No. 1

MINISTRY OF EDUCATION

PALESTINE

BASIC DESIGN STUDY REPORT ON THE PROJECT FOR UPGRADING AND DEVELOPMENT OF HIGHER EDUCATION (PHASE-1)

AUGUST 1995

JAPAN INTERNATIONAL COOPERATION AGENCY

UNICO INTERNATIONAL CORPORATION

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Preface

In response to a request from the Palestinian Economic Council for Development and Reconstruction, the Government of Japan decided to conduct a basic design study on the Project for Upgrading and Development of Higher Education (Phase I) and entrusted the study to the Japan International Cooperation Agency (JICA).

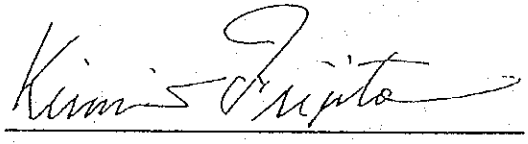
JICA sent the Basic Design Study Team from the 4th March to the 2nd April,1995.

The team held discussion with the Palestinian side, and conducted a field study at the study area. After the team returned to Japan, further studies were made, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to enhancement of friendly relations.

I wish to express my sincere appreciation to the Palestinian side for their close cooperation extended to the teams.

August,1995



Kimio Fujita
President
Japan International Cooperation Agency

August, 1995

Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Upgrading and Development of Higher Education (Phase-1).

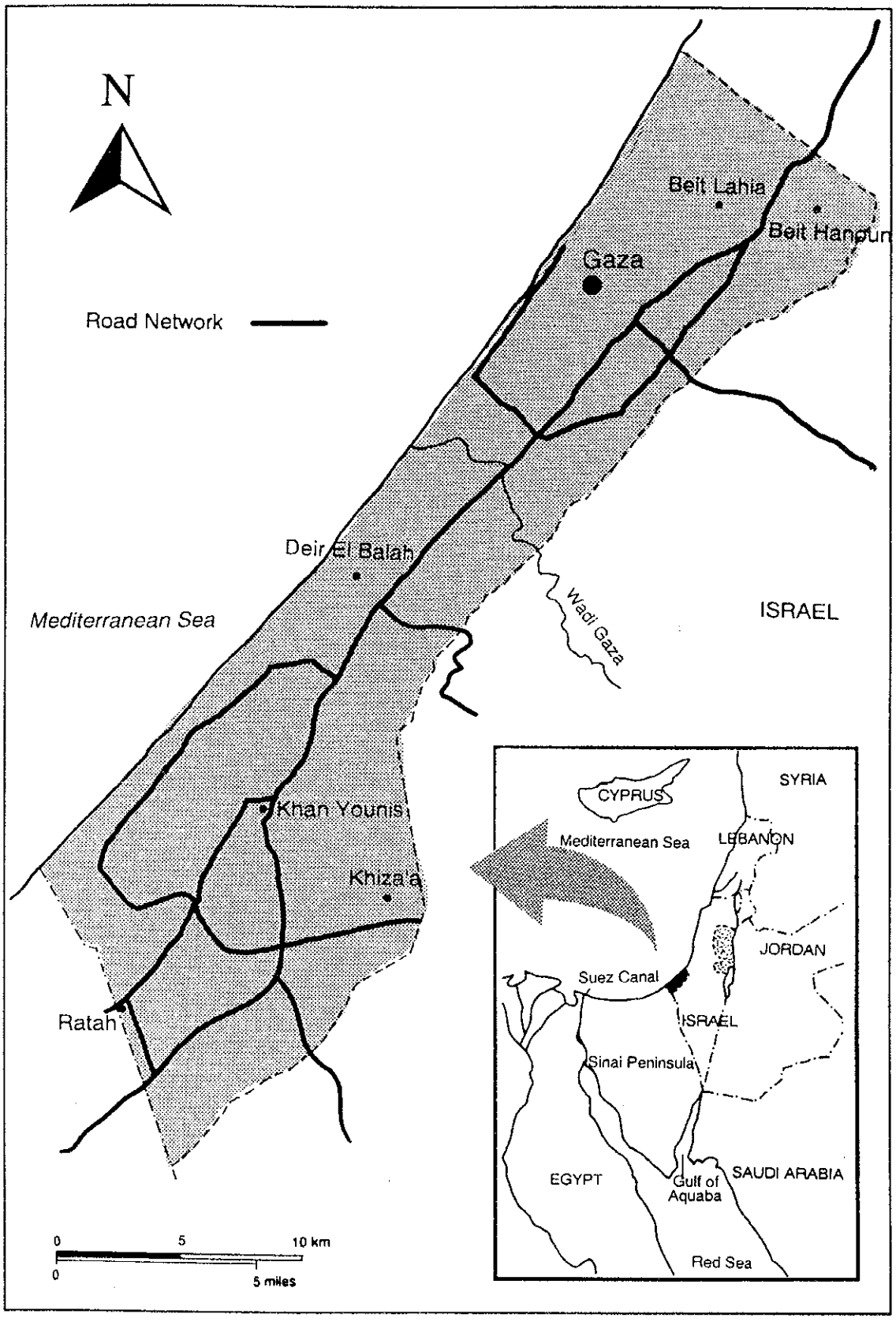
This study was conducted by UNICO International Corporation, under a contract to JICA, during the period from March, 1995 to August, 1995. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of the area and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

Atsushi Kameda
Project manager,
Basic design study team on
The Project for
Upgrading and Development
of Higher Education
(Phase-1)

LOCATION OF THE PROJECT SITE



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Chapter 1 Background of the Project

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Palestine became a trust territory under Britain after World War I. After World War II, series of strifes broke out and made it difficult for Britain to maintain public order in the area. Britain returned the mandate to the United Nations in 1947, and the United Nations adopted a resolution for partition of the area into three parts designated as an Arab area, a Jewish area, and an international zone. In 1948, the state of Israel was proclaimed.

Arab nations opposed it and unsuccessfully instigated four wars against Israel, who took the entire Palestine area under occupation. Under the occupational policies, Israel controlled Palestine politically and economically. As a result industries were stagnated, freedom of education was deprived and even the status of Palestine people was lost. Palestine became a victim of Israel's development and was relegated to a marginal position. The UN Relief and Works Agency (UNRWA) for Palestine Refugees was established in 1949.

The Gulf War, broke out in August 1990, brought home to the international community the need for resolution of the Palestine issue. In 1991, the Middle East Peace Conference held in Madrid made a breakthrough by bringing together all the parties on the both sides of the long-term hostile relations, including Syria, Lebanon, Jordan, Palestine, and Israel, for the peacemaking process. A historical stage was set to initiated the long-craved Interim Self-Government of Palestine.

In September 13, 1993, "Declaration of Principles on Interim Self-Government Agreements" signed by the Israeli government and the P.L.O. team (in the Jordanian-Palestinian delegation to the Middle East Peace Conference) (the Palestinian Delegation) marked the first step toward the actual peacemaking process between Palestine and Israel. The Agreements set forth the launching of self-government by Palestinians of the entire Gaza Strip as well as a Jerico of the West Bank of Jordan River.

Based on the agreement, partial transfer of authority from Israel has been progressing in stage, and as of March 1995, transfer has been completed in the areas of direct taxation, health, social welfare, education, and tourism. However, there remains so many tasks to be executed in order the entire system works. It is

said that one of those tasks are set up the legal system and financial system and workable system at the interface between the sections.

Prior to the 1993 agreement, Palestine established the Ministry of Education in preparation for transfer of educational service, and started to build an organization and develop national educational policy for Palestinians to be implemented by Palestinians. The policy emphasizes higher education, particularly science and technology and vocational training, with a primary goal to foster human resources capable of contributing to national development.

The vigorous policy, however, has to face harsh reality of the past education policy in Palestine that has been severely restrained under the Israeli occupation. Under such unfavorable conditions, e.g., the serious shortage of school buildings and classrooms, deterioration and shortage of equipment, the shortage of teaching materials, and the lack of a unified curriculum, Palestine educators have provided service.
Such disadvantages do not discourage Palestinians from receiving decent education, however. According to statistics, the enrollment rate in primary education (6 – 12 years old) is 100%, and that in higher education is highest among Arab nations.

On one side, Palestine people are building up foundation for an independent nation, on the other Ministry of Education have started to develop national educational policy with an emphasis on its indigenous culture and history. In the mean time, the following actions should be urgently taken to establish and maintain effective educational policy:

- Improvement of scientific and technological education with an eye to the future direction of the economy;
- Securing of financial resources required for university operation; and
- Provision of urgently needed educational equipment and materials.

These actions are further detailed as follows.

1) Improvement of scientific and engineering education
   - To increase the number of students in science and technology up to the

same ratio with liberal arts.

- To introduce advanced knowledge and technology through personnel exchange with foreign universities.
- To invite Palestinian academicians and professionals working overseas.
- To create further opportunity for women to receive higher education by establishing or increasing capacity of departments particularly suitable for female students, including nursing, nutrition, tourism, computer programming, costume design and production, emergency medical care, handcraft, home economics, and pharmacy.

2) Securing the funds for university operation

During the past two decades, Palestine has managed to build, develop and operate a complex system of higher education schools with their own financial sources. However, financial resources for education are far from achieving the desired objective in terms of absolute amount and sustainability. According to UNESCO's report, the normal funding per university student in the industrially developed countries ranges between US$6,000 - 8,000 in liberal arts and science institution, and US$10,000 - 12,000 in science and engineering one with graduate and professional programs. In contrast, the average cost in Palestine is estimated to be around $1,200. To secure the funds for university education on a continuous basis, the aid conference led by the Ministry of Education and UNESCO is held regularly and conducts a wide range of activities.

3) Provision of educational equipment and materials

Along with a rapid increase of students, some universities offer classes in two shift due to the shortage of facilities but universities and colleges in Palestine have minimum-required facilities with the adequate number of faculty members as well as their academic levels. On the other hand, educational equipment and materials are in serious shortage due to the restricted educational policy under the Israeli occupation and the shortage of funds.

As part of efforts to improve situation at universities, Palestine has requested the Japanese government to provide grant-in-aid required to supply necessary equipment and materials to Al-Azhal University and Deir El Balah Polytechnic in Gaza.

Chapter 2 Contents of the Project

Chapter 2 Contents of the Project

2.1 Objective of the Project

The project is primarily designed to supply laboratory and training equipment needed to improve the quality of higher education, particularly in science and technological education at universities and colleges, thereby to help develop human resources for national development.

During the past 27 years, Palestine has been under restraint in many aspects. It has been deprived of opportunity to provide sufficient education for Palestine people. As a result, it suffers the shortages of classrooms, teaching materials, and educational equipment – the situation persists and affects most of population. The signing of the Declaration of Principles on Interim Self-Government Agreements has finally allowed Palestine to embark on construction of its own nation. The national development process is based on the notion that future development of Palestine hinges on establishment of its own economic base, which is conducive to peace and order in the future.

Nevertheless, Palestine is handicapped by geographical constraints and its economic development inevitably relies on cooperation with neighboring countries. Based on such understanding, Palestine pursues a long-term objective of developing technology-intensive industries through the interchange of products, capital, labor, and technology with other countries.

Palestine is endowed with human resources. The project is designed to mobilize these resources for the development of technology-intensive industries.

2.2 Basic Concept of the Project

Al-Azhal University, only four years after its foundation, educates 6,546 students. While students in liberal arts dominate those in science and technology, by the 81:19 ratio, the latter is highly expected for their potential of making significant contribution to society. In transitional time in particular, young scientists and engineers are the one who support the foundation of national development. Also young scientists and engineers can contribute much to the national economy by earning income from working overseas. In fact, they are valuable assets for the

country to gain foreign currency in the short run.

On the other hand, Deir El Balah Polytechnic will start its activity in 1995 as a technical college under supervision of the Ministry of Education, which will help develop local economy and earn hard currency for the country. Existing industries in the Gaza Strip are mostly small in size and serve as subcontractors for Israeli industries. Technological advancement occurring worldwide demands increasingly advanced technology to be applied to products made in Gaza factories, who are unable to catch up with due to a significant technological gap created by restraining conditions prevailing over a long period of time. The new college has industrial and applied arts departments to train skilled engineers and technicians within a short period of time and supply them to local communities for economic revitalization, as well as to create opportunity for women to learn. Also, the college emphasizes education related to tourism that is one of the most promising sources to earn much-needed foreign currency. In particular, development of human resources in the hotel industry holds the key to the success of the tourist industry, in addition to construction and improvement of infrastructure.

In line with the above concept, Palestine has requested the Japanese government to supply educational equipment to the above university and college under the grant-in-aid project. Educational equipment requested are as follows.

1) Al-Azhal University

Faculty of Science	Chemistry Department	51 items
	Biology Department	49 items
	Physics Department	89 items
	Geology Department	25 items
	Computer Center	16 items
Faculty of Pharmacy		76 items
Faculty of Agriculture		50 items
Faculty of Arts	Geography Department	4 items
	Language Laboratory	1 item
Common		8 items
	Total	592 items

2) Deir El Balah Polytechnic

Primary Workshop	15 items
General Electricity Workshop	29 items
Electronics Laboratory	22 items
Radio & TV Laboratory	58 items
Physics Laboratory	40 items
Hotel Management Training	3 items
Hotel Catering/Training	21 items
Finance Department Training Management	1 item
Dress Making Workshop	15 items
Library	1 item
Educational Supporting Equipment	13 items
Administration Equipment	3 items
Total	223 items

The list of equipment requested by the Palestinian counterpart is attached as Appendix 1.

2.3 Basic Design

2.3.1 Design Concept

Contents of the project will be designed with the following concept.

The equipment provided under the Project must be:

1) indispensable for Higher Education,
2) necessary for Human Resources development in Palestine development and reconstruction,
3) effectively utilized by the recipient University and College, and
4) maintained properly by the recipient University and College.

2.3.2 Appropriateness of the Request

Departments and courses for which equipment is requested are evaluated below in terms of actual need and appropriateness.

(1) Al-Azhal University

1) Appropriateness of the request in terms of department and course

a. Department of Science

Chemistry, physics, biology, and geology are basic courses in the field of science and are compulsory as basic elements of the entire curriculum including other related departments such as Pharmacy and Agricultural Department.

b. Computer Center

The center is a newly established facility led by the mathematics department in Faculty of Science. It serves as a center for computer education for students in all the fields and can provide a wide range of services in consideration to wide applicability of computer technology today.

c. Faculty of Pharmacy

The department is only one educational institution in medical field available in Gaza and is considered to play a very important role in supply human resources to public health and medical services.

d. Faculty of Agriculture

Since agriculture is a major industry in Gaza, the department is very important in human resource development for agricultural technology and agricultural management.

e. Geography Department

The earth science course will supply human resources much needed for production of general and topographic maps that are essential in formulating national management and development plans for Palestine that is under way to build basic infrastructure.

f. Language laboratory

Since Palestine has to have close contact with foreign countries

because of its geographical setting, language education is very important. The facility is used for foreign language education of all students, particularly training of English conversation skill.

2) Operational capability on equipment requested

Many teaching staff of the university have received education at foreign universities and colleges, and there are many Ph.D. holders. They have sufficient knowledge and experience in operation of equipment to be supplied.

3) Maintenance considerations

Though there are no educational equipment manufacturers who have agents in Gaza, a large number of manufacturer have sales offices in Israel, who are capable of repairing equipment and supplying various consumables.
In addition, there are many agents of equipment manufacturers in Egypt who can also provide maintenance service for equipment in Gaza.

4) Evaluation of equipment requested in terms for suitability for use

Equipment are for the educational purpose of the university students. Equipment specifications should satisfy basic educational needs as well as certain levels of research requirements in light of the fact that the university offers four-year courses and plans to have graduate schools in future.

(2) Deir El Balah Polytechnic

1) Appropriateness of the requested equipment for its use

a. Equipment for primary workshop

Basic machinery are an essential item of education common to all the fields of engineering education. Together with training for equipment operation, it constitutes an essential part of the curriculum.

b. Equipment for general electricity workshop

Electrical engineers and electricians familiar with interior wiring are highly demanded for construction of houses and industrial/ commercial facilities which are under way in Gaza. Also, those who are engaged in production, and trained maintenance and management of power supply and distribution equipment are indispensable to built up local industries.

c. Equipment for electronics laboratory

Since modern electrical equipment are mostly electronically controlled, there is high demand for electronics engineers and technicians in the fields of production and repairing of electrical equipment.

d. Equipment for physics laboratory

Physics is one of fundamentals for engineering students and can be effectively learned through field experiments using a variety of laboratory equipment.

e. Training equipment for hotel management and catering

For Palestine that does not have major industries, the development of tourism is considered to be a promising economic base. In particular, Gaza has historical sites and potential as a resort place and tourism. New development projects are under way in addition to the renovation of existing hotel facilities. The tourism industry requires a variety of professionals, and the class – only class in Gaza – will be very useful for promotion of the industry.

f. Training equipment for the field of management and finance

Skilled office workers in clerical work, accounting, and secretarial service take important roll for smooth office operation. They will be great demand along with the development of local business in Gaza.

g. Training equipment for dress making shop

Costume design is one of traditional areas where female workers can show their professional skills. The course is very important to encourage social participation of women.

2) Operational capability on equipment requested

Teaching staff of the college have received advanced education in foreign countries, and the college plans to hire new instructors who have sufficient knowledge and experience in use of equipment.

3) Maintenance consideration

Though there are no laboratory equipment manufacturers who have agents in Gaza, a large number of manufacturer have sales offices in Israel, who are capable of repairing equipment and supplying various consumables.
In addition, there are many agents of equipment manufacturers in Egypt who can also provide maintenance service for equipment in Gaza.

4) Evaluation of equipment requested in terms for suitability for use

The primary objective of this college is to educate qualified engineers and technicians. Equipment requested is intended to use for field training that is the most important element of technical education. In this connection, graduates from the college are expected to work immediately after graduation, so that the equipment list should include advanced production and calibration equipment used in various industrial fields that will give students opportunity for practical training and operation.

2.3.3 Design Criteria

Equipment selection criteria including the grade and numbers of equipment are summarized as follows:

The equipment covered under the Project shall be selected in accordance with the following criteria.

a) Each equipment should be for Under-Graduate education purpose;

b) Each equipment should comply with the requirement of the present curriculum;

c) Each equipment must have its own space for installment in existing facilities;

d) For effective operation of each equipment, consumable or other necessary materials for effective operation must be easily and sustainably supplied locally;

e) Each equipment must be maintained and operated in proper manner; and

f) Should the equipment requires special utilities (e.g. electricity and water supply) for its operation, such utilities must be provided by the recipient institution, in principal.

The quantity of each equipment should be determined based on the number of students and teaching staff, curriculum at each institution, space for installation, and capacity of utilities like power supply.

The basic data and information are attached as follows.

Appendix 1-1	Requested Equipment (Al-Azhal University)
Appendix 1-2	Requested Equipment (Deir El Balah Polytechnic)
Appendix 2	Condition of the Project Site
Appendix 3	Academic Profile
Appendix 4-1	Curriculum (Al-Azhal University)
Appendix 4-2	Curriculum (Deir El Balah Polytechnic)
Appendix 5-1	Number of Student and Teachers at Al-Azhal University
Appendix 5-2	Number of Student and Teachers at Deir El Balah Polytechnic

Appendix 6-1 Existing Equipment at Al-Azhal University
Appendix 6-2 Existing Equipment at Deir El Balah Polytechnic
Appendix 7-1 Building Layout of Al-Azhal University
Appendix 7-2 Building Layout of Deir El Balah Polytechnic

2.3.4 Basic Design

(1) Overall plan

1) Al-Azhal University

The requested equipment is all laboratory or training equipment used for educational purposes and will be installed in laboratories and other facilities of the existing buildings, which are currently in use and have access to utilities.

2) Deir El Balah Polytechnic – Gaza

The requested equipment will be installed in suitable rooms of the college. The college is scheduled to move to new buildings that are currently used by a university of education, and equipment will be installed in laboratories and other rooms after necessary renovation. Based on the layout and room allocation plan for the new buildings, space requirements for laboratories and training rooms should be estimated on the basis of availability of utilities and equipment to be installed.

If any equipment is found to be unsuitable for a its proposed place for installation in terms of type, quantity and other factors, its installation plan should be modified accordingly.

(2) Evaluation of the contents requested

1) Al-Azhal University

The contents of the request are evaluated below in the context of principle of equipment selection.

a. Consideration related to analytical equipment

The request by chemistry and biology courses of Faculty of Science, Faculty of Pharmacy, and Faculty of Agriculture contains high grade analytical equipment. These equipment require costly consumables, consume electricity on a continuous basis, and/or require high maintenance costs, while they will not frequently be used by a particular faculty or department. To maximize their use, therefore, it is proposed to accommodate them in a special room to be shared by different faculty and departments. In consideration to the frequency of use and convenience, these equipment will be controlled by the chemistry department, and thus they are all listed in the equipment list for the chemistry department.

The contents of the request and proposed quantities of equipment are summarized in Table 2-1.

Table 2-1 NUMBER OF ANALYTICAL EQUIPMENT

Name	Req. from Faculty/Department					Recommended number
	Chemistry	Biology	Pharmacy	Agriculture	Total	
NMR spectrometer	1		1		2	1
HPLC	1	1	1		3	1
Gas chromatograph	1			1	2	1
Atomic absorption spectrometer	1			1	2	1
Elemental analyzer	1		1		2	1
UV/VIS/NIR spectrometer	1		1		2	1
TIR spectrometer	1			1	2	1

Among the above equipment, the nuclear magnetic resonance (NMR)equipment is 200MHz superconductive type that requires liquid helium and nitrogen for cooling. Liquid helium needs to be refilled once per year on average, and can be procured from Israel. On the other hand, liquid nitrogen is refilled daily, necessitating small liquid nitrogen production equipment. Moreover, considering that the equipment is used for laboratory work by students, the superconductive, high-frequency type is not essential. Instead, the

permanent magnet type or the 90MHz electromagnet type is proposed. As a result, the liquid nitrogen production equipment is removed from the list.

b. Other general-purpose equipment

Other general-purpose equipment will be selected in consideration to consistency with the curriculum, maintenance requirements, and the layout plan including the installation space.

2) Deir El Balah Polytechnic - Gaza

The equipment requested by the college is basically laboratory and training equipment for technical education and does not include those requiring advanced operating techniques or maintenance. The equipment list has been selected in consideration to the curriculum, syllabus, layout plan for each course.

(3) Quantity requirements

The number of equipment has been determined on the basis of the following principles, in consideration to actual laboratory work.

1) Al-Azhal University

a. Evaluation of alternatives

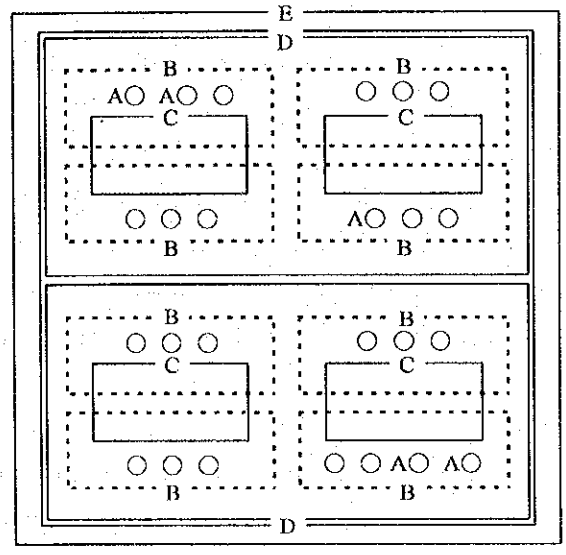
Laboratory work conducted by various departments and courses is basically conducted by a group of students. To ensure the efficiency of laboratory work, all students in a class will conduct laboratory work under the same topic and within the same time zone. Thus, the equipment list is decided by taking into account relevant factors including the number of student groups per class, the number of students per group, the number of groups or students who can share each equipment that should be determined on the basis of equipment operation and the contents of each experiment.

Each class is assumed to consist of 25 students, which can be divided into the varying number of groups shown below:

Number of groups per class	Number of students per group
1 group	25 people
2 groups	12 + 13 people
3 groups	8 people x 2 groups + 9 people
4 groups	6 people x 3 groups + 7 people
5 groups	5 people x 4 groups + 6 people
6 groups	4 people x 5 groups + 5 people
8 groups	3 people x 7 groups + 4 people
12 groups	2 people x 11 groups + 3 people

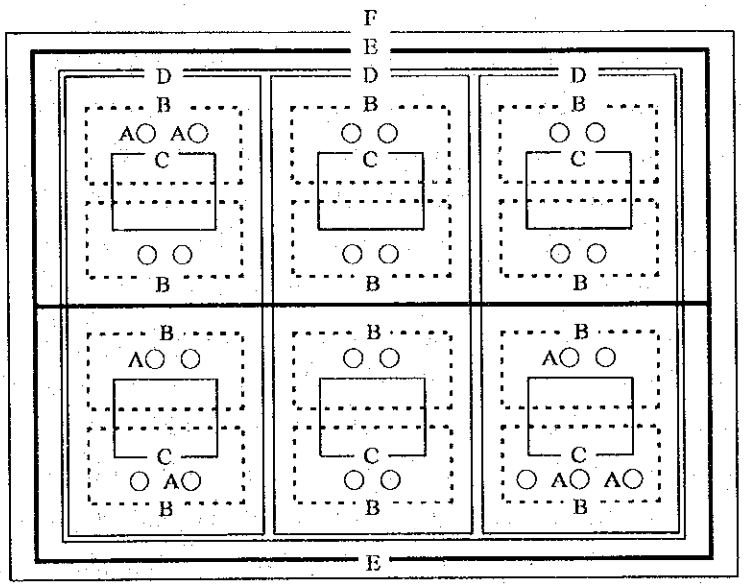
In addition, the groups so selected should preferably be consolidated or subdivided according to the contents of each experiment. In consideration to the layout of laboratory tables and work tables as well as the organization of groups, the maximum number of groups per class should preferably be set at 8 or 12. These two alternatives are evaluated in more detail as follows.

Alternative 1 : 8 Grou ps per class



A : No Group
B : 8 Groups
C : 4 Groups
D : 2 Groups
E : 1 Group

Alternative 2 : 12 Gro ups per class



A : No Group
B : 12 Groups
C : 6 Groups
D : 3 Groups
E : 2 Groups
F : 1 Group

Comparing the two alternatives, Alternative 2 allows a higher degree of freedom for combination and offers a better layout plan for laboratory tables, so that 6 groups are selected as the basic unit. It should be noted, however, that the 6-group plan counts out one student, although every class does not consist of 25 students and thus group size can be adjusted according to the actual number of students.

b. Vehicles

2 vehicles are requested; a micro-bus with capacity of 18 persons, and a mini-bus accommodating 50 passengers. They will be used to move a small group or 2 classes of students as well as faculties for field work and other purposes, e.g., field survey for a geology course or an agricultural course, or field tour or practical training at a private company. They will serve as an effective means of transportation in Gaza where pubic transportation service is not widely available.

Yet, the 50-passenger mini-bus is considered to be a large vehicle that may face various problems related to daily operation or maintenance. Instead, 2 smaller buses (capacity: 25 - 30 passengers) will be recommended.

c. Computers

The original request contemplates the computer center to be provided in a large classroom accommodating 100 students, using a file server and 100 personal computers. However, it is not consistent with the computer training plan proposed by the local counterpart, that will be conducted for a class or a course in each year. The large classroom is simply inconvenient and inefficient for such arrangement.

The center will be used for all students at the university and will be frequently used as the curriculum emphasizes computer training. In consideration to convenience and a high degree of freedom for designing the training plan, the computer center will consist of 3 rooms, each used by one class, to meet expected demand. Capacity of each room will be 30 students to allow for extra attendance in excess of ordinary class size of 25. For basic system configuration, a file server will be installed in each room to store all software programs, together with a laser printer, for an efficient use of software and peripherals.

d. Language laboratory equipment

Language laboratory will be conducted for all the students. To

ensure efficiency, it will handle one class each time. Capacity is 30 to allow for extra attendance in excess of ordinary class size of 25.

e. Laboratory equipment for physics course

The physics course will set up a training program to assign different types of experiments to groups in each class; each group will perform series of experiments according to the schedule. Thus, a set of equipment will be supplied for each subject of experiment.
In addition, it has come to attention that proposed experiments are diverse and cannot be covered over four years due to time limitation. Thus, the number of experiments have been reduced to 30 according to priority. Other equipment consists of general measuring instruments and has been evaluated and determined in terms of type and quantity.

2) Deir El Balah Polytechnic – Gaza

The college is basically requesting laboratory equipment for technical education, which is consistent with the curriculum. The number of equipment has been determined under assumption that each class consists of 25 students and is divided into 6 groups, as planned in Al-Azhal University. In principle, laboratory will be conducted for the same topic within each time zone.

2.3.5 Recommended Equipment List

The list of recommended equipment are shown below.
Equipemnt under code number like AC-1, AB-1,--- are controlled by respective faculty/department. AC, AB,--- are abbreviation of following faculty and department.

Al-Azhal University	Deir El Balah Polytechnic
AC: Chemistry Department	DW: Primary Workshop
AB: Biology Department	DL: General Electricity Workshop
AP: Physics Department	DR: Electronics Laboratory
AG: Geology Department	DT: Radio, TV Laboratory
AS: Computer Center	DP: Physics Laboratory

AH: Faculty of Pharmacy
AA: Faculty of Agriculture
AO: Geography Department
AL: Language Laboratory
AE: Common

DH: Hotel Management/Training
DC: Hotel Catering/Training
DD: Dress Making Workshop
DF: Finance Department Training/Management
DB: Library
DE: Educational Supporting Equipment
DA: Administration Equipment

AL-AZHAL UNIVERSITY (1/10)

CODE	DESCRIPTION	QUANTITY
AC – 1	NMR spectrometer	1
AC – 2	GC Mass spectrometer	1
AC – 3	FTIR spectrometer	1
AC – 4	UV/VIS/NIR spectrometer	1
AC – 6	Gas chromatograph	1
AC – 7	Atomic absorption spectrometer	1
AC – 8	Elemental analyzer	1
AC – 9	HPLC	1
AC – 11	Flame photometer	2
AC – 12	Automatic scanning densitometer	1
AC – 13	Conductivity meter (digital)	4
AC – 14	Drying oven	4
AC – 15	Muffle furnace	2
AC – 16	Melting point apparatus (digital)	6
AC – 17	Vacuum pump oil filling	5
AC – 18	Universal polarimeter	4
AC – 19	Automatic polarographic recorder	1
AC – 20	Automatic voltmetric processor	1
AC – 21	Sodium press	1
AC – 22	Rotary vacuum evaporator	6
AC – 23	Ice maker (crushed)	1
AC – 26	Balance (digital)	5
AC – 27	Analytical balance	5
AC – 28	pH meter (digital)	5
AC – 29	Magnetic stirrer w/hot plate	16
AC – 30	Universal refractometer	3
AC – 31	Test tube mixer	16
AC – 32	Rotary shaking apparatus	2
AC – 33	Homogenizer (ultrasonic)	1
AC – 34	Emulsifying stirring apparatus	1
AC – 35	Personal computer w/printer	1
AC – 36	Desphor HF electrophoresis system	1
AC – 37	Fume hood	2
AC – 38	Corrosion measurement system	1

AL-AZHAL UNIVERSITY (2/10)

CODE	DESCRIPTION	QUANTITY
AC – 39	Stirrer motor	12
AC – 40	Surface tensiometer (digital)	3
AC – 41	Refrigerated circulator	2
AC – 42	Light scattering apparatus	1
AC – 43	Cooling unit (for water bath)	1
AC – 44	Vacuum drying oven	2
AC – 45	Heater (for water bath)	5
AC – 47	Deionized water apparatus	1
AC – 48	Farady's balance	1
AC – 49	Spectrophotometer	2
AC – 50	Cabinet	2
AC – 51	Shelves	2
AC – 52	Sewage treatment unit	1
AB – 1	Analytical balance	4
AB – 2	Microscope (w/attachement)	2
AB – 3	Autoclave	2
AB – 4	CO2 incubator	1
AB – 5	Auto –cell Counter	1
AB – 6	Centrifuge (desk top)	4
AB – 7	Colony counter	15
AB – 8	Personal computer w/printer	1
AB – 9	Microscope (dark field)	2
AB – 10	Deep freezer	1
AB – 11	Microscope (dissecting)	2
AB – 12	Distillator	1
AB – 13	Electrolyte coagulometer	1
AB – 14	Homogenizer (electronic)	4
AB – 15	Balance (digital)	8
AB – 16	Electrophoresis apparatus	4
AB – 17	ELISA reader	1
AB – 18	An –aerobic jars	12
AB – 19	Microscope (fluorescent)	2
AB – 20	Fluorometer	1
AB – 21	Gas chromatograph	1

AL-AZHAL UNIVERSITY (3/10)

CODE	DESCRIPTION	QUANTITY
AB – 22	Electrophoresis (gel)	4
AB – 23	Microscope (graduate w/camera)	1
AB – 24	Centrifuge (hi –speed)	1
AB – 25	Magnetic stirrer w/hot plate	4
AB – 27	Ice maker (crushed)	1
AB – 28	Incubator	4
AB – 29	Incubator (low temp.)	1
AB – 30	Laminar flow hood	1
AB – 31	Auto –pipette set	8
AB – 32	Microscope (binocular)	30
AB – 33	Microtome	2
AB – 34	Mixer	4
AB – 35	Osmometer	1
AB – 36	Drying oven	3
AB – 37	pH meter	8
AB – 38	Refrigerator	4
AB – 39	Microscope (stereo)	30
AB – 40	TLC set	4
AB – 41	Homogenizer (ultrasonic)	1
AB – 42	Ultrasonic cleaner	1
AB – 43	UV/VIS/NIR spectrophotometer	1
AB – 44	Test –tube mixer	12
AB – 45	Washing machine for glassware	1
AB – 46	Water bath	4
AB – 47	Centrifuge (refrigerated)	1
AB – 48	Cabinet	2
AB – 49	Shelves	2
AP – 1	X –ray apparatus	1
AP – 2	Radio active source apparatus	1
AP – 3	Photoresistor apparatus	1
AP – 4	Fluorescence electron beam apparatus	1
AP – 6	Compton effect apparatus	1
AP – 7	α spectrum apparatus	1
AP – 11	Electron spin resonance apparatus	1

AL-AZHAL UNIVERSITY (4/10)

CODE	DESCRIPTION	QUANTITY
AP – 12	Electron diffraction apparatus	1
AP – 14	Spectral wavelength apparatus	1
AP – 16	Critical point apparatus	1
AP – 17	Thermal expansion apparatus	1
AP – 18	Gas coefficient apparatus	1
AP – 19	Heat capacity apparatus (solid/liquid)	1
AP – 21	Maxwellian velocity apparatus	1
AP – 22	Stefan –Boatsman's law apparatus	1
AP – 24	Stirling engine efficiency apparatus	1
AP – 26	Kundt's tube apparatus	1
AP – 27	Sound velocity apparatus	1
AP – 28	Doppler effect apparatus	1
AP – 29	Fourier analysis apparatus	1
AP – 30	Transverse wave apparatus	1
AP – 31	Strings vibration apparatus	1
AP – 32	Quincke tube apparatus	1
AP – 33	Ripple tank apparatus	1
AP – 36	Gravity/acceleration apparatus	1
AP – 38	Pulley force table	1
AP – 39	Complete rotational system	1
AP – 40	Gyroscope	1
AP – 41	Boyle's law experiment apparatus	1
AP – 42	Hook's law apparatus	1
AP – 43	Harmonic motion apparatus	1
AP – 44	Dynamic motion apparatus	1
AP – 45	Optical multichannel analyzer	1
AP – 46	Color CCD camera with monitor	1
AP – 48	Interferometer	1
AP – 49	Monochromator	1
AP – 50	Time –delay generator	1
AP – 52	Spectrometer	1
AP – 53	Calorimeter with heater	4
AP – 54	Tuning fork set	4
AP – 55	Slide rheostat	10

AL-AZHAL UNIVERSITY (5/10)

CODE	DESCRIPTION	QUANTITY
AP – 56	Resistance box	10
AP – 57	Galvanometer	2
AP – 58	Stop watch (digital)	8
AP – 59	Set of precision weights with hook	2
AP – 60	Laser pointer	2
AP – 61	Optical bench (1m)	6
AP – 62	Set of interference filter	2
AP – 64	Fiber optic cable for demonstration (20m)	2
AP – 65	Balance (precision)	6
AP – 66	Micrometer	10
AP – 67	Vernier caliper	10
AP – 68	Complete set of lenses with holder	2
AP – 69	Prism	6
AP – 70	Reflection diffraction grating	2
AP – 71	He –Ne laser with power supply	4
AP – 72	Diode laser with power supply	4
AP – 74	Light emitting diode	20
AP – 75	Power supply for light emitting diode	4
AP – 76	DC power supply (+/ –40V)	10
AP – 77	AC power supply	10
AP – 78	Models of molecules, atoms and crystals	1
AP – 79	Scientific slide set for slide projector	1
AP – 80	Functional transparencies set for OHP	1
AP – 81	Scientific video software set	1
AP – 82	Models of different engines	1
AP – 83	Blackboard optics system	1
AP – 84	Physics education software for PC	1
AP – 85	Laboratory table	12
AP – 86	Cabinet	2
AP – 87	Shelves	6
AP – 88	Panel frames for laboratory table	12
AP – 89	Mobile container	8
AG – 1	Microscope (polarizing)	25
AG – 2	Microscope (stereo)	25

AL-AZHAL UNIVERSITY (6/10)

CODE	DESCRIPTION	QUANTITY
AG – 3	Standard sieves	5
AG – 4	Wooden frame square sieve	5
AG – 5	Compass	25
AG – 7	Clinometer (pocketable)	25
AG – 8	Precision universal cutter	1
AG – 9	Stereoscope	25
AG – 10	Microscope (research)	1
AG – 11	Drying oven	1
AG – 12	Hand tool set for field survey	25
AG – 13	Electromagnetic geophone	1
AG – 14	Theodolite	5
AG – 15	Alidade	5
AG – 16	Microscope (polarizing w/attachment)	2
AG – 17	Personal computer w/printer	1
AG – 18	Crystal collection	1
AG – 19	Minerals collection	1
AG – 20	Crystallized mineral collection	1
AG – 21	Rocks collection	1
AG – 22	Fossils collection	1
AG – 23	Geological maps	1
AG – 24	Geological model set (three –dimensional)	1
AG – 25	Geological thin –section set	1
AS – 1	File server	3
AS – 2	Personal computer set	90
AS – 3	Printer (laser)	3
AS – 4	Printer (bubble jet)	3
AS – 5	LAN system	3
AS – 6	Software set	3
AS – 7	UPS	3
AS – 8	PC –OHP unit	3
AS – 9	Color scanner	1
AS – 10	Computer table	90
AS – 11	Computer chair	90
AS – 12	Printer table	6

AL-AZHAL UNIVERSITY (7/10)

CODE	DESCRIPTION	QUANTITY
AS – 13	Cabinet	4
AS – 14	Shelves	4
AS – 15	Copy holder	90
AS – 16	Monitor filter	90
AH – 1	Refractometer (Abbe)	1
AH – 2	Ampoule sealer	1
AH – 3	Autoclave	1
AH – 4	Ice maker (crushed)	1
AH – 6	Blood sedimentation apparatus	1
AH – 8	Centrifuge (desk top)	4
AH – 9	Centrifuge (hi –speed, desk top)	4
AH – 10	Colloid mill (laboratory size)	1
AH – 11	Personal computer w/printer	1
AH – 12	Melting point apparatus (digital)	2
AH – 13	pH meter (digital)	4
AH – 14	Disintegration tester	2
AH – 15	Drying oven (50 l)	2
AH – 16	Drying machine for medicinal plant	2
AH – 17	Drying pistol	4
AH – 18	Surface tensiometer (digital)	1
AH – 19	Analytical balance	2
AH – 20	Balance (precision)	4
AH – 21	Osmometer (Semi –micro)	1
AH – 22	Emulsifying stirring apparatus	1
AH – 23	Flame photometer	2
AH – 24	Flask shaker	2
AH – 25	Friability tester	2
AH – 26	Gas chromatograph	1
AH – 27	Grimp moster grimping station	2
AH – 28	Capsule machine (manual type)	1
AH – 29	Decapper (manual type)	4
AH – 30	Grimpers (manual type)	4
AH – 31	Harris kymograph	4
AH – 32	Heating mantle	4

AL-AZHAL UNIVERSITY (8/10)

CODE	DESCRIPTION	QUANTITY
AH – 34	Centrifuge (hematocrit)	2
AH – 36	Mill (hi –speed)	2
AH – 37	Incubator	2
AH – 38	Fractional distillation apparatus	1
AH – 40	Sphygmomanometer	15
AH – 41	Microscope	25
AH – 42	Mill (mortar grinder)	2
AH – 43	Mixer/rotor	1
AH – 44	Mould set for conical suppository	25
AH – 45	Ointment mixer	1
AH – 46	Physiograph	2
AH – 47	Auto –pipette set	8
AH – 48	Pliers decapper	4
AH – 49	Pipette filler	50
AH – 50	Polygraph	1
AH – 51	Precision DS potentiometer	2
AH – 52	PTFE magnetic retriever	25
AH – 53	IR spectrophotometer	1
AH – 54	UV/VIS spectrophotometer	1
AH – 55	Rotary granulator and sifter	2
AH – 56	Rotary evaporator	4
AH – 57	Stimulator	4
AH – 58	Shaking water bath	2
AH – 59	Single punch tablet press machine	1
AH – 60	Pan coating machine	1
AH – 61	Soxhelet extractor	4
AH – 62	Spectrophotometer	4
AH – 63	Column chromatography apparatus	1
AH – 64	Stethoscope	15
AH – 65	Syringe set	25
AH – 67	Tablet hardness tester	2
AH – 68	Spatula blade	25
AH – 69	Twin shell blender	2
AH – 70	U –tube viscometer	4

AL-AZHAL UNIVERSITY (9/10)

CODE	DESCRIPTION	QUANTITY
AH – 71	Homogenizer (ultrasonic)	2
AH – 72	Universal polarimeter	1
AH – 73	Microscope (trinocular)	1
AH – 74	TLC set	1
AH – 76	Water bath	4
AH – 77	Water bath	4
AH – 78	Water distilling apparatus	1
AA – 2	Autoclave	2
AA – 3	Centrifuge (desk top)	1
AA – 4	Centrifuge (ultra)	1
AA – 5	Colony counter	8
AA – 6	Deionized water apparatus	2
AA – 7	Desiccator (S)	4
AA – 8	Desiccator (M)	4
AA – 9	Desiccator (L)	2
AA – 10	Balance (digital, 250g)	2
AA – 11	Balance (digital, top pan, 2kg)	2
AA – 12	Analytical balance	2
AA – 13	Gas chromatograph	1
AA – 14	Hot plate	8
AA – 15	Incubator	3
AA – 17	Magnetic stirrer w/hot plate	4
AA – 19	Micro Kjeldahl apparatus	4
AA – 20	Microscope	30
AA – 21	Nitrogen analyzer	1
AA – 22	Drying oven	2
AA – 23	pH meter	8
AA – 24	Refrigerator	1
AA – 25	Rotary evaporator (S)	1
AA – 26	Rotary evaporator (M)	1
AA – 27	Microscope (torinocurerw/camera)	2
AA – 28	Flash point apparatus	1
AA – 29	Melting point apparatus	4
AA – 30	Pesticide sprayers	4

AL-AZHAL UNIVERSITY (10/10)

CODE	DESCRIPTION	QUANTITY
AA – 31	UV/VIS spectrophotometer	1
AA – 32	Spectrophotometer	2
AA – 33	Personal computer w/printer	1
AA – 34	HPLC	1
AA – 35	Muffle furnace	1
AA – 36	Deep freezer	1
AA – 38	Homogenizer	1
AA – 39	Lactometer	1
AA – 40	Refractometer (pocketable)	2
AA – 41	Salometer	1
AA – 43	Microtome	1
AA – 49	Cabinet	2
AA – 50	Shelves	2
AO – 1	GIS system	1
AO – 2	Meteorological station	1
AO – 3	Cabinet	2
AO – 4	Shelves	2
AL – 1	Language laboratory system	1
AE – 1	Microbus (18 passengers)	1
AE – 2	Minibus (30 passengers)	2
AE – 3	Electric power generator	1
AE – 4	Photocopying machine (Heavy duty)	1
AE – 5	OHP	12
AE – 6	Slide projector	9
AE – 7	Mimeographing equipment set	1
AE – 8	Personal computer w/printer	4

DEIR EL BALAH POLYTECHNIC (1/7)

CODE	DESCRIPTION	QUANTITY
DW – 1	Plate shear	1
DW – 2	Folding machine	1
DW – 3	Grinder	2
DW – 4	Hand drilling machine	6
DW – 5	Anvil	6
DW – 6	Hammering base	12
DW – 7	Arc welding machine	1
DW – 8	Working table	6
DW – 9	Vice	25
DW – 10	Tool set	25
DW – 11	Measuring tool set	25
DW – 12	Drill press	2
DW – 13	Universal saw	1
DW – 14	Tool cabinet	2
DW – 15	Air compressor	1
DL – 1	Multimeter (analog)	25
DL – 2	Multimeter (digital)	6
DL – 3	Ammeter	6
DL – 4	Motor set (for 6 groups of students)	1
DL – 5	Electric wiring training set	25
DL – 6	Generator (3 phase)	1
DL – 7	Current generator (1 phase)	1
DL – 8	Voltmeter	6
DL – 9	Programmable logic control circuit apparatus	6
DL – 10	General electric tool set	25
DL – 11	Clamp meter	6
DL – 12	Tachometer set	6
DL – 13	Micrometer	6
DL – 14	Winding machine	1
DL – 15	Watt meter	6
DL – 16	Q meter	6
DL – 17	Power factor meter	6
DL – 18	Frequency meter	6
DL – 19	Solar battery experimental apparatus	1

DEIR EL BALAH POLYTECHNIC (2/7)

CODE	DESCRIPTION	QUANTITY
DL – 20	Transformer (3 phase)	6
DL – 21	Variable transformer	1
DL – 22	Oscilloscope	1
DL – 23	Frequency generator	1
DL – 24	Lux meter	6
DL – 25	Insulation tester	6
DL – 26	Earth tester	6
DL – 27	Hand drilling machine	6
DL – 28	Thermometer	6
DL – 29	Vice	6
DR – 1	Multimeter (analog)	25
DR – 2	Multimeter (digital)	6
DR – 3	DC power supply	6
DR – 4	Function generator	6
DR – 5	High voltage power supply	1
DR – 6	Voltage regulator	4
DR – 7	Power soldering iron	1
DR – 8	Bread board	25
DR – 9	Electronics soldering training kit	25
DR – 10	Transformer	25
DR – 11	Oscilloscope	6
DR – 12	RMS voltmeter	6
DR – 13	Universal bridge	6
DR – 14	Optical fiber sample set	1
DR – 15	Noise filter	6
DR – 16	Thermoelectricity experiment apparatus	6
DR – 17	Impedance converter experiment apparatus	6
DR – 18	Digital circuit trainer	6
DR – 19	Electromagnetic induction experiment app.	1
DR – 20	Vacuum tube sample set	1
DR – 21	Electronics circuit trainer	6
DR – 22	Optical fiber teaching apparatus	1
DT – 1	Oscilloscope (2 ch)	6
DT – 2	FM/AM standard signal generator	6

DEIR EL BALAH POLYTECHNIC (3/7)

CODE	DESCRIPTION	QUANTITY
DT – 3	Standard signal generator	1
DT – 4	TV multichannel sound level meter	6
DT – 5	VHF/UHF signal generator	4
DT – 7	Audio response tracer	1
DT – 8	Equalizer amplifier	6
DT – 9	Microphone amplifier	1
DT – 10	Frequency response recorder	1
DT – 11	Sound level meter	1
DT – 12	Function generator	6
DT – 13	Wow/flutter meter	1
DT – 14	Distortion meter	1
DT – 16	Video level meter	1
DT – 17	CRT cut model set	1
DT – 19	Varactor tuner controller	1
DT – 20	Universal swemar generator	1
DT – 21	VHF/UHF field level meter	1
DT – 22	Multimeter (digital)	6
DT – 23	Multimeter (analog)	25
DT – 24	PAL/SECAM color pattern generator	1
DT – 25	RGB generator	1
DT – 26	Audio analyzer	1
DT – 27	Frequency counter	6
DT – 28	Frequency counter (wide band)	1
DT – 29	Satellite field strength meter	1
DT – 30	CRT tester	1
DT – 31	Satellite receiver set	1
DT – 32	Broad casting signal scanner	6
DT – 33	DC power supply (24 V)	6
DT – 34	DC power supply (multi out –put)	1
DT – 35	Bandpass filter	6
DT – 36	Attenuator	6
DT – 37	Resistance box	6
DT – 38	Capacitance box	6
DT – 40	TV trainer	1

DEIR EL BALAH POLYTECHNIC (4/7)

CODE	DESCRIPTION	QUANTITY
DT – 41	Broad band amplifier	6
DT – 42	Radio communication test set	1
DT – 43	Modulation meter (AM/FM/PCM)	6
DT – 44	RF power meter	6
DT – 45	AF power meter	6
DT – 46	Spectrum analyzer	1
DT – 48	TV set	6
DT – 49	Antenna test bench	1
DT – 50	TV camera	1
DT – 51	TV RF modulator	1
DT – 52	Video cassette recorder	1
DT – 54	Color mixer	1
DT – 55	Tuning fork set	1
DT – 56	Flue pipe set	1
DT – 57	Audio oscillator set	1
DT – 58	Interference phenomena set	1
DP – 2	Rotational dynamics apparatus	6
DP – 3	Simple harmonic motion apparatus	6
DP – 4	Compound pendulum apparatus	6
DP – 5	Boyle's & Charle'slaw experiment apparatus	6
DP – 6	Measurement material set	12
DP – 7	Measuring tool set	12
DP – 8	Hare's apparatus	6
DP – 9	Stop watch (digital)	12
DP – 10	Mirror & lens set	12
DP – 12	Thermal expansion apparatus	6
DP – 13	Thermometer set (grass rod)	12
DP – 14	Thermometer (digital)	6
DP – 15	Atmospheric barometer	1
DP – 16	Calorimeter	6
DP – 17	Scale/cursor set	12
DP – 18	Spherometer	12
DP – 19	Weight set	12
DP – 20	Balance (4 beam)	6

DEIR EL BALAH POLYTECHNIC (5/7)

CODE	DESCRIPTION	QUANTITY
DP – 21	Balance (3 beam)	6
DP – 22	Balance (digital, top pan)	6
DP – 23	Linear air track apparatus	6
DP – 24	Law of Inertia experiment apparatus	6
DP – 25	Optical bench	6
DP – 26	Millikan apparatus	6
DP – 27	Galvanometer	6
DP – 28	Ammeter	6
DP – 29	Voltmeter	6
DP – 30	Multimeter (digital)	6
DP – 31	Decade resistance box	6
DP – 32	e/m apparatus	1
DP – 34	Oscilloscope	6
DP – 35	Function generator	6
DP – 37	Michelson interferometer	1
DP – 38	Optic system experiment apparatus	1
DP – 39	G/M apparatus	1
DP – 41	Light velocity measurement apparatus	1
DH – 1	Model reception set	1
DH – 2	Model bed room set	1
DH – 3	Model reception hall set	1
DC – 1	Cooking table	4
DC – 3	Washing machine	1
DC – 4	Refrigerator	2
DC – 5	Vegetable grinding machine	2
DC – 6	Vegetable cutting machine	2
DC – 7	Microwave cooker	4
DC – 8	Pot	8
DC – 9	Oven	2
DC – 10	Vapor heater	8
DC – 11	Kitchen utensil set	1
DC – 12	Meat cutting machine	1
DC – 13	Grill	4
DC – 14	Mixer (large)	2

DEIR EL BALAH POLYTECHNIC (6/7)

CODE	DESCRIPTION	QUANTITY
DC – 15	Mixer (small)	4
DC – 16	Ice maker (crushed)	1
DC – 19	Tableware set	1
DC – 20	Wagon	2
DC – 21	Restaurant decoration set	1
DD – 1	Industrial sewing machine	1
DD – 2	Sewing machine	25
DD – 3	Measuring tool set	25
DD – 4	Electric iron	5
DD – 5	Scissors set	25
DD – 6	Sewing kit	25
DD – 7	Ironing table	5
DD – 8	Wheel marker	25
DD – 9	Knitting machine	5
DD – 10	Dress pattern set	25
DD – 11	Model	12
DD – 12	Working table	5
DD – 13	Electrical scissors	1
DD – 14	Tool cabinet	2
DD – 15	Full length mirror	5
DF – 1	Model office room set	1
DB – 1	Books	1
DB – 2	Library furniture set	1
DB – 3	Photocopying machine (Heavy duty)	1
DB – 4	Personal computer w/printer	1
DE – 1	Slide projector	2
DE – 2	OHP	5
DE – 3	Typewriter (electronic)	2
DE – 4	Personal computer w/printer	1
DE – 5	Laminating machine set	1
DE – 6	Photocopying machine	1
DE – 7	Paper cutter set	1
DE – 8	Mounting machine	1
DE – 9	35mm camera	1

DEIR EL BALAH POLYTECHNIC (7/7)

CODE	DESCRIPTION	QUANTITY
DE – 10	Tripod	1
DE – 11	TV & VTR set	2
DE – 12	Video camera	1
DE – 13	Mimeographing equipment set	1
DA – 1	Personal computer w/printer	4
DA – 2	Photocopying machine (Heavy duty)	1
DA – 3	Photocopying machine	1

2.3.6 Short Specification for Major Equipment

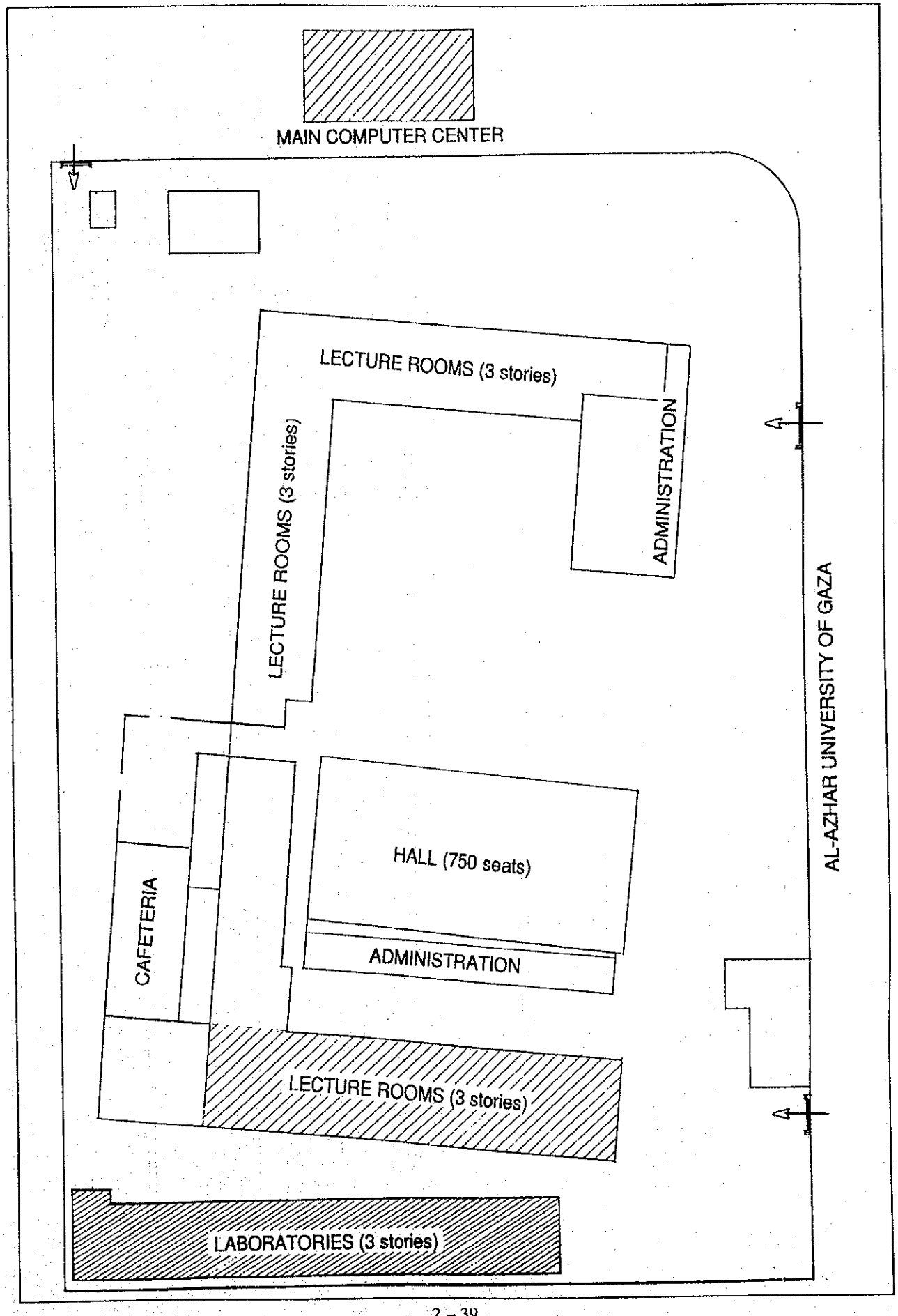
Short specification for major equipment are described on the following.

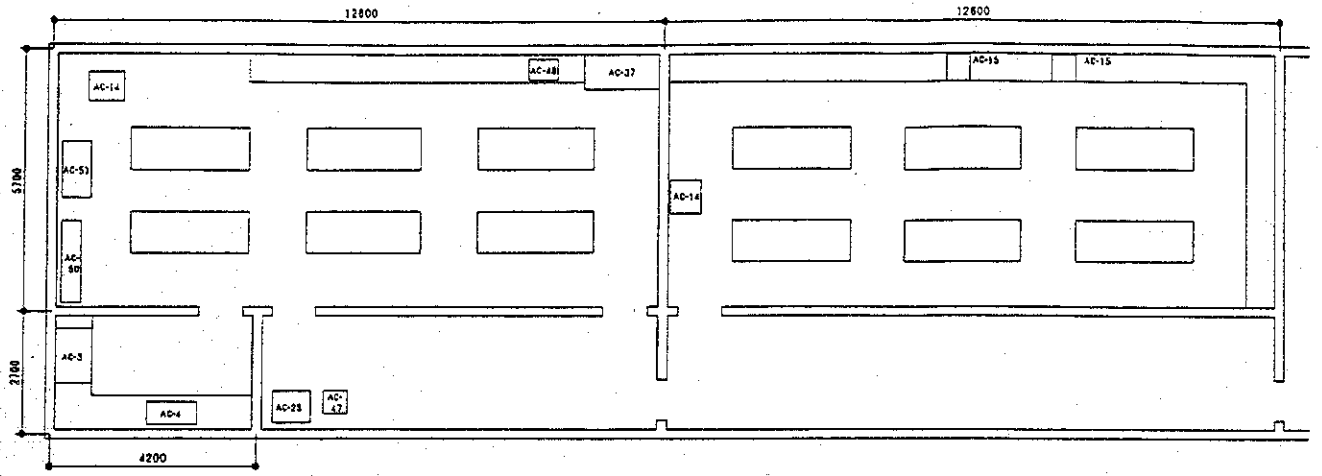
Short Specification
NMR spectrometer : Permanent Magnet or Electrical Magnet, 90MHz
GIS system : PC with Software, 32bit CPU
Electric power generator : 380V, 3phase, 500kVA
GC Mass spectrometer : GC –MS (Inter –face unit, Ion source), Data system
Atomic absorption spectrometer : AA main unit, Atomizer, Cooling water supply system
Elemental analyzer : Measuring Elements; C/H/N/S/O, Accuracy; Absolute Value +/ – 0.3%
Polygraph : 8 channel, Amplifier, Recorder, Blood pressure measuring unit, etc.
Centrifuge (ultra) : 56,000rpm, 409,000xG, Main Unit w/ Angle rotors, etc.
HPLC : Main Unit (w/UV –Vis Spectro –detector), Data system
UV/VIS/NIR spectro –photometer : Wave length; 190 –3200nm, Resolution; 0.1nm
Language laboratory system : for 30 students, Main Console, Tape –recorder, etc.
Light scattering apparatus : Light source; He –Ne laser, Particle size; 0.04 –262micro –meter
Electromagnetic geophone : Portable lateral magnifying detector, PC w/software, etc.
FTIR spectro –photometer : Resolution; 1/cm, Wave range; 4000 –650/cm
Library furniture set : Book shelves, Desks, Chairs, etc.

Short Specification
Gas chromatograph :GC main unit (w/Columns, Specimen evaporator), GC Work station
Pan coating machine :Coating capacity; 2kg, Rotation speed; 0 -30rpm
Microscope (polarizing) :Semi -apochromat objective lens, Magnification; max.x1000 w/Multi -discussion system for 15 students
Nitrogen analyzer :Kjeldahl, Min. analytical capacity; >/=0.2mg, Replecatability;+/ -1%
IR spectrophotometer :Resolution; 4/cm, Wave range; 4000 -650/cm
Optical multichannel analyzer :Wave range; 400 -1750nm, Level; -70 -10dB
Capsule machine (manual type) :for hard capsule, Capacity; 3000 pcs/h
Software set :Word -processor, Calculation, Computer language, for 30 persons
Fractional distillation apparatus :Column; 15dia.x1200mm, Plate number; 60 or more
Fluorometer :Wave length; 220 -730nm+/ -5nm, Indicator; CRT
Minibus (30 passengers) :for 30 passengers, 4000cc diesel engine, Manual shift, etc.
Farady's balance :Gouy balance, Measuring range; 50g, Readability; 0.1mg
Microscope (w/attachment) :Semi -apochromat objective lens, Magnification; max.x1000 w/Multi -discussion system for 15 students

Short Specification
TV trainer :Mount type, Subject; TV circuit principle
Centrifuge (hi -speed) :20000rpm, 45000xG, Main unit w/Angle rotors, etc.
UV/VIS spectrophotometer :Wave length; 190 -1100nm, Band width; 2nm
Monochromator :Divider, Wave length driver, Photon generator tube, etc.
Books :Science books
Microscope (fluorescent) :Semi -apochromat objective lens, Magnification; max.x1000 w/Multi -discussion system for 15 students
Washing machine for glassware :Jet -washing type, Washing tube; 560dia.x500Hmm
Automatic scanning densitometer :Absorption rate; 0.1 -3.0, Wavelength range; 430 -625nm
α spectrum apparatus :Experiment subject; α spectrum characteristical study
File server :CPU (as Pentium 100MHz) w/Monitor, HDD 2GB, etc.
Motor set (for 6 groups of students) :Experiment subject; Characteristical experiments of AC/DC motors
Generator (3 phase) :Experiment subject; Characteristical experiments of 3 -phase generator, etc.
LAN system :for 30 students, 10 BaseT
Personal computer set :32 bit CPU, 50MHz

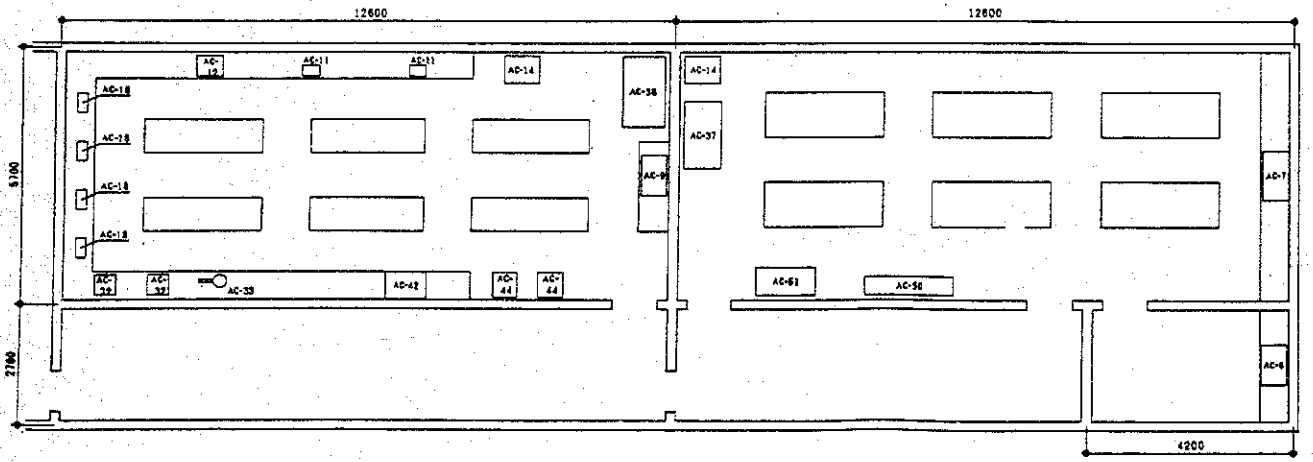
2.3.7 Equipment Layout Plan


MAIN COMPUTER CENTER
LECTURE ROOMS (3 stories)
LECTURE ROOMS (3 stories)
ADMINISTRATION
AL-AZHAR UNIVERSITY OF GAZA
HALL (750 seats)
CAFETERIA
ADMINISTRATION
LECTURE ROOMS (3 stories)
LABORATORIES (3 stories)



CHEMISTRY LAB.-I

CHEMISTRY LAB.-III



CHEMISTRY LAB.-II

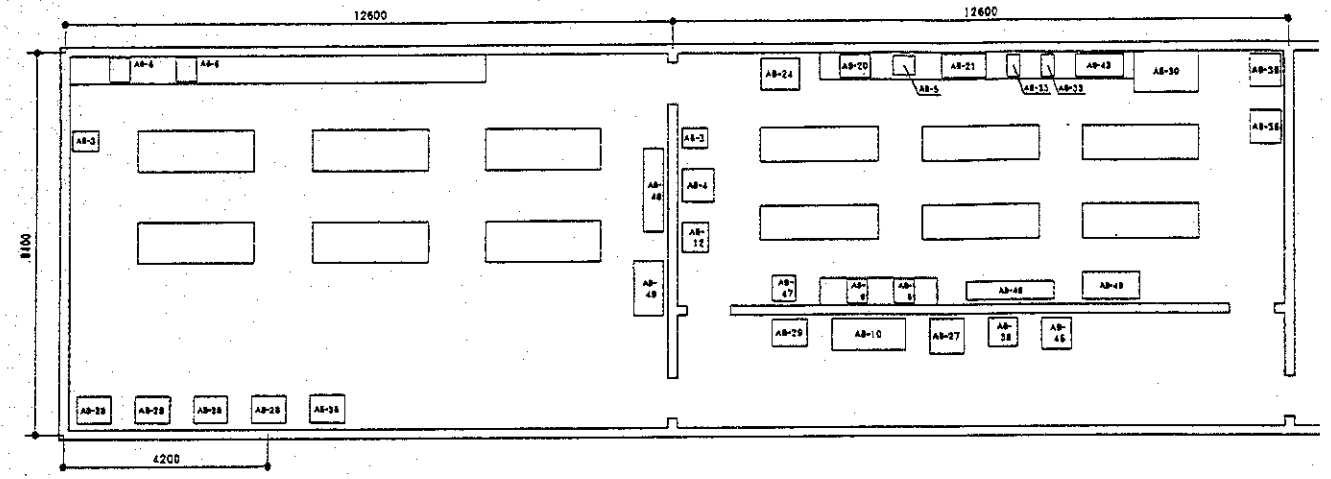
CHEMISTRY LAB.-IV

CODE	Description
AC- 3	FTIR spectrometer
AC- 4	UV/VIS/NIR spectrometer
AC- 6	Gas chromatograph
AC- 7	Atomic absorption spectrometer
AC- 9	HPLC
AC-11	Flame photometer
AC-12	Automatic scanning densitometer
AC-14	Drying oven
AC-15	Muffle furnace
AC-18	Universal polarimeter
AC-23	Ice maker (crushed)
AC-32	Rotary shaking apparatus
AC-33	Homogenizer (ultrasonic)
AC-37	Fume hood
AC-38	Corrosion measurement system
AC-42	Light scattering apparatus
AC-44	Vacuum drying oven
AC-47	Deionized water apparatus
AC-48	Farady's balance
AC-50	Cabinet
AC-51	Shelves

AL AZHAR UNIVERSITY

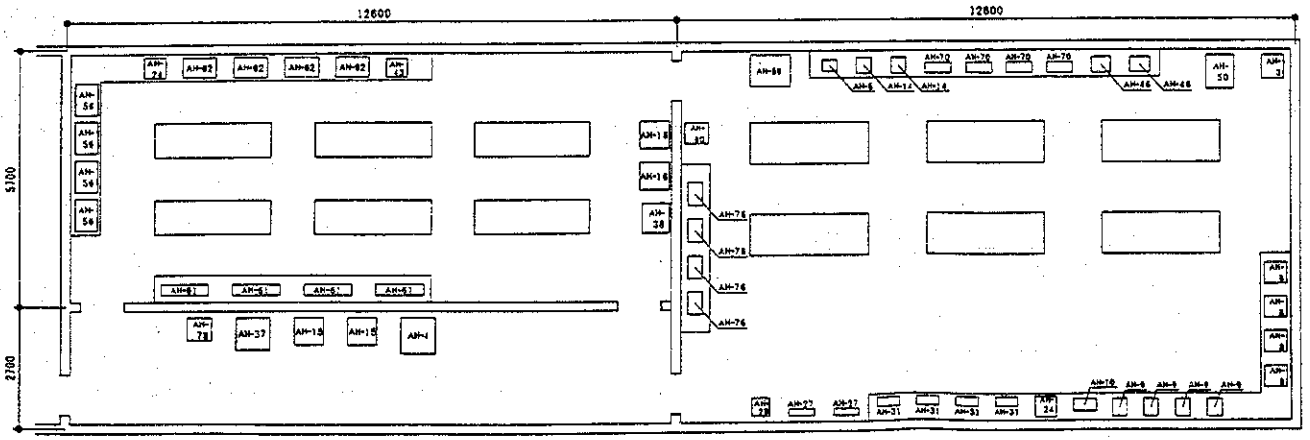
EQUIPMENT LAYOUT PLAN

GROUND FLOOR



BIOLOGY LAB.-I

BIOLOGY LAB.-II



PHARMACY LAB.-I

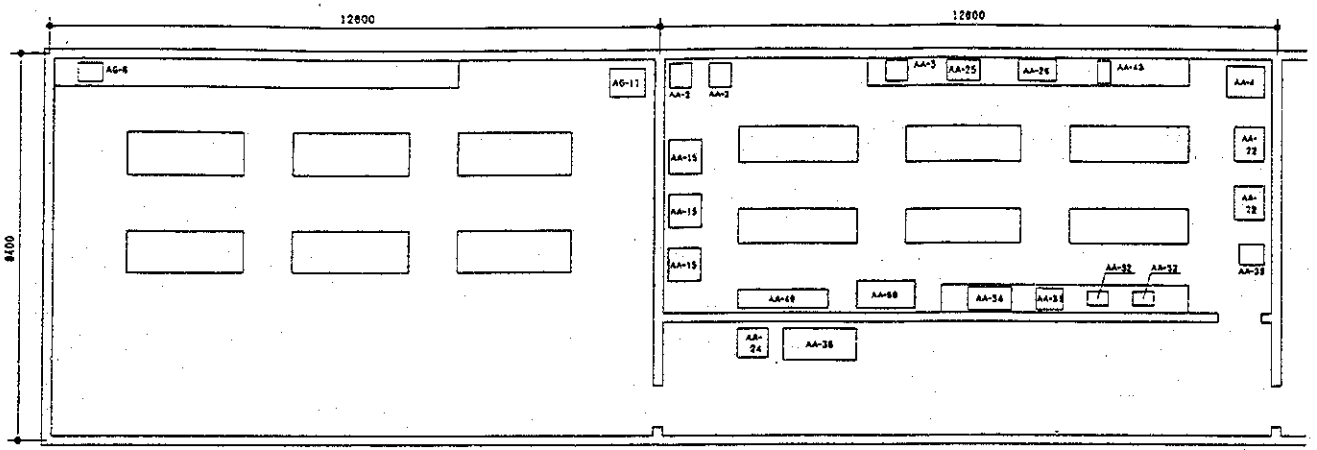
PHARMACY LAB.-II

CODE	Description
AB- 3	Autoclave
AB- 4	CO2 incubator
AB- 5	Auto-cell Counter
AB- 6	Centrifuge (desk top)
AB-10	Deep freezer
AB-12	Distillator
AB-20	Fluorometer
AB-21	Gas chromatograph
AB-24	Centrifuge (hi-speed)
AB-27	Ice maker (crushed)
AB-28	Incubator
AB-29	Incubator (low temp.)
AB-30	Laminar flow hood
AB-33	Microtome
AB-36	Drying oven
AB-38	Refrigerator
AB-43	UV/VIS/NIR spectrophotometer
AB-45	Washing machine for glassware
AB-47	Centrifuge (refrigerated)
AB-48	Cabinet
AB-49	Shelves
AH- 3	Autoclave
AH- 4	Ice maker (crushed)
AH- 8	Centrifuge (desk top)
AH- 9	Centrifuge (hi-speed, desk top)
AH-10	Colloid mill (laboratory size)
AH-14	Disintegration tester
AH-15	Drying oven (50 l)
AH-16	Drying machine for medicinal plant
AH-24	Flask shaker
AH-27	Grimp moster grimping station
AH-28	Capsule machine (manual type)
AH-31	Harris kymograph
AH-37	Incubator
AH-38	Fractional distillation apparatus
AH-43	Mixer/rotor
AH-46	Physiograph
AH-50	Polygraph
AH-56	Rotary evaporator
AH-59	Single punch tablet press machine
AH-61	Soxhelet extractor
AH-62	Spectrophotometer
AH-70	U-tube viscometer
AH-76	Water bath
AH-78	Water distilling apparatus

AL AZHAR UNIVERSITY

EQUIPMENT LAYOUT PLAN

SECOND FLOOR



GEOLOGY LAB.

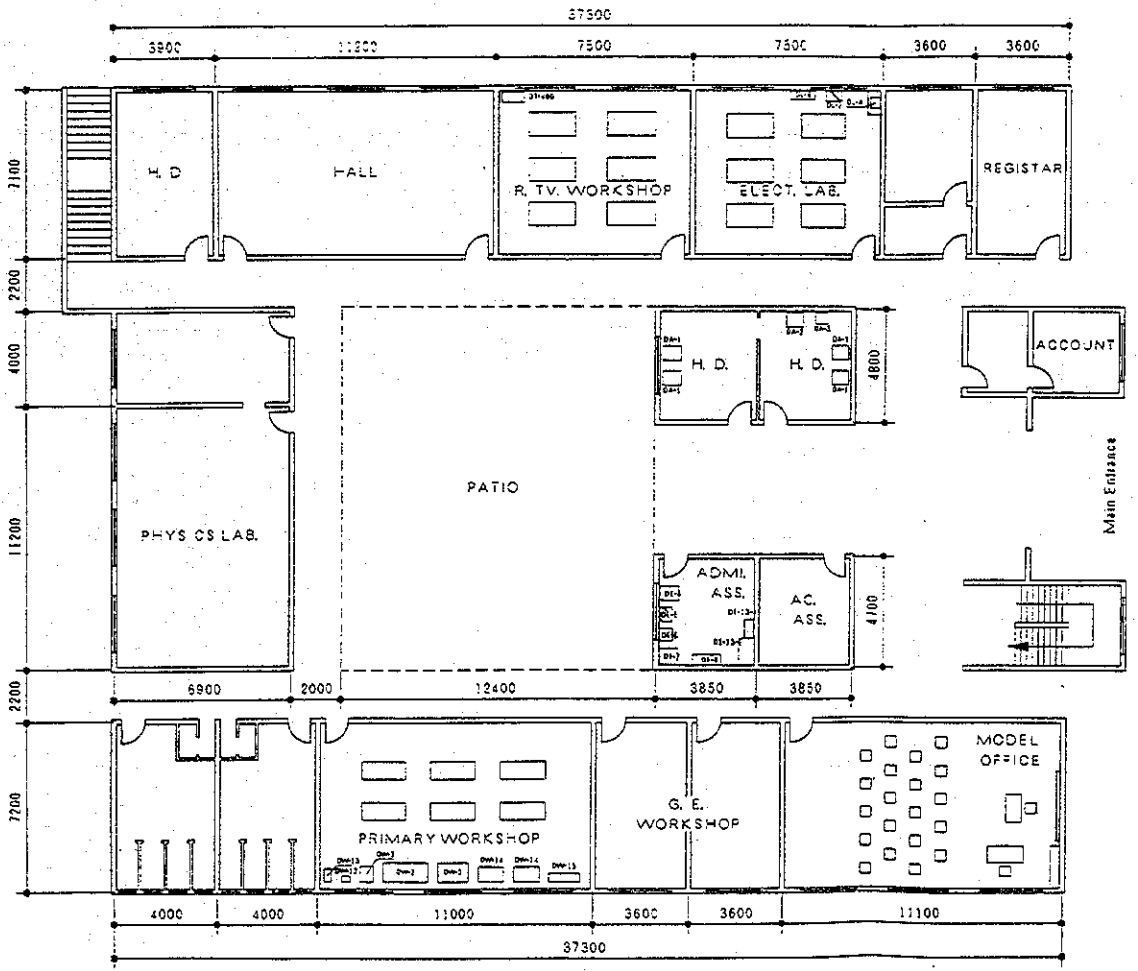
AGRICULTURE LAB.

CODE	Description
AG- 8	Precision universal cutter
AG-11	Drying oven
AA- 2	Autoclave
AA- 3	Centrifuge (desk top)
AA- 4	Centrifuge (ultra)
AA-15	Incubator
AA-22	Drying oven
AA-24	Refrigerator
AA-25	Rotary evaporator (S)
AA-26	Rotary evaporator (M)
AA-31	UV/VIS spectrophotometer
AA-32	Spectrophotometer
AA-34	HPLC
AA-35	Muffle furnace
AA-36	Deep freezer
AA-43	Microtome
AA-49	Cabinet
AA-50	Shelves

AL AZHAR UNIVERSITY

EQUIPMENT LAYOUT PLAN

FIRST FLOOR

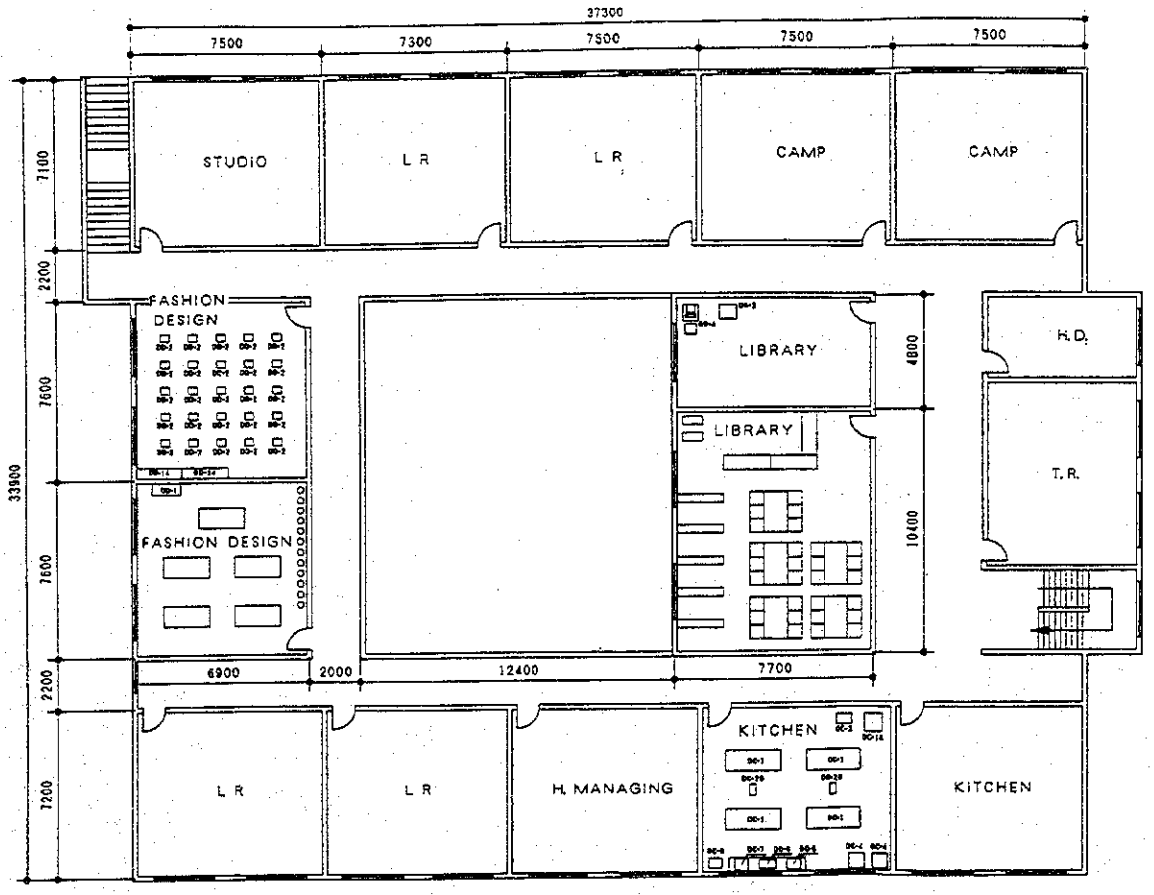


CODE	Description
DW- 1	Plate shear
DW- 2	Folding machine
DW- 3	Grinder
DW- 8	Working table
DW-12	Drill press
DW-13	Universal saw
DW-14	Tool cabinet
DW-15	Air compressor
DL- 4	Motor set (for 6 groups of students)
DL- 6	Generator (3 phase)
DL- 7	Current generator (1 phase)
DT-40	TV trainer
DF- 1	Model office room set
DE- 4	Personal computer w/printer
DE- 5	Laminating machine set
DE- 6	Photocopying machine
DE- 7	Paper cutter set
DE- 8	Mounting machine
DE-13	Mimeographing equipment set
DA- 1	Personal computer w/printer
DA- 2	Photocopying machine (Heavy duty)
DA- 3	Photocopying machine

DELR BALAH POLYTECHNIC

EQUIPMENT LAYOUT PLAN

GROUND FLOOR 1/200



CODE	Description
DH- 1	Model reception set
DH- 2	Model bed room set
DH- 3	Model reception hall set
DC- 1	Cooking table
DC- 3	Washing machine
DC- 4	Refrigerator
DC- 5	Vegetable grinding machine
DC- 6	Vegetable cutting machine
DC- 7	Microwave cooker
DC- 9	Oven
DC-16	Ice maker (crushed)
DC-20	Wagon
DC-21	Restaurant decoration set
DD- 1	Industrial sewing machine
DD- 2	Sewing machine
DD-11	Model
DD-12	Working table
DD-14	Tool cabinet
DB- 2	Library furniture set
DB- 3	Photocopying machine (Heavy duty)
DB- 4	Personal computer w/printer

DELR BALAH POLYTECHNIC

EQUIPMENT LAYOUT PLAN

FIRST FLOOR 1/200

Chapter 3 Implementation Plan

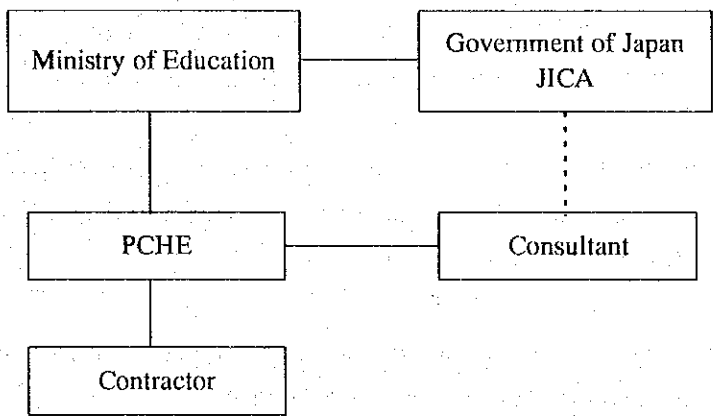
Chapter 3 Implementation Plan

3.1 Implementation Plan

3.1.1 Implementation Method

This project is meant to provide equipment to Al-Azhal University-Gaza, Deir El Balah Polytechnic-Gaza through the Grant Aid Assistance of the Government of Japan. The Palestinian Council for Higher Education is the project's executing agency and to sign a contract with a Japanese consultant and have him assist Al-Azhal University and Deir El Balah Polytechnic to carry out such works as detail design, preparation of tender documents, tender evaluation and supervision of the executing of the works for installation of the equipment.

The PCHE will also sign contracts with a Japanese contractor, and the contractor is expected to supply and install the equipment and provide guidance on their operation and maintenance. The installation is to be carried out by utilizing the local labor force under guidance by the engineer and technicians of the contractor from opening of the packages to installation of the equipment on the designated locations, and subsequent wiring, etc. which require certain skill, are to be carried out by the engineer of the contractor. The adjustment, test runs and guidance on operation and maintenance are to be carried out by contractor's engineers. The implementation system at the time of execution is as shown in the diagram below.



3.1.2 Points to be Considered During Implementation

Considering that the project will be implemented under grant-in-aid of the Japanese government, the implementation plan will be established according to the following policy and guideline:

(1) Since the proposed equipment includes advanced scientific equipment that has to be delivered within a limited period of time, installation will be supervised by Japanese engineers.

(2) Japanese engineers will be responsible for general administration, electrical engineering, process engineering, scientific instruments, and other general equipment. As for analytical equipment including the nuclear magnetic resonance equipment, spectrometers, chromatographs, installation, commissioning, and initial instruction will be carried out by engineers of respective manufacturers to ensure smooth delivery and takeover of equipment.

(3) Persons and/or Agency responsible for reception of equipment will be formally designated in Palestine to ensure the smooth delivery process and subsequent activities.

(4) The execution agency and the two institutions (Al-Azhal university and Deir El Balah Polytechnic) are separately located in West Bank and Gaza strip to make smooth communication very difficult. The implementation plan should be established to fully reflect needs and wants of the both sides.

(5) Care should be taken to ensure safety and efficiency in transportation and customs clearance of equipment to be imported by taking into account local conditions peculiar to the project area.

(6) The implementation plan should be developed in full consultation with the Palestinian officials and the two schools.

3.1.3 Implementation Conditions

Primary considerations required for implementation of the project are as follows:

(1) To ensure that equipment will be smoothly accommodated in buildings in terms of space availability and interface with building work to be carried out by the Palestinian side;

(2) To clearly define utilities required for the project together with interface related to connectivity work for efficient construction work;

(3) To take necessary safety precautions and measures during transportation and installation of equipment in order to prevent any damage to personal life and property; and

(4) To maintain good working relations among the Palestinian counterpart, the consultant, and equipment suppliers through effective communication at each stage of the project.

3.1.4 Scope of Work

The scope of work defined by division of responsibilities between the Japanese and Palestinian sides is summarized in Table 3–1.

Table 3-1 DIVISION OF RESPONSIBILITIES

Activity	Japanese side	Palestinian side
* Equipment		
- Procurement	○	
- Installation	○	
- Commissioning	○	
- Guidance	○	
* Utilities		
- Electrical connection to equipment	○	
* Securing of equipment storage space		○
* Transportation and customs clearance		
- Equipment transportation to Palestine	○	
- Customs clearance	○	
- Special tax treatment procedures		○
* B/A procedures and fee payment		○
* Expedited legal procedures related to entry, stay, and exit of Japanese personnel		○
* Effective control of equipment operation		○
* Disbursement of costs for related work not covered by grant-in-aid		○
* Necessary approvals and permits related to project implementation		○

3.1.5 Consultant's Supervision

Important considerations in supervision work rendered by the consultant are summarized as follows:

(1) To ensure smooth installation of equipment, close communication should be made with the two schools from the planning stage. In particularly, information should be exchanged with the Palestinian counterpart to ensure that facilities accommodating equipment satisfy requirements for installation and operation. The consultant is expected to conduct detailed field survey on the current conditions as well as the construction work to be carried out by the Palestinian side and its schedule.

(2) To consult with equipment suppliers and evaluate the implementation plan in relation to equipment delivery and installation, in order to ascertain viability of the procurement plan and schedule, as well as appropriateness of

equipment specifications.

(3) To perform thorough inspection and testing on equipment prior to transportation to the sites.

(4) To check that delivered equipment satisfies design specifications and is installed and operated properly, and sufficient guidance in operation and maintenance has been provided before final acceptance.

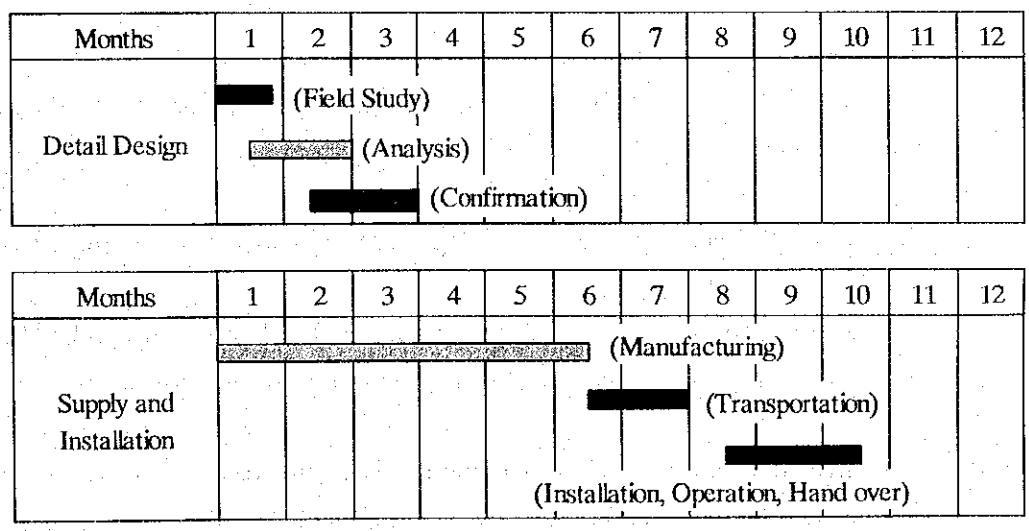
3.1.6 Procurement Plan

In Gaza strip where the project is implemented, there is no supplier of industrial products, especially scientific instruments, educational equipment, and office equipment. The listed equipment is widely supplied by various Japanese manufacturers who are capable of providing a variety of equipment that satisfies project requirements. Thus, the equipment will be primarily procured from Japanese suppliers.

3.1.7 Implementation Schedule

The preliminary implementation schedule of the project is shown as Table 3-2.

Table 3-2 IMPLEMENTATION SCHEDULE



3.1.8 Obligation of Recipient Country

In the project, the following works and services will be provided by the Palestinian side at its own cost.

(1) Remodeling work for equipment installation
This is particularly important for Deir El Balah Polytechnic that plans to move its facilities. It is expected to complete interior work according to the layout plan prior to equipment installation.

(2) Electrical wiring on the primary side

(3) Water supply and drainage work

(4) Air-conditioning and ventilation work

(5) Securing of equipment storage space
For the benefits of work efficiency and security including prevention of theft, equipment will be temporarily storaged in a safe place after delivery.

(6) Special tax treatment procedures
To apply for exemption of custom duties on equipment to be imported via an Israeli port.

(7) Establishment of bank account and fee payment
To initiate bank transaction related to payment of equipment costs and pay bank charges.

(8) Necessary assistance and advice in legal procedures related to entry, stay, and exit of Japanese personnel
To provide necessary assistance and advice in legal procedures related to entry, stay, and exit of Japanese personnel working for the project.

(9) Effective control of equipment operation and maintenance
To ensure effective operation and use of equipment.

(10) Disbursement of costs for related work not covered by grant-in-aid

To bear costs and expenses related to implementation of the project not covered by grant-in-aid.

(11) Necessary approvals and permits related to project implementation

To apply for government approvals and permits, if any, required for implementation of the project, including exemption or exception as required.

3.2 Operation and Maintenance Plan

If project is implemented and equipment are installed, then an additional expenditure for utility including consumable will be;

1) Al -Azhal University

1,678 US$/month

2) Deir El Balah Polytechnic

310 US$/month

Chapter 4 Project Evaluation and Recommendations

Chapter 4 Project Evaluation and Recommendations

4.1 Major Benefits of the Project

Declaration of Principles on Interim Self-Government Agreements signed in September 1993 has marked the commencement of the five-year transition period and negotiations for the permanent status, following the withdrawal of Israeli troops from Gaza and Jerico. The progress and result of the peacemaking negotiation will determine the future of Palestine and will serve as an effective instrument to solidify political achievements agreed in the declaration. Clearly, the peacemaking process is closely linked with the economic development process of Palestine.

Under agreements, Israeli has transferred authority in the areas of education, public health, social welfare, direct taxation, and tourism to Palestine. Nevertheless, it is still a long way before Palestine obtains the permanent status as an independent nation. Even if the interim self-government successfully ends to obtain the permanent status, Palestine will face difficulties originated from its geographical conditions, political and economic strains accumulated under the Israeli occupation,some of those difficulteis are;

(1) The lack of raw materials for industrial products handicaps Palestine for the fostering of an industrial base in future.

(2) Palestine is too small to be independent economically.

(3) The economy's long-term growth can never be achieved without the regional economic cooperation.

(4) Industries in Palestine used to be subcontractors for Israeli industries.

(5) Palestine is a supply source of only unskilled labor to Israel.

(6) Too much economical dependency to Israel.

Palestine sets forth the development of technology-intensive industries as its long-term objective by utilizing abundant human resources and promoting

regional cooperation in terms of product, capital, labor force, and technology. This project will contribute greatly to the accomplishment of the objective in the form of improved scientific and technical education. Supply of productive human resources is an essential element of building the foundation for future development of Palestine.

Major benefits achievable or expected from the project are summarized in Table 4-1.

Table 4-1 MAJOR BENEFITS OF THE PROJECT

Current issues	Measures effected by the project	Effect and improvement
Shortage of laboratory equipment	Provision of equipment required for higher education	To improve the quality of scientific and technical education, and to supply human resources required by society and industry. To lay the foundation for development of technology-intensive industries.
Educational cost burden on household under current income level	Reduction of operating budget	Enable to earmark the budget which would otherwise be spent for equipment for educational loans to reduce students who are forced to leave school for economic reasons (10 - 20% of total annually).
A large gap in technical level from neighboring countries	Improvement of technical education and human resource development	To improve technical levels for supporting long-term horizontal development and interdependence with neighboring countries by reducing a technical gap.
Industries in Palestine are primary served as Israel's manufacturing section	Supply of engineers and technicians	Improve the present conditions so as to manufacture the goods for not only neighboring countries but also U.S. and European countries.
Overdependence on Israeli labor market	Education of engineers and technicians with advanced techniques	Promotion of interdependent relationship
Lack of raw materials	Inventory survey on available or potential resources	Betterment of products. Improvement of quality products. Development of value added goods.
Unbalanced ratio of humanity students to science and engineering students	Improvement of science and engineering education through supply of educational equipment	Supply of human resources in diverse scientific and engineering fields

4.2 Recommendations

Palestine has not yet established entire organization as an independent state and its future is uncertain at best.

Under these circumstances, it should be reiterated that the success of the project heavily depends upon fully-committed support and cooperation of the government including the Ministry of education, in addition to future self-help efforts of the recipient university and college who must secure stable financial sources.

Appendixes

AL-AZHAR UNIVERSITY
REQUESTED EQUIPMENT LIST

(1) FACULTY OF SCIENCE

- CHEMISTRY DEPARTMENT
- BIOLOGY DEPARTMENT
- PHYSICS DEPARTMENT
- GEOLOGY DEPARTMENT
- COMPUTER CENTER

(2) FACULTY OF PHARMACY

(3) FACULTY OF AGRICULTURE

(4) FACULTY OF ARTS

- GEOGRAPHY DEPARTMENT
- LANGUAGE LABORATORY

(5) EDUCATIONAL SUPPORTING EQUIPMENT

AL-AZHAR UNIVERSITY GAZA

26.3.95

REQUESTED EQUIPMENT LIST (FACULTY OF SCIENCE : CHEMISTRY DEPARTMENT)

NO.	Description	A	B	C	T
1.	NMR spectrometer	1	–	–	1
2.	GC Mass spectrometer	1	–	–	1
3.	FTIR spectrometer	1	–	–	1
4.	UV/VIS/NIR double beam spectrometer	1	–	–	1
5.	15 ton press for KBr dies	1	–	–	1
6.	Gas chromatograph	1	–	–	1
7.	Atomic absorption spectrometer	1	–	–	1
8.	Elemental analyzer	1	–	–	1
9.	HPLC	1	–	–	1
10.	Liquid nitrogen unit	1	–	–	1
11.	Flame photometer	2	–	–	2
12.	Automatic scanning densitometer	1	–	–	1
13.	Digital conductivity meter	4	–	–	4
14.	Drying oven	4	–	–	4
15.	Muffle furnace	2	–	–	2
16.	Digital melting point apparatus	6	–	–	6
17.	Vacuum pump oil filling	5	–	–	5
18.	Universal polarimeter	4	–	–	4
19.	Automatic polarographic recorder	1	–	–	1
20.	Automatic voltmetric processor	1	–	–	1
21.	Sodium press	1	–	–	1
22.	Rotary vacuum evaporator	6	–	–	6
23.	Automatic crushed ice machine	1	–	–	1
24.	Solid carbon dioxide dry ice producer	–	1	–	1
25.	Carbon dioxide cylinder	–	5	–	5
26.	Digital balance	5	–	–	5
27.	Electronic analytical balance	5	–	–	5
28.	Digital pH meter	5	–	–	5
29.	Magnetic stirrer hot plate	32	–	–	32
30.	Universal refractometer	3	–	–	3
31.	Test tube mixer	32	–	–	32
32.	Rotary shaking apparatus	2	–	–	2
33.	Ultrasonic homogenizer	1	–	–	1
34.	Emulsifying stirring apparatus	1	–	–	1
35.	Personal computer	1	–	–	1
36.	Desphor HF electrophoresis system	1	–	–	1
37.	Fume hood	5	–	–	5
38.	Corrosion measurement system	1	–	–	1

AL-AZHAR UNIVERSITY GAZA

R.H. 24.3.95

NO. Description	A	B	C	T
39.Stirrer motor	12	–	–	12
40.Surface tensiometer	3	–	–	3
41.Refrigerated circulator	2	–	–	2
42.Light scattering apparatus	1	–	–	1
43.Cooling unit (for water bath)	1	–	–	1
44.Vacuum drying oven	2	–	–	2
45.Heater (for water bath)	5	–	–	5
46.Double distillation apparatus (10 l/h)	1	–	–	1
47.Deionized water apparatus	1	–	–	1
48.Faraday's balance	1	–	–	1
49.Spectrophotometer	2	–	–	2
50.Cabinet	2	2	–	4
51.Shelves	2	–	–	2

REQUESTED EQUIPMENT LIST (FACULTY OF SCIENCE : BIOLOGY DEPARTMENT)

NO. Description	A	B	C	T
1.Analytical balance	4	-	-	4
2.Attachment microscope	3	-	-	3
3.Autoclave	2	-	-	2
4.CO2 incubator	1	-	-	1
5.Auto-cell Counter	1	-	-	1
6.Centrifuge (desk top)	4	2	-	6
7.Colony counter	15	15	-	30
8.Personal computer w/printer	1	-	-	1
9.Dark field microscope	2	-	-	2
10.Deep freezer	1	-	-	1
11.Dissecting microscope	2	-	-	2
12.Distillator	1	-	-	1
13.Electrolyte coagulometer	1	-	-	1
14.Electronic homogenizer	4	-	-	4
15.Digital balance	8	-	-	8
16.Electrophoresis apparatus	4	-	-	4
17.ELISA reader	1	-	-	1
18.An-aerobic jars	12	-	-	12
19.Fluorescent microscope	2	-	-	2
20.Fluorometer	1	-	-	1
21.Gas chromatography	1	-	-	1
22.Gel electrophoresis	4	-	-	4
23.Graduate microscope w/camera	1	-	-	1
24.Hi-speed centrifuge	2	-	-	2
25.Magnetic stirrer w/hot plate	4	-	-	4
26.HPLC	1	-	-	1
27.Ice maker	1	-	-	1
28.Incubator	4	-	-	4
29.Low temp. incubator	1	-	-	1
30.Laminar flow hood	1	-	-	1
31.Micro pipette set	8	-	-	8
32.Binocular Microscope	30	10	-	40
33.Microtome	4	4	-	8
34.Mixer	4	-	-	4
35.Osmometer	1	-	-	1
36.Oven	3	-	-	3
37.pH meter	8	8	-	16
38.Refrigerator	4	-	-	4

NO.	Description	A	B	C	T
39.	Stereoscopic microscope	30	-	-	30
40.	TLC	4	-	-	4
41.	Ultrasonic Homogenizer	1	-	-	1
42.	Ultrasonic cleaner	1	-	-	1
43.	UV/VIS/NIR spectrophotometer	1	-	-	1
44.	Test-tube mixer	12	-	-	12
45.	Washing machine for glassware	2	1	-	3
46.	Water bath	4	-	-	4
47.	Refrigerated centrifuge	1	-	-	1
48.	Cabinet	2	-	-	2
49.	Shelves	2	-	-	2

REQUESTED EQUIPMENT LIST (FACULTY OF SCIENCE : PHYSICS DEPARTMENT)

NO.	Description	A	B	C	T
1.	X-ray apparatus	1	-	-	1
2.	Radio active source apparatus	1	-	-	1
3.	Photoresistor apparatus	1	-	-	1
4.	Fluorescence electron beam apparatus	1	-	-	1
5.	Fluorescence UV light apparatus	-	1	-	1
6.	Compton effect apparatus	1	-	-	1
7.	α spectrum apparatus	1	-	-	1
8.	γ / β spectrum apparatus	-	1	-	1
9.	Frank-Hertz apparatus	-	1	-	1
10.	Activated isotope apparatus	-	1	-	1
11.	Electron spin resonance apparatus	1	-	-	1
12.	Electron diffraction apparatus	1	-	-	1
13.	Positron annihilation radiation apparatus	-	1	-	1
14.	Spectral wavelength apparatus	1	-	-	1
15.	Heat transfer apparatus (air/water)	-	1	-	1
16.	Critical point apparatus	1	-	-	1
17.	Thermal expansion apparatus	1	-	-	1
18.	Gas coefficient apparatus	1	-	-	1
19.	Heat capacity apparatus (solid/liquid)	1	-	-	1
20.	Heat capacity apparatus (gas)	-	1	-	1
21.	Maxwellian velocity apparatus	1	-	-	1
22.	Stefan-Boatsman's law apparatus	1	-	-	1
23.	Ideal gas law apparatus	-	1	-	1
24.	Stirling engine efficiency apparatus	1	-	-	1
25.	Black body radiation apparatus	-	1	-	1
26.	Kundt's tube apparatus	1	-	-	1
27.	Sound velocity apparatus	1	-	-	1
28.	Doppler effect apparatus	1	-	-	1
29.	Fourier analysis apparatus	1	-	-	1
30.	Transverse wave apparatus	1	-	-	1
31.	Strings vibration apparatus	1	-	-	1
32.	Quincke tube apparatus	1	-	-	1
33.	Ripple tank apparatus	1	-	-	1
34.	Ultrasonic waves apparatus	-	1	-	1
35.	Microwave characteristic apparatus	-	1	-	1
36.	Gravity/acceleration apparatus	1	-	-	1
37.	Projectile launcher	-	1	-	1
38.	Pulley force table	1	-	-	1

R. Kl.

NO.	Description	A	B	C	T
39.	Complete rotational system	1	-	-	1
40.	Gyroscope	1	-	-	1
41.	Boyle's law apparatus	1	-	-	1
42.	Hook's law apparatus	1	-	-	1
43.	Harmonic motion apparatus	1	-	-	1
44.	Dynamic motion apparatus	1	-	-	1
45.	Optical multichannel analyzer	1	-	-	1
46.	Color CCD camera with monitor	1	1	-	2
47.	Boxcar average	-	1	-	1
48.	Interferometer	1	-	-	1
49.	Monochromator	1	-	-	1
50.	Time-delay generator	1	-	-	1
51.	VIS/IR sensitive photomultiplier tube	-	1	-	1
52.	Spectrometer	1	-	-	1
53.	Calorimeter with heater	4	-	-	4
54.	Set of tuning fork	4	-	-	4
55.	Slide rheostat	10	-	-	10
56.	Resistance box	10	-	-	10
57.	Galvanometer	2	-	-	2
58.	Digital stop watch	8	-	-	8
59.	Set of precision weights with hook	2	-	-	2
60.	Laser pointer	2	-	-	2
61.	Optical bench (1m)	6	-	-	6
62.	Set of interference filter	2	-	-	2
63.	Set of Nuteral density filter	2	-	-	2
64.	Fiber optic cable for demonstration (20m)	2	-	-	2
65.	Precision balance	6	-	-	6
66.	Micrometer	10	-	-	10
67.	Vernier caliper	10	-	-	10
68.	Complete set of lenses with holder	2	-	-	2
69.	Prism	6	-	-	6
70.	Reflection diffraction grating	2	-	-	2
71.	He-Ne laser with power supply	4	-	-	4
72.	Diode laser	10	-	-	10
73.	Power supply for diode laser	4	-	-	4
74.	Light emitting diode	20	-	-	20
75.	Power supply for light emitting diode	4	-	-	4
76.	DC power supply (+/-40V)	10	-	-	10
77.	AC power supply (+/-15V)	10	-	-	10

NO. Description	A	B	C	T
78.Models of molecules, atoms and crystals	1	-	-	1
79.Scientific slide set for slide projector	1	-	-	1
80.Functional transparencies set for OHP	1	-	-	1
81.Scientific video software set	1	-	-	1
82.Models of different engines	1	-	-	1
83.Blackboard optics system	1	-	-	1
84.Physics education software for PC	1	-	-	1
85.Laboratory Table	18	-	-	18
86.Cabinet	2	2	-	4
87.Shelves	6	-	-	6
88.Panel frames for laboratory table	18	-	-	18
89.Mobile container	8	-	-	8

REQUESTED EQUIPMENT LIST (FACULTY OF SCIENCE : GEOLOGY DEPARTMENT)

NO. Description	A	B	C	T
1.Polarizing microscope	25	-	-	25
2.Stereo microscope	25	-	-	25
3.Standard sieves	5	-	-	5
4.Wooden frame square sieve	5	-	-	5
5.Compass	25	-	-	25
6.Clinometer	10	-	-	10
7.Pocketable clinometer	25	-	-	25
8.Precision universal cutter	1	-	-	1
9.Stereoscope	25	-	-	25
10.Research microscope	1	-	-	1
11.Drying oven	1	-	-	1
12.Hand tool set for field survey	25	-	-	25
13.Electromagnetic geophone	2	-	-	2
14.Theodolite	5	-	-	5
15.Alidade	5	-	-	5
16.Attachment polarizing microscope	2	-	-	2
17.Personal computer w/printer	1	-	-	1
18.Crystal collection	1	-	-	1
19.Minerals collection	1	-	-	1
20.Crystallized mineral collection	1	-	-	1
21.Rocks collection	1	-	-	1
22.Fossils collection	1	-	-	1
23.Geological maps	1	-	-	1
24.Geological model set (three-dimensional)	1	-	-	1
25.Geological thin-section set	1	-	-	1

REQUESTED EQUIPMENT LIST (FACULTY OF SCIENCE : COMPUTER CENTER)

NO. Description	A	B	C	T
1.File server	3	-	-	3
2.Personal computer	90	-	-	90
3.Laser printer	3	-	-	3
4.Bubble jet printer	3	-	-	3
5.LAN system	1	-	-	1
6.Software set	1	-	-	1
7.UPS	1	-	-	1
8.PC-OHP unit	3	-	-	3
9.Color scanner	1	-	-	1
10.Computer table	90	-	-	90
11.Computer chair	90	-	-	90
12.Printer table	6	-	-	6
13.Cabinet	4	-	-	4
14.Shelves	4	-	-	4
15.Copy holder	90	-	-	90
16.Monitor filter	90	-	-	90

REQUESTED EQUIPMENT LIST (FACULTY OF PHARMACY)

NO.	Description	A	B	C	T
1.	Abbe refractometer	1	-	-	1
2.	Ampoule sealer	1	-	-	1
3.	Autoclave	1	-	-	1
4.	Ice maker	1	-	-	1
5.	Blood chemical analyzer	1	-	-	1
6.	Blood sedimentation apparatus	1	-	-	1
7.	Elemental analyzer	1	-	-	1
8.	Centrifuge (desk top)	4	-	-	4
9.	High-speed centrifuge (desk top)	4	-	-	4
10.	Colloid mill (laboratory size)	1	-	-	1
11.	Personal computer	1	-	-	1
12.	Melting point apparatus (digital)	2	-	-	2
13.	pH meter (digital)	4	-	-	4
14.	Disintegration tester	2	-	-	2
15.	Drying oven (50 l)	2	-	-	2
16.	Drying machine for medicinal plant	2	-	-	2
17.	Drying pistol	4	-	-	4
18.	Surface tensiometer (digital)	1	-	-	1
19.	Analytical balance	2	-	-	2
20.	Precision balance	4	-	-	4
21.	Semi-micro osmometer	1	-	-	1
22.	Emulsifying stirring apparatus	1	-	-	1
23.	Flame photometer	2	-	-	2
24.	Flask shaker	2	-	-	2
25.	Friability tester	2	-	-	2
26.	Gas chromatograph	1	-	-	1
27.	Grimp moster grimping station	2	-	-	2
28.	Capsule machine (manual type)	4	-	-	4
29.	Decapper (manual type)	4	-	-	4
30.	Grimpers (manual type)	4	-	-	4
31.	Harris kymograph	4	-	-	4
32.	Heating mantle	4	-	-	4
34.	Hematocrit centrifuge	2	-	-	2
35.	HPLC	1	-	-	1
36.	High speed mill	2	-	-	2
37.	Incubator	2	-	-	2
38.	Fractional distillation apparatus	2	-	-	2
39.	Laboratory sieving machine	1	-	-	1

NO. Description	A	B	C	T
40.Sphygmomanometer	15	–	–	15
41.Microscope	25	–	–	25
42.Mill (mortar grinder)	2	–	–	2
43.Mixer/Rotor strut set	1	–	–	1
44.Mould set for conical suppository	25	–	–	25
45.Ointment mixer	1	–	–	1
46.Physiograph	4	–	–	4
47.Auto-pipette set	8	–	–	8
48.Pliers decapper	4	–	–	4
49.Pipette filler	50	–	–	50
50.Polygraph	2	–	–	2
51.Precision DS potentiometer	2	–	–	2
52.PTFE magnetic retriever	25	–	–	25
53.IR spectrophotometer	1	–	–	1
54.UV/VIS spectrophotometer	1	–	–	1
55.Rotary granulator and sifter	2	–	–	2
56.Rotary evaporator	4	–	–	4
57.Stimulator	4	2	–	6
58.Shaking water bath	2	–	–	2
59.Single punch tablet press machine	1	–	–	1
60.Pan coating machine	2	–	–	2
61.Soxhelet extractor	4	–	–	4
62.Spectrophotometer	4	–	–	4
63.Column chromatography apparatus	1	–	–	1
64.Stethoscope	15	–	–	15
65.Syringe set	25	–	–	25
67.Tablet hardness tester	2	–	–	2
68.Spatula blade	25	–	–	25
69.Twin shell blender	2	–	–	2
70.U-tube viscometer	4	–	–	4
71.Ultrasonic homogenizer	2	–	–	2
72.Universal polarimeter	1	–	–	1
73.Microscope (trinocular)	1	–	–	1
74.TLC set	1	–	–	1
75.UV/VIS/NIR spectrometer	1	–	–	1
76.Water bath	4	–	–	4
77.Water bath	4	–	–	4
78.Water distilling apparatus	1	–	–	1

REQUESTED EQUIPMENT LIST (FACULTY OF AGRICULTURE)

NO.	Description	A	B	C	T
1.	Atomic absorption spectrometer	1	-	-	1
2.	Autoclave	2	-	-	2
3.	Centrifuge (desk top)	1	-	-	1
4.	Ultra centrifuge	1	-	-	1
5.	Colony counter	8	-	-	8
6.	Deionizer	2	-	-	2
7.	Desiccator(S)	4	-	-	4
8.	Desiccator(M)	4	-	-	4
9.	Desiccator(L)	2	-	-	2
10.	Digital balance (250g)	2	-	-	2
11.	Digital balance (Top pan, 2kg)	2	-	-	2
12.	Analytical balance	2	-	-	2
13.	Gas chromatograph	1	-	-	1
14.	Hot plate	8	-	-	8
15.	Incubator	3	-	-	3
16.	FTIR spectrometer	1	-	-	1
17.	Magnetic stirrer w/hot plate	4	-	-	4
18.	GC Mass spectrometer	1	-	-	1
19.	Micro Kjeldahl apparatus	4	-	-	4
20.	Microscope	30	-	-	30
21.	Nitrogen analyzer	1	-	-	1
22.	Drying oven	2	-	-	2
23.	pH meter	8	-	-	8
24.	Refrigerator	1	-	-	1
25.	Rotary evaporator (S)	1	-	-	1
26.	Rotary evaporator (M)	1	-	-	1
27.	Torinocure microscope w/camera	2	-	-	2
28.	Flash point apparatus	1	1	-	2
29.	Melting point apparatus	4	-	-	4
30.	Pesticide sprayers	4	-	-	4
31.	UV/VIS spectrophotometer	1	-	-	1
32.	Spectrophotometer	2	-	-	2
33.	Personal Computer w/printer	1	-	-	1
34.	HPLC	1	-	-	1
35.	Muffle furnace	1	-	-	1
36.	Deep freezer	1	1	-	2
37.	Flame photometer	-	1	-	1
38.	Homogenizer	1	-	-	1

NO. Description	A	B	C	T
39.Lactometer	1	2	–	3
40.Pocket refractometer	2	3	–	5
41.Salometer	1	2	–	3
42.Freezer drier	–	1	–	1
43.Microtome	1	–	–	1
44.Hydrometer set	–	–	5	5
45.Blender	–	–	3	3
46.Dissolve oxygen meter	–	–	2	2
47.Ostwald viscometer	–	–	4	4
48.Babble suction hoods	–	–	1	1
49.Cabinet	2	–	–	2
50.Shelves	2	–	–	2

REQUESTED EQUIPMENT LIST (FACULTY OF ARTS : GEOGRAPHY DEPARTMENT)

NO.	Description	A	B	C	T
1.	GIS system	1	-	-	1
2.	Meteorological station	1	-	-	1
3.	Cabinet	2	-	-	2
4.	Shelves	2	-	-	2

REQUESTED EQUIPMENT LIST (FACULTY OF ARTS : LANGUAGE LABORATORY)

NO.	Description	A	B	C	T
1.	Language laboratory system	1	1	-	2

REQUESTED EQUIPMENT LIST (EDUCATIONAL SUPPORTING EQUIPMENT)

NO. Description	A	B	C	T
1.Microbus (18 passengers)	1	-	-	1
2.Minibus (52 passengers)	1	-	-	1
3.Electric power generator	1	-	-	1
4.Heavy duty photocopying machine	1	-	-	1
5.OHP	12	12	-	24
6.Slide projector	9	9	-	18
7.Mimeographing equipment set	2	1	-	3
8.Personal computer w/printer	4	-	-	4

بسم الله الرحمن الرحيم

Appendix 1-2

Palestinian National Authority
Ministry of
Education & Higher Education

السلطة الوطنية الفلسطينية
وزارة
التربية والتعليم العالي

PALESTINE TECHNICAL COLLEGE
REQUESTED EQUIPMENT LIST

(1) PRIMARY WORKSHOP

(2) GENERAL ELECTRICITY WORKSHOP

(3) ELECTRONICS LABORATORY

(4) RADIO & TV LABORATORY

(5) PHYSICS LABORATORY

(6) HOTEL MANAGEMENT TRAINING ROOM

(7) HOTEL CATERING TRAINING ROOM

(8) DRESS MAKING WORKSHOP

(9) MANAGEMENT AND FINANCE DEPARTMENT TRAINING ROOM

(10) LIBRARY

(11) EDUCATIONAL SUPPORTING EQUIPMENT

(12) ADMINISTRATION EQUIPMENT

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REQUESTED EQUIPMENT LIST (PRIMARY WORKSHOP)

NO. Description	A	B	C	T
1.Plate shear	1	-	-	1
2.Folding machine	1	-	-	1
3.Grinder	2	-	-	2
4.Hand drilling machine	6	-	-	6
5.Anvil	6	-	-	6
6.Hammering base	12	-	-	12
7.Arc welding machine	1	-	-	1
8.Working table	6	-	-	6
9.Vice	25	-	-	25
10.Tool set	25	-	-	25
11.Measuring tool set	25	-	-	25
12.Drill press	2	-	-	2
13.Universal saw	1	-	-	1
14.Tool cabinet	2	-	-	2
15.Air compressor	1	-	-	1

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PALESTINIAN NATIONAL AUTHORITY
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REQUESTED EQUIPMENT LIST (GENERAL ELECTRICITY WORKSHOP)

NO. Description	A	B	C	T
1.Multimeter (analog)	25	-	-	25
2.Multimeter (digital)	6	-	-	6
3.Ammeter	25	-	-	25
4.Motor set (for 6 groups of students)	1	-	-	1
5.Electric wiring training set	25	-	-	25
6.Generator (3 phase)	1	-	-	1
7.Current generator (1 phase)	1	-	-	1
8.Voltmeter	25	-	-	25
9.Programmable logic control circuit apparatus	6	-	-	6
10.General electric tool set	25	-	-	25
11.Clamp meter	6	-	-	6
12.Tachometer set	6	-	-	6
13.Micrometer	6	-	-	6
14.Winding machine	1	1	-	2
15.Watt meter	6	-	-	6
16.Q meter	6	-	-	6
17.Power factor meter	6	-	-	6
18.Frequency meter	6	-	-	6
19.Solar battery experimental apparatus	1	5	-	6
20.Transformer (3 phase)	6	-	-	6
21.Variable transformer	1	-	-	1
22.Oscilloscope	1	-	-	1
23.Frequency generator	1	-	-	1
24.Lux meter	6	-	-	6
25.Insulation tester	6	-	-	6
26.Earth tester	6	-	-	6
27.Hand drill	6	-	-	6
28.Thermometer	6	-	-	6
29.Vice	6	-	-	6

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REQUESTED EQUIPMENT LIST (ELECTRONICS LABORATORY)

NO. Description	A	B	C	T
1.Multimeter (analogue)	25	-	-	25
2.Multimeter (digital)	8	-	-	8
3.DC powersupply	8	-	-	8
4.Function generator	8	-	-	8
5.High voltage power supply	1	-	-	1
6.Voltage regulator	4	-	-	4
7.Power soldering iron	1	-	-	1
8.Bread board	25	-	-	25
9.Electronics soldering training kit	25	-	-	25
10.Transformer	25	-	-	25
11.Oscilloscope	8	-	-	8
12.RMS voltmeter	8	-	-	8
13.Universal bridge	8	-	-	8
14.Optical fiber sample set	1	-	-	1
15.Noise filter	8	-	-	8
16.Thermoelectricity experiment apparatus	8	-	-	8
17.Impedance converter experiment apparatus	8	-	-	8
18.Digital circuit trainer	8	-	-	8
19.Electromagnetic induction experiment app.	1	-	-	1
20.Vacuum tube sample set	1	-	-	1
21.Electronics circuit trainer	8	-	-	8
22.Optical fiber teaching apparatus	1	-	-	1

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REQUESTED EQUIPMENT LIST (RADIO & TV LABORATORY)

NO.	Description	A	B	C	T
1.	Oscilloscope (2 ch)	8	–	–	8
2.	FM/AM standard signal generator	8	–	–	8
3.	Standard signal generator	1	–	–	1
4.	TV multichannel sound level meter	8	–	–	8
5.	VHF/UHF signal generator	4	–	–	4
6.	LCR bridge	8	–	–	8
7.	Audio response tracer	1	–	–	1
8.	Equalizer amplifier	8	–	–	8
9.	Microphone amplifier	1	–	–	1
10.	Frequency response recorder	8	–	–	8
11.	Sound level meter	1	–	–	1
12.	Function generator	8	–	–	8
13.	Wow/flutter meter	1	–	–	1
14.	Distortion meter	1	–	–	1
15.	VHS hi-fi audio analyzer	1	–	–	1
16.	Video level meter	1	–	–	1
17.	CRT cut model set	1	–	–	1
18.	UHF swemar generator	1	1	–	2
19.	Varactor tuner controller	1	–	–	1
20.	Universal swemar generator	1	–	–	1
21.	VHF/UHF field level meter	1	–	–	1
22.	Multimeter (digital)	8	–	–	8
23.	Multimeter (analog)	25	–	–	25
24.	PAL/SECAM color pattern generator	1	–	–	1
25.	RGB generator	1	–	–	1
26.	Audio analyzer	1	–	–	1
27.	Frequency counter	8	–	–	8
28.	Frequency counter (wide band)	1	–	–	1
29.	Satellite field strength meter	1	–	–	1
30.	CRT tester	1	–	–	1
31.	Satellite receiver set	1	–	–	1
32.	Broad casting signal scanner	8	–	–	8
33.	DC power supply (24 V)	8	–	–	8
34.	DC power supply (multi out-put)	1	–	–	1
35.	Bandpass filter	8	–	–	8
36.	Attenuator	8	–	–	8
37.	Resistance box	8	–	–	8
38.	Capacitance box	8	–	–	8

M-ABU SHAMAD

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NO.	Description	A	B	C	T
39.	Digital circuit trainer	8	-	-	
840.	TV trainer	1	-	-	1
41.	Broad band amplifier	8	-	-	8
42.	Radio communication test set	1	-	-	1
43.	Modulation meter (AM/FM/PCM)	8	-	-	8
44.	RF power meter	8	-	-	8
45.	AF power meter	8	-	-	8
46.	Spectrum analyzer	1	-	-	1
47.	Distortion meter	1	-	-	1
48.	TV set	8	-	-	8
49.	Antenna test bench	1	-	-	1
50.	TV camera	1	-	-	1
51.	TV RF modulator	1	-	-	1
52.	Video cassette recorder	1	-	-	1
53.	16mm film projector	-	1	-	1
54.	Color mixer	1	-	-	1
55.	Tuning fork set	1	-	-	1
56.	Flue pipe set	1	-	-	1
57.	Audio oscillator set	1	-	-	1
58.	Interference phenomena set	1	-	-	1

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REQUESTED EQUIPMENT LIST (PHYSICS LABORATORY)

NO.	Description	A	B	C	T
1.	Linear momentum apparatus	6	–	–	6
2.	Rotational dynamics apparatus	6	–	–	6
3.	Simple harmonic motion apparatus	6	–	–	6
4.	Compound pendulum apparatus	6	–	–	6
5.	Boyle's law experiment apparatus	6	–	–	6
6.	Measurement material set	12	–	–	12
7.	Measurement tool set	12	–	–	12
8.	Hare's apparatus	6	–	–	6
9.	Stop watch	12	–	–	12
10.	Mirror & lens set	12	–	–	12
11.	Charle's law apparatus	6	–	–	6
12.	Thermal expansion apparatus	6	–	–	6
13.	Grass rod thermometer set	12	–	–	12
14.	Digital thermometer	6	–	–	6
15.	Atmospheric barometer	1	–	–	1
16.	Calorimeter	6	–	–	6
17.	Scale/cursor set	12	–	–	12
18.	Spherometer	12	–	–	12
19.	Weight set	12	–	–	12
20.	Balance (4 beam)	6	–	–	6
21.	Balance (3 beam)	6	–	–	6
22.	Digital top pan balance	6	–	–	6
23.	Linear air track apparatus	6	–	–	6
24.	Law of Inertia experiment apparatus	6	–	–	6
25.	Optical bench	6	–	–	6
26.	Millikan apparatus	6	–	–	6
27.	Galvanometer	6	–	–	6
28.	Ammeter	12	–	–	12
29.	Voltmeter	12	–	–	12
30.	Multimeter (digital)	6	–	–	6
31.	Decade resistance box	6	–	–	6
32.	e/m apparatus	1	–	–	1
33.	X-ray apparatus	–	1	–	1
34.	Oscilloscope	6	–	–	6
35.	Function generator	6	–	–	6
36.	Spectrometer	–	6	–	6
38.	Michelson interferometer	1	–	–	1

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NO.	Description	A	B	C	T
39.	Optic system experiment apparatus	1	-	-	1
39.	G/M apparatus	1	-	-	1
40.	Light velocity measurement apparatus	1	-	-	1

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REQUESTED EQUIPMENT LIST (HOTEL MANAGEMENT TRAINING ROOM)

NO.	Description	A	B	C	T
1.	Model reception set	1	-	-	1
2.	Model bed room set	1	-	-	1
3.	Model reception hall set	1	-	-	1

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REQUESTED EQUIPMENT LIST (HOTEL CATERING TRAINING ROOM)

NO. Description	A	B	C	T
1.Cooking table	15	-	-	15
2.Gas heater	4	-	-	4
3.Washing machine	3	-	-	3
4.Refrigerator	5	-	-	5
5.Vegetable grinding machine	2	-	-	2
6.Vegetable cutting machine	2	-	-	2
7.Microwave cooker	10	-	-	10
8.Pot	20	-	-	20
9.Oven	6	-	-	6
10.Vapor heater	25	-	-	25
11.Kitchen utensil set	1	-	-	1
12.Meat cutting machine	1	-	-	1
13.Grill	5	-	-	5
14.Mixer (large)	3	-	-	3
15.Mixer (small)	10	-	-	10
16.Ice maker	1	-	-	1
17.Dining table	5	-	-	5
18.Dining chair	20	-	-	20
19.Tableware set	1	-	-	1
20.Wagon	5	-	-	5
21.Restaurant decoration set	1	-	-	1

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REQUESTED EQUIPMENT LIST (DRESS MAKING WORKSHOP)

NO. Description	A	B	C	T
1.Industrial sewing machine	1	-	-	1
2.Sewing machine	25	-	-	25
3.Measuring tool set	25	-	-	25
4.Electric iron	5	-	-	5
5.Scissors set	25	-	-	25
6.Sewing kit	25	-	-	25
7.Ironing table	5	-	-	5
8.Wheel marker	25	-	-	25
9.Knitting machine	5	-	-	5
10.Dress pattern set	25	-	-	25
11.Model	25	-	-	25
12.Working table	5	-	-	5
13.Electrical scissors	1	-	-	1
14.Tool cabinet	2	-	-	2
15.Full length mirror	5	-	-	5

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REQUESTED EQUIPMENT LIST (MANAGEMENT AND FINANCE DEPARTMENT TRAINING ROOM)

NO.	Description	A	B	C	T
1.	Model office room set	1	-	-	1

M. ABU SHAND

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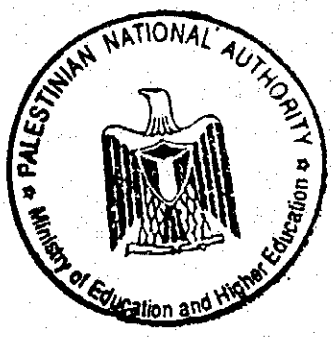
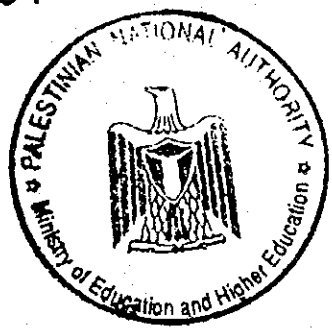


REQUESTED EQUIPMENT LIST (LIBRARY)

NO.	Description	A	B	C	T
1.	Books	1	-	-	1
2.	Library furniture set	1	-	-	1
3.	Heavy duty photocopying machine	1	-	-	1
4.	Personal computer set	1	-	-	1

M. ABU TARAD



REQUESTED EQUIPMENT LIST (EDUCATIONAL SUPPORTING EQUIPMENT)

NO.	Description	A	B	C	T
1.	Slide projector	2	-	-	2
2.	OHP	5	-	-	5
3.	Electronic typewriter	2	-	-	2
4.	Personal computer set	1	-	-	1
5.	Laminating machine set	1	-	-	1
6.	Photocopying machine	1	-	-	1
7.	Paper cutter set	1	-	-	1
8.	Mounting machine	1	-	-	1
9.	35mm camera	1	-	-	1
10.	Tripod	1	-	-	1
11.	TV & VTR set	2	-	-	2
12.	Video camera	1	-	-	1
13.	Mimeographing equipment set	1	-	-	1

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PALESTINIAN NATIONAL AUTHORITY
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REQUESTED EQUIPMENT LIST (ADMINISTRATION EQUIPMENT)

NO.	Description	A	B	C	T
1.	Personal computer set	4	-	-	4
2.	Heavy duty photocopying machine	1	-	-	1
3.	Photocopying machine	3	-	-	3

M. ABU BARAD

CONDITION OF PROJECT SITE

1. Climatic Condition

Table 1 Climatic Condition

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Max. Temp.	18.8	18.5	18.7	23.3	25.2	28.0	28.2	29.2	28.3	27.0	23.5	20.3
Min. Temp.	10.9	10.5	10.5	14.4	14.5	17.9	21.5	22.1	20.0	13.0	11.0	10.8
Relative Humidity (%)	85.0	85.0	83.5	82.0	84.0	87.0	86.0	86.5	85.5	74.0	78.0	85.0

2. Electricity Supply

Main Current	Three phase	380 – 400 Volt.
	Single Phase	220 V.
Frequency	50 Hz.	

3. Water Quality

Table 2 Chemical Analysis for the Underground Water in Gaza

Sample Site	pH	Conductive us/cm	Ts mg/L	Cl– mg/L	NO3– mg/L	SO4-- mg/L	Ca++ mg/L	Mg++ mg/L	F– mg/L	K+ mg/L	Na+ mg/L
Beit Ranoun	7.5	951	576	145	27	23	48	28	1.0	3.1	124
Biet Lahiah	7.4	632	382	64	45	18	68	44	0.6	5.9	33
Jabaliah Camp	7.4	958	665	137	148	72	76	42	0.9	5.2	61
Gaza	7.4	1,949	1,298	374	83	92	86	44	1.3	5.3	299
Buraj Camp	7.3	4,280	2,853	940	51	350	91	73	1.2	6.6	471
Deir El Balah	7.2	6,040	4,026	1,260	480	450	256	157	1.0	35.0	828
Nuseirat	7.4	4,258	2,831	843	66	309	87	64	1.5	5.7	521
Khan Younis	7.2	2,343	1,474	423	172	117	87	48	1.2	4.6	298
Rafah	7.6	1,991	1,429	472	68	157	51	42	0.8	9.0	317
Average	7.4	2,600	1,726	518	138	176	95	60	1	8.9	274

Table 3 Summary of Water Quality in Gaza

	Hardness	Alk	pH	Cond	Ts
Source	133.3	N.D.	N.D.	2,270.0	1.6640
Municipal	160.7	265.0	7.82	1,832.90	1.2143
Springs	N.D.	N.D.	N.D.	N.D.	N.D.
Cisterns	N.D.	N.D.	N.D.	N.D.	N.D.
Camps	178.1	233.3	7.74	1,741.8	1.2220

*N.D. = not done

ACADEMIC PROFILE

1. Al Azhar University	
Class hour	55 min.
Class/day	7 class (from 8:00 to 16:55)
One credit hour	1 for theory + 3 class for laboratory per week
Number of day/week	6 days a week
System	2 – semester system
One semester	16 weeks
Min. of year	4 years (5 years for pharmacy)
2. Dier El Balah Polytechnic	
Class hour	50 min.
Class/day	7 class (from 8:00 to 14:50)
One credit hour	1 class for theory plus
Number of day/week	3 classes for laboratory per week
System	2 – semester system
One semester	16 weeks
Min. of year	2 years