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ASIAN INSTITUTE OF TECHNOLOGY

A PLAN FOR GROWTH AND DEVELOPMENT

601B 172 9/68

September 1968

not U.S. classification

~~This report is confidential and intended solely for the information and benefit of the immediate recipient hereof.~~

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September 27, 1968

Dr. Milton E. Bender, Jr.
President
Asian Institute of Technology
Bangkok, Thailand

Dear President Bender:

With this letter, we are submitting to you and members of the Board of Trustees copies of our report containing a plan for the growth and development over the next ten years of the Asian Institute of Technology. This report documents in greater detail the substantive matters which were presented in our oral/visual presentation on July 29. Where necessary, minor corrections have been made in the projection figures and the mathematical calculations.

The plans which you and the Board of Trustees have approved, and which are quantified in this report, give promise of an exciting and challenging future for AIT. At the same time, we should like to emphasize the importance of periodically reviewing and modifying these plans during their execution, as required by changing conditions.

If there is any one action which we feel deserves priority in implementation, it is the establishment of the function and position of Vice President for Development and International Affairs. It is imperative that an aggressive and systematic approach be taken to the promotion of financial support for AIT among the Asian and Western nations concerned.

We feel privileged to have participated in this worthwhile project, and we have enjoyed our association with you and all of the people at AIT with whom we have dealt. We shall be watching with interest the development and growth of AIT, and would be pleased to assist you in achieving your objectives, should you so desire.

Very truly yours,

Cresap, McCormick and Paget

CRESAP, McCORMICK and PAGET

ASIAN INSTITUTE OF TECHNOLOGY

A PLAN FOR GROWTH AND DEVELOPMENT

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I - INTRODUCTION

I - INTRODUCTION

The following introductory chapter discusses the background of this study, objectives and scope of the study conducted, outlines the methods of study employed, and the arrangement of the remainder of the report.

BACKGROUND

In the history of AIT - and its predecessor institution, the SEATO Graduate School of Engineering - considerable effort was devoted to planning and projecting the future course of the School. Much of what was envisioned in the various plans became reality as time passed, with the School exhibiting a continuing growth pattern. It became evident that the School would eventually outgrow the facilities which had been provided on the campus of Chulalongkorn University, and thus would need someday to move to more permanent and considerably expanded facilities.

In recognition of a pending move, the administration of AIT drafted, in some detail, a general plan for relocating to a new campus on a plot of land provided by the Royal Thai Government. This plan called for a number of listed facilities to support an estimated student body reaching 1,200 at the close of the planning period. The plan also applied cost factors to the proposed facilities to determine the capital funds required for their construction.

The newly organized Board of Trustees of the independent and autonomous AIT reviewed the plans of the administration and sought documentation in greater detail, both to approve and adopt the plans and to offer necessary data to possible funding sources. Also, because of the magnitude of financial requirements, the Board felt that the plans should be reviewed and validated by an independent planning organization, to ensure that they represented AIT's requirements in realistic and fundable terms and that the entire concept of AIT was truly viable.

Cresap, McCormick and Paget was asked to consider undertaking such a study, and the United States Government, a principal past supporter of AIT, provided the funding for the study.

This study was begun in early May 1968 and completed in late September 1968.

OBJECTIVES AND SCOPE OF STUDY

The overall objective of the study was to develop, in detail, the relevant factors necessary to project and document the needs of a campus and facility master plan, to guide the growth of AIT through 1977. To accomplish this objective, a series of secondary objectives were set.

- The growth rate of the student body was to be studied, researched and developed. Correlations were to be made to enable AIT to project its anticipated growth through 1977 and beyond as appropriat

- Program plans were to be studied, in accordance with the guidelines provided by the Board of Trustees regarding the Institute's program goals, in terms of enrollment growth and other salient factors such as identifiable needs for particular technical skills.

- Supporting needs were to be developed, in detail, in relation to the anticipated enrollment and programs. Among the supporting requirements for which specific recommendations were to be made were the size and disciplinary competencies of the faculties, the size and special vocational skills of the administration and service staff, and the outline specifications of physical plant needs, interpreted where possible in terms of functional units and buildings.

- The cost implications were to be projected for the development and operation of AIT through the planning period to 1977. These estimat were to be in sufficient detail to substantiate approaches to possible funding sources for gifts, grants or loans; however, it was understo that final and more precise financial needs would depend on the actua construction plans and bids.

- The funding sources available to AIT were to be explored, to determine their ability to contribute funds for the development of AIT. Agencies were not to be approached, nor was any specific approach within the scope of the study.

- As a further consideration, the Board of Trustees desired that a review be made of salary scales and total compensation for professional and key administrative staff.

METHODS OF STUDY

The principal method of study involved a thorough documentation of the salient factors regarding the history and future of AIT. A team of three consultants resided in Bangkok from early May until early August 1968. Two additional consultants from the firm's United States offices joined the team in Bangkok for various periods of time during the study, to provide coordination and assistance in fact finding. Visits were also made by members of the team to Colorado State University and various other agencies in the United States.

More specifically, the following methods were employed.

- Most members of the faculty and staff of AIT who were present in Bangkok during the study were interviewed by the members of the team. Some members were interviewed several times during various phases of the study (a list of those interviewed is shown as Appendix A at the end of this report).

- Also interviewed were representatives of most international organizations having offices in Bangkok and involved in regional and/or international projects in education or other areas relevant to the growth of AIT (a partial list of those interviewed is also included in Appendix A).

- Some members of the Board of Trustees, as well as representatives of organizations concerned with aspects of AIT's development in the United States, were interviewed (see Appendix A).

- Research was conducted, both in Bangkok and in the United States, into those aspects of southeastern Asia that would tend to define the situation in education at the postgraduate level. This research involved gathering and analyzing publications and published and unpublished materials. A partial bibliography is shown at the end of this report.

- Virtually all of the published and unpublished reports and other data and factual material of AIT and of the SEATO Graduate School were reviewed and analyzed, including the minutes of the various Boards of Trustees that have guided AIT's past development, position papers of the President of AIT, financial reports, registration analyses and statistics, and other documents. Systems, methods and procedures were documented as needed for the study.

- The current physical plant of AIT was reviewed, documented and analyzed in detail in terms of its size, contents and use.

- Contacts were made with persons knowledgeable in the construction and construction planning field in Bangkok, to clarify cost patterns and other necessary data regarding the local construction situtation.

After this fact-gathering and analysis phase, certain conclusions were drawn and a series of projections made. These projections were reviewed with AIT administrators, and changes were made, reflecting their input, when both the consultants and AIT felt these to be appropriate. When it was not possible for the consultants and the administration of AIT to agree fully, the AIT position was projected without the endorsement of the consultants; these situations are noted throughout the report.

A preliminary report of the principal findings and a draft plan for growth were prepared and presented to the Board of Trustees in July 1968. This preliminary presentation was discussed in some detail with the Board, and tentative agreement with the basic concepts was reached. The consultants then prepared this final report, detailing the specific findings, observations and conclusions of the study.

ARRANGEMENT OF REPORT

The following report is divided into nine chapters, and appendixes and a bibliography, as follows:

I - Introduction - this chapter

II - History Of The Asian Institute Of Technology - reviews the founding and development of the Asian Institute of Technology from 1959 to the present.

III - Analysis Of Growth And Operations, 1959-60 Through 1967-68 - discusses the historical growth of programs, student enrollments, faculty, organization and staffing, facilities and space utilization and equipment, and the financial history of the institution.

IV - Needs Of Asia For Higher Level Manpower - presents various factors which indicate the need for high-level manpower in Asia, including regional development plans, the need for high-level personnel to man institutions, and other considerations.

V - Review Of Asian Requirements For Engineers - discusses various data concerning higher education in Asia, including institutions and enrollments, and fields of study of enrolled students. Various conclusions are drawn regarding the output of first-degree level engineers in Asia, and subsequent requirements for postgraduate training.

VI - Criteria For Further Growth And Development - presents criteria developed for projecting the various aspects of the growth of the Asian Institute of Technology, including program criteria, enrollment criteria, faculty staffing criteria, non-faculty staffing, and other miscellaneous criteria such as cost patterns.

VII - Proposed Plan For Growth And Development Of AIT - projects the growth of the Asian Institute of Technology in terms of programs, student enrollments, faculty staffing, organization, and space planning.

VIII - Funding Considerations - discusses the operating and capital funds required to support the proposed program outlined in Chapter VII and proposes a fund-raising program to obtain such funds.

IX - Summary Of Proposed Plan And Alternatives - reviews the principal features of the proposed plan and offers a few alternatives in the event of limited or inadequate funds to support the proposed program.

Appendixes

Bibliography

II - HISTORY OF THE ASIAN INSTITUTE OF TECHNOLOGY

II - HISTORY OF THE ASIAN INSTITUTE OF TECHNOLOGY

The following chapter outlines the history of the Asian Institute of Technology, from its founding as a cultural program of the Southeast Asia Treaty Organization to its current status.

The concept for the development of a graduate school of engineering to serve all of southeastern Asia originated with Pote Sarasin, Secretary-General of the Southeast Asia Treaty Organization. An early plan, drawn up by the International Cooperation Administration - now Agency for International Development, or USAID (USOM) of the United States - outlined some aspects of the institution such as its disciplines, the composition of the faculty, and financing. In 1958, Colorado State University received an AID contract to make an operational survey of the specifics involved in developing such an institution, and in early 1959, such a study was conducted. The report of the study, Survey For The Proposed SEATO Graduate School Of Engineering published in Bangkok, Thailand in April 1959, presented the following conclusions and recommendations.

> ...that it be truly international and that it be intended to serve every country of Southeast Asia regardless of SEATO affiliation. This undertaking includes provision for an international staff and students, and it anticipates support for an indefinite period from Australia, England, France, New Zealand, Pakistan, The Philippines, Thailand and the United States.
>
> The total program of the SEATO Graduate School of Engineering will involve both instruction and research as follows:
>
> 1. Regular courses which apply toward the Master of Engineering degree...
>
> 2. Special programs consisting of in-service training, special lectures, and conferences...
>
> 3. A research program...intended to train students... in the techniques of analyzing a problem...also intended to serve in solving special problems which confront the countries of Southeast Asia.

The report also recommended that Colorado State University sponsor the developing school and defined such other aspects of the proposed institution as initial programs, staffing, and research.

On June 30, 1959, a Royal Decree establishing in the SEATO Graduate School of Engineering was signed by the King of Thailand.

Prior to the establishment of a permanent Board of Management, an interim Board was appointed to develop, in detail, the necessary features of the institution. Throughout 1959, the interim Board met and drafted many guidelines, regulations, procedures and plans, which have been followed in operating the school. At the Thirteenth Meeting of 1959 of the SEATO Council Representatives, a Board of Management was established for the school. This Board was empowered to direct all affairs of the school and legally authorized as an independent component of SEATO.

Arrangements were made for the school to use a part of the Chulalongkorn University facilities and grounds, and the school was formally opened on September 8, 1959. The initial student body of 19 first-year degree candidates came from Thailand, Pakistan and the Philippine Republic. The principal program in the first year was in Hydraulic Engineering, leading to a master's degree in Civil Engineering. Finances for the school, in its first year, came primarily from the Royal Thai Government, the United States and the United Kingdom, with other support from the Philippine Republic and Australia.

With an international faculty seconded by Thailand, New Zealand, France, Australia, the Philippines, the United States and the United Kingdom, the school has since grown in both students and programs. Options in transportation, structures, soils, and public health engineering have been added to the initial program, and the student body has increased from the original enrollment of 19 to an enrollment of 167 in 1967.

The number of countries sending students to AIT has grown also and the following nine countries are, or have been, represented within the student body:

- Brunei
- Hong Kong
- India
- Malaysia
- Pakistan

- The Philippines

- Taiwan

- Thailand

- Vietnam.

The first graduates emerged from the school in 1961 with master's degrees in Civil Engineering conferred jointly by Chulalongkorn University and the school.

From its earliest days, there has been much conern regarding the specific long-term future of AIT, its growth potential, and its structure and programs. While AIT exhibited a sound growth pattern, questions were raised about the constraints on future growth caused by AIT's affiliation with, and sponsorship by, SEATO. The relationship of AIT to Chulalongkorn University was also questioned. Some persons felt that Chulalongkorn perhaps should take over the operation of AIT, while others, seeing this as placing the regional aspects of the school in jeopardy, preferred either continued sponsorship by SEATO or complete independence.

The desirability of some of the programs of AIT also was questioned during its early years, particularly the nondegree extension programs which were conducted in countries outside of Thailand. These were later discontinued, reportedly because of high costs. Opinions on the worthiness of some of the programs, such as the on-campus seminars on various aspects of engineering technology, varied widely.

Nonetheless, the student body, the different countries represented in the student body, the size of the faculty and its international representation grew, while the academic program expanded generally according to the plans proposed in the documents and studies of 1959.

After several studies by different groups under the sponsorship of SEATO and others, it was decided that the institution had acquired sufficient maturity to enable its further development as an independent international institution of higher education. The school was granted its independence by formal resolution at the tenth meeting of the Council of SEATO in 1965. A Royal Decree was issued on November 24, 1967, which chartered the Asian Institute of Technology as an independent, autonomous international institution of higher learning in Thailand. The Thai Government recognized the international characteristics of AIT and granted it certain exemptions and privileges that are extended only to international bodies.

An international Board of Trustees was formed and met in Bangkok, in January 1968, to assume control of the newly independent institution. At this meeting, the Board adopted a set of objectives, which is presented in Exhibit II-1, on the following page. These objectives correspond closely with those pursued historically by the SEATO Graduate School of Engineering, and their achievement will require continued development by AIT.

AIT has been granted rights to a 400-acre site approximately 40 kilometers north of Bangkok for a new campus. This site is situated in a plot of about 1,000 acres on which other international institutions devoted to aspects of research and technology will be located. A new campus of Thammasat University is also planned for this area.

AIT continues to depend primarily for its financial support on several affluent western nations and Thailand, and interest in providing support has been expressed recently by some other nations, both Asian and non-Asian.

In summary, AIT has achieved a commendable degree of success since its founding as the SEATO Graduate School of Engineering, essentially an experimental project. Its growth and development have been guided by a number of critical reviews and planning studies, and AIT has developed quite consistently according to the early plans and goals which were established for it.

Certainly, continuity of purpose, firm resolve and adherence to general plans are desirable factors in a developing institution. The nine-year history of achievement by the AIT and its predecessor institution is a strong argument for continuing support for its further development.

ASIAN INSTITUTE OF TECHNOLOGY

OBJECTIVES

The Asian Institute of Technology, as an international institution of higher learning, will engage in instruction and research in engineering, the sciences, and closely related fields to serve the region. Its program will reflect the changing needs of the region and will provide:

1. Educational opportunities at the master and doctorate levels

2. Through postgraduate diploma courses and short-term institutes, opportunities for practicing engineers in the region to keep abreast of technological developments and their application to the needs of the region

3. Stimuli for the development of research by the establishment of a major research center within AIT

4. Opportunities for faculty members from other educational institutions to study and conduct research at AIT

5. A focus for the development of engineering education to meet the unique needs of the region

6. Mechanisms for the introduction into the region of the latest developments in technology and for the development of their application to its needs

7. A center for the development of equipment for research and instructional laboratories

8. An outstanding library to serve the needs of both AIT and the region

9. A major computing center, designed and operated to serve AIT and other institutions in the region

10. A regional focal point and catalyst for the development of professional activities, including conferences and seminars, and a center for the publication of technical information for the region.

Source: Minutes of the Board of Trustees, January 1968.

III - ANALYSIS OF GROWTH AND OPERATIONS, 1959-60 THROUGH 1967-68

III - ANALYSIS OF GROWTH AND OPERATIONS, 1959-60 THROUGH 1967-68

This chapter discusses the development of the Asian Institute of Technology from its inception to the present time in terms of programs, students, faculty, current organization and staffing, facilities and space use, and finances.

A - PROGRAMS

This section reviews the development of major areas of study offered by AIT since its beginning, its curriculums, the academic calendar, special nondegree programs, and current plans for the future.

OPTION DEVELOPMENT

The SEATO Graduate School of Engineering enrolled its first students in 1959 in the hydraulics option of civil engineering. Civil engineering was chosen as the initial engineering discipline to be offered because of its applicability to the needs of developing countries. This field of engineering is generally concerned with the economics of the use and design of construction materials, the construction of engineering structures, the investigation of applicable laws and forces of nature, the preparation of designs and engineering reports with appropriate plans and specifications, regional and city planning, and surveying and measurements. Civil engineers engage in technical, commercial, and administrative work in such areas as transportation systems, bridges, buildings, harbor facilities, water supplies, sewerage, hydraulic power systems, flood control, irrigation, contracting and construction.

Hydraulic engineering was the sole option offered in 1959, but in the second year of operation two new options - structural engineering and highway engineering - were added. In 1963, the title of the highway engineering option was changed to transportation engineering, to reflect more accurately the scope of courses offered. A fourth option - public health engineering - was introduced in 1964 and in 1968, its name was changed to environmental engineering to describe its scope more accurately. Soil engineering, the fifth option currently offered by AIT, was introduced in 1966.

ACADEMIC PROGRAMS

AIT offers programs leading to the degree of Master of Engineering. The degree program consists of classroom and laboratory work, field trips, research design and implementation, and thesis work. All instruction is in the English language. The academic programs are designed to lead to the degree in two academic years (one year and nine months actual time), although the exceptional student may finish in less time. The minimum required residence period is three semesters and one summer session, and students must complete the program within four years from the time of first enrollment. To qualify for the master's degree in engineering, a student must:

- Satisfactorily complete a minimum of 30 semester-hours of courses approved by the student's thesis committee.

- Complete a suitable research project and submit an adequate thesis describing the project and presenting and analyzing the results.

- Pass a comprehensive examination conducted by the Institute, covering his entire program.

An incoming student is assigned to an adviser in the student's major area, who assists him in preparing a program of study based on the student's background, interests, and qualifications. The first year consists entirely of course work, which provides a balance of classroom lectures, laboratory demonstrations and experience, and trips to engineering projects. The normal course load is about 12 credit-hours per semester.

Near the end of the second semester, each option chairman usually requests faculty members in his area to submit titles and brief descriptions of potential thesis topics. The students in the option are given copies of the topic lists and asked to make their selections, generally a first, second and third choice. The option faculty then compares the choices made and determines the final thesis topic assignments. A student can select his own topic if he can locate a thesis chairman willing to supervise the project. The thesis chairman and two other faculty members become the formal thesis committee.

After the second semester has been completed, the student presents an application for advancement to degree candidacy for the approval of the Academic Dean. The application includes the planned program of study, grades received to date, the thesis topic, a brief description of the proposed project, and the names of the members of the thesis committee.

The summer session is used for course work, research or both. During the third and fourth semesters, the student may take one or two courses and devote the remainder of his time to his research. The student tends to rely mainly on his thesis chairman for advice and guidance during the research and report-writing phases. When the project has been completed, the student submits the final report to each member of his thesis committee, and a day is then scheduled for the student to defend his thesis and take an oral comprehensive examination covering the course work in his program.

If the student passes both the thesis defense and the comprehensive examination, he has completed the degree program and the degree is conferred at a formal graduation ceremony. If the student passes the thesis defense but fails the comprehensive examination, he is generally allowed to take a second comprehensive examination at a later date. When a student fails the thesis defense, he may or may not be allowed to take another thesis defense. The thesis committee must determine whether the student's research is basically sound, in which event the student may be reevaluated at a later date, or whether the execution and analysis are below acceptable standards, in which event he may be dismissed from the program.

Concern over the lateness of the evaluation of students' research capabilities and the potential dismissal of students at the final stage of the program led the Academic Committee to discuss methods of discovering research potential earlier in the program. A plan was presented to the Academic Senate, and finally to the entire faculty, which emerged as the "thesis assessment." Under the new plan, the procedures for the development, choice, and assignment of research topic remain the same. At this point, however, the student must prepare a formal review of the literature, a research design and an analysis of equipment needs in a written report to the thesis committee for evaluation. The option chairmen set deadlines for completion of the evaluations, usually soon after the end of the second semester so that the students may begin work on their projects during the summer. If the thesis assessment is favorable, the student prepares his application for advancement to candidacy and follows the procedure toward graduation described earlier.

A student who does not successfully pass the thesis assessment may be allowed to repeat the assessment if the committee decides that there is potential for good research but additional work and refinement in the proposal are needed. If, however, the committee decides that the student is not capable of doing research, he is removed from candidacy. The most critical element in the assessment is the student's approach to solving the research problem. A student who fails the thesis assessment is allowed to remain at AIT for one more semester of course work with no change in scholarship status. At the end of this semester, he must leave AIT with no degree or recognition. His transcript records only courses taken and grades received.

The thesis assessment was first applied to the class enrolling in 1966. Two members of that class failed the thesis evaluation after they had completed the second semester in 1967. The thesis evaluations for the class that enrolled in 1967 will not be completed until August 1968.

The grading system for course work is based on a 100 per cent scale. The passing grade for individual courses is 60 per cent. To continue in the master's program, a student must have a grade average for all courses in the first semester of study of at least 65 per cent and maintain a cumulative average of at least 70 per cent at the end of each subsequent semester, including summer sessions. To graduate, a student must have a grade average of at least 70 per cent. All averages are weighted by the number of credit-hours assigned to each course. If a course is repeated, the grades are averaged for inclusion in the cumulative grade average.

CURRICULUMS

A student plans his course work program with his adviser. Changes can be made later with the consent of the adviser or the thesis chairman. During the history of AIT and the SEATO Graduate School of Engineering, a total of 90 different courses (in number or title) have been offered. The 1968-69 catalog lists 63 course offerings.

Courses range in credit-hours from one to four. Some courses are given entirely in classroom sessions, some consist entirely of laboratory work, and some combine classroom and laboratory sessions. Total credit-hours for a course are determined by the classroom and laboratory contact-hours per week. One hour of credit is given for each classroom-hour per week and for each three hours of scheduled laboratory work.

Each of the five civil engineering options offers courses that are acceptable for inclusion in a program leading to a degree in that option. In the early days of the SEATO School, the program within each option was rigidly prescribed, but as the School grew and more courses could be offered, this rigidity began to wane, and in 1964-65, the previously used "major" was changed to "area of study," to reflect the flexibility in programs of study. The latest catalog lists no required courses, but rather suggested courses. In fact, a student may include in his program course work in other options, with the consent of his adviser or thesis chairman. The number of courses listed in each area of study are:

Area Of Study	Number Of Courses Offered
Hydraulic engineering	22
Public health engineering	19
Soil engineering	19
Structural engineering	25
Transportation engineering	18

Of the courses acceptable for inclusion in an option program, 26 appear in more than one option listing. Thus, over 41 per cent of the total number of course offerings serve more than one option. Three courses - probability and statistics, computer programming, and engineering experimentation - are included as a part of all five options. A summary of all course offerings, by option inclusion, is presented below:

Number Of Options Listing A Course Offering	Number Of Courses
1	37
2	18
3	5
4	0
5	3
Total	63

The number of courses offered each year since the Institute's inception has grown steadily. During the first four years, courses were offered only during the two regular semesters of the academic year. In the summer of 1964, the first summer session credit courses were added to the program. The number of summer offerings has remained small, serving only those students who have completed the first year of their degree programs. The course offerings by academic year are listed below:

Academic Year	Number Of Courses Offered			
	First Semester	Second Semester	Summer Session	Total
1959-60	3	4	-	7
1960-61	11	14	-	25
1961-62	18	15	-	33
1962-63	18	15	-	33
1963-64	20	19	2	41
1964-65	24	19	7	50
1965-66	23	22	5	50
1966-67	26	23	5	54
1967-68	24	26	5	55
Total	167	157	24	348

During the most recent five years, 250 courses have been offered. The following table shows the frequency of offering during the past five years of the courses listed in the 1968-69 catalog:

Frequency Of Offering 1963-64 Through 1967-68	Number Of Courses
0	1
1	4
2	7
3	11
4	20
5	16
6 or more	4
Total	63

As the table indicates, one course has never been offered and four courses have been offered only once during this period. At the other extreme, one course has been offered ten times, for an average of twice per academic year. The average course has been offered 3.8 times in the last five years, with slightly less than one-third of the courses having been offered an average of at least once per year. The figures are lowered somewhat by the addition of new options and courses. The bulk of the courses in the public health and soil engineering options were first offered in 1964-65 and 1965-66.

If the course records for hydraulics, structural and transportation engineering are viewed apart from the rest, it can be seen that each course in these three options has been offered an average of 4.0 times in the last five years, with 43 per cent of the courses having been offered an average of at least once per year. During the four years in which specialized courses in public health engineering have been offered, and the three years in which specialized courses in soil engineering have been offered, 76 per cent of these courses were offered at least once per year.

The effect of the two newest options on the number of courses offered is demonstrated by the fact that the 1964-65 catalog listed only 45 courses compared with the 63 courses listed in the 1968-69 catalog. There are 17 courses in the new options that are considered to be specialized.

The average enrollment per course over the last five academic years has remained quite stable, as shown in Exhibit III-1, on the following page, which presents average course enrollment figures, by year and by term. Auditors (both regular students and outsiders) are not included in these figures.

More courses are generally offered in the first semester than in the second, and they obtain more students per average course. This is probably due to the fact that, during their second year of study, students take more courses in the first semester than in the second. Few courses are offered during the summer sessions, but the average per course enrollment is highest. The average for each academic year ranged between 12.7 and 14.7 students per course, with a total five-year average of 13.6.

The class size distribution during the five academic years studied reveals a curve skewed to the right. The figures, as before, do not include auditors:

Number Of Students Per Course	Number Of Courses	Cumulative Per Cent
1-5	36	14.3%
6-10	69	41.8
11-15	75	71.7
16-20	27	82.5
21-25	17	89.3
26-30	7	92.0
31-35	8	95.2
36-40	6	97.6
41 and over	6	100.0
Total	251	

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ENROLLMENT AND NUMBER OF COURSES GIVEN
1963-64 Through 1967-68

	1963-64	1964-65	1965-66	1966-67	1967-68	Total
First Semester						
Number of students enrolled	363	344	322	388	443	1,860
Number of courses given	20	24	23	26	24	117
Average number of students per course	18.1	14.3	14.0	14.9	18.5	15.9
Second Semester						
Number of students enrolled	208	203	220	249	292	1,172
Number of courses given	19	20	22	23	26	110
Average number of students per course	11.0	10.2	10.0	10.8	11.2	10.7
Summer Session						
Number of students enrolled	24	128	92	78	86	408
Number of courses given	2	7	5	5	6	25
Average number of students per course	12.0	18.3	18.4	15.6	14.3	16.3
Total For Academic Year						
Number of students enrolled	595	675	634	715	821	3,440
Number of courses given	41	51	50	54	56	252
Average number of students per course	14.5	13.2	12.7	13.2	14.7	13.6

The total number of courses listed in the table above is one less than the number in the previous table, as one course was taught with four auditors and no regular enrollees.

More than 14 per cent of the courses offered in the last five academic years had an enrollment of five students or less. Over 57 per cent of the courses taught had an enrollment of between six and fifteen students. The largest single course had an enrollment of 57 students.

ACADEMIC CALENDAR

The academic year of the Asian Institute of Technology is divided into a first semester, a second semester, and a summer session. From the inception of the SEATO Graduate School of Engineering in 1959, through the academic year 1967-68, the first semester began in mid-June and ended in mid-October, including approximately two weeks for final examinations and grading. The second semester began in early November and ended approximately April 1, including more than three weeks for final examinations, grading, thesis submission and graduation. The summer session, added in academic year 1963-64, ran from early April until the beginning of June.

The early starting date for the first semester, which coincided with that of other academic schedules in southeastern Asia, presented serious problems for the seconded faculty. Many had commitments in their home universities until late May or early June, and those able to arrive on schedule had little or no time to adjust to a foreign environment. Some faculty members were unable to arrive until days, weeks or even months after the semester began.

To alleviate some of the inconveniences of the old calendar, a new academic calendar has been developed for 1968-69. The first semester will commence in mid-August, and classes will terminate the beginning of December. The term will officially end in mid-December after one week of final examinations and five days for examination grading. A vacation period, coinciding with the Christmas-New Year holiday season and lasting approximately three weeks, will separate the two semesters.

The second semester will commence on January 7 and end May 1, followed by one week of final examinations and five days for grading. May 15 is the last day for submitting to the office of the Academic Dean the names of eligible candidates for graduation, which is scheduled for May 22. The summer session begins May 19 and terminates the first week of August.

Since 1965, AIT has sponsored a noncredit intensive English course for new students prior to their first semester of regular academic course work. The program was started to alleviate difficulties encountered, particularly by Thai students, in English comprehension and has been required for all entering students from Thailand. In the summer of 1968, a total of 61 students from Brunei, Hong Kong, Korea, Malaysia, Taiwan and Thailand enrolled in the six-week course, which is taught by the Language Center of the American University Alumni Association in Bangkok.

The policy on English proficiency has been under study by the Academic Committee of AIT, which is recommending that all applicants submit a certificate of proficiency in English through an exam such as TOEFL (Test of English as a Foreign Language) or by having completed undergraduate training in an institution where English is the language of instruction. All other students would be required to take the summer English course, although waivers may be obtained in special circumstances - for example, where a student has lived in an English-speaking country for a period of time. Such waivers might be recommended to the Academic Dean by an option chairman.

SPECIAL TRAINING PROGRAMS

When the SEATO Graduate School of Engineering was started, one of its missions was to offer continuing education to engineers in southeastern Asia who were unable to attend classes at the School on a full-time basis. The Special Training Program, coordinated by a Director of Special Programs, was designed to offer lectures, courses and conferences in Bangkok and other cities of the region. The Program fulfilled additional and specific educational needs of practicing engineers and also helped to publicize the School in its early years.

Because of the complex arrangements needed to promote and fund successful programs in cities throughout the region, the first few years were devoted mainly to planning and organization. During academic year 1960-61, special courses were offered for engineering graduates in Bangkok, Lahore and Manila. The Program was most productive between the academic years of 1961-62 and 1963-64. A summary of those activities for which information is available is shown in the following table:

Year	Special Lectures		Special Courses		Conferences	
	Number	Total Attendance	Number	Total Attendance	Number	Total Attendance
1961-62	33	2,964	n.a.	784	9	1,317
1962-63	61	2,381	37	1,130	1	167
1963-64	36	1,289	33	954	n.a.	n.a.

n.a. - not available.

The special lectures were generally one-session presentations by distinguished experts on specific topics. Lectures were held chiefly in Pakistan, the Philippines and Thailand, with a few in India in 1961-62. Approximately 40 per cent of the lectures were held in Thailand.

The special courses were offered in Pakistan, the Philippines and Thailand by local or foreign instructors. School faculty members participated frequently, particularly in the Thailand courses. The number of courses was fairly evenly divided among the three countries. The average course consisted of a total of 20 to 30 lecture-hours on a specific engineering topic oriented to the needs of the practicing engineer. Upon the successful completion of these noncredit courses, participants were presented with certificates.

The conferences were held in India, Pakistan, and Thailand and were designed to cover a specific topic intensively in from one to several days under the leadership of experts in the field, faculty members, and local instructors.

During 1963-64, the SEATO Board of Management reevaluated the Special Training Program and decided to alter its emphasis. The Program, although successful, proved to be an expensive operation that drained funds from the AIT resident program. Although a continued need for extension education for practicing engineers was realized, the expense of coordinating and staffing a program in a region as large as southeastern Asia was too great for the SEATO School. In addition, the certificates presented at the successful completion of special courses were occasionally used as evidence of having graduated from the SEATO School. The faculty feared that continuation of the certificate program would impair the prestige of the School's degree program, since many of the noncredit course participants lacked the proper qualifications for admission to the degree program.

It appeared more desirable to have continuing education carried out by local universities and professional societies. The Board of Management approved the School's plan to alter its role from one of planning, coordinating, and executing the programs to a role of assisting local organizations in developing their own programs. In order to facilitate this change in role, the Director of Special Programs and the Dean visited several countries to explain the change and explore the problems in accomplishing it.

A major result of these visits was the realization of the need for educators in the region to meet and discuss common needs and problems. The SEATO School assisted by developing a five-day Seminar on Engineering Education, which was held at the School in March 1965 and attended by representatives of 16 engineering schools from East and West Pakistan, Thailand, Malaysia, Singapore, Hong Kong, and the Philippines. One result of the seminar was the development of preliminary plans to organize a professional society of engineering educators.

Since 1964, faculty participation in continuing education programs has been limited to a specialized conference and a summer institute. Faculty members in soil engineering developed the Southeast Asian Regional Conference on Soil Engineering, which was held in Bangkok for one week in April 1967. The conference, the first of its kind in the region, consisted of a number of technical sessions where papers and guest lectures were presented. It was attended by 207 persons from 15 countries around the world, and resulted in much publicity and recognition for the School. Two of the School's faculty were made research affiliates of the Massachusetts Institute of Technology in the United States as a result of the conference. The School has also been asked to sponsor a specialty session on engineering properties of lateritic soils at the Seventh International Conference on Soil Mechanics and Foundation Engineering in Mexico City, Mexico, in 1969. The planning for this session is under way.

The other continuing education program was a three-week summer institute in coastal engineering. This program was run as a noncredit course with lectures, discussions and problem-solving sessions of the more than 100 persons who applied, 45 were accepted and 38, from 11 countries, attended. Tuition of $40 was charged, and a number of travel grants were made available to participants by the Institute. Participants were responsible for their own room and board while attending the session.

PRESENT PLANS FOR THE FUTURE

The latest plans for the future of AIT are contained in two documents dated March 1968. The first is a printed pamphlet, Development Program, which describes the transition of the SEATO Graduate School of Engineering to the Asian Institute of Technology and contains a list of the Trustees, the objectives of the Institute, enrollment and graduation statistics, the legal structure, the charter and bylaws, and projections for operating and capital requirements through 1977. The second is a mimeographed document, Long-Range Planning Criteria, which develops the projected needs of AIT through 1977 in terms of the Institute's objectives. It is this latter document that develops program objectives and plans. This section reviews AIT's current plans in the program area.

One of the stated objectives of AIT is to provide "Educational opportunities at the masters and doctorate levels." At the master's level, AIT plans the development of new options in civil engineering, as well as a horizontal movement into other engineering and related disciplines. AIT's program thus far has been concentrated in civil engineering because of the technological skills needed in the development of the southeastern Asian region. Other civil engineering options that may be offered are coastal engineering, hydrology, atmospheric science, irrigation engineering and soil physics. As stated in Long-Range Planning Criteria, "Clearly if the Institute is to reflect the needs of the region in its programs, horizontal expansion into electrical, mechanical/industrial, agricultural and chemical engineering is of high priority. Increased emphasis upon engineering planning, management, economics and entrepreneurial skills must be given in all programs. Evantually, more intensive programs in mathematics, physics, chemistry, biology and computer technology must be developed to provide the appropriate scientific base for vertical expansion in the engineering programs."

AIT plans to offer mechanical/industrial engineering in 1971 when its anticipated new campus is ready for occupancy. The mechanical engineering program envisioned would emphasize fundamental, more than theoretical, aspects. Options would be developed in the mechanical aspects of agricultural engineering and eventually in more theoretical aspects of engineering, as regional needs are revealed. Substantial emphasis would be given to engineering economics and industrial planning and management.

An electrical engineering program is also planned for introduction in 1971, with options in power and transmission systems. The development of options in electronics and nuclear power engineering would take place as regional needs dictate. The programs in both mechanical and electrical engineering are anticipated to have larger student enrollments than the civil engineering program.

Also planned for introduction in 1971 is a chemical engineering program. As stated in AIT's planning document, "Although this discipline is currently very popular in some undergraduate universities in South East Asia, the supply of chemical engineers exceeds the demand in some countries. As industrialization proceeds, however, there will be much greater demand for highly-trained chemical engineers."

Other programs that may evolve are in the science service areas that are essential or closely related to the civil engineering program, as well as to the mechanical, electrical and chemical engineering programs. Sound knowledge of mathematics, statistics, computer technology and physics is considered basic for all engineers today. Some biology, and chemistry are currently taught in the public health option of civil engineering, the teaching of chemistry is anticipated to expand considerably once chemical engineering is added. Course work in engineering economics and management is planned as an addition to the civil engineering program in the near future and would become part of all engineering programs.

In terms of vertical expansion, AIT plans to initiate a three-year doctoral program in some or all of the present civil engineering options in 1970 or, more probably, 1971. Doctoral programs would also be introduced in mechanical, electrical and chemical engineering as early as 1973. As further stated in the planning document, "Ultimately it is probable that AIT will concentrate in doctorate programs." By doing so, AIT feels it may avoid entering into academic competition with other higher educational institutions in the region.

Another objective of the Institute is to provide "through postgraduate diploma courses and short-term institutes, opportunities for practicing engineers in the region to keep abreast of technological developments and their application to the needs of the region."

The diploma program would be specifically designed to serve the needs of the practicing engineer - that is, it would be oriented more to applied aspects of engineering practice than would the regular degree program. The program, which would last from nine to twelve months, would emphasize the engineering specialties and engineering economics and management. The program would consist of course work, laboratory sessions and field trips, but would not include the thesis requirement of the master's degree program. Completion of the program would be certificated by a diploma.

Short courses, seminars, institutes, symposiums and professional meetings would be included on a scheduled basis, in response to requests and the needs of the region. Through these activities, AIT hopes to catalyze the development of professional activities and become a center for the publication of technical information for the region.

Another stated objective is that AIT would serve as "A focus for the development of engineering education to meet the unique needs of the region." Through continual contact with students, study-leave faculty and professional engineers of southeastern Asia and the regular faculty of the Institute, AIT would be able to evaluate its programs in terms of the changing needs of the area. In the absence of influential engineering societies similar to those in western countries, which set objective standards for the profession, AIT hopes to be an influence in setting such standards in southeastern Asia.

CONCLUSIONS

The Asian Institute of Technology, like its predecessor, the SEATO Graduate School of Engineering, has grown from an institution offering a master's degree in one option in 1959 to one that now offers a civil engineering degree in five options. Programs leading to the master's degree in engineering are offered in hydraulic engineering, public health engineering, soil engineering, structural engineering and transportation engineering.

The program of study takes approximately two years to complete and consists of a minimum of 30 semester-hours of credit course work and requires a research thesis. Students must complete their course work with a cumulative grade average of 70 per cent, must pass a thesis assessment before research commences, must defend their thesis and pass a comprehensive examination covering the required course work.

The thesis assessment, first used in 1967, was instituted to identify capacity for research through the presentation of a formal research plan at the end of the second semester of course work. It was hoped that the thesis assessment would avoid the necessity of dismissing students at the end of two or three years of study because of unacceptable research.

The great majority of the students have had little or no prior laboratory or problem-solving experience, and the development of an acceptable thesis plan may depend heavily on the student's aggressiveness in soliciting help from his thesis chairman and the amount and type of assistance the thesis chairman is willing to offer. A student with good grades in his course work could fail the thesis assessment and be dismissed from the program and allowed to take one more semester of course work. Thus, it is conceivable that a student could

complete more credit-hours with acceptable grades and not graduate, while another student with fewer credit-hours and marginal grades could graduate from the program. In 1967, one of the two students who were dismissed because of failing the thesis assessment had a 75 per cent average, which placed him in the top half of his class.

The courses offered at AIT are basic and specialized engineering courses and general service courses in mathematics, statistics and computer technology. Limited courses in chemistry and biology as they apply to public health engineering are also offered. AIT offers no specific course work in economics, management or the social sciences, even though few of the students have had any formal instruction in these areas. The economics offered in current courses is limited to feasibility, costing and financing. Except for the non-credit, preenrollment English course required of some students, no course work is offered in English or report writing. Few Asian languages are technical languages, and further competence in English or some other technical language could possibly be a major stimulus to personal growth as well as a means for keeping abreast of professional advances.

The current catalog lists 63 course offerings, of which 41 per cent serve more than one option; the remainder are specialized courses within a given option. The average course currently listed has been offered 3.8 times within the last five academic years, with approximately one-third of the courses having been offered an average of at least once per year. Not including the specialized option courses in public health and soil engineering introduced during this period, the average course in the three other options has been offered 4.0 times in five years, with 43 per cent of the courses having been offered an average of at least once per year. Within the two new options, 76 per cent of the new courses have been offered once each academic year since their inception.

The change in the academic calendar for 1968-69 will delay the starting date of AIT's new term by approximately two months. This will place AIT on a different time schedule from the other educational institutions in the area but should cause few, if any, problems. On the other hand, the new calendar will place AIT more in phase with western educational schedules making it easier for seconded faculty to arrive and get settled before the beginning of classes. The short vacation scheduled between the first and second semesters, coinciding with the Christmas-New Year holiday period, should prove welcome.

The Special Training Program as originally envisioned by the SEATO School was both difficult and expensive to coordinate. It was feared, perhaps without reason, that the certificates issued at the completion of the special courses would impair the value of the resident degree. The Program was, however, successful in its mission and was most active in the academic years from 1961-62 through 1963-64. During 1963-64, it became apparent that the Program could

not be continued without seriously draining the funds available for the resident program. AIT therefore changed its role to one of assisting universities and societies in the area in developing local continuing education programs. Little, however, has been done by AIT to carry out such a role. AIT activity in continuing education has been limited to planning and hosting one educational conference, one regional conference and one summer institute.

AIT's plans for the future involve a broadening of the master's degree program into other options of civil engineering, as well as a rapid growth into mechanical, electrical, and chemical engineering, coinciding with relocation on a new campus site in 1971. A doctoral program in civil engineering is also planned for 1970 or 1971, to be followed by doctoral programs in other engineering disciplines as early as 1973. Degree programs in some of the service disciplines are also envisioned. According to plans, the programs at AIT may eventually concentrate at the doctoral level.

Continuing education for engineers in the region would be provided in AIT's plans through the development of a nine- to twelve-month resident diploma program, along with short courses, seminars, institutes, symposiums and professional meetings.

B - STUDENTS

This section reviews the admissions criteria and procedures; growth in applications, admissions and enrollments; attrition and graduation; tuition, fees and scholarships; and present plans for the future.

ADMISSIONS CRITERIA AND PROCEDURES

To be eligible for admission to the Asian Institute of Technology, a student must meet the following requirements:

- Hold a bachelor's degree in civil engineering, or its equivalent, from a recognized institution
- Have undergraduate grades well above average
- Be competent in the use of the English language
- Be physically fit
- Have a record of good conduct and honorable behavior.

Under the new academic calendar, applications for admission in 1969-70 must be received by April 15, 1969. All applications are sent to the Registrar's office, where a registration number is assigned. Lists are prepared by first option preference, including applicant's name, address, country, undergraduate institution, grade average and class rank, where available.

A completed application for admission consists of the application form, two letters of recommendation, an official transcript or certificate of undergraduate and any advanced work, and a certificate of physical fitness from a qualified physician. Personal interviews of prospective students by faculty members are scheduled for students from Thailand, Pakistan and other selected countries. Most of the Thai students reside or study in Bangkok, and most are interviewed. The applications from Pakistan are sent directly to the Pakistan Ministry of Education rather than to AIT, and a formal committee, including an AIT faculty member, interviews each applicant in the university centers at Dacca, Karachi and Lahore. In 1968, one faculty member also interviewed applicants in Hong Kong, Korea and Taiwan.

The number of students to be admitted each year is usually decided by the President, with the assistance of the Academic Dean. Since most of the students are awarded scholarships, the funds available for scholarships are an important factor, as are the number and specialties of the faculty, and the availability of space. For the class entering in 1968-69, it was decided that 110 students could be accommodated. On the basis of past experience and current developments, the number to be offered admission was set at 135, to ensure an actual enrollment of 110. The President, with the assistance of the President's Advisory Committee, sets preliminary goals for the number of students to be admitted in each option and the number to be admitted from each country. The latter goal is to ensure that the Institute retains a regional balance.

At the closing date for the receipt of applications, the completed application folders, including personal interview notes, where available, are sent to each area chairman. The area chairman is responsible for reviewing applications according to any procedure he chooses to adopt for recommending action.

Factors usually considered by the chairmen include undergraduate record, class rank, performance in specific courses or areas, work experience, letters of recommendation and interview notes. Undergraduate degree-granting institutions have compiled records comparing performance of students as undergraduates with their performance as AIT students. Some of these institutions have had sufficient numbers of graduates enrolled at AIT to enable correlations of undergraduate grades with AIT grades. These data should become more useful in assisting predictions of success at AIT as time goes on.

After reviewing the applications, the area chairmen usually meet with the Academic Dean to reallocate students among the options and to adjust admissions among countries. Applicants rejected by their first option preference are sent to the chairman of their second option preference for admissions consideration. The Academic Committee, however, is considering the elimination of second preferences.

APPLICATIONS, ADMISSIONS AND ENROLLMENTS

The number of students applying for admission to AIT has grown steadily from 49 in the first year of operation to 385 for the class entering in 1968. Applicants from 22 countries have submitted applications. A summary of the applications received, the admissions offered and the actual enrollments for the academic years from 1959-60 through 1967-68 is presented in Exhibit III-2.

ASIAN INSTITUTE OF TECHNOLOGY

APPLICATIONS, ADMISSIONS AND ENROLLMENTS, BY YEAR, OPTION AND COUNTRY

1959-60 Through 1967-68

	Number Of Students			Per Cent Of Applicants Admitted	Per Cent Of Admitteds Enrolling
	Applying	Admitted	Enrolling		
Year					
1959-60	49	22	19	45%	86%
1960-61	120	43	34	36	79
1961-62	89	34	21	38	62
1962-63	117	58	47	50	81
1963-64	208	69	52	33	75
1964-65	161	79	56	49	71
1965-66	177	80	56	45	70
1966-67	298	116	67	39	58
1967-68	238	122	87	51	71
Total	1,457	624	439	43%	70%
1968-69	385 (act.)	135 (act.)	110 (est.)	35%	81%
Option(a)					
Hydraulic engineering	397	182	139	46%	76%
Public health engineering	154	61	44	40	72
Soil engineering	91	36	25	40	69
Structural engineering	556	220	140	40	64
Transportation engineering	253	124	91	49	73
Country					
Afghanistan	1	1	-	100%	0
Borneo	1	1	-	100	0
Brunei	1	1	1	100	100%
Burma	6	4	-	67	0
Cambodia	3	-	-	0	0
Hong Kong	10	4	3	40	75
India	161	58	2	36	4
Indonesia	2	-	-	0	0
Korea	1	1	-	100	0
Laos	1	-	-	0	0
Malaysia	40	15	12	38	80
Pakistan	345	147	79	43	54
Philippines	185	113	100	61	89
Sarawak	2	-	-	0	0
Taiwan	88	37	18	42	49
Thailand	591	231	222	39	96
United States	2	1	-	50	0
Vietnam	17	9	2	53	22

(a)Six options unspecified on applications received.

Statistics for 1968-69 enrollments are not yet available, but there were 385 applications and 135 admissions.

During the period covered by the exhibit, the number of students admitted has increased each year (with the exception of 1961-62). The number of students admitted has depended on the availability of faculty to teach the courses and to supervise student research projects. As an average for the period, 43 per cent of the students applying for admission to AIT have been admitted, with the yearly figures ranging from a low of 33 per cent to a high of 51 per cent. The lower this percentage, the greater are AIT's chances of admitting a more select group of students from the total number of applicants.

Once students are admitted, their choice of whether to enroll is generally beyond AIT's direct control. Some students may have been offered admission to western universities as well and may choose to study abroad. Others may encounter difficulties in obtaining permission from their governments to attend AIT. This was a particular problem in past years with certain countries (especially India) because of the school's SEATO affiliation. An average of 70 per cent of the students admitted to AIT have enrolled, with the yearly figure ranging from a low of 58 per cent in 1966 to a high of 86 per cent in 1959, the first year of operation.

For 1968-69, a higher percentage of enrollees has been anticipated. The Institute hopes to enroll 110 students from the 135 admitted. This assumes that over 81 per cent of the admissions will matriculate and that AIT's disaffiliation from SEATO and its growing stature in southeastern Asia will combine to achieve this rate.

The admission statistics by option show that an average of 40 to 49 per cent of the applicants in each major area are admitted. AIT appears to be adjusting its admissions policies to the needs of the students, as determined by their first choice of option. The annual variations in the percentage of students matriculating are also small.

An analysis of admission statistics by country shows that applications through 1967-68 have been received from students of 18 countries. (In 1968-69, applications were received for the first time from students in Ceylon, Nepal, Turkey, and the United Kingdom.) The table below shows that, from 1959-60 through 1967-68, five countries have dominated the number of applications received:

Country	Number Of Students Applying	Per Cent Of Total Applications (1457)	Cumulative Per Cent
Thailand	591	40%	40%
Pakistan	345	24	64
Philippines	185	13	77
India	161	11	88
Taiwan	88	6	94

Thailand unquestionably represented the largest single source of applications for the period. Thailand and Pakistan together accounted for 64 per cent of all applications received. In 1968-69, these five countries account for 93 per cent of the total applications. The percentages from each country have changed, however. In the early years, Thailand and Pakistan were the two countries from which most applications came. In 1960-61, these two countries accounted for 94 per cent of all applications, and in 1961-62, 82 per cent The applications received in 1968 indicate the trend toward a more even distribution of applicants by country. Five countries account for 93 per cent of the applications, but the distribution is considerably more even than in the past: Thailand has 28 per cent, Pakistan 22 per cent, Taiwan 19 per cent, India 15 per cent, and the Philippines 9 per cent.

During the period from 1959-60 through 1967-68, students were admitted from five countries, as shown below:

Country	Number Of Students Admitted	Per Cent Of Total Admissions (623)	Cumulative Per Cent
Thailand	231	37%	37%
Pakistan	147	24	61
Philippines	113	18	79
India	58	9	88
Taiwan	37	6	94

The average percentages of students admitted from 1959-60 to 1967-68 are similar to the percentages of applications received from the five countries for the same period. A similar trend to that of applications in more recent years indicates a more even distribution of admissions among the five countries, but not as much as shown in the 1968 application figures. The admission percentages for the five countries in 1968 are: Thailand, 31 per cent; Pakistan, 21 per cent; Taiwan, 18 per cent; Philippines, 15 per cent; and India, 4 per cent. These five countries accounted for 89 per cent of total admissions in 1968.

The major country differences between applications and admissions are for India and the Philippines. The percentage of admissions allocated to India are higher than its representative percentage of applications, and vice versa for the Philippines. The number of Indian admissions was lowered primarily because of the poor enrollment record of students from India in the past, as shown below:

Country	Number Of Students Enrolling	Per Cent Of Total Enrolling (439)	Cumulative Per Cent
Thailand	222	51%	51%
Pakistan	79	18	69
Philippines	100	23	92
India	2	0.5	92
Taiwan	18	4	96

For the period from 1959 to 1967, 51 per cent of the enrollees were from Thailand. A high percentage (96 per cent) of the Thai students who were admitted to AIT actually enrolled. The Filipino students, who account for 23 per cent of all enrollees, also showed a high propensity to enroll once admitted (89 per cent). Pakistan and Taiwan show a somewhat lesser propensity to enroll, with 54 and 49 per cent enrollment respectively. Indian students have shown a very low propensity to enroll (4 per cent, or two enrollees out of 58 admissions). The Indian students have been particularly affected by the Institute's previous SEATO affiliation, as well as by problems of emigration. A surplus of engineers in India has probably been a prominent reason for emigration controls. No Indian student has enrolled at AIT since 1962, although Indian students have been accepted for admission every year the Institute has been in operation. In 1966-67, 19 Indian students were accepted, and in 1967-68, 14 students were accepted. Complete figures for 1968-69 were not available at the time of this writing, but the number of Indian admissions was purposely reduced to six.

The Asian Institute of Technology and its predecessor, the SEATO Graduate School of Engineering, have grown from an initial enrollment of 19 first-year students in 1959-60 to 151 students enrolled in all phases of master's work in 1967-68. The table below shows enrollment figures, by category, representing registrations for the first semester of each academic year, including estimates for 1968-69. These data, which are presented graphically in Exhibit III-3, on the following page, are shown below:

ASIAN INSTITUTE OF TECHNOLOGY

ENROLLMENTS, BY YEAR

1959–60 THROUGH 1968–69

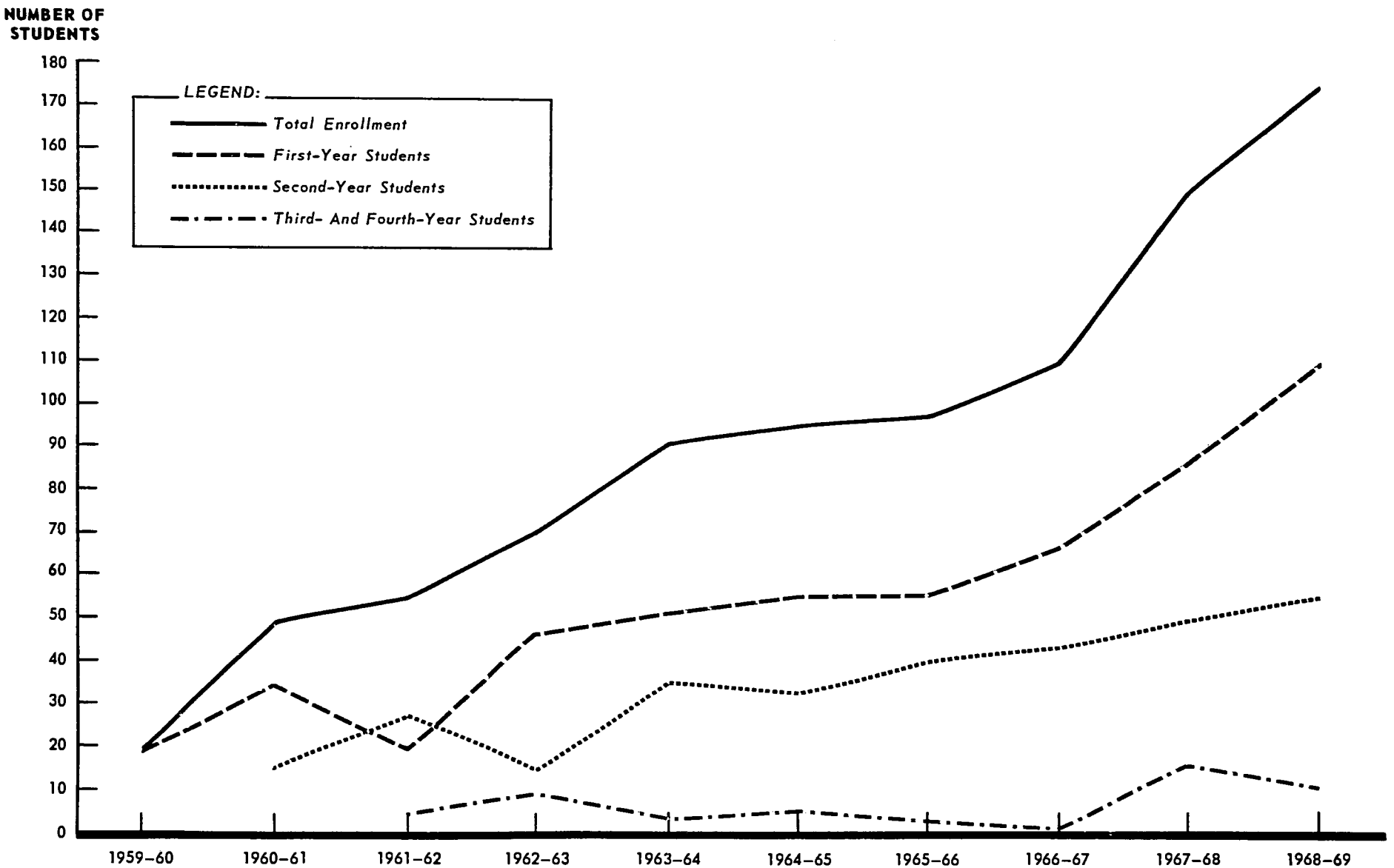


EXHIBIT III-3

Student Level	1959-60	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69(a)	Total
First Year	19	34	21	47	52	56	56	67	87	110	549
Second Year	-	14	27	15	36	33	39	43	48	55	310
Third Plus Fourth Year	-	-	6	8	4	6	3	1	16	10	54
Total	19	48	54	70	92	95	98	111	151	175	913

(a)Estimated.

AIT has enjoyed a fairly steady growth in total enrollment. Excluding 1959, when only first-year students were enrolled, the increase in enrollment has ranged from 3 to 36 per cent per year, with an average annual increase of 18.2 per cent. The enrollment of first-year students, which represents the largest single component of total enrollment, has shown steady growth, with the exception of 1961-62, when a decline was experienced. The number of second-year students corresponds closely to the number of first-year students enrolled the previous year. The enrollment figures for the third- and fourth-year students tends to be erratic, since they do not necessarily include all of the students in good standing who did not graduate in the normal two-year period, but only those who registered.

ATTRITION AND GRADUATION

Not all of the students who enroll at AIT receive the master's degree; the attrition rate for AIT students has averaged 31 per cent. The largest attrition is experienced during the first year of study, when 28 per cent of the students leave the program for one reason or another. A summary of the attrition of enrollees entering AIT between 1959-60 and 1966-67 is presented in Exhibit III-4, on the following page, by year of enrollment, by option and by country. There are 15 students in good standing who have completed two or more years of study but have not yet completed their degree requirements. It has been assumed that they will all eventually graduate.

Attrition figures show that between 21 and 37 per cent of the first-year students failed to reach second-year status during the period from 1959-60 to 1966-67. The yearly attrition rates from enrollment to graduation for the same period (including pendings) are in the same range, but the average attrition for the entire period is slightly higher.

ASIAN INSTITUTE OF TECHNOLOGY

ATTRITION OF ENROLLEES BY YEAR, OPTION AND COUNTRY
1959-60 Through 1966-67

	Number Of Enrollees	Number Starting Second Year	Number Graduating Or Pending	Per Cent Attrition Of Enrollees	
				Starting Second Year	Graduating Or Pending
Year Of Enrollment					
1959-60	19	14	14	26%	26%
1960-61	34	27	24	21	29
1961-62	21	15	15	29	29
1962-63	47	37(a)	37	21	21
1963-64	52	33	33	37	37
1964-65	56	38	36	32	36
1965-66	56	43	39	23	30
1966-67	67	48	44	28	34
Total	352	255	242	28%	31%
Option					
Hydraulic engineering	115	81	78	30%	32%
Public health engineering	32	22	21	31	34
Soil engineering	13	11	11	15	15
Structural engineering	121	92	86	24	29
Transportation engineering	71	49	46	31	35
Country					
Hong Kong	2	2	1	-	50%
India	2	1	1	50%	50
Malaysia	10	8	8	20	20
Pakistan	65	41	38	37	42
Philippines	77	50	47	35	39
Taiwan	9	9	9	0	0
Thailand	186	143	137	23	26
Vietnam	1	1	1	-	-

(a)One student enrolling in 1962 took one year's leave of absence during the academic year of 1963-64. He entered the second year in 1964-65 and graduated in 1967.

The attrition statistics by option show little percentage variation among options, with the exception of soil engineering. This option is the newest one at AIT, and enrolled only 13 students in the period analyzed. Of the other options, structural engineering shows a slightly lower attrition rate during the first year, but the gap closes when attrition of students graduating or pending is analyzed.

The final section of the exhibit indicates that only Pakistan, the Philippines and Thailand have enrolled large numbers of students at AIT. Of these three countries, Pakistan and the Philippines show higher than average attrition rates. Students from Thailand show lower than average attrition rates. Malaysia and Taiwan show indications of low attrition rates, but the number of students is still small.

Students leave the program during the first year of study for a variety of reasons. Some are dismissed for academic reasons - that is, for not maintaining a satisfactory grade average - and some resign for personal reasons or because they realize that they are failing to perform adequately. The line between dismissal and resignation is frequently unclear, making a statistical evaluation of the reasons for attrition during the first year of study difficult.

Several factors contribute to attrition after the student completes his second year of study. The three students in this category from the class enrolled in 1964 failed to graduate because they did not successfully complete their research thesis. They were officially dropped at the end of the maximum four-year period. The attrition of four students each from the classes enrolled in 1965 and 1966 occurred during their second year of study. Three were dismissed, one resigned, one failed the comprehensive examination on course work, one failed to produce an acceptable thesis, and two failed the thesis assessment. The thesis assessment was first introduced for the class enrolled in 1966 in an attempt to identify capacity to perform research early in the program and lessen the failure of students for research inabilities later on.

A student is allowed a maximum of four years in which to complete his master's degree, although the degree normally can be completed in two years. Exhibit III-5 presents graduation data by length of time taken for classes enrolled in the years 1959 through 1966, by year, by option and by country.

During the years covered, 227 students graduated and 15 are pending. Three students from the class enrolled in 1965 are entering their fourth year of study and it is assumed that all will graduate at the end of this academic year. Twelve students are still pending from the class enrolled in 1966; they are

ASIAN INSTITUTE OF TECHNOLOGY

LENGTH OF TIME NEEDED FOR GRADUATION
1959-60 Through 1966-67

	Total Graduating Or Pending	Number Graduating In Two Years	Number Graduating Or Pending In: Three Years	Number Graduating Or Pending In: Four Years	Per Cent Graduating In Two Years	Per Cent Graduating Or Pending In: Three Years	Per Cent Graduating Or Pending In: Four Years
Year Of Enrollment							
1959-60	14	8	6	-	57%	43%	
1960-61	24	16	8	-	67	33	
1961-62	15	9	4	2	60	27	
1962-63	37	23	12	2	62	33	
1963-64	33	24	9	-	73	27	
1964-65	36	28	7	1	78	19	
1965-66	39	17	19	3	43	49	
1966-67	44	32	12	-	73	27	-
Total	242	157	77(a)	8	65%	32%	3%
Option							
Hydraulic engineering	78	56	22	-	72%	28%	-
Public-health engineering	21	13	6	2	62	29	9%
Soil engineering	11	7	4	-	64	36	-
Structural engineering	86	59	24	3	69	28	3
Transportation engineering	46	22	21	3	48	46	6
Country							
Hong Kong	1	-	1	-	-	100%	-
India	1	1	-	-	100%	-	-
Malaysia	8	5	3	-	63	37	-
Pakistan	38	30	8	-	79	21	-
Philippines	47	37	8	2	79	17	4%
Taiwan	9	3	6	-	33	67	-
Thailand	137	81	50	6	59	37	4
Vietnam	1	-	1	-	-	100	-

(a) Twelve members of the 1966-67 enrollment year did not graduate in 1968. It is assumed that all 12 will graduate in one additional year, although several may need a fourth year or may not graduate at all.

EXHIBIT III-5

entering their third year of study. It is assumed here that all twelve will graduate at the end of the third year, but some may, in fact, take the full four years and others may not graduate at all.

A total of 65 per cent of the graduating or pending students have been able to complete their programs in the minimum two-year period, and most of the remaining 35 per cent finish in their third year, but there is considerable variation from year to year. Only 44 per cent of the graduating or pending students who enrolled in 1965 were able to complete the program in two years while of those who enrolled in 1964, 78 per cent graduated in two years. The majority of those who do not graduate after two years finish during the third year, although in one year as many as 13 per cent took the maximum time to graduate.

The record by option shows that less than half of the students in transportation engineering graduate in the normal two-year period, while students in the remaining options have a two-year graduation rate between 62 and 72 per cent. Public health engineering, with 10 per cent of its graduates taking the full four years, has the highest percentage in that category. By country, students from both Pakistan and the Philippines show a higher than average propensity to graduate in the minimum two years, while the Thai students are somewhat below average. To a certain extent, there is less pressure on the Thai students to finish in two years because they do not have to face the problem of having their visas extended to complete their degrees. The number of enrollees from the remaining countries is too small to enable significant conclusions to be drawn.

TUITION, FEES AND SCHOLARSHIPS

Students without scholarship or graduate assistantship support are required to pay a tuition fee of 100 Baht (approximately U. S. $5) per credit-hour of course work taken and 500 Baht for thesis registration each semester up to a maximum of 1,000 Baht per student per semester. The tuition includes charges for research and other thesis expenses, but not for textbooks. All students are required to pay a deposit of 200 Baht to cover laboratory breakages. Additional fees are levied on all students for transportation and other expenses when field or inspection trips are required as part of a course. Fees are also charged for certain graduation expenses.

All students engaged in thesis research at the Institute are required to register for "thesis" each semester. The registration fee, however, may be waived for the third year if the following conditions are fulfilled:

- The student has completed all experimental work.

- The student might reasonably be expected to complete his thesis within the first few weeks of the term.

- The area chairman recommends a waiver to the Academic Dean.

Students holding scholarships or graduate assistantships are furnished, free of charge, with all required textbooks in courses taken for credit. If the student drops a course, the textbooks must be returned; but if the student continues in the course throughout the semester, the book becomes his property regardless of whether he passes or fails the course. All other students must pay for textbooks at a price established by the School - usually the School's cost.

Student support is available in three forms - scholarships, graduate assistantships and student assistantships. A full scholarship for a student in academic 1968-69 consists of the following:

- Minimum-cost air travel from residence to Bangkok and return, plus an allowance of 500 Baht toward fees charged in connection with entering Thailand (students from Thailand living outside the vicinity of Bangkok receive a travel allowance of 400 Baht)

- Subsistence allowance of 1,500 Baht per month

- Tuition

- Textbooks used in courses taken for credit

- Research and other thesis expenses.

The transportation allowance applies at the beginning of the program, with return at the end of the 21-month period, or earlier if the student leaves the program or completes all the degree requirements sooner. The subsistence allowance is paid for the full 21 months or less under the same conditions as above. If a student completes his degree requirements prior to the final date for submission of the thesis, he may elect to terminate his scholarship as of the date of completion, or he may work under the supervision of his adviser and have his scholarship continue until graduation.

The subsistence allowance has been raised several times since 1959-60. Until 1968-69, the Thai students generally received a lower subsistence allowance than students from other countries. Thai students from Bangkok received an even lower subsistence allowance on the assumption that they lived at home. The subsistence allowance for all students will be 1,500 Baht per month beginning in 1968-69. A summary of subsistence allowances by academic year is presented below:

	Subsistence Allowance (Baht) For:		
		Thai Students	
Year	Non-Thai Students	Outside Vicinity Of Bangkok	From Vicinity Of Bangkok
1959-60	1,000	Not stated	Not stated
1960-61	1,200	1,200	900
1961-62	1,500	1,200	900
1962-63	1,500	1,200	900
1963-64	1,500	1,200	900
1964-65	1,500	1,200	900
1965-66	1,500	1,200	900
1966-67	1,500	1,200	1,000
1967-68	1,500	1,200	1,000
1968-69	1,500	1,500	1,500

When AIT was still the SEATO School, scholarships could be made available only to students who were nationals of Brunei, Burma, Cambodia, Ceylon, India, Indonesia, Laos, Malaysia, Pakistan, the Philippines, Singapore, South Vietnam or Thailand. Students from other countries could be offered graduate assistantships requiring half-time work in the School as assigned. The assistantship carried a 2,000 Baht per month stipend plus tuition, textbooks, and research and other thesis expenses. Assistants were expected to carry a reduced academic load that could slightly extend the length of the program. After AIT's disaffiliation from SEATO, all applicants became eligible for scholarships, and the graduate assistantship is not currently in use, although the 1968-69 catalog notes a rise in the stipend to 3,000 Baht per month.

The third form of student aid is the student assistantship, which may be awarded to outstanding scholarship holders. The student assistant carries a normal academic load and is allowed to work a maximum of 20 hours per month at a rate of pay of 20 Baht per hour. In some cases, student assistants who are married may be allowed to work a maximum of 50 hours per month. During 1967-68, 24 scholarship holders were employed as student assistants.

The majority of students have been on scholarship, though a few have held graduate assistantships. The table below presents a summary of student support (in terms of scholarships, graduate assistantships and no support) during the past six academic years, for both first- and second-year students:

	Scholarship	Graduate Assistantship	No Support	Total
1962-63				
First-year students	45	2	-	47
Second-year students	14	1	-	15
1963-64				
First-year students	50	2	-	52
Second-year students	35	1	-	36
1964-65				
First-year students	55	1	-	56
Second-year students	31	2	-	33
1965-66				
First-year students	54	2	-	56
Second-year students	38	1	-	39
1966-67				
First-year students	61	4	2	67
Second-year students	41	-	2	43
1967-68				
First-year students	87	-	-	87
Second-year students	48	-	-	48

During 1967-68, all graduate assistantships were changed to scholarships when SEATO disaffiliation became imminent. In the past six years, only four students have matriculated without some support from the School. Third- and fourth-year students do not normally receive scholarship or graduate assistantship support, though the subsistence allowance for some third-year students has been extended under certain conditions when the need for such an extension was not the student's fault. Extensions normally are for one month, but have, in rare cases, gone as long as three. The delay in the 1968 graduation ceremony caused by difficulty in the schedule of the King of Thailand forced a one-month extension in the allowance for all second-year students.

Living accommodations for unmarried AIT students are made available by Chulalongkorn University. For men, a residential hall with 42 double rooms is available within walking distance of AIT. Single women are usually accommodated in a Chulalongkorn women's dormitory. The charge for a double occupancy room is 150 Baht (U. S. $7.50) per month per student. A contract caterer provides two meals per day at nominal cost for those who wish such service. Kitchen facilities are sometimes available for groups who wish to do their own cooking. Married students who come with their families must find local housing.

PRESENT PLANS FOR THE FUTURE

The document Long-Range Planning Criteria presents a proposed 10-year accretion plan for student enrollments by discipline, and including master's, doctoral and diploma students. The master's students are assumed to be in a two-year program, with doctoral students in a three-year program. The length of program for diploma students is not specified. The table is shown in Exhibit III-6.

To reach the projected 1,200 student enrollment, the plan calls for civil engineering to level off at 250 students, with mechanical engineering growing to 450 students, electrical engineering to 300 students, chemical engineering to 140 students and basic sciences to 60 students. The total enrollment of 300 students in 1971 should double in 1973, triple in 1975 and quadruple in 1977, according to the plan.

The ratio of students in degree programs to students in nondegree programs can be found in the Development Program, where a footnote to a table estimating AIT capital costs states that the figures are based on estimates of 800 degree candidates and 400 diploma students. If it is assumed that both figures are full-time equivalents, two-thirds of the enrollments represent degree candidates.

CONCLUSIONS

Since the majority of students at AIT are on scholarship, the number to be admitted is dependent upon the availability of scholarship funds as well as of faculty and space. The President usually decides how many enrollees are desired and how many acceptances should be made. The admissions are divided among options and among countries, so that AIT retains its regional balance. The admissions, within the President's goals and guidelines, are made by the option chairmen. Factors usually considered are undergraduate record, class

ASIAN INSTITUTE OF TECHNOLOGY

PROPOSED TEN-YEAR ENROLLMENT ACCRETION PLAN
1968-69 Through 1977-78

Year	Engineering				Basic Sciences	Total
	Civil	Mechanical	Electrical	Chemical		
1968-69	170	-	-	-	-	170
1969-70	190	-	-	-	-	190
1970-71	220	-	-	-	-	220
1971-72	220(a)	30	30	20	-	300
1972-73	240	80	80	40	10	450
1973-74	250	140(a)	130(a)	60(a)	20	600
1974-75	250	210	180	80	30	750
1975-76	250	280	230	100	40	900
1976-77	250	360	270	120	50	1,050
1977-78	250	450	300	140	60	1,200

(a)Probable years in which doctoral program will begin in each field.

rank, performance in specific courses or areas, work experience, letters of recommendation and interview notes. All of the applicants from Thailand, Pakistan and other selected countries are interviewed.

The number of applications received by the Institute has generally increased, with some fluctuations from year to year. The number of students admitted each year has shown, with the exception of one year, a steady growth in programs. The per cent of applicants admitted has varied from year to year, reflecting variations in the number of applications received and, at the same time, the effort to expand programs. From 1959-60 to 1967-68, an average of 43 per cent of all applicants were admitted. The percentages of applications accepted show little variation among options, indicating an attempt to admit students in accordance with their option preferences. An average of 70 per cent of those admitted each year actually enrolled.

The figures by country showed a great deal of variation. Applications and admissions have been dominated by Thailand, Pakistan, the Philippines and India, while enrollments have come predominantly from Thailand, Pakistan and the Philippines. Factors such as SEATO disaffiliation and a greater recognition of the quality of an AIT degree may combine in the future to attract applications from more countries of the region and improve the percentage of admitted students that actually enroll.

Enrollment statistics since the opening of the Institute show an average growth per year of 18.2 per cent. The number of second-year students corresponds closely to the number of first-year students the previous year. Experience has shown that an attrition rate of 28 per cent prevails between the first and second years of study. After the beginning of the second year of study, there is an additional average attrition rate of 3 per cent. The lowest attrition rate occurs in the newest option, but the number of students there has been small. The remaining options all show higher attrition rates. Of the three countries that have accounted for 92 per cent of the enrollments over the Institute's history, Thailand has shown an attrition rate lower than the Institute average, and Pakistan and the Philippines have shown higher ones.

The normal time needed to graduate from the program is stated to be two years, but only 65 per cent of the students graduate in that length of time. An additional 32 per cent graduate during their third year, and 3 per cent graduate during their fourth year. These figures do not mean that a full three or four years are taken to complete the program. Since there is only one graduation ceremony per year, a student completing his degree one week after the graduation deadline would be forced to wait until the next year to participate in the

official ceremony. The percentage of students who complete the program in two years is nearly identical for all options except for transportation engineering, where only 48 per cent of the students graduate in two years. Of the three major countries from which students come, Thailand has just under 60 per cent graduating in two years, while Pakistan and the Philippines have just under 80 per cent graduating in that time.

The great majority of AIT students are admitted under full scholarship, including transportation costs, a subsistence allowance, tuition, textbooks, and research and thesis expenses. Scholarship students can earn additional funds through hourly work in the student assistantship program. Graduate assistantships were originally used to help support students from non-SEATO countries, who were not eligible for scholarships. The major differences between the scholarship and the graduate assistantship is that the latter does not provide transportation, requires 20 hours of work per week, and provides a higher monthly payment. With AIT's disaffiliation from SEATO, the graduate assistantship is not currently being used, and its future is uncertain.

AIT's plans for the future include a student body of 1,200 by 1977. The student body would consist of approximately 800 degree candidates and 400 nondegree diploma students. The proposed 1977 breakdown of students by discipline is 250 in civil engineering, 450 in mechanical engineering, 300 in electrical engineering, 140 in chemical engineering and 60 in basic sciences. Degree candidates include both master's and doctoral students. At some time in the future, the majority of degree students may be at the doctoral level.

C - FACULTY

This section reviews the academic organization, faculty rules and regulations, faculty size and workloads and present plans for the future.

ACADEMIC ORGANIZATION

As shown in Exhibit III-7, the academic organization of AIT is directed by the Academic Dean, who supervises the Registrar's office, the library, the computer operation and the workshop. The workshop is under the direction of the Academic Dean because of its heavy involvement in building research equipment.

The Advisory Committee to the Academic Dean, which consists of the five option chairmen, assists the Academic Dean in administrative matters relating to the faculty or other offices under his supervision.

The Academic Senate operates under a set of bylaws passed by the Executive Committee of the Board of Trustees in July 1968. The bylaws call for a Senate composed of the Academic Dean (as Chairman), all option chairmen and additional members of the faculty, numbering not less than five nor more than fifteen. The President of the Institute is an ex officio member of the Senate. The additional members are to be elected within two months of the beginning of the first semester of an academic year at a meeting of the faculty. Insofar as possible, the number of professors, associate professors and assistant professors elected to the Senate should be proportional to their representation on the faculty. In addition, not more than three members from any one option may be members of the Senate at any one time.

The Senate is required by the bylaws to hold a regular meeting once each month, with special meetings as necessary. The Senate is responsible for recommending to the President policies for developing and conducting the academic program, and any other matters referred to it by the Board of Trustees, the Executive Committee or the President.

The Senate is assisted by the Academic Committee and other special or standing committees as necessary. The Academic Committee consists of the Academic Dean (as Chairman), plus all option chairmen (not to exceed six in number). The Academic Committee serves as the executive body of the Senate. At present, three standing committees have been appointed by the Academic Dean - the Library Committee, the Computer Committee and the Publications Committee.

ASIAN INSTITUTE OF TECHNOLOGY

PRESENT ACADEMIC ORGANIZATION

SEPTEMBER 1968

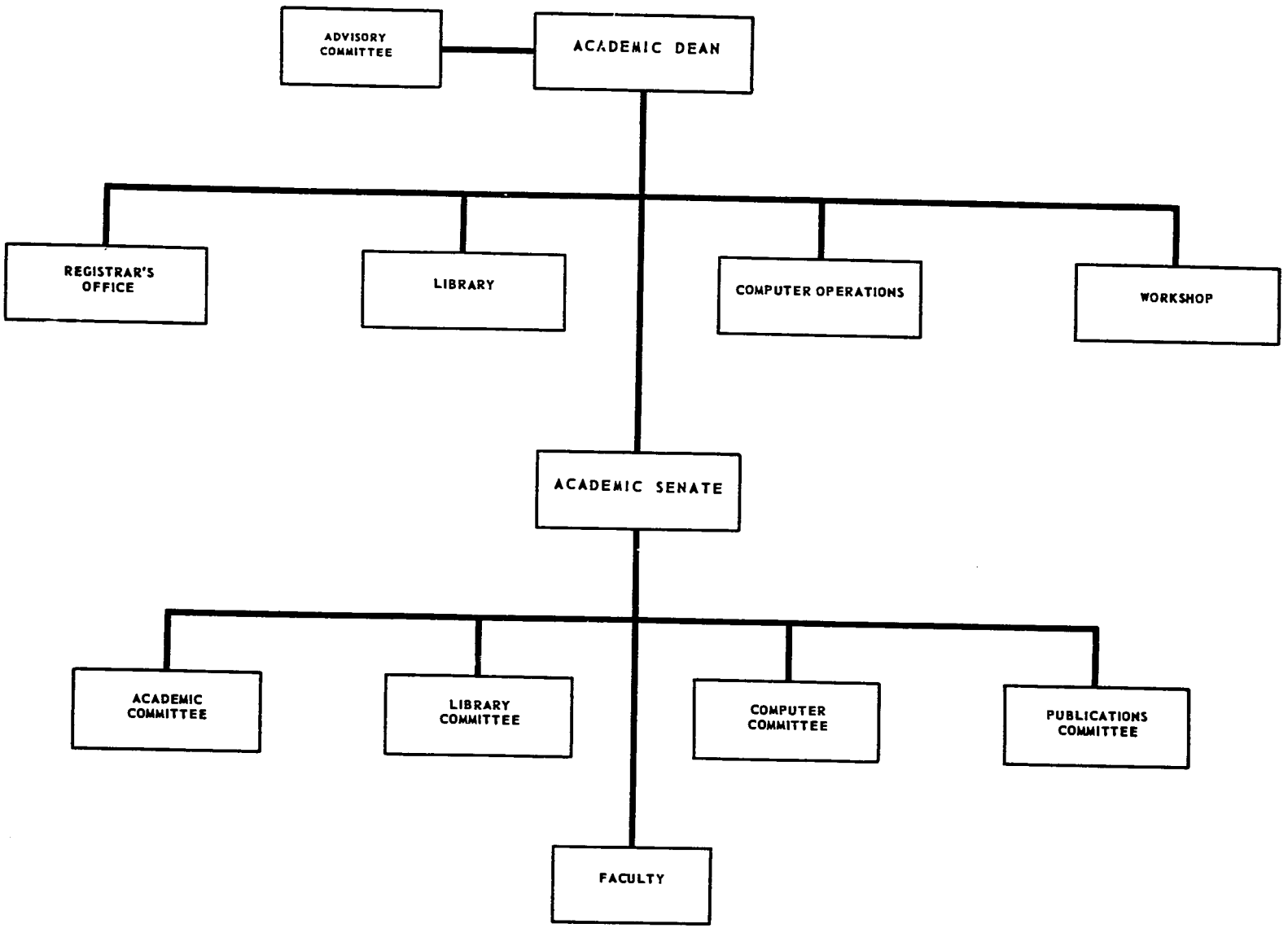


EXHIBIT III-7

The faculty consists of all individuals holding teaching appointments, plus the Librarian. It meets under the chairmanship of the President not less than once per year for discussion of matters affecting the faculty, and for the election of Senate members. Special meetings may be called as needed. The present teaching faculty is divided into five options, each headed by a chairman. An option chairman is responsible for the conduct of the academic program within his area, in accordance with the policies and procedures established by the Academic Senate.

FACULTY RULES AND REGULATIONS

AIT is currently in the process of developing rules and regulations for faculty and staff. The Institute is operating under a series of memorandums known as academic operating memorandums, which have been developed over the years. The proposed rules and regulations attempt to bring these policies together, improve them and fill in the gaps.

To date, one policy, which concerns contract research, has been approved by the Board of Trustees. The policy recognizes that research is basic to the general objectives of AIT, to southeastern Asia, and to the education of engineers, but further states that the Institute must first serve the specific objectives of its academic programs and must never place itself in a position of competing with private enterprise. The following statements were approved:

1. No research program will be undertaken that is either inconsistent with the objectives of the Institute or does not in some manner contribute to the overall excellence of its academic programs.

2. Any sponsored research program that in any way limits the publication rights of either the faculty or students associated with it is to be discouraged and will be undertaken only after careful consideration by the appropriate Administrative Officers.

3. The sponsor of a research program will agree to pay all the costs associated with the research, including faculty and staff salaries and annuities, supplies, equipment, shop charges and other direct costs. The sponsor will also agree to pay a certain amount of overhead to cover all indirect costs of the project and which will be deposited in a general fund for the normal operational costs of the Institute.

4. The sponsor and faculty member(s) will determine the scope of the project and will prepare a proposal and budget for submission through appropriate administrative channels to the President's office for negotion and approval.

5. All research contracts will be made in the name of the Asian Institute of Technology.

6. All research contract funds will be expended in accordance with the usual business practices of the Institute.

FACULTY SIZE AND WORKLOADS

According to the AIT and SEATO Graduate School catalogs, a total of 38 men have held professorial positions (not including the chief administrative officer) during the nine years in which the Institute or its predecessor has been in existence. This total represents all professors who have spent at least one year at the School, and are not full-time equivalents. The majority of professors have been seconded and have come from six countries. The following table presents a tabulation of the number of professors by source, total man-years, and average years per man for the period 1959-60 to 1967-68:

Source	Number Of Professors	Total Man-Years	Years Per Man
Seconded			
United States	24	55	2.3
Thailand	5	19	3.8
United Kingdom	4(a)	12	3.0
Australia	1	1	1.0
France	1	6	6.0
New Zealand	1	4	4.0
Subtotal	36	97	2.7
Direct Hire	2	4	2.0
Total	38	101	2.7

(a)It also should be noted that there was one additional professor from the United Kingdom who, although he spent less than one year at the School, made a long-term significant contribution to the development of the School.

The United States has provided over half the seconded faculty for AIT. It has also provided the Deans and the President, who are not included in these figures. Thailand has provided five faculty members, who have been primarily part-time at the Institute. The majority of professors stay for a period of two years, but a core of longer-term professors have developed, raising the average to 2.7 years per seconded professor. Of the eleven professors who will form the nucleus of the 1968-69 faculty, four are from the United States and have combined experience of 17 years at AIT; four are from Thailand and have spent 14 years at the Institute; one is from the United Kingdom and has four years experience at AIT; one is from Australia and has completed one year at AIT; and one is a direct-hire employee who has completed two years at AIT.

An analysis of professors, both seconded and direct hire, by academic year and by rank is presented in Exhibit III-8, on the following page.

The total number of professors in all ranks has grown steadily since the Institute's inception. The number of full professors has always been 50 per cent or more of the total faculty, with associate professors usually outnumbering assistant professors. Four faculty members have been promoted during their terms and these promotions are reflected in the foregoing exhibit. Two were promoted from associate professor to professor, and two from assistant professor to associate professor. Three of them are seconded by the United States, and one by the United Kingdom. All four are still on the AIT faculty. One associate professor was promoted to professor during the summer of 1968 with the result that six professors, two associate professors and three assistant professors will continue at AIT as the nucleus of the 1968-69 faculty.

Each faculty member performs a number of functions in his role as a professor. He teaches, advises students, supervises research theses, and does individual research. In addition, he spends a certain portion of his time on administrative duties such as attending meetings, screening admissions, and engaging in promotional activities, and may also be involved in continuing education or regional activities. Determining precise inputs of time into each of these activities for each professor or even for the average professor is a difficult task, but an analysis of full-time equivalent faculty inputs has been made. For this analysis, the academic years 1963-64 through 1967-68 have been used. Two new options were added during this period and the size of the faculty and the student body grew at a fairly steady rate. Since this analysis is concerned only with instructional staff, not supportive or administrative staff, the President of AIT and the previous Deans, who are considered full-time administrators, have not been considered.

ASIAN INSTITUTE OF TECHNOLOGY

PROFESSORIAL STAFF
1959-60 Through 1967-68

Year	Assistant Professors		Associate Professors		Professors		Total	
	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent
1959-60	1	20%	1	20%	3	60%	5	100%
1960-61	1	11	2	22	6	67	9	100
1961-62	2	18	1	9	8	73	11	100
1962-63	2	18	2	18	7	64	11	100
1963-64	1	9	4	36	6	55	11	100
1964-65	1	10	4	40	5	50	10	100
1965-66	1	8	5	42	6	50	12	100
1966-67	3	19	3	19	10	62	16	100
1967-68	3	19	4	25	9	56	16	100
Total	15	15%	26	26%	60	59%	101	100%

EXHIBIT III-8

This analysis attempts to avoid identifying how a full-time faculty member actually spends his time. If a full-time faculty member hired as a professor is physically present or employed solely by AIT from the beginning of the first semester until the end of the summer session, he is considered to be 1.0 full-time equivalent faculty member. This concept is established regardless of how many courses he taught, how many students he supervised or how much research he did. It is assumed that if he has been hired as an instructional professor, his time is consumed by one or more of these activities plus some administrative work in full-time employment throughout the academic year. The assignment of course work and the control of other time inputs are administrative matters.

If a full-time faculty employee arrived after the start of the academic year or departed prior to its close, his full-time equivalent calculation must reflect this. The relationship among the two semesters and the summer session can be expressed by the ratio 10: 10: 7, which will be explained later. For example, if a faculty member misses the first semester but is at AIT for the second semester and summer session, he represents 17/27 FTE. No matter what he does during that period of time - as long as it is not administrative work beyond that expected of every faculty member - he represents 0.63 FTE. Calculations were made to the nearest half term of arrival or departure, and no account has been taken of home leaves during tours of duty. These are assumed to be a cost of doing business.

A final set of assumptions for full-time professors regards administrative work beyond that which a full-time faculty member might ordinarily be expected to perform. As mentioned earlier, the work of the President is assumed to be 100 per cent administrative. The position of Academic Dean (formerly Director of Research) has special administrative duties. For purposes of this analysis, the administrative duties of this position were assumed to require 20 per cent of the incumbent's time through 1964-65, and 50 per cent beginning 1965-66, reflecting differing job responsibilities. The position of option chairman also carries administrative duties assumed to be 20 per cent more than the normal amount. It has also been assumed that the option chairmen for the two options started during the analysis period began preparations one year in advance.

To get a complete picture of FTE faculty inputs, part-time instructors must also be included. To enable analysis of the FTE input of part-time instructional staff, three basic assumptions must be made:

1. A faculty member who engaged only in teaching could handle 27 credit-hours per academic year. As three hours outside the classroom - for lecture preparation, student counseling, developing and correcting examinations, etc. - are needed for every class contact-hour, a total of four hours per week would be required for each credit-hour taught. Using a 40-hour week as a guideline, if an instructor spent his full time teaching, he could handle a maximum of 10 class contact-hours per week. Thus, within the context of the semester system used at AIT, a faculty member engaged only in teaching could handle 10 credit-hours per semester plus 7 credit-hours during the shorter summer session, for a total of 27 credit-hours per academic year.

2. Approximately 0.10 FTE is required for each student thesis supervised, on the assumption that an average of four hours per week must be spent with each thesis student.

3. Part-time faculty would have none of the administrative obligations of full-time faculty members.

On the basis of the above assumptions, the faculty FTE's have been calculated for the period 1963-64 to 1967-68. The table below shows the faculty FTE's, the student FTE's and the student-faculty ratios for that period.

Year	FTE		Student-Faculty Ratio
	Students	Faculty	
1967-68	151.0	12.2	12.4:1.0
1966-67	111.0	12.6	8.8:1.0
1965-66	98.0	10.3	9.5:1.0
1964-65	95.0	9.8	9.7:1.0
1963-64	92.0	9.2	10.0:1.0
Total	547.0	54.1	10.1:1.0

For the five-year period, the School operated with an average of approximately 10 students for each faculty member, on a full-time equivalent basis. The greatest variation occurred in the last two academic years, when AIT had a large increase in the number of students while experiencing a slight reduction in FTE faculty members.

PRESENT PLANS FOR THE FUTURE

In its Long-Range Planning Criteria, AIT translates FTE student enrollments into FTE faculty needs by means of an appropriate student-faculty ratio. AIT feels, however, that a ratio that would be satisfactory in a western university would not necessarily be applicable at AIT. On the one hand, the Asian student needs relatively more individual attention, while on the other hand, the AIT faculty has relatively greater involvement in other programs such as conferences, institutes, etc. In addition, AIT insists that all faculty engage in research. With these points in mind, AIT feels that a student-faculty ratio of 6:1 overall is adequate. On the basis of this ratio, AIT has developed faculty needs by year for each discipline, as shown in Exhibit III-9.

AIT recognizes that doctoral programs require high-quality, permanent staff. The secondment of faculty from western countries, which has accounted for the great majority of full-time faculty members in the past, serves the important advantage of bringing western methods and technologies to southeastern Asia. A disadvantage of secondment is that faculty members are linked to their home universities and do not generally stay at AIT for more than a two- or four-year period, which results in discontinuities in programs, uncertainties in staffing, difficulties in planning a development program, and acts as a deterrent in initiating doctoral programs. To alleviate these problems, AIT hopes to balance the seconded faculty with a core of permanent faculty members. As an eventual goal, AIT would like to have a faculty that is 70 per cent direct hire and 30 per cent seconded. Such a mix would ensure continuity while providing interaction of technologies. A proposed trend toward this goal is presented below:

Year	Faculty	Seconded Faculty		Direct-Hire Faculty	
		Number	Per Cent	Number	Per Cent
1968-69	28	18	64%	10	36%
1969-70	37	21	57	16	43
1970-71	45	25	56	20	44
1971-72	50	26	52	24	48
1972-73	75	36	48	39	52
1973-74	100	44	44	56	56
1974-75	125	50	40	75	60
1975-76	150	54	36	96	64
1976-77	175	58	33	117	67
1977-78	200	60	30	140	70

ASIAN INSTITUTE OF TECHNOLOGY

PROPOSED TEN-YEAR FACULTY ACCRETION PLAN
1968-69 Through 1977-78

(Based on 6:1 Student-Faculty Ratio)

Year	Engineering				Basic Sciences	Total
	Civil	Mechanical	Electrical	Chemical		
1968-69	28	-	-	-	-	28
1969-70	32	2(a)	2(a)	1(a)	-	37
1970-71	37	3(a)	3(a)	2(a)	-	45
1971-72	37	5	5	3	-	50
1972-73	40	13	13	7	2	75
1973-74	42	23	22	10	3	100
1974-75	42	35	30	13	5	125
1975-76	42	47	38	17	6	150
1976-77	42	60	45	20	8	175
1977-78	42	75	50	23	10	200

(a)Faculty planning new programs to begin in 1971, in addition to the normal 6:1 ratio in on-going programs.

The plan calls for a rapid rise in direct-hire faculty, with a sevenfold increase between 1970 and 1977. The number of seconded faculty also grows, but at a much lower rate, reducing the per cent of total faculty on a seconded basis in 1977 to less than half the projected 1968 percentage. The projected size of the faculty is based on the 6:1 student-faculty ratio for both the degree and nondegree programs.

AIT stresses the importance of research for its professors. Freedom for professors to conduct research of their own choosing is recognized as basic to AIT's objectives. A large faculty will have research interests that range from highly theoretical to applied. Research will not only enhance the prestige of AIT but may also help to solve problems unique to southeastern Asia. The effect of research on the students should be to develop the technique of problem solving, rather than to solve specific problems.

AIT also hopes to encourage faculty members from other universities in the region to spend their sabbatical or study leaves at the Institute. Such a program would, it is thought, benefit the AIT faculty as well as the faculties of the other universities. Study-leave faculty would be able to work with the resident faculty in a common environment to learn the latest techniques from the west and from the Institute. AIT faculty would benefit from the interaction by obtaining first-hand reports of the changing needs of the region. The Development Program projects the number of special study-leave faculty to 80 in 1977 from one in 1968.

CONCLUSIONS

The academic organization is headed by the Academic Dean, who also supervises the Registrar's office, the library, the computer operation and the Workshop, all of which are assumed to be closely linked to the academic operation. The Academic Dean presides over the Academic Senate, which consists of all option chairmen and five to fifteen additional faculty members. The Academic Committee acts as the executive body of the Senate; it consists of the option chairmen and is presided over by the Academic Dean. Current standing committees are the Library Committee, the Computer Committee and the Publications Committee. The faculty, consisting of all individuals holding teaching appointments, as well as the Librarian, meets under the chairmanship of the President at least once each year for discussion of faculty matters and election of Senate members.

Faculty rules and regulations are in the process of being reformulated. Some guidelines are contained in a series of academic operating memorandums, but these are not complete. To date only one policy, covering contract research, has been passed by the Senate and approved by the Board of Trustees.

The professional faculty of AIT has grown steadily since the Institute's inception. Most of the faculty members have been seconded, and most of the seconded faculty have been provided by the United States. Other countries seconding faculty are Thailand, the United Kingdom, Australia, France and New Zealand. The average seconded faculty members spends two-and-one-half to three years at AIT. Each year, half or more of the instructors have been full professors. While this does add experience and maturity to the faculty, it is, at the same time, a somewhat top-heavy structure by normal standards.

In arriving at a measure of faculty workloads, full-time equivalents per academic year were developed. Each full-time professional faculty member was assigned an FTE depending on his arrival and departure date for each academic year, and corrections were made for administrative responsibilities. The President, whose duties were assumed to be 100 per cent administrative, was not included in th calculation. The work of the Academic Dean was considered to be 20 per cent administrative in the earlier years and 50 per cent administrative in recent years; these percentages were excluded. The work of the option chairmen was considered to be 20 per cent administrative.

Part-time instructors were assigned FTE's on the basis of their teaching load and their research thesis supervision. It was assumed that a maximum teaching load with no other responsibilities would add up to 27 credit-hours per academic year. The number of hours taught by a part-time instructor in an academic year was expressed as a percentage of the maximum. It was also assumed that thesis supervision required an input of 0.10 FTE per student per year.

Faculty FTE's for the last five academic years were calculated using the above assumptions. They range from 9.2 to 12.6, with an average of 10.8 FTE faculty members per academic year. Applying these figures to student enrollments for the same year, the student-faculty ratios were found to range between 8.8:1.0 and 12.4:1.0, with a five-year average of 10.1:1.0.

In its plans for the future, AIT has projected faculty needs using a 6:1 student-faculty ratio. This calls for an FTE faculty of 200 in 1977 when the enrollment reaches 1,200 FTE students. AIT also hopes to increase the percentage of direct-hire faculty members to 70 per cent by 1977. By that time, AIT also hopes to have 80 faculty members who are on sabbaticals or study leaves from other universities in the region. It is hoped that this will enable the visiting instructors to learn the latest western techniques, while imparting to AIT's resident faculty an understanding of the problems of the region.

D - PRESENT ORGANIZATION AND STAFFING

This section presents the titles, basic functions and intended relationships of the principal positions of the Asian Institute of Technology, and documents the organization as it existed during June and July 1968. Since the Institute is in an accelerated growth phase of development, the organization and the particular duties and responsibilities of individual positions change frequently to meet particular demands. Thus, with the exception of known position changes or additions - that is, not merely planned, but specifically scheduled, financed and staffed - no attempt is made to include intended position modifications.

A brief documentation and analysis of the staffing as of June 1968 are included later in this section. Again, as with organizational structure, the staffing pattern changes frequently and thus is valid for the period reported only.

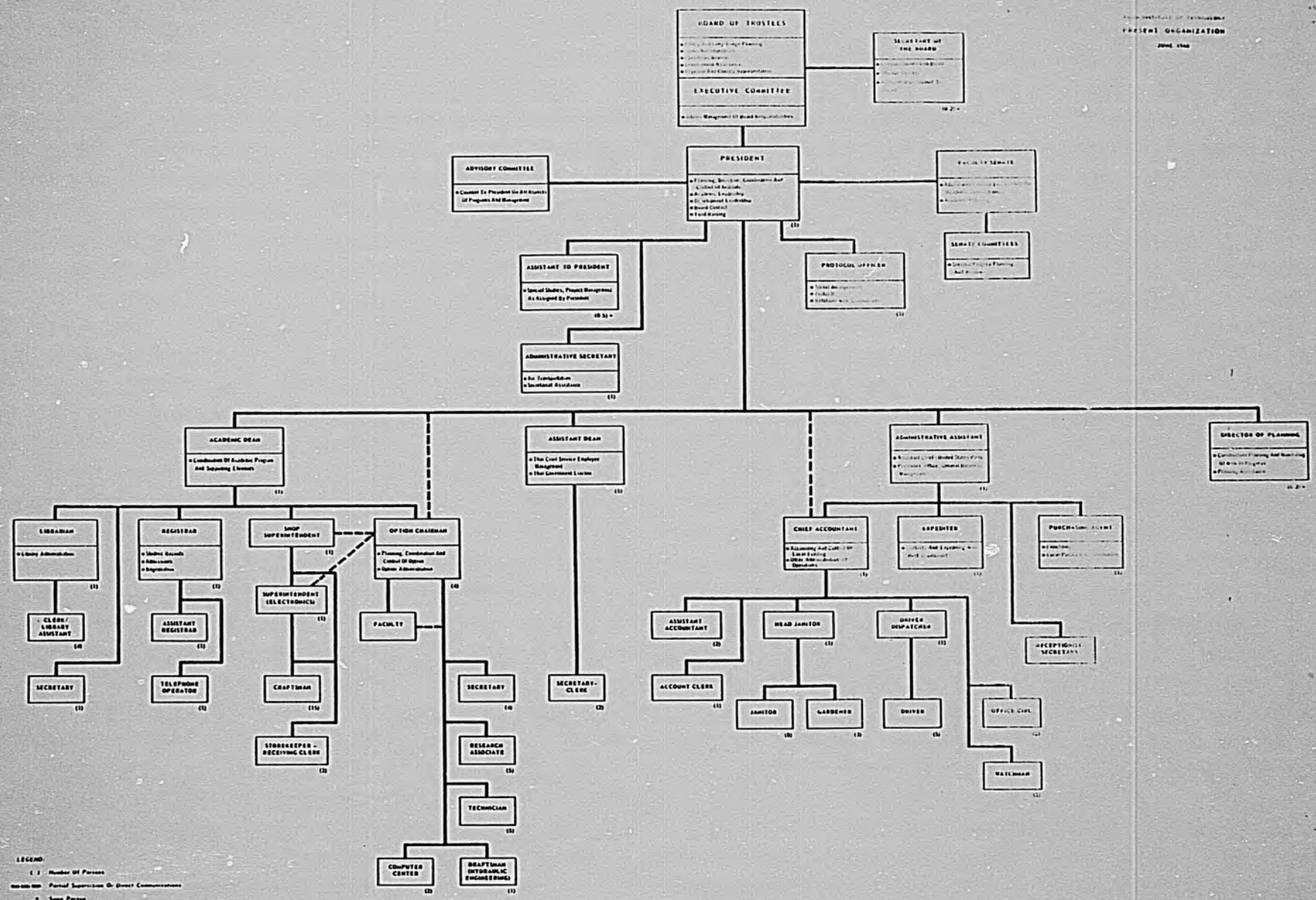
ORGANIZATION

Exhibit III-10, on the following page, outlines the functional organization as of June 1968. The following paragraphs describe the principal duties, responsibilities, reporting relationships and basic functions of the units and positions shown in the exhibit.

Board Of Trustees

The Board of Trustees consists of 24 members representing 13 countries, as follows:

- Australia - 2
- East Pakistan - 1
- South Vietnam - 1
- Malaysia - 1
- Indonesia - 1
- France - 3
- Philippines - 3
- New Zealand - 1
- Singapore - 1
- Thailand - 3
- United Kingdom - 2
- United States - 3
- West Pakistan - 1
- AIT President - 1.


PRESENT ORGANIZATION
JUNE 1968
BOARD OF TRUSTEES
EXECUTIVE COMMITTEE
SECRETARY OF THE BOARD
ADVISORY COMMITTEE
PRESIDENT
FACULTY SENATE
SENATE COMMITTEES
ASSISTANT TO PRESIDENT
PROTOCOL OFFICER
ADMINISTRATIVE SECRETARY
ACADEMIC DEAN
ASSISTANT DEAN
ADMINISTRATIVE ASSISTANT
DIRECTOR OF PLANNING
LIBRARIAN
REGISTRAR
SHOP SUPERINTENDENT
OPTION CHAIRMAN
CHIEF ACCOUNTANT
EXPEDITER
PURCHASING AGENT
CLERK/ LIBRARY ASSISTANT
ASSISTANT REGISTRAR
SUPERINTENDENT (ELECTRONICS)
FACULTY
ASSISTANT ACCOUNTANT
HEAD JANITOR
DRIVER DISPATCHER
RECEPTIONIST SECRETARY
SECRETARY
TELEPHONE OPERATOR
CRAFTSMAN
SECRETARY
SECRETARY-CLERK
ACCOUNT CLERK
JANITOR
GARDENER
DRIVER
OFFICE GIRL
STOREKEEPER - RECEIVING CLERK
RESEARCH ASSOCIATE
WATCHMAN
TECHNICIAN
COMPUTER CENTER
DRAFTSMAN (HYDRAULIC ENGINEERING)
LEGEND:
( ) Number Of Persons
Partial Supervision Or Direct Communications
Same Person

The charter of AIT empowers the Board, which can have up to 60 members, to manage all of the affairs of the Institute. The term of office of Board members is set at five years. Since the majority of members began their terms in January 1968, most of their terms will expire in January 1973. The Board is self-perpetuating - that is, empowered to reelect itself to unlimited consecutive terms. It should be noted that the Board intends to increase its membership to a maximum of 40, and appoint Trustees from countries other than the current 13.

As mentioned previously, the Board first met in January 1968, and thus has not yet fully exercised all of the management prerogatives which might be expected in the future. The Board is, nevertheless, charged with the responsibility to plan, direct, control and review the total operations of AIT. In accordance with this responsibility, the Board has approved the overall goals and objectives of AIT and adopted an operating budget proposed by the administration. In addition, the Board has reviewed, considered and approved several intended actions, policies and program outlines of operating management, such as applications for proposed Thai legislation, research policies, financial management policies and procedures and general academic program parameters.

The proposed meeting schedule of the full Board is once a year, generally in the month of January. (In 1968-69 and 1969-70, however, the Board plans to meet twice each year.) By resolution, the Board has established a multinational Executive Committee, which is charged with carrying out Board responsibilities between the regular meetings of the full Board. The Executive Committee (consisting of seven members) is scheduled to meet quarterly in Bangkok to approve policies, review operations and provide interim management guidance. Day-to-day Board management responsibilities are provided through the Chairman of the Board. Neither the Chairman nor the Executive Committee is empowered to reverse or make exceptions to policies enacted by the full Board.

The Board currently has no formal committee structure beyond the Executive Committee. It has appointed three officers, including a nonmember secretary, as follows:

- Chairman
- Vice Chairman
- Secretary.

Board officers currently serve three-year terms of office.

The Secretary of the Board is responsible for the official records of AIT, for all official communications (agenda, minutes, etc.) and for administrative support of the Board. From time to time, the Secretary may also be called upon to do special research or fact-finding in support of the Board or its Chairman. The present Secretary also serves as Assistant to the President of AIT, and Director of Planning of AIT.

Office Of The President

The President of AIT is responsible for the implementation of Board directives and for the day-to-day planning, direction, coordination and control of all aspects of AIT. In practice, the President has also served as the Institute's principal program planner and development and fund-raising officer. He serves, with others, as the representative of AIT to the host government, and maintains social and academic contacts.

The President now serves as chief executive officer in each of the following functional areas:

- Academic
- Administrative
- Development
- Planning
- Social representation.

The President's Advisory Committee consists of the following officers of AIT:

- Academic Dean
- Director of Planning
- Administrative Assistant to the President.

As the Institute develops, it is expected that the following members will be added:

- Director of Development
- Director of Public Relations
- Business Manager (successor position to Administrative Assistant to the President).

At the time of this study, the Committee had ceased to function formally. The individual members, however, continued to meet with the President, individually or in groups, to advise him on such matters as administrative and academic problems and procedural developments.

The Advisory Committee will serve as an advisory forum for the President, but it is not intended to have specific decision-making authority.

The Faculty Senate, which is composed of elected members of the regular faculty of AIT, is organized to provide a direct channel of communication between the professional instructional staff and the President.

The President is assisted in the discharge of his duties by three special assistants - the Assistant to the President, the Protocol Officer, and his Administrative Secretary. The basic functions of these positions are discussed below.

The Assistant to the President serves as the Director of Planning and Secretary to the Board of Trustees. Since the specific responsibilities of each of these positions tend to overlap, it is difficult to define the specific position of Assistant. As defined by the incumbent, though, the position is intended to include such functions as special analysis and background studies not directly involved in planning (such as development of data for negotiations with the host government on tax matters, funding proposals, and legal documents). Recently, the incumbent prepared the draft of the bylaws for the Faculty Senate, as well as other draft documents for the President. As the position was newly established at the time of this study, its specific duties and responsibilities, authorities (if any) and basic functions were not fully defined.

The Protocol Officer serves both the President and the Institute in planning and arranging the official and informal social functions at AIT. Included in this responsibility are the many aspects of greeting and accommodating official visitors to the Institute, arranging receptions, ensuring proper diplomatic protocol and courtesies and, in general, ensuring that AIT presents itself properly as an international institution. The Protocol Officer is also serving temporarily as a Royal Thai Government contact and working to a limited extent on public relations matters for AIT. It is intended that a Director of Public Relations be appointed for a limited time to set up the initial public relations program of AIT.

The Administrative Secretary to the President handles all of the President's official correspondence, makes arrangements for various travel visas, transportation, housing, etc., in connection with the President's official travel and, in general, maintains and performs the administrative detail of the presidential office. In addition, the Administrative Secretary is responsible for the administration and management of all air travel arrangements for staff and for scholarship students for whom authorizations must be made to carriers to issue tickets to students in their home country and bill AIT. The Secretary also provides secretarial services to other members of the executive staff.

Administrative Executive Functions

Two administrative executives are responsible for providing support to the presidential office and AIT in general - the Assistant Dean and the Director of Planning.

The Assistant Dean, reporting to the President, serves in various advisory capacities. The incumbent is a highly respected Thai national who is able to assist in establishing and maintaining highest-level contacts with the various branches of the Royal Thai Government. The incumbent is also a member of the Chulalongkorn University faculty and serves a similar role of coordination in that capacity. The Assistant Dean is also responsible for the civil service administration in connection with Thai nationals seconded from Thailand to AIT. He is assisted in this area by two clericals who also provide limited secretarial support to several faculty members.

The Assistant Dean is generally instrumental in any contracts, negotiations or similar dealings with the Thai Government and the private sector.

The Director of Planning, reporting to the President, is a more recently established position and is envisioned during periods of construction or new faculty planning as being involved in monitoring the specific projects from inception through completion. At present, since no actual construction is under way, much of his time and effort is being devoted to other administrative and planning functions. The incumbent also serves as Assistant to the President and Secretary to the Board of Trustees, as previously described. While no detailed construction or new faculty planning has yet been accomplished, the Director has participated in and prepared some of the preliminary planning efforts.

Business Office

The chief administrative officer of AIT is the Administrative Assistant to the President (Business Manager). All of the nonacademic administrative and supporting units are under his supervision. Reporting to him are the Chief Accountant, the expediter, the purchasing clerk and the receptionist-secretary. The Administrative Assistant also serves as the assistant chief of party for the USOM (USAID) Colorado State University technical assistance contract. In general, he serves as Office Manager, Business Manager, Personnel Manager and Chief Purchasing Officer.

The Chief Accountant, reporting to the Administrative Assistant to the President, is responsible for the financial record-keeping involved in the AIT discretionary funds - that is, those funds not received from United States contract support or other specific contract funds. In addition, the Chief Accountant has supervisory responsibility for the building and grounds maintenance, and custodial, and transportation services. He exercises these responsibilities through the Head Janitor and Driver Dispatcher, who report directly to him.

The office girls (coffee and tea servers) and the campus watchman also report to the Chief Accountant. In the area of accounting for local funds, the Chief Accountant is assisted by two Account Assistants and one junior clerk, who perform the detailed accounting procedures.

The Expediter, reporting to the Administrative Assistant to the President, servies as a liaison between AIT and various host country administrative governmental units. His function is to expedite the release and clearance of goods through Thai Government customs, to facilitate immigration and customs clearance of newly arriving personnel, and to perform other such services requiring knowledge of local government procedures and practice.

The Purchasing Clerk, also reporting to the Administrative Assistant, serves both as alternate Expediter and local Purchasing Officer. As Purchasing Officer, he establishes sources of supply of locally purchased items and actually shops for and purchases such items. Generally, all procurements are first cleared or authorized by the Administrative Assistant.

The receptionist-secretary, reporting to the Administrative Assistant, receives mail from the local postal service, maintains the vehicles dispatch record, arranges local transportation, and serves as receptionist for the administrative office. Some secretarial service is provided by the incumbent to the Protocol Officer and others.

Academic Administration

The academic administrative functions, as well as several academic support functions, are under the direction of the Academic Dean. The Option Chairmen, the Registrar, and Shop Superintendents and the Librarian all report to him. The following paragraphs briefly describe the basic functions and positions within the organization.

The Academic Dean, reporting to the President, is responsible for controlling and coordinating the administrative and support aspects of the academic program. He is responsible for assisting in faculty recruitment, class and faculty scheduling, academic calendar planning, etc. He also serves as Chairman of the Academic Committee.

The Option Chairmen each report to the Academic Dean and are responsible for the planning, direction and control of the academic and administrative aspects of their respective options; this often involves direct communication with the President. The supporting personnel within the options, such as Technicians and Research Associates, have a partial reporting relationship with the Option Chairman, but are often assigned to work directly with a particular faculty member.

The Librarian, reporting to the Academic Dean, is responsible for the operation and control of the AIT library. She has most of the normal responsibilities and authorities of an institutional librarian, but, at present, only limited authority over the library acquisitions of AIT. This authority generally rests with the Option Chairmen and the Academic Dean. The Librarian is assisted by a total of four clerks and Library Assistants.

The Shop Superintendents have an informal reporting relationship among themselves and a partial reporting relationship with the Academic Dean. As academic service functions, the shops most often receive their direction from the faculty member or Option Chairman involved; in general, however, they operate independently.

The Registrar, reporting to the Academic Dean, is responsible for the student record-keeping activities of AIT, and for the supervision of admissions, registration, grade reporting and official student records functions. She is assisted by an Assistant Registrar. The Registrar also supervises the switchboard operation and local duplication service. She is assisted in these services by a telephone operator-clerk and a duplication operator.

* * * * *

Much of the preceding documentation implies an organizational structure and reporting relationships that are more specific than those that actually exist. As with any expanding, smaller organization, many positions are so broad that the precise function and reporting relationships of the position are unclear and change with the particular requirements of the moment. The reporting relationship between the Administrative Assistant to the President and the Chief Accountant, for example, is more one of informal cooperation than of a formal reporting relationship. The same is true of the relationship between the two Shop Superintendents and others.

Other positions, such as that of Assistant Dean, are so broad that they would appear ill-defined, though they are essential to continued effective operation.

In interviews conducted in documenting the organization, incumbents often expressed concern over the looseness of its structure, which might be more correctly classified as a high degree of flexibility. The current organization certainly focuses on the President, tending to maintain the informality of decision-making and communications, somewhat different from the structure diagrammed in Exhibit III-10.

In the opinion of the consultants, such informality in organization is adequate, if not essential, at this stage in AIT's growth. The goals toward which AIT aspires, however, will require both a stronger definition of structure and a more formalized delegation of responsibilities and authority. Proposals to strengthen the current organization and provide structure for future growth are made later in this report.

PRESENT STAFFING PATTERN

Exhibit III-11, on the following page, outlines the current staffing pattern of the organization as of June 1968. As shown in the recapitulation below, AIT employed, or received the services of, 104 persons. The division of these employees among administrative, academic and support functions is shown in the following table:

Functional Area	Number Of Employees
General administration	41
Instruction and research	31
Academic administration	12
Accademic support	20
Total	104

ASIAN INSTITUTE OF TECHNOLOGY

ADMINISTRATIVE AND SUPPORT STAFF
June 1968

Function And Position Title	Number Of Positions
Central Administration	
Director of Planning	1
Administrative Assistant to President	1
Public relations (Protocol) Officer	1
Administrative Secretary	2
Shorthand-typist	1
Receptionist-typist	1
Office girl	2
Presidential Staff	
Housekeeper	1
Cook	1
Gardener	2
Driver	1
Subtotal	14
Registrar	
Registrar	1
Telephone operator - typist	1
Assistant Registrar	1
Subtotal	3
Finance And Accounting	
Chief Accountant	1
Purchasing Agent	1
Expediter	1
Account Assistant	2
Junior clerk	1
Subtotal	6
Plant And Operations	
Janitor Foreman	1
Driver-dispatcher	1
Driver-mechanic	1
Janitor	8
Gardener	3
Driver	5
Watchman	2
Subtotal	21

Function And Position Title	Number Of Positions
Shop Operations	
Shop Superintendent	1
Shop Superintendent (Electronics)	1
Shop mechanical engineering technician (VSO)	1
Shop Foreman	1
Craftsman I	4
Craftsman II	5
Apprentice craftsman II	3
Storekeeper - receiving clerk	1
Assistant Storekeeper	1
Apprentice technician (Electronics)	1
Subtotal	19
Academic Administration	
Librarian	1
Clerk - Library	2
Library Assistant	2
Division secretary	4
Subtotal	9
Academic Support	
Research Associate	7
Laboratory Technician	3
Apprentice Technician	4
Draftsman	1
Subtotal	15
Faculty	17
Total(a)	104

(a)Does not include two Thai Civil Service employees.

There is an unusually high administrative complement, even though administration, as shown, includes positions such as drivers and custodial employees. The purely administrative positions - that, top management and supervisory and clerical employees involved in AIT's administration - amount to 13 persons. In the chapters of this report dealing with personnel proposals in support of the Institute's expansion, specific staffing patterns are proposed for each classification and functional area.

E - FACILITIES AND SPACE UTILIZATION

This section includes a brief history of the physical development of the AIT campus, an inventory of current space and major items of equipment, an analysis of space utilization, and a review of the present planning for the future physical development of the Institute.

BACKGROUND

At its inception, the Institute occupied three new buildings which were constructed by the Government of Thailand on a portion of the Chulalongkorn University campus. The present structures laboratory, a hydraulics laboratory (currently the machine shop), and the administration and classroom building - a total of approximately 28,500 square feet of floor space - represented the nucleus of the School. The campus facilities have been expanding constantly, with major construction having been undertaken in four of the past eight years.

In 1960, a north-south wing and an east wing were added to the hydraulics laboratory, increasing the gross floor space by 19,660 square feet. A two-stage construction project added the soils building during 1962-63 (9,240 gross square feet of floor space), and with the 1963 construction of the service and storage tower at the south end of the administration and classroom building, the campus facilities attained their present form. In 1964, a portion of the upper floor of the hydraulics building was converted to public health engineering laboratories. In 1967, the structures laboratory service area was expanded, and the second floor of the soils laboratory building was converted from a loft area used as a transportation engineering laboratory to faculty office space. The transportation laboratory was then moved to the shop area in the hydraulics building, while the shop was relocated in the original hydraulics building. The progressive development of the School's facilities to their present 64,000 gross square feet is summarized in the following table:

Facility	Date Of Construction	Gross Square Feet
Original	1959	
Structures laboratory		5,300
Hydraulics laboratory		2,400
Administration and classroom building		20,000
Subtotal		28,500
Additional	1960	
Hydraulics wing		19,660
Soils laboratory building	1962-63	9,240
Service tower administration building	1963	1,600
Structures laboratory service area	1967	2,600
Workshop		700
Shop storage		1,700
Subtotal		35,500
Total		64,000

PRESENT SPACE AVAILABLE

Following is an inventory of present space, by function and use, as illustrated in Exhibit III-12. The four buildings currently occupied by the Institute contain administrative offices, classrooms, laboratories, faculty offices, the library and supporting facilities, additional open-air installations that are available for research in climatology and hydraulics, and a student residence housing 84 students. The total space available on the Chulalongkorn campus is divided among the three major departments of the Institute and auxiliary services.

Instruction And Research

Instruction and research utilize 33,560 square feet of space, or over 67 per cent of the total space, for classrooms, laboratories and offices.

ASIAN INSTITUTE OF TECHNOLOGY

INVENTORY OF PRESENT SPACE

June 1968

Function And Use	Net Square Feet	Per Cent Of Total
Instruction And Research		
General - Classrooms	5,090	
Engineering Sciences		
Class laboratory	1,160	
Nonclass laboratory (a)	18,300	
Computer laboratory	1,230	
Laboratory service	3,300	
Office	4,480	
Subtotal	33,560	69.9%
Library		
Open-stack reading room	3,340	
Library processing room	260	
Office	520	
Subtotal	4,120	8.6
General Administration And Institutional Service		
Office	3,330	
Office service	570	
Conference room	450	
	4,350	9.1
Auxiliary Services		
General-use facilities		
Cafeteria and lunchroom	915	
Kitchen	140	
Supporting facilities		
Shop	2,460	
Shop storage	1,180	
Shop office	215	
Subtotal	4,910	10.2
Unassigned - Office	1,060	2.2
Total	48,000	100.0%

(a)Does not include climatological station or towing basin.

The classrooms, located mostly in the main administrative and classroom building, use 5,090 square feet of space consisting of four rooms, each of which measures 20 x 40 feet and can accommodate 38 students, a double room (40 x 40 feet) for larger assemblies, and a seminar room (24 x 20 feet), located in the hydraulics building.

Research laboratories require the most space, and 18,300 square feet have been allocated for this purpose. These laboratories are located in all major buildings, except the administration and classroom facility. The hydraulics and structures options have specialized requirements dictated by the size and type of their equipment and their research projects. Hydraulics requires floor flumes and large open areas while structures needs reinforced flooring (equivalent to four feet of concrete) and high ceilings. In addition, structures utilizes an extensive preparation area for storing, mixing and using concrete and other materials. The School has only one laboratory, which is used strictly for classroom purposes, and this has been allocated to public health engineering. A small computer laboratory is located in the administration and classroom building.

Twenty-two offices, ranging in size from 151 to 318 square feet, have been assigned to faculty members, their secretaries and Research Associates; a total of 4,480 square feet is used for this purpose. Faculty offices are primarily located on the second floors of the laboratory buildings.

Library

The library, which contains over 16,400 books, periodicals and other publications, occupies 4,120 square feet of space on the second floor of the administration and classroom building. The area consists of an open stack reading room (3,340 square feet) that is furnished with chairs and tables, processing rooms containing index files, administrative work space, reproduction equipment, and office space for the Librarian.

General Administration And Institutional Services

General administration and institutional services occupy 4,200 square feet of space in the first and second floors of the administration and classroom building. In addition to offices for the President and his administrative staff, this space contains the accounting and registrar functions and the office of the Academic Dean. A conference room is also located in this area.

Auxiliary Services

The auxiliary services, including general-use and supporting facilities, take up 4,910 square feet of floor space in the administration and classroom and hydraulics buildings. The shop (located in the hydraulics building) and its supporting space are the major facilities in the group, with 3,855 square feet of space. Cafeteria and lunchroom space is provided in the administration and classroom building.

Unassigned Space

At the time of the inventory, 1,060 square feet of unassigned office space were available in the soils building and the administration and classroom building.

Exhibit III-13, on the following page, shows in detail the distribution of instructional, research and faculty office space among the five civil engineering options and the computer area. Hydraulic engineering, with its large flumes, and structural engineering, with its substantial laboratory service area, require the most space - 8,550 and 8,620 square feet, respectively. The other options have smaller space requirements, ranging in size from 3,170 to 3,420 square feet.

The present utilization of this space and the maximum enrollment that can be efficiently accommodated are discussed below.

PRESENT SPACE UTILIZATION

In general, the physical facilities currently available for carrying out its academic program are being used by the Institute at a level near capacity. A detailed review of available space has revealed few opportunities for greater space utilization that would enable AIT to increase its enrollment significantly beyond that which is currently planned without compromising the quality of the education being offered.

Classrooms

At present enrollment levels, one of the few areas of major underutilization of space is classrooms. On the basis of a standard 40-hour week, the six classrooms are in use only 28.0 per cent of the time. For this analysis, the class scheduling and enrollment for the first semester (June 1967) were used. For efficient utilization, classrooms should be used at least 75 per cent of the

ASIAN INSTITUTE OF TECHNOLOGY

ALLOCATION OF PRESENT SPACE, BY OPTION

June 1968

Option	Net Square Feet
Instruction And Research	
General or unclassified	5,630
Engineering Sciences	
Hydraulic Engineering	
Nonclass laboratory(a)	6,980
Office	1,570
Public Health Engineering	
Class laboratory	1,160
Nonclass laboratory	1,680
Office	580
Soil Engineering	
Nonclass laboratory(a)	2,480
Office	810
Structural Engineering	
Nonclass laboratory(a)	4,180
Laboratory service	3,300
Office	1,140
Transportation Engineering	
Nonclass laboratory(a)	2,980
Office	190
Electronic Data Processing	
Laboratory	1,230
Office	190
Subtotal	34,100
All Other	13,900
Total	48,000

(a)Space also used for class laboratory work.

time, or 30 hours per week for each room. Moreover, the utilization of available student stations (on the basis of total square feet divided by 20 square feet per station, times 40 hours per week) was 13.9 per cent during the semester (a level of 45 per cent is considered efficient). In addition, when the classroom space was in scheduled use, only 42.7 per cent of the stations were used, indicating that the rooms are somewhat larger than necessary for present class size; indeed, present classroom space could efficiently handle a student body of 450.

Teaching And Research Laboratories

The limited teaching and research laboratory space available imposes severe restrictions on expanding student enrollment.

The hydraulics laboratory, with 6,980 square feet of recently added floor space, is large enough to support a research group of 10 to 12 students. Seven students were using the laboratory for this purpose during the first semester of 1967-68, indicating a utilization rate of about 64 per cent (based on the assumption that the laboratory can only be used by one group per semester). Therefore, an additional three to five students could perform their research in this option; an additional three to five could be engaged in theoretical research primarily utilizing the computer rather than the hydraulics laboratory facilities, thus enabling the option to have second-year enrollment of 15 to 17 students. The class level for first-year students using the same facilities for laboratory classes is 25, which corresponds to the enrollment during the semester under consideration.

The public health engineering laboratory facilities (1,680 square feet) are only large enough to accommodate 12 to 14 people working on research projects. Although many projects are conducted partially outside the laboratory, bench space is still required for all students. Last year, 11 students and one Research Associate were active in the laboratory - indicating maximum use, if only one group can use the space during a semester. Public health engineering has the only laboratory (1,160 net square feet) used exclusively for teaching purposes. This room, with 18 stations, was used for two class-hours per week during the first semester of 1967-68.

The soil engineering research laboratory, with 2,480 square feet has space for 13 to 15 research projects; these projects, however, generally require space for more than one semester. Ten students performed thesis research during the first semester of 1967-68, indicating laboratory utilization of approximately 70 per cent. Two of the projects were conducted primarily outdoors, thus reducing this figure somewhat. Laboratory classes

were held in the same facility, which can seat 20 students. The faculty member interviewed does not consider a separate teaching laboratory a necessity.

The structures laboratory is overcrowded at its present level of enrollment (10 students) and method of operation. Although this option has 7,480 net square feet of space assigned for research, material preparation and teaching, the requirements of special flooring and height limit most research activity to 3,100 net square feet. It is estimated that this area becomes overcrowded when more than 8 to 10 research projects are being carried on simultaneously. Although the preparation area is adequate for mixing and storing materials, it is not considered adequate for curing concrete forms. Better utilization of this laboratory could be achieved through improved scheduling and the selection of smaller research projects. With such a program, the maximum number of second-year students in this option could be increased from 10 to 16, if at least three students perform theoretical research and therefore not require laboratory floor space.

The transportation engineering option requires only limited laboratory space, because much research is performed in the field. The 2,980 net square feet of assigned floor space is more than is required for the present or the foreseeable future.

The computer laboratory is available to all options. The 1,420 square feet of space assigned to this activity is enough for the present equipment and utilization. The limiting factor is available computer time. As present policy restricts the availability of the computer to 40 hours per week, the number of students who can use the facility extensively during their thesis research projects is limited to eight to ten per semester, approximating the present load.

Library

The space allocated to the library is adequate to serve the present student body, but the service areas are marginal in size and will become increasingly overcrowded as enrollment increases. The library has seating capacity for 64 students at tables in the open stack area. This was equal to 42.3 per cent of the student body during the semester under consideration - substantially higher than the 25 per cent standard which is often used in space planning. There are, however, no open or enclosed carrels, and the students are most likely subject to distractions when using this space. Moreover, no provision has been made for faculty study space.

Of the total 4,120 square feet utilized by the library, 18.9 per cent (or 780 square feet) is devoted to service areas containing office space, card files and reproduction equipment. This area is now overcrowded and contains less space than the 1,030 square feet which would be indicated by current standards. In addition to the increased demands which will be placed on the library by anticipated higher enrollments, space will have to be provided for an additional 6,900 volumes that will be acquired during the next three years. This 42 per cent increase in total volumes will require about 550 additional square feet of floor space.

Offices

Faculty and administrative office space has not been a problem since the renovation of the soils laboratory building in 1967. Of the 8,870 square feet space available, 7,810 square feet were assigned and utilized during the past year. Most offices are adequate for their present use and are conveniently located and comfortably furnished. This situation will change during the current academic year, however, if the faculty and administrative staffs are expanded according to the present plan.

Other Facilities

The shop, which supports both the laboratory programs and plant maintenance activities, is the only other major facility in the present complex. The space allocated for this purpose (4,910 square feet) is used for machine and carpenter shops, storage areas, a tool crib and an office. The anticipated acquisition of machine tools requiring approximately 216 square feet of floor space will overcrowd this facility. The dormitory made available to AIT students by Chulalongkorn University for a rental of $7.50 per month per student in double occupancy can house 84 students in 42 double rooms. This facility is considered inadequate, as it has room only for foreign (non-Thai) students. Thai students are forced to find housing on their own.

Summary

Utilization of the space currently available to AIT is summarized in Exhibit III-14, on the following page. Classroom utilization is low, affording opportunities for converting some classroom space to other uses. Although the average utilization of the research laboratories is estimated at 75 per cent, two options - public health and structural engineering - enrolled the maximum number of students they could handle in the present space and with the present operating procedures. An additional 11 to 17 students performing laboratory

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SUMMARY OF UTILIZATION OF PRESENT SPACE

June 1968

Type Of Space	Measures Of Use			Effective Utilization			Per Cent Of Effective Utilization
	Hours	Square Feet	Students(a) And Research Associates	Hours	Square Feet	Students And Research Associates	
Classrooms	67	-	-	180	-	-	37.2%
Engineering Research Laboratories							
Hydraulic	-	-	7	-	-	10-12	53.6
Public health	-	-	12	-	-	12-14	92.5
Soil	-	-	10	-	-	13-15	71.5
Structural	-	-	10	-	-	8-10	111.0
Transportation	-	-	3	-	-	8-10	33.3
Library							
Reading area	-	-	38(b)	-	-	64	59.4
Service area	-	1,030(c)	-	-	780(d)	-	132.0
Offices - Faculty And Administration	-	7,810(e)	-	-	8,870(f)	-	88.1

(a)First semester 1967-68.
(b)Represents 25 per cent of student body, which is considered to be maximum use of a library facility at any one time.
(c)Space requirement according to accepted standards.
(d)Space allocated for this purpose.
(e)Space currently in use.
(f)Space available.

EXHIBIT III-14

research could be enrolled in the remaining three options. The total space available to the library is adequate for the present enrollment and number of volumes. The structural limitations of the building, however, have precluded the most efficient layout, resulting in overcrowded service areas. With 88.1 per cent of the faculty and administrative office space assigned or occupied, utilization in this area is rapidly approaching 100 per cent.

EQUIPMENT

The Institute currently has an equipment inventory valued at approximately $365,513. The largest portion - $246,458, or 65.5 per cent - is invested in research laboratory equipment, while the balance is divided between office and classroom furniture and equipment, the shop, and other miscellaneous items. A breakdown of the total equipment and furniture inventory, by use, is shown in Exhibit III-15, on the following page.

Office furniture and equipment - primarily desks, chairs, bookshelves, typewriters, a computer, calculators, filing cabinets, and the telephone switchboard and equipment - is valued at $45,823.

Hydraulics and structural engineering laboratory equipment accounts for over 60 per cent of the value of all laboratory equipment. Major items in these laboratories include large in-place flumes, basins and tanks, pumps and testing devices. The balance consists of numerous less-expensive pieces of measuring and testing equipment.

The classrooms are equipped with standard-size table-desks, wooden chairs and chalkboards. Teaching aids, such as cameras, projectors and recorders, are also available.

The shop and instrument sections, with equipment inventoried at $23,376, service both the research laboratories and the physical plant. Lathes and milling machines are the major pieces of equipment in the shop, while the instrument section inventory consists of electronic testing equipment.

Auxiliary equipment consists primarily of nine vehicles worth $11,650, and 111 air conditions with an average value of $184 each.

PRESENT PLAN FOR THE FUTURE

The Institute's current planning is focused on the immediate future and the period following 1971, which has been set as the target date for moving to the new campus. Office space will become a critical problem as the Institute

ASIAN INSTITUTE OF TECHNOLOGY

SUMMARY OF EQUIPMENT AND FURNITURE, BY USE

Use	Estimated Value
Office	
Furniture and office equipment	$ 22,158
Reproduction equipment	2,480
Computer and calculators	17,935
Typewriters	3,250
Subtotal	$ 45,823
Laboratory	
Hydraulic engineering laboratory equipment	$ 82,782
Public health engineering laboratory equipment	20,587
Soil engineering laboratory equipment	39,800
Structural engineering laboratory equipment	76,068
Transportation engineering laboratory equipment	27,221
Subtotal	$246,458
Classroom	
Desks and chairs	$ 3,000
Classroom and lecture aids equipment	9,460
Other furnishing	600
Subtotal	$ 13,060
Shop And Instrument Section	
Major workshop equipment	$ 17,086
Instrument equipment	6,290
Subtotal	$ 23,376
Auxiliary	
Vehicles	$ 11,650
Air conditioners	20,450
Telephone equipment	2,497
Miscellaneous	2,199
Subtotal	$ 36,796
Total	$365,513

Source: AIT reports, December 31, 1967.

organizes and staffs for the increased enrollments, and develops the administrative capability that will be required for the operation of an enlarged organization. In order to house the 30 additional faculty and administrative staff members expected during the next three years, the Institute is negotiating with Chulalongkorn University for the use of a two-story garage building, adjacent to the hydraulics laboratory, which contains approximately 4,000 net square feet of space. If this space is obtained, it would enable the administration to expand into space now occupied by the two ground-floor classrooms in the administration and classroom building and construct required classroom space in the garage building, along with faculty and administrative offices.

There are no current plans to expand the laboratories or service space at the present site.

A development plan including space requirements for the period following 1971 was presented to the Board of Trustees at the January 1968 meeting. This plan is summarized in Exhibit III-16, on the following page, and detailed in Appendix B. The plan calls for a two-phase physical development of the Institute. The first phase would involve the addition of 360,729 net square feet of space for lecture rooms, laboratories, offices, a library, an infirmary, and supporting facilities at a new campus. This phase of the plan also calls for the construction of an International Center (with 64,560 square feet of space) and half of the planned space for the Computer Center (34,432 total square feet). The second phase would add an extra 387,091 square feet of space in the form of lecture rooms, laboratories, offices, supporting facilities and the balance of the Computer Center. Faculty and student housing would be built during both phases. The new campus, with a total of 747,820 net square feet of space, is planned for a maximum student enrollment of 1,200, plus additional regional and special study activities.

CONCLUSIONS

The continued increase of the student body at the present campus will require maximum utilization of available space. The most severe restriction limiting enrollment is the lack of sufficient research laboratory space. Facilities (including the computer laboratory) currently assigned to the five civil engineering options could accommodate 82 students conducting thesis research projects. This would require tighter scheduling in all laboratories - particularly structures - and the conversion of the public health engineering seminar room into a research laboratory. In some instances, research projects would have to be selected by the faculty to ensure maximum utilization of space, and laboratory research by faculty and Research Associates would also have to be carefully scheduled.

ASIAN INSTITUTE OF TECHNOLOGY

PLAN FOR FUTURE SPACE

Use	Net Square Feet		
	Phase I	Phase II	Total
Instruction And Research			
General - lecture rooms	10, 760	32, 280	43, 040
Engineering sciences			
Faculty laboratories	24, 210	72, 630	96, 840
Student laboratories	43, 040	129, 120	72, 160
Shops	10, 760	10, 760	21, 520
Offices	25, 555	76, 665	102, 220
Library	43, 040	-	43, 040
General Administration And Institutional Services			
Offices			
Campus	26, 900	-	26, 900
Bangkok	16, 140	-	16, 140
Infirmary	35, 508	-	35, 508
Physical plant	43, 040	48, 420	91, 460
Specialized Space			
International Center	64, 560	-	64, 560
Computer Center	17, 216	17, 216	34, 432
Total	360, 729	387, 091	747, 820

Source: AIT Development Plan, March 1968.

The following table indicates the estimated number of second- and third-year students who could be enrolled in each option. These figures were developed after a careful review of present space and enrollments, and discussions with Option Chairmen and faculty members. Nonlaboratory research refers to students who would be conducting research not requiring laboratory space. This could either be in the field, such as in the case of transportation engineering, or in the computer laboratory.

Option	Students Performing Research		
	Nonlaboratory	Laboratory	Total
Hydraulic engineering	4	12	16
Public health engineering	-	18	18
Soil engineering	1	15	16
Structural engineering	3	13	16
Transportation engineering	8	8	16
Total	16	66	82

Although many of the public health engineering students would be operating outside the laboratory, they would also require bench space. Since many transportation engineering research projects are not performed in a laboratory, the maximum enrollment in this option is determined by student demand and faculty availability.

The need for more faculty and administrative offices can be met by acquiring the use of the garage building adjacent to the hydraulics laboratory and reducing the number of classrooms from the five currently in the administration and classroom building to four, which will be adequate for the projected 1970-71 enrollment level. The converted facilities in the administration building, with the addition of the unassigned offices and half of the garage building, would provide office space for approximately 26 people, at an average of 150 square feet per person. Further additions to the faculty or staff would have to be accomodated by doubling up junior faculty members.

F - FINANCES

Since its inception in 1959, the Institute has relied almost exclusively on contributions from SEATO and its member countries to develop the physical plant and sustain operations. Many contributions have been "in kind", rather than cash, and have been solicited on an individual basis by those responsible for running the Institute. This method of funding has required the Institute to operate on a short-term basis, adjusting its programs to the available funds and in-kind contributions. Instead of capital and operating budgets, only individual programs and budgets aimed at specific contributions have been developed. In-kind contributions are estimated below, to develop trends in the contributions, total income and expenses. Current planning at AIT for its future operation and trends in the School's finances are also discussed.

PAST FINANCIAL OPERATIONS

In its first year of operation, the School received contributions valued at approximately $353,100. Since that time, donations have increased 313 per cent, to an estimated $1,137,000 during the 1967-68 school year. The capital investment requirements at AIT have been small, because the Government of Thailand has made available land and the use of all buildings and some of the equipment housed in them. The land and buildings were not contributed outright to the School, and will revert to Chulalongkorn University when AIT moves to its new campus. As a result, capital expenditures have been primarily for office, classroom and laboratory equipment. Expenditures for these items during the past three years are estimated as follows:

Year	Capital Expenditures
1965-66	$30,518
1966-67	61,678
1967-68	85,200

The United States, the United Kingdom, and the Government of Thailand have been responsible for covering these costs.

Exhibit III-17, on the following page, shows a detailed breakdown of the Institute's operating expenses for the 1965-66 to 1967-68 period. As indicated earlier, both income and expenses are often based on estimated values assigned

ASIAN INSTITUTE OF TECHNOLOGY

PRO FORMA STATEMENT OF INCOME AND EXPENSE
(Fiscal Year Ending June 30)
1965-66 Through 1967-68

	1965-66	1966-67	1967-68 (Est.)
Income			
Contributions In Cash Or In Kind(a)	$732,500	$956,500	$1,128,500
Research and Miscellaneous(b)	33,800	16,200	8,400
Total Income	$766,300	$972,700	$1,136,900
Operating Expense			
Salaries and Related Expense			
Faculty and Administrative Salaries(c)	$184,466	$250,908	$ 265,612
Faculty and Administrative Allowances(d)	146,998	183,749	204,246
Local Hire Salaries(e)	59,578	73,803	96,501
Retirement Contribution(f)	6,420	7,250	8,380
Workmen's Compensation(g)	3,023	259	3,049
Subtotal	$400,485	$515,969	$ 577,788
Supplies, Materials and Publications			
Laboratory and Shop Supplies(h)	$ 12,472	$ 23,869	$ 35,972
Office Supplies and Miscellaneous Operating Expense(i)	19,115	23,343	37,612
Training Materials(j)	2,080	2,609	23,964
School Publications(k)	4,893	7,421	6,472
Subtotal	$ 38,560	$ 57,242	$ 104,020
Library			
Books, Magazines, Periodicals(l)	$ 13,766	$ 14,803	$ 27,098
Special Programs			
Salaries(m)	2,435	3,136	2,082
Travel(n)	749	4,200	7,688
Printing and Supplies(o)	176	5,367	3,662
Subtotal	$ 3,360	$ 12,703	$ 13,432

	1965-66	1966-67	1967-68 (Est.)
Operating Expenses (Cont'd)			
Utilities And Water			
Electricity(p)	$ 11,760	$ 13,320	$ 18,000
Water(q)	274	311	420
Subtotal	$ 12,034	$ 13,631	$ 18,420
Rent - (Rental Value - Buildings)(r)	$101,000	$101,000	$ 101,000
Travel and Entertainment			
Travel(s)	$ 5,257	$ 7,385	$ 5,171
Miscellaneous(t)	1,956	2,118	3,000
Subtotal	$ 7,213	$ 9,503	$ 8,171
Repair and Maintenance			
Building and Equipment(u)	$ 8,905	$ 35,159	$ 14,722
Vehicles(v)	2,000	2,250	2,250
Subtotal	$ 10,905	$ 37,409	$ 16,972
Scholarships(w)	$114,416	$ 95,775	$ 158,600
CSU Charges			
U.S. Campus Staff(x)	$ 24,186	$ 21,302	$ 24,459
Travel(y)	5,054	3,673	6,813
Office Supplies(z)	4,068	1,056	3,922
Overhead (aa)	43,620	43,964	48,565
Subtotal	$ 76,928	$ 69,995	$ 83,759
Total	$778,667	$928,030	$1,109,200
Operating Surplus Or (Deficit)	($ 12,367)	$ 44,670	$ 27,640

(a)Seconded faculty (except U.S.) value estimated at $22,700 in 1965, $23,800 in 1966, and $25,000 in 1967.

(b)As shown in AIT budget.

(c)Line 1A of USAID operating budget, plus other seconded personnel at 50 per cent of estimated value plus Thai estimated contribution.

(d)Lines 2A, B, C, D, and 3A of USAID operating budget, plus 50 per cent of estimated value of seconded personnel.

(e)Line 4J of USAID operating budget, plus "salaries" as shown on AIT income and disbursement statement.
(f)Line 4I of USAID operating budget, prorated between faculty and staff and U. S. campus staff.
(g)Line 4C of USAID operating budget.
(h)Line 4E of USAID operating budget, plus "direct cost and expendable supplies" from the AIT statement of income and disbursements.
(i)Line 4A of USAID operating budget, less estimate for utilities and water and vehicle maintenance.
(j)Line 4G of USAID operating budget.
(k)Line 4F of USAID operating budget.
(l)Line 61 of USAID operating budget.
(m)Line 1F of USAID operating budget.
(n)Line 3E of USAID operating budget.
(o)Line 4D of USAID operating budget.
(p)Estimated at $1,500 per month.
(q)Estimated at $35 per month.
(r)Estimated at $2.10 per square foot for 48,000 net square feet.
(s)Line 3D of USAID operating budget, plus "Travel and Transportation" from AIT statement of income and disbursements.
(t)"Miscellaneous" from AIT statement of income and disbursements.
(u)Line 4H of USAID operating budget, plus "construction and improvements" from AIT statement of income and disbursements.
(v)Estimated at $250 per vehicle per year.
(w)Lines 7A and 7B of USAID operating budget, "scholarship" from AIT statement of income and disbursements.
(x)Line 1D of USAID operating budget, plus proportional part of line 4I.
(y)Lines 3B and 3F of USAID operating budget.
(z)Line 4B USAID operating budget.
(aa)Lines 5A and 5B of USAID operating budget.

to in-kind contributions. In 1967-68 and 1966-67, there were operating surpluses of $27,640 and $44,670, respectively, while 1965-66 showed a deficit of $12,367.

Total expenses rose at a compound annual rate of 19.3 per cent during this period, with the major increases in salaries and allowances (which accounted for 52 per cent of the total expenses in 1967-68), laboratory, office and shop supplies, scholarships, and miscellaneous operating expenses. "Training materials" also showed a substantial increase, because computer rental was charged to the account. A more detailed review of income by source and designated use fullows.

Sources Of Income

Income for the operation of AIT has been derived primarily from contributions by SEATO member countries. The only other significant sources have been the SEATO organization itself and a research project undertaken for the United States Advanced Research Project Agency during the period from 1962 through 1965. Exhibit III-18, on the following page, presents a detailed summary of income, by source. Government contributions, account- for 95 per cent of the total, have been brought about largely by the increase in the United States commitment, which has risen from 61 per cent of total income in 1959 to 73 per cent in the past year. Thailand (the second largest donor) and the United Kingdom have also been consistently increasing their contributions, while Australia has maintained a modest level. France, New Zealand, Pakistan and the Philippines have either withdrawn their support or greatly reduced their commitments. SEATO has contributed $10,000 in cash to cover contingencies in each of the nine years. The research and miscellaneous account consists mainly of money earned under the United States research contract.

Income By Kind Or Designated Use

The United States AID program has provided operating funds totaling $4,506,000 during the period, as illustrated in Exhibit III-19, on the following page.

Seconded personnel were the next largest source of income. For this analysis, the value placed on all seconded faculty and administrative personnel (except those included in the USAID program and those from Thailand) was $16,900 in 1959 compounded annually at 5 per cent ($25,000 in 1967) and included in the operating funds.

ASIAN INSTITUTE OF TECHNOLOGY

SOURCES OF INCOME
1959-60 Through 1967-68

Source	1959-60	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	Total Dollars	Total Per Cent
	(000)										
Government											
Australia	$ 4.0	$ 9.3	$ 13.2	$ 13.2	$ 13.2	-	$ 14.5	$ 23.8	$ 25.0	$ 116.2	1.7%
France	-	10.0	18.7	19.6	20.6	$ 21.6	22.7	23.8	-	137.0	2.0
New Zealand	20.5	21.4	22.3	23.2	24.2	3.6	3.4	3.4	2.2	124.2	1.8
Pakistan	-	2.2	-	-	1.7	-	-	-	-	3.9	0.1
Phillippines	7.6	-	-	-	9.0	9.0	-	-	-	25.6	0.4
Thailand	31.0	56.0	81.1	97.8	109.5	114.3	126.5	131.1	132.4	879.7	13.2
United Kingdom	64.0	27.8	34.5	30.9	30.6	61.9	55.4	119.4	130.0	554.5	8.3
United States	216.0	350.0	460.0	536.0	480.7	489.3	500.0	645.0	829.0	4,506.0	67.4
Regional Organization - SEATO	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	90.0	1.3
Other - Research And Miscellaneous	-	-	-	32.9	95.2	65.3	33.8	16.2	8.4	251.8	3.8
Total	$353.1	$486.7	$639.8	$763.6	$794.7	$775.0	$776.3	$972.7	$1,137.0	$6,688.9	100.0%

EXHIBIT III-18

ASIAN INSTITUTE OF TECHNOLOGY

INCOME BY KIND OR DESIGNATED USE
1959-60 Through 1967-68

Contributions	1950-60	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	Total Dollars	Total Per Cent
	(000)										
perating Funds(a)	$216.0	$350.0	$460.0	$536.0	$480.7	$489.3	$500.0	$645.0	$ 829.0	$4,506.0	67.4%
:conded Personnel	24.9	45.6	68.2	77.6	82.3	88.5	91.1	178.6	137.4	794.2	11.9
se Of Facilities	23.0	46.0	69.0	79.0	89.0	89.0	101.0	101.0	101.0	698.0	10.4
quipment	64.0	10.0	10.0	10.0	10.0	10.0	10.3	15.5	45.7	185.5	2.8
irestricted Cash	17.6	12.2	15.8	11.3	20.7	19.0	10.0	10.0	10.0	126.6	1.9
holarships	7.6	22.9	16.8	16.8	16.8	12.3	17.9	3.4	2.2	116.7	1.7
pplies And Utilities(b)	-	-	-	-	-	1.6	2.2	3.0	3.3	10.1	0.1
her - Cash From tesearch	-	-	-	32.9	95.2	65.3	33.8	16.2	8.4	251.8	3.8
Total	$353.1	$486.7	$639.8	$763.6	$794.7	$775.0	$766.3	$972.7	$1,137.0	$6,688.9	100.0%

USAID contribution.
Small contributions of supplies and utilities were made by Thailand during the period 1959-1969 but the amounts could not be identified.

EXHIBIT III-19

Personnel from Thailand are reported at actual cost. Countries whose contributions are included in the "seconded personnel" category for the past academic year include Australia, Thailand and the United Kingdom.

The Government of Thailand constructed all facilities currently being used by the Institute. Since the contribution consists of the use of the buildings rather than the facilities themselves, a value of $2.10 per square foot, or $101,000, has been assigned for recent years, and a smaller amount for earlier years. Equipment (other than that included in the USAID program funds) has been given to the Institute by Thailand and the United Kingdom. Other recent contributions have consisted of cash (from SEATO), scholarships (from New Zealand) and supplies and utilities (from Thailand).

Cost Per Student

The average annual cost of educating a student at AIT appears to have dropped during the first five years of the School's existence, and then stabilized at about the present level. The annual cost per student was approximately $15,200 in 1959-60, and has remained between $8,200 and $8,400 since 1964-65. The annual cost per student has not declined significantly since enrollment reached 89 students, as shown in the following table:

Year	Number Of Students	Estimated Operating Costs: Total	Estimated Operating Costs: Per Student
		In Thousands Of $U. S.	
1959-60	19	$ 289.1	$15.2
1960-61	48	476.7	9.9
1961-62	48	629.8	13.1
1962-63	62	742.6	12.0
1963-64	88	753.0	8.6
1964-65	89	750.4	8.4
1965-66	95	778.7	8.2
1966-67	110	928.0	8.4
1967-68	135	1,109.2	8.2

Only first- and second-year students were considered in this analysis, and because of the lack of a detailed financial record for early years, certain assumptions had to be made regarding cost.

- During the years from 1959-60 through 1961-62 it is assumed that costs closely matched income (as shown previously in Exhibit III-19) less equipment expenditures.

- For the years 1962-63 and 1963-64, operating costs equaled income less equipment expenditures and one third of "other" income, which it is also assumed, represented a cash surplus.

Summary

The administration of the Institute has been successful in attracting funds that have enabled it to meet rapidly expanding expense budgets, to build new facilities and to increase enrollment, while at the same time substantially reducing the average cost of educating the students. The base of support has not been increasing, however. Thailand and, in particular, the United States have had to assume a greater proportion of the overall support required for the Institute's growth and operation. There is also a tendency for the support to be in the highly visible form of seconded personnel rather than in operating cost support such as scholarships.

PRESENT PLANS FOR THE FUTURE

The Institute's projections of operating costs over the next nine-year period were detailed in the report presented to the Trustees in January 1968. These projections, shown in Exhibit III-20, call for an increase in degree program costs from the anticipated 1968-69 level of $1,343,000 to $7,600,000. Special programs will add an extra $1,992,000, bringing total projected costs to $9,592,000 for 1976-77. Operating costs for the degree programs are expected to increase at a rate somewhat faster than the projected enrollment, resulting in an average cost per student of $9,500 in 1977-78.

ASIAN INSTITUTE OF TECHNOLOGY

ESTIMATED ANNUAL OPERATING COSTS
1968-69 Through 1976-77

Year	Degree Programs			Special Study-Leave Faculty			Regional Activities	Total
	Number	Unit Cost	Total	Number	Unit Cost	Total		
1968-69	170	$7,900	$1,343,000	1	$10,000	$ 10,000	$ 150,000	$1,503,000
1969-70	190	8,100	1,539,000	2	10,300	20,600	150,000	1,709,600
1970-71	220	8,300	1,826,000	5	10,600	53,000	150,000	2,029,000
1971-72	300	8,500	2,550,000	10	10,900	109,000	200,000	2,859,000
1972-73	450	8,700	3,915,000	15	11,200	168,000	400,000	4,483,000
1973-74	600	8,900	5,340,000	25	11,500	287,500	700,000	6,327,500
1974-75	675	9,100	6,142,500	40	11,800	472,000	1,000,000	7,614,500
1975-76	750	9,300	6,975,000	60	12,100	726,000	1,000,000	8,701,000
1976-77	800	9,500	7,600,000	80	12,400	992,000	1,000,000	9,592,000

Source: AIT Development Plan, March 1968.

EXHIBIT III-20

IV - NEEDS OF ASIA FOR HIGHER LEVEL MANPOWER

IV - NEEDS OF ASIA FOR HIGHER LEVEL MANPOWER

Education is generally acknowledged as a prerequisite to the development of the human and material resources of a country or geographical region. Simple correlations can and have been established between a country's average level of educational attainment and its level of economic development. Although questions may be raised about whether educational attainment precedes economic development, or vice versa, it is acknowledged that, for a nation to develop its economy, it must fill certain needs for high-level manpower.

Some of the rationale supporting the need for high-level manpower, particularly in the technological areas that would be served by a postgraduate engineering institution, are discussed below.

BASIC ASSUMPTION

This chapter (and the following chapter) presents the results of data collection, research and analysis done by the consultants in assessing the viability and need for an institution such as the Asian Institute of Technology and identifying realistic parameters of growth for such an institution. Much of the case for the development of AIT does not lend itself to precise measurement or categorial treatment, partly because of the relative state of flux in which many countries of southeastern Asia find themselves, with each country seeking its own avenue for sound and rapid development. Thus, much of what can be documented about the past or predicted for the future depends on a course of events that will affect the overall development of the region. Political, economic and even cultural stability have yet to be achieved in some of the countries involved, and major modifications in development plans will undoubtedly be made to meet the changing needs of the individual countries and the region itself. Any finite projections of the region's needs for postgraduate level training in engineering will also be affected. Events outside of southeastern Asia may also directly or indirectly affect projections and assumptions regarding the future of an institution such as AIT.

Indicators concerning the likely viability of AIT were compiled and analyzed based on the assumption that the current political, economic and cultural situations in the countries involved will continue at least through 1977.

REGIONAL DEVELOPMENT PLANS AND PROGRAMS

The uniqueness of Asia, as a region, lies neither in the diversity of the nationalistic goals and aspirations of its states, nor in the vastness of its geographical size and population. It does perhaps lie in the relative historical time in which it must develop its economy as rapidly and soundly as possible. Asia's economic development is made imperative by its need to provide for its people the basic necessities of human life, as well as opportunities to work for wages that offer a modicum of financial security.

The development of many other nations took place when they were under- rather than overpopulated, and thus had a general shortage of labor. Their first goal, therefore, was the agricultural exploitation of the land, part of a development that was nationalistically oriented and that neither showed nor required much regard for international cooperation to meet common goals. As populations grew, however, regional needs superseded national ones, and transportation, water resource utilization, communications and other activities became regional undertakings.

Asia, on the other hand, is faced with an immediate need to approach its development on a regional basis. Water resources utilization must be planned, developed and controlled for the benefit of the entire region. Transportation of goods and services must also be developed on a regional basis, as must communications and other area needs. In order to plan, control, coordinate, implement and operate such regional programs effectively, trained manpower at all levels - and particularly at the higher levels - is needed.

For example, the Mekong Project, the development of the Irawaddy Valley and other projects concerned with the exploitation of water resources are more likely to succeed as international development projects under the leadership, at the higher levels of planning and coordination, of trained Asians representing the nations involved. To supply this kind of manpower, institutions of engineering education are needed. Here, then, is an obvious role for AIT, which is itself a regional institution with representatives from many nations in its student body, faculty and administration.

DIVERSION OF SECOND- AND THIRD-DEGREE ENGINEERS INTO HIGHER EDUCATIONAL INSTITUTIONS

In the development plans of the southeastern Asian nations, concern is expressed for the quality of their third-level (college and university) educational programs. A lack of sufficient top-quality instructional personnel to conduct high-quality educational programs is prevalent. In engineering education especially, there appears to be a regionwide need to attract and retain qualified faculty members of Asian descent. Also, the demands of regional projects for first-degree level engineers and skilled technicians, as well as more highly educated and professional engineers, are evident. There are concomitant demands for a sufficient number of instructional personnel to meet the needs for engineering training and education. The continuance of a high-level academic program at AIT could help to supply all of these kinds of highly trained technological personnel and could serve as a standard of excellence for other similar institutions in Asia.

THE "BRAIN DRAIN" IN REVERSE

The question has been asked whether it would be less costly to achieve the same goals as AIT's by providing direct grants-in-aids to permit southeastern Asian students to attend technological institutions in the West. Although it may, indeed, be somewhat less costly to follow this approach, it is highly doubtful whether equivalent ends would be attained. As most of the countries that offer technological education of the level and quality anticipated by AIT are highly developed, the educational programs they offer are oriented to serve the needs of an advanced industrial economy. Moreover, since these nations have, for the most part, already passed through the development phases that still face the nations of southeastern Asia, they are more concerned with the esoteric aspects of technological education than with the fundamentals involved in the development and exploitation of natural resources. As a result, the Asian nationals who have gone to the industrialized countries to obtain their educations have often found that the knowledge and experience they acquired there are not readily applicable to the problems of their own nations. These persons have frequently decided to remain in the countries where they received their educations. Where they have returned to their country of origin, they have become frustrated in attempting to apply their knowledge and experience in their own country and have either been diverted into other fields or have emigrated to other countries where they can more readily find employment in a field consistent with their education.

AIT offers a partial solution to this problem. Since it is located in the heart of southeastern Asia, it is to be staffed primarily by persons of Asian origin, and is designed to serve a student body consisting of reprentatives of all the southeastern Asian nations, its program will necessarily be oriented to the particular needs of southeastern Asia. Thus, students receiving their higher technological education at AIT should find it directly applicable to the problems of their own nations and should be more likely to obtain satisfying employment in their home nations. Actually, the growth and development of AIT as an outstanding institution of technological education could serve to create a "brain gain" by attracting back to Asia some of those engineers who had emigrated because of unsatisfactory work situations and who now see opportunities to work with the highly trained and educated engineers emerging from AIT.

OTHER CONSIDERATIONS

Technical assistance in the form of temporary imported high-level manpower has, for some time, been an expedient method of providing needed skills in southeastern Asia. Continued reliance on such a system seems impractical though, because it dilutes the resources available to the country retaining such assistance, regardless of whether the services are contributed by another government or are contracted for directly by the using country. If the cost of such contributed assistance were applied to a national, a greater economic return would result for the country concerned. Contracting for the needed services outside of the country would create an economic drain on the country's resources.

Thus, the importation of technical assistance costs more in terms of national resources and often may not be consistent with the cultural heritage of the area served.

The continued growth and development of AIT promise at least a partial solution to this situation. In addition to its academic program, AIT should be in a position in the future to furnish some of the technical assistance needed in parts of southeastern Asia through its faculty, Research Associates and students. Also, AIT would be in a position to provide research services for major problem-solving in assisting the nations of southeastern Asia in their development.

Another important factor is AIT's international mixture of faculty and students. During their tenure at AIT, students from many nations of the region will be exposed to each other and will become more familiar with the

human and cultural aspects of each other's nations, as well as with many of their political and economic characteristics. As a result, when AIT students return to their countries of origin, they will be more inclined to enter into international cooperative development projects, and help facilitate their establishment and execution.

V - REVIEW OF ASIAN REQUIREMENTS FOR ENGINEERS

V - REVIEW OF ASIAN REQUIREMENTS FOR ENGINEERS

This chapter presents significant data and conclusions on the past and present state of higher education in Asian countries, with specific reference to engineering education wherever possible. The future requirements for engineers are quantified as a basis for further determining the need for AIT.

HIGHER EDUCATION IN ASIA

Higher education, classified as third-level education (that is, above the level of secondary school), varies greatly among the countries of Asia, both in scope and in quality. Several countries apparently have programs whose graduates generally exhibit educational achievements similar to those of the more highly industrialized countries. Conversely, other programs produce graduates whose educational achievements fall below those of graduates from developed countries. Such variances are most pronounced in disciplines such as medical science, law and engineering. It appears to be generally acknowledged that the preparation received in obtaining a baccalaureate degree in many Asian undergraduate technological programs compares unfavorably with that received in highly regarded universities in some of the western countries.

Another significant factor to be considered is the greater emphasis that universities in more highly developed countries place on independent and creative thought processes through the application of scientific methods in original research. In many countries (both Asian and western), the educational process has traditionally consisted of learning by rote, or memorizing, specific details of a subject area. Also, the greater respect accorded teachers by Asian students often inhibits discussion, questions and the free interchange of ideas between student and instructor. As a result, many students graduate from secondary schools, and even third-level educational programs, with little or no exposure to, or training in, independent reasoning and research methodology.

Yet another factor which should be noted is the somewhat narrow curriculum, especially in the technological subject areas and at the third educational level. For example, students pursuing engineering degrees in some Asian countries may devote their full four years to the technical aspects of engineering, neglecting such areas as sociology, economic analysis and the management sciences. While it is by no means axiomatic that technological and

science students in more highly developed countries always study areas other than their specialization, many of the better schools attempt to provide their engineering graduates with broad social and managerial credentials by requiring them to take 20 to 25 per cent of their course work in nontechnical subject areas.

INSTITUTIONS AND ENROLLMENTS

Exhibit V-1, on the following page, shows the number of institutions of higher learning and their enrollments as reported for several Asian nations. The selection of these nations was based solely on the availability of comparable data, and their inclusion does not necessarily define a particular geographical region. These data generally cover a nine-year period ending in 1964. As a general indication of the growth of higher education in Asia, the total number of students enrolled in the earlier period for each country was about 1.1 million, and nine years later it had risen to about 2.2 million, a growth of about 100 per cent. Since the total number of institutions showed a similar growth, it can be concluded that the significant expansion in higher education that has taken place during the period from 1955 to 1964 will be repeated in the period of 1965 through 1973 in almost all of the countries reported, and perhaps at an accelerated pace in those countries with smaller 1964 base enrollments such as Cambodia and Laos.

Interpretation of the above data in terms of the need for graduate level engineering programs indicates the following:

- Continued growth in the number of institutions of higher learning and their enrollments would likely stimulate expansion in their academic programs, including those at the undergraduate level of engineering education.

- Accordingly, growth in the number of institutions offering undergraduate engineering and increased enrollments in the programs of these institutions would result in an increased number of students qualified to pursue postgraduate engineering programs.

- Also, the demand for instructional personnel in engineering, including those with academic qualifications beyond the first degree level, would be greatly increased.

These findings clearly indicate an increasing requirement for regional and international programs in graduate engineering.

NUMBER OF INSTITUTIONS OF HIGHER LEARNING AND THEIR REPORTED ENROLLMENTS

Country	Years Reported	Number Of Institutions	Number Of Students Enrolled
Burma	1950	1	3,333
	1960	1	13,600
Cambodia	1955	4	383
	1964	9	4,763
Ceylon	1955	3	4,449
	1964	3	12,485
Taiwan	1955	15	18,174
	1964	35	64,010
Hong Kong	1955	15	3,733
	1964	13	10,189
India	1955	1,236	681,179
	1962	2,633	1,207,511
Indonesia	1950	n.a.	6,183
	1961	101	65,635
Korea	1955	56	78,649
	1964	189	142,629
Laos	1960	2	113
	1964	2	129
Malaya	1954	2	940
	1964	25	8,818
Sarawak	1963	2	143
	1964	2	153
Pakistan	1955	197	87,508
	1963	247	218,577
Philippines	1955	380	183,905
	1963	700+	346,081
Singapore	1955	2	3,062
	1964	6	16,228
Thailand	1955	40	31,527
	1963	36	57,276
Vietnam	1955	6	2,829
	1963	21	21,087

n.a. - not available.
Source: UNESCO Statistical Yearbook, 1965, Paris, 1966.

FIELDS OF STUDY OF ENROLLED STUDENTS

Exhibit V-2, on the following page, presents the fields of study pursued by students in selected Asian countries. Some of the data are incomplete and vague, such as numbers of students enrolled in nondegree programs as distinct from those enrolled in lower degree programs. The data reported for engineering enrollments, however, generally represent undergraduate programs in recognized engineering disciplines.

The growth trend of total students enrolled in engineering is similar to the trend of those enrolled in all other courses, and in several countries, it is greater.

The lack of coordination between higher education and manpower needs is apparent in the data for India, which has been unable to utilize effectively its first-degree engineer output, but has had accelerating enrollments in engineering programs during the period reported; a similar situation is illustrated in the data for the Philippines. On the other hand, there are countries (such as Malaysia, Cambodia and Vietnam) that have critical shortages of technically trained personnel and have had modest increases or even reduced enrollments. Review of the data on enrollments in agriculture also reveals slight, if any, increases in countries such as Indonesia and Malaysia which have critical shortages of highly skilled persons to plan and implement agricultural expansion and improved productivity programs.

Exhibit V-2 shows the reported enrollments in engineering in various countries. These data were extracted from national reports which were submitted to UNESCO in June 1968, prior to a meeting (scheduled for August 1968) on manpower needs in higher level technical fields. These data depict the significant growth trends in the higher engineering education of the countries concerned. With such an increase in the graduation of first-degree engineers, those seeking postgraduate training are expected to increase accordingly.

OUTPUT OF FIRST-DEGREE ENGINEERS IN SELECTED COUNTRIES

Exhibit V-3, on the following page, presents the reported number of first-degree engineers graduated in several Asian countries. The trends indicated by these data correlate quite closely with those on total enrollments and engineering enrollments. Although the wastage (students who enroll but

SELECTED FIELDS OF STUDY OF STUDENTS ENROLLED IN HIGHER EDUCATION

Country	Years Reported	Natural Sciences	Engineering	Medical Science	Agriculture
Burma	1954	3,148	398	881	76
	1963	6,020	663	1,624	170
Cambodia	1956	(a)	(a)	182	74
	1965	164	82	483	65
Ceylon	1956	459	136	829	32
	1963	826	410	1,481	117
Taiwan	1955	1,129	4,467	712	2,038
	1964	5,071	9,889	5,655	4,519
Hong Kong	1955	430	746	634	6
	1962	1,063	1,380	389	0
India	1955	(a)	19,858	25,072	5,877
	1962	353,304	61,181	48,494	36,089
Indonesia	1952	450	2,576	2,780	631
	1956	1,351	3,245	4,560	531
Korea, South	1956	8,802	7,838	6,712	9,022
	1964	11,616	24,038	11,502	11,419
Malaysia	1963	398	800	40	174
	1964	462	701	193	123
Pakistan	1961	31,015	3,988	5,234	3,145
	1963	15,673	3,755	5,199	3,756
Philippines	1957	1,487	38,414	24,940	10,372
	1963	6,689	56,663	19,696	8,448
Singapore	1960	877	(a)	692	(a)
	1964	1,492	1,855	946	(a)
Thailand	1959	999	476	812	302
	1963	1,567	1,741	3,380	1,721
Vietnam	1960	3,160	225	1,906	107
	1964	5,100	320	4,350	260

(a)None or not reported.
Source: UNESCO Statistical Yearbook, 1965, Paris, 1966.

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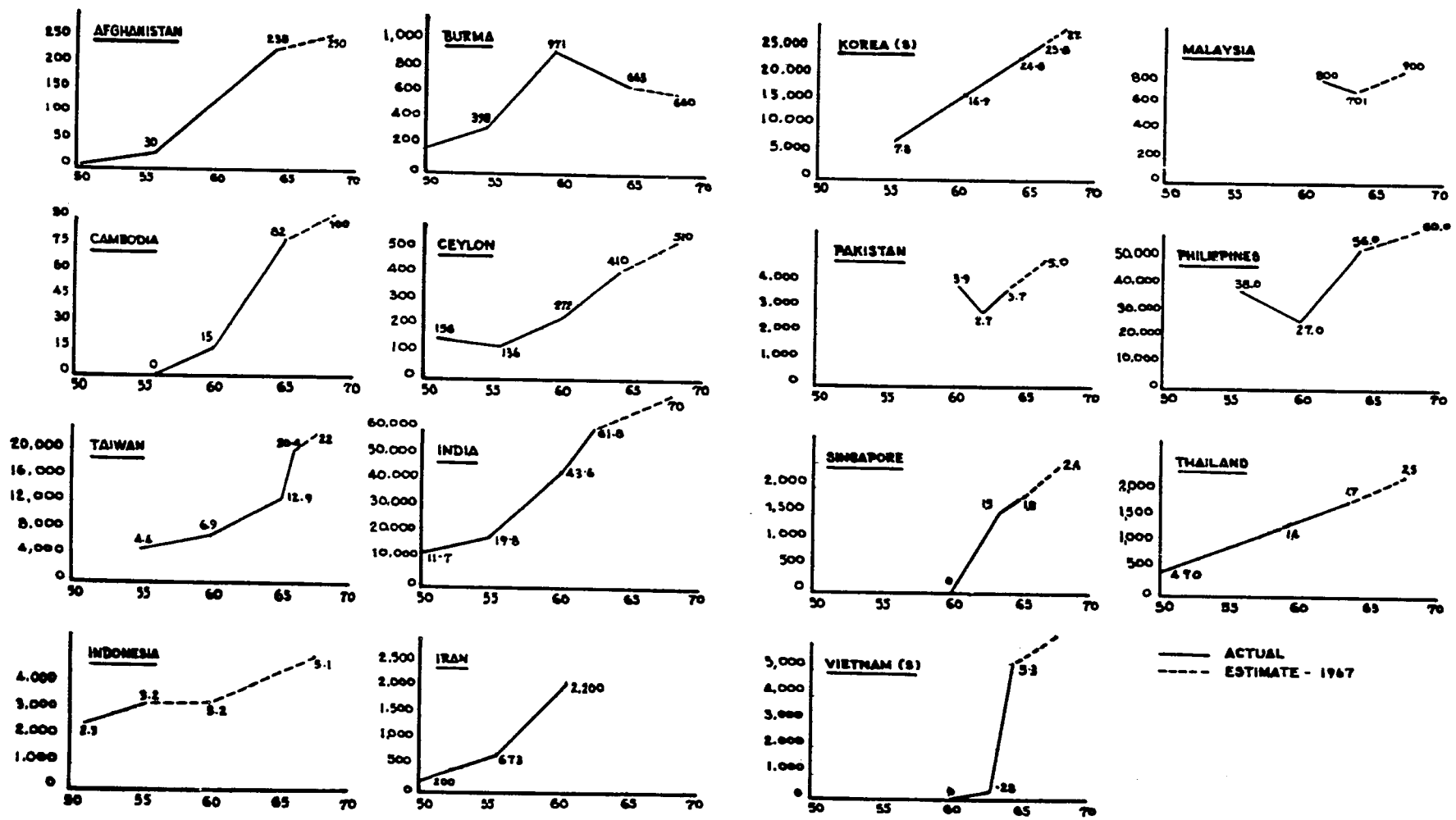
STUDENTS ENROLLED IN ENGINEERING (FULL TIME)



SOURCES-NATIONAL REPORTS

UNESCO - STATISTICAL YEAR BOOK. 1965

REVIEW OF EDUCATIONAL PROGRESS IN THE ASIAN REGION-UNESCO, 1966 (UPDATED TO 1968)

OUTPUT OF ENGINEERS (FIRST-DEGREE LEVEL), BY SELECTED COUNTRIES

Country	Years Reported	Output
Burma	1954	52
	1962	244
Ceylon	1957	24
	1963	55
Taiwan	1957	1,014
	1963	1,551
Hong Kong	1957	16
	1963	43
India	1957	4,854
	1963	11,800
Indonesia	1953	11
	1959	162
Korea	1957	1,185
	1961	1,522
Pakistan	1957	412
	1965	550
Thailand	1961	311
	1963	233
Vietnam	1957	23
	1963	51

Sources: UNESCO Statistical Yearbook, 1965, Paris, 1966; Higher Education And Development In Southeast Asia, Vol. 1, UNESCO and IAU, 1967, UN: Engineering Education In Asia, Thacker, M.S., World Congress on Engineering Education, June 1965.

fail to obtain a degree) is considerable in many institutions, it appears that approximately 15 to 20 per cent of the total number of students in any one reported year do continue and obtain a first degree. For example, the total enrollment in India in 1962 was reported at about 61,000 and the output four years later was about 11,800, or 19 per cent, of the 1962 enrollment.

The general trend is toward continued and, in many cases, accelerated growth in the output of first-degree engineers. Concomitantly, this implies increased facility and program requirements for accommodating engineers pursuing higher degrees.

Students Studying Abroad

The number of Asian students studying in foreign countries is one measure of the degree to which educational facilities have been developed in the student's country of origin. Exhibit V-4, on the following page, presents the latest available data (1963) on such students from selected Asian countries. As shown, the figures vary considerably from country to country: the Philippines was lowest, at 0.7 per cent, with Malaysia and Cambodia highest at 40 per cent. Laos probably had all of its students studying abroad during the reported year.

Section B of Exhibit V-4 lists the major countries in which Asians studied in 1963, and the per cent of the students listed in Section A which each country received. Except for Japan, the distribution does not include students studying in other Asian countries. The greatest portion of students go to the United States for higher education, followed closely by Australia. Perhaps because French is a second language in several Asian nations, a significant number of Asian students migrate to France for higher education. As further shown in the exhibit, about 9,100 of the 11,800 students (77 per cent) from the Asian countries studied in countries where English is the language of instruction. This signifies that the greatest demands, now and in the future, are likely to be directed toward graduate level engineering institutions, using English as the technical and instructional language.

A further breakdown, by country, shows more distinctly the migration of students to countries in which the instructional medium is the second language of the student's country of origin. Exhibit V-5 illustrates this, but also reveals that a significant number of students study in countries where the medium of instruction is a third language.

In conclusion, an institution using a given technical language in its instructional program might expect most of its foreign students to come from countries in which that language is a generally used second language, and it might also expect a smaller but still significant number of students to come from other countries in which that language is the third.

ASIAN STUDENTS STUDYING ABROAD
1963

A - As A Per Cent Of Total Enrollment

Country	Total Enrollment For Higher Education	Students Abroad	
		Number	Per Cent Of Total
Burma	12,965	446	3.5%
Cambodia	693	278	40.0
Indonesia	47,378	1,556	3.0
Laos	(a)	116	-
Malaya	6,233	2,487	40.0
Philippines	276,288	1,861	0.7
Thailand	35,031	1,403	4.0
Vietnam	8,267	1,904	23.0

(a)None or not available.

B - Distribution Of Students, By Country(a)

Country	Per Cent Of Total	Medium Of Basic Instruction - English
Total (11,829)	100%	
Australia	32.0	3,784
Austria	0.3	
France	18.4	
Japan	4.1	
U.K.	5.2	618
U.S.	36.6	4,323
Other	3.4	400+
Total		9,125

(a)Does not include intra-Asian migrations.

Source: UNESCO Statistical Yearbook, 1963, UNESCO, 1964
Engineering Education In Asia, Thacker, M.S., World Congress on Engineering Education, June 1965.

DISTRIBUTION OF STUDENTS STUDYING IN SELECTED COUNTRIES ABROAD
1964

Country Of Origin	Country Of Study								
	Australia	Canada(a)	France	Germany	Japan	U.A.R.	U.K.	U.S.	Total(b)
Burma	20	15	2	3	34	10	52	130	268
Cambodia	5	14	155	1	13	2	4	209	437
Ceylon	28	24	28	12	25	2	1	220	96
India	105	508	85	1,104	18	31	1,673	6,813	10,572
Indonesia	264	29	23	529	407	128	20	766	2,434
Korea(c)	17	22	65	185	(d)	(d)	28	2,604	6,512
Laos	(e)	14	178	(e)	4	(e)	(e)	36	252
Malaysia(f)	3,538	183	11	6	188	95	413	536	4,974
Pakistan	85	148	31	158	40	16	942	1,081	2,531
Philippines	72	71	9	31	38	35	39	2,473	2,810
Singapore	(e)	28	(e)	(e)	(e)	(e)	196	(e)	225
Thailand	171	24	68	143	250	51	145	1,630	2,512
Vietnam(c)	98	110	(e)	36	60	(e)	7	399	3,505

(a)1963 data.
(b)Includes all [other] students in 15 countries, as follows; Austria, Belgium, Czechoslovakia, Italy, Spain, Switzerland, Syria and those listed above.
(c)May include some participation from northern sector.
(d)Data available felt to be incorrect.
(e)None or not reported.
(f)Includes Singapore.
Source: UNESCO Statistical Yearbook, 1965, Paris, 1966.

Students Studying Engineering In Other Asian Countries

Another factor that must be considered in defining the status of engineering education in Asia is migration of students among Asian countries. Exhibit V-6, on the following page, briefly reviews reported data concerning this factor for selected countries. These data indicate willingness on the part of Asian Students to remain in Asia for their higher education in programs which may not be available within their native countries. Most of the students who study abroad still go to more highly developed countries, a factor which may be closely related both to the absence of accredited institutions in southeastern Asia and to the availability of grants-in-aid to attend institutions abroad. The extent to which students remaining in Asia for their higher education do so by choice or in the absence of suitable offers from other developed countries cannot be fully determined. The reasons why some students fail to receive aid and admission to institutions of education abroad also cannot be completely ascertained.

These questions were, however, explored by the consulting team in interviews with various persons involved in higher education in Asia. The consensus of opinion was that students having the best credentials would, by choice and availability of financial support, tend to study at an established institution of higher education in a developed country. However, given the opportunity to attend a recognized quality institution with adequate financial support within Asia, most students, it was generally felt, might prefer to remain in Asia for their graduate education.

Students Studying Engineering In Developed Countries

Exhibit V-7, on the following page, presents available data, for several countries, on the numbers of foreign students enrolled in higher educational programs in general, and in engineering in particular. Of the total number of foreign students studying engineering in the United States, over 40 per cent are in postgraduate programs - that is, at the United States master's or doctoral degree level. It is assumed that a similar pattern exists for the other countries.

Exhibit V-5, discussed previously, showed that of the students from 13 Asian countries attending institutions in 15 developed countries in 1964, about 17,000 were studying in the United States. Assuming that 22 per cent of the total number of students studying engineering, about 3,740 were enrolled in engineering studies and about 1,500 were at the postgraduate level of engineering education. Applying the same formula to all countries listed in Exhibit V-6, it is estimated that as many as 6,500 students from these countries were engaged in engineering studies at a postgraduate level.

FOREIGN STUDENTS STUDYING ENGINEERING IN SELECTED ASIAN COUNTRIES

Country	Year Reported	Total Foreign Students	Total Studying Engineering
Cambodia	1965	104	-
Ceylon	1963	5	-
Taiwan	1964	429	129
Hong Kong	1964	390	82
India	1962	3,923	269
Indonesia	1959	357	42
Korea	1964	107	15
Malaysia	1964	9	-
Pakistan	1963	366	64
Singapore	1964	1,231	269
Thailand	1963	69	42
Vietnam, South	1964	61	-

Source: UNESCO Statistical Yearbook, 1965, Paris, 1966.

NUMBER OF FOREIGN STUDENTS STUDYING ENGINEERING IN SELECTED COUNTRIES ABROAD

1964

Country	Total Enrolled	Total Studying Engineering	
		Number	Per Cent Of Total
U.A.R.	15,346	2,226	14.5%
U.S. (a)	82,045	18,084	22.0
France	35,584	1,243	3.5
Germany	25,594	7,845	30.6
U.K.	15,084	3,832	25.4
Australia	6,767	1,791	26.4

(a)In U.S., about 40 per cent are at master's or doctoral level.
Source: UNESCO Statistical Yearbook, 1965, Paris, 1966.

Target Outputs Of First-Degree Level Engineers

In 1967, UNESCO and the International Association of Universities completed and published the results of a cooperative study of higher education in southeastern Asia. The study, conducted between September 1961 and April 1965, deals with all aspects of higher education in the following 11 countries: Burma, Thailand, Malaysia, Singapore, Indonesia, the Philippines, South Vietnam, Cambodia, Laos, Sabah and Sarawak.

The background, findings, conclusions and recommendations for individual countries and for the region as a whole are presented in three volumes consisting of about 1,500 pages. Volume III, which explores and projects the probable requirements for high-level manpower, was conducted with the active participation and under the direction of Mr. Guy Hunter, who has been involved in similar studies in Africa and has authored several books on educational development.

The study is generally acknowledged as the most definitive of its type on third-level education in Asia. While various international agencies and regional bodies have plans for even more detailed studies of education and manpower requirements, no such studies have yet been started.

Mr. Hunter's analysis attempts to balance the ultimate need for technical competence within various countries with the realistic economic ability of these countries to employ such highly trained manpower. This methodology was chosen despite the fact that independent studies of some countries had shown high current needs even though the prevailing economic situation was such that higher level graduates could not find employment for lack of government and private positions requiring their particular skills. In one country, for example, 28 per cent of the 1964 engineering graduates were unemployed in 1965 for lack of positions. Yet this country reported a current shortage and projected increasing needs.

The following quote from the text of Mr. Hunter's report outlines his concept of the needs of developing countries for higher level trained manpower.

> In the early stages of development, which includes all of the South East Asian countries, there will be priority to produce relatively small numbers of high-quality secondary and university graduates to start the process of modernization and to replace expatriates; and this minimum must have precedence over primary education. In the next stage, when the flow of higher education is established, the economy will

> take some time to absorb much greater numbers, and the moment has come for consolidation and expansion of primary education, so that the response to modernizing leadership is more active and intelligent. In the third stage the emphasis will swing back to higher levels...as the requirements of technicians and technologists begin to rise steeply.

With this rather generalized model of a country's educational resources developing in accordance with its economic and social expansion, Mr. Hunter establishes some target outputs for various degree levels of high-level manpower, including engineers. He often refers to the weakness of the data basis available for such projections and makes the following disclosure regarding his own forecasts.

> ...one general conclusion - that none of the methods, however mathematically sophisticated, gives a reliable technique for forecasting detailed requirements in every special field over long periods. The assumptions which have to be made - as to economic growth, alterations of techniques, balance of world trade, political policies, etc., are so enormous that huge possibilities of error are built in before mathematics start...moreover, this report...could not be based on enough detailed and accurate information even to feed the right facts to the calculating machine.

With this qualification and others for individual countries, projections, or "target outputs," were made with the following assumptions.

> There will be a need to expand the proportion of manpower with University education...at a rate faster than the annual rate of growth of national income, while the total employed labour force will tend to expand at a lower rate than GNP. Both of these assumptions are based on historical experience.
>
> ...a proportion of technicians to university graduates of from 3:1 to 5:1 is a reasonable target... This assumption is based on the amount of technician or sub-professional support needed by a doctor, a scientist, an engineer...
>
> ...the requirements for men with the highest educational background is assumed to grow about twice as fast as GNP; that for post-secondary trainees at about three times that rate...

> ...the proportion of high-level manpower to total population, a proportion which varies from as low as 0.1 per cent in very unmodernized economies to 5 per cent or more in, say, the United States of America. In South-East Asia this proportion is at present found in the range 0.2 to over 1 per cent.

Based on the assumptions listed above plus data which has become available since the completion of the Hunter study, Exhibit V-8, on the following page, outlines the target outputs of engineers for various years in the 1970's. Several targets are based on country reports issued more recently, although most are based on the Hunter report. In all cases, the targets represent a supposed balance between total need and economic employability of graduates. While no more precise method of making such projections was found utilizing available data, more current estimates, such as those of Thailand, indicate that the Hunter targets may be somewhat conservative. A second calculation, combining the Hunter estimates with those developed by the consultants, is shown on Exhibit V-9, on the following page.

As shown, a one-year target output for all the countries listed would be about 26,400 first-degree level engineers. Excluding India, which has been and is developing significant graduate level institutions, the target would be about 3,700 first-degree level graduates. These are target outputs - that is, balanced requirements based on need, economic development, replacement of existing professionals and other relevant factors regarding lower education. Since, in most cases, these targets fall significantly short of what may be projected as critical need by the countries themselves, individual country programs may result in actual outputs, in the 1970's, which greatly exceed the targets. In the Philippines, for example, the actual output will continue to exceed by a large margin the "target" of 400, in view of the 1962 output of 3,587 "engineers" (that is graduates of two-, three- and four-year courses). Thus, the target of 3,700 first-degree engineers may actually be exceeded by 100 per cent or more, resulting in a total output of first-degree level engineers of from 7,500 to 12,000 per year, a range considered more realistic than the lower figure.

DEMAND FOR GRADUATE TRAINING

Of the estimated output of first-degree engineers, a certain portion will continue their education at the graduate level. A review of some relevant data would help in estimating what portion could be considered reasonable.

TARGET OUTPUTS FOR PROFESSIONAL ENGINEERS

Country	Target Year	Number
Burma	1972	140
Thailand	1975	450
Malaysia	1970	130
Indonesia	1970	600
Cambodia	1975	20
Vietnam	1980	200
Philippines	1975	400
Pakistan	1970	1,400
India	1971	22,700

Sources: Extrapolated from various reports, estimates and documents, including UNESCO Planning Mission; Higher Education and Development, Hunter, Guy, UNESCO 1967; Estimated Student Population of the University of Malaya, Doh Joon Sue, Kuala Lumpur, 1962; Planning Branch, Ministry of Education, January 1965, Burma; Engineering Education in Asia, Thacker, M.S., delivered at World Congress on Engineering Education, June 1965.

OUTPUT PROJECTIONS OF ENGINEERING GRADUATES

Country	Engineering Enrollment		Actual Output		Target Output		Revised Output		Estimated Number Seeking Postgraduate Training
	Year	Number	Year	Number	Year	Number	Year	Number	
Afghanistan	1964	238	1962	167	-	-	1970	200	40
Burma	1963	663	1962	244	1972	140	1970	140	28
Cambodia	1965	82	-	-	1975	20	1970	20	4
Ceylon	1963	410	1963	55	1969	200	1970	200	40
Taiwan	1966	20,400	1963	1,551	-	-	1970	2,000	400
Hong Kong	1962	1,380	1963	43	-	-	1970	200	40
India	1962	61,181	1966	11,800	1971	22,700	1970	24,000	4,800
Indonesia	1956	3,245	1959	162	1970	600	1970	600	120
Korea	1966	25,866	1961	1,522	-	-	1970	2,500	500
Malaysia	1964	701	-	-	1970	130	1970	150	30
Pakistan	1963	3,755	1965	550	1970	1,400	1970	1,400	280
Philippines	1963	56,663	1962	3,587	1975	400	1970	5,000	1,000
Singapore	1964	1,855	-	-	-	-	1970	400	80
Thailand	1963	1,741	1963	233	1975	450	1970	500	100
Vietnam	1964	320	1963	51	1980	200	1970	200	40
									7,502

Anticipated Output Seeking Admission To Postgraduate Program: 7,502

Implications For AIT At 5%: 375
10%: 750

EXHIBIT V-9

- In the United States, recent indications are that about 38 per cent of first-degree engineering graduates enter graduate programs, and about 17 per cent of master's level candidates proceed to enroll in doctoral programs.

- In Latin America, about 1 per cent of first-degree engineering students eventually enroll in graduate programs there, and as many as 20 per cent migrate to developed countries for their graduate engineering training.

- As noted earlier, about 40 per cent of all foreign students studying engineering in the United States are at graduate levels.

On the basis of these data, it is estimated that between 20 and 25 per cent of first-degree engineering graduates in Asia will proceed to the graduate level. Thus, excluding India, the actual number of engineering graduates seeking admission to graduate programs in any year during the early 1970's should range from 2,000 to 3,000 (refer to Exhibit V-9).

If the countries for which no targets were established were to have about 2 per cent of their engineering students seek graduate training, this would increase the above figures as follows:

		Engineering Enrollment	
Country	Year Reported	Numbers	Times 2 Per Cent
Afghanistan	1963	238	5
Ceylon	1963	410	8
Taiwan	1966	20,490	400
Iran	1963	2,224	44
Korea	1966	25,866	540
Singapore	1964	1,855	37
Total			1,034

Thus, the estimated range of students possibly seeking graduate level education in engineering would be increased to between 3,000 and 4,000. The inclusion of India would further increase the range to beyond 7,000 students.

These ranges, then, constitute the reservoir, or supply, from which AIT may expect to receive its applications.

SUMMARY AND CONCLUSIONS

The foregoing sections discussed various aspects of higher education in Asia, with particular reference to engineering education. This section presents a summary of the significance of the data to the potential growth of AIT.

Higher Education In Asia

Most of the countries studied showed a growth pattern in which both the number of institutions and their total enrollments doubled over a ten-year period. The education plans of several countries emphasize both the growth of their institutions and improvement in the quality of their third-level education.

Growth in undergraduate enrollments should result in a corresponding growth in the number of students seeking postgraduate training as well as in the demand for instructional personnel to support both graduate and undergraduate programs. Increasing emphasis on quality in higher education should result in increasing demands for instructional personnel with higher qualifications or postgraduate credentials. These factors would, of course, increase the need for postgraduate engineering training such as is offered at AIT.

Fields Of Study

The growth in undergraduate engineering enrollments is equal to or greater than the growth in enrollments of other higher education programs. The education plans of many countries call for continuing expansion of technological education and increased emphasis on upgrading the quality of the programs.

Student demand for engineering education has exceeded the planned targets in many nations; without government control, many targets for popular professional disciplines such as engineering may be exceeded.

These factors also support an increasing demand for institutions such as AIT to supply graduate level training.

Students Studying Abroad

The countries studied have between 1 and 40 per cent of their third-level students studying abroad, of which a significant number are in engineering fields. The proportions are generally between 22 and 26 per cent, but have been as high as 30 per cent and as low as 3.5 per cent.

Of all the students studying engineering abroad, a large portion - estimated at 40 per cent - are at the graduate level.

It is likely that students from those Asian countries which do not plan a significant increase in their graduate engineering education programs will continue to study in foreign countries, a situation of which AIT could take advantage.

Anticipated Output Seeking Graduate Training

On the basis of output projections for first-degree engineers, and assumptions on first-degree graduates seeking admission to graduate programs, a supply can be estimated for graduate level programs in the early 1970's.

As developed in this chapter, the supply is projected at a minimum of 5,000 students in the early 1970's, with an increase expected for each subsequent year in the foreseeable future.

The significance of the supply size for AIT is that it defines the outside limits for growth and identifies AIT's possible contribution to the field of graduate engineering education. For example, it would be unreasonable for AIT to anticipate or plan for new enrollments of 5,000 students or more in any one year in the early 1970's, as this would exhaust the entire supply. On the other hand, if AIT were to consider admitting only 10 new students of the anticipated supply of 5,000 or more each year, its contribution to graduate engineering education could hardly be considered significant.

It is estimated that AIT's demand, or drawing power on the total supply, would range from 5 to 10 per cent of the supply. If 5 per cent would be reasonably attainable in the early 1970's, AIT could enroll 250 new degree students each year. At 7 per cent, it could enroll 350, and at 10 per cent, 500 new degree students could be enrolled each year.

Thus, if AIT plans its growth within the reasonably attainable limits of 250 and 500 new admissions each year for the early 1970's, it can be assured of adequate demand to maintain sound expansion of its programs and to emphasize the quality aspects of its development.

DOCTORAL LEVEL SUPPLY AND DEMAND

The study of supply and demand factors for graduate engineering education included identification of the current situation and future needs. Data on doctoral level engineering education were sought from 15 Asian countries,

with the help of the United States Embassy Regional office in Bangkok. The only possible conclusion from analysis of the data obtained is that few educational opprotunities exist for doctoral engineering education in Asia.

Four institutions were reported to be offering doctoral engineering degrees, but their total output from 1963 through 1967 was about four graduates.

Following is a summary of the supply and demand factors for doctoral level engineering training, especially as they relate to the programs of AIT:

- There is no statistical evidence of a major requirement for doctoral level engineering education in Asia.

- In the absence of such evidence, the assumption can nevertheless be made that some engineers acquiring their master's degrees do, in fact, desire to seek a doctoral degree.

- The nonquantitative factors cited earlier in support of AIT's role in master's degree level engineering education appear valid also for the doctoral level.

- Expressions of interest and support for doctoral engineering education have been made to AIT administrators by representatives of several Asian institutions.

- The paucity of analyzable data and expressed demand for doctoral engineering programs leads to the conclusion that any program that is undertaken should necessarily be initiated and expanded on a limited basis.

VI - CRITERIA FOR FURTHER GROWTH AND DEVELOPMENT

VI - CRITERIA FOR FURTHER GROWTH AND DEVELOPMENT

This chapter presents the criteria that were used in formulating the plans for the growth of AIT. These criteria pertain to general concepts, programs, enrollment growth, faculty staffing, organization and administrative staffing, and factors influencing equipment and compensation costs. Details of cost factors used in capital construction are included in Appendix D.

A - GENERAL CONCEPTS

Essential to sound growth is a well-conceived plan of action. Without a plan of growth, it is easy to lose sight of objectives and to follow the path of least resistance instead of the path to long-range goals.

A sound plan should begin with a statement of the objectives of the organization and should be based on criteria, developed through experience and research, that will help to ensure achievement of desired goals. The plan must also be flexible, so that it can be adapted to changing conditions. The longer the range of a plan, the more frequent must be adjustments to keep the plan current. To remain effective, a plan must be periodically reevaluated to determine whether projections are still valid in terms of the latest information and experience available.

Five general criteria have governed the development of a growth plan for AIT:

- Emphasis on qualitative growth. The history of AIT has shown both qualitative and quantitative growth in programs, students and faculty. The emphasis on qualitative improvement should continue and should proceed in a way that will facilitate the assimilation of new programs, students and faculty without lowering standards.

- Consonance with supply and demand. The growth of AIT must be consistent with the supply and demand of first-degree level engineers in southeastern Asia, to ensure that well-qualified students are enrolled and that there is a need for the graduates in their nations. For the initial years of growth, AIT should not attempt to matriculate more than 10 per cent of the estimated total supply qualified for graduate degree work.

- High-quality faculty. High-quality programs cannot be developed and maintained without high-quality faculty members. AIT has been able to attract highly qualified faculty members in the past when its faculty needs were small. However, during the period of planned growth, the need for highly qualified faculty members will be much greater, and it is not known whether large numbers of highly qualified seconded and direct-hire professors can be attracted. If the proper faculty cannot be attracted, AIT has the choice of growing at a slower pace or becoming a second-rate institution. In such a situation, the choice must be to curtail growth in order to maintain its standard of excellence.

- Additional facilities. The present site is small, and soon it will surpass its capacity. However, a new site is expected to be available for occupancy the beginning of the 1971-72 academic year. The plans for growth are based on occupancy of the site in 1971 but include a safety factor to cover unforeseen developments that may delay occupancy until 1972.

- Availability of funds. A final criterion involves the ability of AIT to raise sufficient funds for both capital and operating needs. Capital funds for the development of the new site and the construction and furnishing of new facilities must be committed soon if the Institute is to move to its new quarters in 1971. The anticipated increase in student enrollments and the demands of the new campus necessitate considerable increases in the annual operating expense. Without firm commitments in advance of needs, the planned growth cannot be realized.

B - PROGRAM CRITERIA

This section presents degree program criteria by discipline and special program criteria by type of program.

DEGREE PROGRAMS

The criteria for degree programs are discussed in terms of the future of civil engineering and the introduction of new disciplines.

Civil Engineering

The development of additional options at the master's level will depend on the needs of the region, faculty interests, and space limitations. Once the new site is occupied, space needs, particularly laboratory space, will no longer be critical. The offering of new options need not wait for the occupancy of the new site if the criteria above are met. The civil engineering program has demonstrated an ability to grow both in quantity and quality. For the planning period, no increase in civil engineering options has been included.

A doctoral program is scheduled to begin in 1971, upon occupancy of the new campus facilities. The doctoral program will be as a three-year program, with the first year devoted exclusively to course work, the second year to course work and/or research (depending on the background of the individual student), and the third year exclusively to research. Since the first year of the program as it is currently planned will consist of course work, there should be few problems of adjustment to the new site. In the event that occupancy of the new site is delayed until 1972, the first year of the doctoral program could be offered at the present site where laboratory rather than classroom space is the limiting factor. With a delayed move, the doctoral candidates entering their second year of study in 1972 might be somewhat inconvenienced.

Mechanical Engineering And Electrical Engineering

There are definite needs in the region for graduate engineers in mechanical and electrical engineering. Master's degree level programs in these disciplines should not be started until 1972, to allow a one-year adjustment to the new campus if construction schedules are met as planned. In the event of a one-year delay in occupying the new site, the new programs would have to start without the benefit of a settling-in period.

The time allowed between the introduction of new programs is established at one year. To accomplish this without serious problems requires a substantial amount of careful planning and coordination.

The choice of which discipline - electrical engineering or mechanical engineering - to offer first necessarily depends upon the availability of qualified faculty, as well as on the considered deliberations of the faculty, the administration and the Trustees. Both programs are needed, and perhaps electrical engineering would be more helpful in a developing region. On the other hand, the greater similarities in laboratory and course requirements of mechanical engineering and civil engineering may make it easier to phase in the mechanical engineering program first. This will be particularly important if occupancy of the new site is delayed until 1972. For this reason, mechanical engineering has been listed as the first program to be introduced, but the order may be changed later.

The new disciplines are scheduled to begin with two options. The choice of specific options would depend on the capabilities of the faculty acquired, and additional options can be phased in within the projected growth rates as needed.

The growth of mechanical engineering and electrical engineering to the doctoral level is anticipated, with the proviso that a doctoral program be initiated only after the master's program has been fully developed and the faculty has achieved stability. The master's program should be in operation at least four full years before the doctoral program is started and a doctoral program should not be started until the annual attrition of faculty in a discipline is at a rate of 25 per cent or less.

Chemical Engineering

The desirability of introducing chemical engineering at this time is open to question. Few statistics are available on the number of first-degree level graduates in chemical engineering in the region, which gives an uncertain picture of supply and demand for graduate chemical engineers. The more immediate needs of the region served appear to be mainly in the disciplines of civil, mechanical and electrical engineering.

For these reasons, a chemical engineering program has not been projected. However, the need for a graduate program in chemical engineering should be reassessed each year, because rapid development in such areas as natural resources and food processing may lead to significant manpower needs in this field.

Program X

Introduction of a new discipline program entitled Program X at the master's level is included in the plan. The title "X" has been used to allow maximum flexibility in offerings, and the unnamed program could be chemical engineering if a sufficient need exists. Other possibilities for Program X include such subjects basic to AIT's current programs as physics, mathematics and computer technology. As these subjects are strengthened and as specialized faculty members are brought in, degree programs would be developed. Some chemistry and biology courses, currently offered under the public health engineering option, might also develop into degree programs. Other possibilities in the physical or biological sciences include meteorology, geology, parasite, biochemistry and botany.

One deficiency noted in undergraduate engineering education in southeastern Asia is the almost complete absence of course work in management, economics and other social sciences. At present, none of these is taught as separate courses at AIT; management is alluded to and economics is considered only as synonymous with cost implications of engineering. The expansion of AIT's program to include course work in all of these areas is highly desirable. It is possible that a degree program in industrial management would have increasing demand in the near future.

Program X could also be expanded into doctoral level study, in accordance with the criteria followed for doctoral programs in the other fields of study.

* * * * *

The years in which degree programs could be introduced under the proposed plan, by discipline and level, is presented in Exhibit VI-1, on the following page.

SPECIAL PROGRAMS

The special programs as envisioned by AIT consist of conferences, institutes, diploma programs, faculty study leaves, a publications program and a regional library.

ASIAN INSTITUTE OF TECHNOLOGY

DEGREE PROGRAM DEVELOPMENT, BY YEAR
1968-69 Through 1977-78

)ption And Degree	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
·il Engineering										
Master's	X	X	X	X	X	X	X	X	X	X
Doctorate	-	-	-	X	X	X	X	X	X	X
chanical Engineering										
Master's	-	-	-	-	X	X	X	X	X	X
Doctorate	-	-	-	-	-	-	-	-	X	X
·ctrical Engineering										
Master's	-	-	-	-	-	X	X	X	X	X
Doctorate	-	-	-	-	-	-	-	-	-	X
›gram X										
Master's	-	-	-	-	-	-	X	X	X	X
Doctorate	-	-	-	-	-	-	-	-	-	-

EXHIBIT VI-1

Based on discussions within and outside AIT regarding the need and desirability for special programs, criteria was developed. Specific comments on these programs are presented in later chapters.

Special Conference Programs

Conferences are planned as professional meetings on matters of current importance in engineering and related fields. Guest lecturers would be invited, research papers would be presented, and technical work and seminar sessions would be held. These meetings would run for an average of one week each. The proceedings of conferences would probably be published and distributed to participants and other interested parties.

In civil engineering, three conferences are projected for the 1968-69 academic year, with the number growing to as many as two per option, a level which would be attained in 1974-75. No conference, however, should be scheduled during the first year a new option is offered. During the second year of offering, one conference is projected, and the number could grow to two per option in the foreseeable future.

Special Institute Program

Institutes are planned as intensive noncredit training in specific subject areas. Training methods might include classroom lectures, seminars, laboratory sessions and field trips. The average institute would run for a three-week period of full-time training. The numbers of institutes are projected to reach one per option within the planning period, with the condition that no institutes be scheduled during the first year of a new option.

Special Diploma Program

The diploma program involves a formal course of study on a credit or noncredit basis to orient practicing engineers to new technologies and the changing needs of the region in specific engineering areas. The average diploma program would extend over nine months of full-time study. Recognition of completion of the program might be in the form of a certificate of attendance or a diploma. To grant a diploma, some testing procedure would be required to gauge the mastering of material and problem-solving techniques presented; a certificate, however, would not involve testing. A student might be allowed to choose either type of recognition but could switch only from the diploma program to the certificate of attendance program.

The program might consist of courses, seminars, laboratory sessions and field trips, with emphasis on classroom work. Approximately two-thirds of the course work would be in sessions designed specifically for the diploma program, while the remaining one-third would consist of courses of interest within the regular degree program offerings. The courses from the degree program would be primarily courses in such related subjects as report writing, management, mathematics, statistics and computer technology, but might also be in specific engineering areas. If a participant desires a certificate of attendance, he would register in regular degree courses as an auditor; if he desires a diploma, the program participant would enroll as a regular student and be subject to the same standards and grading as degree candidates. Successful completion of regular courses would constitute the earning of graduate credits that might later be applied to a graduate degree program.

As a planning guide, one diploma program is projected for each engineering discipline that has been in operation for a full year. This does not imply that diploma program subject matter must be related to specific disciplines, but rather that the capacity to offer such programs is a function of total program stability as measured by the operations of the discipline. The first diploma program is projected to begin in 1970-71, with one offered each year through 1972-73. The number would then be increased to two in 1973-74, to three in 1974-75, and to four in 1975-76.

Special Faculty Study-Leave Program

This program is designed to encourage faculty members of other universities, particularly those in southeastern Asia, to spend their sabbatical or study leaves at AIT. Such a program would promote the exchange of knowledge, ideas and experiences on engineering, technology and education between the faculty at AIT and other university faculties. The study-leave faculty members would be invited to spend an average of nine months at AIT where office space, clerical services, research space and research support would be provided.

As a planning guide, the size of the program is based on the number of options: one participant is planned for each option that has completed one full year of operation and has been scheduled for an eventual level of two per option, with the stipulation that no more than one participant be added for a discipline in any one year.

Special Publications Program

Asian Institute of Technology plans to develop a professional engineering journal to serve the regional needs of southeastern Asia. The journal would be published quarterly and distributed on a paid-subscription basis after approximately three years of free distribution. Each issue would have an estimated printing of 3,000 copies.

Special Regional Library

Development of a library to serve the needs of practicing engineers, academicians and other interested persons in the region would require facilities and resources significantly beyond the needs for the projected degree programs. The regional library, however, is not envisioned as a separate entity, but rather as a larger unit that would meet both degree and regional needs with one facility.

Acquisitions for a regional library beyond the needs of the degree program are projected at 7,000 volumes in 1969-70, increasing each year to 15,000 volumes in 1977-78. Acquisitions would start prior to the planned date of moving to the new campus, so that the regional library holdings would be significant at the time the service is made available. Before actual occupancy, some volumes may have to be placed in storage because of lack of shelf space. Annual acquisition levels have been projected on the basis of estimated size of the regional component and the ordering and cataloging capabilities of an expanded library staff.

* * * * *

A summary of special programs, by type and year of introduction, is presented in Exhibit VI-2, on the following page.

ASIAN INSTITUTE OF TECHNOLOGY

SPECIAL PROGRAM DEVELOPMENT, BY TYPE AND YEAR
1968-69 Through 1977-78

	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
ıber Of Programs										
Conference programs	3	5	6	7	8	11	14	17	20	24
nstitute programs	1	2	3	4	5	6	8	11	13	14
Diploma programs	-	-	1	1	1	2	3	4	4	4
ıber Of Participants Faculty-Study ave	-	1	2	3	4	6	8	11	13	14
ıber Of Acquisitions Regional Library	-	7,000	8,000	9,000	10,000	11,000	12,000	13,000	14,000	15,000

EXHIBIT VI-2

C - ENROLLMENT GROWTH CRITERIA

This section discusses the criteria used in projecting enrollment growth in both degree and special programs.

DEGREE PROGRAMS

The criteria for enrollment growth in the degree programs are presented by master's and doctoral level.

Master's Level

Civil engineering enrollments for 1968-69 have already been pegged by the administration of AIT at 175 students. Further growth in civil engineering prior to occupancy of the new site is restricted by the capacity of the laboratories. In particular, the limiting factor is the number of second-year students who can be accommodated with sufficient space and facilities to allow them to fulfill their research commitments.

The new master's level programs in mechanical engineering, electrical engineering and Program X are scheduled in the plan to begin with two options of 20 first-year students in each option, for a total of 40 students. Experience of AIT shows that 72 per cent of the first-year students will start the second year of study and that an average of 21 per cent of the second-year students enroll for a third or fourth year to receive their degrees. The planned growth in the number of first-year students in each new master's program is equivalent to AIT's historical average growth of almost 20 per cent each year.

Enrollments beyond the second year of study have been erratic, ranging from 3 to 37 per cent each year. Often the problem was more one of faculty turnover than of student inabilities to complete the thesis in time. As the faculty becomes more stable, AIT intends to maintain the percentage of second-year students enrolling after the normal two-year period to about 5 per cent. In the plan, 5 to 10 per cent of the previous year's second-year students has been used to project enrollments of third- and fourth-year students.

An additional criterion affecting the size of the master's program in civil engineering is the arbitrary ceiling on enrollment of 250 students, set by the AIT administration. As the proposed doctoral program grows, a decrease in the number of master's candidates would be experienced under this ceiling.

Doctoral Level

The fundamental criterion of doctoral program growth is a modest beginning with moderate growth each year. A quality doctoral program demands a close relationship between the candidate and his committee. The doctoral degree is the highest recognition an institution can give to those it educates, and in the future, the prestige of AIT may depend heavily on the recipients of this highest degree. A modest program, both in size and in growth, will help AIT to develop a quality doctoral program. In the proposed plan, civil engineering would begin with seven candidates and the other programs with six candidates, and these doctoral programs would grow to 10 to 20 per cent of total enrollments.

The plan is based on several assumptions concerning growth per year, attrition, and length of time to complete the degree program. The number of doctoral students entering each year is estimated to increase at a rate of 10 per cent. Attrition between the first and second year of the program is expected to be 10 per cent; attrition between the second and third year is anticipated to be 5 per cent. It is further estimated that 25 per cent of the third-year students will need a fourth year to complete their degrees.

SPECIAL PROGRAMS

The special conference programs have been projected on an estimated average of 100 participants for each conference running an average of one week. As a planning guide, the concept of full-time-equivalent (FTE) participants has been used, based on a full-time conference participant being in residence for 40 weeks. Thus, an average conference would represent 2.50 FTE registrations.

The institutes are programmed for an average of 30 participants each, with an average duration of three weeks. On an FTE residence basis of 40 weeks, each institute would represent an enrollment of 2.25 FTE participants.

The diploma programs are scheduled to have 20 participants in each section for an average of nine months. On an FTE basis, this is assumed to represent 20.0 participants.

The faculty study-leave program participants, who are estimated to average nine months at AIT, have been counted as 0.90 FTE enrollments each.

D - FACULTY STAFFING CRITERIA

In this section, the criteria are developed for the faculty staffing of degree programs, special programs, and other faculty needs.

DEGREE PROGRAMS

The criteria for degree program faculty needs are discussed in terms of professorial composition, student-faculty ratios, and new academic program development.

Professorial Composition

During the last five years, the professorial staff has consisted of 50 per cent or more of full professors. This represents a structure heavily weighted in the top rank. As a long-range target, AIT should aim for the following professorial composition: 45 per cent Assistant Professors, 30 per cent Associate Professors and 25 per cent Professors.

At present, AIT has one direct-hire faculty member, but it plans to increase the number of direct hires to 70 per cent of the total faculty, which appears to be reasonable as a long-range goal. The Institute's experience in direct hiring has been limited, and so it has little indication of time and difficulties that may be encountered in hiring the large numbers of faculty members that will be needed for its expanding programs and enrollments. A high-quality faculty must be the primary objective; the 70 per cent direct-hire target should be a secondary goal.

Student-Faculty Ratio

The average "teaching" faculty member at AIT may be engaged in a wide variety of activities: classroom teaching, professional research, committee work and other administrative affairs, student research supervision, and continuing education and special program activities. To identify the time spent by individual Professors on each of these activities is neither possible nor practical; to identify accurately the time spent by the average faculty member is no easier. No two Professors are identical in capacity or ability, yet some sort of criteria must be delineated for an average faculty member.

In Chapter III, a number of assumptions were made about full-time and part-time faculty members, to calculate the number of FTE faculty members at AIT in the past five years. These assumptions were:

- A full-time faculty member was assigned an FTE value depending on the percentage of each academic year that he was under contract.

- A part-time faculty member was assigned an FTE value on the basis of total credit-hours taught and number of student theses supervised per academic year, based on the assumption that 27 credit-hours per academic year equals 1.00 FTE and each student thesis supervised represented 0.10 FTE.

- Administrative work over the normal amount was subtracted from the FTE calculation, as follows: the President was assumed to be 100 per cent administrative; the Academic Deans were assumed to devote 20 per cent for the first two years of the five-year period and 50 per cent for the last three years; Option Chairmen were assumed to devote 20 per cent of their time to administrative duties.

After calculating the number of FTE faculty members for each of the last five academic years, the figures were divided into the student enrollment for each corresponding year (enrollments equivalent to the number of FTE students) to determine the FTE student-faculty ratio. An average of 10.1 to 1.0 was found, with an annual range between 8.8 to 1.0 and 12.4 to 1.0.

This average of 10.1 FTE students to each FTE faculty member includes first-year, second-year, and some third- and fourth-year students. More first-year students who are engaged entirely in course work can be handled per FTE faculty member than second-year students who are engaged in some combinations of course work and thesis research. As noted, the composition of the faculty during this period consisted of a high percentage of Professors, who are usually assumed to carry somewhat lighter student loads than Assistant Professors and Associate Professors. It should also be mentioned that, during this period, two special programs, a conference and a summer institute, were conceived, planned and coordinated by faculty members. At the same time, enrollment of first-year students grew almost 70 per cent; total enrollment grew almost 65 per cent; and a total of 180 students received master's degrees. This is a highly successful record.

Faculty needs can be calculated from student growth projections by using projected student-faculty ratios. These ratios were developed from the historical ratios at AIT over the last five years, adjusted to achieve:

- Closer contact between students and faculty, which means a reduction in the number of students per faculty member

- Greater faculty research, which necessitates fewer students per faculty member

- More faculty participation in special programs, which demands fewer students per faculty member

- A greater percentage of the faculty in the Assistant and Associate Professor ranks which tends to allow a slightly greater number of students per faculty member.

The following table presents the student-faculty ratios, by degree program and year, that were used in developing teaching faculty needs:

Program And Year	FTE Student-Faculty Ratio
Master's Degree	
First year	10:1
Second year and subsequent years	6:1
Doctoral Degree	
First year	8:1
Second year	6:1
Third and subsequent years	5:1

Since there are more master's students in the first year of study than in the second or subsequent years (because of attrition), the average student-faculty ratio for the master's program would be a little more than eight students per faculty member. Therefore, the plan represents a reduction of approximately two students per faculty member from AIT's recent experience.

In the doctoral program, the first year is assumed to be composed entirely of course work, and the ratio has been set 20 per cent lower than in the first year of the master's program. The composition of the second year of the doctoral program will vary, depending on the candidates' background and performance in the first year of study. Candidates with a Master of Engineering degree from AIT and other students with similarly strong backgrounds may be required to take little or no course work during the second year but will devote most or all of their time to thesis research. Other candidates might need as much as a full second year of course work to prepare for their thesis. It has been assumed that the average doctoral candidate will spend more than half of his time in research; for this reason, the ratio has been set at 6 to 1. In the third and subsequent years of study, the candidates will spend all of their time engaged in research and so a ratio of 5 to 1 has been used.

It must be emphasized that these ratios pertain only to the normal professorial teaching staff. As the research program broadens into grant and contract operations, the time of Professors may be diverted, in varying degrees, to these activities The Institute may have to hire additional Professors to "replace" the time of those committed to funded research. There should be no additional cost involved, since research grants and contracts are generally costed to pay for that portion of a Professor's research time as well as the cost of Research Associates, technicians, students, etc. As more grant and contract research is added, the effect will be to add more Professors at no extra cost to AIT, with no change in the number of students. The net effect would be a lowering of the student-faculty ratio. A low ratio could indicate greater emphasis on research than on the importance of degree programs.

New Program Development

It is mandatory to start planning a new academic program well in advance of its inception, to ensure a quality program with a minimum of adjustment problems. For developing master's degree level programs in mechanical engineering, electrical engineering and Program X, planning should begin two years in advance of offering. The projections allow 1.0 FTE faculty member two years prior to introduction and 2.0 FTE faculty members one year for each of the three new engineering disciplines. The planning phases are heavily staffed, because it is anticipated that they would include some designing of laboratories, determination of specific equipment needs, and placement of equipment, in addition to curriculum planning.

Planning for doctoral curriculums is projected at 1.0 FTE faculty member for each of the four disciplines one year prior to the introduction of the program. This planning would occur when a maximum faculty turnover of 25 per cent per year has been achieved and when the physical problems encountered in initiating the disciplines have been largely overcome. The planning time should be devoted fully to curriculum matters within the doctoral program framework developed by the faculty.

SPECIAL PROGRAMS

Faculty time will be needed in planning, coordinating, conducting and follow-up phases of special conferences, special institutes and special diploma programs. For planning purposes, it is estimated that the average conference and the average institute will each demand 0.50 FTE of faculty time, while the average diploma program section would need 1.50 full-time equivalents of faculty time. The faculty study-leave program is assumed to need no direct assignment of AIT faculty time. The conference program would also utilize guest lecturers, and it has been estimated that one guest lecturer would be hired for every two conferences.

The Asian Institute of Technology expects the average "teaching" faculty member to devote a portion of his time to special programs as a part of the normal range of activities. The percentage of time available for special program work has been projected on a sliding scale. For the period from 1968-69 through 1971-72, this has been estimated at 5 per cent; for 1972-73 through 1975-76, at 7.5 per cent; and for 1976-77 through the end of the projection period, at 9 per cent of total time. The input of professional time to special programs could be realistically raised to 15 or even 20 per cent, depending on the emphasis AIT wishes to give these activities. The difference between the professorial needs of the projected special program and the time spent by the regular teaching faculty is the number of professorial personnel that must be hired to achieve the level of special programs desired by the Institute.

ADMINISTRATIVE AND SUPPORTING FACULTY NEEDS

To project the total faculty needs for the program and enrollment described, other faculty in administrative and supportive roles must be added.

At AIT, the Academic Dean, the Librarian and Research Associates are faculty members. For the entire projection period, the Academic Dean and Librarian are each included as 1.0 FTE faculty member. Research Associate

positions are projected on the basis of 1.0 FTE Research Associates for every 5.0 FTE professorial faculty member in both degree and special program activities.

The Option Chairmen are the heads of each area of study. It is assumed that the activities involved in this position require 0.25 FTE for each Option Chairman over and above the normal administrative demands on the average faculty member. Option Chairmen for new options are considered to begin their jobs the year that the new option is offered. Prior to that time, an Option Chairman could be appointed as part of the new program planning allowance discussed earlier.

As the number of engineering disciplines grows, a new administrative level of Department Chairmen may become necessary in the academic organization, between the Option Chairmen and the Academic Dean. A Department Chairman for civil engineering is programmed for appointment in 1971-72 while Department Chairmen in mechanical engineering, electrical engineering and Program X are scheduled for appointment in the same year that two options are offered in any one discipline. The Department Chairmen could also be appointed prior to this time as a part of the new program planning allowances. Each Department Chairman is considered to devote 0.5 FTE to this administrative role.

As the academic program grows, two other faculty level administrators are scheduled to be added. A Director of Student Affairs is added as 1.0 FTE in 1971-72, to assist the Academic Dean in coordinating the academic and nonacademic activities and welfare of degree candidates. With the special program activity desired by the AIT administration, a Director of Special Programs (1.0 FTE) will have to be added to the Academic Dean's office in 1975-76, to coordinate the special programs and provide professional assistance to Professors.

E - ORGANIZATION AND ADMINISTRATIVE STAFFING

In projecting administrative staffing needs, individual situations have been given more consideration than applying precise formulae or ratios. Meetings were held with the principal administrative officers of AIT to discuss detailed future needs in their areas in terms of program, student and faculty growth, as developed in the plan. Local conditions of employment, the state of technology and mechanization, and assessed levels of performance have been used as standards against which future needs can be estimated.

To discuss the criteria used in projecting nonacademic staff needs, this section is divided into six parts: top administration, academic administration, finance and business organization, development organization, new units, and special programs administration.

TOP ADMINISTRATION

The top administration consists of the office of the President, including the planning function. Staffing needs, based on the anticipated future workload, were discussed with the incumbent President and the Director of Planning.

ACADEMIC ADMINISTRATION

The academic organization includes the library, the Registrar's office and special program administration, as well as responsibility for assigning Laboratory Technicians and faculty secretaries. Future needs were discussed in detail with the incumbent Academic Dean, the Librarian and the Registrar.

As mentioned in the faculty section, in 1971-72 the Academic Dean will need the assistance of a Director of Student Affairs. Appropriate secretarial support will be needed for this position.

A number of factors were used in determining library staff needs for the academic program, including the acquisitions program, the number of hours open per week, and the number of students to be served. The acquisitions staff is based primarily on the acquisition program, which ranges from 2,100 to 2,500 volumes per year but will increase to 4,400 to 5,800 volumes per year after the move to the new campus. The library administration,

circulation and reference staffs depend on the number of students and the number of hours the library should open (estimated to be 84 hours per week).

The staffing in the Registrar's office is based on the estimated number of applications and enrollments in the degree program. The Registrar's office would also handle the registration and records for the special programs, and provisions are made on the basis of the number of programs and the number of participants.

Laboratory Technicians and apprentice technicians, as a group, are projected so that approximately one is available for every three FTE faculty members. Faculty secretaries are assigned approximately one for every seven FTE faculty members.

FINANCE AND BUSINESS ORGANIZATION

The finance and business organization is considered to include the functions of accounting, purchasing, personnel, computer operations, and maintenance and operations. Discussions were held with the Acting Business Manager, the Administrative Assistant and the Shop Superintendent.

Accounting and purchasing are projected on the growth of the Institution and estimates of the volume of funds handled by these functions. The personnel area is projected on the estimates of the numbers of nonacadamic staff members and on an estimated balance between direct hire and seconded faculty numbers.

The computer operations would assist both the business and academic functions of the Institute. The computer would be used for payrolls, general accounting, accounts payable, accounts receivable, student records, personnel records and fund-raising records, as well as for solving academic problems. To perform these functions, a staff of programmers and machine operators is projected primarily on the size of the Institute, funds processed and number of research students.

The maintenance and operations staff is projected on a number of bases. The craftsmen and workers are based on the size of the Institution, particularly on the number of students and faculty engaged in research; the tradesmen and workers are based on the size of plant to be maintained. Watchmen are assigned on the basis of the size of the campus; custodians, on the square footage of buildings; groundsmen, on the number of acres of grounds. Drivers

and mechanics for the motor pool are determined by the number of vehicles needed, which in turn is estimated on the basis of the transportation that must be provided by the Institute.

DEVELOPMENT ORGANIZATION

Development includes fund raising, protocol, customs and immigration coordination, public relations and publications activities. Nonacademic staff projections are based on the anticipated volume of activity in each of these areas.

NEW UNITS

The move to the new campus will necessitate the addition of several new areas of staff support. The student services building would contain a bookstore, post office, infirmary, dining facilities and guest accommodations. There would also be faculty housing, student housing, and water and sewerage treatment plants. Staff for all of these new units have been developed on the basis of activity volume and work patterns in the local employment market.

SPECIAL PROGRAMS ADMINISTRATION

The nonacademic staff needs have been projected by individual program as noted earlier in this chapter. Any reductions or deletions in activities would result in corresponding reductions or deletions in staff.

If the special programs activity grows as anticipated, a Director of Special Programs would be needed at the faculty level by 1975-76. This position would require appropriate secretarial support.

Nonacademic support is planned as needed for each special program type. Secretarial and laboratory assistants for additional Professors are scheduled, using the same criteria discussed under the academic programs. The special publications program needs are based on estimated volume of activity. Staff for the special regional library are based primarily on the acquisitions program and reference needs. Staffs for additional transportation and housing needs for special programs have also been considered, based on the volume of activity and local employment conditions.

F - FACTORS INFLUENCING EQUIPMENT AND COMPENSATION COSTS

A number of factors were considered in determining costs for equipment and compensation.

FURNISHING AND EQUIPMENT COSTS

The furnishing and equipment cost factors for the new campus facility were developed from the present inventory valuations of administrative, classroom, laboratory and shop facilities and from accepted standard for student housing hotel and food service facilities. Although much of this equipment may not be replaceable at book value, it is felt that the high density of equipment in the present facilities compensates for this when the standards are applied to the new space. Since the Institute and its Department Chairmen would determine the specific options and equipment requirements at a future date, it is not practical, at this time, to develop detailed tables of equipment. The factors used in the capital cost projection for equipment and furnishings are shown below:

		Furniture And Equipment		
Functional Area	Present Space(NSF)	Present Value	Value Per NSF	Cost Factor Per NSF
Administrative area, offices and library	14,180	$ 45,823	$ 3.23	$ 3.20
Class and research laboratories	19,460	246,458	12.66	12.70
Classrooms	5,090	13,060	2.56	2.60
Shop and instrument section	2,660	23,376	8.79	12.70
Food service area	-	-	-	4.00
Student housing	-	-	-	1.00
Temporary housing	-	-	-	1.67
Multipurpose and miscellaneous space	-	-	-	2.00
Auxiliary and miscellaneous equipment	48,000	36,796	0.77	0.12

The factor used for the shop and instrument section was increased to $12.70 per net square foot, because the present value of $8.79 was not considered adequate. The auxiliary and miscellaneous equipment factor was reduced, because air conditioners represent the major investment in the current figure. Necessary air conditioning is included in new building costs.

COMPENSATION

Faculty Salary And Perquisite Plan

In order to achieve the objectives of growth and high-quality education in the engineering discipline, AIT must attract and retain highly qualified professional educators in these areas. This means that the Institute must be not only competitive in facilities and research opportunity, but also in its compensation program. The level of compensation that is necessary has, in a sense, largely been set for AIT by other established organizations buying similar talent both in the region and in other parts of the world. Compensation scales for many of these organizations are reviewed below.

Competitive Compensation Levels

Estimates of the salaries and annual allowances offered by selected organizations and countries are shown in Exhibit VI-3, on the following page. These estimates represent the compensation that would accrue to individuals either working directly for these organizations or seconded by his home country to the organization in the Bangkok area. Compensation ranges from a high level paid to personnel seconded by the United States to a low represented by the salary scales of Thailand and some other Asian universities.

All estimates are based on pretax amounts. The figures shown for the United States were developed from average salary scales paid by many major United States institutions, as reported by the American Association of University Professors. Allowances include a post differential estimated at 10 per cent of base salary and a quarters allowance of $3,500.

The UNESCO schedule follows the scale set forth in the 1966 staff regulations of the United Nations. Allowances include both an assignment allowance of $1,400 paid to personnel who are in a foreign country for a period of less than five years and a dependency allowance of $1,000 for three dependents. Post adjustments are not included.

Salary and quarters allowances for SEATO are based on the revised schedule (July 1967) included in the SEATO staff regulations. Estimated compensation for educators seconded by the United Kingdom and Australia was

ESTIMATED GROSS SALARIES AND ALLOWANCES GRANTED TO EDUCATORS BY SELECTED ORGANIZATIONS AND COUNTRIES

Organization Or Country	Annual Gross Salary Minimum	Annual Gross Salary Maximum	Annual Allowances
Professor			
United States	$18,300		$5,500
UNESCO	$13,900	$18,600	2,400
SEATO	10,800	12,800	4,500
United Kingdom	8,600	12,000	7,700
Australia	9,900	10,900	7,100
University of Hong Kong	9,300	13,300	-
University of Malaya	6,900	8,300	1,600
Thai Civil Service	-	5,200	-
East Pakistan University	3,800	5,000	-
Associate Professor			
United States	12,900		4,900
UNESCO	11,300	15,600	2,200
SEATO	9,800	11,200	3,800
United Kingdom	6,500	8,200	7,700
Australia	7,500	8,800	6,400
University of Hong Kong	7,600	9,000	-
University of Malaya	-	n.a.	-
Thai Civil Service	2,900	4,200	-
East Pakistan University	2,500	4,400	-
Assistant Professor			
United States	10,300		4,600
UNESCO	7,100	12,200	2,200
SEATO	7,600	9,200	3,800
United Kingdom	3,500	6,400	4,100
Australia	5,400	7,300	3,500
University of Hong Kong	5,900	7,900	-
University of Malaya	3,600	5,600	1,600
Thai Civil Service	2,600	2,900	-
East Pakistan University	2,100	3,800	-
Instructor			
United States	8,200		4,000
UNESCO	6,900	9,400	2,000
SEATO	6,300	7,600	3,200
United Kingdom	2,600	3,200	n.a.
Australia	-	n.a.	-
University of Hong Kong	3,300	4,000	-
University Of Malaya	3,100	3,400	1,200
Thai Civil Service	700	2,200	-
East Pakistan University	1,300	2,900	-

n.a. - not available.

developed after discussions with faculty members from these countries. Information from the Universities of Hong Kong, Malaya, East Pakistan and the Thai Civil Service was gained through contacts with these organizations by members of the AIT staff.

The compensation scales shown in Exhibit VI-3 clearly indicate a wide difference between the Western countries and the organizations that draw heavily on them for staff on the one hand and the national Asian institutions on the other. The University of Hong Kong, a more regional type of institution, stands between the two extremes.

Proposed Level Of Compensation

After a review of the information secured for the development of Exhibit VI-3 and careful consideration of other competitive aspects such as the universally strong demand for technical personnel, and the objectives of AIT, it was determined that the Institute should offer a compensation plan that would be competitive with the Western and regional scales. Further, it was determined that, in order for the recently established Institute to secure the high-quality educational and administrative personnel required to accomplish its ambitious plans, it must offer a compenstion plan equivalent to the higher end of this scale. To accomplish this and to reduce to a minimum the executive time required to administer such a plan, it is recommended that the Institute adopt a program similar to the one offered by UNESCO. Such a schedule is shown in Exhibit VI-4, on the following page. Shown are both the UNESCO compensation levels and the proposed AIT salary grades, which have been equated to them. The assignment allowance is similar to the scheduled outlined in UNESCO Rule 203.11. Rather than granting a dependency allowance, it is proposed that the Institute offer a housing allowance, which follows UNESCO Regulation 3.4. This allowance would then be used to partially offset the rental paid by faculty for their housing on the new campus. Houses will be provided for the President and the Vice President, so no housing allowance is recommended. In addition to salaries and allowances, the program should include the following:

- Annual leave - two days per month, accumulated to a maximum of 40 days

- Home leave - each two years, chargeable to accumulated annual leave

- Travel economy air fare for spouse and children under 21 years of age, applicable only at the beginning and end of each two-year period

ASIAN INSTITUTE OF TECHNOLOGY

PROPOSED INTERNATIONAL COMPENSATION PLAN

AIT Grade	UNESCO Level	Title	Minimum	Base Salary Increments	Maximum	Assignment Allowance (UNESCO Rule 203.11)	Housing Allowance (UNESCO Reg. 3.4)
I	7	President	$24,050	3 at $650	$26,000	$1,400	None - house provided
II	6	Vice Presidents (or equivalent)	20,000	6 at $650	23,900	1,400	None - house provided
III	5	Department Chairmen (and honored professors)	17,400	9 at $500	21,900	1,400	$1,000(a)
IV	4	Professor	13,900	11 at $430	18,630	1,200	1,000(a)
V	3	Associate Professor	11,270	12 at $360	15,590	1,200	1,000(a)
VI	2	Assistant Professor	9,050	10 at $310	12,150	1,000	1,000(a)
VII	1	Research Associate	6,920	9 at $280	9,440	1,000	1,000(a)

(a)Estimated for wife and 2 children.

Annual Leave - 2 days per month, accumulated to a maximum of 40 days.
Home Leave - Each two years chargeable to accumulated annual leave.
Travel - Economy, air, spouse and children under 21, applicable only at beginning and end of each 2 years.
Retirement - AIT contribution to maximum of 10% annual base salary.
Shipping - Same as UNESCO Rule 207.20.
Education - Same as UNESCO Rule 103.20.

EXHIBIT VI-4

- Retirement - AIT contributing to a maximum of 10 per cent of annual base salary

- Shipping - same as UNESCO Rule 207.20, which allows excess baggage up to 44 pounds for flights and shipment of personal and household effects by land and/or sea up to a maximum of 660 pounds for the first dependent and 220 for each additional dependent, up to a maximum of 1,980 pounds.

- Education - same as UNESCO Rule 103, allows a grant of up to $700 per year for each dependent 21 years old or under.

The proposed international salary scale would apply not only to the academic staff, but also to certain key administrators.

The following positions in the proposed organization would be covered by this plan:

Salary Grade	Position Title
I	President
II	Academic Dean Vice President
III	Department Chairman Honored Professor
IV	Dean of Students Professor Medical Officer Development Officer Manager of Computer Center
V	Associate Professor Librarian Director of Planning
VI	Assistant Professor Public Relations Officer Director of Maintenance and Operations
VII	Shop Superintendent Trade Superintendent
VIII	Research Associate

Salary Scale Used In Projections

In its July 1968 meeting, the Board of Trustees of AIT reviewed the consultants' proposed salary plan and agreed, in concept, with the basic rationale involved. However, it did not feel that AIT could implement the specific proposal. The Board thus adopted a compensation scale that was somewhat lower than that proposed by the consultants. While the adopted plan was not felt to be adequate to place AIT in a truly competitive position with regard to several international organizations competing in the same, or a similar, employment market, the plan was an initial step towards such a position. The adopted plan is thus endorsed by the consultants and is used in subsequent projections of this report.

The adopted scale is presented in greater detail in following chapters dealing with cost projections.

Other Staffing Cost Guides

The cost guides used in projecting local hire compensation expense later in this report follow the proposed scale presented to the Board of Trustees in January 1968. The annual cost for each employee in each salary grade is listed below. It is based on an average wage for the grade plus an 8.33 per cent retirement benefit.

Salary Grade	Average Annual Salary	Retirement Benefit	Total
8	$5,802	$483	$6,285
7	3,689	307	3,996
6	2,150	179	2,329
5	1,510	126	1,636
4	1,016	85	1,101
3	726	60	786
2	624	52	676
2A	749	62	811
1	391	32	423
1A	470	39	509

The positions which are included in each salary grade are as shown on Exhibit VI-5, on the following page.

ASIAN INSTITUTE OF TECHNOLOGY

PROPOSED POSITION TITLES AND SALARY GRADES

Salary Grade	Position Title
8	Chief Accountant
	Director of Personnel Services
	Building Manager - Student Services
	Protocol Officer
	Editor
	Registrar
7	Administrative Secretary
	Assistant Accountant
	Bookstore Manager
	Registered Nurse
	Food Service Manager
	Publications Officer
	Assistant Librarian
6	Expediter
	Purchasing Agent
	Shop Foreman
	Assistant Librarian
	Laboratory Technician
	Secretary
	Assistant Registrar
	Draftsman III
5	Library Assistant
	Shorthand Typist
	Accountant Assistant
	Draftsman II
4	Craftsman II
	Senior Clerk
	Typist
	Receptionist - Telephone Operator
	Storekeeper - Receiving Clerk
	Draftsman I

Salary Grade	Position Title
3	Laboratory Technician II Craftsman I Junior Clerk
2	Laboratory Technician I Apprentice Craftsman II Janitor Foreman Assistant Shop Storekeeper
2A	Driver
1	Laborer Apprentice Technician Apprentice Craftsman I Watchman
1A	Janitor Gardener

VII - PROPOSED PLAN FOR GROWTH AND DEVELOPMENT OF AIT

VII - PROPOSED PLAN FOR GROWTH AND DEVELOPMENT OF AIT

This chapter presents a plan for the growth and development of the Asian Institute of Technology in terms of programs, student enrollments, faculty, and organization for administration through academic year 1977-78 and space planning. The criteria underlying the growth plan were presented earlier in this report. Supporting data for the materials presented in this chapter are appended as noted.

A - PROGRAMS

The proposed growth of AIT is reviewed in terms of academic and special programs.

ACADEMIC PROGRAMS

The proposed growth plan recommends expansion, both horizontally and vertically. Horizontal expansion into other engineering or related disciplines is strongly urged. Such growth can begin only if a new campus is built according to the general specifications presented in Section E of this chapter. Programs at the master's level in mechanical engineering, electrical engineering and one other engineering or related area are planned shortly after the anticipated occupancy of a new campus in 1971. Each new discipline is scheduled to begin programs in two options, with a gradual growth in number of options offered. Civil engineering is assumed to remain stable at five options. The number of options offered are discussed only as a planning guide, and the increase or decrease in numbers of options should be decided by the faculty.

Vertical growth would mean the development of a doctoral program. A three-year program - including course work in the first year of study, a combination of course work and research in the second year, and research in the third year - is endorsed by the consultants. Doctoral level work in civil engineering is scheduled to begin in 1971-72. Doctoral study in the new disciplines is scheduled to begin after four complete years of master's level offerings; faculty stability is also strongly recommended for the new disciplines - i.e., no doctoral study should be offered in a discipline until faculty turnover in that discipline has stabilized at 25 per cent per year or less.

Exhibit VII-1, on the following page, summarizes the growth in academic programs by option for each year. The number of options for master's degree level of study is also indicated, while at the doctoral level, it is assumed that programs of study will be tailored to student interest without the need for rigid option lines. Doctoral degree level study in Program X may be scheduled for 1978-79 if the choice of program warrants study at that level and if the other criteria for doctoral study have been met.

A delay in campus occupancy to 1972 should not change this schedule. However, the problems resulting from the introduction of the doctoral program in civil engineering and the introduction of a new master's program in mechanical engineering will be compounded by the inevitable adjustment to new facilities. Although this creates an undesirable situation, the problems are not insurmountable and careful planning will minimize disruptions. If campus occupancy is delayed beyond 1972, the schedule as presented should be scrapped and a new one developed based on the revised occupancy date. Any reduction in facilities or in the year of availability of specific facilities or faculty will necessitate a reevaluation of this proposed program development plan.

SPECIAL PROGRAMS

The special programs based on the initial criteria presented in Exhibit VII-2, on the second following page, are not endorsed by the consultants. The consultants' analysis indicated that there is not sufficient information available in the region to support this level of interest and acceptance of the special programs combination. The volume of special programs activity, as indicated in Exhibit VII-2, involves the addition of a sizable number of professorial faculty members, other faculty members, and nonacademic support, as well as more space. The consultants feel that AIT should begin its special programs activity within the resources available from the degree programs. After several years of operation, the demand for, and acceptance of, the components of the special programs package can be more easily ascertained and the combination adjusted for the future.

In planning the staffing of the special programs with professorial faculty members, certain criteria were used. It was estimated that a percentage of each Professor's time was to be devoted to special program activity in a slightly ever-increasing proportion through the projection period. This pool of faculty time available for special programs activity was allocated to each special program on the basis of the FTE participants served. The professorial time available for each special program was used to determine the number of programs that can be offered, as shown in Exhibit VII-3, on the third following page.

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PROPOSED ACADEMIC PROGRAM DEVELOPMENT, BY OPTION
1968-69 Through 1977-78

Option And Degree Level	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Civil Engineering										
Master's	5	5	5	5	5	5	5	5	5	5
Doctoral	-	-	-	X	X	X	X	X	X	X
Mechanical Engineering										
Master's	-	-	-	-	2	2	3	3	3	4
Doctoral	-	-	-	-	-	-	-	-	X	X
Electrical Engineering										
Master's	-	-	-	-	-	2	2	3	3	3
Doctoral	-	-	-	-	-	-	-	-	-	X
Program X										
Master's	-	-	-	-	-	-	2	2	3	3
Doctoral	-	-	-	-	-	-	-	-	-	-

EXHIBIT VII-1

ASIAN INSTITUTE OF TECHNOLOGY

PROPOSED SPECIAL PROGRAM DEVELOPMENT, BY PROGRAM
1968-69 Through 1977-78

Program	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Conferences	3	5	6	7	8	11	14	17	20	24
Institutes	1	2	3	4	5	6	8	11	13	14
Diploma Programs	-	-	1	1	1	2	3	4	4	4
Faculty Study Leaves	-	1	2	3	4	6	8	11	13	14
Special Publications	-	X	X	X	X	X	X	X	X	X
Regional Library	-	-	-	X	X	X	X	X	X	X

EXHIBIT VII-2

ASIAN INSTITUTE OF TECHNOLOGY

REVISED SPECIAL PROGRAM DEVELOPMENT
1968-69 Through 1977-78

Program	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Conferences	1	2	2	2	2	3	3	3	4	5
Institutes	1	1	1	1	1	2	2	2	3	3
Diploma Programs	-	-	-	-	1	1	1	2	2	2

EXHIBIT VII-3

The number of conferences in the revised program projection ranges from one in 1968-69 to a total of five in 1977-78, a sizable reduction in the number of conferences offered, compared with special programs based on the initial criteria shown in Exhibit VII-2. A similar reduction occurs in the numbers of institutes, which range from one in 1968-69 to three by the end of the projection period. The revised projection for diploma programs shows the first offering delayed until 1972-73, with a total of two being offered by 1977-78.

It will be noted that the faculty study-leave program is not included on Exhibit VII-3. The consultants have several questions concerning the advisability of offering this program at the level suggested by the AIT administration. The cost of such a program would reach $178,000 by 1977-78. The primary concern, however, is that there appears to be no evidence of demand for such a program. A faculty study-leave program limited to professors from other universities engaging in research and exchange of information with AIT faculty would be too restricted if the program were reserved for persons holding a doctorate. The number of professors in southeastern Asia holding a doctorate in engineering is small. If the program were to include professors not having their doctorates, they might better be served by enrolling in the doctoral degree program or one of the diploma programs. For these reasons, the faculty study-leave program has been deleted from the special programs. If AIT finds an individual or individuals who may benefit from such a program, it may well be desirable to offer the opportunity to come to AIT for several months. However, they should participate in various AIT programs by presenting guest lectures at conferences, institutes or diploma program sessions.

The special publications program based on the initial criteria is endorsed by the consultants. The need for a professional engineering journal in southeastern Asia is apparent, and the cost of providing such a service is relatively small.

The regional library concept presents an unusual opportunity for AIT to provide a service to the region. With a present low investment in books, AIT is in the enviable position of being able to develop an innovative approach to information systems that may supplement or even outdate the need for books on shelves. The Institute should seek new information technologies for its library. Such approaches as satellite transmission with other libraries around the world and electronic information retrieval should be seriously considered. The emphasis should be not on acquisitions, but rather on exploiting established libraries and information centers around the world.

The consultants feel that, at this time, the demand for a regional library is not sufficient to warrant undertaking this program. Regional or specialty libraries have been successful in other parts of the world, but the demand for such a facility in southeastern Asia cannot be predicted on the basis of the current information available. Until the demand is greater, the consultants recommend that no additional resources be allocated for staff or for acquisitions beyond the degree programs library. The regular AIT library has been planned with sufficient staff, acquisitions and space to develop a quality library in the subjects now taught at AIT and for the programs and areas to be added during the projection period. The academic library can support the regional program in the early years, and perhaps even on a permanent basis. A periodic reevaluation of needs and use will indicate whether an expansion should be undertaken.

In the meantime, AIT should be developing plans for the regional use of its collection. A promotional campaign should be launched to acquaint the region with AIT's library and what is available, how the library may be used, the cost of using the facilities, grants in aid that might be available, etc. The Board of Trustees should approve the regional program and its guidelines.

B - STUDENT ENROLLMENTS

This section presents the proposed growth of student enrollments for the degree and special programs.

DEGREE PROGRAMS

The proposed growth in degree programs by discipline and level by year is presented in Exhibit VII-4, on the following page.

At the master's level in civil engineering, the number of first-year students fluctuates somewhat due to two constraints.

- The limitation of laboratory space on the present campus imposes a ceiling on the number of second-year students that can be adequately handled which, in turn, places a limit on the preceding year's first-year students.

- The arbitrary ceiling on total civil engineering candidates at 250 forces a reduction in the number of first-year master's candidates (and the total number of master's candidates) as a doctoral program grows. It will also be noted that the number of third-year students projected in the master's program is higher in 1968-69 than in future years despite an increase in the total number of students. Beginning in 1969-70, the AIT administration will strive to lower the number requiring additional time to within 5 to 10 per cent of the previous year's second-year total.

The doctoral level in civil engineering is scheduled to begin in 1971-72 with seven first-year candidates. By 1977-78, the doctoral program will have stabilized at just over 15 per cent of the total civil engineering candidates.

In 1972-73, the mechanical engineering discipline will begin a master's program, with 40 students in two options to be determined by the faculty. The program will grow to a total of 163 students by the end of the projection period. The doctoral program in mechanical engineering is scheduled to begin in 1976-77, after four complete years of master's level operation, with six first-year students.

The electrical engineering and Program X disciplines are scheduled to introduce master's level programs in 1973-74 and 1974-75, respectively. Their student enrollment levels will be identical to those projected for

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PROJECTED ENROLLMENTS IN DEGREE PROGRAMS
1968-69 Through 1977-78

	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Civil Engineering										
Master's										
New enrollees	110	104	124	130	128	129	124	121	121	121
Second year	55	79	78	89	94	92	93	89	87	87
Third year	10	4	4	4	5	5	5	4	4	4
Doctorate										
New enrollees				7	9	11	13	13	13	13
Second year					6	8	10	12	12	12
Third year						6	8	9	11	11
Fourth year							1	1	2	3
Subtotal	175	187	206	230	242	251	254	249	250	251
Mechanical Engineering										
Master's										
New enrollees					40	48	58	70	84	100
Second year						28	34	42	50	60
Third year							1	2	2	3
Doctorate										
New enrollees									6	8
Second year										6
Third year										
Fourth year										
Subtotal					40	76	93	114	142	177
Electrical Engineering										
Master's										
New enrollees						40	48	58	70	84
Second year							28	34	42	50
Third year		CURRENT CAMPUS			NEW CAMPUS			1	2	2
Doctorate										
New enrollees										6
Second year										
Third year										
Fourth year										
Subtotal						40	76	93	114	142
Program X										
Master's										
New enrollees							40	48	58	70
Second year								28	34	42
Third year									1	2
Subtotal							40	76	93	114
Total										
Civil Engineering	175	187	206	230	242	251	254	249	250	251
Mechanical Engineering					40	76	93	114	142	177
Electrical Engineering						40	76	93	114	142
Program X							40	76	93	114
Grand Total	175	187	206	230	282	367	463	532	599	684

mechanical engineering. The doctoral program for electrical engineering is planned for introduction in 1977-78 at the same level as mechanical engineering. The doctoral program for Program X may be considered for introduction after the projection period in 1978-79.

The student enrollment projections assume occupancy of the new campus in 1971. If occupancy is delayed until 1972, the growth plan will still be possible, although some crowding will be evident on the old campus in the last year and some additional problems of adjustment will be encountered on the new campus with the concurrent introduction of a new engineering program. A delay in occupancy beyond the beginning of academic year 1971-72 or delays in construction of specific facilities will necessitate a revision of this growth schedule.

Total student enrollments will increase during the projection period from 175 students to 684 students, a 390 per cent increase. In 1977-78, the student body will consist of 625 master's candidates and 59 doctoral candidates. The number of doctoral candidates will grow significantly beyond the projection period as these programs reach maturity. Exhibit VII-5, on the following page, presents both historical and projected growth. Once the new campus is occupied, the rate of growth will accelerate.

Exhibit VII-6, on the second following page, continues the trend line beyond 1977, applying the same growth criteria to the maximum student enrollment size of 2,000 set by the Board of Trustees in July 1968. If enrollment growth continues on the same basis beyond 1977, a steep rise results and the 2,000 student limit is reached by 1985. This is a difficult trend to follow if a maximum of 2,000 students is desired. It points up a need that cannot be overemphasized - the need for an annual reevaluation of the objectives of AIT, the experiences to date, and the application of latest information to the future. It is strongly recommended that the Board of Trustees require the administration to present a reevaluated growth projection each year, to ensure that AIT is following a logical plan of growth that is consistent with the latest information.

SPECIAL PROGRAMS

Student enrollments in degree programs are assumed to be those of full-time students for an entire academic year. In special programs, the participants may not be full time for an academic year. For planning purposes, it is useful to translate the number of participants into full-time-equivalent participants. These calculations are based on criteria developed earlier

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ENROLLMENT GROWTH IN DEGREE PROGRAMS

1959–60 THROUGH 1977–78

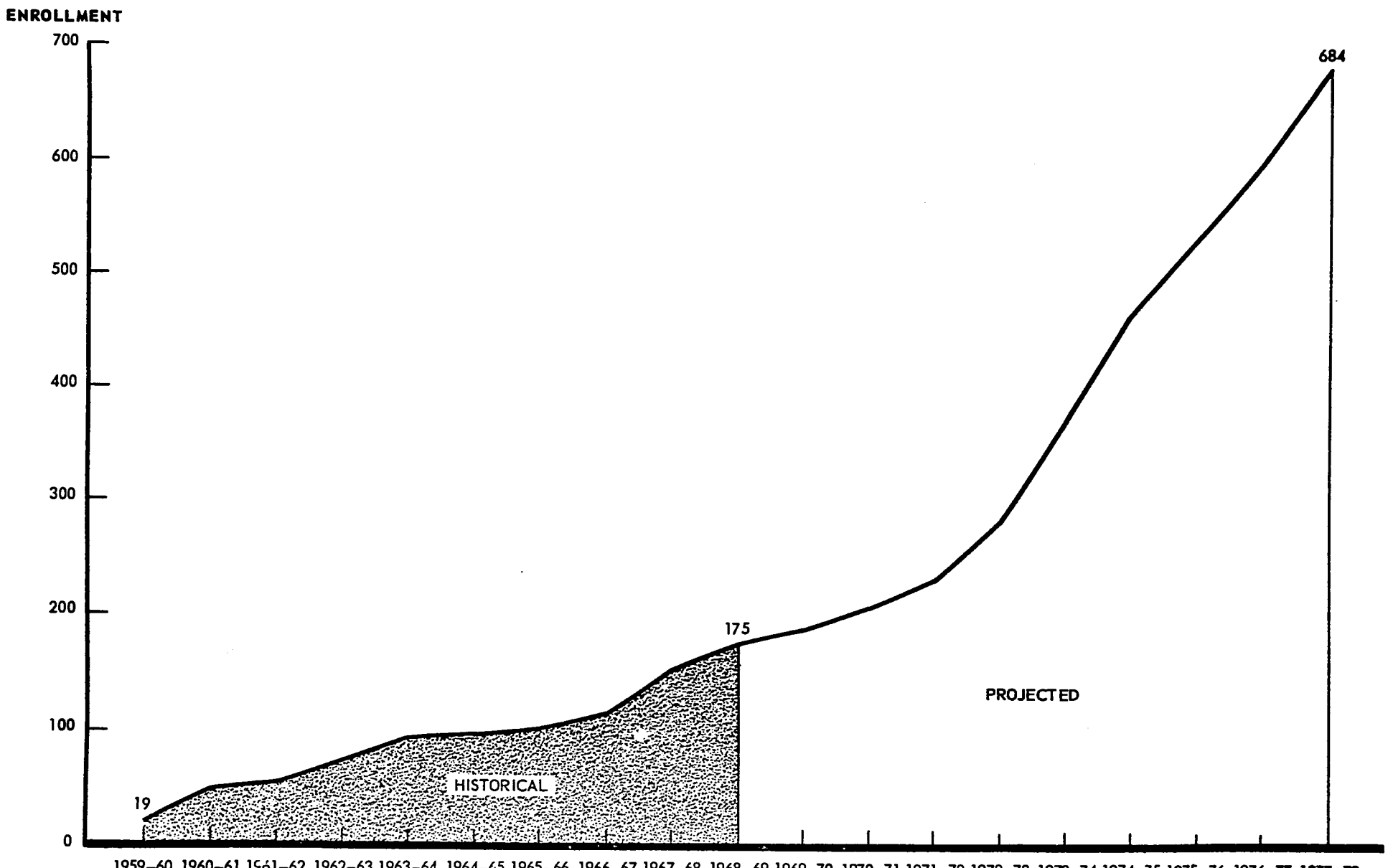

EXHIBIT VII.5

ASIAN INSTITUTE OF TECHNOLOGY

PROJECTED ENROLLMENT GROWTH IN DEGREE PROGRAMS BEYOND 1977

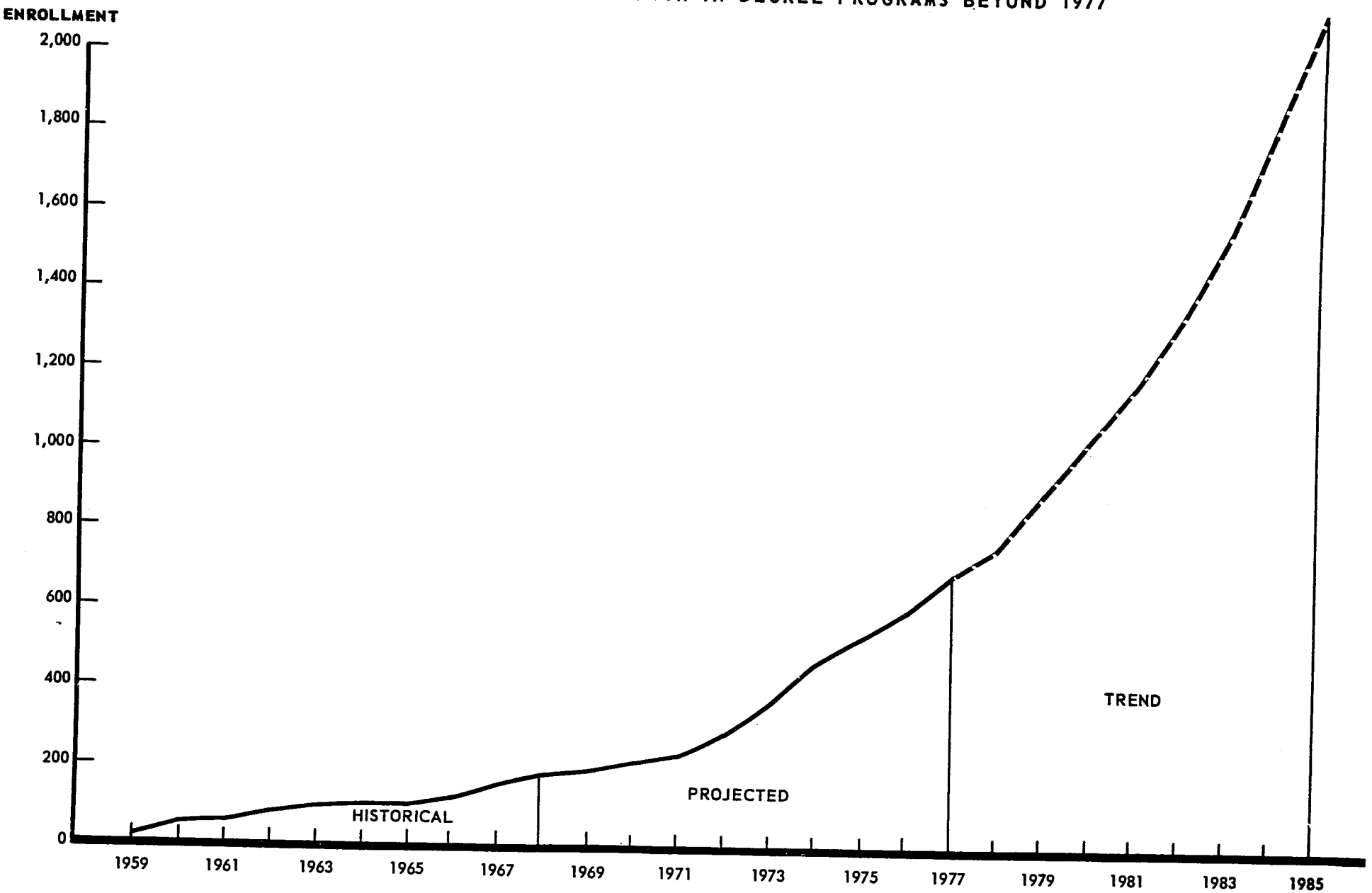

EXHIBIT VII-6

in this report. Exhibit VII-7, on the following page, presents the number of participants and the number of FTE participants, by program and by year, for the level of special program activity based on initial criteria.

The number of persons attending the projected conferences is large, but the short duration of each conference significantly reduces the number of full-time equivalents. The participants in institutes and diploma programs, although fewer in number, add significantly to the FTE numbers. In 1977-78, the plan, based on initial criteria, would be to enroll 2,914 participants, representing 184 FTE participants in special program activities.

In the previous section on programs, it was recommended that AIT limit its special program activity to the number of programs that can be handled by the regular teaching faculty without the hiring of additional faculty. A projection of participants, by number and full-time equivalents, for the revised level of activity is presented in Exhibit VII-8, on the second following page. The total number of participants is reduced to 630, and the full-time equivalents reach 59.25 in 1977-78. This level of special program activity involves no additional resource input beyond the needs of the regular degree programs. Although the diploma programs in 1977 enroll the fewest number of participants, the program is dominant in terms of FTE participants.

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PROJECTED ENROLLMENTS IN SPECIAL PROGRAMS
1968-69 Through 1977-78

	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Numbers										
Conferences	300	500	600	700	800	1,100	1,400	1,700	2,000	2,400
Institutes	30	60	90	120	150	180	240	330	390	420
Diploma programs	-	-	20	20	20	40	60	80	80	80
Faculty study leaves	-	1	2	3	4	6	8	11	13	14
Total	330	560	712	843	974	1,326	1,708	2,121	2,483	2,914
Full-Time Equivalents										
Conferences	7.50	12.50	15.00	17.50	20.00	27.50	35.00	42.50	50.00	60.00
Institutes	2.25	4.50	6.75	9.00	11.25	13.50	18.00	24.75	29.25	31.50
Diploma programs	-	-	20.00	20.00	20.00	40.00	60.00	80.00	80.00	80.00
Faculty study leaves	-	0.90	1.80	2.70	3.60	5.40	7.20	9.90	11.70	12.60
Total	9.75	17.90	43.55	49.20	54.85	86.40	120.20	157.15	170.95	184.10

EXHIBIT VII-7

ASIAN INSTITUTE OF TECHNOLOGY

REVISED PROJECTED ENROLLMENTS IN SPECIAL PROGRAMS
1968-69 Through 1977-78

	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Numbers										
Conferences	100	200	200	200	200	300	300	300	400	500
Institutes	30	30	30	30	30	60	60	60	90	90
Diploma programs	-	-	-	-	20	20	20	40	40	40
Total	130	230	230	230	250	380	380	400	530	630
Full-Time Equivalents										
Conferences	2.50	5.00	5.00	5.00	5.00	7.50	7.50	7.50	10.00	12.50
Institutes	2.25	2.25	2.25	2.25	2.25	4.50	4.50	4.50	6.75	6.75
Diploma programs	-	-	-	-	20.00	20.00	20.00	40.00	40.00	40.00
Total	4.75	7.25	7.25	7.25	27.25	32.00	32.00	52.00	56.75	59.25

EXHIBIT VII-8

C - FACULTY

The projected faculty needs for the level of programs and enrollments discussed previously are presented for both academic and special programs.

ACADEMIC PROGRAMS

Professorial needs are projected on the application of student-faculty ratios to the student enrollments presented in the previous section. The ratios used (explained in detail in Chapter IV) in this projection are:

Program	Student-Faculty Ratio (FTE)
Master's Level	
First year	10:1
Second and subsequent years	6:1
Doctoral Level	
First year	8:1
Second year	6:1
Third and subsequent years	5:1

The number of FTE faculty members for each discipline, by level and year of study, was calculated and is presented in Appendix F. A summary of the total needs for each discipline rounded to the next whole number appears below:

Program	Number Of FTE Professors									
	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Civil engineering	22	25	26	30	32	33	34	34	34	34
Mechanical engineering	-	-	-	-	4	10	12	15	18	23
Electrical engineering	-	-	-	-	-	4	10	12	15	18
Program X	-	-	-	-	-	-	4	10	12	15
Total	22	25	26	30	36	47	60	71	79	90

These figures refer only to the number of instructional faculty members. To this number must be added the extra professorial time needed for nonteaching activities within the discipline structure. Included here are Option Chairmen, Department Chairmen and professorial time for the development of new

disciplines and programs. As a planning guide, the consultants recommend that AIT attempt to reach a teaching mix that will approximate 45 per cent Assistant Professors, 30 per cent Associate Professors and 25 per cent Professors. Exhibit VII-9, on the following page, shows total professorial needs, by rank, for each discipline. Option Chairmen, Departmental Chairmen and program developers have been assumed to be at the Professor level. Also included in the exhibit are the nonteaching faculty members and the total faculty needs for AIT through 1977-78.

The civil engineering professorial needs reach a stable level in 1974-75, with preset enrollment of 250 students. For intensive planning, professorial needs in the three new disciplines predate the introduction of master's programs by two years. Planning time for doctoral programs are provided for all disciplines prior to introduction. The total professorial needs increase from 23.25 in 1968-69 to 96.75 in 1977-78

Additional faculty include the Academic Dean, Librarian, a new Director of Student Affairs and Research Associates. The total size of the faculty increases from 30 in 1968-69 to 120 in 1977-78.

SPECIAL PROGRAMS

Professorial time is a necessary input in three of the special programs: conferences, institutes, and diploma programs. The professorial and other faculty needs including Research Associate support, by year and by program, are presented in Exhibit VII-10, on the following page, for the level of activity desired by the AIT administration. This level of activity calls for 2 FTE Professors in 1968-69, increasing to 25 in 1977-78. The total faculty needs, including a Director of Special Programs to be added in 1975-76, increases from 2.4 to 33.9 FTE during the projection period.

Not all of these faculty members represent additional hires, however, since each Professor in the regular academic program is expected by the administration to devote a portion of his time to special program activity. This percentage increases from 5 per cent in the initial years to 9 per cent by the end of the projection period. On this basis, the following professorial full-time equivalents will be available for special programs activity:

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PROPOSED FACULTY NEEDS BY RANK
1968-69 Through 1977-78

	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Civil Engineering										
Professor	6.75	7.50	8.75	9.25	9.75	10.00	10.25	10.25	10.25	10.25
Associate Professor	6.60	7.50	7.80	9.00	9.60	9.90	10.20	10.20	10.20	10.20
Assistant Professor	9.90	11.25	11.70	13.50	14.40	14.85	15.30	15.30	15.30	15.30
Subtotal	23.25	26.25	28.25	31.75	33.75	34.75	35.75	35.75	35.75	35.75
Mechanical Engineering										
Professor			1.00	1.00	2.00	3.50	4.25	6.00	5.75	7.25
Associate Professor			-	1.00	1.20	3.00	3.60	4.50	5.40	6.90
Assistant Professor			-	-	1.80	4.50	5.40	6.75	8.10	10.35
Subtotal			1.00	2.00	5.00	11.00	13.25	17.25	19.25	24.50
Electrical Engineering										
Professor				1.00	1.00	2.00	3.50	4.25	6.00	5.75
Associate Professor				-	1.00	1.20	3.00	3.60	4.50	5.40
Assistant Professor				-	-	1.80	4.50	5.40	6.75	8.10
Subtotal				1.00	2.00	5.00	11.00	13.25	17.25	19.25
Program X										
Professor					1.00	1.00	2.00	3.50	4.25	6.00
Associate Professor					-	1.00	1.20	3.00	3.60	4.50
Assistant Professor					-	-	1.80	4.50	5.40	6.75
Subtotal					1.00	2.00	5.00	11.00	13.25	17.25
Total	23.25	26.25	29.25	34.75	41.75	52.75	65.00	77.25	85.50	96.75
Other										
Academic Dean	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Librarian	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Director of Student Affairs	-	-	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Research Associates	5.00	6.00	6.00	7.00	9.00	11.00	13.00	16.00	17.00	20.00
Total	7.00	8.00	8.00	10.00	12.00	14.00	16.00	19.00	20.00	23.00
Grand Total	30.25	34.25	37.25	44.75	53.75	66.75	81.00	96.25	105.50	119.75

EXHIBIT VII-9

ASIAN INSTITUTE OF TECHNOLOGY

PROJECTED FACULTY NEEDS, BY SPECIAL PROGRAM
1968-69 Through 1977-78

	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Conferences										
Professors	1.5	2.5	3.0	3.5	4.0	5.5	7.0	8.5	10.0	12.0
Research Associates	0.3	0.5	0.6	0.7	0.8	1.1	1.4	1.8	2.1	2.5
Director of Special Programs	-	-	-	-	-	-	-	0.5	0.5	0.5
Total	1.8	3.0	3.6	4.2	4.8	6.6	8.4	10.8	12.6	15.0
Institutes										
Professors	0.5	1.0	1.5	2.0	2.5	3.0	4.0	5.5	6.5	7.0
Research Associates	0.1	0.2	0.3	0.4	0.5	0.6	0.8	1.1	1.3	1.4
Director of Special Programs	-	-	-	-	-	-	-	0.5	0.5	0.5
Total	0.6	1.2	1.8	2.4	3.0	3.6	4.8	7.1	8.3	8.9
Diploma Programs										
Professors	-	-	1.5	1.5	1.5	3.0	4.5	6.0	6.0	6.0
Research Associates	-	-	0.3	0.3	0.3	0.6	0.9	1.2	1.2	1.2
Total	-	-	1.8	1.8	1.8	3.6	5.4	7.2	7.2	7.2
Faculty Study-Leaves - Research Associates	-	0.2	0.4	0.6	0.8	1.2	1.6	2.2	2.6	2.8
Summary										
Professors	2.0	3.5	6.0	7.0	8.0	11.5	15.5	20.0	22.5	25.0
Research Associates	0.4	0.9	1.6	2.0	2.4	3.5	4.7	6.3	7.2	7.9
Director of Special Programs	-	-	-	-	-	-	-	1.0	1.0	1.0
Total	2.4	4.4	7.6	9.0	10.4	15.0	20.2	27.3	30.7	33.9

EXHIBIT VII-10

Year	Professorial Full-Time Equivalents Available
1968-69	1.1
1969-70	1.3
1970-71	1.4
1971-72	1.7
1972-73	3.1
1973-74	3.9
1974-75	4.8
1975-76	5.7
1976-77	6.8
1977-78	7.7

The number of full-time equivalents available from the regular teaching staff is not sufficient to carry out the level of activity, based on the initial criteria. To determine additional professorial needs by program, inputs of academic program Professors first had to be allocated among the programs (only the conference, institutes and diploma programs require professorial input). The basis for the allocation used is the number of FTE participant enrollments in each program, since this one measure seems to indicate the relative levels of value placed on the three programs. The available professorial time is allocated to the three programs according to a year-by-year proportion of FTE participants in each program. Exhibit VII-11, on the following page, presents the results.

The FTE instructional faculty members that must be hired in order to complete the special programs staffing range from 0.9 FTE Professor and 0.1 FTE Research Associate in 1968-69 to 17.3 Professors, 6.4 Research Associates and 1.0 Director of Special Programs in 1977-78, an 18 per cent increase over the number of Professors needed for the degree program.

The consultants feel that a commitment of this proportion is unwarranted at this time. There is little, if any, evidence of the demand for programs at this level. The consultants also feel that the development of a strong academic program in the early years on the new campus should not be jeopardized by diverting effort to large programs of continuing education. It is recommended that AIT limit special programs activity to the level that can be carried out by the regular academic staff. If at some later time there is sufficient information available to justify a continued demand at a higher level of activity, the Board might wish to authorize changes. The special programs at the activity level recommended by the consultants in the two previous sections will not require any additional Professors, Research Associates or a Director of Special Programs.

ASIAN INSTITUTE OF TECHNOLOGY

ALLOCATION OF ACADEMIC PROFESSORIAL TIME TO SPECIAL PROGRAMS
1968-69 Through 1977-78

	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Conferences	0.8	1.0	0.5	0.7	1.2	1.3	1.5	1.6	2.1	2.7
Institutes	0.3	0.3	0.2	0.3	0.7	0.7	0.8	1.0	1.3	1.5
Diploma Programs	-	-	0.7	0.7	1.2	1.9	2.5	3.1	3.4	3.5
Total	1.1	1.3	1.4	1.7	3.1	3.9	4.8	5.7	6.8	7.7

EXHIBIT VII-11

D - ORGANIZATION FOR ADMINISTRATION

This chapter discusses recommendations regarding the role, functions and relationships of the Board of Trustees, the proposed administrative staff, and the proposed administrative organization.

BOARD OF TRUSTEES

The Board of Trustees of the Asian Institute of Technology has met twice since AIT formally came into existence. At the first meeting in January 1968, the charter and bylaws (discussed in Chapter III, Section D), which describe the role, functions and relationships of the Board to the operating management, were approved. The plan of operation for the Board and the Executive Committee appears to have been carefully formulated. During the short period of time in which the Board and Executive Committee have been functioning, no serious problems have arisen.

The membership of the Board numbers 24; it plans to increase to approximately 40 members in the near future, well within the maximum of 60 prescribed in the charter. The Institute should strive to continue the broadbased membership philosophy and should attempt to extend membership to individuals from all participating Asian countries, as well as other countries providing support and encouragement. Members should be highly placed influential governmental officials or affluent leaders of industry, business and education. The Board should continue to be concerned with general policy, fund-raising assistance, general operational review, and the enhancement of AIT in the eyes of the public it serves.

The role of the Executive Committee, as stated in the bylaws, is endorsed by the consultants. The Executive Committee, which meets four times a year, should continue to determine and control general, financial and administrative policies.

It is recommended that the Board appoint a Development Committee to assist AIT administration in its fund-raising efforts. The Development Committee should work closely with the President and the Vice President for Development and International Affairs, who should be ex officio members of the Committee, in AIT fund-raising activities. The Development Committee, consisting of five to seven members, should help AIT develop an annual funding plan that would identify funding objectives and potential sources for each goal. Committee members should be expected to assist AIT actively by contacting

donors and potential donors. The importance of close contact and coordination of Committee members with operating management and the problems of travel may make it advisable to staff the Development Committee with the same members as the Executive Committee, since this Committee meets at least four times per year.

PROPOSED ADMINISTRATIVE STAFF

The projected staff for AIT is presented for the degree and special programs.

Degree Programs

The nonacademic staff needed to support the degree programs and future growth has been grouped into 10 categories:

- Executive management (the President and his immediate staff)
- Central administration and office services (receptionists, reproduction clerks, office girls, telephone operators and a typing pool)
- Development (fund raising, public relations, publications and host country relations)
- Academic administration (Academic Dean's office and registrar's office)
- Library (for academic programs, excluding the special regional library needs)
- Academic support (Laboratory Technicians and faculty secretaries)
- Business, finance and accounting (computer operations)
- Student services (shops, custodial and grounds work, water and sewerage plant operations, transportation and security)
- Maintenance and operations
- Presidential house.

A summary of proposed staffing requirements, by functional area and year, is presented in Exhibit VII-12, on the following page. (A detailed staffing chart appears in Appendix C.) The largest increase in staff occurs in 1971-72 when AIT is scheduled to occupy its new site. Almost half of the increase is needed in the maintenance and operation of the new campus with its larger area and greater number of buildings and facilities. With the opening of the student services building - combining a bookstore, post office, infirmary, dining facilities and guest accommodations - the student services staff will also have to be increased.

Between 1971-72 and 1977-78, the number of staff members grows almost 90 per cent, reflecting substantial expansion in several functional areas. The academic support area almost triples during this period, closely paralleling the greater number of students and faculty. Academic administration, development, student services, and maintenance and operations approximately double in the same period to meet the needs of the larger campus and increased student body and faculty.

The projected staff figures do not include faculty members or special program staff; they are considered separately. A comparison of the projected degree program staff to degree program students reveals the following ratios:

Year	Projected FTE Degree Program Students	Projected FTE Degree Program Staff	Projected Student-Staff Ratio
1968-69	175	89.5	1.9:1.0
1969-70	187	96.5	1.9:1.0
1970-71	206	112.5	1.8:1.0
1971-72	230	191.0	1.2:1.0
1972-73	282	210.0	1.3:1.0
1973-74	367	248.0	1.5:1.0
1974-75	463	281.0	1.6:1.0
1975-76	532	310.5	1.7:1.0
1976-77	599	338.5	1.8:1.0
1977-78	684	358.5	1.9:1.0

The student-staff ratio is steady at 1.9 to 1.0 for the first few years and then drops rapidly to 1.2 to 1.0 in 1971-72, which is the year AIT is scheduled to occupy the new site. The ratio then climbs steadily and reestablishes itself at the 1.9 to 1.0 level in 1977-78. The sudden drop is accounted for by the sharp increase in staff needed to operate the new campus and the correspondingly small increase in student enrollment. It must be remembered that program development requires a long planning period and that program projections,

ASIAN INSTITUTE OF TECHNOLOGY

PROPOSED FTE NONFACULTY REQUIREMENTS FOR DEGREE PROGRAMS

1968-69 Through 1977-78

Functional Area	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Executive Management	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Central Administration And Office Services	8.0	9.5	9.5	8.5	9.5	10.0	10.0	11.5	12.5	12.5
Development	4.0	5.0	5.0	7.0	8.0	9.0	10.0	11.0	11.0	12.0
Academic Administration	3.5	3.5	4.0	5.0	5.0	7.0	7.0	7.0	8.0	8.0
Library	6.0	8.0	9.0	11.0	12.0	13.0	13.0	13.0	14.0	14.0
Academic Support	12.0	12.0	13.0	18.0	23.0	28.0	33.0	39.0	43.0	48.0
Business, Finance And Accounting	8.5	9.0	11.5	16.5	17.5	19.0	21.0	23.0	25.0	26.0
Student Services	-	-	3.0	36.0	38.0	49.0	58.0	63.0	68.0	74.0
Maintenance And Operations	38.5	40.5	48.5	80.0	88.0	104.0	120.0	134.0	148.0	155.0
Presidential House	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Total	89.5	96.5	112.5	191.0	210.0	248.0	281.0	310.5	338.5	358.5

EXHIBIT VII-12

and resulting student body projections, assumed a possible one-year delay in campus occupancy. Plans were developed so that such a delay would have only minimal effect on academic programs. The staff projections assume an occupancy of the new campus in 1971. The growth of staff, however, can be much more flexible than the growth in enrollment. Thus, if there is a delay until 1972, most staff needs in 1971-72 could be held at the 1970-71 level, with future requirements a year behind the proposed schedule.

In 1971, student enrollments begin to accelerate, while the percentage growth in staff generally decreases from year to year. By 1977-78, the student-staff ratio equals the projected 1968-69 ratio when the present plant is presumably in a stable condition. Yet the 1977-78 staff figures provide for several facilities not provided by AIT at the present site, such as dormitories for students, faculty housing, guest accommodations, dining facilities, water and sewerage treatment plant, infirmary, post office and bookstore. Even with these additional facilities, the ratio in 1977 equals the 1968 level, showing a greater efficiency of plant. There is reason to believe that additional student growth may yield greater efficiency as measured by the student-staff ratio.

Special Programs

The proposed nonfaculty staffing requirements for the special programs are projected in Exhibit VII-13, on the following page. (A position-by-position projection appears in Appendix C.) The levels of staff needed are based on the special programs based on initial criteria, which is not endorsed by the consultants.

The conference staff consists of a Conference Coordinator, a Public Relations Officer and secretarial and clerical assistance for these positions, plus secretarial and laboratory assistance for the additional faculty members needed to plan and present the level of conferences desired by AIT management. The institutes, diploma programs and faculty study leaves are staffed with secretarial and laboratory assistance for the additional faculty members needed and study-leave faculty. The regional library is staffed with librarians, catalogers, clerks and guards. There is a staff complement of editors and secretaries for the publications program.

The special programs support also includes transportation and housing. The transportation staff consists of drivers for the special programs buses; the housing staff consists of a Manager, Housekeeper, housemen and maids for the hotel that will be needed for special program participants. If the hotel is able to attract guests who are not connected with special programs, more staff will have to be added.

ASIAN INSTITUTE OF TECHNOLOGY

PROPOSED FTE NONFACULTY STAFFING REQUIREMENTS FOR SPECIAL PROGRAMS

1968-69 Through 1977-78

Programs	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Conferences	0.3	0.7	2.2	4.3	5.3	5.9	6.6	8.5	9.0	9.6
Institutes	0.2	0.3	1.1	1.4	1.4	1.6	2.1	2.9	3.2	3.4
Diploma Programs	-	-	0.9	0.9	0.7	1.1	1.5	1.9	1.8	1.7
Faculty Study Leaves	-	0.5	1.1	1.6	2.1	3.2	4.2	5.8	6.8	7.4
Regional Library	-	4.0	6.0	9.0	10.0	11.0	11.0	12.0	13.0	13.0
Publications	-	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Transportation	-	-	-	3.0	3.0	3.0	4.0	4.0	5.0	5.0
Temporary Housing	-	-	-	8.5	9.0	12.0	14.5	18.0	20.0	22.0
Total	0.5	8.5	14.3	31.7	34.5	40.8	46.9	56.1	61.8	65.1

As discussed earlier, the consultants recommend a diminished level of activity in conferences, institutes and diploma programs so that additional faculty or nonfaculty requirements beyond the needs of the degree programs will not be required. The consultants further recommend that the faculty study-leave program concept be eliminated until a greater demand is evident and until the high cost of this program is better justified by the potential gains to the region. Also recommended is that AIT continue with the regional library concept, but within the degree programs library, until the type and level of service demanded are determined. Therefore neither the faculty study-leave program nor the regional library is projected to have additional staff members. The publications program based on the initial criteria is endorsed. Because of the diminished level of activity, no additional staff will be needed for housing or transportation, since both can be provided by the staff projected for the degree programs. In summary, only three FTE nonfaculty staff, shown in Exhibit VII-13, for the publications program from 1969-70 through 1977-78 are needed for the level of special program activity recommended by the consultants.

PROPOSED ADMINISTRATIVE ORGANIZATION

A flexible organization structure is proposed for AIT to handle present needs and easily adjust to the changes demanded by the occupancy of new facilities and a large increase in enrollment. Organization is discussed in terms of the top administration and the academic, business and development functions.

Top Administration

A proposed structure for the top administrative organization is presented in Exhibit VII-14, on the following page. The role and function of the Board of Trustees and the Executive Committee, as well as the proposed Development Committee, have been described earlier.

The President is the chief operating officer of the Institute and is responsible for:

- Planning, direction and control of the Institute and its activities
- Overall direction and leadership of the academic and special programs

ASIAN INSTITUTE OF TECHNOLOGY

PROPOSED TOP ADMINISTRATIVE ORGANIZATION

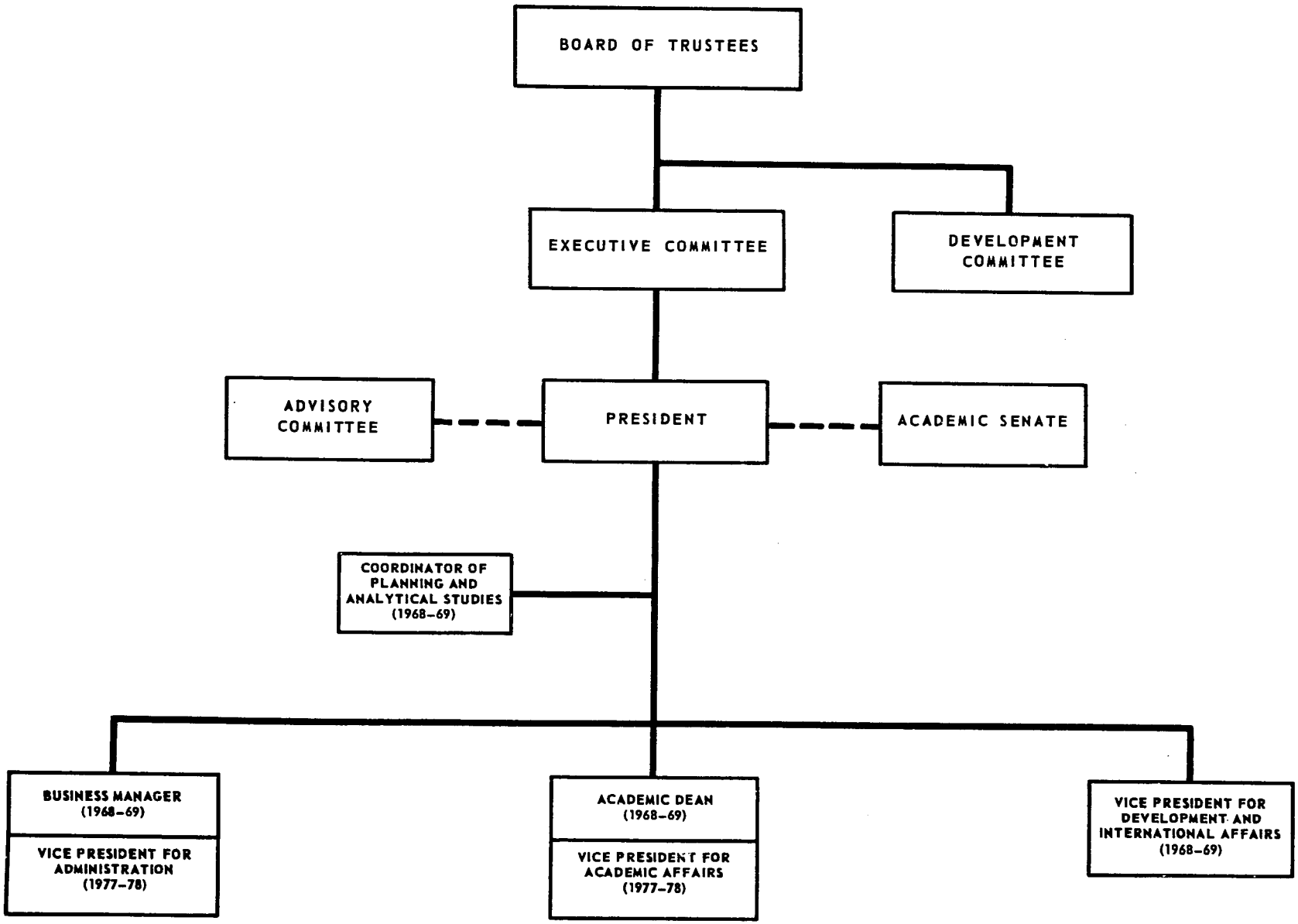

EXHIBIT VII-14

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- Direction and leadership of the development program

- Continuing contact with Trustees

- Major fund-raising activities

- Representing the Institute to the public

- Chairman of the faculty.

In the performance of his duties, the President is assisted by an Advisory Committee consisting of the chief administrative personnel, the Academic Senate and the Coordinator of Planning and Analytical Studies.

The current job of the Planning Director should be enlarged and retitled as the Coordinator of Planning and Analytical Studies. The duties of this position should include:

- Institutional research

- Cost-effectiveness analysis

- Overall coordination of planning

- Special studies.

Below the president, the activities of AIT are organized into three major functions directed by the Academic Dean, the Business Manager and the Vice President for Development and International Affairs.

Academic

The academic organization as seen in Exhibit VII-15 is under the direction of the Academic Dean. The Institute might consider changing the title of the chief academic officer to Provost or Vice President for Academic Affairs or could continue using the position's present title. The responsibilities of the Academic Dean include:

- Planning and coordination of academic programs

- Coordination of special programs

- Assistance in faculty selection and evaluation

ASIAN INSTITUTE OF TECHNOLOGY

PROPOSED ACADEMIC ORGANIZATION

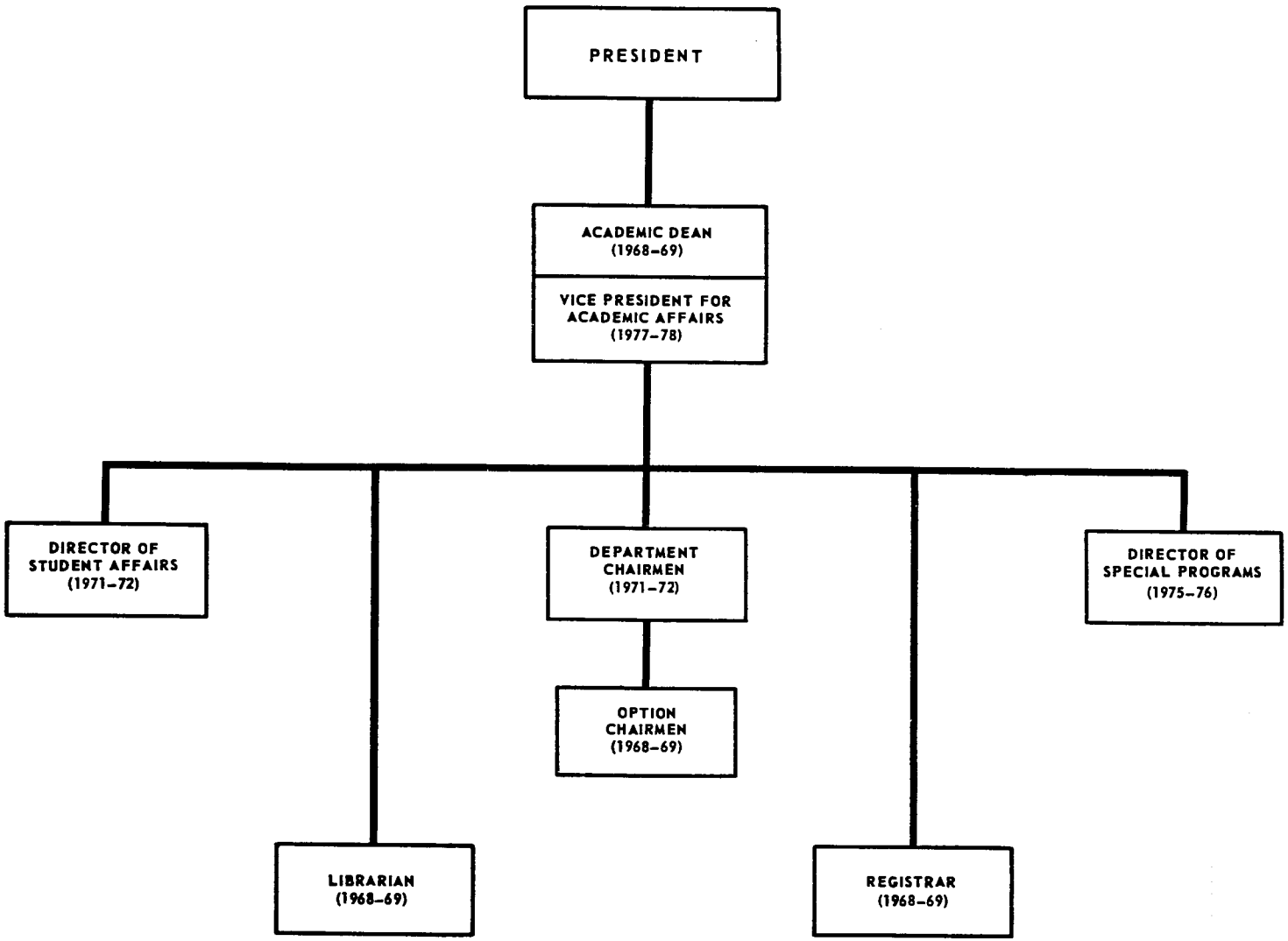

EXHIBIT VII-15

ASIAN INSTITUTE OF TECHNOLOGY

PROPOSED BUSINESS ORGANIZATION

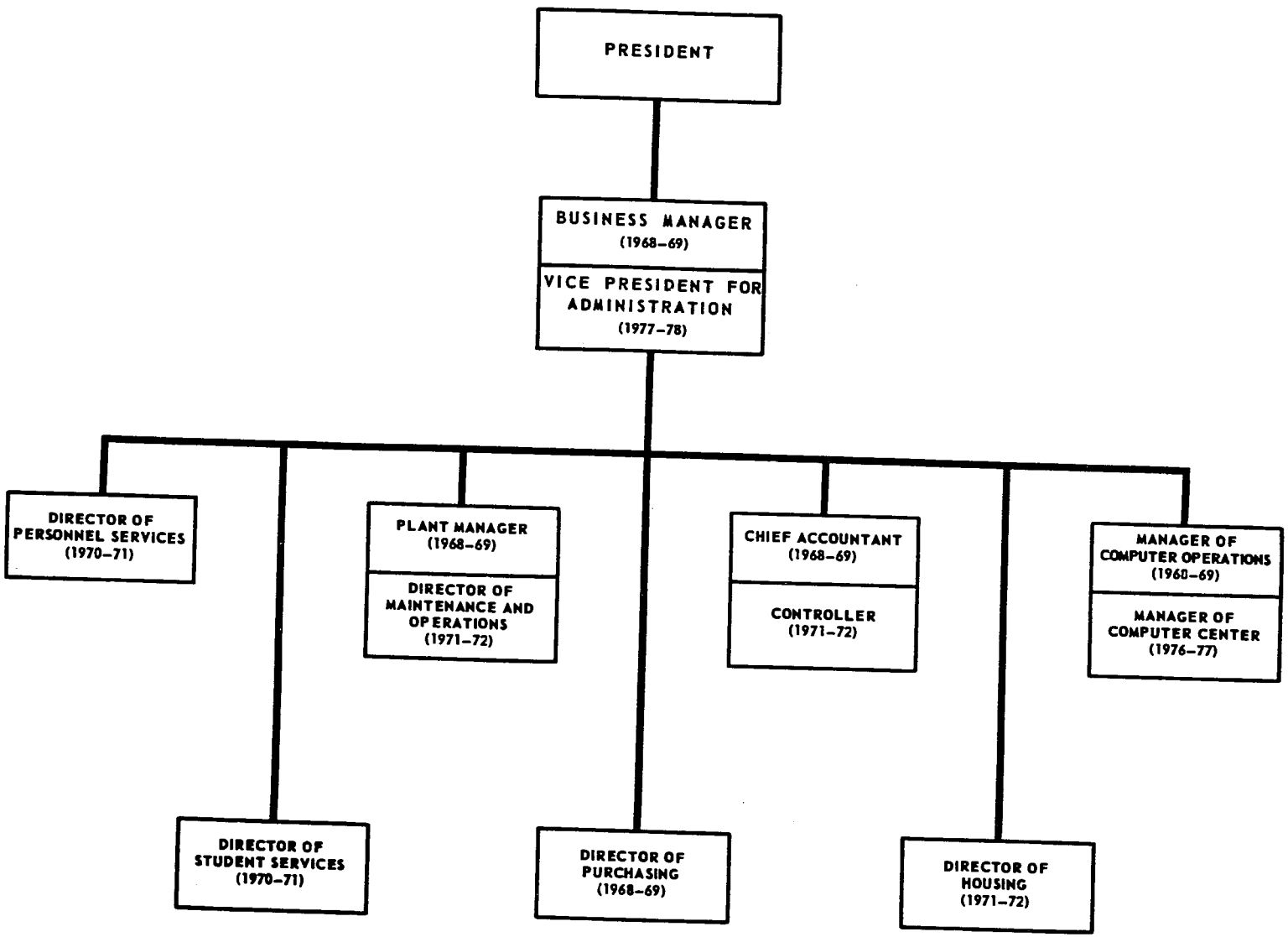

EXHIBIT VII-16

- Assignment of teaching schedules

- Coordination of Department Chairmen and/or Option Chairmen

- Chairman of the Academic Senate

- Overall direction of the Registrar's office and the library.

The Department Chairmen level has been created to plan and coordinate the activities within each engineering discipline. The Option Chairmen are concerned with the activities of each option, particularly those dealing with the instructional program.

A Director of Student Affairs is recommended in 1971-72, to assist the Academic Dean in directing and coordinating the liaison of the administration and the student body of the Institute. If the special programs are initiated and expanded at the rate proposed by the administration, a Director of Special Programs will be needed in 1975-76, to assist in coordinating these programs. If special programs are initiated and expanded at a considerably slower rate as recommended by the consultants, the filling of this position can be deferred until the volume of special program activities warrants a full-time faculty position.

Business

As shown on Exhibit VII-16, on the following page, the Business Manager supervises the nonacademic day-to-day operations of the Institute. It is recommended that the title be changed to Vice President for Administration by 1977-78, to reflect the increased scope of responsibilities as AIT grows. These responsibilities include:

- Planning, direction and coordination of all business and financial activities and staffs

- Budget preparation and control

- Improvement of systems and procedures

- Management of Institute funds.

The Chief Accountant supervises financial record-keeping and budget management. It is recommended that the title of Chief Accountant be changed to Controller when the Institute occupies its new campus, to reflect the increased responsibilities of the position.

In the present organization structure, the Shop Superintendent reports to the Academic Dean. The proposed organization structure recommends an immediate change in the title of that position to Plant Manager under the supervision of the Business Manager. The construction and maintenance of research equipment must continue to be a joint responsibility of the academic and business organizations, but the majority the Plant Manager's total activities will be concerned with the business function. The responsibilities of the Plant Manager will increase significantly when AIT occupies its new campus, and it is recommended, for this reason, that the position be retitled Director of Maintenance and Operations at that time. His responsibilities will include supervision and coordination of the shops, tradesmen, custodial and grounds keeping staffs, transportation facilities and equipment, warehouse facilities, campus security, and utilities operations.

The title of Director of Purchasing is recommended for immediate use. Several persons assist in the ordering, processing and receiving of supplies, and one person should coordinate these activities. An Expediter - to assist in the smooth flow of goods, particularly through customs - should report to the Director of Purchasing.

Computer facilities at AIT are now coordinated by a Research Associate. It is recommended that a computer programmer be hired as Manager of Computer Operations to devote part time to administration, with the bulk of the time spent on programming. As the faculty and student size expand and equipment becomes more sophisticated, the proportion of time needed for administration of computer facilities will increase.

A new position, Director of Personnel Services, is recommended for 1970-71, to coordinate and centralize nonacademic personnel planning and record-keeping, as well as recruitment, screening and hiring. This position must be filled prior to the move to the new campus in order to facilitate the hiring of the projected increases in staff.

Two additional positions are recommended for hiring prior to new campus occupancy. A Director of Student Services will be needed to supervise the food service operations, guest accommodations, post office and bookstore, as well as the library and infirmary.

A Director of Housing is recommended to supervise and direct the operation and staffs associated with the student dormitories and faculty housing units.

Development

The Institute is in immediate need of full-time, high-level fund-raising assistance to meet its plans for growth and new campus occupancy. The small size of the Institute would not ordinarily justify administrative titles at the vice presidential level, but in this case, the title of Vice President for Development and International Affairs is recommended for the officer heading development, as shown in Exhibit VII-17, on the following page. This person should spend the bulk of his time contacting potential donors. The more important the title sounds, the greater acceptance the person will have in southeastern Asia. His duties should include:

- Development of a long-range and an annual fund-raising program
- Contacting and maintaining relationships with donors and potential donors
- Coordination of the fund-raising activities of the Trustees, the President and the Development Officer
- Supervision of the public relations program and protocol personnel.

The Vice President for Development and International Affairs must be intimately familiar with fund raising and fund-raising techniques and be particularly sensitive to the attitudes and customs in southeastern Asia. With the assistance of the Development Officer, he must quickly identify potential funding sources by name and develop information on each - including names of officers and trustees, funding history, potentially favorable approaches, and personal or business relations with AIT officers or trustees. The Development Officer should also assist by making some contacts and coordinating fund-raising records.

A Public Relations Officer should develop and coordinate a program of publicity and publications that will inform and educate the mass media and the general public about the objectives and goals of AIT. Such a program can greatly assist the fund-raising efforts. As the public relations function grows, a Publications Manager and an Editor might be added to assist the Public Relations Officer.

The Protocol Officer is concerned with proper relations with the host country and visiting dignitaries, as well as the coordination of special Institute events. The Customs and Immigration Specialist recommended for 1969-70 should assist the Protocol Officer, as well as expediting clearances and making travel arrangements for AIT faculty and staff.

E - SPACE PLANNING

The following section summarizes the space requirements in support of the programs, enrollments, and staffing patterns discussed in previous sections. For planning purposes, the space requirements are categorized by function - that is, into laboratories, offices, etc. It should be noted that this particular division of space is merely to facilitate capital funding estimates and other planning forecasts, and does not represent a recommended or even suggested arrangement of total space requirements into specific buildings or structures. It is proposed, for example, that the administration complex be allocated about 24,000 gross square feet of space. Whether this space is housed in one or more structures is a decision to be made by the Asian Institute of Technology, in cooperation with its architects.

PROJECTION METHODS

Briefly, the methods of data development used in the planning of space requirements involved the application of planning standards to the projections of student enrollments, faculty and staff complements, etc. If the staffing projections, for example, showed a clerical complement in a particular program for a particular year, this complement was multiplied by a planning standard for clerical space. The various functional areas were all developed in this manner, to obtain total office space, classroom space, etc. A year-by-year projections was thus developed for each major program. The detail for each complex is included in tabular form in the appendixes of this report.

From the year-by-year projections of total requirements for a given program, reasonable construction package was determined in terms of initial building modules and subsequent additions. No particular formula was utilized in determining the building module of a complex. Rather, each complex was individually analyzed over the entire planning period. In some cases, the module chosen for initial construction fulfills the entire requirement. Such was the case with the administration complex, since the total gross requirement for the end of the planning period was only slightly greater than the initial requirement. In other cases, such as with the student service complex, the initial use of a portion of the complex is to be changed to an alternate use. In other cases, major additions were specifically scheduled in response to anticipated increased requirements.

As with the projections of the division of space among various complexes, it may become evident as actual building plans are developed that the construction of certain buildings can be delayed or must be accelerated to achieve the greatest economies. The details of the construction must, of course, be determined by AIT in conjunction with its architects.

SPACE REQUIREMENTS

Exhibit VII-18, on the following pages, summarizes the gross space requirements for each proposed complex for the year in which it should be ready for occupancy. Most facilities are planned to have excess capacity so that they will not require immediate additions or modifications. In other cases, such as student and faculty housing, in which the requirements are well adapted to an annual construction program, the projected construction is in response to immediate needs, except that the building modules used may provide some excess capacity.

ADMINISTRATION COMPLEX

The administration complex is projected as a structure or group of structures that will house the central academic and administrative management, and administrative service functions of AIT. It is to include the following functional units:

- Executive offices
- Central office services
- Academic administration
- Business and finance offices
- Development offices
- Computer Center
- Building services for administration complex.

The initial space requirements for 1970-71 will amount to 12,450 square feet, and will increase to about 14,000 square feet by 1972-73, and to 16,000 square feet by 1976-77. It was decided that, since the first construction package would have to serve at least through 1972-73 (14,000 net square feet), it should satisfy the total anticipated requirement through the entire planning period. The initial construction package was therefore programmed at 16,010 net square feet (24,015 gross square feet) to be built in 1970-71 and to serve the needs of the administration complex through 1976-77. A portion of the initial excess capacity of the building can be utilized to provide office and administrative

ASIAN INSTITUTE OF TECHNOLOGY

PROPOSED DEVELOPMENT ORGANIZATION

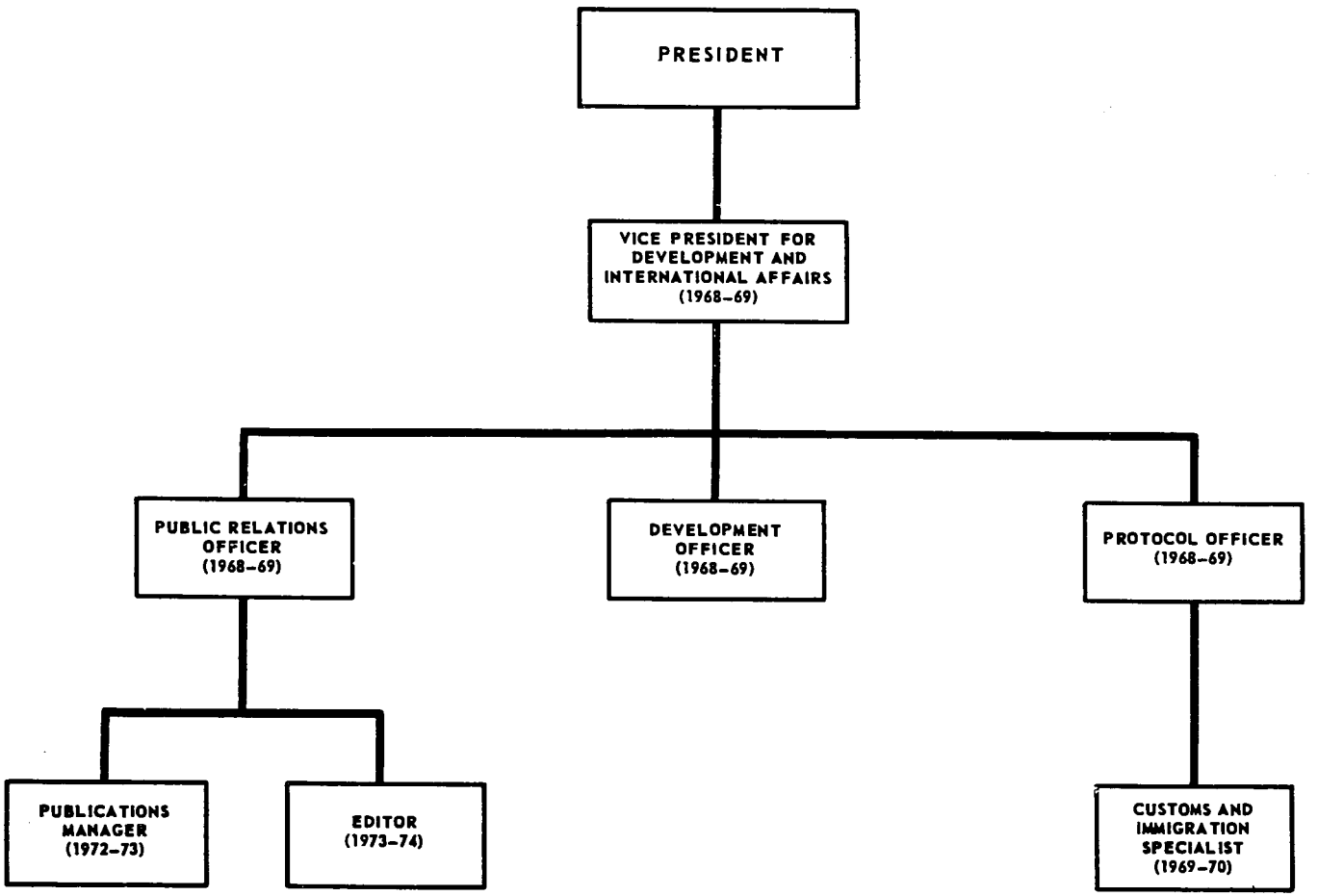

EXHIBIT VII-17

ASIAN INSTITUTE OF TECHNOLOGY

SUMMARY OF GROSS SPACE REQUIREMENTS
1970-71 Through 1976-77

	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
A - Regular Academic Program (Including Special Programs) (Gross Square Feet)							
Administration Complex	24,015						
Library Complex	In Student Center Until 1974			25,692			
Academic Program							
Civil engineering							
Laboratory	88,596						
Classroom	5,100						
Office	18,345						
Miscellaneous	7,356						
Total	119,397						
Mechanical engineering							
Laboratory		36,018		(add 15,214)		51,232	
Classroom		2,040		(add 1,020)		3,060	
Office		8,070		(add 3,555)		11,625	
Miscellaneous		7,050				7,050	
Total		53,178		(add 19,789)		72,967	
Electrical engineering							
Laboratory			27,634	(add 8,590)		36,224	
Classroom			2,040	(add 1,020)		3,060	
Office			5,955	(add 2,715)		8,670	
Miscellaneous			7,050			7,050	
Total			42,679	(add 12,325)		55,004	
Program X							
Laboratory				27,634	(add 8,590)		36,224
Classroom				2,040	(add 1,020)		3,060
Office				5,955	(add 2,715)		8,670
Miscellaneous				7,050			7,050
Total				42,679	(add 12,325)		55,004
Campus Service Complex							
Office	3,990	(add 90)		4,080			
Shops	12,750	(add 4,650)		17,400			
Warehouse	6,000	(add 3,000)		9,000			
Miscellaneous	750	(add 375)		1,125			
Total	23,490	(add 8,115)		31,605			
Student Service Complex	65,753						
Student Housing Complex	57,600 (add 14,400)	72,000 (add 21,600)	93,600 (add 21,600)	115,000 (add 14,400)	129,600 (add 14,400)	144,000 (add 22,050)	166,050
Faculty And Staff Housing Complex	(Family And Individual Units)						
President's house	1						
Single-family units	19 (add 4)	23 (add 3)	26 (add 6)	32 (add 5)	37 (add 4)	41 (add 5)	46
Duplexes	10 (add 2)	12 (add 4)	16 (add 2)	18 (add 4)	22 (add 4)		26
Apartments	16 (add 4)		20 (add 4)	24 (add 4)	28 (add 4)		32
B - Expanded Special Programs (Gross Square Feet)							
Special Programs							
Laboratory	8,280		(add 5,760)		14,040		
Classroom	6,000		(add 4,500)		10,500		
Office	6,360		(add 3,600)		9,960		
Housing (Special Programs)	(Family And Individual Units)						
Single-family units	5 (add 2)		7 (add 3)	10 (add 3)	13 (add 2)	15	
Apartments	4 (add 4)		8 (add 4)	12 (add 4)	16		
Transient			150 (add 50)		200		
Regional Library(a)			31,059 (add 12,086)		43,145		

(a)Alternate plan.

space for faculty and staff who are scheduled to be added several years prior to the commencement of their new programs and the construction of academic facilities for these programs.

The complex, as specified and detailed in Appendix D, is to support the regular academic program and limited special programs. Should AIT become involved in special programs at a significantly increased level, as was discussed in preceding sections, some additional administrative space would be required. The office space shown in Exhibit VII-18 would be apportioned among the administrative and other complexes and would have to be added as detailed in Appendix D, which defines special program space requirements.

LIBRARY COMPLEX

The library complex, shown in Exhibit VII-18, directly supports the academic program. A regional facility to meet the specific needs of southeastern Asia for a multidiscipline technological library is also shown in this exhibit. It should be noted that the facilities designated in support of the regular academic program are also intended to allow AIT to develop a technological library in the engineering sciences with limited additional coverage of other branches of the sciences.

The number of volumes for the regional technological library would cover a greater number of subject areas, and the number of student-stations would be increased to meet the needs of the many special program students.

The following tabulation compares various aspects of the two libraries as planned for 1976-77.

	Regular Library	Added For Regional
Total Gross Square Feet	25,692	17,453
Student Reader Stations	228	87
Collection Size	59,100	99,000
Additional Staff	-	13

Regular Library

Libraries are best constructed as a single unit unless they can be effectively desinged to enable the addition of future wings which are relatively independent, such as the law or medical science wing of a general library. In the case of AIT, it does not appear that a multistage construction project extending over the planning period would be advisable. Space requirements for 1970-71 amount to about 13,100 gross square feet and increase to about 25,700 gross square feet in 1976-77. Since it was possible to provide an allocation of space in the student service complex for use as a library facility during the years 1970-71 to 1973-74 the construction of the full library complex can be delayed until that time. When it is built, however, the library should meet 1976-77 requirements.

Regional Technological Library

If AIT decides to establish the regional library and can find adequate support for it, the construction schedule discussed above would be impractical. Therefore, the plan outlined in Exhibit VII-18 and detailed in Appendix D should be followed. The structure should be completed in two stages, the first amounting to 31,059 gross square feet, for occupancy in 1970-71, and the second (12,086 gross square feet), to be constructed in 1974-75. Since this library will be larger than the one described above and will have additional science branches, it is more suitable for stage development. In addition, as mentioned in previous parts of this report, major collections may soon become unnecessary for this type of library, if such alternatives as advanced satellite information systems become available.

CIVIL ENGINEERING COMPLEX

As shown in Exhibit VII-18, the civil engineering complex is scheduled to be completed and ready for occupancy by 1970-71. Following the assumptions of AIT's administration regarding the intended growth of the civil engineering program, only limited additional growth is projected following the occupancy of the new campus. It was felt, therefore, that the total structure should be completed in one stage. The many uncertainties regarding the precise scope and content of the civil engineering program also dictated that some excess capacity be provided for adequate flexibility. Such factors as the amount of sponsored research at AIT, AIT's involvement in regional technological projects, and so forth, were considered in making this determination. It should be noted that the excess capacity of the complex is designated for greater involvement in functions such as sponsored research but it is not adequate for such major projects as the "Water for Peace" program. If this or other major programs

were to be housed at AIT, additional space would be required and should be provided - but only in response to known and scheduled requirements.

As with each complex profile, provision is made for AIT's continued involvement in regional programs, such as conferences and institutes. The level of involvement is expected to increase, but at a rate not significantly exceeding overall academic program growth. Should AIT decide to undertake the greater increases projected for the special programs discussed previously, additional facilities would be required, as shown in Exhibit VII-18, and would be distributed among the various academic and supporting complexes, including that of civil engineering.

MECHANICAL ENGINEERING, ELECTRICAL ENGINEERING, PROGRAM X

The projections of space requirements for the mechanical and electrical engineering programs follow the methods used for projecting civil engineering requirements. Projections for research and laboratory allocations for mechanical engineering varied slightly from those used previously, as did the electrical engineering projections, in recognition of the reduced space requirements for these programs. All other standards were identical.

In precise space planning the gross square feet allocations must be translated into specific functional units for well-defined programs. It would be premature, if not impossible, to define such space precisely at this time, as no programming has yet been undertaken.

As discussed in preceding chapters, future expansion of academic facilities is designated as Program X, as the scope and content of this program is unclear. Indications at this time, however, are that such a program could be in chemical engineering, a physical science or a similar field. Lacking specific planning directives, the consultants chose to leave the program unidentified, but to apply standards of space planning which were considered adequate to house either a chemical engineering or physical sciences program. If, however, it becomes evident in future planning that the intended program will not involve the use of extensive research laboratories, the designated space should be reprogrammed.

CAMPUS SERVICE COMPLEX

The campus service complex includes all of the shops, the warehousing area and maintenance and operations facilities for the new campus. The allocation of space among the various functions is shown in Exhibit VII-18, and detailed in Appendix D. The requirements are based on the application of various standards to staff projections developed in cooperation with AIT staff members currently involved. Though certain assumptions, such as warehouse requirements at the more remote location, had to be made, they were reviewed with responsible personnel to ensure their validity.

The proposed construction program allows for some excess capacity in the early years, which is felt to be necessary to support projected growth. As with most projections, a follow-up study (of the necessity of the second construction package) should be made after several years, when the requirements of AIT at its new location will be better defined. The second stage of the program is recommended for completion in 1973-74, though it could be delayed if there is significant over-capacity in 1972-73. Likewise, it could be accelerated if a shortage of space developed.

STUDENT SERVICE COMPLEX

The student service complex is a multipurpose complex housing many of the auxiliary services at the new campus, including:

- Food service (students, faculty and guests)
- Major assembly halls and multipurpose spaces
- Indoor recreational facilities
- Bookstores and sundry shops
- Infirmary and clinic services
- Limited temporary housing (hotel)
- Miscellaneous (barber shop, post office, etc.)

Because of the space requirements for some major functions - such as food service - it was felt that the entire complex should be completed in a single phase, with the use of certain larger areas being subsequently altered. For example, it is suggested that the library be housed in what will later become the major assembly area (multipurpose rooms). Also, a portion of what will become the full-size student dining area is to be used initially as the multipurpose space.

STUDENT HOUSING COMPLEX

The construction of the student housing complex is scheduled to proceed in direct relation to the expanding student body, assuming that all full-time students are housed on campus. Planning is to be in terms of 30-unit modules, so that some excess capacity is provided each year. If, for example, the exact number of students to be housed were 282, 10 30-unit modules would be scheduled for construction. The planning module is composed of 30 units of approximately 150 net square feet each, based on single occupancy for graduate students. In addition to the basic housing and service space, a student commons allocation of 300 net square feet is allowed for each module as a planning standard. In planning actual construction, these commons areas would likely be grouped into single, larger areas serving several modules.

It is proposed that, to provide maximum flexibility, every two units should share a bath. This will enable the units to serve either as male or female residences, depending on the requirements. Also, they could be used in the summer to house special institute participants, supplementing the limited hotel-type space in the student service complex. As every two units would be connected, the double unit could serve as a one-bedroom apartment for married students, with the extra room serving as a living/dining room combination.

FACULTY AND STAFF HOUSING COMPLEX

Faculty and staff housing needs are projected on the basis of housing 80 per cent of the regular full-time faculty plus selected members of the executive and administrative staff, including the President, three proposed Vice Presidential officers, the Plant Manager, the Chief Security Officer and the Chief of Transportation. No other support staff are expected to be provided housing on campus.

In order to create a planning model for distributing the types and sizes of houses, an assumption was made as to the mix between single-family units, duplexes, and apartments. On the basis of interviews and informal discussions with the faculty and staff, the total housing was distributed as follows:

- Single-family units (three bedrooms) - 45 per cent
- Duplexes (three bedrooms) - 25 per cent
- Apartments (two and three bedrooms) - 30 per cent.

For planning purposes, it was assumed that all apartments would be grouped into four-unit modules and, of course, duplexes would be composed of two units each. In a year such as 1971, therefore, when only 13 apartments units will be required, 16 will be available, leaving an excess of three units, which could be used for additional staff or special faculty additions. Such a set-up will provide a degree of flexibility until AIT gains more experience in its housing needs.

SPECIAL PROGRAM NEEDS

As discussed in preceding sections, space planning for the required academic program allowed for increasing involvement in special programs, such as conferences, institutes and diploma programs. As mentioned, if the Board of Trustees and the administration of the Asian Institute of Technology pursue the special programs at a rate of growth shown in the preceding chapters on criteria and program development, added facilities will be required. These needs are summarized in Exhibit VII-18, under various functional classifications.

With the exception of housing, all of these needs can be met by additions to the proposed gross space requirements for each building complex. In other words, no special complex is proposed. In the area of housing, however, the added requirements will necessitate additional buildings and, in the case of the hotel-type facilities, a major structure or addition to a structure. The details of these programs and projections in support of major increases in special programs are included in Appendix D.

As stated previously, the consultants cannot endorse major special program increases either on the basis of AIT's historical involvement in such programs, or future projections, and consequently, do not propose any building program in support of such increases. The projections made are solely for the purpose of identifying the requirements and subsequent capital costs of these programs.

MISCELLANEOUS FACILITIES

In addition to the major building complexes discussed in the preceding sections, a series of minor construction projects will be necessary to support overall campus development. These additions include outdoor recreational facilities, roads and walkways, sewage and water plants and general site development projects. Each of these construction programs is described in detail in Appendix D and discussed briefly below.

Outdoor Recreational Facilities

These facilities are to include a swimming pool, several tennis courts, a football field, volleyball and badminton courts.

Roads And Walkways

A percentage of the ground cover required for the total developed land was calculated. Main roads will be concrete and service roads will be covered by macadam. About 50 per cent of the walks will be covered and 50 per cent open.

Sewage Plant

A plant capable of handling a total population of up to 10,000 - more than AIT's projected needs - is scheduled for development in one stage. Other plant sizes were considered, but the consultants were advised by local engineers that smaller plants were either unavailable or impractical.

Water Pumping Station

The pumping station envisioned is for a deep-well (up to 250 meters) water supply, with no treatment facilities. According to preliminary surveys of the area, the water at this level is potable and in adequate supply to serve the needs of AIT.

General Site Development Projects

These include fill of a designated area of the total plot to 3 feet in depth, and the remainder of the developed area to 1-1/2 feet, based on an estimated ground cover, by buildings and structures, of approximately 25 per cent of the 75.5 acres developed for the planning period. In addition, it is assumed that there will be 16,000 linear feet of fencing facing the public areas on the perimeters of the campus and the total 400 acres enclosed with nondecorative fencing.

VIII - FUNDING CONSIDERATIONS

VIII - FUNDING CONSIDERATIONS

This chapter discusses the cost of the preceding program projections in terms of capital and operating fund requirements, the total fund requirements, and a possible fund-raising program.

CAPITAL NEEDS

A summary of the capital funds that will be needed to implement the proposed 10-year growth plan is shown in Exhibit VIII-1, on the following page (a further detailed breakdown is included in Appendix D). Requirements for the degree programs are listed by major items such as master planning, site development and the envisioned building packages. All funds are shown in the year of actual need and include architectural and engineering expenses and construction, and equipment and furnishing costs. Completing the proposed degree program facilities will require a capital input of $12,463,600 during the planning period. Funds will be needed in each of the nine years, with the greatest demand ($6,639,300) being in the two-year period prior to moving to the new site.

Implementation of the special programs, based on the initial criteria, will call for additional capital of $3,269,900. As shown in the exhibit, the requirements are listed by programs and type of space needed. Here again, costs include architect and engineering fees and construction, and equipment and furnishing costs. Figures for the regional library also include books, which are treated as capital expenditures in this report. If the Board adopts the consultants' revised proposal on special programs, these additional capital funds would not be required.

Of the special programs the conference program will have the greatest capital requirement at $1,498,100 because of the need to build a temporary housing facility. The regional library will also be a major undertaking because of the extensive collection of books that would have to be assembled.

Exhibit VIII-2 also illustrates the capital requirements for the degree program by year of need; in addition, it shows the total commitment that will be called for by each building phase (detailed in Exhibit in Appendix D). Construction packages, once begun, are assumed to be committed for completion; thus, the fund requirement represents the total of construction under way in addition to that completed during the year. A total of $7,469,300 will be

ASIAN INSTITUTE OF TECHNOLOGY

SUMMARY OF CAPITAL FUND REQUIREMENTS BY YEAR OF NEED
1968-69 Through 1976-77

	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	Total For Planning Period
	($ U.S. In Thousands)									
Degree Programs										
Master Campus Planning	$150.0	-	-	-	-	-	-	-	-	$ 150.0
Site Development, Land Improvements and Utilities	196.1	$ 321.0	$ 83.6	$ 15.5	$ 29.0	$ 7.3	$ 23.0	$ 2.0	-	677.5
Central Administration	7.4	268.2	129.1	-	-	-	-	-	-	404.7
Computer Equipment	-	-	600.0	-	-	-	-	-	-	600.0
Library	28.0	30.0	94.2	71.2	282.7	197.0	58.0	64.0	$ 70.0	895.1
Civil Engineering	30.6	903.3	1,242.4	-	-	-	-	-	-	2,176.3
Mechanical Engineering	-	13.6	403.3	533.0	-	5.1	150.0	209.6	-	1,314.6
Electrical Engineering	-	-	10.9	322.4	419.0	3.2	93.9	126.1	-	975.5
Program X	-	-	-	10.9	322.4	419.0	3.2	93.9	126.1	975.5
Campus Services	3.8	112.9	238.6	1.1	33.7	47.4	-	-	-	437.5
Student Services	17.3	511.1	391.0	1.0	28.6	44.5	-	-	-	993.5
Outdoor Recreation	3.3	64.2	23.5	13.7	-	0.6	16.8	-	14.2	136.3
Student Housing	8.5	252.5	249.4	142.9	164.9	133.6	111.7	141.6	70.0	1,275.1
Faculty and Staff Housing	2.0	424.3	272.2	124.3	158.5	172.0	102.2	138.3	58.2	1,452.0
Total	$447.0	$2,901.1	$3,738.2	$1,236.0	$1,438.8	$1,029.7	$ 558.8	$775.5	$338.5	$12,463.6
Special Programs										
Conference	$ 2.4	$ 66.9	$ 71.9	-	$ 1.5	$ 43.8	$ 47.3	-	-	$ 233.8
Housing	-	-	50.6	-	26.9	34.6	32.2	$ 11.1	-	155.4
Hotel	16.2	480.6	334.9	-	5.4	160.2	111.6	-	-	1,108.9
Subtotal	$ 18.6	$ 547.5	$ 457.4	-	$ 33.8	$ 238.6	$ 191.1	$ 11.1	-	$ 1,498.1
Institute	$ 1.1	$ 30.9	$ 35.0	-	$ 0.7	$ 22.5	$ 25.1	-	-	$ 115.3
Housing	-	-	29.1	-	17.0	19.6	20.7	$ 8.2	-	94.6
Hotel	1.5	44.7	31.1	-	0.5	14.9	10.4	-	-	103.1
Subtotal	$ 2.6	$ 75.6	$ 95.2	-	$ 18.2	$ 57.0	$ 56.2	$ 8.2	-	$ 313.0
Diploma	$ 0.6	$ 17.3	$ 20.4	-	$ 0.4	$ 10.2	$ 13.9	-	-	$ 62.8
Housing	-	-	13.9	-	8.5	12.2	10.4	$ 3.2	-	48.2
Hotel	0.6	16.8	11.7	-	0.2	5.6	3.9	-	-	38.8
Subtotal	$ 1.2	$ 34.1	$ 46.0	-	$ 9.1	$ 28.0	$ 28.2	$ 3.2	-	$ 149.8
Faculty Study Leave	$ 1.2	$ 39.1	$ 55.7	-	$ 1.0	$ 29.1	$ 39.7	-	-	$ 165.8
Housing	-	-	32.9	-	24.6	27.1	30.2	$ 10.5	-	125.3
Hotel	0.6	16.8	11.7	-	0.2	5.6	3.9	-	-	38.8
Subtotal	$ 1.8	$ 55.9	$ 100.3	-	$ 25.8	$ 61.8	$ 73.8	$ 10.5	-	$ 329.9
Publications	$ 0.2	$ 6.8	$ 5.8	-	$ 0.1	$ 2.1	$ 1.8	-	-	$ 16.8
Regional Library (Net)	$ 64.7	$ 323.2	$ 229.0	$ 52.2	$ 50.6	$ 31.8	$ 98.0	$104.0	$110.0	$ 962.3
All Special Programs										
Program Space	$ 70.2	$ 484.2	$ 417.8	$ 52.2	$ (46.9)	$ 139.5	$ 225.8	$104.0	$110.0	$ 1,556.8
Housing	-	-	126.5	-	77.0	93.5	93.5	33.0	-	423.5
Hotel	18.9	558.9	389.4	-	6.3	186.3	129.8	-	-	1,289.6
Total	$ 89.1	$1,043.1	$ 933.7	$ 52.2	$ 36.4	$ 419.3	$ 449.1	$137.0	$110.0	$ 3,269.9
Grand Total	$536.1	$3,944.2	$4,671.9	$1,288.2	$1,475.2	$1,449.0	$1,007.9	$912.5	$448.5	$15,733.5

EXHIBIT VIII-1

ASIAN INSTITUTE OF TECHNOLOGY

SUMMARY OF CAPITAL FUND REQUIREMENTS IN FUNDING PACKAGES BY YEAR OF NEED
1968-69 Through 1976-77

($ U.S. In Thousands)

Degree Program	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	Totals For Planning Period
Master Campus Planning	$150.0	-	-	-	-	-	-	-	-	$ 150.0
Site Development, Land Improvement And Utilities	196.1	$ 321.0	$ 83.6	$ 15.5	$ 29.0	$ 7.3	$ 23.0	$ 2.0	-	677.5
Central Administration	7.4	268.2	129.1	-	-	-	-	-	-	404.7
Computer Equipment	-	-	600.0	-	-	-	-	-	-	600.0
Library	28.0	30.0	94.2	71.2	282.7	197.0	58.0	64.0	$ 70.0	895.1
Civil Engineering	30.6	903.3	1,242.4	-	-	-	-	-	-	2,176.3
Mechanical Engineering	-	13.6	403.3	533.0	-	5.1	150.0	209.6	-	1,314.6
Electrical Engineering	-	-	10.9	322.4	419.0	3.2	93.9	126.1	-	975.5
Program X	-	-	-	10.9	322.4	419.0	3.2	93.9	126.1	975.5
Campus Services	3.8	112.9	238.6	1.1	33.7	47.4	-	-	-	437.5
Student Services	17.3	511.1	391.0	1.0	28.6	44.5	-	-	-	993.5
Outdoor Recreation	3.3	64.2	23.5	13.7	-	0.6	16.8	-	14.2	136.3
Student Housing	8.5	252.5	249.1	142.9	164.9	133.6	111.7	141.6	70.0	1,275.1
Faculty And Staff Housing	2.0	424.3	272.2	124.3	158.5	172.0	102.2	138.3	58.2	1,452.0
Total	$447.0	$2,901.1	$3,738.2	$1,236.0	$1,438.8	$1,029.7	$558.8	$775.5	$338.5	$12,463.6
Funding Package	$150.0(a)	$7,469.3		$3,171.5			$889.5	$783.3		

(a)Funded.

EXHIBIT VII-2

needed to undertake the initial development of the new campus. Further expansion following the planned development of the degree programs will cost $3,171,500 during the three-year period from 1971-72 through 1973-74, $889,500 in 1974-75 and $783,300 during the last two years of the planning period, for a total of $12,463,600.

In addition to the capital needs that have been summarized here, the Institute will have a continuing and expanding need for operating funds. Projections of these needs are developed below.

PROJECTED OPERATING EXPENSES

Projected operating expenses have been developed for both the degree and special programs. These expenses are based on the proposed faculty and nonfaculty staffing schedules (detailed in Appendix C and F), past operating expenses, and the development of the physical plant (as outlined in earlier chapters). The salary and benefits schedule approved by the Board of Trustees at the July 1968 meeting was used in projecting employment costs for the international faculty and staff. (See Exhibit VIII-3 on the following page.) A summary of the individual expenses that would be incurred by the Institute under the approved scale is shown below (although not included in the compensation plan outlined by the Board, some administrative staff expenses have also been projected on the basis of this scale; the listing of positions, by salary grade, included earlier in this report has been followed, with the exception that there is no salary grade distinctions between Department Chairmen, honored Professors and other Professors and administrators at that level):

Salary Grade	Title	Average Salary	Quarter Allowance	Retirement Plan	Settlement And Transportation	Total
I	President	-	-	-	-	$25,000
II	Vice President	-	-	-	-	25,000
III	Professor	$13,000	$2,500	$1,300	$2,200	19,100
IV	Associate Professor	11,000	2,200	1,100	2,040	16,340
V	Assistant Professor	9,000	1,800	900	1,890	13,590
VI	Instructor	6,000	1,200	600	1,660	9,460

ASIAN INSTITUTE OF TECHNOLOGY

APPROVED FACULTY COMPENSATION SCALE

A - Salary And Allowances

Academic Rank	Salary Range	Initial Settlement Grant	Maximum Quarters Allowance
Professor	$12,000-$14,000	$1,200 + 1% per dependent	$2,400-$2,800
Associate Professor	$10,000-$12,000	$1,000 + 1% per dependent	$2,000-$2,400
Assistant Professor	$ 8,000-$10,000	$ 800 + 1% per dependent	$1,600-$2,000
Instructor	$ 5,000-$ 7,000	$ 500 + 1% per dependent	$1,000-$1,400

B - Other Prerequisites

Retirement Plan

It is estimated that 5 per cent will be withheld from each employee's salary; AIT will contribute 10 per cent. The program will be managed by the Institute, but details must be resolved.

Medical Plan

There is none at present, but this should be considered for the future. The cost should be shared by AIT and its employees.

Annual Salary Increments

Merit increments will be given, based upon performance and availability of funds.

Travel Allowance

Each employee residing outside Thailand will be reimbursed for the cost of travel from point of origin to Bangkok at the beginning of his tour and from Bangkok to point of origin at the end of his contract at a rate not to exceed the cost of economy-class air fare by the most direct route for the staff member, his spouse and children under 21 years of age.

Settlement Grant

A grant to defray the costs of relocating in Bangkok will be paid each new staff member residing outside Thailand. At the beginning of his assignment, this will be computed at 10 per cent of his base salary, plus 1 per cent for each dependent. At the termination of his tour, this will be computed at 10 per cent of his base salary. From this, he will be expected to pay the costs of shipping, temporary quarters, etc.

Quarters Allowance

Each staff member retained at international scale shall receive a quarters allowance computed at two-thirds of the actual cost of his rental payment, but not to exceed 20 per cent of his base salary.

These compensation expenses are based on the following assumptions.

- Each employee has a wife and two children.
- Contracts are for two-year periods.
- Average length of tour is three years.
- Travel allowance is computed at $600 per person.
- All employees come from outside Thailand.

To project salary expenses, an estimated cost of $25,000 a year has been used for the President and Vice President. To allow for comparability and adjustments, expenses for all international faculty and staff have been projected at the rates above, without consideration of the expected seconded position of many of them. Local living compensation costs are based on the schedule outlined earlier in this report.

Salary and related expense, as shown for degree programs in Exhibit VIII-4, is the most significant expense item, accounting for somewhat over 50 per cent of total expenses in all years included in the planning period. Scholarship assistance projected at an average of $1,500 per student is the second major cost item, accounting for 23 per cent of total expenses in 1977. Also shown in Exhibit VIII-4, the average cost of educating a student at the Institute is projected to remain at approximately the same level (around $8,000) during the next three years. In 1971-72, a small increase is expected, reflecting the additional expenses that will be incurred when the school occupies the new site. Thereafter, through the end of the planning period, the average cost is projected to decline from $8,090 in 1971-72 to $6,630 in 1977-78, primarily because of a more favorable ratio of administrative personnel to student and the average salary paid to faculty and staff members as more individuals are retained at the lower salary scales.

Projected operating expenses are summarized in Exhibit VIII-5 for both the degree programs and each of the special programs based on initial criteria. Salaries, wages and related expenses have been separated from other expenses, because they are the dominant items in all programs except sabbaticals where substantial research assistance is anticipated. If the Board adopts the consultants' proposal on these special programs, the additional expenses for special programs would not be needed.

Special program expense is programmed to increase from the modest level of $34,000 in 1968-69 to $891,000 in 1977-78, thus bringing the Institute's total

ASIAN INSTITUTE OF TECHNOLOGY

OPERATING EXPENSE PROJECTIONS FOR DEGREE PROGRAMS
1968-69 Through 1977-78
(Thousands Of Dollars)

	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Salaries and Related Expenses	$ 736	$ 806	$ 915	$1,134	$1,294	$1,542	$1,790	$2,047	$2,216	$2,461
Supplies, Materials and Publications	96	107	121	138	163	199	240	277	315	361
Computer Rental	18	18	18	-	-	-	-	-	-	-
Library	10	11	12	14	17	22	27	32	36	41
Repair and Maintenance	28	31	35	42	49	58	67	79	92	107
Utilities	24	26	29	79	114	153	207	244	320	383
Scholarships	248	274	303	339	416	543	687	792	892	1,020
Travel, Recruiting and Entertainment	50	52	55	58	60	64	67	70	74	78
Rent	101	101	101	-	-	-	-	-	-	-
Special Programs (Limited)	16	18	21	24	27	31	36	41	47	54
Total	$1,327	$1,444	$1,610	$1,828	$2,140	$2,612	$3,121	$3,582	$3,992	$4,505
Cost Per Student	$8,040	$7,890	$7,970	$8,090	$7,730	$7,220	$6,810	$6,780	$6,710	$6,630

EXHIBIT VIII-4

ASIAN INSTITUTE OF TECHNOLOGY

SUMMARY OF OPERATING EXPENSE PROJECTIONS
1968-69 Through 1977-78

($ U.S. In Thousands)

	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Degree Programs										
Salaries, wages and related	$ 736	$ 806	$ 915	$1,134	$1,294	$1,542	$1,790	$2,047	$2,216	$2,461
Other	591	638	695	694	846	1,070	1,331	1,535	1,776	2,044
Total	$1,327	$1,444	$1,610	$1,828	$2,140	$2,612	$3,121	$3,582	$3,992	$4,505
Special Programs										
Conferences										
Salaries, wages and related	$ 13	$ 28	$ 49	$ 62	$ 63	$ 89	$ 115	$ 152	$ 173	$ 199
Other	15	27	36	43	47	65	82	105	122	142
Subtotal	$ 28	$ 55	$ 85	$ 105	$ 110	$ 154	$ 197	$ 257	$ 295	$ 341
Institutes										
Salaries, wages and related	$ 3	$ 13	$ 24	$ 33	$ 35	$ 45	$ 61	$ 95	$ 109	$ 114
Other	3	8	14	18	21	26	35	52	60	64
Subtotal	$ 6	$ 21	$ 38	$ 51	$ 56	$ 71	$ 96	$ 147	$ 169	$ 178
Diploma										
Salaries, wages and related	-	-	$ 16	$ 16	$ 7	$ 21	$ 39	$ 56	$ 51	$ 49
Other	-	-	7	7	4	10	17	24	23	22
Subtotal	-	-	$ 23	$ 23	$ 11	$ 31	$ 56	$ 80	$ 74	$ 71
Sabbaticals										
Salaries, wages and related	-	$ 2	$ 5	$ 8	$ 10	$ 16	$ 21	$ 29	$ 35	$ 38
Other	-	10	19	29	39	59	78	107	127	136
Subtotal	-	$ 12	$ 24	$ 37	$ 49	$ 75	$ 99	$ 136	$ 162	$ 174
Regional Library										
Salaries, wages and related	-	$ 27	$ 32	$ 35	$ 37	$ 41	$ 41	$ 42	$ 42	$ 42
Other	-	7	9	10	10	11	11	11	12	12
Subtotal	-	$ 34	$ 41	$ 45	$ 47	$ 52	$ 52	$ 53	$ 54	$ 54
Publications										
Salaries, wages and related	-	$ 19	$ 19	$ 19	$ 19	$ 19	$ 19	$ 19	$ 19	$ 19
Other	-	14	14	14	14	14	14	14	14	14
Subtotal	-	$ 33	$ 33	$ 33	$ 33	$ 33	$ 33	$ 33	$ 33	$ 33
Temporary housing										
Salaries, wages and related	-	-	-	$ 11	$ 11	$ 13	$ 14	$ 15	$ 16	$ 17
Other	-	-	-	11	11	13	14	15	16	17
Subtotal	-	-	-	$ 22	$ 22	$ 26	$ 28	$ 30	$ 32	$ 34
Transportation										
Salaries, wages and related	-	-	-	$ 2	$ 2	$ 2	$ 3	$ 3	$ 4	$ 4
Other	-	-	-	1	1	1	2	2	2	2
Subtotal	-	-	-	$ 3	$ 3	$ 3	$ 5	$ 5	$ 6	$ 6
Total	$ 34	$ 155	$ 244	$ 319	$ 331	$ 445	$ 566	$ 741	$ 825	$ 891
Grand Total	$1,361	$1,599	$1,854	$2,147	$2,471	$3,057	$3,687	$4,323	$4,817	$5,396

EXHIBIT VIII-5

operating needs from the 1968-69 level of $1,361,000 a year to $5,396,000 during the 1977-78 fiscal year. All figures are in current U.S. dollars; thus if current inflation continues, the dollar requirements would be substantially greater and projections must be adjusted accordingly.

TOTAL FINANCIAL REQUIREMENTS

The total financial resources needed to build and operate the expanded Institute are presented in Exhibit VIII-6, on the following page. The total program calls for the expenditure of $46,446,000 over the nine-year period. To develop and operate the expanded degree programs and facilities, 83 per cent, or $38,625,000, will be required. The balance, $7,821,000, represents the requirements of the special programs based on initial criteria.

It is significant to note that the requirements of $30,712,000 for operating funds during the planning period is almost twice the $15,733,500 capital need and will probably be the most critical factor in the overall expansion program.

FINANCIAL VIABILITY OF AIT

The financial viability of AIT is not measurable in precise terms and is dependent on several important near- and long-term actions:

- The continued largesse of its major supporters over the next five to ten years

- A move into enlarged facilities that will permit expansion and growth of academic programs

- Development of an organization and program for aggressively promoting AIT among other nations - both Asian and Western - and for obtaining their financial support

- A public relations program that will inform AIT's public regarding its mission, programs and accomplishments, thus creating a favorable impression to be followed up by direct fund-raising approaches

- Perhaps most important, continued emphasis and development of educational programs of outstanding quality. The Institute cannot afford to compromise in this area; undoubtedly, it may have to refuse some offers of financial assistance where the intended purposes are inconsistent with its own programs, plans and mission.

The Board of Trustees and its membership must take an active part in locating financial support and ensuring the financial viability of AIT. Individual members of the Board must be willing to intercede with governmental and other agencies in their own countries to promote support for AIT. The survival of AIT, not to mention its growth and expansion, may well hinge on the extent to which individual Board members become active in soliciting support for AIT.

DEVELOPING THE FUND-RAISING PROGRAM

The important elements involved in developing the fund-raising program for AIT are organization, planning, establishing contacts, and execution and follow-up.

Organization

It is essential that AIT move with all deliberate speed in setting up and carrying out an intensive program for garnering greater support from the nations of southeastern Asia and the rest of the world, commerce and industry, foundations, individuals, and other potential sources. Because of the urgency of need for this action, AIT might consider retaining professional fund-raising counsel. A difficulty in this approach is that Asian nations know little of fund-raising as it is practiced in the United States and other western countries. Consequently, a professional fund-raising firm may have to learn fund-raising in Asia at AIT's expense. At the same time, there is a risk that the use of such counsel could result in unwise approaches to Asian nations, thus jeopardizing AIT's future possibilities of obtaining financial support.

In view of the difficulties and risks involved, it is suggested that AIT, before considering the use of outside counsel in fund raising, establish its own organization for this activity which would control the use of any outside counsel that may ultimately be used. Earlier in this report, it was recommended that a Vice President for Development and International Affairs be recruited and appointed and given responsibility for planning, organizing and administering an aggressive fund-raising program.

As his first responsibility, the Vice President for Development and International Affairs should prepare a detailed plan for promoting AIT and obtaining financial support from all possible sources.

Planning The Fund-Raising Program

To plan the fund-raising program, the Vice President for Development and International Affairs must first familiarize himself, as quickly as possible, with the history of AIT's support and with the known and possible sources of funds. He should work closely with, and give direction to, the Director of Public Relations, ensuring that the public relations program is designed and carried out in the most efficient and effective way. It is essential that a sound and effective public relations effort be launched before major sources are approached for funds.

Meanwhile, the Vice President - in collaboration with members of his staff, faculty members, the President, members of the Board of Trustees, and others as appropriate - should design a fund-raising program in great detail, including the packages of support to be offered to potential donors and the specific solicitation approaches to be used. The Development Committee of the Board of Trustees should work closely with the Vice President in establishing fund-raising approaches and goals and in making actual contacts.

Establishing Contacts

It is essential that contacts be made and channels of communications be opened with agencies and individuals in all nations and in all lines of endeavor that may be potential sources of financial support. The Vice President for Development and International Affairs should establish both formal and informal relations with the foreign embassies and ministries in Bangkok, as well as with the ministries and governmental agencies of Thailand itself. Many of the contacts to be made with other nations very likely should be through diplomatic channels, even though AIT is an independent institution for education. For example, it is essential that AIT have a sound and close working relationship with appropriate officials and members of the United States Embassy in Thailand and with the various ministries of the United States located in the host country. By the same token, sound communications and close working relationships should be established with host country agencies, officials and other important individuals and agencies. An initial approach to a country such as Japan, for example, may be made on a quasi-diplomatic level, involving perhaps embassy officials of the United States and Thailand as well as trustees and administrators of AIT.

In addition to governmental agencies, contacts should be established and channels of communications opened with foundations that are potential supporters of AIT, with commercial and industrial organizations having business in Asia,

ASIAN INSTITUTE OF TECHNOLOGY

SUMMARY OF ANNUAL AND TOTAL FINANCIAL REQUIREMENTS
1968-69 Through 1977-78

($ U.S. In Thousands)

	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	Total
Degree Programs											
Capital	$ 447	$2,901	$3,738	$1,236	$1,439	$1,029	$ 559	$ 776	$ 339	-	$12,464
Operating	1,327	1,444	1,610	1,828	2,140	2,612	3,121	3,582	3,992	$4,505	26,161
Total	$1,774	$4,345	$5,348	$3,064	$3,579	$3,641	$3,680	$4,358	$4,331	$4,505	$38,625
Special Programs											
Conferences											
Capital	$ 2	$ 67	$ 123	-	$ 28	$ 78	$ 80	$ 11	-	-	$ 389
Operating	28	55	85	$ 105	110	154	197	257	$ 295	$ 341	1,627
Subtotal	$ 30	$ 122	$ 208	$ 105	$ 138	$ 232	$ 277	$ 268	$ 295	$ 341	$ 2,016
Institutes											
Capital	$ 1	$ 31	$ 64	-	$ 18	$ 42	$ 46	$ 8	-	-	$ 210
Operating	6	21	38	$ 51	56	71	96	147	$ 169	$ 178	833
Subtotal	$ 7	$ 52	$ 102	$ 51	$ 74	$ 113	$ 142	$ 155	$ 169	$ 178	$ 1,043
Diploma											
Capital	$ 1	$ 17	$ 34	-	$ 9	$ 23	$ 24	$ 3	-	-	$ 111
Operating	-	-	23	$ 23	11	31	56	80	$ 74	$ 71	369
Subtotal	$ 1	$ 17	$ 57	$ 23	$ 20	$ 54	$ 80	$ 83	$ 74	$ 71	$ 480
Saboaticals											
Capital	$ 1	$ 39	$ 89	-	$ 26	$ 56	$ 70	$ 11	-	-	$ 292
Operating	-	12	24	$ 37	49	75	99	136	$ 162	$ 174	768
Subtotal	$ 1	$ 51	$ 113	$ 37	$ 75	$ 131	$ 169	$ 147	$ 162	$ 174	$ 1,060
Regional Library											
Capital	$ 65	$ 323	$ 229	$ 52	$ (51)	$ 32	$ 98	$ 104	$ 110	-	$ 962
Operating	-	34	41	45	47	52	52	53	54	$ 54	432
Subtotal	$ 65	$ 357	$ 270	$ 97	$ (4)	$ 84	$ 150	$ 157	$ 164	$ 54	$ 1,394
Publications											
Capital	-	$ 7	$ 6	-	-	$ 2	$ 2	-	-	-	$ 17
Operating	-	33	33	$ 33	$ 33	33	33	$ 33	$ 33	$ 33	297
Subtotal	-	$ 40	$ 39	$ 33	$ 33	$ 35	$ 35	$ 33	$ 33	$ 33	$ 314
Temporary housing											
Capital	$ 19	$ 559	$ 389	-	$ 6	$ 186	$ 130	-	-	-	$ 1,289
Operating	-	-	-	$ 22	22	26	28	$ 30	$ 32	$ 34	194
Subtotal	$ 19	$ 559	$ 389	$ 22	$ 28	$ 212	$ 158	$ 30	$ 32	$ 34	$ 1,483
Transporation											
Capital	-	-	-	-	-	-	-	-	-	-	-
Operating	-	-	-	$ 3	$ 3	$ 3	$ 5	$ 5	$ 6	$ 6	$ 31
Subtotal	-	-	-	$ 3	$ 3	$ 3	$ 5	$ 5	$ 6	$ 6	$ 31
Total	$ 123	$1,198	$1,178	$ 371	$ 367	$ 864	$1,016	$ 878	$ 935	$ 891	$ 7,821
Grand Total	$1,897	$5,543	$6,526	$3,435	$3,946	$4,505	$4,696	$5,236	$5,266	$5,396	$46,446

EXHIBIT VIII-6

and with associations of all kinds and individuals. The Institute cannot afford to adopt a completely independent posture where these kinds of organizations and potential supporters are concerned. There is plenty of room in such relationships for differences of opinion concerning the mission and program of AIT. It is best if these differences are recognized and acknowledged on a friendly basis, so that contacts and communications between AIT and the party concerned can be maintained. Specifically, AIT should reestablish and cultivate friendly relationships with the Ford Foundation, and the Southeast Asian Ministers of Education Secretariat, among others.

A file of dossiers on each of the possible sources of support for AIT should be developed and maintained. Each dossier should contain such information concerning the source as names of individuals who are important to know and keep in touch with, personal characteristics of these individuals, history of the approaches and contacts that have been made, records of the support they have provided, indications of pledges that have been made for future support, and any other facts that may be significant in reviewing the fund-raising program and in planning future approaches.

Follow-up

The Vice President for Development and International Affairs, although having responsibility for the fund-raising program, should ensure that the appropriate persons are used in making the actual approaches. For example, it may be desirable for the President of AIT to make an initial or follow-up approach to some potential sources. In other instances, one or more members of the Board of Trustees might make the approach; sometimes the Vice President himself may make the approach.

The Vice President should ensure that meaningful and attractive presentation material is prepared for use in approaching potential donors for funds, and that reports are submitted on the pertinent aspects and results of the approach. The Vice President should establish a procedure for regularly following up on approaches according to the success, or lack of success, achieved in the initial and subsequent approaches. These too should be recorded and scheduled in the appropriate dossier.

Success in planning, organizing and administering a fund-raising program is crucial if AIT is to survive and grow and develop. The plans for such a program must be creative and appealing. These plans must be aggressively pursued, and the many details involved in a successful fund-raising program must receive careful attention, including follow-up on a regular basis.

PAST SOURCES OF FUNDS

The primary source of funds for AIT and its predecessor have been governments, which have contributed in cash and kind. Exhibit VIII-7, on the following page, presents the sources of funds, by year; donations in kind are valued in monetary terms and included in the total Institute income, as explained in Chapter II, Section F.

Government support has ranged between 87 and 98 per cent of the total income received. The largest single government supporter has been the United States, which has consistently provided about two-thirds of the total funds. Thailand is the second largest government contributor, averaging over 13 per cent of the total income during the history of the Institute. Support from the United Kingdom has fluctuated, but has represented over 10 per cent of the total for the last 10 years. Thus, three countries have contributed nearly 89 per cent of AIT's total support since its founding. In the fiscal year 1968-69, these same three countries are projected to provide about 92 per cent of AIT's support. Australia, France and New Zealand are the other non-Asian countries that have provided income to the Institute. Australia's support has been consistent at about 2 per cent of AIT's total income, while New Zealand's percentage contribution has declined from close to 6 per cent to well under 1 per cent. France seconded a faculty member for seven years, but made no contribution in 1967. Funds from Asian countries other than Thailand have come from Pakistan and the Philippines on an irregular basis and in token amounts.

One regional organization, SEATO, as the founding organization of the School, has donated a constant dollar amount each year, representing a decreasing percentage of the total income of AIT.

Additional income is classified as research and miscellaneous income, and includes such income as tuition, fees, book sales, equipment (primarily vehicle sales) and special program fees. The largest portion of this income, however, was received from research contracts. Between 1962 and 1965, the School provided space, personnel brokerage and laboratory testing services under a contract with the joint Thai-American Combat Development and Test Center. Other contract work was done for the Advanced Research Projects Agency of the United States government, for other governments, and for private companies. The contract research program was curtailed in 1966 because of a lack of laboratory space and a reassessment of contract research goals.

ASIAN INSTITUTE OF TECHNOLOGY

PAST SOURCES OF FUNDS
1959-60 Through 1967-68

Source Of Funds	1959-60	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	Total
Governments										
Australia	1.1%	1.9%	2.0%	1.7%	1.7%	-	1.9%	2.4%	2.2%	1.7%
France	-	2.1	2.9	2.6	2.6	2.8%	3.0	2.4	-	2.0
New Zealand	5.8	4.4	3.5	3.0	3.0	0.5	0.4	0.4	0.2	1.9
Pakistan	-	0.4	-	-	0.2	-	-	-	-	0.1
Philippines	2.2	-	-	-	1.1	1.2	-	-	-	0.4
Thailand	8.8	11.5	12.7	12.8	13.8	14.7	16.5	13.5	11.6	13.1
United Kingdom	18.1	5.7	5.4	4.1	3.8	8.0	7.2	12.3	11.4	8.3
United States	61.2	71.9	71.9	70.2	60.5	63.1	65.3	66.3	73.0	67.4
Regional Organization - SEATO	2.8	2.1	1.6	1.3	1.3	1.3	1.3	1.0	0.9	1.3
Other - Research And Miscellaneous	-	-	-	4.3	12.0	8.4	4.4	1.7	0.7	3.8
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

EXHIBIT VIII-7

POTENTIAL FUTURE FUNDING SOURCES

There are several sources of funds that should be approached to meet future funding needs. Ten major categories of sources are identified and discussed below.

Governments

Both Asian and non-Asian governments represent the greatest potential sources of continued support over the foreseeable future. Few Asian governments have given material support to the Institute, and except for Thailand, support has been irregular and in token amounts.

If AIT is to continue to grow as a permanent and effective regional institution, it must receive significant, if not major, support from the region. The Institute should adopt, as an objective, the cultivation and promotion of greater support at a substantially higher level by the governments of the region. Since ability to pay varies greatly among Asian nations, a formula or plan must be developed to assess and assign targets for each nation.

Notably missing from the list of Asian government donors to AIT are Japan and Taiwan, probably because of the Institute's earlier SEATO affiliation. Japan, as the most highly developed Asian nation, both industrially and economically, would benefit greatly from technological improvements and economic gains in the other nations of the region and thus should be aggressively sought as an AIT supporter. Taiwan, also, has advanced economically, and should be cultivated as a supporter of AIT.

However, non-Asian governments will continue to represent a major source of funds for the next few years. The United States is committed to provide up to $18 million over the next five to seven years, on a matching basis, for capital and operational needs. In effect, this would reduce the level of United States support from its historical two-thirds to one-half, although the actual dollar amount may be substantially greater than in the past, depending on AIT's ability to raise the matching funds. Beyond that period, it is difficult to ascertain support, but it may be assumed that the United States would reduce somewhat more its percentage of total support in the future. The United Kingdom has increased its contributions in the last two years and, at this time, may increase its support. Indications are that Australia and New Zealand will continue their levels of support over the next few years; they also represent a good potential for increased support. Future support from France at this time is questionable. Among the developed non-Asian countries

conspicuously absent from the list of those supporting AIT are Canada, Austria, The Netherlands, the Scandinavian countries and West Germany. Because of their absence from SEATO and their stake in the economic advancement of southeastern Asia, they represent potential sources of support.

The ministries, departments and agencies of many government organizations that are likely to have assistance funds for allocation include international development, regional development, education, public health, agriculture, commerce, labor, and military units.

Quasi-Government Units

This category includes organizations, agencies, foundations and businesses, which, although government-owned or -supported, still retain substantial autonomy for independent action. One grouping of quasi-government units might include public health, public science, public power, public communications, intelligence, and volunteer organizations. A request for support of a program related directly to public health engineering might be favorably considered by a public health organization; engineering research might be funded by a public science foundation; funds to support electrical engineering courses might be solicited from public power and electronic communications organizations.

Another grouping of quasi-government units might include utility companies and government-owned businesses and monopolies. Utility companies represent a good potential source of funds for proposed programs in electrical and mechanical engineering. Government-owned businesses and monopolies may be engaged in a wide variety of such ventures as mining, processing, primary metals, transportation and manufacturing. Each must be analyzed individually in order to assess its potential for support of AIT. Generally, the possibilities for significant support from this source appear to be good.

International Organizations

The United Nations, as the largest of the worldwide organizations, and its units, particularly United Nations Education, Scientific and Cultural Organizations, United Nations Development Program, World Health Organization, Food and Agriculture Organization, and the Economic Commission for Asia and the Far East are potential sources of direct and indirect financial support. Indirect support might be in the form of educational grants to a country in which they are earmarked for AIT students or programs. The potential for direct support appears to be limited, but specific short-term requests might receive favorable consideration.

Although other international organizations, such as the International Labor Organization, the International Association of Universities and the World Chamber of Commerce, do not appear to have as much potential as financial supporters of AIT, these organizations may consider specific requests. The International Monetary Fund and the International Development Bank probably would not contribute any funds to AIT.

Regional Organizations

The future role of the South East Asia Treaty Organization in the direct funding of its ex affiliate is not clear at this time. From 1959 through 1967, SEATO contributed $10,000 each year in unrestricted funds, but apparently there has been no discussion on the continuation of such support. SEATO awards scholarships for advanced study to students from SEATO member countries. Prior to disaffiliation, all students admitted to the School from SEATO countries were offered scholarships. With AIT's independent status, it appears that SEATO scholarships could be used for study at AIT.

The South East Asia Ministers of Education Secretariat (SEAMES) may represent a source of funds in the future.

The Economic Commission for Asia and the Far East (a regional commission of the United Nations) has as one of its projects the Committee for Coordination of Investigation of the Lower Mekong Basin, a massive undertaking for which funds could be given to AIT for training engineers and performing research. The Food and Agriculture Organization, another United Nations agency, already has informally discussed with AIT the possibility of developing at AIT a regional center for training in water management. Such a center would involve substantial programs of funded training and research.

The Colombo Plan, under the Ministry of Overseas Development of the United Kingdom, provides technical assistance and equipment to countries of southeastern Asia, and AIT might be able to participate in this program.

The Asian Development Bank does not appear to have potential as a source of direct funds, although AIT may benefit indirectly from its loans to participating countries in the region.

Foundations

The potential for obtaining support funds from foundations appears to be quite high. The approach to be used in soliciting support would necessarily vary according to the purpose, scope of operations, funding history, etc., of a particular foundation and its classification as international, regional, or national in interest. Before exploiting this source of funds, AIT must develop information on the history and operation of the foundations most likely to become sponsors of a regional educational institution.

Commerce And Industry

Another potential source of funds for AIT is commerce and industry, in which organizations are classified as international, multinational, regional and national in scope of interest and operation.

Associations

The major types of associations that may be considered as potential supporters of AIT include engineering, educational, trade, unions and professional associations. With the possible exception of some trade associations and some unions, there is a general lack of strength and financial ability among associations in southeastern Asia that makes this a category of questionable potential for AIT fund-raising.

Religious Organizations

The inclusion of religious organizations among potential supporters of AIT is questionable, although there may be some indirect support to students through educational or charitable missions.

Other Organizations

Other types of organizations to be considered are political, fraternal and ethnic groups from which the potential as fund sources is virtually nonexistent.

Individuals

Contributions from individuals may be classified as coming from alumni and friends, although the alumni potential in the near future is limited. The Institute should strive to maintain contact with its graduates and to develop an alumni program that initially would be devoted to news about alumni, but eventually it would be used in fund-raising. Private individuals from all over

the world represent a high potential source for financial support. To a large extent, AIT must rely on the contacts of its Board members in raising funds from individuals, and again, for best results, should tailor its funding proposals to specific rather than general purposes. Funds may be solicited as current donations or as deferred giving in the form of trusts or estates.

TYPES OF FUNDS NEEDED

Capital and operating fund needs are discussed below, along with indications of the most likely sources of funds for each.

Endowment Funds

Foundations, commerce and industry, and individuals are the greatest potential sources of endowment funds. Donations from foundations for endowment purposes most likely would be matching fund arrangements similar to those used frequently by the Ford Foundation of the United States. Matching fund donations can supply impetus and motivation to an institution and its potential donors in a large fund-raising campaign.

Both commerce and industry and individuals are potential donors of endowment funds for a variety of specific purposes. Student scholarship awards may be named in honor of an organization or an individual. Special and restricted scholarships may be established for students from a designated country, in a certain discipline or option, in a master's or doctoral program, and for a variety of purposes. Endowments could be established to support a professorial chair or to pay for a periodic technological conference in the name of the donors. Endowment contributions could also be promoted for funding annual library acquisitions, equipment purchases, building maintenance, or faculty and student research.

Capital Funds

Planning a new campus, preparing the site, building roads, installing utilities, constructing buildings, and purchasing furniture, equipment and books are all activities requiring expenditure of capital funds. Timing is extremely important in raising capital funds, not only because of the lag between the planning and the completion of physical facilities, but also because program development and growth in size, both of which must be planned well in advance, depend to a large extent on the availability of adequate facilities.

The most likely potential sources of capital funds are governments, commerce and industry, and individuals, with governments by far predominant. As noted earlier, the United States has promised to supply - on a matching basis - 50 per cent of the capital needs of AIT over the next five to seven years, up to about $9 million in total. Several governments are said to have indicated willingness to support the capital needs of AIT, although there is a lack of tangible evidence to support this claim. It appears that Thailand, the United States and, to some extent, the United Kingdom may be the primary suppliers of capital funds for the less tangible and less glamorous but vital areas of planning, site development, and road and utility construction. Other countries may be expected to join these three in contributing capital finances for building construction, purchases, equipment, library acquisitions and development of computer facilities - all capital projects that provide greater visibility in the international development assistance scene.

Commerce and industry appears a likely source of finances for specific laboratories and equipment and a remote possibility as a fund source for major construction. Furniture, furnishings, books, vehicles, tools, air-conditioning units, etc., might also be financed by commerce and industry.

Individuals appear to have little potential as substantial contributors of capital funds.

Operating Funds

Substantial finances are needed for such expenses incurred in the general operation of AIT as salaries, benefits and allowances, scholarships, supplies, travel, and maintenance of buildings and grounds.

Contributions of funds for operational expenses are potentially available from several sources. Governments are the source of greatest potential for funds to cover faculty salaries (both seconded and direct hire), allowances, travel, scholarships, grant and contract research, library acquisitions, special program support, academic program development, etc. Other possible sources of operational funds are quasi-government units, international organizations, foundations, commerce and industry, and individuals. Regional and other organizations are of questionable potential as sources of operational funds, but they may provide some funds for scholarships.

FUNDING APPROACHES

Some approaches to promoting financial support of AIT are discussed below.

Academic Program Development

In approaching prospective donors for financial support of its academic program development, AIT must rely on its own carefully formulated academic plans for the future. Any funds sought and obtained for program development costs should not impose upon AIT a departure from its stated mission and educational objectives.

It is possible to package AIT's current plans for academic development so that they would be attractive to prospective donors. For example, current plans now propose that AIT definitely will move into electrical and mechanical engineering in the future. Presentations could be prepared for fund solicitation purposes, describing these plans in an exciting way, showing the staffing and cost factors involved in detailing the plans for each area, and identifying the contributions of such programs to the economic welfare of the region. In the future, as the need for other programs is more specifically identified, this, too, could be presented in such a way as to attract financial support from outside sources.

Possible sources of funds for academic program development include governments, commerce and industry, foundations, and associations.

Faculty Support

In the past, support of faculty members has come almost exclusively from governments through secondment, wherein a faculty member is recruited for AIT and is compensated for salary and allowances by an agency of his home government, while serving at AIT. The Institute generally is not involved in the compensation procedure and often is not even informed on the details and terms of the compensation agreement. Although AIT has established a long-term goal of 70 per cent of its faculty under direct hire by AIT, the secondment of faculty by governments will continue to be an important source of financial support, and must be aggressively promoted.

In addition to promoting secondment of individual faculty members by governmental agencies, AIT should prepare presentations for promoting, among the various governments, support of larger segments of academic costs. For example, these costs would include secondments of faculty members, along with contributions of additional funds to cover the technical and administrative support they require. Costs for expenses for research supplies and equipment could be included as well, and perhaps even some amount for grants-in-aid to students who may study and work under the professors involved. Long-term commitments by governments of such large segments of academic support should receive recognition and visibility through naming professional chairs for sponsoring country or governmental agencies. Although governments providing such support may have the privilege of recommending professors to fill the chairs involved, or may stipulate that such professors be from specific countries or regions, AIT must give final approval of the faculty members.

Similar presentations may be prepared to solicit funds from individuals, commerce and industry, and foundations to endow one or more professorial chairs. The amount of endowment to be sought for each such chair should be sufficient to produce investment income each year, to cover a professor's salary and allowances, as well as the support of research personnel, research costs, secretarial help and student grants-in-aid. Such endowments or professorial chairs may be named by, or in honor of, the donor; however, the professors selected to fill these chairs must be acceptable to AIT.

Student Scholarships

Student scholarships are probably more appealing to potential donors of funds than other areas of AIT operations. The amounts of funds needed for each scholarship are relatively low, and a donor can identify readily with the recipient, as well as gain visibility as a philanthropist.

The Board of Trustees approved a scholarship program at its July 1968 meeting. The approved program is based on the 21-month period normally required for completion of the master's program, with a total scholarship amount of $8,500 (including tuition, fees, stipends, books and transportation). A summary of the components follows:

Tuition for four regular semesters at $1,200 per semester	$4,800
Tuition for one summer session	800
Research fee (paid at beginning of third semester)	600
Medical and general fees at $60 per semester and summer session	300
Student stipend at $75 per month for 21 months	1,575
Books and supplies (average)	225
Air transportation (average)	200
Total	$8,500

Apparently, no provisions are included in this program for the cost of the special English course given to some new students prior to their first semester or for the student stipends for these students during this course.

The increased tuition in the scholarship program more closely approximates the actual cost to AIT of educating a master's candidate, although it still falls short of covering the total cost by about $5,500. Over the last three fiscal years, the operating cost per student has ranged between $8,200 and $8,400 a year. This cost is projected to rise significantly in the next few years and then to drop to a little less than $7,000 per student by 1977. Thus, although the new plan represents a potential improvement over present funding methods, it still leaves a sizeable amount of each student's education to be subsidized.

The total amount of each scholarship in the approved program was established at $8,500, in order to keep it at a lower annual cost than the $5,000 that is estimated to support an Asian student at a western university for one year. A comprehensive annual survey on international student exchange for the academic year 1967-68 was conducted by the Institute of International Education. According to that survey, only 2 per cent of the students from southeastern Asia (including Japan) studying in the United States were receiving support from a foreign (non-U. S.) government. Thus, it appears there is little relevance, where Asian governments are concerned, in establishing the scholarship program at a figure below AIT's actual cost.

Scholarships should be solicited in a number of ways, one being through endowments. If funds are donated for establishing scholarship endowments, investment income for scholarships would be ensured over an indefinite period of time. The size of an endowment fund must be great enough to produce

sufficient funds at a modest rate of return. The primary sources of scholarship endowment funds are from commerce and industry and individuals.

On an annual basis, scholarship contributions are within the means of any of the sources of funds discussed earlier. The ability of the donor to be identified with the scholarship award, and the sense of direct rather than indirect support of education, makes scholarship support a popular funding item.

Research Support

Support for research at AIT, in the form of grants and contracts from governments, commerce and industry, foundations, and associations, should be promoted. Either grants or contracts may be solicited for the same kinds of research; however, grants are preferable, since contracts are more binding and generally involve greater administrative detail. Generally both are awarded on the basis of a research proposal which includes an estimated cost budget. The budget should include professional time, salaries of Research Associates, student assistants and secretarial help, as well as well as travel, supplies, communication, equipment, etc. In addition, an overhead charge should be included, to reimburse the Institute for such indirect charges as light, air conditioning, space costs and accounting and administrative charges. Such overhead funds represent discretionary income for the Institute.

The approach for research grants and contracts must be made through the faculty, although a conducive and receptive atmosphere created by the administration would be of great help. Once faculty interest is stimulated, the fund-raising staff should assist by identifying likely funding sources and helping the faculty in making initial contacts and in grant or contract negotiations.

Funds should also be solicited to reward professors and students for outstanding accomplishments in research work. Such rewards may be made by setting up discretionary budget accounts to be used for individual research projects. These awards could be made in the name of principal donors. Commerce and industry and individuals represent the most probable sources of funds for this purpose.

Equipment

Funds for equipment or donations of equipment are most likely to come from commerce and industry and governments, and to a lesser extent, from other sources such as quasi-government units and associations. The most

satisfactory arrangement for AIT would be to persuade a donor to finance a comprehensive package, such as a fully equipped laboratory building and to make a commitment of annual funds or an endowment to cover the maintenance or replacement of equipment and the maintenance of the building.

The United Kingdom is now seconding two technicians and providing one shop assistant under the Voluntary Services Overseas program. These three are significantly involved in the construction and maintenance of equipment. Continued and increased secondment or support of qualified direct-hire technicians should be encouraged from governments and commerce and industry.

One approach to promoting financial support for the library is the establishment of an endowment that would generate annual income for use in the acquisition of books. Areas of acquisition from endowments may be unrestricted or restricted to one or more of such areas as soil engineering, organic chemistry, computer technology, etc. The best potential sources for fund-raising for library acquisition purposes are commerce and industry and individuals.

Annual or occasional contributions of finances, books and other library essentials may be successfully solicited from a variety of sources, including governments, quasi-government units, commerce and industry, international organizations, regional organizations, foundations and associations. Contributions should be acknowledged through bookplates and appropriate announcements.

Computer Operations

Support for computer operations - including donations of equipment, and software and financial contributions toward operating costs - should be aggressively pursued. The sources of greatest potential for donations of equipment and software appear to be government, commerce and industry, and individuals. Solicitation of contributions for operating costs may be most favorably received by foundations, commerce and industry, governments, and individuals.

Research grants and contracts should also include provision for financial support of computer operations where computer use is an integral part of the research. This form of computer support would come mostly from research agreements with commerce and industry, governments, foundations, and associations.

Special Programs

The entire special program package of AIT should be self-sustaining through both revenues and designated gifts, which would cover all costs of the special programs including a portion of the operating overhead. Thus, the salaries of all staff time devoted to special programs and the direct expenses for the programs should be recovered. Since it appears unlikely that revenues from special programs would be sufficient to cover all of these costs, substantial outside funding will be needed.

Annual or periodic conferences or institutes covering general or specific topics could be promoted for sponsorship among commerce and industry, governments, foundations, and international and regional organizations. Programs could be named after or by donors.

Partial or full support of some conferences and institutions could be obtained from commerce and industry, governments, foundations, associations and others may be designated for such costs as honoraria and expenses for guest lecturers as well as others.

The regional publications program should be attractive to, and elicit support from, associations and commerce and industry, while the regional library should receive support from a variety of groups as discussed under the degree program library.

Buildings And Physical Facilities

The new campus plans project the construction of many new buildings, including an administration building, classroom buildings, a President's house, dormitories, faculty housing, maintenance and operations facilities, a student center, and recreational fields and facilities. Depending on the scope and level of special program activity, an international center building may be needed. The best potential sources of finances for these needs appear to be governments, commerce and industry, and individuals. Funds donated for entire or major parts of buildings could be named after or by donors as a permanent and visible recognition of support.

The Institute should consider promoting an agreement from donors to support the maintenance of structures by establishing endowments or by pledging annual contributions.

IX - SUMMARY OF PROPOSED PLAN AND ALTERNATIVES

IX - SUMMARY OF PROPOSED PLAN AND ALTERNATIVES

The following chapter summarizes the proposed development plan discussed in the preceding chapters. Within the proposed plan, there are several alternatives in the event of a lack of available supporting funds or other program development limitations.

SUMMARY OF PROPOSED PLAN

Exhibit IX-1, on the following page, presents the principal features and implications of the proposed plan.

Program Growth

As seen on the exhibit, most program growth (that is, additions of new and expanded disciplines) is scheduled to occur after the relocation of AIT to its new campus site. Civil engineering, however, is projected to grow moderately in the next three years, with a doctoral program introduced in 1971-72. All conferences, institutes, diploma programs, etc., are projected to continue to increase in relation to the overall degree of program growth.

Mechanical engineering is introduced in 1972-73, electrical engineering in 1973-74 and Program X is introduced in 1974-75. In each of these disciplines, a doctoral program is introduced after four years of program experience at the master's level.

Enrollments

Enrollments are projected to grow at an accelerating rate, with total enrollment in degree programs increasing from 175 in 1968-69 to 684 in 1977-78. The enrollment projections through 1977-78 are not program limits, but merely what are reasonably attainable growth patterns. With the exception of civil engineering, which will grow to a limit of 251 students, enrollment in the remaining programs will continue to grow beyond the planning period. It is anticipated that total enrollment would reach 2,000 FTE students in mid-1984.

ASIAN INSTITUTE OF TECHNOLOGY

SUMMARY OF PROPOSED PLAN FOR DEGREE PROGRAMS
1968-69 Through 1977-78

	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Programs										
Civil engineering	X	→	→	→	→	→	→	→	→	→
Mechanical engineering					X	→	→	→	→	→
Electrical engineering						X	→	→	→	→
Program X							X	→	→	→
Special Programs	X	→	→	→	→	→	→	→	→	→
Enrollments	175	187	206	230	282	367	463	532	599	684
Faculty complement	30.25	34.25	37.25	44.75	53.75	66.75	81.00	96.25	105.50	119.75
FTE staff complement	89.5	96.5	112.5	191.0	210.0	248.0	281.0	310.5	338.5	358.5
Capital fund requirements (000)	$447.0	$2,901.1	$3,738.2	$1,236.0	$1,438.8	$1,029.7	$558.8	$775.5	$338.5	-
Operating expense projections (000)	$1,327.0	$1,444.0	$1,610.0	$1,828.0	$2,140.0	$2,612.0	$3,121.0	$3,582.0	$3,992.0	$4,505.0
Cost per student	$8,040	$7,890	$7,970	$8,090	$7,730	$7,220	$6,810	$6,780	$6,710	$6,630
Total fund requirement for all programs (000)	$1,897	$5,543	$6,526	$3,435	$3,946	$4,505	$4,696	$5,236	$5,266	$5,396

EXHIBIT IX-1

Supporting Faculty

Supporting faculty will increase in direct relation to both the total numbers of students projected and the composition of the overall student body. As more students are enrolled at the research levels (second year and beyond) in both the master's and doctoral programs, the ratio of students to faculty will diminish because more faculty time is required. The faculty composition over the planning period increases from about 30 full-time equivalents in 1968-69 to about 120 in 1977-78.

Supporting Staff

The FTE supporting staff is scheduled on the basis of the increasing requirements for administrative support, as well as operations and maintenance support. The total nonfaculty staff increases from about 90 full-time equivalents in 1968-69 to about 359 in 1977-78. Much of the growth is, of course, a reflection of the operation and maintenance requirements at the new campus, where services now are either furnished by the host university (Chulalongkorn University), or contracted for.

Capital Fund Requirements

Fund requirements for the proposed construction program are scheduled over the construction period; thus, annual requirements will vary. About $7.5 million will be needed for the first phase of construction. Capital fund requirements are not shown for 1977-78 because the construction program precedes the academic program by one year. A construction program for 1977-78 would be based on the 1978-79 enrollment.

Operating Expenses

Operating expense requirements, reflecting the detailed development of professional and nonprofessional staffing, and other scheduled cost factors, will increase from $1,327,000 in 1968-69 to $4,505,000 in 1977-78. The cost per student follows in a general downward trend, except for the initial years of the new campus occupancy when there will be extraordinary requirements to man the greatly expanded campus and facilities.

The 1968-69 cost per student is estimated at $8,040. After stability is achieved at the new campus - that is, by 1977-78 - this is expected to decline to about $6,630, reflecting the greater educational efficiency possible in the expanded plant.

Total Funding Requirements

If all special programs expand at the rate estimated in the initial criteria, total funding requirements will amount to approximately $46,446,000 through the planning period.

Special Programs

Exhibit IX-2 through IX-7, on the following pages, recapitulate the individual initial criteria and requirements for the special programs. As mentioned previously, the extent of program expansion and involvement shown on these exhibits is not endorsed by the consultants. All special programs are represented in the projection of the regular degree program at a level of growth somewhat paralleling the growth of the degree programs. The implementation of the special programs at the level shown on the exhibits would raise the initial capital requirements for occupancy of the new campus by approximately $2.1 million and by over $3.2 million during the entire ten-year planning period. Operating funds required to support the expanded special programs would range from the 1968-69 estimate of $34,000 to $891,000 in 1977-78.

The capital and operating requirements, based on the consultants' proposed criteria for special programs, are summarized on Exhibit IX-1. However, total fund requirements for all programs, shown on the same exhibit, also include the cost for the proposed programs based on the initial criteria. (See Exhibit VIII-6 for details.)

* * * * *

The primary limitation on the accomplishment of the proposed plan will be the ability of AIT to attract both capital and operating funds.

The Institute will have to be able to commit capital funds in "construction packages," to ensure that a project once begun will be completed. The initial funding requirement for the academic program with limited special programs at the new campus will be $7,469,300, and should be scheduled, as follows:

ASIAN INSTITUTE OF TECHNOLOGY

SUMMARY OF SPECIAL CONFERENCE PROGRAM

These are professional meetings on matters of current importance in engineering and related technology, with guest lecturers, presentation of research and other papers by AIT faculty members, and technical work and seminar sessions. Practicing engineers, educators and other experts in the subject area will participate.

Planning Criteria

2 conferences per AIT degree option
100 participants each conference
1 week average conference length
40 participant-weeks = 1.0 FTE

	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Projection Of Conferences And Participants										
Number of conferences	3	5	6	7	8	11	14	17	20	24
Participants	300	500	600	700	800	1,100	1,400	1,700	2,000	2,400
Full-time equivalents	7.5	12.5	15.0	17.5	20.0	27.5	35.0	42.5	50.0	60.0
Faculty Support (FTE)										
Total faculty needed	1.8	3.0	3.6	4.2	4.8	6.6	8.4	10.8	12.6	15.0
Needs provided by degree program faculty	0.8	1.0	0.5	0.7	1.2	1.3	1.5	1.6	2.1	2.7
Additional faculty needs	1.0	2.0	3.1	3.5	3.6	5.3	6.9	9.2	10.5	12.3
Plus guest lecturers	2.0	3.0	3.0	4.0	4.0	6.0	7.0	9.0	10.0	12.0
Nonfaculty Staff Support (FTE)	0.3	0.7	2.2	4.3	5.3	5.9	6.6	8.5	9.0	9.6
Additional Facilities Needed										
Academic space (thousands of gross square feet)										
Laboratory			1.4	1.3	1.9	2.5	3.3	3.6	4.3	
Classroom			1.3	1.3	2.5	4.7	8.4	8.4	8.7	
Office and other			1.3	1.4	1.7	2.0	2.7	2.8	3.2	
Total			4.0	4.0	6.1	9.2	14.4	14.8	16.2	
Housing Units										
Single-family			1.5	1.5	1.9	2.8	3.0	3.6	4.3	
Apartments			2.5	2.5	3.4	4.1	5.7	6.7	7.7	
Hotel			91.0	91.0	107.0	123.0	163.0	166.0	170.0	
Total			95.0	95.0	112.3	129.9	171.7	176.3	182.0	

Other Considerations

Publication of proceedings; promotional efforts and costs required; transportation problems; may generate modest revenues; main support from fund-raising efforts.

ASIAN INSTITUTE OF TECHNOLOGY

SUMMARY OF SPECIAL INSTITUTE PROGRAM

This program consists of intensified noncredit study in specific areas of engineering, using classroom lectures, seminars, laboratory workshops and field trips. Practicing engineers are the major participants.

Planning Criteria

1 institute per AIT degree option
30 participants in each institute
3 weeks average institute length
40 participant-weeks = 1.0 FTE

	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Projection Of Institutes And Participants										
Number of institutes	1	2	3	4	5	6	8	11	13	14
Participants	30	60	90	120	150	180	240	330	390	420
Full-time equivalents	2.3	4.5	6.8	9.0	11.3	13.5	18.0	24.8	29.3	31.5
Faculty Support (FTE)										
Total faculty needed	0.6	1.2	1.8	2.4	3.0	3.6	4.8	7.1	8.3	8.9
Needs provided by degree program faculty	0.3	0.3	0.2	0.3	0.7	0.7	0.8	1.0	1.3	1.5
Additional faculty needs	0.3	0.9	1.6	2.1	2.3	2.9	4.0	6.1	7.0	7.4
Nonfaculty Staff Support (FTE)	0.2	0.3	1.1	1.4	1.4	1.6	2.1	2.9	3.2	3.4
Additional Facilities Needed										
Academic space (thousands of gross square feet)										
Laboratory			0.8	0.8	1.1	1.4	2.2	2.4	2.6	
Classroom			0.2	0.2	0.4	0.8	1.5	1.5	1.5	
Office			0.6	0.6	0.7	0.9	1.4	1.5	1.6	
Total			1.6	1.6	2.2	3.1	5.1	5.4	5.7	
Housing Units										
Single-family			0.9	1.0	1.1	1.6	2.0	2.4	2.6	
Apartments			1.4	1.6	1.9	2.4	3.7	4.5	4.6	
Hotel			8.0	9.0	9.0	11.0	15.0	15.0	15.0	
Total			10.3	11.6	12.0	15.0	20.7	21.9	22.2	

Other Considerations

Promotional efforts and costs required; transportation problems; may generate modest revenues; main support from fund-raising efforts.

EXHIBIT IX-3

ASIAN INSTITUTE OF TECHNOLOGY

SUMMARY OF SPECIAL DIPLOMA PROGRAM

This is a formal course of study, on a credit or noncredit basis, to orient practicing engineers to new technologies and the changing needs of the region in specific engineering areas, using classroom lectures, seminars, laboratory work and field trips.

Planning Criteria

1 program per engineering area
20 participants in each diploma program
9 months average length
9 participant-months = 1.0 FTE

	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-67	1977-78
Projection Of Diploma Programs And Participants										
Number of programs	0	0	1	1	1	2	3	4	4	4
Participants (FTE)	0	0	20	20	20	40	60	80	80	80
Faculty Support (FTE)										
Total faculty needed	0	0	1.8	1.8	1.8	3.6	5.4	7.2	7.2	7.2
Needs provided by degree program faculty	0	0	0.7	0.7	1.2	1.9	2.5	3.1	3.4	3.5
Additional faculty needs	0	0	1.1	1.1	0.6	1.7	2.9	4.1	3.8	3.7
Nonfaculty Staff Support (FTE)	0	0	0.9	0.9	0.7	1.1	1.5	1.9	1.8	1.7
Additional Facilities Needed										
Academic space (thousands of gross square feet)			0.4	0.1	0.5	0.9	1.1	1.1	1.1	
Laboratory			0.4	0.1	0.5	0.9	1.1	1.1	1.1	
Classroom			-	-	0.1	0.3	0.3	0.3	0.3	
Office			0.3	0.2	0.4	0.6	0.7	0.7	0.7	
Total			0.7	0.3	1.0	1.8	2.1	2.1	2.1	
Housing Units										
Single-family			0.4	0.2	0.5	1.0	1.1	1.1	1.1	
Apartments			0.7	0.3	0.9	1.5	1.9	1.9	1.9	
Hotel			2.0	2.0	4.0	5.0	5.0	5.0	5.0	
Total			3.1	2.5	5.4	7.5	8.0	8.0	8.0	

Other Considerations

Promotional efforts and costs required; transportation; very little revenue; support from fund-raising program.

EXHIBIT IX-4

ASIAN INSTITUTE OF TECHNOLOGY

SUMMARY OF FACULTY STUDY-LEAVE PROGRAM

The goal of this program is to encourage faculty members of other universities in Southeastern Asia to spend their sabbatical or study leaves at AIT, thus promoting exchanges of knowledge, ideas and experiences on engineering technology and education

Planning Criteria

1 study faculty per AIT degree option
9 9 months average in-residence
Each study faculty = 0.9 FTE

	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Projection Of Study Faculty									
Numbers	1	2	3	4	6	8	11	13	14
Full-time equivalents	0.9	1.8	2.7	3.6	5.4	7.2	9.9	11.7	12.6
Faculty Support - Research Associates (FTE)	0.2	0.4	0.6	0.8	1.2	1.6	2.2	2.6	2.8
Nonfaculty Staff Support									
Full-time equivalents	0.5	1.1	1.6	2.1	3.2	4.2	5.8	6.8	7.4
Additional Facilities Needed									
Academic space (thousands of gross square feet)									
Laboratory		1.4	1.6	2.1	3.5	4.8	5.5	6.0	
Office		0.9	1.1	1.8	1.3	3.2	3.7	4.0	
Total		2.3	2.7	3.9	4.8	8.0	9.2	10.0	
Housing Units									
Single-family		2.2	2.3	3.5	4.6	6.8	7.9	7.0	
Apartments		0.4	0.6	0.8	1.0	1.4	1.7	1.8	
Hotel		1.0	2.0	3.0	4.0	5.0	6.0	7.0	
Total		3.6	4.9	7.3	9.6	13.2	15.6	15.8	

Other Considerations

Promotional efforts required; some transportation; insignificant revenues; may develop some outside fund support; mostly subsidized.

EXHIBIT IX-5

ASIAN INSTITUTE OF TECHNOLOGY

SUMMARY OF SPECIAL REGIONAL LIBRARY

Development of a technological library goes beyond the academic program needs of AIT to serve individuals, universities and research organizations throughout southeastern Asia.

	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Acquisition Of Books And Reference Materials (000)									
Added - degree program	1.8	2.5	4.8	5.3	5.8	4.4	4.8	5.3	5.8
Added - special regional	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0
Total	27.4	37.9	51.7	67.0	83.8	90.2	108.0	127.3	148.1
Nonfaculty Staff Support (FTE)									
Staff for degree program	8.0	9.0	11.0	12.0	13.0	13.0	13.0	14.0	14.0
Additional staff needs	4.0	6.0	9.0	10.0	11.0	11.0	12.0	13.0	13.0
Total	12.0	15.0	20.0	22.0	24.0	24.0	25.0	27.0	27.0
Space Needs (Thousands Of Gross Square Feet)									
Degree program		13.1	14.6	16.9	20.4	22.4	23.7	25.7	
Regional library		7.6	9.0	10.4	9.5	10.9	14.2	16.2	
Total		20.7	23.6	27.3	29.9	33.3	37.9	41.9	

Other Considerations

Use of regional library must be promoted; insignificant revenues; must be subsidized or supported by outside funds.

EXHIBIT IX-6

ASIAN INSTITUTE OF TECHNOLOGY

SUMMARY OF SPECIAL PUBLICATIONS PROGRAM

To serve the regional needs of Asia, an engineering journal will be published quarterly and distributed on a subscription basis after three years of free distribution. This program is in addition to the publication of conference proceedings.

Planning Criteria

4 issues published each year
3,000 copies of each issue distributed

Nonfaculty Staff

3.0 FTE positions beginning in the fiscal year 1969-70

Facilities Needs

720 gross square feet office space

Other Considerations

Estimated operating cost of $35,000 annually. Fully subsidized for first 3 years; likely to require subsidy thereafter.

	1967-68	1968-69	1969-70	1970-71	1971-72(a)
	(000)				
Construction		$184.0	$2,738.7	$1,938.5	$224.0
Architect and engineering fee	$150.0(b)	85.0	83.2	97.7	13.7
Furnishings and and equipment		28.0	79.2	1,702.0	295.3
Total		$297.0	$2,901.1	$3,738.2	$533.0
			$7,469.3		

(a) Funding of construction of mechanical engineering complex begun in 1970-71.

(b) Funded. CMP and Johnson-Marshall studies.

This amount is the absolute requirement to fully fund the move, if the degree program, enrollments, faculty and staff projections are to be achieved as projected. Briefly then, to fund the 1970-71 capital construction program, AIT must be able to secure $297,000 within the current fiscal year and the amounts shown for the subsequent years, for a total amount of $7.5 million. In addition, annual operating funds will, of course, also be required.

POSSIBLE ALTERNATIVES

In the event that the Institute is unable to secure the required funds, either programs or program development must be curtailed. In the opinion of the consultants, the construction program described in preceding chapters provides a fiscal plant that will not only support the projected program on a year-to-year basis, but also provide some excess capacity. However, this excess capacity is not adequate to support a significantly enlarged program at the quality standards desired. The following alternatives are divided into two sections: one discusses the possibilities that will not affect the quality of the program offered; the other would affect the quality of program.

Alternative Not Affecting Program Quality

AIT could elect to delay the beginning of new disciplines. If the Institute delays the introduction of the mechanical engineering program, the net reduction in capital requirements for 1970-71 would amount to about $950,000.

AIT could elect to provide a more limited on-campus housing program. If the Institute were to reduce the number of faculty to be housed on campus from 80 to 40 per cent of the faculty, the net saving in capital funds would amount to about $250,000 through 1970-71. However, it should be noted that such a reduction in capital costs would result in an increase in operating funds, because those faculty not provided housing on campus would be entitled to a housing allowance.

AIT could delay the construction of the student service building and use temporary facilities for essential functions. If the entire construction of the student service complex (to be completed by 1970-71) were delayed to a time beyond the initial move, a gross saving of capital costs would amount to about $920,000; however, essential services - such as food service, the clinic operation and library - would still have to be provided in temporary facilities, thus offsetting as much as $400,000 of the gross capital savings or rendering a net capital saving of about $520,000.

* * * * *

Without adversely affecting the quality in the program offered, there does not appear to be any significant operating fund savings possible, with the exception of those that will naturally result from the delayed introduction of any new program or facility.

If each of the curtailments discussed above were made as discussed, a net saving of capital funds needed for 1970-71 would amount to approximately $1,720,000 for the period up to the occupancy of the new campus.

Alternatives That Would Affect Program Quality

AIT could elect to reduce all facilities to the essential minimum. As has been discussed, all projections of this report reflect the application of standards that are felt to provide an adequate physical plant to support a quality academic program. However, they are not standards or total building sizes

that can be considered the essential minimum. If AIT is unable to secure the required funding to support the full capital construction program, it could elect to reduce construction requirements to the minimum level required to support the basic programs. For example, at one half of the size proposed, the civil engineering building could accommodate the most basic program in graduate level civil engineering, with severe limitations on the kinds of research possible in such a plant. Equipment required for teaching and research programs would also have to be reduced in scale. Student and faculty research would have to be planned, scheduled and often limited by the lack of both equipment and space. In civil engineering, or any other program, such action would, of course, be reflected in the quality of the program possible. A plant of one half the proposed size would more closely approximate the current space on the Chulalongkorn campus and involve restrictions similar to those currently in effect at AIT.

If a general reduction of facilities were elected by AIT, generally each complex could be cut by as much as 25 per cent, without losing its functional characteristics - that is, the ability to support a basic program.

AIT could elect to build structures below the standards envisioned in the cost projections. Again, while it is not a recommended alternative, the quality of the structures built could be reduced, with subsequent savings. The cost factors used in this report are for moderate, but high-quality permanent construction. The same gross square footage of most space could be constructed, using the most economical methods and materials, at somewhat less than 75 per cent of the current estimated cost. For example, the administration complex cost factors used are for first-quality (not deluxe) office-type space. It is estimated that the same square footage could be constructed at less than 60 per cent of the estimated cost; however, the structure would probably not meet the intended fire resistance standards envisioned in the original projections, nor the quality and permanence of structure standards considered.

AIT could elect to increase the student-faculty and student-staff ratios used in the report projections. The ratios used in the projection of this report are felt to provide adequate staffing for a quality educational program. Increasing the ratio to have more students per professional and nonprofessional staff would, of course, have an effect on the quality of the program possible. While there is no overriding evidence of the precise relationship between the numbers of students in relation to the numbers of faculty and the quality of education possible, it is generally acknowledged that, at the postgraduate level of education, the lower the ratio the greater the possibility of quality education. The projections of this report are about midway between the standards of the developed nations for graduate level training. They are higher than those of the

United Kingdom and lower than those of the United States. Increasing the ratios used from about 7 to 1 to 10 to 1 would result in an operating cost saving in 1977-78 of about $560,000.

* * * * *

There are, of course, numerous other possible savings in funding requirements in both capital and operating costs. However, in general, the following should be considered.

- In operating costs, the prime cost factor is salaries and wages of professional personnel - that is, top administrators and faculty. In the magnitude of funds discussed in this section, only significant reductions in these personnel will result in major operating costs reductions.

- To reduce the total capital requirements, the quality of construction specified have to be lowered. This is not recommended. Therefore, the only significant savings possible are through the delay or cancellation of construction projects altogether. While every effort should be made, by the administration and the architects advising AIT, to build the most economical structure within the specifications, the magnitude of funds required indicates that construction should reflect the past and assumed future quality and permanence of the institution.

dt 5/4/79 498 - 0114

ASIAN INSTITUTE OF TECHNOLOGY

A PLAN FOR GROWTH AND DEVELOPMENT

9/68

APPENDIXES

September 1968

FEASIBILITY STUDY

not U.S.G. classification

~~This report is confidential and intended solely for the information and benefit of the immediate recipient hereof.~~

ASIAN INSTITUTE OF TECHNOLOGY

A PLAN FOR GROWTH AND DEVELOPMENT

APPENDIXES

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APPENDIX A

PARTIAL LIST OF INTERVIEWS AND CONTACTS

PARTIAL LIST OF INTERVIEWS AND CONTACTS

Asian Institute For Economics And Development Planning
- Dr. M. M. Metha, Program Officer
- Dr. P. B. Patnaik, Deputy Director

Asian Institute Of Technology
- Faculty
  - Norbert L. Ackermann
  - A. Anat
  - Milton E. Bender
  - Jerry C. L. Change
  - Arthur N. L. Chiu
  - Gordon Flammer
  - John Hugh Jones
  - William Lorell
  - Robert D. Mackey
  - Za-Chieh Moh
  - Mainwaring Pescod
  - Edmund F. Schultz
  - Richard Silvester
  - Arcon Sorathesn
  - Roscoe F. Ward
- Administration
  - Mai Charoensupaya, Registrar
  - Brian Heath, Electronics Superintendent
  - David McClintock, Planner
  - Nancy J. Ong, Librarian
  - Wallace E. Peterson, Administrative Assistant
  - Esma Prasobneter, Administrative Secretary to the Academic Dean
  - Nisa Sheanakul, Protocol Officer
  - David Shearer, Maintenance Superintendent

Colorado State University
- Dr. William E. Morgan, President
- Prof. Maurice L. Albertson
- Prof. Churchill, Head of Electrical Engineering
- Bonnie Frantz
- Prof. Marschner, Head of Mechanical Engineering
- Dr. George G. Olson, Special Assistant to Executive Vice President
- Ruth Rittenhouse

Economic Commission For Asia And The Far East
- Dr. Hiroshi Kitamura, Director of Research and Planning
- Mr. Alan D. Benham, Senior Economic Affairs Officer

Ford Foundation
- Dr. George Gant, Director, Regional Office, Bangkok
- Dr. Phillip Davidson, Bangkok
- Mr. David P. Panner, Program Office, New York

Food And Agriculture Organization
- Dr. G. Cameron Clark, Regional Agriculture Extension and Education Officer
- Dr. Delmont, Regional Office

International Labor Organization
- Mr. Ratnavale, Deputy Director
- Mr. Tate, Program Planner

Office In Charge Of Construction
- Mr. Lyden

Rockefeller Foundation
- Dr. Kenneth Thompson

Southeast Asia Ministers Of Education
- Mr. Swingle, Consultant to SEAMES

Southeast Asia Treaty Organization
- General Jesus Vargas, Secretary-General

United States Agency For Internation Development
- Mr. Paul Beidler, Washington
- Dr. T. C. Clark, Washington
- Mr. Thomas C. Niblock, Washington
- Mr. Carroll K. Shaw, Washington
- Majorie V. Wheatley, Washington
- Dr. Morris Williams, Bangkok

United States Embassy, Regional Office, Bangkok
- Mr. Lee St. Lawrence, Director, Regional Office
- Mr. Morris Crawford
- Mr. Robert Halligan
- Dr. Robert Jacobs

United Nations Development Program
Mr. Donald Bergstrom, Director

United Nations Educational, Scientific And Cultural Organization
Mr. Roger Roy Sing, Director
Dr. Reiss, Director of Economic Research

Other
Mr. R. Blakley, Ital-Thai Engineers, Bangkok
Dr. Henry Heald, AIT Board of Trustees
Dr. John Hrones, AIT Board of Trustees

APPENDIX B

PLANNING FOR THE FUTURE

PLANNING FOR THE FUTURE

Exhibits B-1 and B-2 show the current planning estimates of space requirements and capital costs. Exhibit B-1, on the following page, represents requirements for Phase I development, to accommodate 300 students in non-specified disciplines, however assumed to be primarily civil engineering if related to the 1971 student enrollment projections. Exhibit B-2 projects the requirements for a student body of 1,200 students. The basis for the estimates is briefly reviewed below; references are made to the item number and column head of the exhibits.

Exhibit B-1

Item 1-D, master site plan. The estimated expense of developing a master site plan includes some building design costs. This amount has been tentatively funded in kind by the United Kingdom.

Item 2a-C, undeveloped land. This is the estimated value of land that would have been procured to accommodate the Asian Institute of Technology as an alternative site to the present Chulalongkorn Campus. However, 400 acres has now been provided by the Royal Thai Government on a long-term lease arrangement with Thammasat University (the landholder).

Item 2b-C, site improvements utilities includes partially cost of grading, roads, and utilities, as well as $800,000 for fill which is optional.

Item 2b-D represents a fixed estimate of 7 per cent of construction acquisition costs for architectural and engineering services. Since these services are being provided by the United Kingdom, their cost may be overstated.

Item 2b-E is a fixed estimate of 5 per cent of construction and acquisition costs which may be overstated in relation to the cost of site improvements.

Item 3a-A, faculty laboratories, is an estimate of the net square meter requirements to provide a 30-square-meter laboratory for each one of the 75 members of the faculty, including:

- 50 AIT faculty members
- 10 faculty members on sabbatical leave from their home university
- 15 extra faculty members.

Actual projected faculty for 1971 is 56, or an excess of 19 regular faculty laboratories.

ASIAN INSTITUTE OF TECHNOLOGY

ESTIMATED PHASE I CAPITAL REQUIREMENTS

Item	A Net Space (Square Meters)	B Gross Space(a) (Square Meters)	C Construction And Acquisition	D Estimated Architect And Engineering Fee Of 7%	E Contingency Of 5%	F Total Cost
1. Master Site Plan	-	-	-	$100,000	-	$ 100,000
2. Improved Land						
a. Undeveloped land	-	-	$ 7,000,000	-	-	7,000,000
b. Site improvements and utilities	-	-	1,925,000	134,750	$102,990	2,162,740
3. Research Space And Equipment						
a. Faculty laboratories	2,250	3,375	421,875	29,530	22,570	473,975
b. Student laboratories	4,000	6,000	750,000	52,500	40,125	842,625
c. Shops - equipped	1,000	1,500	400,000	28,000	21,400	449,400
d. Laboratory equipment	-	-	1,200,000	-	-	1,200,000
4. Office Space						
a. Regular faculty offices	800	1,200	180,000	12,600	9,630	202,230
b. Special faculty offices	300	450	67,500	4,725	3,610	75,835
c. Student offices	900	1,350	202,500	14,175	10,835	227,510
d. Academic clerical offices	375	560	84,375	5,905	4,515	94,795
5. Lecture Space/Equipment						
a. Lecture rooms	1,000	1,500	262,500	18,375	14,045	294,920
b. Instructional aids	-	-	250,000	-	-	250,000
6. Specialized Space						
a. International Center	6,000	9,000	1,350,000	94,500	72,225	1,516,725
b. Library	4,000	6,000	1,200,000	84,000	64,200	1,348,200
c. Library collection	-	-	600,000	-	-	600,000
d. Computer Center - partially equipped	1,600	2,500	500,000	35,000	26,750	561,750
7. Supporting Space						
a. Administration - campus	2,500	3,750	750,000	52,500	42,535	845,035
b. Administration complex - Bangkok	1,500	2,250	450,000	31,500	25,275	506,775
c. Infirmary - equipped	3,300	5,000	1,000,000	70,000	53,500	1,123,500
d. Physical plant, shops, storage, etc.	4,000	6,000	360,000	25,200	19,260	404,460
8. Housing						
a. Faculty (80%)	-	-	900,000	63,000	48,150	1,011,150
b. Senior staff	-	-	250,000	17,500	13,375	280,875
c. Student (100%)	-	-	750,000	52,500	40,125	842,625
Total	33,525	50,435	$20,853,750	$943,760	$648,490	$22,446,000

(a)Net square meters times 1.5.
Source: AIT Long-Range Planning Criteria, March 1968.

EXHIBIT B-1

ASIAN INSTITUTE OF TECHNOLOGY

ESTIMATED PHASE II CAPITAL REQUIREMENTS

Item	Net Space (Square Meters)	Gross Space(a) (Square Meters)	Construction And Acquisition	Estimated Architect And Engineering Fee Of 7%	Contingency Of 5%	Total Cost
Master Site Plan Update	-	-	-	$ 50,000	-	$ 50,000
Site Development	-	-	$ 400,000	28,000	$ 21,400	449,400
Research Space And Equipment						
Faculty laboratories	6,750	10,125	1,465,625	102,590	78,410	1,646,625
Student laboratories	12,000	18,000	2,250,000	157,500	120,375	2,527,875
Shops - equipped	1,000	1,500	400,000	28,000	21,400	449,400
Laboratory equipment	-	-	3,600,000	-	-	3,600,000
Office Space						
Regular faculty offices	2,400	3,000	540,000	37,800	28,890	606,690
Special faculty offices	900	1,350	202,500	14,175	10,830	227,505
Student offices	2,700	4,050	607,500	42,525	32,505	682,530
Academic clerical offices	1,125	1,690	253,125	17,715	13,545	284,385
Lecture Space And Equipment						
Lecture rooms	3,000	4,500	787,500	55,125	42,135	884,760
Instructional aids	-	-	750,000	-	-	750,000
Library Collections	-	-	1,400,000	-	-	1,400,000
Computer Center And Computer	1,600	2,500	3,000,000	40,500	29,525	3,070,025
Physical Plants And Shops Storage	4,500	6,750	391,000	27,870	21,485	440,355
Housing						
Faculty (80%)	-	-	2,700,000	189,000	144,450	3,033,450
Senior staff	-	-	750,000	52,500	40,125	842,625
Student (100%)	-	-	2,250,000	157,500	120,375	2,527,875
Total	35,975	54,065	$21,747,250	$1,000,800	$725,450	$23,473,500

(a)Net square meters times 1.5.
Source: AIT Long-Range Planning Criteria, March 1968.

EXHIBIT B-2

Item 3a-B, or a fixed ratio of 1.5 times net square meters, is somewhat excessive if a total building were composed of such laboratories.

Item 3a-C is calculated at $125 per square meter, to cover basic building and fixed equipment such as utility outlets, plumbing fixtures and a built-in working station. The per meter cost is for a partially air-conditioned space.

Item 3b-A, student laboratories, is estimated to accommodate 200 students at 20 square meters per student. There is no breakdown of the number of laboratories projected.

Item 3b-B is estimated at a fixed ratio of net to gross of 1 to 1.5, which appears somewhat high.

Item 3b-C is estimated at $125 per square meter for a partially (50 per cent) air-conditioned space.

Item 3c-A, shops - equipped, is estimated on a gross basis, with no identification of the number of shops, their function or size.

Item 3c-C is estimated at $300 per square meter equipped, which without the specifics of such shops would appear excessive since much of the space would be lower-cost construction.

Items 3c-D and E are estimated at fixed rates of 7 and 5 per cent respectively, which appears high in relation to both the cost per square meter and actual design requirements.

Item 3d,laboratory equipment, is a gross estimate with no supporting detail.

Item 4a-A, regular faculty offices, is based on 16 square meters per regular faculty member times the regular faculty projection of 50.

Item 4a-C is estimated at $150 per gross square meter for air-conditioned space.

Item 4b-A, special faculty offices, is based on special faculty, i.e., sabbatical leave and others, at 12 square meters per staff.

Item 4c-A, student offices, is estimated at 300 student offices (100 diploma and 200 degree), or dual occupant offices of 3 square meters per occupant.

Item 4c-C is estimated at $150 per square meter.

Item 4d-A, academic clerical offices, is based on having one secretary for each three faculty (for 75 faculty members, 25 secretaries). Each secretarial area is estimated at 15 square meters, and includes file areas and supply cabinets.

Item 4d-C is estimated at $150 per square meter.

Item 5a-A, lecture rooms, is based on an average room size of 50 square meters, to accommodate approximately 25 students. If fully utilized, 20 such rooms would accommodate 360 typical class sections. At 60 per cent utilization, they would accommodate a student body of 600 in a total lecture program (that is, all credits taken would be full lecture courses). At AIT, lecture courses are limited; therefore, these lecture rooms would accommodate a student body of 1,200.

Item 5a-C is estimated on the basis of $175 per square meter for partially air-conditioned space.

Item 5b-C, instructional aids, is estimated, with no particular detail, at $250,000.

Item 6a-A, International Center, is envisioned in planning as a hotel-like facility to house and service conference programs, etc. The facility is to include such space as living quarters for attendees, food service areas, meeting rooms for conferences, a meeting room for the Board of Trustees and such student services as a bookstore. There is no functional breakdown for the planned space.

Item 6a-C is estimated at $150 per square meter, which, on the basis of current cost estimates for hotel space, would be a deluxe facility.

Item 6b-A, library, space estimate is based on full development of the facility during the initial phase. The collection to be housed is estimated at 250,000 volumes. (The current collection totals approximately 16,000 volumes.)

Item 6b-C, cost, is projected at $200 per square meter for fully air-conditioned space.

Item 6c-C, library collection, is based on the acquisition of an initial collection of about 75,000 volumes at an average cost of $8 per volume.

Item 6d-A, Computer Center (partially equipped), is based on a space estimate of 1,600 square meters, especially equipped to house a computer facility that has special air-conditioning, its own power source, elevated floors, and sound proofing.

Item 6d-B is a net to gross calculation increased to accommodate special conditions required for such a center.

Item 6d-C is based on a cost of $200 per square meter.

Item 7a-A, administration - campus, represents a net estimate of space (however, not functionally specified) to house the administrative complex of the AIT. Functions that will be housed in the Bangkok administrative complex, such as purchasing, are not included.

Item 7a-C is based on $200 per square meter, which, in terms of current costs for air-conditioned office space, would represent deluxe quality administrative space.

Item 7b-A, administrative complex - Bangkok, represents the space estimated for an administrative complex to be located in the city of Bangkok, to house functions which could not presumably operate at the more remote campus.

Item 7b-C is estimated at $200 per square meter, which again would represent deluxe quality office space.

Item 7c-A, infirmary - equipped, is estimated in gross requirements for a 40-bed, short-term and extended care clinic with isolation rooms, medical treatment rooms, minor surgery theater, etc. The student population is estimated at 300; faculty, 50; dependents, 200; staff, 200 - a campus population of 750 or more.

Item 7c-C cost is estimated at $200 per square meter.

Item 7d-A, physical plant, shops, storage, etc., is a net requirement estimated with no details on design or functional breakdown.

Item 7d-C is projected at $60 per square meter.

Exhibit B-2

Exhibit B-2 shows capital fund requirements for the expanded campus to support a program for 1,200 students. The item-by-item detail is similar to that discussed above; however, it has been extended and projected in relation to the increased student body, faculties, and supporting staff and facilities. Only expanded functional facilities are proposed on Exhibit B-2; there are no new functions proposed, only additions to the current functions.

Without building plans and specifications, it is not possible to evaluate fairly the adequacy of the estimates or to reject specifically any particular estimate. The capital requirements shown on the two exhibits are for a maximum-size physical plant. In the opinion of the consultants, who did not have any specifications with which to make a factual evaluation, the plans do not represent the optimum requirements, but only the maximum plant.

APPENDIX C

FTE NONFACULTY STAFFING REQUIREMENTS

ASIAN INSTITUTE OF TECHNOLOGY

FTE NONFACULTY STAFFING REQUIREMENTS FOR THE REGULAR ACADEMIC PROGRAM
1968-69 Through 1977-78

Function And Position Title	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Executive Management										
President	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Business Manager	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	-
Vice President for Administration	-	-	-	-	-	-	-	-	-	1.0
Vice President for Development and International Affairs	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Coordinator of Planning and Analytical Studies	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Subtotal	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Central Administration - Office Services										
Administrative Secretary (Secretary to President)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Receptionist-typist	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Office girl	2.0	2.0	2.0	-	-	-	-	-	-	-
Telephone operator	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Mail clerk	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0
Reproduction clerk	1.0	1.0	1.0	1.5	1.5	2.0	2.0	3.0	3.0	3.0
Secretary (pool)	1.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0
Typist	0.5	0.5	0.5	1.0	1.0	1.0	1.0	1.5	1.5	1.5
Subtotal	8.0	9.5	9.5	8.5	9.5	10.0	10.0	11.5	12.5	12.5
Development										
Administrative Secretary (Secretary to Vice President)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Protocol Officer	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Customs and Immigration Specialist	-	1.0	1.0	1.0	1.0	1.0	2.0	2.0	2.0	2.0
Development Officer	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0
Public Relations Officer	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Publications Officer	-	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0
Editor	-	-	-	-	-	1.0	1.0	1.0	1.0	1.0
Secretary-clerks	-	-	-	2.0	2.0	2.0	2.0	3.0	3.0	3.0
Subtotal	4.0	5.0	5.0	7.0	8.0	9.0	10.0	11.0	11.0	12.0

Function And Position Title	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Academic Administration										
Administrative Secretary (Secretary to Provost)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Registrar	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Assistant Registrar	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Secretary (to Registrar's Office)	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Clerk (Registrar's Office)	0.5	0.5	1.0	1.0	1.0	2.0	2.0	2.0	3.0	3.0
Secretary (to Director of Student Affairs)	-	-	-	-	-	1.0	1.0	1.0	1.0	1.0
Subtotal	3.5	3.5	4.0	5.0	5.0	7.0	7.0	7.0	8.0	8.0
Library										
Secretary (to Librarian)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Assistant Librarian										
Circulation	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Acquisition	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Clerk (Library)	3.5	3.5	4.5	5.0	6.0	6.5	6.5	6.5	7.0	7.0
Guard (Library)	1.5	1.5	1.5	2.0	2.0	2.5	2.5	2.5	3.0	3.0
Secretary (Acquisitions)	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Subtotal	6.0	8.0	9.0	11.0	12.0	13.0	13.0	13.0	14.0	14.0
Academic Support										
Laboratory technician	3.0	3.0	3.0	4.0	6.0	8.0	10.0	12.0	13.0	14.0
Apprentice technician	4.0	4.0	4.0	6.0	8.0	9.0	11.0	13.0	15.0	17.0
Draftsman	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Faculty secretary	4.0	4.0	5.0	7.0	8.0	10.0	11.0	13.0	14.0	16.0
Subtotal	12.0	12.0	13.0	18.0	23.0	28.0	33.0	39.0	43.0	48.0

Function And Position Title	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Business, Finance And Accounting										
Administrative Secretary (Secretary to Business Manager)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Chief Accountant	1.0	1.0	1.0	-	-	-	-	-	-	-
Controller	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Assistant Accountant	1.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0	2.0	2.0
Account assistant	1.0	1.0	1.0	2.0	2.0	2.0	3.0	3.0	4.0	4.0
Clerk-typist (accounting)	-	-	-	1.0	1.0	1.0	1.0	1.0	2.0	2.0
Director of Purchasing	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Receiving clerk	0.5	0.5	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Clerk-typist (purchasing)	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Purchasing clerk (buyers)	-	-	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Supply clerk	-	0.5	0.5	0.5	0.5	1.0	1.0	1.0	1.0	1.0
Expediter	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Director of Personnel Services	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Clerk (personnel)	-	-	1.0	1.0	1.0	1.0	1.0	2.0	2.0	2.0
Manager of Computer Operations	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	-	-
Director of Computer Center	-	-	-	-	-	-	-	-	1.0	1.0
Programmers/systems personnel	1.0	1.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0	3.0
Machine operators	-	-	-	-	-	1.0	1.0	1.0	1.0	1.0
Keypunch operators	-	-	-	1.0	1.0	1.0	1.0	2.0	2.0	2.0
Subtotal	8.5	9.0	11.5	16.5	17.5	19.0	21.0	23.0	25.0	26.0

Function And Position Title	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Student Services										
Director of Student Services Building	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Secretary (to Director)	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Bookstore and Sundries Shop Manager	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Order shipping clerk (Bookstore)	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Sales attendant (Bookstore)	-	-	-	1.0	1.0	1.0	2.0	2.0	2.0	2.0
Cashier (Bookstore)	-	-	-	-	-	1.0	1.0	1.0	1.0	1.0
Post Office Manager	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Postal clerk	-	-	-	-	-	1.0	1.0	1.0	1.0	2.0
Housekeeper	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Cleaning and setup staff	-	-	-	3.0	3.0	3.0	4.0	4.0	4.0	4.0
Room maid	-	-	-	2.0	2.0	2.0	4.0	4.0	4.0	4.0
Houseboy	-	-	-	-	-	1.0	1.0	1.0	1.0	1.0
Medical Officer	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Registered nurse	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Practical nurse	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	2.0
Nurses' aide	-	-	-	-	-	1.0	1.0	1.0	2.0	2.0
Food Service Manager	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Assistant Food Service Manager	-	-	-	1.0	1.0	1.0	1.0	2.0	2.0	2.0
Cook	-	-	-	1.0	1.0	2.0	2.0	2.0	2.0	2.0
Assistant Cook	-	-	-	1.0	1.0	1.0	2.0	2.0	2.0	2.0
Food service worker	-	-	-	5.0	5.0	7.0	9.0	11.0	12.0	14.0
Snack bar attendant	-	-	-	1.0	1.0	2.0	2.0	2.0	3.0	3.0
Manager - Faculty Lounge and Dining Room	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Service personnel	-	-	-	2.0	2.0	3.0	3.0	3.0	4.0	4.0
Cashier-checker	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Director of Housing	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Clerk-typist (housing)	-	-	-	1.0	2.0	2.0	2.0	3.0	3.0	3.0
Dormitory custodian	-	-	-	5.0	6.0	8.0	10.0	11.0	12.0	14.0
Subtotal	-	-	3.0	36.0	38.0	49.0	58.0	63.0	68.0	74.0

Function And Position Title	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Maintenance And Operations										
Plant Manager	1.0	1.0	1.0	-	-	-	-	-	-	-
Director of Maintenance and Operations	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Secretary (to Director)	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
General Secretary	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Shop Superintendent				1.0	1.0	1.0	1.0	1.0	1.0	1.0
Trade Superintendent	1.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Craftsmen (including Foreman)				10.0	12.0	13.0	15.0	16.0	18.0	19.0
Tradesmen (including Foreman)	10.0	11.0	13.0	7.0	8.0	9.0	11.0	13.0	14.0	16.0
Crafts worker				4.0	5.0	6.0	8.0	9.0	10.0	11.0
Trades worker	3.0	4.0	6.0	5.0	6.0	8.0	10.0	12.0	14.0	15.0
Head Groundsman				1.0	1.0	1.0	1.0	1.0	1.0	1.0
Head Custodian	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Groundsman	1.0	1.0	1.0	6.0	6.0	8.0	10.0	12.0	12.0	12.0
Custodian	3.0	3.0	3.0	11.0	14.0	18.0	22.0	25.0	30.0	30.0
Warehouse Manager	8.0	8.0	8.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Warehouseman	1.0	1.0	1.0	3.0	3.0	4.0	4.0	5.0	6.0	7.0
Work order clerk	1.0	1.0	2.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0
Sewage Plant Supervisor	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Sewage plant operator	-	-	-	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Water Plant Supervisor	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Water plant operator	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Automotive mechanic	0.5	0.5	0.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Automotive worker	-	-	-	1.0	1.0	2.0	2.0	2.0	3.0	3.0
Dispatcher	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Assistant dispatcher	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Driver	6.0	6.0	7.0	10.0	10.0	11.0	12.0	13.0	14.0	15.0
Transportation clerk	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Security officer	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Campus guard/watchman	2.0	2.0	2.0	4.0	4.0	5.0	6.0	7.0	7.0	7.0
Subtotal	38.5	40.5	48.5	80.0	88.0	104.0	120.0	134.0	148.0	155.0
Presidential House Staff	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Total	89.5	96.5	112.5	191.0	210.0	248.0	281.0	310.5	338.5	358.5

ASIAN INSTITUTE OF TECHNOLOGY

FTE NONFACULTY STAFFING REQUIREMENTS FOR SPECIAL PROGRAMS
1968-69 Through 1977-78

Program And Position Title	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Conferences										
Secretary	0.1	0.2	0.4	0.4	0.4	0.6	0.8	1.0	1.2	1.4
Laboratory technician	0.2	0.5	0.8	0.9	0.9	1.3	1.8	2.5	2.8	3.2
Conference Coordinator	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Administrative clerk-secretary	-	-	1.0	1.0	2.0	2.0	2.0	3.0	3.0	3.0
Public relations staff	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Subtotal	0.3	0.7	2.2	4.3	5.3	5.9	6.6	8.5	9.0	9.6
Institutes										
Secretary	0.1	0.1	0.2	0.3	0.3	0.3	0.5	0.7	0.8	0.9
Laboratory technician	0.1	0.2	0.4	0.6	0.6	0.8	1.1	1.7	1.9	2.0
Registrar-clerk	-	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Subtotal	0.2	0.3	1.1	1.4	1.4	1.6	2.1	2.9	3.2	3.4
Diploma Programs										
Secretary	-	-	0.1	0.1	0.1	0.2	0.3	0.4	0.4	0.4
Laboratory technician	-	-	0.3	0.3	0.1	0.4	0.7	1.0	0.9	0.8
Registrar-clerk	-	-	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Subtotal	-	-	0.9	0.9	0.7	1.1	1.5	1.9	1.8	1.7
Faculty Study Leaves										
Secretary	-	0.2	0.5	0.7	0.9	1.4	1.8	2.5	2.9	3.2
Laboratory technician	-	0.3	0.6	0.9	1.2	1.8	2.4	3.3	3.9	4.2
Subtotal	-	0.5	1.1	1.6	2.1	3.2	4.2	5.8	6.8	7.4
Regional Library										
Librarian	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Assistant Librarian	-	-	1.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0
Cataloger	-	3.0	4.0	4.0	5.0	5.0	5.0	6.0	7.0	7.0
Clerk	-	-	-	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Guard	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Subtotal	-	4.0	6.0	9.0	10.0	11.0	11.0	12.0	13.0	13.0
Publications										
Editor	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Clerical assistant	-	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Subtotal	-	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Transportation - Driver	-	-	-	3.0	3.0	3.0	4.0	4.0	5.0	5.0
Temporary Housing										
Rooms Manager	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Assistant Housekeeper	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Maid	-	-	-	5.5	6.0	8.0	10.5	14.0	15.0	16.0
Houseman	-	-	-	1.0	1.0	2.0	2.0	2.0	3.0	4.0
Subtotal	-	-	-	8.5	9.0	12.0	14.5	18.0	20.0	22.0
Total	0.5	8.5	14.3	31.7	34.5	40.8	46.9	56.1	61.8	65.1

EXHIBIT C-2

APPENDIX D

SPACE REQUIREMENTS AND FUNDING SCHEDULES

ADMINISTRATION COMPLEX

ASIAN INSTITUTE OF TECHNOLOGY

ADMINISTRATION COMPLEX SPACE REQUIREMENTS
1970-71 Through 1976-77

	1970-71		1971-72		1972-73		1973-74		1974-75		1975-76		1976-77	
	Number	Net Square Feet	Number	Net Square Feet	Number	Net Square Feet	Number	Net Square Feet	Number	Net Square Feet	Number	Net Square Feet	Number	Net Square Feet
Executive Offices														
President	1	480	1	480	1	480	1	480	1	480	1	480	1	480
Vice Presidents or equivalent	3	960	3	960	3	960	3	960	3	960	3	960	3	960
Coordinator of Planning	1	180	1	180	1	180	1	180	1	180	1	180	1	180
Administrative secretaries	4	720	4	720	4	720	4	720	4	720	4	720	4	720
Conference rooms	1	480	1	480	2	960	2	960	2	960	3	1,440	3	1,440
Central Office Services														
Receptionist-typist	1	120	1	120	1	120	1	120	1	120	1	120	1	120
Telephone operator	1	120	1	120	1	120	1	120	1	120	1	120	1	120
Mail and reproduction clerks	2.5	240	2.5	240	3	240	3	240	4	320	5	400	5	400
Typists and pool secretaries	3	240	4	320	4	320	4	320	4.5	400	4.5	400	4.5	400
Telephone equipment	-	120	-	120	-	120	-	120	-	120	-	120	-	120
Mail and reproduction space	-	200	-	200	-	200	-	200	-	200	-	200	-	200
Academic Administration														
Director of Student Affairs	-	-	-	-	1	180	1	180	1	180	1	180	1	180
Registrar	1	180	1	180	1	180	1	180	1	180	1	180	1	180
Assistant Registrar	1	120	1	120	1	120	1	120	1	120	1	120	1	120
Secretaries	1	120	1	120	2	240	2	240	2	240	2	240	2	240
Clerks	1	120	1	120	2	240	2	240	2	240	3	240	3	240
Registration area	-	400	-	400	-	400	-	400	-	500	-	500	-	500
Student affairs waiting area	-	-	-	-	-	60	-	60	-	60	-	60	-	60
Files and records	-	200	-	200	-	200	-	200	-	200	-	200	-	200
Business And Financial														
Chief Accountant	1	180	1	180	1	180	1	180	1	180	1	180	1	180
Purchasing Agent	1	180	1	180	1	180	1	180	1	180	1	180	1	180
Director of Personnel Services	1	180	1	180	1	180	1	180	1	180	1	180	1	180
Assistant Accountant	1	120	1	120	1	120	2	240	2	240	2	240	2	240
Account Assistants	2	240	2	240	2	240	3	240	3	240	4	320	4	320
Clerks, typists, expediters	6.5	560	6.5	560	7	560	7	560	8	640	9	720	9	720
Files and records	-	400	-	400	-	500	-	500	-	600	-	600	-	600
Personnel processing area	-	300	-	300	-	300	-	300	-	300	-	300	-	300
Development														
Protocol Officer	1	180	1	180	1	180	1	180	1	180	1	180	1	180
Development Officers	1	180	1	180	1	180	1	180	1	180	1	180	2	360
Public Relations Officer	1	180	1	180	1	180	1	180	1	180	1	180	1	180
Customs And Immigration Specialist	1	120	1	120	1	120	2	240	2	240	2	240	2	240
Publications Manager	-	-	1	120	1	120	1	120	1	120	1	120	1	120
Editor	-	-	-	-	1	120	1	120	1	120	1	120	1	120
Secretaries	2	240	2	240	2	240	2	240	2	240	3	240	3	240
Building Service														
Dead storage	-	1,200	-	1,200	-	1,200	-	1,200	-	1,200	-	1,200	-	1,200
Building maintenance	-	480	-	480	-	480	-	480	-	480	-	480	-	480
Custodian's room	-	100	-	100	-	100	-	100	-	100	-	100	-	100
Janitor's closets	2	120	2	120	2	120	2	120	2	120	2	120	2	120
Trash room	-	160	-	160	-	160	-	160	-	160	-	160	-	160
Entry-lobby	-	550	-	550	-	550	-	550	-	550	-	550	-	550
Lounge	1	520	1	520	1	520	1	520	1	520	1	520	1	520
Computer Center														
Director of Computer Center	1	180	1	180	1	180	1	180	1	180	1	180	1	180
Programmers, other personnel	2	240	3	240	4	320	4	320	5	400	5	400	6	480
Computer room	-	480	-	480	-	480	-	480	-	480	-	480	-	480
Demonstration work room	-	240	-	240	-	240	-	320	-	320	-	480	-	480
Files and storage area	-	120	-	120	-	120	-	240	-	240	-	240	-	240
Total Net		12,450		12,650		13,910		14,350		14,870		15,750		16,010
Total Gross(a)		18,675		18,975		20,865		21,525		22,305		23,625		24,015

(a)Computed at 1.5 times net square feet.

EXHIBIT D-1

ASIAN INSTITUTE OF TECHNOLOGY

ADMINISTRATION COMPLEX FUNDING SCHEDULE
1968-69 Through 1970-71

Functional Area	Gross Square Feet(a)	Cost Per Square Foot	Total Estimated Cost	Funds Required 1968-69	1969-70	1970-71
				(000)		
Office areas	16,530	$14	$231,420			
Computer Center	2,790	14	39,060			
Miscellaneous	4,695	10	46,950			
Subtotal	24,015		$317,430	-	$211.6	$105.8
Architect and engineering fee of 7 per cent			22,220	$7.4	7.4	7.4
Contingency of 5 per cent			15,872	-	-	15.9
Total			$355,522	$7.4	$219.0	$129.1

(a)Net square feet times 1.5.

EXHIBIT D-2

LIBRARY COMPLEX

ASIAN INSTITUTE OF TECHNOLOGY

LIBRARY COMPLEX SPACE REQUIREMENTS
FOR THE REGULAR ACADEMIC PROGRAM
1970-71 Through 1976-77

	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
Student Population	230	282	367	463	532	599	684
Reader Stations (one-third of student population in reader stations and open carrels)	77	94	123	155	178	200	228
				(Square Feet)			
Reader Station Area (25 sq. ft. per station)	1,925	2,350	3,075	3,875	4,450	5,000	5,700
Reference and catalog area	1,000	1,000	1,000	1,600	1,600	1,600	1,600
Circulation desk	400	400	400	600	600	600	600
Cataloging and ordering(a)	360	360	360	360	360	360	360
Repair and bindery	480	480	480	480	480	480	480
Receiving and shipping	320	320	320	320	320	320	320
Central duplicating	120	120	120	120	120	120	120
Microfilm reading	240	240	240	480	480	480	480
Administrative office	200	200	200	200	200	200	200
Supply and storage	500	500	720	720	720	720	720
Listening booths (20 NSF each)	100	100	100	100	100	100	100
Faculty reading room	200	200	200	200	200	200	200
Conference room - 3	200	200	200	200	200	200	200
Typing room (5 stations at 30 NSF per station)	150	150	150	150	150	150	150
Open book stack space - NSF (.08 NSF per vol.)	2,216	2,640	3,104	3,456	3,840	4,264	4,728
Closed carrels(c), 30 NSF per station	330	450	590	730	850	970	1,170
Total Net	8,741	9,710	11,259	13,591	14,670	15,764	17,128
Gross (1.5 Times Net)	13,112	14,565	16,889	20,387	22,005	23,646	25.692
Collection estimate (volumes)	27,700	33,000	38,800	43.200	48,000	53,300	59,100
Faculty	45	54	67	81	97	106	120
Doctoral candidates	7	15	25	32	35	44	59

(a)120 NSF per employee. One cataloger processes up to 2,000 vols. per year.
(b).08 NSF per vol. + standard
(c)Based on 20 per cent of faculty and 25 per cent of doctoral candidates.

EXHIBIT D-3

ASIAN INSTITUTE OF TECHNOLOGY

LIBRARY COMPLEX ACQUISITION PROJECTION
FOR ACADEMIC PROGRAM
1968-69 Through 1977-78

(Thousands)

	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Beginning Collection	16.0	18.1	20.4	22.9	27.7	33.0	38.8	43.2	48.0	53.3
Add:										
Regular acquisitions(a) policies implementation	1.6	1.8	2.0	2.3	2.8	3.3	3.9	4.3	4.8	5.3
New program-supporting acquisitions(b)	-	-	-	2.0	2.0	2.0	-	-	-	-
Special collections accepted	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Total Added	2.1	2.3	2.5	4.8	5.3	5.8	4.4	4.8	5.3	5.8
Ending Collection	18.1	20.4	22.9	27.7	33.0	38.8	43.2	48.0	53.3	59.1
Open Bookshelf Space (.08 NSF Per Volume)										
Ending total	1,448	1,632	1,832	2,216	2,640	3,104	3,456	3,840	4,264	4,728
Added during year	168	184	200	384	424	464	352	384	424	464

(a) About 10 per cent of collection.
(b) To support new programs, add 2,000 volumes one year in advance of program starting date.

EXHIBIT D-4

ASIAN INSTITUTE OF TECHNOLOGY

FUNDING SCHEDULE LIBRARY COMPLEX
1971-72 Through 1973-74

	Gross Square Feet(a)	Cost Per Square Feet	Total Estimated Cost	Funds Required 1971-72	1972-73 (000)	1973-74
Construction	25,692	$12	$308,304	-	$205.5	$102.8
Architect and engineering fee of 7%			21,581	$7.2	7.2	7.2
Contingency of 5%			15,415	-	-	15.4
Total			$345,300	$7.2	$212.7	$125.4

(a)Net square feet times 1.5.

EXHIBIT D-5

CIVIL ENGINEERING COMPLEX

ASIAN INSTITUTE OF TECHNOLOGY

CIVIL ENGINEERING COMPLEX SPACE REQUIREMENTS
1970-71

Area	Staffing	Planning Standard: Net Square Feet	Planning Standard: Unit	Estimated Total Area (Net Square Feet)
Offices				
Department Chairman	1	180	Each	180
Option Chairman	5	160	Each	800
Faculty	31	120	FTE	3,720
Research Associates	8	120	Each	960
Secretaries	6	120	Each for 2	720
		80	Each for 3 or more	
Students (research level)	117	50	Carrels each	5,850
Total				12,230
Teaching Laboratories				
Options	2	2,400	Every other option (30 stations of 80 NSF per station)	4,800
Computer or calculating	1	480	Room	480
Total				5,280
Nonteaching Laboratories				
Options	3	2,400	Every other option (30 stations of 80 NSF per station)	7,200
Research faculty (including Research Assistants)	45	240	Each	10,800
Research students	117	240	Each	28,080
Total				46,080
Laboratory Service	-	-	15% of total laboratory NSF	7,704
Classrooms(a)	5	680	Per classroom	3,400
Miscellaneous				
Lounge	302	2	Occupant (student and faculty)	604
Building maintenance	-	480	Building	480
Conference room	-	480	Allowing 24 stations of 20 NSF	480
Janitor's closets	-	60	Per floor (2 buildings, 2 floors each)	240
Custodian room	-	100	Each	100
Student commons	-	1,800	For one building	1,800
Dead storage	-	1,200	For one building	1,200
Total				4,904

(a)Net square feet times 1.5.

FORMULA FOR DETERMINING NUMBER OF CLASSROOMS REQUIRED:

Step	Action
A	Number of first- and second-year master's students Plus: Number of first-, second- and third-year doctorate students
B	Times: Average load of ten class-hours
C	Divided By: Average class size of 20 students
D	And by: Average utilization of class week of 30 hours
E	If not a whole number, rounded to next full classroom

* * * * *

Example: Civil Engineer - 1977

$$A \times B = \quad \div C = \quad \div D \quad = E$$
$$244 \times 10 = 2,440 \div 20 \quad 122 \div 30 = 4.07 = 5$$

Or

$$\frac{\frac{A \times B}{C}}{D} = \text{Number of classrooms (rounded to higher figure)}$$

Or

$$\frac{\text{Number Of Students}}{60} = \text{Number of classrooms}$$

ASIAN INSTITUTE OF TECHNOLOGY

CIVIL ENGINEERING COMPLEX FUNDING SCHEDULE
1968-69 Through 1970-71

Functional Area	Gross Square Feet(a)	Cost Per Square Foot	Total Estimated Cost	Funds Required 1968-69	1969-70	1970-71
				← (000) →		
Office	18,345	$12	$ 220,140			
Laboratory (minor)	7,920	12	95,040			
Laboratory (major)	69,120	11	760,320			
Classroom	5,100	11	56,100			
Laboratory service	11,556	9	104,004			
Miscellaneous	7,356	10	73,560			
Subtotal			$1,309,164	-	$872.8	$436.4
Architect and engineering fee of 7 per cent			91,641	$30.6	30.5	30.5
Contingency of 5 per cent			65,458	-	-	65.5
Total			$1,466,263	$30.6	$903.3	$532.4

(a)Net square feet times 1.5.

EXHIBIT D-7

MECHANICAL ENGINEERING COMPLEX

ASIAN INSTITUTE OF TECHNOLOGY

MECHANICAL ENGINEERING COMPLEX SPACE REQUIREMENTS
1972 And 1976

Functional Area	1972 Staffing	1972 Planning Standard: Net Square Feet	1972 Planning Standard: Unit	1972 Estimated Total Area (Net Square Feet)	1976 Staffing	1976 Estimated Total Area (Net Square Feet)
Office						
Department Chairman	1	180	Each	180	1	180
Option Chairman	3	160	Each	480	4	640
Faculty (FTE)	14	120	FTE	1,680	20	2,400
Research Associates	4	120	Each	480	5	600
Secretaries	3	120	Each	360	4	480
Students (Research level)	44	50	Carrels each	2,200	69	3,450
Total				5,380		7,750
Teaching Laboratories						
Options	2	2,400	Every other option (30 stations of 80 NSF per station)	4,800	2	4,800
Computer or calculating	1	480	Each room	480	1	480
Total				5,280		5,280
Nonteaching Laboratories						
Options	1	2,400	Every other option (30 stations of 80 NSF per station)	2,400	2	4,800
Research faculty (including Research Assistant)	22	240	Each	5,280	30	7,200
Research students	44	180	Each	7,920	69	12,420
Total				15,600		24,420
Laboratory Services	-	-	15% of total laboratory NSF	3,132	-	4,455
Classrooms(a)	2	680	Per classroom	1,360	3	2,040
Miscellaneous						
Lounge	139	2	Per occupant (minimum 520 NSF)	520	211	520
Building maintenance	-	480	For one building	480	-	480
Conference room	-	480	Allowing 24 stations of 20 NSF	480	-	480
Janitor's closets	-	60	Per floor (2 floors)	120	-	120
Custodian's room	-	100	Each building	100	-	100
Student common	-	1,800	For one building	1,800	-	1,800
Dead storage	-	1,200	For one building	1,200	-	1,200
Total				4,700		4,700

(a)See Exhibit D-6.

EXHIBIT D-8

ASIAN INSTITUTE OF TECHNOLOGY

MECHANICAL ENGINEERING COMPLEX FUNDING SCHEDULE
1969-70 Through 1975-76

Functional Area	Gross Square Feet(a)	Cost Per Square Foot	Total Estimated Cost	Funds Required 1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76
				(000)						
Phase I										
Office	8,070	$12	$ 96,840							
Laboratory (minor)	7,920	12	95,040							
Laboratory (major)	23,400	11	257,400							
Classroom	2,040	11	22,440							
Laboratory service	4,698	9	42,282							
Miscellaneous	7,050	10	70,500							
Subotal			$584,502	-	$389.7	$194.8				
Architect and engineering fee of 7%			40,915	$13.6	13.6	13.7				
Contingency of 5%			29,225	-	-	29.2				
Total Phase I			$654,642							
Phase II										
Office	3,555	$12	$ 42,660							
Laboratory (minor)	-	12	-							
Laboratory (major)	13,230	11	145,530							
Classroom	1,020	11	11,220							
Laboratory service	1,984	9	17,856							
Miscellaneous	-	10	-							
Subtotal			$217,266					-	$144.9	$72.4
Architect and engineering fee of 7%			15,209					$5.1	5.1	5.0
Contingency of 5%			10,863					-	-	10.9
Total Phase II			$243,338							
Grand Total			$897,980	$13.6	$403.3	$237.7		$5.1	$150.0	$88.3

(a)Net square feet times 1.5.

EXHIBIT D-9

ELECTRICAL ENGINEERING COMPLEX

ASIAN INSTITUTE OF TECHNOLOGY

ELECTRICAL ENGINEERING COMPLEX SPACE REQUIREMENTS
1973 And 1976

Functional Area	1973 Staffing	1973 Planning Standard: Net Square Feet	1973 Planning Standard: Unit	1973 Estimated Total Area (Net Square Feet)	1976 Staffing	1976 Estimated Total Area (Net Square Feet)
Office						
Department Chairman	1	180	Each	180	1	180
Option Chairman	3	160	Each	480	3	48[illegible]
Faculty	10	120	FTE	1,200	16	1,920
Research Associates	2	60	Each	120	4	240
Secretaries	2	120	Each	240	3	360
Students (research level)	35	50	Carrel each	1,750	52	[illegible],600
Total				3,970		[illegible]
Teaching Laboratories						
Options	2	1,800	Every other option (30 stations of 60 NSF per student)	3,600	2	[illegible]
Computer or calculating	1	480	Each room	480	1	48[illegible]
Total				4,080		4,080
Nonteaching Laboratories						
Options	1	1,800	Every other option (30 stations of 60 NSF per student)	1,800	1	1,800
Research faculty (including Research Assistant)	16	240	Each	3,840	24	5,760
Research Students	35	180	Each	6,300	52	9,360
Total				11,940		16,920
Laboratory Services	-	-	15% of total laboratory NSF	2,403	-	3,150
Classrooms(a)	2	680	Per classroom	1,360	3	2,040
Miscellaneous						
Lounge	111	2	Per occupant (minimum 520 NSF)	520	169	520
Building maintenance	-	480	Each building	480	-	480
Conference room	-	480	Allowing 24 stations of 20 NSF	480	-	480
Janitor's closets	-	60	Per floor (2 floors)	120	--	120
Custodian's room	-	100	Each building	100	-	100
Student common	-	1,800	Each building	1,800	-	1,800
Dead storage	-	1,200	Each building	1,200	-	1,200
Total				4,700		4,700

(a)See Exhibit D-6.

EXHIBIT D-10

ASIAN INSTITUTE OF TECHNOLOGY

ELECTRICAL ENGINEERING COMPLEX FUNDING SCHEDULES
1970-71 Through 1975-76

Functional Area	Gross Square Feet(a)	Cost Per Square Foot	Total Estimated Cost	Funds Required 1970-71	1971-72	1972-73	1973-74	1974-75	1975-76
				(000)					
Phase I									
Office	5,955	$12	$ 71,460						
Laboratory (minor)	6,120	12	73,440						
Laboratory (major)	17,910	11	197,010						
Classroom	2,040	11	22,440						
Laboratory service	3,604	9	32,436						
Miscellaneous	7,050	10	70,500						
Subtotal			$467,286	-	$311.5	$155.7			
Architect and engineering fee of 7%			32,710	$10.9	10.9	10.9			
Contingency of 5%			23,364	-	-	23.4			
Total Phase I			$523,360						
Phase II									
Office	2,715	$12	$ 32,580						
Laboratory (minor)	-	12	-						
Laboratory (major)	7,470	11	82,170						
Classroom	1,020	11	11,220						
Laboratory service	1,120	9	10,080						
Miscellaneous	-	10	-						
Subtotal			$136,050				-	$90.7	$45.4
Architect and engineering fee of 7%			9,524				$3.2	3.2	3.1
Contingency of 5%			6,802				-	-	6.8
Total Phase II			$152,376						
Grand Total			$675,736	$10.9	$322.4	$190.1	$3.2	$93.9	$55.3

(a)Net square feet times 1.5.

EXHIBIT D-11

PROGRAM X COMPLEX

ASIAN INSTITUTE OF TECHNOLOGY

PROGRAM X COMPLEX SPACE REQUIREMENTS
1974 And 1977

Functional Area	1974 Staffing	1974 Planning Standard: Net Square Feet	1974 Planning Standard: Unit	1974 Estimated Total Area (Net Square Feet)	1977 Staffing	1977 Estimated Total Area (Net Square Feet)
Office						
Department Chairman	1	180	Each	180	1	180
Option Chairman	3	160	Each	480	3	480
Faculty	10	120	FTE	1,200	16	1,920
Research Associates	2	60	Each	120	4	240
Secretaries	2	120	Each	240	3	360
Students (Research level)	35	50	Carrels each	1,750	52	2,600
Total				3,970		5,780
Teaching Laboratories						
Options	2	1,800	Every other option (30 stations of 60 NSF per student)	3,600	2	3,600
Computer or calculating	1	480	Each room	480	1	480
Total				4,080		4,080
Nonteaching Laboratories						
Options	1	1,800	Every other option (30 stations of 60 NSF per student)	1,800	1	1,800
Research faculty (including Research Assistant)	16	240	Each	3,840	24	5,760
Research students	35	180	Each	6,300	52	9,360
Total				11,940		16,920
Laboratory Services	-	-	15% of total laboratory NSF	2,403	-	3,150
Classrooms(a)	2	680	Per classroom	1,360	3	2,040
Miscellaneous						
Lounge	111	2	Per occupant (minimum 520 NSF)	520	169	520
Building maintenance	-	480	Each building	480	-	480
Conference room	-	480	Allowing 24 stations of 20 NSF	480	-	480
Janitor's closets	-	60	Per floor (2 floors)	120	-	120
Custodian's room	-	100	Each building	100	-	100
Student common	-	1,800	Each building	1,800	-	1,300
Dead storage	-	1,200	Each building	1,200	-	1,200
Total				4,700		4,700

(a)See Exhibit D-6.

EXHIBIT D-12

ASIAN INSTITUTE OF TECHNOLOGY

PROGRAM X COMPLEX FUNDING SCHEDULES
1971-72 Through 1976-77

Functional Area	Gross Square Feet(a)	Cost Per Square Foot	Total Estimated Cost	Funds Required 1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
				(000)					
Phase I									
Office	5,955	$12	$ 71,460						
Laboratory (minor)	6,120	12	73,440						
Laboratory (major)	17,910	11	197,010						
Classroom	2,040	11	22,440						
Laboratory service	3,604	9	32,436						
Miscellaneous	7,050	10	70,500						
Subtotal			$467,286	-	$311.5	$155.7			
Architect and Engineering fee of 7%			32,710	$10.9	10.9	10.9			
Contingency of 5%			23,364	-	-	23.4			
Total Phase I			$523,360						
Phase II									
Office	2,715	$12	$ 32,580						
Laboratory (minor)	-	12	-						
Laboratory (major)	7,470	11	82,170						
Classroom	1,020	11	11,220						
Laboratory Service	1,120	9	10,080						
Miscellaneous	-	10	-						
Subtotal			$136,050				-	$90.7	$45.4
Architect and engineering fee of 7%			9,524				$3.2	3.2	3.1
Contingency of 5%			6,802				-	-	6.8
Total Phase II			$152,376						
Grand Total			$675,736	$10.9	$322.4	$190.1	$3.2	$93.9	$55.3

(a)Net square feet times 1.5.

EXHIBIT D-13

CAMPUS SERVICE COMPLEX

ASIAN INSTITUTE OF TECHNOLOGY

CAMPUS SERVICE COMPLEX SPACE REQUIREMENTS
1970-71 Through 1976-77

(Net Square Feet)

	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
Office And Administrative							
Director's office	180	180	180	180	180	180	180
Secretary to Director	120	120	120	120	120	120	120
Administrative office	240	240	360	360	360	360	360
Shop Superintendents' offices	240	240	240	240	240	240	240
Head Groundsman's office	120	120	120	120	120	120	120
Head Custodian's office	120	120	120	120	120	120	120
Security Officer's office	120	120	120	120	120	120	120
Dispatcher's office	120	120	120	120	120	120	120
Assistant Dispatcher's office and clerical area	240	240	240	240	240	240	240
Drivers' waiting room	240	240	240	240	300	300	300
Guard room	200	200	200	200	200	200	200
Lounge	600	600	600	600	600	600	600
Subtotal	2,540	2,540	2,660	2,660	2,720	2,720	2,720
Shops							
Automotive shop	1,000	1,000	1,000	1,500	1,500	1,500	1,500
Workshop, carpentry shop, sheet metal shop, welding shop (including stores)	6,000	6,000	6,000	8,000	8,000	8,000	8,000
Electric shop (including stores)	1,200	1,200	1,200	1,800	1,800	1,800	1,800
Paint shed	300	300	300	300	300	300	300
Subtotal	8,500	8,500	8,500	11,600	11,600	11,600	11,600
Warehouse (Including Administration)	4,000	4,000	4,000	6,000	6,000	6,000	6,000
Other - Showers, Lockers, Toilets	500	500	500	750	750	750	750
Total Net	15,540	15,540	15,660	21,010	21,070	21,070	21,070
Total Gross	23,310	23,310	23,490	31,515	31,605	31,605	31,605
	Phase I			Phase II			

EXHIBIT D-14

ASIAN INSTITUTE OF TECHNOLOGY

CAMPUS SERVICE COMPLEX FUNDING SCHEDULE
1968-69 Through 1973-74

Functional Area	Gross Square Feet(a)	Cost Per Square Foot	Total Estimated Cost	Funds Required 1968-69	1969-70	1970-71	1971-72	1972-73	1973-74
				(000)					
Phase I									
Office and administrative	3,990	$12.00	$ 47,880						
Shops	12,750	6.00	76,500						
Warehouse	6,000	5.30	31,800						
Other	750	10.00	7,500						
Subtotal			$163,680	-	$109.1	$54.6			
Architect and engineering fee of 7 per cent			11,458	$3.8	3.8	3.9			
Contingency of 5 per cent			8,184	-	3.8	8.2			
Total Phase I			$183,322						
Phase II	90								
Office and administrative	90		$ 1,080						
Shops	4,650		27,900						
Warehouse	3,000		15,900						
Other	375		3,750						
Subtotal			$ 48,630				-	$32.5	$16.2
Architect and engineering fee of 7 per cent			3,404				$1.1	1.2	1.1
Contingency of 5 per cent			2,432				-	-	2.4
Total Phase II			$ 54,466						
Grand Total			$237,788	$3.8	$112.9	$66.7	$1.1	$33.7	$19.7

(a)Net square feet multiplied by 1.5.

EXHIBIT D-15

STUDENT SERVICE COMPLEX

ASIAN INSTITUTE OF TECHNOLOGY

STUDENT SERVICE BUILDING COMPLEX
SPACE REQUIREMENTS
1971-74 Through 1975-77

(Net Square Feet)

	1971-74	1975-77
Level A		
Food service	7,106	11,336
Multipurpose	4,200	-
Building storage	1,000	1,000
Mechanical rooms/building service	1,600	1,600
Restrooms	500	500
Subtotal	14,406	14,436
Level B		
Student lounges	1,000	1,000
Post office	450	450
Barber shop	400	400
Bookstore	1,200	1,200
Indoor recreation	2,930	2,930
Infirmary	1,930	1,930
Student government offices	480	480
Snack bar	1,000	1,000
Faculty lounge	800	800
Faculty dining room	500	500
Meeting rooms (2)	600	600
Board of Trustees room	800	800
Building offices	500	500
Housing offices	360	360
Lobby	600	600
Restrooms	500	500
Extra offices	480	480
Subtotal	14,530	14,530
Level C		
Library	11,299	-
Multipurpose room	-	6,000
Multipurpose service	-	600
Hotel studio apartments	3,600	7,200
Restrooms	-	500
Subtotal	14,899	14,300
Total	43,835	43,266

ASIAN INSTITUTE OF TECHNOLOGY

FOOD SERVICE SPACE REQUIREMENTS
1970-71 Through 1976-77

	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
Student Population	230	282	367	463	532	599	684
Seating Requirement	115	141	184	232	266	300	342
Functional Space (Square Feet)							
Entrance, lobby, lounge	690	846	1,104	1,392	1,596	1,800	2,052
Dining space	1,380	1,692	2,208	2,784	3,192	3,600	4,104
Serving area	600	600	600	600	1,200	1,200	1,200
Kitchen(a)							
Preparation area	1,100	1,100	1,100	1,100	2,200	2,200	2,200
Dishwashing	250	250	250	250	500	500	500
Refrigeration	120	120	120	120	120	120	120
Storage	300	300	300	300	600	600	600
Receiving area	160	160	160	160	160	160	160
Trash and garbage	120	120	120	120	120	120	120
Restrooms							
Men	140	140	140	140	140	140	140
Women	140	140	140	140	140	140	140
Total Assignable	5,000	5,460	6,242	7,106	9,968	10,580	11,336
Total Gross	7,500	8,190	9,363	10,659	14,952	15,780	17,004
	First Unit(b)				Second Unit (Addition To First)(c)		

(a) The kitchen will serve snack bar and faculty dining room and provide banquet service.
(b) Handling capacity - 300 seats.
(c) Handling capacity - 600 seats

EXHIBIT D-17

ASIAN INSTITUTE OF TECHNOLOGY

DETAILS OF STUDENT SERVICE FUNCTIONAL AREAS
(500 Students)

Student Lounge
- General informal meeting area, lounge-style seating
- Skating capacity: 10% of FTE (500)
- At lounge standard NSF of 20/per station, or 1,000 NSF

Post Office
- A mail sorting and distribution center, including mail boxes, postage sales counter, etc.
- 0.75 NSF per box x 600 boxes = 450 NSF

Barber Shop
- Includes all facilities required for four chairs
- At 100 NSF per chair, 400 NSF

Bookstore/Sundries Sales Shop
- A retail sales outlet for a limited product mix, principally school supplies, but also including such sundries as toilette articles, smoking supplies and snack foods
- 1,200 NSF

Indoor Recreation
- An area designated to accommodate a limited recreation facility
- Estimate includes:

2 Table tennis areas	1,380
2 Billiards area	1,280
20 Station card room	270
Total	2,930 NSF

Infirmary
- Normal standard is one bed per 150 students, or less than 4 beds for 500 students; increased to 10 beds because of remote location
- Facility programmed for first aid care only; no provision for extended illness

- Includes four examination and treatment rooms for first aid care, inoculations, and ambulatory extended treatment.
- Facility projection is as follows:

10 Beds at 100 NSF per bed	1,000
5 Complete baths at 50 NSF per bath	250
1 Waiting room for 15 persons	200
4 Treatment rooms at 120 NSF per room	480
Total	1,930 NSF

Student Government Office

- An office area to accommodate limited student government functions
- 480 NSF

Snack Bar

- A food service facility, seating 100, providing limited snack and short-order service
- Supporting food preparation is in main kitchen
- 1,000 NSF

Faculty Lounge

- A facility to serve as a lounge-style faculty meeting place, but greater in size to accommodate receptions, etc.
- Seating capacity: 40
- Reception capacity: Up to 160
- 800 NSF

Faculty Dining Room

- A 40-seat dining room and service area for faculty and guests, adjacent to faculty lounge
- Food preparation in main kitchen

Hotel Space

- 15 rooms 1971-73
- 30 rooms 1974-77
- At 240 NSF each, 500 NSF

Meeting Rooms

- One meeting room divided into two smaller rooms each with a seating capacity of 15
- Should be adjacent to student government offices to accommodate special activities of student organizations
- A total of 600 NSF

Board Of Trustees Room

- A larger meeting room, adjacent to faculty lounge to accommodate 40 persons in conference style
- 800 NSF

Housing Office

- Housing Officer and clerical assistance
- 360 NSF

Assembly-Multipurpose Rooms

- An auditorium-style (portable seating) room to accommodate assembly of faculty and students
- Subdividable into 10 smaller areas of 25 capacity for seminars.
- Portable stages and platforms for banquet and special presentation functions, etc.
- Seating capacity: 600
- 6,000 NSF

Building Offices

- Offices for Building Manager, housekeeper, and clerical staff
- 500 NSF

ASIAN INSTITUTE OF TECHNOLOGY

STUDENT SERVICE COMPLEX FUNDING SCHEDULE
1968-69 Through 1973-74

Functional Area	Gross Square Feet(a)	Cost Per Square Foot	Total Estimated Cost	Funds Required 1968-69	1969-70	1970-71	1971-72	1972-73	1973-74
				(000)					
Phase I									
Food service	10,659	$11	$117,249						
Multipurpose	6,300	10	63,000						
Library	16,949	12	203,388						
Hotel	5,400	15	81,000						
Infirmary	2,895	14	40,530						
Other	23,550	10	235,500						
Subtotal			$740,667	-	$493.8	$246.9			
Architect and engineering fee of 7 per cent			51,847	$17.3	17.3	17.2			
Contingency of 5 per cent			37,033	-	-	37.0			
Total Phase I			$829,547						
Phase II									
Conversion	20,700	$ 2	$ 41,400				-	$27.6	$13.8
Architect and engineering fee of 7 per cent			2,898				$1.0	1.0	0.9
Contingency of 5 per cent			2,070				-	-	2.1
Total Phase II			$ 46,368						
Grand Total			$875,915	$17.3	$511.1	$301.1	$1.0	$28.6	$16.8

(a)Net square feet times 1.5.

EXHIBIT D-19

STUDENT HOUSING COMPLEX

ASIAN INSTITUTE OF TECHNOLOGY

STUDENT HOUSING COMPLEX SPACE REQUIREMENTS
1968-69 Through 1977-78

	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Student Population										
Master's	175	187	206	223	267	342	431	497	555	625
Doctorate	-	-	-	7	15	25	32	35	44	59
Beds										
Master's	175	187	206	223	267	342	431	497	555	625
Doctorate	-	-	-	7	15	25	32	35	44	59
Total	175	187	206	230	282	367	463	532	599	684
30-Unit Modules Required										
150 net square feet per unit	6	7	7	8	10	13	16	18	20	23
Net assignable space	27,000	31,500	31,500	36,000	45,000	58,500	72,000	81,000	90,000	103,500
Gross square feet(a)	40,500	47,250	47,250	54,000	67,500	87,750	108,000	121,500	135,000	155,250
Common Area										
Net square feet	1,800	2,100	2,100	2,400	3,000	3,900	4,800	5,400	6,000	7,200
Gross square feet	2,700	3,150	3,150	3,600	4,500	5,850	7,200	8,100	9,000	10,800
Total Gross Square Feet	43,200	50,400	50,400	57,600	72,000	93,600	115,200	129,600	144,000	166,050
	Phase I				Phase II	Phase III	Phase IV	Phase V	Phase VI	Phase VII
Added Each Phase (Gross Square Feet)	57,600				14,400	21,600	21,600	14,400	14,400	22,050

(a)Net square feet times 1.5.

EXHIBIT D-20

ASIAN INSTITUTE OF TECHNOLOGY

STUDENT HOUSING COMPLEX FUNDING SCHEDULE
1968-69 Through 1976-77

	Gross Square Feet(a)	Cost Per Square Foot	Total Estimated Cost	Funds Required 1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
				(000)								
Phase I												
Construction	57,600	$6.30	$362,880	-	$241.9	$121.0						
Architect and engineering fee of 7 per cent			25,402	$8.5	8.5	8.4						
Contingency of 5 per cent			18,144	-	-	18.2						
Phase II												
Construction	14,400		90,720		-	60.5	$ 30.2					
Architect and engineering fee of 7 per cent			6,350		2.1	2.1	2.1					
Contingency of 5 per cent			4,536		-	-	4.5					
Phase III												
Construction	21,600		136,080			-	90.7	$ 45.4				
Architect and engineering fee of 7 per cent			9,526			3.2	3.2	3.2				
Contingency of 5 per cent			6,804			-	-	6.8				
Phase IV												
Construction	21,600		136,080				-	90.7	$ 45.4			
Architect and engineering fee of 7 per cent			9,526				3.2	3.2	3.2			
Contingency of 5 per cent			6,804				-	-	6.8			
Phase V												
Construction	14,400		90,720					-	60.5	$ 30.2		
Architect and engineering fee of 7 per cent			6,350					2.1	2.1	2.1		
Contingency of 5 per cent			4,536					-	-	4.5		
Phase VI												
Construction	14,400		90,720						-	60.5	$ 30.2	
Architect and engineering fee of 7 per cent			6,350						2.1	2.1	2.1	
Contingency of 5 per cent			4,536						-	-	4.5	
Phase VII												
Construction	22,050		138,915							-	92.6	$46.3
Architect and engineering fee of 7 per cent			9,724							3.3	3.2	3.2
Contingency of 5 per cent			6,946							-	-	7.0
All Phases												
Construction			$1,046,115	-	$241.9	$181.5	$120.9	$136.1	$105.9	$ 90.7	$122.8	$46.3
Architect and engineering fee of 7 per cent			73,228	8.5	10.6	13.7	8.5	8.5	7.4	7.5	5.3	3.2
Contingency of 5 per cent			52,306	-	-	18.2	4.5	6.8	6.8	4.5	4.5	7.0
Total			$1,171,649	$8.5	$252.5	$713.4	$133.9	$151.4	$120.1	$102.7	$132.6	$56.5

(a)Net square feet times 1.5.

EXHIBIT D-21

FACULTY AND STAFF HOUSING COMPLEX

ASIAN INSTITUTE OF TECHNOLOGY

FACULTY AND STAFF HOUSING COMPLEX SPACE REQUIREMENTS
FOR THE REGULAR ACADEMIC PROGRAM
1970-71 Through 1976-77

	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
Presidential Residence	1	1	1	1	1	1	1
Faculty (80% rounded to next higher figure)	36	44	54	65	78	85	96
Executive Staff(a)	3	3	3	3	3	3	3
Senior Supporting Staff(b)	3	3	3	3	3	3	3
Units Required For Faculty And Staff	42	50	60	71	84	91	102
Single Family Units 45%	19	23	26	32	37	41	46
Duplexes 25%	10	12	16	18	22	22	26
Apartments 30%	13	15	18	21	25	28	30
Apartments Available (four units in each building)	16	16	20	24	28	28	32
Temporary Housing							
Studio Apartments	-	-	-	-	10	10	10
Hotel Rooms	15	15	15	15	20	20	20

(a)Plant Manager, Security Officer, Chief of Transportation.
(b)Three vice presidential level officers.

EXHIBIT D-22

ASIAN INSTITUTE OF TECHNOLOGY

TYPICAL UNIT COST OF FACULTY AND STAFF HOUSING

Type Of Housing	Construction Cost	Architect And Engineering Fee Of: 7%	4%	Contingency Of 5%	Subtotal	Furnishings	Total Unit Cost
President's House							
3,000 Gross Square Feet At $7.00	$21,000	$1,470	-	$1,050	$23,520	$2,000	$25,520
Single Family Units							
2,000 Gross Square Feet At $7.00 (Prototype)	14,000	980		700	15,680	1,200	16,880
2,000 Gross Square Feet At $7.00			560	700	15,260	1,100	16,360
Duplexes							
1,500 Gross Square Feet At $7.00 (Prototype)	10,500	735		525	11,760	900	12,660
1,500 Gross Square Feet At $7.00	10,500		420	525	11,445	800	12,245
Apartments							
1,500 Gross Square Feet At $6.30 (Prototype)	9,450	662		473	10,585	700	11,285
1,500 Gross Square Feet At $6.30	9,450		378	473	10,301	600	10,901

EXHIBIT D-23

ASIAN INSTITUTE OF TECHNOLOGY

FACULTY AND STAFF HOUSING FUNDING SCHEDULE
1968-69 Through 1976-77

Type Of Housing	Number Units Added	Unit Cost	Total Estimated Cost	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
				(000)								
Phase I												
President's house	1	$25.5	$ 25.5									
Single-family units												
Prototype	1	17.0	314.0									
All others	18	16.5										
Duplexes												
Prototype	1	12.5	120.5									
All others	9	12.0										
Apartments												
Prototype	1	11.5	176.5									
All others	15	11.0										
Prototype architect and engineering fee			2.4									
Subtotal			$ 638.9	$2.4	$424.3	$212.2						
Phase II												
Single-family units	4	16.5	$ 66.0									
Duplexes	2	12.0	24.0									
Subtotal			$ 90.0			60.0	$30.0					
Phase III												
Single-family units	3	16.5	$ 49.5									
Duplexes	4	12.0	48.0									
Apartments	4	11.0	44.0									
Subtotal			$ 141.5				94.3	$ 47.2				
Phase IV												
Single-family units	6	16.5	$ 99.0									
Duplexes	2	12.0	24.0									
Apartments	4	11.0	44.0									
Subtotal			$ 167.0					111.3	$ 55.7			
Phase V												
Single-family units	5	16.5	$ 82.5									
Duplexes	4	12.0	48.0									
Apartments	4	11.0	44.0									
Subtotal			$ 174.5						116.3	$ 58.2		
Phase VI												
Single-family units	4	16.5	$ 66.0							44.0	$ 22.0	
Phase VII												
Single-family units	5	16.5	$ 82.5									
Duplexes	4	12.0	48.0									
Apartment	4	11.0	44.0									
Subtotal			$ 174.5								116.3	$58.2
Total			$1,452.4	$2.4	$424.3	$272.2	$124.3	$158.5	$172.0	$102.2	$138.3	$58.2

EXHIBIT D-24

OUTDOOR RECREATION

ASIAN INSTITUTE OF TECHNOLOGY

LAND USE FOR OUTDOOR RECREATION
FOR THE ACADEMIC PROGRAM

	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
Estimated Campus Population(a)							
Students	230	282	367	463	532	599	684
Other	140	148	192	228	264	288	316
Total	370	430	559	691	796	887	1,000
Land Use							
Tennis							
One court for each 200 users	2	2	3	3	4	4	5
Square-foot allocation(b) (60 x 110 feet per court)	13,200	13,200	19,800	19,800	26,400	26,400	33,000
Football field (Soccer)							
Court (225 x 360 feet)	1	1	1	1	1	1	1
Acreage allocation(b)	81,000	81,000	81,000	81,000	81,000	81,000	81,000
Volleyball-Badminton							
One court for each 200 users	2	2	3	3	4	4	5
Square-foot allocation(b)	3,600	3,600	5,400	5,400	7,200	7,200	9,000
Basketball							
Court (90 x 50 feet) per	1	1	1	1	1	1	1
Square-foot allocation(b)	4,500	4,500	4,500	4,500	4,500	4,500	4,500
Handball-Squash							
Court (30 x 40 feet)	1	1	1	2	2	2	2
Square-foot allocation(b)	1,200	1,200	1,200	2,400	2,400	2,400	2,400
Swimming Pool (6,000 Square Feet)	1	1	1	1	1	1	1
Golfing Facilities - Putting Greens, Pitch and Putt Course, etc. (optional)							

(a)Includes students, faculty, staff and dependents housed on campus. Ratio of staff to dependents is 1:4.
(b)Includes field area, adjacent service areas and limited spectator area.

EXHIBIT D-25

ASIAN INSTITUTE OF TECHNOLOGY

OUTDOOR RECREATION FACILITIES FUNDING SCHEDULE
1968-69 Through 1976-77

PHASE I-PHASE II

	Number Units Added	Unit Cost	Total Estimated Cost	Funds Required (000) 1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
Phase I												
Tennis Courts	2	$10,000	$ 20,000									
Soccer field	1	14,000	14,000									
Volleyball courts	2	3,000	6,000									
Basketball courts	1	7,000	7,000									
Handball court	1	3,000	3,000									
Swimming pool	1	33,000	33,000									
Subtotal			$ 83,000	-	$60.0	$23.0						
Architect and engineering fee of 4%			3,320	$3.3	-	-						
Contingency of 5%			4,150	-	4.2	-						
Total Phase I			$ 90,470									
Phase II												
Tennis court	1		$ 10,000									
Volleyball - badminton court	1		3,000									
Subtotal			$ 13,000			-	$13.0					
Architect and engineering fee of 4%			520			0.5	-					
Contingency of 5%			650			-	0.7					
Total Phase II			$ 14,170									

EXHIBIT D-26

ASIAN INSTITUTE OF TECHNOLOGY

OUTDOOR RECREATION FACILITIES FUNDING SCHEDULE
1968-69 Through 1976-77

PHASE III-PHASE IV

	Number Units Added	Unit Cost	Total Estimated Cost	Funds Required (000) 1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
Phase III												
Tennis court	1		$ 10,000									
Badminton court	1		3,000									
Handball court	1		3,000									
Subtotal			$ 16,000						-	$16.0		
Architect and engineering fee of 4%			640						$0.6	-		
Contingency of 5%			800						-	0.8		
Total Phase III			$ 17,440									
Phase IV												
Tennis court	1		$ 10,000									
Badminton court	1		3,000									
Subtotal			$ 13,000									$13.0
Architect and engineering fee of 4%			520									0.5
Contingency of 5%			650									0.7
Total Phase IV			$ 14,170									
Grand Total			$136,250	$3.3	$64.2	$23.5	$13.7	-	$0.6	$16.8	-	$14.2

EXHIBIT D-27

ROADS AND GENERAL IMPROVEMENT

ASIAN INSTITUTE OF TECHNOLOGY

ROADS AND GENERAL IMPROVEMENT FUNDING SCHEDULE
1968-69 Through 1974-75

Function	Estimated Cost	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75
		←			(000)			→
Main Arterial Road (Concrete, 100,000 square feet)	$100,000	$50.0	$ 50.0					
Feeder Roads (Macadam, 55,000 square feet)	33,000	-	15.0	$ 6.0	$5.0	$5.0	-	$2.0
Parking Areas (Macadam, 170 places at 300 feet per vehicle, or 51,000 square feet)	30,600	-	20.0	5.6	2.5	-	$2.5	-
Walkways								
Concrete, 20,000 square feet	20,000	-	12.0	5.0	1.0	1.0	1.0	-
40% covered, 2,000 square feet	6,000	-	4.0	1.0	-	1.0	-	-
Macadam, lanes and paths, 20,000 square feet	12,000	-	8.0	1.0	1.0	1.0	1.0	-
Fencing (16,000 linear feet, mix of decorative, plantings and barbed wire at $0.75 per foot)	12,000	10.0	2.0	-	-	-	-	-
Total	$213,600	$60.0	$111.0	$18.6	$9.5	$8.0	$4.5	$2.0

EXHIBIT D-28

LAND FILL

ASIAN INSTITUTE OF TECHNOLOGY

LAND USE SCHEME
1970-71 Through 1976-77

	Floor	Approximate Square Footage Of Ground Cover	Acres (Rounded)	Required Developed Land At 20% Ground Cover	1970-71	1972-73	1974-75	1976-77	Total Through 1976-77
				(Acres)					
Core Campus									
Administration building	2	12,000	0.3	1.5	1.5				1.5
Library (anticipate 1974)	2	12,900	0.3	1.5	1.5				1.5
Academic Complex									
Civil engineering	2	60,000	1.4	7.0	7.0				7.0
Mechanical engineering	2	36,000	0.9	4.5	4.5				4.5
Electrical engineering	2	27,500	0.7	3.5	3.5				3.5
Program X	2	27,500	0.7	3.5	3.5				3.5
Student Service Complex	3	22,000	0.5	2.5	2.5				2.5
Housing									
Student housing complex - 1977	3	55,400	1.3	6.5	6.5				6.5
Faculty housing									
1970-71	1	92,000	2.1	10.5	10.5				10.5
1972-73		124,000	3.0	15.0		15.0			15.0
1974-75		174,000	4.1	20.5			20.5		20.5
1976-77		208,000	4.8	24.0				24.0	24.0
Other									
Outdoor recreation	-	135,000	3.1	15.5	15.5				15.5
Campus service complex	1	31,600	0.8	4.0	4.0				4.0
Water-sewage plant	1	10,000	0.3	1.5	1.5				1.5
Total Developed Land					62.0	15.0	20.5	24.0	121.5
Calculation of Land-Fill Requirements									
Developed land (millions of square feet)					2.7			3.3	
Estimated fill in millions of cubic feet (fill of two feet)					5.4			6.6	
Estimated size of dredged area in millions of square feet (15-foot depth and one cubic foot dredged equals 4/5 cubic foot of fill when settled)					0.45			0.55	
Acres					10.5			12.8	
Cost of dredge and fill at $0.03 per cubic foot					$162.0			$198.0	

EXHIBIT D-29

LANDSCAPING

ASIAN INSTITUTE OF TECHNOLOGY

LANDSCAPING FUNDING SCHEDULE
1968-69 Through 1975-76

Function	Estimated Cost	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76
		←			(000)				→
Landscaping									
Developed acreage - (80 acres at $400 per acre)	$32,000	-	-	$18.0	$6.0	$2.0	$2.0	$2.0	$2.0
Ground cover and minor landscaping of undeveloped acreage - (320 acres at $40 per acre)	12,800		$8.0	4.0			0.8		
Subtotal	$44,800								
Landscape architect and engineering fee of 7%	$ 3,136	$3.1							
Total	$47,936	$3.1	$8.0	$22.0	$6.0	$2.0	$2.8	$2.0	$2.0

EXHIBIT D-30

ACADEMIC SPACE

ASIAN INSTITUTE OF TECHNOLOGY

ACADEMIC SPACE FUNDING SCHEDULE FOR SPECIAL PROGRAMS
1968-69 Through 1976-77

Functional Area	Gross Square Feet(a)	Cost Per Square Foot	Total Estimated Cost	Funds Required 1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
				(000)								
Phase I												
Offices	6,360(b)	$12.00	$ 76,320									
Laboratories	8,280	11.00	91,080									
Classrooms	6,000	11.00	66,000									
Subtotal			$233,400	-	$155.6	$77.8						
Architect and engineering			16,338	$5.5	5.4	5.4						
fee of 7 per cent				-	-	11.7						
Contingency of 5 per cent			11,670									
Total Phase I			$261,408									
Phase II												
Offices	3,600		$ 43,200									
Laboratories	5,760		63,360									
Classrooms	4,500		49,500									
Subtotal			$156,060					-	$104.1	$52.0		
Architect and engineering fee of 7 per cent			10,924					$3.7	3.6	3.6		
Contingency of 5 per cent			7,803					-	-	7.8		
Total Phase II			$174,787									
Grand Total			$436,195	$5.5	$161.0	$94.9	-	$3.7	$107.7	$63.4		

(a)Net square feet times 1.5.
(b)Includes 480 square feet for publications.

EXHIBIT D-31

FACILITIES

ASIAN INSTITUTE OF TECHNOLOGY

SPACE REQUIREMENTS FOR SPECIAL PROGRAMS
1970-77 Through 1976-77

(Net Square Feet)

	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
Offices							
Faculty	720	600	960	1,320	1,800	1,920	2,160
Secretarial	240	240	360	480	600	720	720
Conference Coordinator	160	160	160	160	160	160	160
Administrative clerk/secretary	120	240	240	240	360	360	360
Research Associates	240	240	360	480	720	720	840
Public relations staff	120	120	120	120	120	120	120
Assistant Dean - Special Programs	-	-	-	-	160	160	160
Study-leave faculty	360	480	720	960	1,320	1,560	1,680
Registration clerical	120	120	120	120	120	120	120
Subtotal	2,080	2,200	3,040	3,880	5,360	5,840	6,320
Laboratories							
Faculty	1,440	1,200	1,920	2,640	3,600	3,840	4,320
Research Associates	480	480	720	960	1,440	1,440	1,680
Study-leave faculty	720	840	1,080	1,920	2,640	3,120	3,360
Total	2,640	2,520	3,720	5,520	7,680	8,400	9,360
Classrooms							
20-50 seating capacity	1,000	1,000	2,000	4,000	5,000	5,000	5,000
50-100 seating capacity	-	-	-	-	2,000	2,000	2,000
	1,000	1,000	2,000	4,000	7,000	7,000	7,000
Publications Office	360	360	360	360	360	360	360

EXHIBIT D-32

PUBLICATIONS PROGRAM

ASIAN INSTITUTE OF TECHNOLOGY

PUBLICATIONS PROGRAM COSTS
1968-69 Through 1976-77

	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
Staffing - Salaries, Wages And And Related									
Editor	$19.2	$19.2	$19.2	$19.2	$19.2	$19.2	$19.2	$19.2	$19.2
Subeditor/secretary	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Circulation clerk									
Subtotal	$21.1	$21.1	$21.1	$21.1	$21.1	$21.1	$21.1	$21.1	$21.1
Printing (4 issues, 3,000 Copies, Approx. 80 Sides at 50¢ Per Copy)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Mailing (25¢ Per Copy, Includes Addressing, Postage, Wrapping, General Handling, at Bulk, Overseas Mailing And Special Postage Rates)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
General Overhead (25% Of Salaries And Wages)	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
Total	$35.3	$35.3	$35.3	$35.3	$35.3	$35.3	$35.3	$35.3	$35.3

EXHIBIT D-33

HOUSING

ASIAN INSTITUTE OF TECHNOLOGY

HOUSING COMPLEX FUNDING SCHEDULES FOR SPECIAL PROGRAMS
1968-69 Through 1976-77

A - Faculty And Staff Housing(a)

	Units Needed	Added	Estimated Cost	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
				(000)						
Phase I										
Single-family units	5	5	$ 82,500	$ 82.5						
Apartments	4	4	44,000	44.0						
Phase II										
Single-family units	7	2	33,000			$33.0				
Apartments	7	4	44,000			44.0				
Phase III										
Single-family units	10	3	49,500				$49.5			
Apartments	9	4	44,000				44.0			
Phase IV										
Single-family units	13	3	49,500					$49.5		
Apartments	13	4	44,000					44.0		
Phase V										
Single-family units	15	2	33,000						$33.0	-
Total			$423,500	$126.5	-	$77.0	$93.5	$93.5	$33.0	-

B - Hotel

	Units Needed	Gross Square Feet	Estimated Cost	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75
				(000)						
Phase I										
Construction	150	540,000	$ 810,000	-	$540.0	$270.0				
Architect and engineering fee of 7%			56,700	$18.9	18.9	18.9				
Contingency of 5%			40,500			40.5				
Phase II										
Construction	200	180,000	270,000						$180.0	$90.0
Architect and engineering fee of 7%			18,900					$6.3	6.3	6.3
Contingency of 5%			13,500							13.5
Total			$1,209,600	$18.9	$558.9	$329.4	-	$6.3	$186.3	$109.8

(a)Including furnishings.

EXHIBIT D-34

ASIAN INSTITUTE OF TECHNOLOGY

TEMPORARY HOUSING-LOAD FACTORS USED TO DETERMINE HOTEL SPACE REQUIREMENTS
1970-71 Through 1976-77

Program	1970-71		1971-72		1972-73		1973-74		1974-75		1975-76		1976-77		Example Of Peak Load(a) Calculation 1970-71		Example Of Peak Load(a) Calculation 1976-77	
	Rooms	Weeks	Rooms	Weeks	Rooms	Weeks	Rooms	Weeks	Rooms	Weeks	Rooms	Weeks	Rooms	Weeks	Rooms	Weeks	Rooms	Weeks
Conference	80	7	80	8	80	11	80	14	80	17	80	20	80	24				
Board of Trustees	40	2	40	2	40	2	40	2	40	2	40	2	40	2	80	21	80	26
Institutes	30	12	30	15	30	18	30	24	-	-	-	-	-	-				
	-	-	-	-	-	-	-	-	30(b)	33	30	39	30	42	-	-	30	42
Sabbatical	1	40	2	40	2	40	3	40	5	40	5	40	6	40	1	40	6	40
Diploma	18	36	18	36	36	36	54	36	72	36	72	36	72	36	18	36	72	36
Visitors	3	52	4	52	5	52	6	52	7	52	8	52	9	52	3	52	9	52
Total Room-Weeks	1,844		2,106		3,136		4,296		5,586		6,058		6,560					
Estimated rooms required	102		104		123		143		191		195		197		102		197	
Available room-weeks	5,304		5,408		6,396		7,436		9,932		10,140		10,244					
Percentage room utilization	34.8%		38.9%		49.0%		57.8%		56.2%		59.7%		64.0%					

(a) For maximum load, 40 weeks usage equals one room-year.
(b) Exceeds maximum peak load and therefore not grouped with other programs.

EXHIBIT D-35

REGIONAL LIBRARY

ASIAN INSTITUTE OF TECHNOLOGY

ALTERNATIVE SPACE REQUIREMENTS OF
THE REGIONAL TECHNOLOGICAL LIBRARY
1970-71 Through 1976-77

	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
Student Population	230	282	367	463	532	599	684
Reader Stations							
Regular student body (one-third of student population in reader stations and open carrels)	77	94	123	155	178	200	228
Special programs (25% FTE enrollment)(a)	13	14	22	31	40	43	47
Regional library (estimate)	30	30	30	30	40	40	40
Total Stations	120	138	175	216	258	283	315
	←			(Square Feet)			→
Reader Station Area (25 Sq. Ft. Per Station)	3,000	3,450	4,375	5,400	6,450	7,075	7,875
Reference And Catalog Area	1,600	1,600	1,600	1,600	1,600	1,600	1,600
Circulation Desk	600	600	600	600	600	600	600
Cataloging And Ordering	840	960	960	960	1,080	1,200	1,200
Repair And Bindery	480	480	480	480	480	480	480
Receiving And Shipping	320	320	320	320	320	320	320
Central Duplicating	120	120	120	120	120	120	120
Microfilm Reading	480	480	480	480	480	480	480
Administrative Office	200	200	200	240	240	240	240
Supply And Storage	720	720	720	720	720	720	720
Listening Booths (20 NSF Each)	200	200	200	200	200	200	200
Faculty Reading Room	200	200	200	200	200	200	200
Conference Rooms	200	200	200	200	400	400	400
Typing Room (10 Stations At 30 NSF Per Station)	300	300	300	300	300	300	300
Closed And Open Book Stack Space(b)	4,136	5,360	6,704	8,016	9,440	10,984	12,648
Closed Carrels(c) (30 NSF Per Station)	390	510	720	870	1,020	1,170	1,380
Total Net Square Feet	13,786	15,700	18,179	20,706	23,650	26,089	28,763
Gross Square Feet	20,679	23,550	27,269	31,059	35,475	39,134	43,145
	First Phase				Second Phase		
(a)Special Program FTE enrollments	50	55	87	121	158	172	185
(b)Estimated ending collection (000 volumes)	51.7	67.0	83.8	100.2	118.0	137.3	158.1
(c)To accommodate 20% of the faculty and 25% of doctoral candidates							
Doctoral candidates	7	15	25	32	35	44	59
Faculty including special programs	54	63	82	101	124	137	153

ASIAN INSTITUTE OF TECHNOLOGY

ALTERNATIVE ACQUISITION PLAN FOR
THE REGIONAL TECHNOLOGICAL LIBRARY
1967-68 Through 1976-77

	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
Beginning Collection (Regular)	16.0	18.1	20.4	22.9	27.7	33.0	38.8	43.2	48.0	53.3
Add:										
Regular acquisitions(a)	1.6	1.8	2.0	2.3	2.8	3.3	3.9	4.3	4.8	5.3
New program supporting collection	-	-	-	2.0	2.0	2.0	-	-	-	-
Special collections accepted	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Subtotal	2.1	2.3	2.5	4.8	5.3	5.8	4.4	4.8	5.3	5.8
Required as a Major Regional Technology Library	-	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0
Total Added	2.1	9.3	10.5	13.8	15.3	16.8	16.4	17.8	19.3	20.8
Ending Collection	18.1	27.4(b)	37.9(b)	51.7	67.0	83.8	100.2	118.0	137.3	158.1
Closed And Open Bookshelf Space (.08 NSF Per Volume)										
Ending total	1,448	2,192	3,032	4,136	5,360	6,704	8,016	9,440	10,984	12,648
Added during year	168	744	840	1,104	1,224	1,344	1,312	1,424	1,544	1,664

(a) 10 per cent of beginning collection to support academic programs.
(b) Excess over 20,000 must be stored because of lack of available shelf space in present facility.

EXHIBIT D-37

ASIAN INSTITUTE OF TECHNOLOGY

FUNDING SCHEDULE REGIONAL LIBRARY
1968-69 Through 1973-74

	Gross Square Feet(a)	Cost Per Square Foot	Total Estimated Cost	Funds Required 1968-69	1969-70	1970-71	1971-72	1972-73	1973-74
				(000)					
Phase I									
Library construction	31,059	$12	$372,708	-	$248.5	$124.2			
Architect and engineering fee of 7 per cent			26,090	$8.7	8.7	8.7			
Contingency of 5 per cent			18,635	-	-	18.6			
Subtotal Phase I			$417,433						
Phase II									
Library construction	12,086	$12	$145,032			-	-	$ 96.7	$48.3
Architect and engineering fee of 7 per cent			10,152			$ 3.4	$3.4	3.4	3.4
Contingency of 5 per cent			7,252			-	-	-	7.3
Subtotal Phase II			$162,436						
Total			$579,869	$8.7	$257.2	$151.5	$3.4	$100.1	$59.0

(a)Net square feet times 1.5.

EXHIBIT D-38

ASIAN INSTITUTE OF TECHNOLOGY

ADDITIONAL PERSONNEL REQUIRED TO SUPPORT
A REGIONAL TECHNOLOGICAL LIBRARY
1968-69 Through 1976-77

	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
A - Number Of Personnel									
Librarian	1	1	1	1	1	1	1	1	1
Assistant Librarian	-	1	1	1	2	2	2	2	2
Catalogers	3	4	4	5	5	5	6	7	7
Clerks	-	-	2	2	2	2	2	2	2
Guards	-	-	1	1	1	1	1	1	1
Total	4	6	9	10	11	11	12	13	13
B - Administrative Expenses (000)									
Administrative									
Salary	$14.75	$14.75	$14.75	$14.75	$14.75	$14.75	$14.75	$14.75	$14.75
Allowances	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50
Retirement contributions	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48
Local Hire									
Salaries	6.45	12.29	14.71	16.86	20.55	20.55	21.57	22.58	22.58
Retirement	0.54	1.02	1.23	1.40	1.71	1.71	1.80	1.88	1.88
Total	$29.72	$36.04	$38.67	$40.99	$44.99	$44.99	$46.10	$47.19	$47.19

EXHIBIT D-39

ASIAN INSTITUTE OF TECHNOLOGY

ADDITIONAL OPERATING COSTS FOR
REGIONAL TECHNOLOGICAL LIBRARY
1968-69 Through 1976-77

	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
Salaries and other wage related	$29.7	$ 36.0	$ 38.7	$ 41.0	$ 45.0	$ 45.0	$ 46.1	$ 47.2	$ 47.2
Acquisitions	84.0	96.0	108.0	120.0	132.0	144.0	156.0	168.0	180.0
Overhead - 25 per cent of salaries and wages	7.4	9.0	9.7	10.2	11.2	11.2	11.5	11.8	11.8
Total	$91.4	$105.0	$117.7	$130.2	$143.2	$155.2	$167.5	$179.8	$191.8

EXHIBIT D-40

COST FACTORS

ASIAN INSTITUTE OF TECHNOLOGY

FACTORS USED IN DETERMINING BUILDING AND FACULTY CONSTRUCTION COSTS

Item	Cost Per Square Foot
Office Space	
Ordinary - frame interior partitioning, standard wall and floor finish (painted surface, vinyl tile), standard windows and doors, acoustic ceilings, standard office lighting, two-story structures, air conditioned	$12.00
Deluxe - same as above, but includes higher-quality floor and wall finish, better doors and windows, air conditioned	14.00
Instructional Space	
Classrooms - sound-retarding partitioning, vinyl-floor finish, standard classroom lighting, built-in blackboards, room-darkening shades, two-story buildings, air conditioned	11.00
Laboratory (major) - one-story building, slab floor with multiple channels for water, power, 20-foot ceilings, not air conditioned, size range: 3,000 to 6,000 square feet	11.00
Laboratory (minor) - two-story building, 10-foot ceilings, channels for utilities, vinyl floors, standard lighting, air conditioned, size range: 500 to 1,500 square feet	12.00

Item	Cost Per Square Foot
Housing	
Single-family unit - three bedrooms, three baths, living room, dining room, kitchen, servants' quarters, not air conditioned, approximately 2,500 net square feet	$ 7.00
Apartments - three-story structures, three-bedroom apartments, 1-1/2 or 2 baths, average of 2,000 square feet per unit, not air conditioned	6.30
Duplex units - Two-story structures, three bedrooms, two bath units (two per structure), 3,000 net square feet per duplex, not air conditioned	7.50
Dormitories - three-story structures, 30 units of 150 net square feet per unit, not air conditioned	6.30
Hotel space - five-story structure, 240 net square feet per unit, 200 units, elevators, air conditioned	15.00
Outdoor Recreation	
Tennis court (complete)	$10,000
Basketball court, covered at $3 per square feet	7,000
Soccer field (complete)	14,000
Swimming pool, six lanes (complete)	33,000
Warehouse - 20-foot ceiling, slab floor	5.30
Food Service (cafeteria) - 17,000 gross square feet for 684 students and 200 others; kitchen, serving area, dining room; air conditioned	11.00

Item	Cost Per Square Foot
Additional	
Estimated cost per square foot for air-conditioned, two-story Library, of about 21,000 gross square feet	$12.00
Estimated cost of equipped infirmary of 1,500 square feet; 3 treatment rooms, 10 patient rooms, 4 baths, lobby/waiting room, air conditioned	14.00
Complete sewage plant for 3,000 population	100,000.00 To 125,000.00
Deep well, water-pumping plant for 3,000 population, 200-meter depth, plus 60,000 gallon storage	50,000.00
Power distribution substation	10,000
Shops	6.00
Laboratory service space	9.00
Miscellaneous and building service	10.00
Roads	
Concrete	9.00
Macadam	0.60
Fence (per linear foot)	0.75
Fill (per cubic meter at 5 meters used to fill 4 meters)	1.00

ASIAN INSTITUTE OF TECHNOLOGY

MASTER FUNDING SCHEDULE
1968-69 Through 1976-77

Cost Element	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	Planning Period Total
	($US In Thousands)									
Administration Complex										
Architect and engineering fees	$ 7.4	$ 7.4	$ 7.4							
Construction	-	211.6	121.7							
Furnishings and equipment	-	49.2	-							
Computer	-	-	600.0							
Subtotal	$ 7.4	$268.2	$729.1							$1,004.7
Library Complex										
Architect and engineering fees	-	-	-	$ 7.2	$ 7.2	$ 7.2	-	-	-	
Construction	-	-	-	-	205.5	118.2	-	-	-	
Furnishings and equipment	-	-	$ 36.2	-	-	18.6	-	-	-	
Books (initial cost only)	$ 28.0	$ 30.0	58.0	64.0	70.0	53.0	$ 58.0	$ 64.0	$ 70.0	
Subtotal	$ 28.0	$ 30.0	$ 94.2	$ 71.2	$282.7	$197.0	$ 58.0	$ 64.0	$ 70.0	895.1
Civil Engineering Complex										
Architect and engineering fees	$ 30.6	$ 30.5	$ 30.5							
Construction	-	872.8	501.9							
Furnishings and equipment	-	-	710.0							
Subtotal	$ 30.6	$903.3	$1,242.4							2,176.3
Mechanical Engineering Complex										
Architect and engineering fees		$ 13.6	$ 13.6	$ 13.7	-	$ 5.1	$ 5.1	$ 5.0	-	
Construction		-	389.7	224.0	-	-	144.9	83.3	-	
Furnishings and equipment		-	-	295.3	-	-	-	121.3	-	
Subtotal		$ 13.6	$403.3	$533.0	-	$ 5.1	$150.0	$209.6	-	1,314.6
Electrical Engineering Complex										
Architect and engineering fees			$ 10.9	$ 10.9	$ 10.9	$ 3.2	$ 3.2	$ 3.1	-	
Construction			-	311.5	179.1	-	90.7	52.2	-	
Furnishings and equipment			-	-	229.0	-	-	70.8	-	
Subtotal			$ 10.9	$322.4	$419.0	$ 3.2	$ 93.9	$126.1	-	975.5
Program X Complex										
Architect and engineering fees				$ 10.9	$ 10.9	$ 10.9	$ 3.2	$ 3.2	$ 3.1	
Construction				-	311.5	179.1	-	90.7	52.2	
Furnishings and equipment				-	-	229.0	-	-	70.8	
Subtotal				$ 10.9	$322.4	$419.0	$ 3.2	$ 93.9	$126.1	975.5
Campus Service Complex										
Architect and engineering fees	$ 3.8	$ 3.8	$ 3.9	$ 1.1	$ 1.2	$ 1.1				
Construction	-	109.1	62.8	-	32.5	18.6				
Furnishings and equipment	-	-	171.9	-	-	27.7				
Subtotal	$ 3.8	$112.9	$238.6	$ 1.1	$ 33.7	$ 47.4				437.5

Cost Element	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	Planning Period Total
	($US In Thousands)									
Student Service Complex										
Architect and engineering fees	$ 17.3	$ 17.3	$ 17.2	$ 1.0	$ 1.0	$ 0.9				
Construction	-	493.8	283.9	-	27.6	15.9				
Furnishings and equipment	-	-	89.9	-	-	27.7				
Subtotal	$ 17.3	$511.1	$391.0	$ 1.0	$ 28.6	$ 44.5				$ 993.5
Student Housing Complex										
Architect and engineering fees	$ 8.5	$ 10.6	$ 13.7	$ 8.5	$ 8.5	$ 7.4	$ 7.5	$ 5.3	$ 3.2	
Construction	-	241.9	199.7	125.4	142.9	112.7	95.2	127.3	53.3	
Furnishings and equipment	-	-	36.0	9.0	13.5	13.5	9.0	9.0	13.5	
Subtotal	$ 8.5	$252.5	$249.4	$142.9	$164.9	$133.6	$111.7	$141.6	$ 70.0	1,275.1
Faculty And Staff Housing Complex										
Architect and engineering fees	$ 2.0	-	-	-	-	-	-	-	-	
Construction (including on-site supervision and partial furnishing)	-	$424.3	$272.2	$124.3	$158.5	$172.0	$102.2	$138.3	$ 58.2	
Subtotal	$ 2.0	$424.3	$272.2	$124.3	$158.5	$172.0	$102.2	$138.3	$ 58.2	1,452.0
Outdoor Recreation										
Architect and engineering fees	$ 3.3	-	$ 0.5	-	-	$ 0.6	-	-	$ 0.5	
Construction	-	$ 64.2	23.0	$ 13.7	-	-	$ 16.8	-	13.7	
Subtotal	$ 33.3	$ 64.2	$ 23.5	$ 13.7	-	$ 0.6	$ 16.8	-	$ 14.2	136.3
Roads And General Improvements	$ 60.0	$111.0	$ 18.6	$ 9.5	$ 8.0	$ 4.5	$ 2.0	-	-	213.6
Land Fill	$ 81.0	$ 81.0	$ 12.0	-	$ 12.0	-	$ 12.0	-	-	198.0
Landscaping										
Architect and engineering fees	$ 3.1	-	-	-	-	-	-	-	-	
Construction	-	$ 8.0	$ 22.0	$ 6.0	$ 2.0	$ 2.8	$ 2.0	$ 2.0	-	
Subtotal	$ 3.1	$ 8.0	$ 22.0	$ 6.0	$ 2.0	$ 2.8	$ 2.0	$ 2.0	-	47.9
Master Plan - architect and engineering fees	$150.0	-	-	-	-	-	-	-	-	150.0
Sewage Plant And Service Extensions										
Architect and engineering fees	$ 5.0	-	-	-	-	-	-	-	-	
Construction	20.0	$ 80.0	$ 20.0	-	$ 4.0	-	$ 4.0	-	-	
Subtotal	$ 25.0	$ 80.0	$ 20.0	-	$ 4.0	-	$ 4.0	-	-	133.0
Water Pumping Station And Service Extensions										
Architect and engineering fees	$ 3.0	-	-	-	-	-	-	-	-	
Construction	10.0	$ 40.0	$ 7.0	-	$ 2.0	-	$ 2.0	-	-	
Subtotal	$ 13.0	$ 40.0	$ 7.0	-	$ 2.0	-	$ 2.0	-	-	64.0

Cost Element	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	Planning Period Total
	($US In Thousands)									
Power (Electric) Substation And Distribution										
Architect and engineering fees	$ 1.0	-	-	-	-	-	-	-	-	
Construction	13.0	$ 1.0	$ 4.0	-	$ 1.0	-	$ 1.0	-	-	
Subtotal	$ 14.0	$ 1.0	$ 4.0	-	$ 1.0	-	$ 1.0	-	-	$ 21.0
Total For Academic Program	$447.0	$2,901.1	$3,738.2	$1,236.0	$1,438.8	$1,029.7	$ 558.8	$ 775.5	$ 338.5	$12,463.6
Special Programs										
Academic space										
Architect and engineering fees	$ 5.5	$ 5.4	$ 5.4	-	$ 3.7	$ 3.6	$ 3.6	-	-	
Construction	-	155.6	89.5	-	-	104.1	59.8	-	-	
Furnishings and equipment	-	-	93.9	-	-	-	64.4	-	-	
Subtotal	$ 5.5	$ 161.0	$ 188.8	-	$ 3.7	$ 107.7	$ 127.8	-	-	$ 594.5
Housing										
Architect and engineering fees (hotel)	$ 18.9	$ 18.9	$ 18.9	-	$ 6.3	$ 6.3	$ 6.3	-	-	
Construction (hotel)	-	540.0	310.5	-	-	180.0	103.5	-	-	
Furnishings and equipment (hotel)	-	-	60.0	-	-	-	20.0	-	-	
Faculty and staff housing - complete	-	-	126.5	-	77.0	93.5	93.5	$ 33.0	-	
Subtotal	$ 18.9	$ 558.9	$ 515.9	$ -	$ 83.3	$ 279.8	$ 223.3	$ 33.0	-	$ 1,713.1
Regional Library										
Architect and engineering fees	$ 8.7	$ 8.7	$ 8.7	$ 3.4	$ 3.4	$ 3.4	-	-	-	
Construction	-	248.5	142.8	-	96.7	55.6	-	-	-	
Furnishings and equipment	-	-	63.7	-	-	25.8	-	-	-	
Books (initial cost only)	84.0	96.0	108.0	120.0	132.0	144.0	$ 156.0	$ 168.0	$ 180.0	
Subtotal	$ 92.7	$ 323.2	$ 323.2	$ 123.4	$ 232.1	$ 228.8	$ 156.0	$ 168.0	$ 180.0	$ 1,857.4
Net Added Cost Over Regular Library	$ 64.7	$ 373.2	$ 229.0	$ 52.2	$ (50.6)	$ 31.8	$ 98.0	$ 104.0	$ 110.0	$ 962.3
Total Special Programs(a)	$ 89.1	$1,043.1	$ 933.7	$ 52.2	$ 36.4	$ 419.3	$ 449.1	$ 137.0	$ 110.0	$ 3,269.9
Grand Total All Programs	$ 536.1	$3,944.2	$4,671.9	$1,288.2	$1,475.2	$1,449.0	$1,007.9	$ 912.5	$ 448.5	$15,733.5

(a)Including net additional cost of regional library.

APPENDIX E

DETAIL OF STAFFING AND COMPENSATION

ASIAN INSTITUTE OF TECHNOLOGY

STAFFING SCHEDULE (APPORTIONED TO SALARY GRADES)
USED FOR PROJECTING COMPENSATION COSTS
1968-69 Through 1977-78

AIT Salary Grade	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
International										
I	1	1	1	1	1	1	1	1	1	1
II	3	3	3	3	3	3	3	3	3	3
III	7.75	8.5	11.75	14.25	16.75	20.5	24.0	28.0	30.25	34.25
IV	7.60	8.5	8.8	12.0	13.8	17.1	20.0	23.3	25.7	29.0
V	12.9	14.25	15.7	17.5	20.2	25.15	31.0	35.95	39.55	44.5
VI	5	6	6	7	9	11	13	16	17	20
Subtotal	37.25	41.25	46.25	54.75	63.75	77.75	92.00	107.25	116.50	131.75
Local Hire										
8	5	5	6	6	6	6	6	6	6	6
7	7	8	9	13	13	14	15	15	15	15
6	14	16	16	25	32	36	42	47	51	54
5	1	2	3	3	3	3	3	3	3	3
4	21.5	23	29	48.5	53.5	59.5	64.5	73.0	80.5	86.5
3	2.5	3	4	10.5	11.5	16	16	18	20	20
2	8	9	11	22	24	30	36.0	39	44	47
2A	6	6	7	10	10	11	12	13	14	15
1	5.5	5.5	6.5	19	19	25.5	31.5	35.5	39	42
1A	12	12	12	24	28	36	44	50	56	58
Subtotal	82.5	89.5	103.5	181.0	200.0	237.0	270.0	299.5	328.5	346.5
Total	119.75	130.75	149.75	235.75	263.75	314.75	362.00	406.75	445.0	478.25

EXHIBIT E-1

ASIAN INSTITUTE OF TECHNOLOGY

COMPENSATION COST PROJECTIONS
1968-69 Through 1977-78

AIT Salary Grade	Annual Compensation Cost	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
International											
I	$25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000
II	25,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000
III	19,100	148,025	162,350	224,425	272,175	319,925	391,550	458,400	534,800	577,775	654,175
IV	16,340	124,184	138,890	143,792	196,080	225,492	279,414	326,800	380,722	419,938	473,860
V	13,590	175,311	193,658	213,363	237,825	274,518	341,788	421,290	488,561	537,484	604,755
VI	9,460	47,300	56,760	56,760	66,220	85,140	104,060	122,980	151,360	160,820	189,200
Subtotal		$594,820	$651,658	$738,340	$ 872,300	$1,005,075	$1,216,812	$1,429,470	$1,655,443	$1,796,017	$2,021,990
Local Hire											
8	$ 6,285	$ 31,425	$ 31,425	$ 37,710	$ 37,710	$ 37,710	$ 37,710	$ 37,710	$ 37,710	$ 37,710	$ 37,710
7	3,996	27,972	31,968	35,964	51,948	51,948	55,944	59,940	59,940	59,940	59,940
6	2,329	32,606	37,264	37,264	58,225	74,528	83,844	97,818	109,463	118,779	125,766
5	1,636	1,636	3,272	4,908	4,908	4,908	4,908	4,908	4,908	4,908	4,908
4	1,100	23,650	25,300	31,900	53,350	58,850	65,450	70,950	80,300	88,550	95,150
3	786	1,965	2,358	3,144	8,253	9,039	12,576	12,576	14,148	15,720	15,720
2	676	5,408	6,084	7,436	14,872	16,224	20,280	24,336	26,364	29,744	31,772
2A	811	4,866	4,866	5,677	8,110	8,110	8,921	9,732	10,543	11,354	12,165
1	424	2,332	2,332	2,756	8,056	8,056	10,812	13,3[illegible]	15,052	16,536	17,808
1A	509	6,108	6,108	6,108	12,216	14,252	18,324	22,396	25,450	28,504	29,522
Subtotal		$137,968	$150,977	$172,867	$ 257,648	$ 283,625	$ 318,769	$ 353,722	$ 383,878	$ 411,745	$ 430,461
Total		$732,787	$802,635	$911,207	$1,129,948	$1,288,700	$1,535,581	$1,783,192	$2,039,321	$2,207,762	$2,452,451
Workmen's Compensation		$ 3,000	$ 3,000	$ 4,000	$$ 4,000	$ 5,000	$ 6,000	$ 7,000	$ 8,000	$ 8,000	$ 9,000

EXHIBIT E-2

APPENDIX F

DETAIL OF PROFESSORIAL FACULTY PROJECTIONS

ASIAN INSTITUTE OF TECHNOLOGY

DETAILED PROJECTION OF PROFESSORIAL TEACHING NEEDS AND PROGRAM
1968-69 Through 1977-78

	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Civil Engineering										
Master's										
First year	11.0	10.4	12.4	13.0	12.8	12.9	12.4	12.1	12.1	12.1
Second and third year	10.8	13.8	13.7	15.5	16.5	16.2	16.3	15.5	15.2	15.2
Doctorate										
First year	-	-	-	0.9	1.1	1.4	1.6	1.6	1.6	1.6
Second year	-	-	-	-	1.0	1.3	1.7	2.0	2.0	2.0
Third and fourth year	-	-	-	-	-	1.2	1.8	2.0	2.6	2.8
Subtotal	21.8	24.2	26.1	29.4	31.4	33.0	33.8	33.2	33.5	33.7
Mechanical Engineering										
Master's										
First year					4.0	4.8	5.8	7.0	8.4	10.0
Second and third year					-	4.7	5.8	7.3	8.7	10.5
Doctorate										
First year					-	-	-	-	0.8	1.0
Second year					-	-	-	-	-	1.0
Third and fourth year					-	-	-	-	-	-
Subtotal					4.0	9.5	11.6	14.3	17.9	22.5
Electrical Engineering										
Master's										
First year						4.0	4.8	5.8	7.0	8.4
Second and third year						-	4.7	5.8	7.3	8.7
Doctorate										
First year						-	-	-	-	0.8
Subtotal						4.0	9.5	11.6	14.3	17.9
Program X										
Master's										
First year							4.0	4.8	5.8	7.0
Second and third year							-	4.7	5.8	7.3
Subtotal							4.0	9.5	11.6	14.3
Total										
Civil engineering	22	25	26	30	32	33	34	34	34	34
Mechanical engineering	-	-	-	-	4	10	12	15	18	23
Electrical engineering	-	-	-	-	-	4	10	12	15	18
Program X	-	-	-	-	-	-	4	10	12	15
Grand Total	22	25	26	30	36	47	60	71	79	90

EXHIBIT F-1

ASIAN INSTITUTE OF TECHNOLOGY

ADDITIONAL PROFESSORIAL FACULTY NEEDS

	Years Needed	Number
Civil Engineering		
Option Chairmen	1968-69 to 1977-78	5 at 0.25 FTE
Department Chairman	1971-72 to 1977-78	1 at 0.50 FTE
Doctoral program development	1970-71	1 at 1.00 FTE
Mechanical Engineering		
Master's program development	1970-71	1 at 1.00 FTE
	1971-72	2 at 1.00 FTE
Option Chairmen	1972-73 to 1973-74	2 at 0.25 FTE
	1974-75 to 1976-77	3 at 0.25 FTE
	1977-78	4 at 0.25 FTE
Departmental Chairman	1972-73 to 1977-78	1 at 0.50 FTE
Doctoral program development	1975-76	1 at 1.00 FTE
Electrical Engineering		
Master's program development	1971-72	1 at 1.00 FTE
	1972-73	2 at 1.00 FTE
Option Chairmen	1973-74 to 1974-75	2 at 0.25 FTE
	1975-76 to 1977-78	3 at 0.25 FTE
Department Chairman	1973-74 to 1977-78	1 at 0.50 FTE
Doctoral program development	1976-77	1 at 1.00 FTE
Program X		
Master's program development	1972-73	1 at 1.00 FTE
	1973-74	2 at 1.00 FTE
Option Chairmen	1974-75 to 1975-76	2 at 0.25 FTE
	1976-77 to 1977-78	3 at 0.25 FTE
Department Chairmen	1974-75 to 1977-78	1 at 0.50 FTE
Doctoral program development	1977-78	1 at 1.00 FTE

APPENDIX G

DETAIL OF OPERATING EXPENSE PROJECTIONS

ASIAN INSTITUTE OF TECHNOLOGY

PRO FORMA NONSALARY OPERATING EXPENSE PROJECTIONS
1968-69 Through 1977-78
($ U.S. In Thousands)

	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Supplies, Materials And Publications										
1. Laboratory and shop supplies	$ 38	$ 41	$ 45	$ 51	$ 62	$ 81	$ 102	$ 117	$ 132	$ 151
2. Office supplies and materials	40	46	53	60	69	79	91	105	120	138
3. Training materials	10	11	12	14	17	22	27	32	36	41
4. School publications	8	9	11	13	15	17	20	23	27	31
Subtotal	$ 96	$107	$121	$138	$163	$ 199	$ 240	$ 277	$ 315	$ 361
5. Computer rental	$ 18	$ 18	$ 18	-	-	-	-	-	-	-
Library										
6. Library books, magazines, etc.	$ 10	$ 11	$ 12	$ 14	$ 17	$ 22	$ 27	$ 32	$ 36	$ 41
Repair And Maintenance										
7. Building and equipment repair and maintenance	$ 26	$ 29	$ 33	$ 39	$ 46	$ 54	$ 63	$ 75	$ 88	$ 103
8. Vehicle repair and maintenance	2	2	2	3	3	4	4	4	4	4
Subtotal	$ 28	$ 31	$ 35	$ 42	$ 49	$ 58	$ 67	$ 79	$ 92	$ 107
Utilities										
9. Gas and electricity	$ 21	$ 22	$ 25	$ 75	$110	$ 148	$ 201	$ 237	$ 313	$ 375
10. Water	1	1	1	-	-	-	-	-	-	-
11. Telephone and telegram	2	3	3	4	4	5	6	7	7	8
Subtotal	$ 24	$ 26	$ 29	$ 79	$114	$ 153	$ 207	$ 244	$ 320	$ 383
Scholarships										
12. Scholarships	$248	$274	$303	$339	$416	$ 543	$ 687	$ 792	$ 892	$1,020
Travel, Recruiting, Entertainment										
13. Travel	$ 20	$ 21	$ 22	$ 23	$ 24	$ 26	$ 27	$ 28	$ 30	$ 31
14. Miscellaneous	30	31	33	35	36	38	40	42	44	47
Subtotal	$ 50	$ 52	$ 55	$ 58	$ 60	$ 64	$ 67	$ 70	$ 74	$ 78
15. Rent	$101	$101	$101	-	-	-	-	-	-	-
16. Special programs	$ 16	$ 18	$ 21	$ 24	$ 27	$ 37	$ 36	$ 41	$ 47	$ 54
Total	$591	$638	$695	$694	$846	$1,070	$1,331	$1,535	$1,776	$2,044

BASIS OF EXPENSE PROJECTIONS

1. Laboratory and shop supplies estimated at $220 per student (historical cost).

2. Office supplies and materials based on compounded average annual increase in faculty and staff of 14.8 per cent during the period. Base figure represents estimate of 1967-68 expense, plus 14.8 per cent.

3. Training materials estimated at $60 per student.

4. School publications - based on compounded average annual growth of student body of 16.3 per cent.

5. Computer rental includes computer rental of $1,515 per month to 1971, using 1967-68 actual as base.

6. Library books, magazines, etc. estimated at $60 per student (capital cost of books estimated at $12 per volume in proposed acquisition program).

7. Building and equipment repair and maintenance - based on a past three-year average, increasing at 13.0 per cent annually for 1968-70 and at 17.6 per cent for 1970-77.

8. Vehicle repair and maintenance estimated at $250 per vehicle (vehicles per year: 1968-69, 8; 1969-70, 8; 1970-71, 9; 1971-72, 13; 1972-73, 13; 1973-74, 14; 1974-75, 15; 1975-76, 16; 1976-77, 17; 1977-78, 18).

9. Gas and electricity are estimated at $120 per student (present cost) 1968-70; 1971-78. As follows on basis of $.28 per gross square foot.

Year	GSF	Projected Cost
1971	266,000	$ 75,000
1972	391,000	110,000
1973	527,000	148,000
1974	717,000	201,000
1975	846,000	237,000
1976	1,118,000	313,000
1977	1,339,000	375,000

10. Water - estimated at $2.80 per student (present cost) for 1968-70; dropped after 1971.

11. Telephone and telegraph - estimated at one phone per faculty or administrative staff, three calls per day at 1 B ($0.05) each or $55 per phone per year.

12. Scholarships - estimated at $1,500 per student (excluding third-year master's).

13. Travel - estimated taking into consideration present travel and increase in activity required if AIT recruits. Increase at 5.0 per cent per year.

14. Miscellaneous - estimated on the basis of current expenses and increase anticipated as a result of AIT taking over the administration of US AID budget. Increase at 5.0 per cent per year.

15. Rent - based on estimated $2.10 per square foot per year (48,000 net square feet); rental value of buildings contributed by Chulalongkorn University.

16. Special programs - $16,000 budgeted for special programs in 1968, increasing at compounded annual rate of 14.5 per cent (the rate of increase of the balance of projection).

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