

## I. NEWARK COLLEGE OF ENGINEERING - AN OVERVIEW

Since its founding ninety years ago, Newark College of Engineering has served the citizens and industry of New Jersey by providing a technical education appropriate to the time. Originally established to strengthen the background of technicians in the burgeoning industry of the Newark area, the College has grown until it now offers a broad spectrum of programs ranging from technician training to doctoral study in engineering. The oldest institution of higher education in Newark, the College is located only a short distance from the site of its founding, just west of the central business district.

### A. The College and the City

As the largest city in New Jersey and the largest suburb of New York City (10 miles east), Newark today is an extreme example of the problems and the challenges of modern urban America. After a long period of decline, the city shows some signs of recovery, as evidenced by substantial public and private construction and a better moral tone in government.

The College is located in an area in transition. Originally a prosperous neighborhood of light industry and housing, the area gradually decayed into a depressed part of the city. Urban renewal has provided new public and private housing as well as sites for four publicly-financed colleges. In the last decade, Newark College of Engineering has expanded into a 20 acre campus, and the Newark Colleges of Rutgers, the State University, have developed an adjacent campus. Within a short walk, campuses are under construction for Essex County College and the College of Medicine and Dentistry of New Jersey in Newark. Located in the midst of the NCE-Rutgers campuses is Central High School, serving the central residential area of the city. In the years ahead, the four colleges are expected to grow into a cooperative "center of learning," thus providing an economic and social impetus to their environment.

## B. The Student Body

As a low-cost public institution, the College has traditionally attracted undergraduate students from working class families who are moving up the socio-economic ladder. Parents of the students typically have not attended college. The College has long served first or second generation Americans, although reduction in immigration has made this pattern less evident. The student body is approximately 66 percent Roman Catholic, 24 percent Protestant, 5 percent Jewish.

As available housing deteriorated or was demolished in the 1950's, and as the ethnic composition of Newark changed, a greater fraction of students began to come from the suburbs. Only about 3 percent of the student body is black. Women constitute about 2 1/2 percent. These figures are typical of enrollments in engineering colleges.

Nearly all students commute to the College from their homes in North Jersey. A small number of students live in apartments or fraternity houses near campus. Foreign student enrollment has been increasing, especially at the graduate level, but the percentage is still small.

Engineering students have been somewhat conservative politically and socially, but in recent years the College's student body has begun to demonstrate political and social awareness in common with students at other colleges. (Styles of dress and hair, for example, have altered radically in recent years.) The College's first student strike occurred after Kent State in the Spring of 1970. The faculty responded by suspending classes for two days, after which the College returned to a state of near normalcy.

Day students are involved in a wide range of extra-curricular activities, including intramural and varsity athletics. These activities range from a productive theatre club to a nationally ranking soccer team. Evening undergraduate and graduate students are usually older and employed full-time in industry; they participate very little in the extra-curricular life of the College.

The student enrollment for the Fall 1971 semester reflects the diverse technical programs offered:

|  |      |
|--|------|
| Day Undergraduate . . . . .              | 2897 |
| (Nearly all full-time)                   |      |
| Evening Undergraduate . . . . .          | 955  |
| (Part-time)                              |      |
| Graduate . . . . .                       | 851  |
| (Including about 135 full-time)          |      |
| Division of Technology . . . . .         | 705  |
| (Part-time evening technician training)  |      |
| Continuing Engineering Studies . . . . . | 550  |
| (Various non-credit short courses)       |      |

In common with engineering colleges across the country, NCE suffered a significant drop in freshmen enrollment in the Fall of 1971. This development is attributed partly to adverse publicity concerning job opportunities in engineering and partly to changing attitudes within the college-bound generation.

### C. The Faculty

Because the College has traditionally offered only engineering-oriented programs, the faculty in all departments has focused its attention on the education of engineering students. The typical engineering curriculum indicates substantial components in humanities, social science, and physical science, as well as in engineering. As a result, the number of faculty in each of these areas is large. Faculty growth in the last ten years reflects expansion of the student body:

|                                       | <u>1961</u> | <u>1971</u> |
|---------------------------------------|-------------|-------------|
| Chemical Engineering                  | 10          | 13          |
| Chemistry                             | 15          | 20          |
| Civil and Environmental Engineering   | 8           | 26*         |
| Computer Science                      | -           | 7           |
| Electrical Engineering                | 25          | 36          |
| Humanities                            | 17          | 36          |
| Industrial and Management Engineering | 12          | 15          |
| Mathematics                           | 17          | 36          |
| Mechanical Engineering                | 17          | 40**        |
| Organizational and Social Science     | 13          | 15          |
| Physics                               | <u>32</u>   | <u>29</u>   |
| Total                                 | 166         | 273         |

\* Includes 6 persons in applied mechanics, part of the physics staff in 1961.

\*\*Includes 7 persons in engineering graphics, a separate department in 1961.

In addition to these full-time faculty members, there are a number of part-time staff and graduate teaching fellows.

During the last decade, a major effort was made to recruit staff with the doctorate to support the developing graduate and research programs. At the present time, 50 percent of staff have the doctorate, and 25 percent are pursuing the degree.

The College recognizes the importance of having its engineering and science faculty maintain contact with industrial practice. Academic year and summer consulting is encouraged. The industrial complex of North Jersey makes considerable consulting available.

The faculty commutes to the College from all parts of North Jersey. A sizeable number live in New York City. A few live in Newark.

#### D. Educational Programs

The College offers undergraduate degrees in six fields: chemical, civil, electrical, industrial, and mechanical engineering, and in engineering science. The last includes options in several fields, including chemistry, computer science, mathematics, physics, and pre-medicine. A new evening program leading to the degree of Bachelor of Technology began in the Fall of 1971.

The undergraduate engineering programs are typical of the highly structured curriculums offered in American engineering colleges. They are all accredited by the Engineers Council for Professional Development. The newer engineering science curriculum offers more elective flexibility and will first be offered for ECPD accreditation in 1972.

About 50 percent of full-time students complete the B.S. in 4 years; another 10 percent take 5 years or longer; the remainder drop out or transfer to other colleges. The part-time evening program can be completed in 8 years, although many students take longer.

At the graduate level, M.S. degrees are offered in the six fields listed above, and in management engineering. Doctoral degrees are available in chemical, civil, electrical, and mechanical engineering. Most graduate courses are offered in the evening, although a few day courses have been established in the last few years.

The Division of Technology offers part-time evening certificate programs of 3 years duration in a variety of technical fields. These programs are taught by part-time adjunct staff.

The Division of Continuing Engineering Studies offers a variety of technical and management short courses, ranging from "Numerical Control of Machine Tools" to "Executive Development."

#### E. A Technological University

There is no generally accepted model for a technological university. Although a number of technically-oriented institutions use the term in describing themselves, each adjusts the model to fit its own patterns and aspirations. Typically, the technological university offers a broad range of undergraduate and graduate degrees centered around a strong engineering program, but extending into fields beyond engineering. NCE's model, which is still being defined, will focus on technical programs, including engineering, science and technology, and hopefully extending into related professional areas, such as architecture and industrial administration.

The College has already begun to evolve into a technological university. The initial development and continued diversification of its graduate and research programs may be regarded as a first step. The broadening of undergraduate offerings into non-engineering fields is a second step, still in progress.

As a prelude to further evolution, the College must define its role among the complex of public colleges in Newark -- and within a developing Master Plan for Higher Education in New Jersey.

Development as a technological university will require a re-examination of the College's services to the city, the region, and the state -- to the citizens, business and industry, and government.

The College's planning and governance will face the challenges of change in the years immediately ahead.