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IX

ACADEMIC SERVICES

Introduction

Academic services seek to establish a positive university climate that fosters the development and retention of students through the provision of a complement of appropriate programs and services. The organizational structures for academic services are designed to promote ease of use, cost effectiveness and efficiency of service delivery. Common threads among the academic service areas are the use of advanced technologies to enhance the delivery of services, and the development of cooperative relationships with Rutgers-Newark and other institutions of higher education.

The areas included in this chapter are: the library; computing services; experiential education and career services; extension programs; continuing education; and distance learning and media services. To better direct and coordinate these activities, as well as a number of related university services (pre-college programs, admissions, student services, freshman studies and physical education), a new associate vice president was hired in August 1990.*

Library

The Robert W. Van Houten Library provides resources, systems and an educational environment in support of the instructional and research programs of the university. In 1990, the Library's holdings included 147,777 volumes (an 11.2% increase since 1986). Periodical subscriptions totaled 1,735 (a 5.2% increase since 1986). The collection emphasizes the

fields of engineering, technology, science, mathematics, architecture, management and computer science. The depth of the collection is greatest in those disciplines offering the doctoral degree. The Library also includes a rare book collection of approximately 250 works which illustrate the development of science and technology over the past three centuries. Special collections include the Edward Weston Collection of personal papers, books, and equipment and the Edward C. Molina collection of 1200 books devoted to mathematics, probability, astronomy, and related subjects.

Library usage has grown, particularly over the past five years. The library's current schedule represents a 16% increase in on-campus hours of service since 1987. Materials are also made available to the libraries at Drew University and Burlington County College to support NJIT's off-campus programs at those locations. At least 10,640 reference questions were answered in the past year. Together with a 50% increase in circulation statistics since 1987 and a 59% increase in items lent through interlibrary loan, the number of primary and secondary users is growing.

These statistics, as well as a 34% increase in mediated on-line searches using DIALOG in the last four years and extensive use of five CD-ROM workstations can be credited to the bibliographic instruction program. The library has produced a slide and sound program for use during presentations on its services and facilities at pre-college programs, freshman orientation seminars, and undergraduate and graduate level classes. Librarians participate in this activity as part of their reference duties. In addition, in the past eighteen months, four general information guides were revised and seventeen new guides

^{*}With the exception of Computing Services, which reports directly to the Provost.

created for key research topics. These include information on local collections in addition to NJIT's holdings.

Cooperative agreements for resource sharing are in effect with other institutions and organizations. The Library is an active member of the New Jersey Academic Library Network, the Council for Higher Education in Newark, and the Essex-Hudson Regional Library Cooperative and has an associate membership in the Research Library Network. Books may also be borrowed and photocopies of articles obtained from libraries across the country and internationally using traditional interlibrary loan arrangements now enhanced with on-line systems and telefacsimile equipment, largely as a result of State grants totalling \$100,000 over a three-year period.

Despite these indications of growth and development, however, the reality is that library progress did not keep pace with other areas of institutional development as NJIT was rapidly becoming a comprehensive technological research university. Collection development did not meet the changing needs of a more research focused institution, especially in areas where programs were added in this past decade. New information technologies were not implemented as quickly as they might have been. Space, staffing and budgets were inadequate to the task of developing a modern research library.

This situation began to change about a year ago, with the momentum picking up quickly. Several major developments underway are key to a significantly strengthened focus on the library:

• A five-year strategic plan for the library has been presented to the academic deans and senior administration. Objectives include:

> improving the quality of information resources through increased buying and selective withdrawing;

improving the ability to provide user services;

offering practical, cost-effective new products and services; and

recovering the costs of selected services.

- A newly installed integrated library system supports an online catalog accessible through the campus network. The goal is to make a broad spectrum of electronic information services such as bibliographic databases and document request and delivery available campuswide.
- The University Library Committee has been reorganized, with representation from all colleges, departments and related offices. It has drafted a mission statement that recognizes the increased university research activity, the importance of information literacy and the value of internal and external partnerships, especially through electronic networking, (see below). The collection policy is designed, in part, to expand collections systemically to support all levels of instruction and research, with special attention to the needs of developing programs.
- Formal partnerships are in various stages of development with Rutgers-Newark, the University of Medicine and Dentistry of New Jersey and the Engineering Societies Library in order to increase collection access, do joint collection development and improve service delivery to users.
- A University Librarian was recently recruited. Her extensive experience includes five years as director of the Bellcore Library Network, as well as other corporate and public library positions. She has also taught library management courses at the university level.

ROBERT W. VAN HOUTEN LIBRARY

MISSION STATEMENT

The mission of the Robert W. Van Houten Library is to provide resources, systems and an educational environment in support of the instructional and research programs of the university. This responsibility extends to students, faculty, administrators and scholars in undergraduate programs, graduate and professional education, research centers and public services. A partnership with faculty and scholars to teach information management skills in preparation for lifelong learning and research is fundamental to fulfilling the goals of the university. By taking an active role in collaborative efforts with other libraries and entities, the university benefits from high quality services and collections while sharing information and access to its unique resources.

· A new library facility is under construction with planned occupancy in the Fall of 1992. The building program was developed following universitywide interviews to identify and meet existing curricular and programmatic needs, while maintaining flexibility to incorporate new technologies and changes in information storage formats. Students will be provided with a variety of study environments; spaces are also designed to stimulate increased use of the library by faculty and graduate students. The building will have 40,000 square feet of usable space, one-third more than the current library, and 40% additional shelf space. Moreover, the design offers a rational way to nearly double the size of the facility in the future. (The present library was not designed for expansion.) The four-story structure will include an interactive instruction room, two rooms for microforms, a library instruction classroom, bibliographic consultation areas, and group study rooms.

A primary consideration in these recent activities is accessibility of the library's collections and services to all members of the university community and, especially, increased

electronic access to information and materials in the library's collection, as well as to regional, national and international databases. Ready access to large data bases is critical to the library's future effectiveness, as is an expanded program of library instruction for information literacy.

With the expansion of programs and services comes the likely need for more staff. Services are presently provided by eight full-time librarians holding master's degrees in library science. It is not only important to prepare this staff for their changing roles, to reorganize work groups, and to revise operating procedures, but also to engage additional personnel as may be required to fulfill the mission of the library and to interact more closely with all segments of the university community.

Computing Services

Since 1984, NJIT has taken major steps to become computing intensive. Consistent with the 1983 computing master plan, the availability and use of computing facilities have grown dramatically. Current capacity includes 3 mainframes, 30 minicomputers, 200 workstations, 4.0 gigabytes of memory, 100 gigabytes of disk capacity, approximately 320 terminals and 4,200 microcomputers. Computing

applications are now integrated into most areas of academic programming. Major activities in the last five years include:

- provision of microcomputers to all fulltime incoming freshmen since 1985 and AT class machines since 1990;
- creation of four microcomputer labs, one with ten PC/XT compatible machines, a second with fifty PC/AT EGA compatibles, a third with fifty PC-386 SVGA compatibles, and the last with fifty PC-486 SVA compatibles;
- installation of a DEC VAX 6430 mainframe and a DEC server 5500 to support academic programs;
- creation of a Simulation Animation Modeling Lab;
- creation of a Computer Integrated Manufacturing Software Development Lab;
- networking of the entire campus with more than 2,500 nodes;
- creation of a Faculty Resource Center to support instructional computer integration;
- creation of the Manufacturing Systems Analysis and Optimization Lab; and
- linkage to the Pittsburgh Supercomputer Center via NSF Net and installation of Silicon Graphics Workstations for visualization of Supercomputing.

To date, NJIT has invested heavily in computing equipment in order to achieve a level of computing intensiveness that has placed the university in the national forefront. The challenge now is to increase use of the equipment in a creative and effective manner to derive the

greatest educational benefit for the students, and to foster a rich and diverse intellectual environment in which faculty can make the maximum contribution to their fields. Toward these ends, multiple interconnected networks, linking all users to the hardware and software needed to perform desired computing activities, with access to voice, image and video transmission capabilities, are being developed.

Experiential Education and Career Services

NJIT has a long history of commitment to experiential and career services for students. Experiential education at NJIT includes student participation in academically integrated co-op education, internships, community service, independent study, senior or graduate projects and theses that involve work in the public or private sector. It expands the opportunities and modes for learning, as well as the structure and means to demonstrate and evaluate the mastery of subject matter.

In response to changing demographics and socio-economic trends, NJIT's Division of Co-op, Internships and Student Employment was established in January 1987 to bring together and further develop a number of existing programs. Recently retitled Career Development Services, the division now coordinates programs and provides service in four areas: cooperative education and internships; career planning and placement; student employment; and community and public service.

The Office of Career Planning and Placement provides counseling and job placement assistance. During 1989-90, the office posted full-time, permanent jobs from over 1,400 companies. Alumni comprise 40% of the population that uses the office's services. Placement rates and starting salaries tend to be relatively high. Of those responding to a survey of 1990 graduates, bachelor degree recipients reported an average salary of \$30,411, an increase of 4.6% over the starting salaries of 1989 graduates and approximately 2.78% higher

than the national average for the same subject areas. Graduates in the class of 1990 received an average of 1.26 job offers. Nearly all (85.9%) graduates who responded to the survey were employed by mid-summer.

NJIT's Cooperative Education Program was reinstituted in 1976 following several decades of inactivity. Originated in the 1920s to provide additional funds for students and make available on-the-job experience, the cooperative education program provided summer job placements during the students' first two years and then alternated work and school. The reestablished program began with the placement of 26 mechanical engineering majors in 1976. It grew slowly over the next decade to the placement of 120 engineering and computer science students in 1986.

With the aid of a \$850,000 five-year Title VIII Federal Co-op Grant (the largest federal grant awarded in that category in 1987) and state funding (1987-89), NJIT's co-op and internship programs currently provide a full spectrum of career services to over 900 students annually. Between 400 and 500 participants complete major-related, academically linked work experiences per year. In 1990-91, Co-op participants earned a total of \$3.1 million. As part of the Title VIII grant, Project CAP: a career advancement plan for women and minorities, BS/MS internships, and Graduate Co-op options were initiated and the undergraduate component expanded.

The value of a co-op program is largely a function of the assignments students receive and the extent to which the co-op experience and academic study are mutually informative. In 1987, faculty at NJIT became integral to the Co-op Program when students were able to earn degree credit for the satisfactory completion of co-op courses. A disagreement arose, however, between the Office of Cooperative Education and several departments about the awarding of credit for the co-op work experience. Pursuant to an academic review process, a policy was established according to which up to six degree credits could be awarded for field placements

while completing two co-op courses. As agreed, this policy was reviewed by faculty in 1991 with the result that individual departments may now determine whether to offer credit for co-op.

Central to this issue is the question of whether the success of co-op is related to the awarding of credit for the experience. A study is under consideration for the purpose of collecting additional information on this issue. In the meantime, efforts are being made to maintain open lines of communication. Formal mechanisms include a Co-op Advisory Committee, regularly scheduled meetings of faculty co-op advisors, and a co-op newsletter. Ongoing informal communication is also necessary to the smooth functioning of the co-op program as it continues to grow. An effective coop program must have faculty, co-op administrators, students and employers working together to define appropriate placements and ways to integrate the academic and work experiences.

NJIT's career advisement services have also been expanded. A career course that is open to all sophomores was introduced in 1988. In 1989, a series of career information seminars with corporate panelists with similar majors, but with different career paths, was offered. Students and alumni also have access to two job-search data bases: Connexion and Kinexus. In 1988-89, the Division assumed responsibility for administering all on-campus student employment and initiated an off-campus job location service for summer and part-time jobs. And in 1990, a community based work/study program was introduced.

From 1989 to 1991, the Co-op Division received \$200,000 in grants from the New Jersey Department of Community Affairs to administer the Housing Fellows Program that places student interns in the non-profit housing sector. This project, together with a 1990-92 FIPSE grant from the U.S. Department of Education, laid the foundation for the implementation of the NJIT Service Corps in March 1990. (See Chapter X)

With a changing marketplace and new NJIT programs, student careers are increasingly

Academic Services

diverse. NJIT's goal is to provide experiential education opportunities and career services for all eligible students to enhance their probability of graduating and succeeding in their chosen professions, and functioning fully as contributing members of their communities and society. A key component in meeting this goal is more complete integration of the experiential education opportunities available into existing academic programs. Approaches include implementation of additional placement patterns, work-site and public service projects, technical assistance internships, and co-op participation in facultyapproved areas, as well as expansion of Project CAP and the BS/MS Program. Special efforts will be made to serve more students from traditionally underrepresented groups, as for example, through an increase in the number of CAP scholarships. With the Title VIII grant coming to a close, resources must be identified to maintain and further develop existing programs.

Extension Programs

NJIT's Office of Extension Programs has administrative responsibility for credit-bearing courses and degree programs presented at locations other than the main campus in Newark. The Director reports to the Assistant Vice-President for Academic Affairs - Enrollment Planning. The mission of the Office of Extension Programs is to make an NJIT education accessible to students who cannot take courses on the main campus. Off-campus sites make the programs geographically accessible, and early evening courses accommodate the needs of working adults. Programs offered at corporate sites meet the needs of New Jersey employers who desire specific types of education for their work force. Whether providing only selected courses or presenting full degree programs, NIIT brings all the appropriate resources to students at all locations.

NJIT began its Extension Program in 1974, when courses in Computer and Information Science were presented at Drew University. The following year, the Computer Science

Department added courses at RCA-Moorestown. The enrollment head count in Fall 1975, was 102 registrations. In Fall 1991, NJIT had eleven extension sites and offered courses in eight areas of specialization. (See Appendix 7) Degree programs (M.S. in Computer Science) are offered at two sites, Cinnaminson and Drew University, both of which are Middle States and New Jersey Department of Higher Education accredited branch campuses.

As Table 9.1 indicates, the 1991 enrollment head count was approximately 650, an all-time high. Since 1986, locations have changed, and programs have been initiated and discontinued, but the commitment to Extension Programs has continued. The majority of discontinued sites are at corporate locations where downsizing has limited employers' ability to support programs. In 1991, courses were offered at three new sites: Felician College, Ramapo College and Hamilton Township in Mercer County.

An important new off-campus initiative is the joint development with Burlington County College (BCC) of a Technology Education Center in Mount Laurel. Currently in the design phase, the facility will ultimately house upper division and graduate NJIT programs, as well as two-year programs offered by Burlington County College. Funds have been secured from the State for the first building and Burlington County has purchased a 74-acre site. A cooperative agreement has been endorsed by both Boards. The site allows for construction of additional educational facilities by both NJIT and BCC in the future.

Faculty for off-campus courses are selected and hired by the academic departments. To the extent possible, full-time faculty are assigned to teach in Extension Programs. Adjunct faculty assigned to the program are screened by the departments and often teach on a part-time basis on the Newark campus. Curricula, course outlines, program and course objectives, and the selection of text books and other learning materials are the responsibility of the departmental faculty teaching the courses.

Table 9.1 EXTENSION PROGRAM OFFERINGS **FALL 1991**

OCATION	AREA(S) OF STUDY	ENROLLMENT
AT&T Middlesex County	Master's level ∞urses, Computer Science	104
Brookdale Community College Monmouth County	Third year courses, Electrical Engineering	47
Burlington County College Pemberton	Second and third year courses, B.S.E.E. curriculum	26
Camden County College Blackwood	B.S.E.T. courses, Electrical Engineering Technology	20
Central Jersey Hamilton Township Mercer County	Master's level courses, Computer Science, Electrical Engineering, Mechanical Engineering, and Transportation; Management added in Spring, 1992	104
Cinnaminson Burlington County	M.S. degree program, Computer Science	52
Drew University Morris County	M.S. degree program, Computer Science Master's level courses, Management	199
Exxon-Clinton Hunterdon County	Master's level courses, Chemistry	6
Felician College Bergen County	Master's level courses, Computer Science and Management	15
Mercer County College West Windsor	B.S.E.T. courses, Construction and Contracting Engineering Technology	32
Ramapo College Bergen County	Master's level courses, Management	<u>42</u> 647

Off-campus programs and courses meet the same academic criteria as on-campus offerings. And assessment is carried out by the academic departments, using the same methods utilized on the main campus.

When prospective students are evaluated for admission, NJIT considers their work experience and on-the-job training, as well as their academic backgrounds. Faculty are encouraged to recognize the work and life

experience of their students when considering admissions. Within the academic parameters established by the various departments, a student's assignments and projects are often an outgrowth of specific problems or tasks encountered outside the classroom. Given a choice of courses to present in a program, departments and faculty are encouraged to select options relevant to the specific interests of the students.

In most cases, the Office of Extension Programs provides on-site registration and advisement for all programs. In some cases, this is accomplished by faculty and departmental staff travelling to the location. In others, a faculty member on a host campus is appointed by NJIT to serve as an on-site liaison. A full-time faculty member at NJIT is assigned to each location to provide academic oversight. Extension Program students are bound by all NJIT rules and regulations. However, it is recognized that their physical separation from the main campus requires flexibility. The Office of Extension Programs has primary responsibility for keeping students informed of impending deadlines. program changes, and related matters.

NJIT's commitment to Extension Programs is evidenced by its financial support of the programs. The academic departments are responsible for determining the on-site needs for library and computing resources. The necessary books, software, hardware, licenses and other materials are purchased through the Office of Extension Programs. In some cases, teaching assistants are assigned to a program by a department. Extension program students may also use any of the facilities on the main campus and can access the NJIT computer system via modem. In all programs open to the public, students are charged the same tuition and fees as students on the main campus; there is no additional fee or surcharge. In some corporate programs, the total cost is covered by the employer; the amount paid is negotiated by the corporation and NJIT.

Course evaluations are provided by the various schools within NJIT and distributed by the Office of Extension Programs. The completed evaluations are processed by the schools, using the same methods utilized for courses on the main campus. Periodic surveys are conducted by the Office of Extension Programs to evaluate student satisfaction and determine what courses should be scheduled. The survey results are shared with the appropriate academic and administrative staff.

In the decade ahead, it is anticipated that

Extension Programs will be more closely coupled with Distance Learning (see below), so that a wider selection of courses in each program will be available to students enrolled at remote sites. Plans also call for seeking Department of Higher Education designation for a third branch campus in Mercer County, pending a decision regarding possible changes in the State's higher education regulations. NJIT presently offers courses at two sites in the county. Courses leading to a B.S.E.T. degree have been offered at Mercer County College for nearly a decade; enrollment has been small, but relatively stable, rarely exceeding forty per semester. A Hamilton Township site was opened in Spring 1991 and offers courses previously given at two other locations, as well as courses new to the area. In Fall 1991, there were more than one hundred student registrations at the site. An increase in the array of courses offered at Mercer County College and the potential for enrollment growth at the Hamilton Township location make a Mercer County branch campus designation a logical next step.

Continuing Education

NJIT has been providing continuing professional education programs for more than fifty years. For much of this time, activities were relatively modest. As an example, in 1964-65, the total operating budget of the Division of Continuing Education (DCE) was \$22,495, in contrast with \$1.16 million in 1991-92. Over the past 16 years, the Division has on average increased its revenue at the rate of 16% per year, its course offerings at 17% per year, and its enrollment at 13% per year.

In Fiscal Year 1991, DCE offered 93 programs to 3,225 participants at sites throughout New Jersey. Of these programs, 56 were customized for individual businesses, industrial clients or government agencies. In addition to serving New Jersey, other locations where DCE courses were offered include Boston, Atlanta, Pittsburgh, Washington, DC, and Raleigh-Durham, North Carolina.

One unique program, the Center for

Environmental Training and Technology
Transfer, provides training in a wide variety of
technologies dealing with hazardous materials.
NJIT has, in fact, been designated as a Superfund
University Training Site. In addition, NJIT's
School of Architecture and the New Jersey
Department of Community Affairs have
established the Community Development
Institute for which the Division provides training
in a number of housing-related areas. The
Division also offers review programs for
numerous professional exams.

As the workplace continues to experience rapid change and a need for frequently updated skills and knowledge, DCE will seek to further establish NJIT as a major provider of continuing professional, managerial and technical education for the scientific, engineering, and architectural communities. Current and planned strategies are designed to respond to the growing problem of technical obsolescence in New Jersey's workforce, as well as the growing number of under- or unemployed professionals. Current research indicates that the half-life of a software engineer's skills in 1986 was 2.5 years; for an electrical engineer, 5 years; and for a mechanical engineer, 7.5 years. As corporations continue to downsize in order to become more competitive, engineers must remain current to be employable. These individuals, though often highly motivated, frequently have neither the time nor the desire to pursue formal graduate education.

To serve this population, expanded initiatives are envisioned in four areas: (1) professional/executive/technical diplomas for employed engineers and technicians; (2) contract training for New Jersey private and public sector organizations; (3) long-term grant or contract relationships in the public sector; and (4) the establishment of a technical assistance program in areas not addressed by current initiatives. In addition to the sixteen certification programs now offered by the Division, new certificates in engineering and the building trades will be offered. Professional executive and management diplomas in such areas as Manufacturing Technology, and Rehabilitative and Assistive

Technology constitute another potential approach. These programs would focus on emerging technologies and how to manage them.

NJIT ultimately seeks to offer breadth in continuing professional education programs that parallels what is offered in degree programs. Critical to this effort is better integration of faculty into continuing education courses. Use of distance learning modalities will enable greater faculty participation, as well as economies of scale in the delivery of programs to more sites. Improved techniques to assess professional needs are also essential. To this end, DCE has engaged a unit of the College Board to conduct market research consistent with NJIT's mission.

Distance Learning and Media Services

Distance learning refers to instruction which utilizes telecommunication technologies as delivery modalities. Typically, NJIT distance learners are geographically removed from their instructor. Both time-free and time-bound deliveries are employed by the university. The material covered is comparable to traditional courses, and students demonstrate mastery through submission of assignments and examinations.

Current economic pressures on colleges and public school boards make distance learning an attractive cost saving option. It can serve as a substitute for costly physical expansion, provide faculty expertise in schools which cannot afford to hire a full-time specialist, and reach populations who might not otherwise pursue further studies. Distance learning is not a substitute for traditional instruction, however; rather, it provides flexible and innovative ways to serve broader student populations and to serve traditional populations differently. Encouraging enhanced and improved pedagogical approaches for distant learning may also enrich the traditional classroom.

The NJIT Center for Distance Learning (CDL) was organized in the spring of 1988. At the same time, the Office of Media Services created the Video Services sub-division. The

result was the formation of a distance learning production team composed of staff members from CDL and Media Services. Since the establishment of this team, there has been a substantial increase in the scope and impact of the NJIT distance learning effort. Regional and national outlets for programming, as well as enrollment, have been growing.

In 1987, seven students were enrolled in five NJIT produced undergraduate telecourses distributed over a single cable television network, Cable Television of New Jersey (CTN). In 1991 (Spring and Fall semesters), nearly 400 students were enrolled in about a dozen ACCESS NJIT telecourses distributed over regional and national cable networks (CTN) and Mind Extension University [Me/U]), an instructional television fixed service network (ITFS), and VHS tape circulation. In the spring of 1991, ACCESS NJIT added satellite distribution to its list of delivery services: a graduate course for the National Technological University (NTU) satellite system and two teacher training videoconferences for the Satellite Educational Resources Center (SERC) were offered. In addition, ACCESS NJIT coordinates a precollege program for advanced placement students which currently serves four New Jersey high schools.

CDL and Media Services have capitalized on existing technology to implement

several different telecommunications modes for distance learners: taped video alone, taped video plus computerized conferencing, and taped video plus periodic live interactive workshops. As evidence of NJIT's commitment to distance learning, over \$1 million in new facilities has been installed, including a fully equipped interactive candid classroom, a lecture hall equipped with video production and playback capabilities, and a camera studio. These facilities are interconnected via fiber optics.

As the distance learning team continues to enhance the educational experience, it is anticipated that costs incurred from development of the distance learning infrastructure will be recouped over time through increased participation. The principal challenge is to use the extensive resources developed as effectively as possible and to further strengthen NJIT's distance learning capacity. A marketing plan is being developed which will consider the development of additional videocourses (e.g., for potential community college transfers), the use of distance learning to deliver extension programs and continuing education courses, expansion of the geographic service area, installation of a videotape circulation system in the NJIT Library with implementation of a campuswide video linkage, and training programs to increase faculty participation in an evaluation of distance learning projects.