

韓國科學院에 開設될 새 프로그램*

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New Programs to be launched at KAIS*

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1. Introduction

In 1971, Korea began a new experiment in advanced man-power development for engineers and applied scientists. In creating Korea Advanced Institute of Science (KAIS) by a special law, the government gave it a broad mandate, sufficient ways and means, and an organizational structure flexible enough to respond, in a timely manner, to the needs of the changing technological scene in Korea.

The mandate was to "produce for Korean industry a supply of engineers and applied scientists who combine high ability with advanced training oriented towards the technological needs of modern industry". Details concerning the operating principles, organization, financing, as well as the early results are presented elsewhere**.

2. Present Status

At present there are nine programs: applied

chemistry, applied physics, biological engineering, chemical engineering, computer science, electrical engineering, industrial engineering, materials science and mechanical engineering. All but a few of the fifty full-time faculty members have doctorates from major U.S. universities, many with considerable teaching and/or research experiences abroad, and another 10 or more are expected to be recruited within the next several months. Current enrollment numbers nearly 320, with 35 of them in the Ph. D. program and the remainder in the M. S. program. Placement of the approximately 250 graduates with M.S. degrees to date are distributed approximately as follows:

Research Laboratories	40%
(Government-financed)	
Private Industries	25%
KAIS Ph. D. program.	13%
Academic Institutions	12%
Government Agencies	10%

There are 135 M.S. candidates expected to graduate in February, 1977, and the demand for them from various sectors are such that for

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every graduate there are on the average two positions offered (excluding those students who were seconded by industries and government agencies at the time of their enrollment, and who, therefore, must return to them).

As these figures amply demonstrate, KAIS is living up to the original expectation and is providing badly needed scientific and technical man-power for Korea's economic development.

The initial emphasis has been on training engineers and applied scientists for R&D activities of Korea's industries, with somewhat greater emphasis on the research end, and it is gratifying to note that industries are becoming increasingly aware of the potential contribution of KAIS graduates in their fledgling R&D endeavors. This is evidenced by requests from 14 industrial firms for 129 prospective KAIS graduates next February.

While it has been the preoccupation of KAIS administration and faculty during the past year to consolidate diverse existing research and academic programs, improve academic governance and strengthen certain priority areas, the ROK Government have unearthed critical man-power shortage in some key industrial sectors and have turned to KAIS in order to remedy the situation.

3. New Programs in Professional Engineering

Early in 1976, the Government set up the goal of drastically increasing the reliance on domestic production of industrial output. An important feature of this campaign is to minimize establishment of the so-called "turn-key" manufacturing plants. While realizing that it will be necessary for Korea to import technical know-how from industrially advanced countries under licenses for some time to come, most of the engineering work including detailed process

design & development, equipment procurement, and engineering service must be gradually taken over by Korean engineers.

It was immediately apparent that the key to the success of this campaign lies in the availability of high-caliber process design engineers. Survey of the man-power situation revealed that there was a critical shortage of competent process design engineers in many fields. Based on the important role they play in the government's industrialization program in the forthcoming Fourth Five-Year Economic Development Plan, machine industry and chemical industry were singled out for special attention, and KAIS was strongly urged to submit proposals for professional engineers' degree program in Production Engineering and Chemical Process Engineering.

Although initial attempts will be in these two fields, it is anticipated that similar programs will be launched in such fields as electrical engineering, nuclear engineering, materials processing and environmental engineering.

Two different levels of operation are being envisaged, one at master's level (Program I) and the other at doctoral level (Program II).

1) Program I

A two-year program that emphasizes practical engineering at the manufacturing and processing plant level, the course offering will include many subjects touched upon lightly or not at all in the present M.S. degree program geared toward producing research engineers. A research thesis required in the current program will be waived in favor of reports on substantial projects and case studies. The overall result aimed at is equivalent to that of an engineer's degree program being offered by some U.S. universities, preceded by a non-thesis M.S. degree program.

The entrance requirements will be identical

to those of our regular M.S. program except that those who graduate from this program are expected to enter manufacturing and processing industries.

2) Program II

Designed for those who have two to three years of practical experience after finishing the Program I above, the emphasis is in producing engineers who can be key members of engineering companies and consulting engineering firms. They will be expected to play supervisory role in all phases of engineering activities including process design, equipment design, and engineering services. A substantial portion of this 2-year program will be devoted to major projects and minor projects undertaken in groups of varying size, under the supervision of experts, to tackle large-scale engineering design tasks. It is anticipated that those who finish this program will be automatically granted the Professional Engineer's License, the highest offered by the government to the practising engineers. At one time granting of the degree, doctor of engineering was contemplated.

4. Discussions

The new programs outlined here are not those normally undertaken by academic institutions in industrially advanced countries. There, industry undertakes these on-the-job training themselves. At this specific juncture in time, however, Korean industries are not capable of providing in-house training for their engineers. Most of the large engineering tasks are performed by outsiders, with local participation limited to fairly low-level subcontracting. Although financing is cited as the main reason for awarding primary contracts to foreign engineering companies, there is considerable doubt as to the availability of Korean engineering companies with sufficient number of competent engineers

to handle construction of a fertilizer plant or a power plant, say, if financing could be arranged.

Granted that there exists an urgent need for training high-level professional engineers, it now becomes a question of who should do it and how.

The government turned to KAIS for a number of reasons listed below:

- 1) It is the only institution set up specifically for producing advanced technical manpower for Korea's industries.
- 2) It has high enough prestige to entice bright young engineers to choose the path leading to industrial career on the plant design level. The normally preferred path is R&D.
- 3) It has a flexible enough organization to accommodate these new programs.

The new programs will require faculty with orientation somewhat different from that of the faculty for the regular academic program, and it is anticipated that during the first few years considerable number of the faculty members must be recruited from the ranks of the practicing engineers in U.S. engineering companies on a multi-year contracts. Some of the present faculty members will want to convert to the new direction. Additional permanent faculty members will have to be recruited who will eventually take over the leadership from the visitors.

The government has pledged sufficient financial resources to accomplish this new task. KAIS needs advice, counsel, and active participation of NAS, NAE and the U.S. engineering communities in formulation of the curricula, planning of the physical facilities and recruitment of faculty for this new venture. Perhaps the formation of a joint advisory committee consisting of representatives of U.S. and Korean engineering communities will be a first step in this direction.