calculate and specify the correct size and physical characteristics of structural components of the simpler forms of structural systems. Design of steel and woodframing members, including bearing plates, base plates, and riveted, bolted, and welded connections. Design of reinforced concrete elements such as rectangular beams, T-beams and one and two slabs, tied and spiral columns, footings, and foundation walls.

TA 127
Architectural Drawing II 1-2-2
Prerequisites: TA 121—Construction Methods and TA 102—Architectural Drawing I. A predesigned sketch plan of a building forms the basis of course work. Under simulated office conditions a complete set of working drawings will be prepared with sufficient detail for professional estimating. Site plan, case plans, stair details, and wall sections will be prepared and the various construction systems studied.

TA 220
Architectural Presentations 1-2-2
Prerequisites: TA 102, 127, 229—Architectural Drawing I, II, III. Course offers further training in the graphic communications skills culminating in the refined techniques of pictorial composition and varied color media used for presentation purposes. Plans, elevations, perspectives; color and finish material displays; typography, models; all as related to the presentation of a project.

TA 225
Building Equipment 3-0-3
Prerequisite: first two years of the program or by special permission. Student is familiarized with aspects of environmental control of building design with emphasis placed upon the implications that modern electrical and mechanical equipment have on building design. Subject of investigation and study are water supply, plumbing, sewage disposal, heat losses, heating, ventilation and air conditioning systems, electrical distribution and lighting, and vertical transportation planning criteria.

TA 227
Construction Law and Building Codes 3-0-3
This course is designed to provide basic knowledge of construction law with special emphasis on building contracts, general conditions, bonds, mechanic liens, agency, trust, and government regulations. General legal relations between the owner, architect, engineer, construction manager, contractor, sub-contractor, supplier.

TA 229
Architectural Drawing III 1-2-2
Prerequisites: TA 127—Architectural Drawing II and first two years in program. Classwork centers around a predesigned multistory steel frame structure with brick masonry exterior. Emphasis is placed on detailing, fire protection, legal exit requirements. Pertinent manufacturer's data is supplied. To round out a simulated job experience, as-built and measured drawings are prepared based on existing conditions.

TA 230
Advanced Architectural Drawing 1-2-2
Prerequisite: third year in program or by special permission. As a conclusion to the architectural courses previously presented, this course presents the problem of designing a completely new building structure to impart a knowledgeable appreciation of this phase of the architect's work; basic architectural design with stress on the integration of aesthetic, functional, spatial, and structural principles. Starting with the development of the building program of space requirements through the presentation of the design to the client, students prepare their own individual solution.

Computer Aided Drafting Technology

TD 124
Computer Aided Drafting I 1-2-2
Students learn by hands-on experience in computer aided drafting techniques using microcomputers, such as Rainbow ("Auto CAD" program), IBM-compatibles (using CAD-basic program) and NJIT developed graphic software. Not allowed for engineering technology elective credits.

TD 128
Computer Aided Drafting II 1-2-2
Students learn by hands-on experience in computer aided drafting techniques using CDC, General Electric or McDonnell Douglas software on CAD work stations. Not allowed for engineering technology elective credits.

Computer Technology

CIS 101
Computer Programming and Problem Solving 2-1-2
An introductory course in FORTRAN programming and its use in solving engineering and scientific problems. The emphasis is on the logical analysis of a problem and the formulation of a computer program leading to its solution.

CIS 202
Computer Programming and Business Problems 3-1-3
An introductory course in programming which develops the same level of FORTRAN knowledge as CIS 101. Problems used in this course will reflect business and managerial decision-making applications. In addition, an introduction to the concepts of COBOL programming is provided. This is a required course for the industrial administration and engineering technology programs. CIS 202 may be used as the CIS 101 prerequisite for other CIS courses.

CIS 213
Introduction to Computer Science 3-0-3
Prerequisite: CIS 101 or CIS 202. Fundamentals of computer science are introduced for understanding the structures and uses of computing systems. The course covers a study of the representation of data and instructions, a survey of programming languages, operating systems, methods for accessing computing systems, and software design. Programming topics in FORTRAN and assembly language are included. Computer problems using both batch and interactive computing are assigned.

CIS 330
Mini-Computer Systems 2-2-3
Prerequisite: CIS 101 or CIS 202. This course deals with the software and hardware characteristics of mini-computers. Included is the programming and application of mini-computer systems. A variety of application areas is surveyed and practical solutions to problems in these applications are offered using functions available on the mini-computer. Areas of application include text handling, data entry, computerized communications, continuous simulation, process control, and multi-mini computer configurations. Individual assignments will be made requiring hands on operation of the minicomputer in the computer and information science laboratory.

TCE 201
Circuit Measurements I 1-3-2
Prerequisites: TE 154—Electronic Laboratory, TS 114—Mechanics I, TS 112—Technical Mathematics II. Lecture and laboratory sessions are designed to develop techniques for the measurement of various circuit parameters. Computer circuit analysis using PCAP is introduced and the basics of microprocessors are included.

TCE 221
Microprocessor Principles 2-2-3
Prerequisite: Some programming experience. This course covers the operations, bread-boarding, and interfacing of devices peripheral to microcomputers. Applications of these microcomputers to industrial measurements and control.

TCE 231
Microprocessor Systems and Instrumentation 3-0-3
Basic principles of various types of instrumentation transducers will first be presented and the electronic amplifiers and filters needed to process the electrical signals generated by these transducers studied. Types and characteristics of A/D and D/A converters and other circuits necessary for the interfacing of instrumentation data to digital computer or digital data transmission system covered. Emphasis placed on microprocessor-based systems. System architecture will be developed, and application to both data logging and process control systems discussed.

Construction Technology

TC 130
Construction Prints and Specifications 1-2-2
Various types of drawings are used to instruct the student on the symbols, notations, and methods needed to be proficient in interpreting plans and specifications. By systematic question and answer procedures the individual soon learns to rapidly take off facts and figures. Instruction on architectural, structural, electrical, plumbing, and mechanical drawings.

TC 132
Quantity Surveys and Estimates 3-0-3
Prerequisite: TC 130—Construction Prints and Specifications or equivalent reading experience. Study of complete bidding procedure in building construction from bid advertisement to submittal of cost estimate. Includes general contractor's quantity survey from drawings and specifications, unit pricing, sub-contract proposals, general conditions, and overhead and profit. Also, contract documents, types of contracts, and relationship of principals.

TC 133
Surveying I 3-3-4
Prerequisites: TS 111 and TS 112—Technical Mathematics I and II or equivalent. This is a preliminary course which includes the use, care, and adjustment of surveying instruments; the measurement of distances, differences in elevation, angles, directions, lines and grades; and the computation of traverse closures and areas. Topographic surveying including stadia and mapmaking for preliminary and construction surveys for highways and other surveying applications are discussed.

TC 134
Surveying II 3-3-4
Prerequisite: TC 133—Surveying I or equivalent. Elements of horizontal, vertical, compound, and easement curves; cross-sectioning and earthwork computations; essentials of practical astronomy and meridian establishment; boundary surveys, precise levels.

TC 136
Structural Steel Drafting 2-1-2
Prerequisite: TA 101—Construction Drawing or a course in mechanical drafting. Instruction in the fundamentals of structural steel drafting and detailing with emphasis on the layout and dimensioning of members. Selection of connections for beams, girders, columns, and trusses is also included.

TC 230
Masonry and Reinforced Concrete Construction 3-0-3
A course stressing the importance of understanding the physical characteristics of concrete and masonry units used in construction. Quality control, additives and admixtures, transporting, placing, and finishing concrete and masonry construction, precast and prestressed concrete, construction methods, and frame work are also covered.

TC 233
Hydraulics and Drainage 3-0-3
Prerequisites: TS 111, TS 112, TC 133—Technical Mathematics I and II and Surveying I. A study of fluid properties and flow through pipes and channels. Class time is divided into teaching of theory and storm drainage design. Familiarization with procedures for determining drainage areas, sizing, and layout of culverts.

TC 236
Waste and Environment 3-0-3
Prerequisite: TC 233—Hydraulics and Drainage. An introduction to basic principles of collection and disposal of wastewater, including an exploration of treatment processes. The reason for various sanitary facilities and their environmental implications are examined. An introduction to solid waste sanitation and an investigation of practices in collection and disposal of solid wastes.

TC 238
Construction Supervision 3-0-3
Prerequisites: TS 112—Technical Mathematics II, TA 121—Construction Methods, TS 117—Mechanics of Materials. Fundamentals of the Critical Path Method of planning and scheduling work as a tool in accomplishing the engineering procurement and construction phases of a project as economically and quickly as resources will permit. Included are various phases of construction to complete a project.

Electrical Technology

TE 151
DC and AC Circuits 3-0-3
Corequisite: TS 111—Technical Mathematics I. An introduction to basic DC and AC circuit operation. The relationships between voltage, current, resistance, and power are studied for series and parallel circuits. Ohm's Law and Kirchhoff's Laws are used to analyze circuits. Phasor techniques are applied to AC circuits. Basic measurements, safety and power distribution concepts are also included.

TE 152
Circuit Analysis 3-0-3
Prerequisite: TE 151—DC and AC Circuits. This course continues the material introduced in TE 151, covering more advanced methods of analyzing AC circuits. The circuit properties of inductance and capacitance are reviewed. Various network analysis techniques, such as mesh analysis, nodal analysis, and Thevenin's Theorem are studied and applied to practical circuits. The use of series resonance, parallel resonance, and three phase circuits for industrial applications are explained.

TE 153
Electronic Fundamentals 3-0-3
Prerequisite: TE 152—Circuit Analysis. An examination of the characteristics of solid-state and integrated circuit devices. The basic concepts of discrete component amplifiers, frequency response, feedback principles, operational amplifiers, and rectifier circuits are included in the course. The techniques of graphical and small signal analysis are applied to practical applications of electronic devices.

TE 154
Electronic Fundamentals Laboratory 0-3-1
Prerequisite: TE 153—Electronic Fundamentals and TE 155—Electronic Circuits Laboratory. This laboratory includes the practical measurement experience needed to verify the correct operation of the devices and circuits studied in TE 153. Test instrument use, power supply and amplifier testing, and trouble shooting techniques are applied to a variety of transistor voltage and power amplifiers.

TE 155
Electronic Circuits Laboratory 0-3-1
Prerequisite: TE 152—Circuit Analysis. This first laboratory course is designed to teach the student electrical safety, the use of various DC and AC measuring instruments, and to verify the principles discussed in TE 151

and TE 152. The use of the laboratory report as a running account of the technical work accomplished is included in this course.

TE 156
Electrical Energy Conversion 3-0-3
Prerequisite: TE 152—Circuit Analysis. An introduction to the basic theory and performance characteristics of electromagnetic devices. The terminal characteristics of series, shunt, and compound motors and their speed control are covered. Alternating current generators, synchronous and induction motors of single phase, and polyphase operation and machine losses and efficiency are included. Transformer behavior and applications are discussed.

TE 255
Integrated Circuit Electronics 3-0-3
Prerequisites: TE 153—Electronic Fundamentals and TE 154—Electronic Fundamentals Laboratory. This course continues the work of TE 153 and TE 154. Power amplifiers, regulated power supplies, and digital logic devices including memory and display devices are included in the course topics. An introduction to the microprocessor, with a demonstration of the use of a logic analyzer, completes the digital electronics sequence in this course.

TE 256
Electronics Applications 3-0-3
Prerequisite: TE 255—Integrated Circuit Electronics. The course covers the principles of communications electronics and selected applications for electronic systems. Amplitude and frequency modulation, digital data communications, single-sideband, and suppressed carrier systems are included. An introduction to radar and television fundamentals provides an overview of advanced electronic systems.

TE 257
Integrated Circuits Laboratory 0-3-1
Corequisite: TE 255—Integrated Circuit Electronics. This laboratory provides experience with field-effect transistors, operational amplifier circuits, complementary power amplifiers, feedback amplifier circuits, differential amplifiers, comparators, and DC and AC converters. An emphasis is placed on the practical operation and testing of these electronic circuits.

TE 258
Electronics Application Laboratory 0-3-1
Corequisite: TE 256—Electronics Applications. This laboratory provides experience in testing the performance of some of the advanced topics from TE 257. Other topics from modern electronics are included to provide a balanced survey of current applications of advanced electronics.

TE 259
Energy Conversion Laboratory 0-3-1
Prerequisite: TE 156—Electrical Energy Conversion. The objectives of this laboratory are to verify the theory learned in TE 156. DC motor starting, speed control, and terminal characteristics will be investigated. Transformers, single phase and polyphase motor operations, and AC generators are studied in this laboratory.

TE 262
National Electric Code Practice 3-0-3
This course is open to any student with a basic knowledge of electricity. The course objective is to provide the student with a working knowledge of electrical wiring requirements for a safe installation that meets the current National Electric Code standards. Distribution circuit design and protection, wiring methods and materials, motors circuits, controllers, and grounding practice are included in the course topics.

TE 263
Control System Technology 3-0-3
Prerequisite: completion of Electric Technology certificate program, including calculus, or permission of D.O.T. office. The objective of this course is the study of the basic concepts and mathematical techniques needed to understand a control system. Included are the various types of control systems, transducer characteristics, process and controller characteristics. La Place transforms and analog computer fundamentals are introduced as needed in this course.

TE 264
Digital Circuits 3-0-3
Prerequisite: TE 154—Electronic Fundamentals Lab. This course presents the basic ideas and principles used in digital devices. Boolean algebra, gates, flip-flops, logic design, and number systems are presented.

Mechanical Technology

TM 101
Technical Drawing I 1-2-2
The primary objective of this course is to teach practical conventional drafting practices with emphasis on three-view drawing, sectioning, dimensioning, isometric drawing, as well as detail and assembly drawing. Topics relating to mechanical, electrical, and plastics technology are covered.

TM 102
Technical Drawing II 1-2-2
Prerequisite: TM 101—Technical Drawing I or equivalent. This course expands upon the work covered in Technical Drawing I, concentrating primarily on topics of importance to the mechanical technician. Knowledge previously acquired is put into practice with the emphasis on graphs, intersections, developments, vectors, descriptive geometry and machine elements.

TM 173
Tool and Die I 1-2-2
Prerequisite: TM 101—Technical Drawing I or equivalent design experience. Introduction into design principles including explanation of tool steels and heating procedures, tolerances, fits, and the economics of production tooling. Actual projects reflect current industrial practices of developing working drawings, and manufacturing layout, establishing sequential operations for the applied use of cutting tools, gages, jigs, and fixtures, and simple punches and dies.

TM 174
Tool and Die II 1-2-2
Prerequisite: TM 101—Technical Drawing I or equivalent preparation. Fundamentals of die operations, various types and design procedures, together with actual die projects; shearing of metals in blanking and trimming dies; pressure computations and calculations of blank sizes; drawing operations; power press characteristics and terminology; selection of die sets and accessories; actual design of a blanking, piercing, forming, and compound die.

TM 175
Heating and Ventilating Design 3-0-3
The course covers the fundamentals of heat load calculations. The basic design and types of steam heating and hot water heating systems including the layout and sizing of piping. Included are the types of heating elements such as convectors, unit heaters, panels and baseboard elements. Types of boilers and boiler firing equipment are studied as well as mechanical ventilation and types of fans and their characteristics. Air outlets used to distribute the air in a space are discussed as to location, selection, and application. Included is the study of air cleaners used in ventilating systems.

TM 176
Air Conditioning Design 3-0-3
This course combines the fundamentals of basic heating, ventilating, and air conditioning design and applies them to the designing of a complete air conditioning system for a building. The various design methods used for low and high pressure duct systems are studied in detail. Also, different types of air conditioning equipment and systems and basis for selection are explained. The automatic control of these systems is discussed.

TM 276
Refrigeration Design 3-0-3
Principles of refrigeration, refrigeration cycles, capacity, and performance; food preservation, freezing, cold storage, other applications; compressors, evaporators, condensers, receivers, flow controls; auxiliary equipment, heat transfer, and insulation; refrigerants; controls, cycling, balancing; piping; electric motors and controls; bibliography for further study.

TM 277
Machine Design I 3-0-3
Prerequisite: TS 112—Technical Mathematics II, TM 102—Technical Drawing II, TS 118—Mechanics II, TS 117—Mechanics of Materials. A theory and problem solving course for the design of machine elements. Properties of materials, the analysis of stress and displacement. Theory of failures of machine components, fasteners, bearings, lubrication, shaft design, brakes, and transmission drives are discussed.

TM 278
Machine Design II 2-1-2
Prerequisite: TM 277—Machine Design I or equivalent preparation. A continuation of Machine Design I including the design of clutches, power screw springs, gears, cams, and flywheels; also, the selection of gears, sprockets, timing belts, pulleys, and other transmission equipment. Design projects are assigned.

TM 279
Mechanisms 3-0-3
Prerequisites: TM 101—Technical Drawing I, TS 112—Technical Mathematics II, TS 118—

Mechanics II. Course presents an introduction to kinematic terminology, principles of motion analysis, velocity and acceleration analysis; linkages; and the analysis of cams and cam followers, gears and gear trains, and mechanism trains.

TM 283
Shop Production Methods 1-2-2
Course covers safety, process planning, precision measuring, gaging, casting techniques, automation, and numerical control. Individual projects familiarize students with lathe, drill press, shaper, milling machine, and welder.

Plastics Technology

TP 191
Properties of Plastics 3-0-3
An introduction to the history of plastics and the classification of plastic materials. The classification of properties is discussed including mechanical, thermal, chemical, electrical, and optical. Rheology, flow, and deformation are followed by fabricating techniques, mixing, and compounding.

TP 192
Plastics Application Techniques 3-0-3
Basic review of competitive industrial processes and techniques used in the production of plastic items; materials selection for major application areas for plastics such as food and drug packaging, automotive, appliances, buildings and structures, furniture, and textiles; comparisons of molding techniques such as injection, rotation, slush, foam, thermoform, and blow molding for thermosets; comparison of extrusion techniques for sheet, film, fibers, and profiles; effects of fillers; composite structures, laminating, marking, decorating, bonding, machining, metallizing, coating, and assembly operations. Ecological and safety considerations in plastics usage.

TP 193
Plastics Injection Molding 3-0-3
Prerequisite: TP 191—Properties of Plastics or TP 192—Plastics Application Techniques or equivalent industrial experience. An intensive discussion of injection molding of thermoplastics and thermoset materials with major emphasis on actual manufacturing practices. Factors in selection of materials, machines, molds, and auxiliary equipment will be covered. Fundamentals of product and mold design, quality control, cost estimation, trouble-shooting of molding problems, shop safety, and plant visits are also included.

TP 194
Extrusions of Plastics 3-0-3
Prerequisite: TP 191—Properties of Plastics or TP 192—Plastics Application Techniques or equivalent experience. This course includes introduction to extrusion processes with definitions, study of materials and properties; extruder components, dies, operation, application and products. Other types of melt processing are discussed along with compounding, applications, methods, and economics.

TP 196
Plastics Mold Designing 3-0-3
Prerequisite: TM 101—Technical Drawing I and TP 191—Properties of Plastics or TP 192—Plastics Application Techniques or equivalent experience. Fundamentals of injection, compression and transfer mold design. Two and three plate molds, side action and unscrewing techniques, design practice, injection and ejection techniques, mold calculations, mold materials and manufacture; board work in the preparation of mold drawings.

TP 295
Processing of Plastics Laboratory 1-2-2
Prerequisite: TP 191—Properties of Plastics or TP 192—Plastics Application Techniques or equivalent experience. Principles of processing plastics on machinery and test apparatus commonly used in industry; studies of melt flow characteristics of typical resins in extrusion, injection molding, and compression molding; testing of melt flow and physical properties of plastics in accord with commercial methods for characterization and assurance for use in production.

TP 298
Plastics Manufacturing Laboratory 1-2-2
Prerequisite: TP 191—Properties of Plastics or TP 192—Plastics Application Techniques or equivalent experience. Analysis of plastics manufacturing procedures and machinery for product criteria applicable to bottles, containers, closures, packages, electrical insulators, wire and cable, housewares, appliances, building components, pipe and profiles, automotive units, fabrics, foams and composites. Selected hands-on operation of plastics fabrication machinery to develop methods for optimization of production rates, molding quality and properties. Make comparisons of feedback process control with manual control of injection molding. Study the effects of process variables on the properties of moldings and extruded parts.

Humanities

TH 101
Effective Communications 3-0-3
Course deals with fundamentals of effective writing and speech. Punctuation, mechanics, and grammar are reviewed. Under supervision, clear, concise paragraphs and themes are written. In the area of speech, fundamentals of oral presentations, speech habits, speech organization, and pronunciation are emphasized. Students are encouraged to think on their feet and have an opportunity to give talks before the group as well as to experience group reactions.

TH 102
Technical Writing 3-0-3
Prerequisite: TH 101—Effective Communications or equivalent. A continuation of Effective Communications, this course stresses the preparation of business letters, reports, abstracts, and other similar papers directly affecting the student's technical field.

Sciences

TS 010
***Basics of Algebra** 3-0-3
An introductory course in algebra covering an overview of basic algebraic concepts. Course material will include signed numbers, solving linear equations, monomials and polynomials, exponents and roots, factoring, graphing techniques, trigonometric definitions, and word problems. This course may not be applied towards any of the Certificate Programs.

TS 111
***Technical Mathematics I** 3-0-3
Prerequisites: high-school diploma including one year of high-school algebra or TS 010. This course reviews fundamental concepts, operations, functions and graphs. Trigonometric functions are covered along with systems of linear and quadratic equations, factoring, and complex numbers. Trigonometric functions of any angle or number, graphs, vectors and oblique triangles are discussed. Numerous applications are included from many fields of technology.

TS 112
***Technical Mathematics II** 3-0-3
Prerequisite: TS 111—Technical Mathematics I. This course covers exponents and radicals, j-Operator, and logarithms. Additional types of equations, systems of equations, and equations of higher degree are discussed. Topics also covered are determinants, matrices, inequalities, and variations. Applications from physics and various fields of technology are emphasized throughout the course.

TS 113
***Principles of Chemistry** 2-1-2
A first course in chemistry designed to provide a knowledge of the fundamental principles concerning the composition and relations of the states of matter. Atomic structure, bonding, equations, gases, solutions, problem solving, and chemical equilibrium are covered. Laboratory experiences are included.

TS 114
***Mechanics I** 3-0-3
Prerequisite: TS 111—Technical Mathematics I. A course in statics involving a study of the fundamental principles of the mechanics of rigid bodies. Topics included are vectors, forces, moments, center of gravity, free-body diagrams, equilibrium, simple trusses, friction, and moment of inertia.

TS 115
Applied Calculus I 3-0-3
Prerequisite: TS 111 and TS 112—Technical Mathematics I and II. Course begins with basic plane analytic geometry followed by the derivative and its applications. Integration and the applications of integration are covered as well as derivatives of the trigonometric, inverse trigonometric, exponential, and logarithmic functions. Methods of integration are also discussed. In all topics, applications in the technologies are stressed.

*Tuition free to residents of Newark, N.J.

TS 116
Applied Calculus II 3-0-3
Prerequisite: TS 115—Applied Calculus I. This course continues with polar coordinates, empirical curve fitting, and the expansion of functions in series. An introduction to partial derivatives and double integrals is presented. Concluding topics in the course are first-order and second-order differential equations and other methods of solving differential equations. Applications in various areas of technology are covered.

TS 117
Mechanics of Materials 3-2-4
Prerequisites: TS 111 and TS 112—Technical Mathematics I and II, TS 114—Mechanics I or equivalent. Study of stresses and deformations in structural members due to axial tensile and compressive loads, torsional loads on shafts, and bending and shear loads on beams. Course includes basic design of structural members based on the analysis of stress and deformation.

TS 118
Mechanics II 3-0-3
Prerequisite: TS 114—Mechanics I. A course in dynamics involving a study of the motion of rigid bodies and the forces causing their motion. Topics included are speed, velocity, acceleration, circular motion, Newton's laws of motion, mass, weight, work, energy, conservation of energy, impulse and momentum, conservation of momentum, simple harmonic motion, and pendulums.

TS 210
Basics of Supervision 3-0-3
The qualifications, duties, and responsibilities of supervisors with special emphasis on supervisory relations with people will be presented. The course will include planning and assigning work, instructing on-the-job, appraising performance, handling grievances, and maintaining morale. Special attention will be given to the supervisor's role in the organization's equal employment opportunity and affirmative action programs, accident prevention and safety programs (OSHA), union contract administration, and programs to increase employee productivity. Case studies will be utilized.

TS 211
Safety 3-0-3
This course is designed for supervisors at various departmental levels involved with the Occupational Safety and Health Act (OSHA). Discussions include industrial safety programs and the functions of safety committees for compliance with current changing regulations. Environmental regulations concerning air and water pollution are also covered.

TS 212
Environmental Chemistry 3-0-3
Prerequisites: TS 113—Principles of Chemistry and permission of the instructor. Methods of determining pollutants will be discussed in general terms and some specific test methods will be described in detail. Standard methods of water analysis will be emphasized and other topics will include air pollution analysis, solid waste disposal, recycling and pesticide residue analysis.

TS 216
Technology of Materials 3-0-3
Prerequisites: TS 113—Principles of Chemistry or permission of the instructor. This course examines mainly solid materials from the viewpoint of atoms or molecules and the effect of their structure on the final properties. Crystals, metals, and plastics are the materials studied with relation to the mechanical, electrical, and chemical properties.

Studies Leading to the Bachelor of Science in Engineering Technology

Graduates with a certificate in technology may decide to pursue a bachelor's degree in engineering technology (B.S.E.T.) at NJIT. They may do so by completing an A.A.S. degree at a community college or by completing a bridge program with the approval of the associate or assistant chairperson for engineering technology of the respective department. The bridge program is composed of those additional courses required for admission to any of the engineering technology options: computer engineering, construction and contracting, electrical systems, environmental engineering, manufacturing, and mechanical systems. An option in surveying is under development. Detailed program descriptions of these six B.S.E.T. options may be found in the undergraduate catalog.

Admission to the B.S.E.T. with an Associate Degree

Students who hold an appropriate associate degree from an accredited college may apply for transfer into the B.S.E.T. program through the undergraduate admissions office. Their college work prior to admission must include 64 credits as follows:

17 credit hours of basic sciences and mathematics of which at least 8 semester credit hours are the study of appropriate mathematics;

12 credit hours consisting of social science/humanities of which at least 6 semester credit hours are the study of communications;

32 credit hours of technical courses including technical sciences, technical specialties, and technical electives.

3 credit hours of Computer Science.

An application may be secured from the NJIT Office of Admissions. The applicant will follow the procedures for transfer admission as outlined in the undergraduate catalog.

Admission to the B.S.E.T. with a Certificate in Technology

In order to apply for admission to the B.S.E.T. program, a holder of a certificate in technology should first contact the associate or assistant chairperson for engineering technology of the department in which the certificate has been earned. He/she will advise the student of the community college programs that lead to an A.A.S. degree in the student's field of interest that will qualify the student for admission to a specific B.S.E.T. program. He/she may also advise the student as to the additional courses needed to qualify for admission to the respective B.S.E.T. options. These courses will constitute the appropriate bridge program the student will follow. Each course must be completed with a grade of 2.0 or better.

Upon completion of the A.A.S. degree or the full bridge program, the student must submit an application for admission to the B.S.E.T. The application may be obtained from the undergraduate admissions office and is processed on the same basis as a transfer admission. An admissions advisor will assist the student with the procedures to follow.

Typical Bridge Programs

The following courses are required of students pursuing a bridge program:

Students who have obtained a certificate in Mechanical Technology

Bridge to the B.S.E.T. *Construction and Contracting Option* or *Manufacturing Option:*
1 course in Applied Calculus: (TS 115, 116 or equivalent)
2 courses in Humanities/Social Science: (Hum 112, 231 or equivalent; SS 201, 210, 221 or equivalent)
3 courses in Science: (Chem 301 or equivalent; CIS 202).

Bridge to the B.S.E.T. *Environmental Option*
1 course in Applied Calculus: (TS 115, 116 or equivalent)
2 courses in Humanities/Social Science: (Hum 112, 231 or equivalent; SS 201, 210, 221 or equivalent)
2 courses in Chemistry/w Lab: (one course must be Chem 301 or equivalent)

Bridge to the B.S.E.T. *Mechanical Option*
2 courses in Applied Calculus: (TS 115, 116 or equivalent)
2 courses in Physics/w Lab: (Phy 105, 106 or equivalent)
1 course in Chemistry/w Lab: (Chem 301 or equivalent)
2 courses in Humanities/Social Science: (Hum 112, 231 or equivalent; SS 201, 210, 221 or equivalent)

Students who have obtained a certificate in Plastics Technology

Bridge to the B.S.E.T. *Environmental Option*:
1 course in Applied Calculus: (TS 115, 116 or equivalent)
2 courses in Humanities/Social Science: (Hum 112, 231 or equivalent; SS 201, 210, 221 or equivalent)
2 courses in Chemistry/w Lab: (Chem 301 or equivalent)
1 course in Electrical: (TE 151 or equivalent)

Students who have obtained a certificate in Architectural Technology or Construction Technology

Bridge to the B.S.E.T. *Construction and Contracting Option* or *Manufacturing Option:*
1 course in Applied Calculus: (TS 115, 116 or equivalent)
2 courses in Humanities/Social Science: (Hum 112, 231 or equivalent; SS 201, 210, 221 or equivalent)
2 Physics courses: (Phy 102, 103 or equivalent)

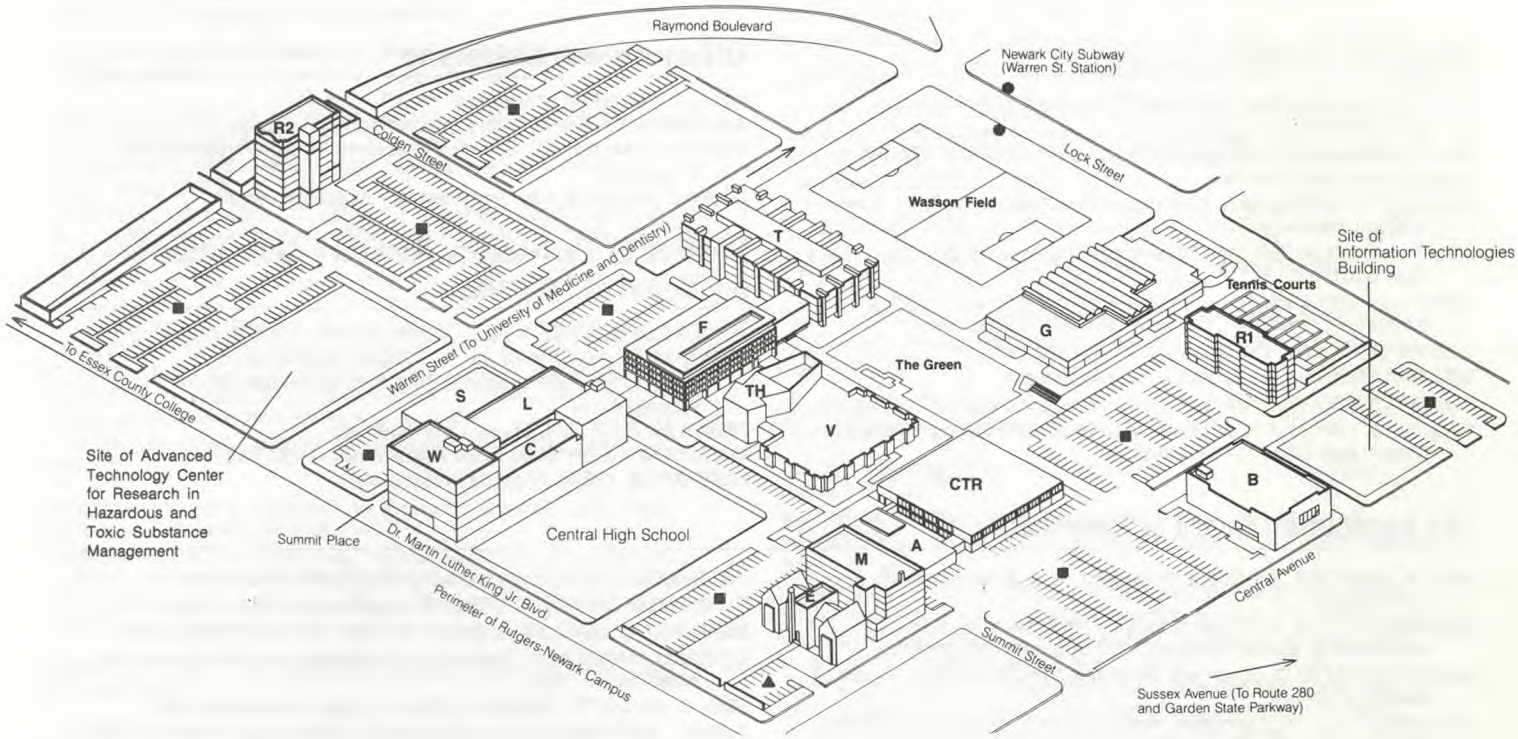
Bridge to B.S.E.T. *Environmental Option*:
1 course in Applied Calculus: (TS 115, 116 or equivalent)
2 courses in Humanities/Social Science: (SS 201, 210, 221 or equivalent)
2 courses in Chemistry/w Lab: (one course must be Chem 301 or equivalent)

Students who have obtained a certificate in Electrical Technology or Computer Technology

Bridge to the B.S.E.T. *Electrical Option*:
1 course in Applied Calculus: (TS 115, 116 or equivalent)
2 courses in Humanities/Social Science: (Hum 112, 231 or equivalent; SS 201, 210, 221 or equivalent)
3 courses in Science: (CIS 202 or equivalent; Phy 102, 103 or equivalent; Chem 301 or equivalent)

Bridge to the B.S.E.T. *Environmental Option*:
1 course in Applied Calculus: (TS 115, 116 or equivalent)
2 courses in Humanities/Social Science: (Hum 112, 231 or equivalent; SS 201, 210, 221 or equivalent)
1 course in Science: (Phy 102, 103 or equivalent)
2 courses in Science: (CIS 202 or equivalent; Phy 102, 103 or equivalent; Chem 301 or equivalent)

Map of the NJIT Campus



KEY TO MAP

Campbell Hall	C
The Hazell Center Cafeteria, Pub, Bookstore, Ballroom, Meeting Rooms	CTR
Colton Hall	L
Cullimore Hall	M
Eberhardt Hall	E
Entwisle Physical Education Bldg	G
Faculty Memorial Hall	F
Mechanical Engineering Center	B
Residence Hall I	R1
Residence Hall II	R2
Specht Building	S
Theater	TH
Tiernan Hall	T
Van Houten Library	V
Weston Hall	W
Wilson Alumni Center	A
Parking	■
Guest Parking	▲
Newark Subway (Warren St. Station)	●

TRAVEL DIRECTIONS TO NEW JERSEY INSTITUTE OF TECHNOLOGY

New Jersey Institute of Technology may be reached via the Garden State Parkway and New Jersey Turnpike from north and south, and via Interstate Route 280 from east and west.

Garden State Parkway: Take exit 145 to Route 280 East, then follow Route 280 Eastbound directions below.

New Jersey Turnpike: Take exit 15W to Route 280, then follow 280 Westbound directions below.

Route 280 Eastbound: Follow signs marked King Boulevard-Harrison. Take King Boulevard Exit 14A and turn right at traffic light. Campus is one block past the third traffic light.

Route 280 Westbound: Take Broad Street Exit 15. Turn left at foot of ramp. Go one short block to stop sign, then turn left on King Boulevard. Campus is one block past the fourth traffic light.

Routes 1, 9 and 22: Take exit marked Newark which leads to McCarter Highway (Route 21). Travel through city and turn left onto Raymond Boulevard. Campus begins at the end of the boulevard.

New York Thruway: New York Thruway Exit 14A connects directly to the Garden State Parkway. Then follow the Parkway directions above.

George Washington Bridge: Follow N.J. Turnpike south to Exit 15 W onto Route 280 West. Then follow Route 280 directions Westbound above.

Lincoln Tunnel: Proceed westbound on Route 3 to New Jersey Turnpike. Follow Turnpike south to Exit 15W onto Route 280 West. Then follow Route 280 directions Westbound above.

Holland Tunnel: Follow signs to N.J. Turnpike, and take Turnpike North to Exit 15W onto Route 280. Then follow Route 280 directions Westbound above.

Visitor Parking at the NJIT campus is controlled from a security station in front of Eberhardt Hall, which is located on the corner of King Boulevard and Bleeker St. Visitor parking must be reserved in advance through your host. Other parking is available on campus during weekend activities and special events.

OTHER TRANSPORTATION SYSTEMS

From Newark International Airport: A minibus (Newark Airlink) connects the airport with Newark's Pennsylvania Railroad Station. Bus, subway, and taxi connections may be obtained at the station.

Newark Erie-Lackawanna Railroad Station: Taxi service only.

Newark Pennsylvania Railroad Station: Connections to the NJIT campus may be made by taxi, city subway or bus service from the station. Visitors should seek assistance for departure points and bus numbers from station representatives.

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Adjunct Faculty of the Division of Technology

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**Registered Architect
†Licensed Professional Engineer and Land Surveyor
‡Licensed Professional Planner

All individuals listed below are Special Adjunct Instructors in the Division of Technology certificate courses.

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In N.J. 1 (800) 222-NJIT

Division of Technology:
The Division of Technology office is located in Cullimore Hall, Room 210. Office hours are 8:30 a.m. to 4:30 p.m. during the academic year. Evening and summer hours will be announced.

Admissions Information:
Office of Admissions
New Jersey Institute of Technology
Newark, New Jersey 07102
(201) 596-3300

For Transcripts:
The Registrar
New Jersey Institute of Technology
Newark, New Jersey 07102
(201) 596-3236

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Technology