

# ENGINEERING NEEDS AT THE CALIFORNIA INSTITUTE OF TECHNOLOGY

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In 1921 the trustees of the Institute adopted a statement of educational policies for the Institute which among other things said the following:

1. The Institute shall offer two four-year undergraduate courses, one in engineering and one in science.

2. The four year undergraduate course in engineering shall be of a general fundamental character with a minimum of specialization in the separate branches of engineering. It shall include an unusually thorough training on the basic sciences of physics, chemistry and mathematics and a large proportion of cultural studies as well as the professional subjects common to all branches of engineering.

3. The four year undergraduate course in science shall afford even more fully than is possible in the engineering course an intensive training in physics, chemistry and mathematics. In its third and fourth years groups of optional studies shall be included which will permit some measure of specialization, which will most effectively fit able students for positions in the research and development departments of manufacturing and transportation enterprises.

Thus early in its history, the Institute made a partial segregation of its undergraduate students between the fields of engineering and science. I say partial because the two courses of studies must necessarily overlap to a considerable degree.

The consistent adherence to high scholastic standards in both these departments of education is too well known to Caltech alumni to need any comment. Facilities and personnel necessary to properly present the courses have kept pace with the ideals outlined in the educational policies as enumerated above and as outlined more fully in the catalogue of the Institute.

It has been recognized that the development of facilities in connection with the engineering course at the present time is somewhat behind that of the science course, and with a view to studying this situation, Doctor Millikan appointed some months ago a committee to investigate the conditions. It has been found that an acute need exists for modern and more ample equipment for materials testing and an up to date study of strength of materials, internal combustion and steam engineer-

ing, airconditioning and refrigeration, heat transfer, hydraulics and fluid mechanics, sanitation, physical metallurgy, electronics and aerodynamics, nor are there buildings now available for these essential installations. The hydraulic and mechanical engineering laboratories are still housed in their original quarters, considered temporary when constructed nearly thirty years ago. A minimum of equipment was then provided for a small number of undergraduate students only. Much of it is now obsolete and of little use for advanced work or research.

Approximately sixty-five percent of the students receiving Bachelor's Degrees of the Institute are in the engineering course, and among the graduate students the proportion of engineers is increasing. Adequate accommodations and equipment for the proper training of these students must be given attention at as early a date as possible.

Since the start of the Institute, changes in the engineering field have been considerable. The Institute has kept abreast, if not ahead of the times in following such transition and its plan of prescribing thorough ground work in mathematics, physics and chemistry has avoided narrow specialization, and superficial instruction. However, the technical advances in recent years have been so great that additional obligations are imposed upon an engineering college which endeavors to keep to the forefront of development.

Great opportunities exist in the west for research based upon current community problems. Examples of work done on some of these at the Institute are represented by improvements in high voltage electrical circuits and apparatus, the control of flood flows, increased stability of structures, development of large capacity pumps, the development and utilization of alloys, improvements in railway car construction, and improvement of aircraft. Results of gratifying excellence have been attained in these fields.

The objectives of the engineering department of the Institute can be summarized as follows:

1. To maintain a position of unquestioned eminence in both undergraduate and graduate engineering instruction.
2. To attain a position of unquestioned eminence in a few selected fields of basic engineering research.

The Alumni as a whole, particularly those from the engineering course, may well hope that the growth and improvement of the facilities necessary to maintain these objectives will keep pace with the needs. In fact, they might well do more than just hope, and lend every assistance possible in interesting themselves and others in directing funds towards the Institute and enlisting aid for furthering the ends outlined.



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