MINISTRY OF HIGHER EDUCATION
THE PALESTINIAN INTERIM SELF-GOVERNMENT AUTHORITY



# BASIC DESIGN STUDY ON THE PROJECT FOR THE SUPPLY OF EQUIPMENT FOR COLLEGE OF MEDICINE, AL-QUDS UNIVERSITY IN THE PALESTINIAN INTERIM SELF-GOVERNMENT AUTHORITY

MARCH 1999



JAPAN INTERNATIONAL COOPERATION AGENCY
SYSTEM SCIENCE CONSULTANTS INC.

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# PREFACE

In response to a request from the Palestinian Interim Self-Government Authority, the Government of Japan decided to conduct a basic design study on the Project for the Supply of Equipment for College of Medicine, Al-Quds University in the Palestinian Interim Self-Government Authority and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to the Palestinian Interim Self-Government Authority a study team from September 3 to October 12, 1998.

The team held discussions with the officials concerned of the Palestinian Interim Self-Government Authority, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to the Palestinian Interim Self-Government Authority in order to discuss a draft basic design, and as this result, the present report was finalized.

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

I wish to express my sincere appreciation to the officials concerned of the Palestinian Interim Self-Government Authority for their close cooperation extended to the teams.

March, 1999

Kimio Fujita
President
Japan International Cooperation Agency

March, 1999

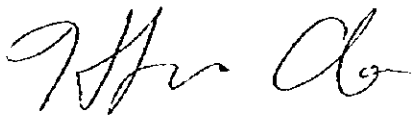
# LETTER OF TRANSMITTAL

We are pleased to submit to you the basic design study report on the Project for the Supply of Equipment for College of Medicine, Al-Quds University in the Palestinian Interim Self-Government Authority.

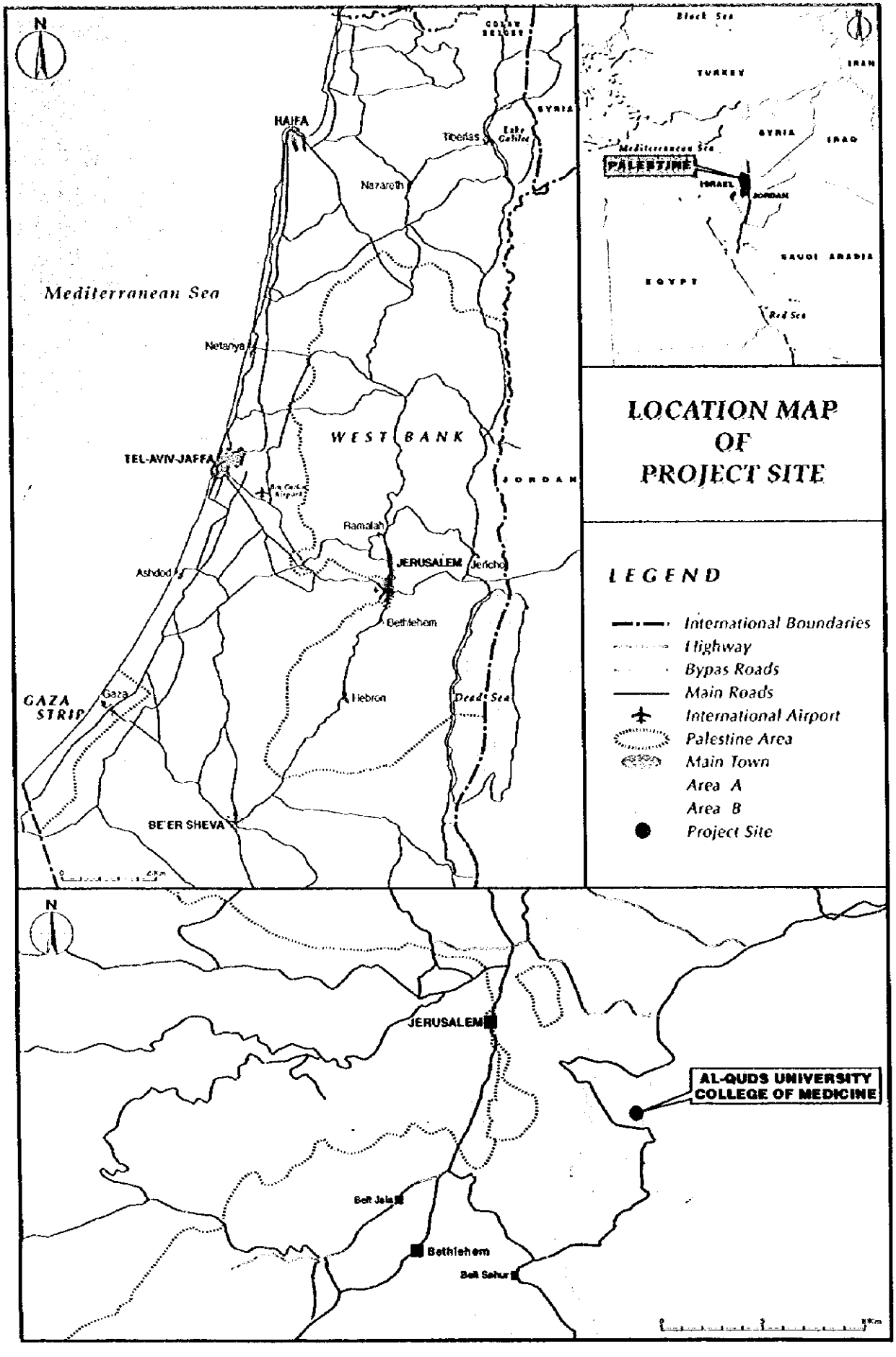
This study was conducted by System Science consultants Inc., under a contract to JICA, during the period from August 24, 1998 to March 31, 1999. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of the Palestinian Interim Self-Government Authority 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,



Hiroshi Abo
Project manager,
Basic design study team on
the Project for the Supply of Equipment for
College of Medicine, Al-Quds University
in the Palestinian Interim Self-Government
Authority
System Science Consultants Inc.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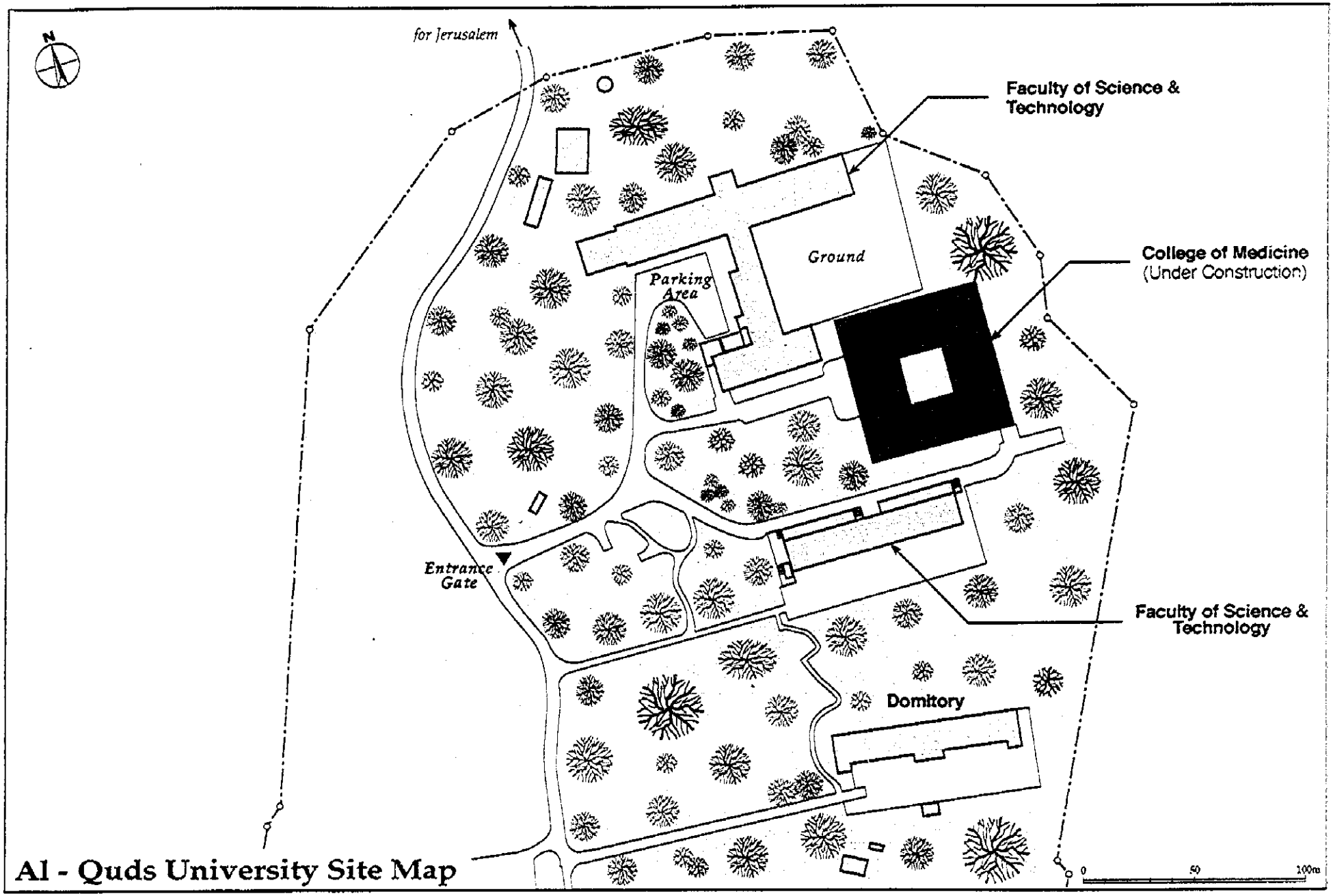
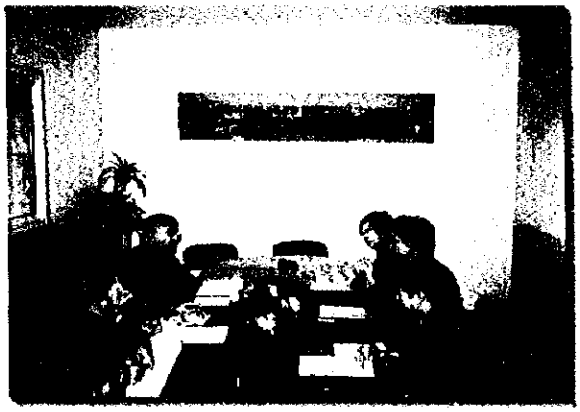
Beit Jala
Bethlehem
Beit Sahur




# Al - Quds University Site Map

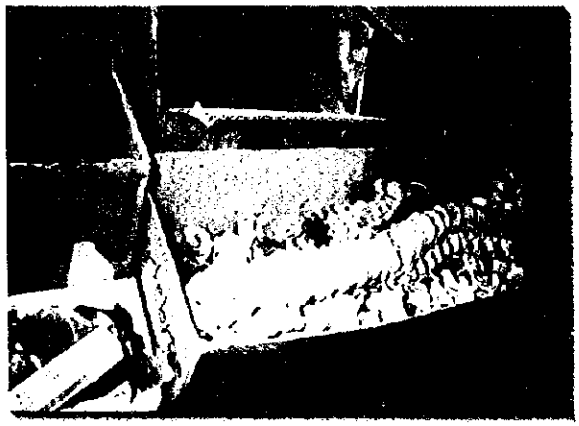
# PHOTOGRAPH


■ Enterance of Existing Building



■ Technical Meeting with Committee

■ Existing Classroom

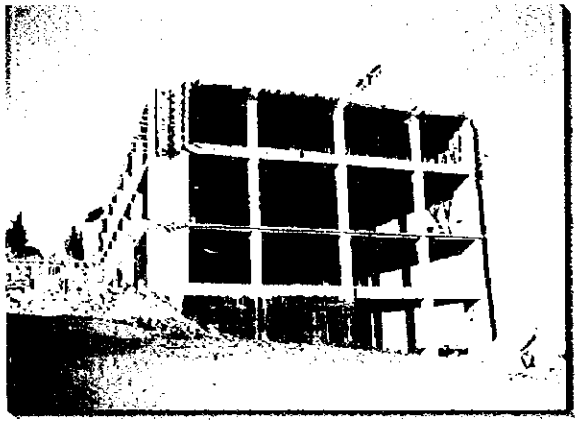


■ Existing Anatomy Samples

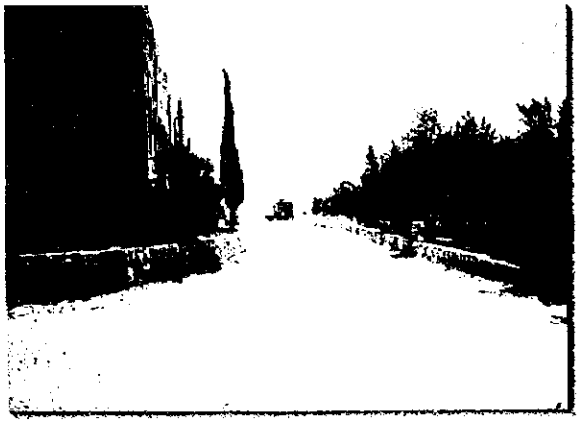
■ Signing of Minutes
(Basic Design Study)

■ Signing of Minutes
(Draft Basic Design)

■ Under Construction of New College of Medicine Building (December, 1998)



■ Side Section of New Building



■ Access Road to New Building

■ Training Hospital (Makasaad)


■ Training Hospital (Victoria)

# Abbreviation

| | |
|---|---|
| B/A | Banking Arrangement |
| E/N | Exchange of Notes |
| GDP | Gross Domestic Product |
| JICA | Japan International Cooperation Agency |
| MOPIC | Ministry of Planning and International Cooperation |
| NIS | New Israel Shekel |
| OJT | On the Job Training |
| PA | Palestinian Interim Self-Government Authority |
| PHC | Primary Health Care |
| PLO | Palestine Liberation Organization |
| UNDP | United Nations Development Programme |
| UNRWA | United Nations Relief and Works Agency for Palestine Refugees in the Near East |
| UPS | Uninterruptible Power Supply |

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Photograph
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# Chapter 1 Background of the Project

# Chapter 1 Background of Project

## 1-1 Summary of the Background

The Palestinian Interim Self-Government Authority (hereinafter referred to as "PA") is located on the east coast of the Mediterranean Sea. It is a narrow strip of land surrounded by Lebanon, Syria, Jordan, Egypt, and the Sinai Peninsula and the region is separated into the Gaza Strip bordering the Mediterranean Sea and the West Bank of the Jordan River.

The Project site is located in the Jerusalem area in the West Bank of the Jordan River. Blessed with a Mediterranean climate with a comparatively long, dry summer season and a short rainy winter season, it located about 900m above sea level. Due to an annual rainfall volume of less than 600mm, the air is dry even in the summer which contributes to a relatively pleasant climate.

According to 1996 estimates, the total population was 22.7 million people, with 9.53 million people residing in the Gaza Strip and 13.17 million living in the West Bank. The annual population growth rate was 3.7 percent. The youth population of under 15 years comprised 48 percent of the entire population and only 5.2 percent of the population was over the age of 60 years.

As a result of the Third Middle East War (June War) in 1967, the Israeli occupied Palestinian Territories. However, in September 1993, the "Declaration of Principles on Interim Self-Government Arrangement" was agreed on between the Israeli government and the PLO (Palestine Liberation Organization). Consequently, the "the Agreement on the Gaza Strip and Jericho Area" were signed in May 1994, the Gaza Strip and Jericho area began its interim self-government, and the autonomous rule in the five areas of direct taxes, culture, social welfare, tourism, and education was begun in the West Bank in August of that same year.

In September 1995, the government entered its second stage of interim self-government and its jurisdiction was expanded to include the West Bank. "The Oslo II Interim Accord" was established which sanctioned to implement "Palestinian Legislative Council" elections. The Palestinian Legislative Council

elections were held in January 1996 and PLO Chairman Arafat was elected as the first president of the Palestinian Interim Self-Government Authority.

Due to its situation under Israeli occupation, the PA faces various problems such as regional disparities, unequal technical levels, limited health care services, a shortage of physicians and health care personnel, etc. and it has been unable to reach the level of health care achieved by its neighboring countries. In particular, the PA has only 8.1 physicians per 10,000 people (1996), a comparatively low figure in contrast to 24.4 physicians and 13.0 physicians per 10,000 people in neighboring Israel and Jordan, respectively, and there is a need to foster physicians. In addition, the infant mortality rate is 40 to 45 deaths per 1,000 births which is an extremely high value in contrast to the WHO standard for developing countries of 20 deaths per 1,000 births. Improvements in this area are needed.

A comparison of the health statistics of the PA, Israel, and other countries is shown in the table below.

**Table 1 Health Indicators**

| | West Bank | Gaza Strip | All Palestine | Israel | Jordan | Japan |
|---|---|---|---|---|---|---|
| Population (million) | 131.7 | 95.3 | 227 | 510 | 430 | 12,450 |
| Total Number of Physician | 906 | 930 | 1,836 | 12,400 | 5,580 | 204,000 |
| (per 10,000 population) | 6.9 | 9.8 | 8.1 | 24.4 | 13 | 16.4 |
| Physician in the Ministry of Health | 475 | 627 | 1,102 | – | – | – |
| (per 10,000 population) | 3.6 | 6.6 | 4.9 | – | – | – |
| Life Expectancy (Year) | 65 | 65 | 65 | 76 | 68 | 79 |
| Infant Mortality Rate (per thousand) | 40~45 | 45 | 40~45 | 9 | 25 | 4 |
| Population Growth Rate | 3.70% | 3.30% | 3.70% | 2.30% | 3.20% | 0.50% |

Source : The Status of Health in Palestine Annual Report 1996, Ministry of Health
World Development Report 1993, UNDP

In view of these circumstances, the Ministry of Health has created the "National Health Plan for the Palestinian People" which focused on strengthening Primary Health Care (PHC) and establishing a health care system. In particular, an important policy of increasing the number of PHC level physicians of health care facilities from 910 in 1992 to 1,229 by 2002 was implemented, in order to raise the level of regional health care which has tended to trail behind urban areas.

In addition, there is a need to raise the number of physicians to the standards of neighboring countries (especially in the rural areas) in order to improve the overall health care environment in the PA. Therefore, fostering physicians is an urgent issue.

Despite the urgency of this issue which is vital to improving health conditions in the PA, the fostering of physicians has had to rely on medical studies undertaken abroad due to the lack of a medicinal university within the country. However, the departure of Palestinians abroad has been under the strict jurisdiction of Israel and due to other reasons such as the inordinately high educational costs required for medical students studying abroad, efforts to establish a system of fostering physicians by creating its own medicinal university within the PA has become a priority issue.

The College of Medicine, Al-Quds University (hereinafter referred to as the "College of Medicine") created the country's sole seven-year program aimed at fostering physicians in 1994 based on earnest national aspirations to establish its own university of medicine in the PA. The program consists of an educational curriculum of language, basic science, etc., for the first and second years, a basic medical education curriculum for the third and fourth year, and basic clinical medicine from the fifth to seventh years. In principle, the undergraduate course is comprised of the first four years and an educational and training curriculum at a training hospital is carried out in the fifth to seventh years.

Al-Quds University which was established on the West Bank in the PA (Abu -Dies near Jerusalem) in 1984 aims to become the future center of higher education of the PA and presently, there are a total seven faculties – the College of Medicine, Faculty of Science and Technology, Faculty of Da'wa and the Principles of Religion, Faculty of Arts, Faculty of Law, Faculty of Health Professions and Faculty of Qur'an and Islamic Studies.

Presently, the College of Medicine is currently using the rooms in the Faculty of Science and Technology building and a separate building for the College of Medicine is under construction with the financial assistance of the Islamic Development Bank which is scheduled to be completed in January 2000. Due to the lack of basic science equipment and specialized equipment from the third year medical curriculum, it has been impossible to conduct practical and training activities.

Due to these circumstances, the PA formulated an educational equipment plan in order to enable practical medical education needed to foster physicians to be conducted at the College of Medicine and requested the Government of Japan for Grant Aid assistance to implement this plan.

## 1-2 Summary of the Request

The content of the equipment requested by PA for this Project is shown below.

(1) Project site:

College of Medicine, Al-Quds University, Abu-Dies (in the suburb of Jerusalem)

(2) Equipment Requested

The Equipment which was requested for this Project is comprised of laboratory and training equipment as shown below (general science equipment, basic science educational equipment, basic medical educational equipment, analysis and measuring equipment for medical education), audio-visual equipment, computer, transportation facilities, furniture, and books.

**Table 2 Contents of Requested Equipment**

| Item | Name of Equipment |
|---|---|
| Equipment and Tools | |
| General Science Equipment | Autoclave, Distillator, Centrifuge, Refrigerator, Fume-Hood |
| Basic Science Educational Equipment | Devices for Chemistry Equipment (Titration, Chemical Analysis), Devices for physics Equipment (Dynamics, Optics, Electronic, Magnetic Field), |
| Basic Medical Educational Equipment | CRT Training Manikins, Dissection Training Instrument, Microscope, Electrocardiograph |
| Analysis & Measuring Equipment | Chemical Analyzer, High Performance Physiograph |
| Audio-Visual | Television set, Video Cassette Recorder, OHP, Personnel Computer |
| Transportation Facilities | 4-Wheel Drive Pick Up, Mini-Bus |
| Furniture & Books | Shelving, Desk, Textbook, Reference Book |
| Total Item Number | 1,009 |

# Chapter 2 Contents of the Project

# Chapter 2 Contents of the Project

## 2-1 Objectives of the Project

The PA faces a host of issues in the health care sector such as regional differences and unequal technical levels, limited health care services, a shortage of physicians and health care personnel, and others, due to its political circumstances as an occupied territory of Israel. Consequently, health care standards have not reached those of its neighboring countries. In particular, the per capita ratio of physicians in the PA is 8.1 physicians per 10,000 people (1996). It is low in comparison to the ratio of physicians in Israel which is 24.4 physicians and 13.0 physicians in neighboring Jordan; and there is a demand to foster physicians.

As a result, priority was placed on creating a system of fostering physicians within the PA itself and a medical university was established within the country due to such reasons as the hitherto nonexistence of a medical university in the PA, the dependence on overseas medical studies, strictly enforced immigration controls by Israeli authorities on entering and departing Palestinians, the inordinately high cost of fostering physicians abroad.

The College of Medicine, Al-Quds University was established in 1994 as the PA's sole college of medicine in answer to the earnest demands of the Palestinian people. Presently, the College of Medicine is located in buildings of Faculty of Science and Technology and the College of Medicine's own building is currently under construction with the assistance of the Islamic Development Bank. Nearly all basic medical educational equipment that is needed for specialty courses after the third year, in addition to basic science equipment for the first and second year levels is nonexistent which has made experiment and practical training activities impossible.

This Project will provide the educational equipment that is in deficient in accordance with the needs of the curriculum, the number of students, the number of lecturers, etc. at the College of Medicine. The objectives are to directly establish a system of medical education at this institution by strengthening and improving the quality of medical education.
In addition, the super goal is to contribute to improving the health care system in the PA by enabling a steady cultivation of much needed physicians.

## 2-2 Basic Concept of the Project

### 2-2-1 Basic Concept of the Project

This Project will provide medical educational equipment for the new building currently under construction for the College of Medicine, in order to enable practical medical education that is needed to foster physicians.

The National Health Plan for the Palestinian People was created in 1994 to improve the health conditions in the PA and strengthening PHC was targeted through the creation of a health care system. In particular, an important policy was enacted to increase the number of physicians in health care facilities at the PHC level in order to develop regional health care which is lagging in comparison to urban areas.

The College of Medicine is a seven year university which is the sole institution in the PA that aims to foster physicians. The first and second years of its educational curriculum are dedicated to the study of languages, basic science, etc., the third and fourth years provide a curriculum in basic medical education, and the fifth to seventh years completes the seven year course with a curriculum in basic clinical medicine. Basically, the first to fourth years are instructed in the University and the fifth to seventh years provide education and practical training at a hospital.

However, as mentioned earlier, despite the existence of excellent lecturers and students, educational equipment is nearly nonexistent. As a result, practical medical education within the College of Medicine in the areas of experiments and practical training can not be implemented and the institution is forced to rely on mainly classroom lectures and this has also negatively affected the practical training courses at the hospital.

Therefore, the most important objective of this Project is to provide basic science and basic medical educational equipment that is essential to implementing practical medical education at the College of Medicine, in order that it may foster physicians that are greatly needed to improve health care conditions in the PA. In view of the lack of an exigency for research equipment that is not directly related to the education of physicians, such equipment has been excluded from this Project.

## 2-2-2 Content of the Equipment Requested

### (1) List of Requested Equipment

In accordance with the list of equipment submitted with the request for cooperation from the PA in January 1998, deliberations were held on the content of the equipment requested with the College of Medicine and the Committee organized by relevant University personnel during the Basic Design Study and a confirmation of the final proposed equipment list was made. The major items of equipment that have been included in the final list are shown in Table 3.

A total of 631 items of laboratory and training equipment have been included in the final list which is comprised of basic science equipment (physics, chemistry, biology), medical educational equipment (pharmacology, anatomy, physiology, pathology, microbiology, immunology, forensic medicine, biochemistry, molecular biology, etc.), and audio-visual equipment.

**Table 3 Major Equipment Requested**

| Item | Name of Equipment |
|---|---|
| Audio-Visual | Television Set, Over-Head Projector, Video Cassette Recorder, Personnel Computer, Laser Printer, Camera with Zoom Lenses, Maintenance Workshop |
| Transportation Facilities | 4 Wheel Drive Pick-Up, Mini-Bus |
| Equipment and Tools | |
| Pharmacology | Double Beam Spec., Water Bath, Centrifuge, Bunsen Burner, Flame Photometer, Drug Level Analyzer |
| Anatomy/Pathology | Autoclave, Top Load Balance, Microscope, pH Meter, Staining Set, Incubator, Fume-Hood, Centrifuge |
| Physiology | Incubation Set, Analytical Balance, Centrifuge, Refrigerator, Glassware Washer, Blood Gas Analyzer, Electrocardiograph, Urinometer |
| Microbiology/Immunology /Haematology | Deep Freezer, Autoclave, Lyophelizer, Incubator, Water Bath, Refrigerator, Staining Set, ELIZA Reader, , Fume-Hood, Microscope, Electrophoresis |
| Forensic Medicine | Deep Freezer, Autoclave, Double Beam Spec., Analytical Balance, Centrifuge, Flame Photometer |
| Biochemistry | Autoclave, Double Beam Spec., Analytical Balance, Centrifuge, Glassware Washer, Pipette, pH Meter |
| Molecular Biology | Analytical Balance, Sonicator, Water Bath, Tissue Centrifuge, Microscope, Electrophoresis |
| Basic Science | Analytical Balance, Optical Pumping, Sonicator, Kjeldahl apparatus, pH Meter |
| Common Use | Distillator, Ice Maker, Ultra Centrifuge |
| Teaching Materials | Slide set for microbiology, Slide set for normal histology, Color slide(transparency) set for medical microbiology |
| Anatomic Models | Thoracic Spinal Column, Lumber Special Column, Super Muscle Torso, Brain, Heart, Dressing Scissors, Dissecting Forceps |
| Physiology and Pharmacology Teaching and Research | Pulmomator, Reaction Timer, Rats Ventilator, Bull Dog Clamp, Alm Retractor, Hemostatic Forceps, Michel Suture Applicator |

### 2-2-3 Review of the Request

(1) Review of the Request

The requested equipment which will be provided in this Project was reviewed and categorized largely according to its use and it is summarized below.

1) General Science Equipment

(Example) Autoclave, distillator, centrifuge, freezer, fume hood

- The equipment will be used in the third and fourth year basic medical curriculum. They are the minimal essential equipment needed to effectively implement basic medical experiments.
- The equipment will require no special technical maintenance and the maintenance costs will be relatively minor.
- If the maintenance personnel is clearly designated and the practice of registering users of the equipment is adopted, it will be possible to use the equipment jointly between courses and different floors of the building.

2) Basic Science Educational Equipment

(Example) Devices for chemistry experiments (titration, chemical analysis), devices for physics experiments (dynamics, optics, electronic, magnetic field)

- Equipment that will enable basic experiments that will be carried out in the first and second year educational curriculum courses are included in this category.
- Basic scientific knowledge is essential in medical education. However, due to the lack of an opportunity to participate in science experiments in the PA until matriculating to a university, equipment that is essential in acquiring scientific knowledge and the ability to handle scientific equipment will be selected.

3) Basic Medical Educational Training Equipment

(example) CRT training manikins, dissection training instruments, slide set, microscopes, electrocardiograph

- Equipment will be provided that will enable the third and fourth year basic medical curriculum to provide basic training to medical students before going into hospital training in the fifth year to seven year.
- Due to the nonexistence of a university hospital at the present time, equipment that will enable medical students to enter into hospital training without hesitation and will prevent damage to hospital equipment and instruments by enabling students to be trained in their handling and use during daily medical examinations will be selected.

4) Analysis and Measuring Equipment for Medical Education

(example) Chemistry analyzer, electroencephalograph, HPLC, gas chromatograghy

- It is important to learn the basic science education curriculum for first and second year students include biology, chemistry and physics, but there is a need to learn the basic operating procedures of each analysis equipment, etc. that will be used in the practice and training in the basic medical curriculum of third year students and above.
- The aim of the basic science courses for third and fourth year students is to instill the knowledge needed to decide which testing methods are applicable and the ability to interpret analytical data and to foster diagnostic skills through measurement and analysis of actual samples.
- In order to prevent damage to hospital equipment and loss of samples during the hospital training curriculum which is conducted in the fifth to seventh years, there is a need to teach medical students the handling techniques for analysis and laboratory equipment.
- Due to these reasons, it is essential that analysis and measuring equipment for the first to fourth year curriculums are introduced in order to achieve the goals of the university's training program.

5) Audio Visual Equipment

(example) Television set, OHP, camera

- The educational impact of audio visual equipment in medical education is large and the equipment is commonly used for educational purposes.
- Similar existing facilities (nursing school, etc.) have installed a television set, OHP, and video cassette recorder in each classroom which are used frequently during lectures.

- Audio visual equipment is frequently used in university seminars, public lectures, research presentations, etc.

6) Computer Equipment

(example) Personal computers, computer network

- A computer network system itself within the university is a supplementary infrastructural facility.
- Basic computer education is an essential course in the curriculum. computer equipment is necessary in medical education since it is a vital item of equipment for physicians today.

7) Transportation Facilities

(example) Four wheel drive pick-up, mini-bus

- Motor vehicles that have been requested will be used as a means of travelling to training courses at the hospital and the health center.
- Medical students are required to obtain individual permits in order to pass the Israeli check points on their field trips. However, if they travel using a university-owned motor vehicle, they are exempted from obtaining individual permits.
- Presently, the university utilizes a privately leased motor vehicle. Furthermore, students are required to pay for the permits individually when they travel alone.
- Due to the existence of a developed public transportation network and a good infrastructure of roads, there is presently no major obstacles to student commuters travelling to the university.
- A driver and maintenance personnel have not been assigned and vehicle maintenance costs have not been secured at the present time.

(2) Equipment Selection Review

The degree of priority, quantity, specifications, etc. of the final list of equipment requested will be carefully reviewed and selected according to the following policy and evaluation criteria.

1) Policy on Equipment Selection

a. The objective of the Project is to provide equipment that will help foster physicians.
b. The equipment which will be provided in this Project will enable the curriculums and educational programs of the College of Medicine to be coordinated.
c. The equipment which will be provided in this Project will be, in principle, equipment that will be used in the first and second year basic educational curriculum (pre-medical) and the third and fourth year basic medical education curriculum (pre-clinical).
d. The equipment which will be provided in this Project will be able to operate and maintain technically.
v. The equipment which will be provided in this Project will require appropriately maintenance and control costs.
e. The installation area for each equipment in the new building for the College of Medicine will be clearly delineated and the person-in-charge of the equipment will be clearly designated.
f. Duplication of existing equipment will be avoided and equipment that has been provided or are in the process of being provided by other donors and sources will not be included in this Project.
g. A policy of rational and joint use of the equipment will be pursued. Therefore, the equipment which will be provided in this Project will be kept essentially to a minimum both in type and quantity.

2) Evaluation Criteria of Equipment Selection

Degree of Priority:

In view of the importance placed on coordinating the educational program and curriculum of the College of Medicine, the highest priority will be given to urgently needed basic science (pre-medical) equipment for the first and second year curriculum and basic medical (pre-clinical) educational equipment for the third and fourth year curriculum. In addition, priority will be given to highly cost-effective equipment.

Quantity:

In the event the equipment requested in this Project overlaps with existing equipment or has been provided under assistance programs of other donors, its priority will be decided after a review of the request. In addition, if equipment provided by this Project overlaps with existing equipment, the quantity requested will be adjusted to allow for joint use between courses and floors, the possibility of alternative equipment, interchangeable use of consumables, parts, etc.

Operation and Maintenance:

Equipment which is financially and technically easy to maintain, with easy specifications, where its installation site in the new building has been clearly decided, and the personnel-in-charge of equipment has been appointed will be given priority in the selection process.

The major criteria for equipment which has been excluded from this Project or where the quantity has been adjusted for rationalization are explained below.

1) Requested equipment which overlaps with existing equipment or equipment such as the distillator, bunsen burner, autoclave, manikin and refrigerator which have been requested in duplicate will be reviewed based on their specifications and their quantity will be adjusted accordingly.

2) It is possible to utilize an ordinary centrifuge in place of a cell washer centrifuge which can be substituted by other types of instruments will be omitted from the list.

3) Equipment such as the stomacher and chemostat where the party responsible for its maintenance is not clear or for equipment where the installation site is not definite will be omitted from this project due to maintenance and management problems.

4) Infrastructural improvements such as computer networking will not be included in this Project.

5) In view of the fact that public transportation can be used for travelling and due to the lack of an appointed driver, maintenance personnel, and maintenance costs, transportation facilities will be excluded from this Project.

6) Computers for the office staff will be excluded from this Project in view of the fact that computers are required in the basic computer course in the educational curriculum.

The evaluation results of the equipment review based on the three criteria of "Priority", "Quantity" and "Operation and Maintenance" and in accordance with the policy explained above, is shown in Table 4. In addition, the results of the review according to the three criteria are explained below.

In addition, the results of the review based on the three criteria are shown as follows.

- No problems found : Blank
- Problems found : X

The overall review of the equipment (Final Evaluation)is shown as follows.

- Equipment judged to be appropriate : O
- Equipment excluded from this Project : X

# Table 4 Review of the Equipment Selection

## AUDIO-VISUAL

| No. | Equipment Name | Q'ty Requested | Evaluation Criteria | | | Final Evaluation | Remarks |
|---|---|---|---|---|---|---|---|
| | | | Priority | Quantity | Operation & Maintenance | | |
| A-1 | Television set | 18 | | | | ○ | |
| A-2 | Video Cassette Recorder | 12 | | | | ○ | |
| A-3 | Electronic Projector | 12 | | | | ○ | |
| A-4 | Over- head Projector | 12 | | | | ○ | |
| A-5 | Screens (for Projectors) | 12 | | | | ○ | |
| A-6 | Slides Projector | 12 | | | | ○ | |
| A-7 | Docto- Phone | 10 | | | | ○ | |
| A-8 | Tape- Recorder | 5 | | | | ○ | |
| A-9 | Paper Shredder | 2 | × | | | × | Office equipment |
| A-10 | Fax- Machine | 2 | × | | | × | Office equipment |
| A-11 | Scanner - Color | 10 | | | | ○ | |
| A-12 | LCD | 12 | | | | ○ | |
| A-13 | Photocopier | 10 | | | | ○ | |
| A-14 | Unix Server | 2 | × | | | × | Substitute Ethernet for this item |
| A-15 | NT Server | 5 | × | | | × | Unnecessary for the system in Computer Lab. |
| A-16 | Backup Tape Drive | 2 | × | | | × | ditto |
| A-17 | Router | 2 | × | | | × | ditto |
| A-18 | Communication Cards | 145 | × | | | × | ditto |
| A-20 | 16 Port Hub | 8 | × | | | × | ditto |
| A-21 | Inter-Site Connection (Radio Modem) | 6 | × | | | × | Build-in computer |
| A-22 | Remote Class (25 seats) | 3 | × | | | × | Indirect relation with medical education in the College of Medicine |
| A-24 | Sun Workstation | 1 | × | | | × | Possibility to cover by the system of computer Lab. |
| A-25 | N.M.R. | 1 | × | | | × | Unnecessary for the system in classroom |
| A-26 | Networking | 1 lot | × | | | × | Infrastructure equipment |
| A-27 | Software | 145 | | | | ○ | |
| A-28 | PC | 145 | | | | ○ | |
| A-29 | Laser Printer color | 7 | | | | ○ | |
| A-30 | Laser Printer Black &White | 12 | | | | ○ | |
| A-31 | Laser Printer for Staff | 50 | × | | | × | Out of educational purpose |
| A-33 | Spectrum Analyzer | 1 | × | | | × | No-person in chorage of this item |
| A-34 | Video camera | 3 | | | | ○ | |
| A-35 | Camera with zoom lenses | 2 | | | | ○ | |
| A-36 | Audio -Visual Machine for integration of slide audio Cassette lectures on an individual basis in library | 1 | × | | | × | Library equipment |
| A-37 | Computer assisted Teaching Slide Maker | 1 | | | | ○ | |
| A-38 | Maintenance Workshop (Electro Mechanical) | 1 | | | | ○ | |

## TRANSPORTATION FACILITIES

| No. | Equipment Name | Q'ty Requested | Evaluation Criteria | | | Final Evaluation | Remarks |
|---|---|---|---|---|---|---|---|
| | | | Priority | Quantity | Operation & Maintenance | | |
| B-1 | 4 Wheel drive pick-up | 1 | × | | × | × | Possibility to use public transportation |
| B-2 | Mini- Bus | 3 | × | | × | × | ditto |

## EQUIPMENT AND TOOLS

| No. | Equipment Name | Qty Requested | Evaluation Criteria | | | Final Evaluation | Remarks |
|---|---|---|---|---|---|---|---|
| | | | Priority | Quantity | Operation & Maintenance | | |
| E-1 | Amino Acid Analyzer | 1 | | | | ○ | |
| E-2 | Deep Freezer | Requested | | | | ○ | |
| E-3 | Beta Counter | 1 | | | | ○ | |
| E-4 | Big Size Autoclave | 2 | | | | ○ | |
| | Midium Size Autoclave | 2 | | | | ○ | |
| | Small Size Autoclave | 2 | | | | ○ | |
| E-5 | HPLC | 3 | | | | ○ | |
| E-6 | Gas Chromatograpgy | 2 | | | | ○ | |
| E-7 | LC Mass Spectroscopy | 1 | | | | ○ | |
| E-8 | GC Mass Spectroscopy | 1 | | | | ○ | |
| E-9 | Double Beam Spec. | 4 | | | | ○ | |
| E-10 | ICE Maker | 3 | | | | ○ | |
| E-11 | Atomic Absorption | 1 | | | | ○ | |
| E-12 | Lyophelizer | 2 | | | | ○ | |
| E-13 | DNA Sequencer | 1 | | | | ○ | |
| E-14 | Large Refregerator | 3 | | | | ○ | |
| E-15 | Ultra Centrifuge | 1 | | | | ○ | |
| E-18 | TDX Analyzer | 1 | | × | | × | Duplication with E-261 |
| E-19 | Blood Bank Refrigerator | 1 | | | | ○ | |
| E-20 | Electrophoresis | 3 | | × | | × | Duplication with E-368 |
| E-21 | Electron Microscope | 1 | | | | ○ | |
| E-22 | Facs: (Fluorescent Activated Cell Sorter (Control) | 1 | × | | × | × | Substitute with E-22 |
| E-23 | Flouro-s-Imager : Flouro Scannar | 1 | | | | ○ | |
| E-24 | Phosphoimager | 1 | × | | | × | Substitute with E-22 |
| E-25 | Anatomical Charts | 2 | | | | ○ | |
| E-27 | Film Projector 16 mm | 1 | | | | × | |
| E-29 | CPR Training doll | 4 | | × | | × | Substitute with E-88, E-89 |
| E-30 | Ostomy Model | 1 | | | | ○ | |
| E-31 | Intubation Set | 1 | | | | ○ | |
| E-32 | Emergency Trolley | 2 | | | | ○ | |
| E-33 | Ear Syringe Trainer | 1 | | | | ○ | |
| E-34 | Inrtramusclar Injection | 1 | | | | ○ | |
| E-35 | Pediatric Injection Head Simulator | 1 | | | | ○ | |
| E-37 | Series Showing Pregnancy | 1 | | | | ○ | |
| E-38 | Enema Administration Simulator | 1 | | | | ○ | |
| E-39 | Peritoneal Dialysis Simulator | 1 | | | | ○ | |
| E-40 | Surgical Bandaging Simulator | 1 | | | | ○ | |
| E-41 | Model of a Set of Teeth | 1 | | | | ○ | |
| E-42 | Pediatric injection Arm Simulator | 1 | | | | ○ | |
| E-43 | UV-Visual (compound with data station & microprocessor + software) | 2 | | × | | × | Duplication with E-9 |
| E-44 | FT - IR | 2 | | | | ○ | |
| E-45 | Ion- Chromatography | 1 | | | | ○ | |
| E-46 | C, H, N, O, S Analyzer | 1 | | | | ○ | |
| E-47 | TGA (Thermal Gravimetric Analyzer) | 1 | | | | ○ | |
| E-48a | Analytical Balances Sensitivity - Five D.P | 8 | | | | ○ | |
| E-48b | Analytical Balance Sensitivity -Four D.P | 10 | | | | ○ | |
| E-49 | Heating- Cooling Circulators | 18 | | | | ○ | |
| E-50 | Centrifuge - Low Speed Bench Top | 10 | | | | ○ | |
| E-51 | Distillator | 3 | | | | ○ | |

| No. | Equipment Name | Q'ty Requested | Evaluation Criteria | | | Final Evaluation | Remarks |
|---|---|---|---|---|---|---|---|
| | | | Priority | Quantity | Operation & Maintenance | | |
| E-52 | Sonicator | 4 | | | | ○ | |
| E-53 | Optical Microscope fitted with Camera | 2 | × | × | | × | Substitute with other microscope (e.g.E-112) for this item |
| E-54 | Liquid Nitrogen Maker | 1 | | | | ○ | |
| E-56 | Dry Ice Maker | 1 | | | | ○ | |
| E-57 | Top Load Balance | 10 | | | | ○ | |
| E-58 | Flow Meter | 2 | × | × | | × | Component of analysis equipment such as Gas Chromatography |
| E-59 | Ambient Air Analyzer | 2 | | | | ○ | |
| E-60a | Water Bathes (Regular Type) | 10 | | | | ○ | |
| E-60b | Water Bathes (Shaking Type) | 2 | | | | ○ | |
| E-61 | Kjeldahl Apparatus | 2 | | | | ○ | |
| E-62 | Gerber Machine with all accessories | 2 | | | | ○ | |
| E-63 | Refractometer | 5 | | | | ○ | |
| E-64 | Polarometer | 5 | | | | ○ | |
| E-65 | Tensiometer | 5 | | | | ○ | |
| E-66 | Digital Bomb Calorimeter | 2 | | | | ○ | |
| E-67 | Laboratory Steam Boiler | 1 | | | | ○ | |
| E-68 | Rising Film Evaporator | 1 | | | | ○ | |
| E-69 | Reverse Osmosis Ultrafiltraion Unit | 2 | | | | ○ | |
| E-76 | Fluid Friction Apparatus | 1 | | | | ○ | |
| E-77 | Tray Drier | 1 | | | | ○ | |
| E-78a | Sonictator, Probe | 2 | | | | ○ | |
| E-78b | Super Critical Fluid Extractor Unit | 1 | | | | ○ | |
| E-79 | Sound Level Meter | 4 | | | | ○ | |
| E-84 | Respiratory System Model | 2 | | | | ○ | |
| E-85 | Digestive System Model | 2 | | | | ○ | |
| E-86 | Circulatory System Model | 2 | | | | ○ | |
| E-87 | Urinary System Model | 2 | | | | ○ | |
| E-88 | Adult CPR Training Manikin | 1 | | | | ○ | |
| E-89 | Child CPR Training Manikin | 1 | | | | ○ | |
| E-90 | Ear Model | 2 | | | | ○ | |
| E-91 | Eye Model | 2 | | × | | × | Duplication with M-14 |
| E-92 | Bunsen Burners | 40 | | | | ○ | |
| E-93 | Biological Safety Cabinet | 10 | | | | ○ | |
| E-95 | Flame Photometer | 2 | | | | ○ | |
| E-96 | Incubators | 5 | | | | ○ | |
| E-97 | Dark Field Microscope | 1 | | | | ○ | |
| E-98 | Rotary Microtome | 3 | | | | ○ | |
| E-99 | Sledge Type Microtome | 3 | | | | ○ | |
| E-100 | Tissue Centrifuge | 1 | | | | ○ | |
| E-101 | Floating Out Bath for Paraffin Sections | 3 | | | | ○ | |
| E-102 | Tissue Processor | 3 | | | | ○ | |
| E-103 | Research microscope plan Apochromat Objectives x2; x10; x25; x100; oil with Fully automatic photo system | 2 | | | | ○ | |
| E-104 | Embedding Center | 2 | | | | ○ | |
| E-105 | Wax Dispenser | 3 | | | | × | Substitute with E-104 |
| E-106 | Fume- Hood | 13 | | | | ○ | |
| E-107 | Slide Cabinet for Slide Storage | 4 | | | | ○ | |
| E-108 | Binocular Microscope for Students Plan : x2; x10; x25; x40; x100; Objectives Eye Pieces x 100, Safty Cabinet | 60 | | | | ○ | |
| E-109 | $CO_2$ Incubator | 2 | | | | ○ | |

| No. | Equipment Name | Q'ty Requested | Evaluation Criteria | | | Final Evaluation | Remarks |
|---|---|---|---|---|---|---|---|
| | | | Priority | Quantity | Operation & Maintenance | | |
| E-110 | Tissue Incubator | 2 | | | | ○ | |
| E-111 | Autoclave | 2 | | | | × | Duplication with E-4 |
| E-112 | Binocular Polarizing Microscope | 1 | | | | ○ | |
| E-113 | Automatic Stainner | 3 | | | | ○ | |
| E-114 | Deep Freezer- Cabinet Type (large) | 3 | | | | ○ | |
| E-115 | Refrigerator (Home Type) | 10 | | | | ○ | |
| E-116 | Safety cabinet | 10 | | | | ○ | |
| E-118 | Teaching Microscope with Television Video Output via Camera - 3CCD ; Plan Apochromat Objectives Plan , x2;x10;x25;x40;x100;wide field x 100 Eyepieces, | 4 | | | | ○ | |
| E-119 | Screen 68 inch | 2 | × | | | × | This item is changed to "monitor" and included E-118 |
| E-120 | Dissecting Microscopes | 30 | | | | ○ | |
| E-121 | pH Meter | 24 | | | | ○ | |
| E-125 | Basic Current Balance | 4 | | | | ○ | Basic science education equipment |
| | Induction by means of variable Magnetic Field | 4 | | | | ○ | is arranged to 7 kinds of experimental equipment sets which included |
| | Optical Pumping | 4 | | | | ○ | E-123 ~ E-260 |
| ~ | Free Fall | 4 | | | | ○ | |
| | One Dimensional Motions R Truck or the Linear Truck | 4 | | | | ○ | |
| | KERR Effect | 4 | | | | ○ | |
| E-260 | Torsion Pendulum | 4 | | | | ○ | |
| E-135 | Magnetic Spectroscopy | 1 | | | | ○ | |
| E-213 | Stop Watch, Interruption Type | 10 | | | | ○ | |
| E-261 | Drug Level Analyzer | 1 | | | | ○ | |
| E-262 | Glass Ware Washer | 4 | | | | ○ | |
| E-263 | Tablet Dissolution Tester | 1 | | | | ○ | |
| E-264 | Tablet Hardness, Thickness Instrument | 1 | | | | ○ | |
| E-265 | Tablet Control System | 1 | | | | ○ | |
| E-267 | Particle Counter | 1 | | | | ○ | |
| E-268 | Nitric Oxide Detector | 1 | | | | ○ | |
| E-269 | Jacket Organ Bath | 5 | | | | ○ | |
| E-270 | Dual Impedance Research Stimulator Set | 2 | | × | | × | Substitute with E-314 |
| E-271 | Animal Operating Set | 4 | | | | ○ | |
| E-272 | Neuro physiological operating table | 2 | | × | | × | Substitute with E-271 |
| E-273 | Animal portable anesthesia box | 2 | | × | | × | This item is component of E-271 |
| E-274 | Rat Holder | 2 | | | | ○ | |
| E-275 | Cat Holder | 2 | | | | ○ | |
| E-276 | Kymograph with Stimulator Set | 2 | | | | ○ | |
| E-277 | I.C.P. -MS | 1 | | | | ○ | |
| E-278 | High Speed Centrifuge | 5 | | | | ○ | |
| E-279 | Rotors SS34 | 5 | | | | ○ | |
| E-280 | GSA | 5 | | | | ○ | |
| E-281 | Gamma Counter | 1 | | | | ○ | |
| E-282 | Melting Point Apparatus | 2 | | | | ○ | |
| E-287 | Ovens | 8 | | | | ○ | |
| E-288 | Orbital Shaker | 4 | | | | ○ | |
| E-289 | Cell Washer Centrifuge | 1 | | | × | × | No person in-charge of this item |
| E-290 | Micro Centrifuge | 8 | | | | ○ | |
| E-291 | Blood Gas Analyzer | 1 | | | | ○ | |
| E-292 | Tissue Homogmizer | 3 | | | | ○ | |
| E-293 | Calorimeter | 2 | | | | ○ | |

| No. | Equipment Name | Q'ty Requested | Evaluation Criteria | | | Final Evaluation | Remarks |
|---|---|---|---|---|---|---|---|
| | | | Priority | Quantity | Operation & Maintenance | | |
| E-294 | Evaporators | 4 | | | | ○ | |
| E-295 | Conductivity Meter | 4 | | | | ○ | |
| E-296 | Multi- Teaching Microscopes | 4 | | | | ○ | |
| E-297 | Slide Warmer | 2 | | | | ○ | |
| E-298 | Staining set | 10 | | | | ○ | |
| E-299 | X-Ray film Illuminator | 2 | | | | ○ | |
| E-302 | Cellulose Acetate Electrophoresis Apps | 3 | | × | | × | Duplication with E-368 |
| E-303 | Multi Channel Recorder Electrocardiograph | 4 | | | | ○ | |
| E-304 | Audiometer | 2 | | × | | × | Include E-79 |
| E-305 | Resuscitation Unit | 2 | | | | ○ | |
| E-307 | Kymograph with Basic Stimulator Set | 1 | | | | ○ | |
| E-308 | Hemodynamic Measuring System | 1 | | | | ○ | |
| E-310 | Inverted Microscope | 2 | | | | ○ | |
| E-311 | Micro Manipulators | 2 | | | | ○ | |
| E-313 | Axopatch Amplifiers | 3 | | | | ○ | |
| E-314 | Electrical Stimulator Set | 3 | | | | ○ | |
| E-315 | Oscilloscopes | 3 | | | | ○ | |
| E-318 | Tissue Slicer (chopper) | 2 | | | | ○ | |
| E-319 | Work Station PC based with digitizer and plotting device | 1 | × | | | × | This item is not correlation with curriculum |
| E-321 | Hematocrit centrifuge | 7 | | | | ○ | |
| E-323 | Spirometer Set | 6 | | | | ○ | |
| E-324 | Cylinder Sets with Outlets & Regulators | 4 | | | | ○ | |
| E-325 | Cycle Ergometer | 6 | | | | ○ | |
| E-326 | Gas (volume) Meter | 2 | | | | ○ | |
| E-327 | $CO_2$ Meter | 2 | | | | ○ | |
| E-328 | $O_2$ Meter | 2 | | | | ○ | |
| E-330 | Douglas Bags | 10 | | | | ○ | |
| E-331 | Flexible Tubes | 20 | | | | ○ | |
| E-332 | Stop Watch | 10 | | × | | × | Duplication with E-213 |
| E-333 | Sphygmomanometers | 40 | | | | ○ | |
| E-334 | Weighning Scale | 5 | | | | ○ | |
| E-335 | Tread Mill | 1 | | | | ○ | |
| E-336 | Recorder Multichannel | 2 | | | | ○ | |
| E-341 | Refrigerated Table Top Certifuge | 10 | | | | ○ | |
| E-342 | Pulsed Field Gel Electrophoresis System | 2 | | | | ○ | |
| E-343 | Washing Machine (Large) | 1 | | | | ○ | |
| E-344 | Distillation Unit (Large) | 1 | | | | ○ | |
| E-345 | PCR Thermal Cycler | 3 | | | | ○ | |
| E-346 | Glassware for Microbiology Laboratory | 5 | | × | | × | Included Glass Ware Set (E-314 ") |
| E-347 | Laminar Flow Hoods | 4 | | | | ○ | |
| E-348 | Fluorescent Microscope | 3 | | | | ○ | |
| E-349 | Upright Freezer | 6 | | | | ○ | |
| E-350 | Eliza Readers | 4 | | | | ○ | |
| E-351 | Chemistry Analyzer | 2 | | | | ○ | |
| E-352 | Blood Cell Counter: automated | 3 | | | | ○ | |
| E-353 | Mechanical Stirrer | 20 | | | | ○ | |
| E-354 | Sealer | 2 | | | | ○ | |
| E-355 | Double Jacketed Open Kettles with electrical heater | 10 | | | | ○ | |

| No. | Equipment Name | Q'ty Requested | Evaluation Criteria | | | Final Evaluation | Remarks |
|---|---|---|---|---|---|---|---|
| | | | Priority | Quantity | Operation & Maintenance | | |
| E-356 | Titrator | 2 | | | | ○ | |
| E-357 | Lovibond Tintometer | 1 | | | | ○ | |
| E-358 | Hydrogenation autoclave | 1 | | | | ○ | |
| E-359 | Gel Documentation Reader | 2 | | | | ○ | |
| E-360 | Chemostat | 2 | | | × | × | No person in-charge of this item |
| E-361 | Counter: Manual White Blood Cell Differential | 20 | | | | ○ | |
| E-362 | Cryogeaic Tanks/Incubators | 2 | | | | ○ | |
| E-363 | Culturing Millipore System | 1 | | | | ○ | |
| E-364 | Cupboards for Microscopes | 10 | | × | | × | Included E-108, E-120 |
| E-365 | Cuvette Waster | 2 | | | | ○ | |
| E-366 | Densitometer: for gel | 2 | | | | ○ | |
| E-367 | Dispensers | 1 | | | | ○ | |
| E-368 | Electrophoresis | 3 | | | | ○ | |
| E-369 | Evaporator: Rotating | 2 | | × | | × | Duplication with E-294 |
| E-370 | Evaporator: Using Nitrogen Gas | 1 | | | | ○ | |
| E-371 | Fibrometer | 1 | | | | ○ | |
| E-373 | Gel Dryer | 4 | | × | | × | Included with E-368 |
| E-374 | Glass Head Cell Homogenizer | 2 | | | | ○ | |
| E-375 | Hematocytometer Set | 20 | | | | ○ | |
| E-376 | Hetovac Centrifuge | 3 | | | | ○ | |
| E-377 | Hot Plate with magnetic stirrer | 32 | | | | ○ | |
| E-378 | Immunoblotter | 1 | | | | ○ | |
| E-379 | Incubator: Shaking | 2 | | | | ○ | |
| E-381 | Microscope: Interphased with TV screen with phase contrast adapter, double head | 2 | | | | ○ | |
| E-382 | Mixer: Blood Tube | 5 | | | | ○ | |
| E-383 | Nephlometer | 2 | | | | ○ | |
| E-384 | Opaque Viewer | 4 | | | × | × | No person in-charge of this item |
| E-385 | Osmometer: Freezing Point | 2 | | | | ○ | |
| E-386 | Osmometer: Vapor Pressure Point | 2 | | | | ○ | |
| E-387 | Phospholipid Analyzer | 1 | | | | ○ | |
| E-388 | Pipette Cleaning System | 8 | | | | ○ | |
| E-389 ~ E-390 | Pipettes Set | 50 | | | | ○ | |
| E-391 | Plasma Extractor | 2 | | | | ○ | |
| E-393 | Power Compensation System | 1 | | | | ○ | |
| E-395 | Safety Cabinet: for Mycology | 1 | | | | ○ | |
| E-396 | Selective Ion Electrodes: $Na^+$, $K^+$, $NH_4$, $NO_3$, $CO_2$, CO | 12 | | | | ○ | |
| E-397 | Serofuge | 2 | | | | ○ | |
| E-398 | Shaker: Slide Shaker with Semicircular Motion | 6 | | | | ○ | |
| E-399 | Slide Shaker | 2 | | | | ○ | |
| E-400 | Slide Stainer: Automated | 2 | | × | | × | Duplication with E-113 |
| E-402 | Stomacher | 3 | | | × | × | No person in-charge of this item |
| E-403 ~ E-404 | Thermometer | 20 | | | | ○ | |
| E-405 | TLC system | 5 | | | | ○ | |
| E-406 | Trays: Staining | 8 | | | | ○ | |
| E-407 | Conical Glass Tubes | 200 | | | | ○ | |
| E-408 | Urinometer | 15 | | | | ○ | |
| E-409 | UV Transilluminator | 4 | | | | ○ | |
| E-410 | Vacuum Pumps | 8 | | | | ○ | |
| E-411 | Test Tube Mixer | 12 | | | | ○ | |

| No. | Equipment Name | Q'ty Requested | Evaluation Criteria | | | Final Evaluation | Remarks |
|---|---|---|---|---|---|---|---|
| | | | Priority | Quantity | Operation & Maintenance | | |
| E-414 ~ E-450 | Glass Ware Set | 1 lot | | | | ○ | |

## TEACHING MATERIALS

| No. | Equipment Name | Q'ty Requested | Evaluation Criteria | | | Final Evaluation | Remarks |
|---|---|---|---|---|---|---|---|
| | | | Priority | Quantity | Operation & Maintenance | | |
| T-1 | Slide Set for Microbiology | 20 | | | | ○ | |
| T-2 | Slide Set for Normal Histology | 20 | | | | ○ | |
| T-3 | Color Slide(Transparancy) Set for Medical Microbiology | 20 | | | | × | No existing equipment in market |

## ANATOMIC MODELS

| No. | Equipment Name | Q'ty Requested | Evaluation Criteria | | | Final Evaluation | Remarks |
|---|---|---|---|---|---|---|---|
| | | | Priority | Quantity | Operation & Maintenance | | |
| M-1 | Thoracic Spinal Column | 1 | | | | ○ | |
| M-2 | Lumber Spinal Column | Requested | | | | ○ | |
| M-3 | 6 Vertebrae | 1 | | | | ○ | |
| M-4 | Arm Skelton | 1 | | | | ○ | |
| M-5 | Leg Skeleton | 1 | | | | ○ | |
| M-6 | Advanced Medical Turso (28 part) | 2 | | | | ○ | |
| M-7 | Super Muscle Torso | 1 | | | | ○ | |
| M-8 | Dise Torso-15 Tlices | 1 | | | | ○ | |
| M-9 | Median+Fomtal Section of Head | 1 | | | | ○ | |
| M-10 | Relief Models | 1 | | | | ○ | |
| M-11 | Larynx | 1 | | | | ○ | |
| M-12 | Advanced Left Ear (6 parts) | 1 | | | | ○ | |
| M-13 | Eye in Orbit 4 Times Full Size | 1 | | | | ○ | |
| M-14 | Skin section 200X | 1 | | | | ○ | |
| M-15 | Relief Model | 1 | | | | ○ | |
| M-16 | Brain - 4 - part | 2 | | | | ○ | |
| M-17 | Brain - 2 - part | 2 | | | | × | Substitute with M-18 |
| M-18 | Brain with Arteries 10 Arts with Base of Head | 1 | | | | ○ | |
| M-19 | 10 Part with Base of Head | 1 | | | | × | Substitute with M-18 |
| M-20 | Spinal Cord, 6 Times Full Size | 1 | | | | ○ | |
| M-21 | De-Luxe Heart-7 part | 2 | | | | ○ | |
| M-22 | Basic Heart - 1 part | 2 | | | | ○ | |
| M-23 | Heart - 4 part | 3 | | × | | × | Substitute with M-21 |
| M-24 | Heart with Oesophagus Aorta .& Windpipe | 2 | | | | ○ | |
| M-25 | Heart with Thymus - 3 part | 1 | | | | ○ | |
| M-26 | Lung -5 parts | 2 | | | | ○ | |
| M-27 | Digistive System-3 parts | 2 | | | | ○ | |
| M-28 | Stomach with Duodenum + | 2 | | | | ○ | |
| M-29 | Pancreas - 3 part | 2 | | | | ○ | |
| M-30 | Intel Prgans -2 parts | 1 | | | | ○ | |
| M-31 | Liver with Gall Bladder | 2 | | | | ○ | |
| M-32 | Kidney with Adrenal Gland - 2 part | 1 | | | | ○ | |
| M-33 | Kidney section - Basic version | 1 | | | | ○ | |
| M-34 | Liver with Gall Blander Pancreas and Duodenum | 2 | | | | ○ | |
| M-35 | Pancreas and Duodenum | 2 | | × | | × | Substitute with M-34 |
| M-36 | Kidney Nephrons Blood Vessels | 2 | | | | ○ | |
| M-37 | Renal Corpuscle | 1 | | × | | × | Substitute with M-38 |
| M-38 | Complete Urinary System Dual Sex 6 parts | 2 | | | | ○ | |
| M-39 | Dual Sex- 6 part | 1 | | × | | × | Substitute with M-40, M-41 |
| M-40 | Female Pelvis-2 parts | 2 | | | | ○ | |
| M-41 | Male Pelvis-2 parts | 2 | | | | ○ | |
| M-44 | Embryonic Development(12 stages) | 1 | | | | ○ | |
| M-45 | S/J. STR | 1 | | | | ○ | |
| M-46 | Pregnancy Series- 8 medels | 1 | | | | ○ | |
| SCISORS | | | | | | | |
| M-47 | Dressing Scissors | 2 | | | | ○ | |
| M-48 | Sharp -str. 14cm | 2 | | | | ○ | |
| M-49 | Sharp -str. 18cm | 2 | | | | ○ | |
| M-50 | Mayo Scissors-Chamfered blades | 1 | | | | ○ | |
| M-51 | Mayo Scissors Flat blades Str. | 2 | | | | ○ | |
| M-52 | Metzenbaum Scissors Str. | 2 | | | | ○ | |
| M-53 | Iris Scissors Sharp Cof Heavy weight | 1 | | | | ○ | |
| FORCEPS | | | | | | | |
| M-54 | Dissecting Forceps Block End | 2 | | | | ○ | |
| M-55 | Dissecting Forceps Fine Points Teethed 1x2 | 1 | | | | ○ | |
| M-56 | Dissecting Forceps. 2x3 Teeth | 1 | | | | ○ | |
| M-57 | Bonney Dissecting Forceps.1x2 Teeth | 2 | | | | ○ | |
| M-58 | Treves dissecting Forceps.1x2 Teeth | 1 | | | | ○ | |

| No. | Equipment Name | Q'ty Requested | Evaluation Criteria | | | Final Evaluation | Remarks |
|---|---|---|---|---|---|---|---|
| | | | Priority | Quantity | Operation & Maintenance | | |
| M-59 | Fixation dissecting Forceps.1x2 Teeth | 1 | | | | O | |
| ARTERY FORCEPS | | | | | | | |
| M-60 | Kilner Artery Forceps | 2 | | | | O | |
| M-61 | Sefrated B/J Cof | 2 | | | | O | |
| M-62 | Spencer Wells Aftery Forceps S/J. Serrated, S/J. STR | 2 | | | | O | |
| M-64 | Listersinus Forceps B/J. Sarrated | 1 | | | | O | |
| NEEDLE HOLDERS | | | | | | | |
| M-65 | Higgs Needle Holders Cross Serrated Jaws B/J | 1 | | | | O | |
| M-67 | Kilner Needle Holder Cross Serrated Jaws B/J | 1 | | | | O | |
| RETRACTOR | | | | | | | |
| M-68 | West Retractor Self Retaining 3 x 4 Teeth Blunt Points | 1 | | | | O | |
| M-69 | Liston amputation Knife | 1 | | | | O | |
| M-70 | B.P.Standard Scalpel Handle No.3 | 3 | | | | O | |
| M-71 | B.P. Standard Scalpel Handle No.4 | 3 | | | | O | |
| BLADES, ETC | | | | | | | |
| M-72 | Blades 6 | 2 | × | | | × | Discontinue of manufacturing |
| M-73 | Blades 10 | 2 | | | | O | |
| M-74 | Blades 15 | 3 | | | | O | |
| M-75 | Blades 20 | 2 | | | | O | |
| M-76 | Blades 21 | 2 | | | | O | |
| M-77 | Blades 23 | 2 | | | | O | |
| M-78 | Blades 24 | 2 | | | | O | |
| M-79 | Silver Probe with eye. | 1 | | | | O | |
| M-80 | Macdonald Dissector Double Ended | 1 | | | | O | |
| M-81 | Syme Dissector double ended blunt/Sharp. | 2 | | | | O | |
| M-82 | Aneurysm Needle Small | 1 | | | | O | |
| M-83 | Syme Aneurysm needle | 1 | | | | O | |
| M-84 | Iris Dissecting Forceps, 1x2 Teeth,STR | 1 | | | | O | |
| M-85 | Walsgrave Tubing Clamps Box Joint. Heavy Pattern | 2 | | | | O | |
| M-86 | Giertz RIB Shears | 1 | | | | O | |
| M-87 | Thudicum Nasal Speculum, Size 1 | 1 | | | | O | |
| M-88 | Laryngel Mirror Handles | 1 | | | | O | |
| M-89 | Laryngeal Mirror without Handle | 3 | | | | O | |
| M-90 | Head Mirror, Fibre Forehead Band | 1 | | | | O | |
| M-91 | Paton Bone Cutting Forceps. | 1 | | | | O | |
| M-92 | Toothed Bone Rongeur. | 1 | | | | O | |
| M-93 | Satterlee Amputation Saw | 1 | | | | O | |
| M-94 | Bristow Periosteal Elevator | 1 | | | | O | |
| M-95 | Mallet, Stainless steel | 1 | | | | O | |
| M-96 | Engel Saw | 1 | | | | O | |
| M-97 | Farabeuf Rugine, Chisel Edge Straight End. | 1 | | | | O | |
| M-98 | Pennybacker Probe Dissector, Double Ended. | 1 | | | | O | |
| M-99 | Mcindoe Scissors. | 1 | | | | O | |
| M-100 | Kilner Scissors | 1 | | | | O | |
| M-101 | Gillies Dissecting Forceps, 1x2 | 1 | | | | O | |
| M-102 | Sprague Bowles Stereoscope | 2 | | | | O | |
| M-103 | National Hospital Percussion Hamer | 2 | | | | O | |
| M-104 | Medical Saw (Rotary) | 1 | | | | O | |
| M-105 | Medical Jig Saw | 1 | | | | O | |

## PHYSIOLOGY TEACHING AND RESEARCH

| No. | Equipment Name | Q'ty Requested | Evaluation Criteria | | | Final Evaluation | Remarks |
|---|---|---|---|---|---|---|---|
| | | | Priority | Quantity | Operation & Maintenance | | |
| K-1 | Triple Beam Balance with Animal Box. | 2 | × | | | × | |
| K-2 | Pulmometer | 6 | | | | ○ | |
| K-3 | Reaction Timer | 6 | | | | ○ | |
| K-4 | Unidirectional Valve | 6 | × | | | × | |
| K-5 | Operating Light | 1 | × | | | × | |
| K-6 | Spiro Analyzer | 1 | × | | | × | |
| K-7 | pH/blood Gas Analyzer | 1 | × | × | | × | |
| K-8 | Rapid freezing Biopsy Drill Sampler | 1 | × | | | × | |
| K-9 | Small Animal Decapitator | 1 | × | | | × | |
| K-10 | Small Animal Clipper Set (Shaving Machine) | 2 | × | | | × | |
| K-11 | Stellar Rat Stereotaxic Enstrument | 1 | × | | | × | |
| K-12 | High Speed Micromotor Drill with all bits and foot pedal | 1 | × | | | × | |
| K-13 | Therm adapter temperature controller | 4 | × | | | × | |
| K-14 | Heating Pads (2 small size, 2 large size) | 4 | × | | | × | |
| K-15 | Micro Perfusion Pump (injection of small volumes to the brain) | 1 | × | | | × | |
| K-16 | Water Circulating Pump with Temp. Regulator | 1 | × | × | | × | |
| K-17 | Fraction Collector with Racks | 2 | × | | | × | |
| K-18 | Manifold vacuum filtration , with vacuum pump | 1 | × | | | × | |
| K-19 | Micro - superfusion with temp. regulator | 1 | × | | | × | |
| K-20 | Vibratome with Nitrogen Liquid Cylinders | 1 | × | | | × | |
| K-21 | Scintillation Vials(glass 20ml with covers) | 5 | × | | | × | |
| K-22 | Scintillation vials (Plastic 5ml with covers) | 5 | × | | | × | |
| K-23 | Rodent Electro Surgical Cautery Unit (small vessel cauterizer) | 2 | × | | | × | |
| K-24 | Rats Ventilator | 2 | | | | ○ | |
| K-25 | Fiber Optic Illuminator system(2 arms) | 2 | × | | | × | |
| K-26 | Tissue Slice Recording Chamber | 2 | × | | | × | |
| COMPLETE DISSECTING SET FOR MEDICAL STUDENTS | | | | | | | |
| K-27 | Stainless Steel Instrument Case | 15 | | | | ○ | |
| K-28 | Gross Anatomy Probe | 15 | | | | ○ | |
| K-29 | Bull Dog Clamps (slight curve) | 30 | | | | ○ | |
| K-30 | Afm Retractor | 15 | | | | ○ | |
| K-31 | Fine Iris Scissors | 15 | | | | ○ | |
| K-32 | Standard Surgical Scissors | 15 | | | | ○ | |
| K-33 | Scissors | 15 | | | | ○ | |
| K-34 | Hemostatic Forceps, cur. 14cm | 15 | | | | ○ | |
| K-35 | Hemostatic Forceps, str. 14cm | 15 | | | | ○ | |
| K-36 | Michel Suture Applicator | 15 | | | | ○ | |
| K-37 | Michel Suture Clips | 5 | | | | ○ | |
| K-38 | Spatura | 15 | | | | ○ | |
| K-39 | Scalpel Handles 3 Sold | 15 | | | | ○ | |
| K-40 | Scalpel Handles 4 Sold | 15 | | | | ○ | |
| K-41 | Blades for Scalpel for 3 Solid | 5 | | | | ○ | |
| K-42 | Blades for Scalpel for 4 Solid | 5 | | | | ○ | |
| K-43 | Narrow Pattern Dressing Forceps, 12cm str. | 15 | | | | ○ | |
| K-44 | Narrow Pattern Dressing Forceps, 16cm str. | 15 | | | | ○ | |
| K-45 | Narrow Pattern Dressing Forceps, 12cm cur. | 15 | | | | ○ | |
| K-46 | Narrow Pattern Dressing Forceps, 16cm cur. | 15 | | | | ○ | |

| No. | Equipment Name | Q'ty Requested | Evaluation Criteria | | | Final Evaluation | Remarks |
|---|---|---|---|---|---|---|---|
| | | | Priority | Quantity | Operation & Maintenance | | |
| ELECTROPHYSIOLOGY LAB. | | | | | | | |
| K-47 | Piezo- Injector and Controller | 1 | × | | | × | |
| K-48 | Microscope Tissue Chamber with Temp. Controller | 1 | | | | ○ | |
| K-49 | Precision Stereo Zoom Microscope & Optional Boom Stand | 1 | | | | ○ | |
| K-50 | Stimulator (for constant current stimulation 50-1000 $\mu$ A) | 1 | × | | | × | |
| K-51 | Stimulus Isolation Units | 2 | × | | | × | |
| K-52 | Constant Current Pulse Generators | 1 | × | | | × | |
| K-53 | EEG (Polygraph) Experiments with Rats | 1 | × | | | × | |
| K-54 | High Performance Physiograph with Different Transducers for Measuring ECG,EEG,EMG,BR,HR | 1 | | | | ○ | |
| K-55 | Nano- Liter Injector, Stepper Motorized | 1 | × | | | × | |
| K-56 | Dual Microprobe System, (2 channels Intracellular and Extracellular Amplifier) | 2 | × | | | × | |
| K-57 | Magnetic Stand with Adjustable Mounting Bar | 4 | × | | | × | |
| K-58 | Magnetic Stand with adjustable articulated arm | 4 | × | | | × | |
| K-59 | Plus Master, Multi-Channel Stimulator | 1 | × | | | × | |
| K-60 | Isostim Stimulator/Isolator | 1 | × | | | × | |
| K-61 | Pneumatic Pump | 1 | × | | | × | |
| K-62 | Micropipette Beveler for Sub Micron Tips | 1 | × | | | × | |
| K-63 | Photon Counting Microspectrofluori-metric Systems with accessories needed for $Ca^{++}$ Counting | 1 | × | × | | × | Common use with other department |
| K-64 | Micropipette Puller | 1 | × | | | × | |
| K-65 | Vibration isolation Table with 2 air cylinders and isolation Cage | 1 | × | | | × | |
| K-66 | Fluovac Isoflurance/Halothane Scavenger | 1 | × | | | × | |
| K-67 | Digitimer (recording and analyzing of Data) | 1 | × | | | × | |
| K-68 | Cerebral Function Monitor (complete with Header Amplifier and Needle Electrodes) | 1 | × | | | × | |
| SYSTEMATIC PHYSIOLOGY LAB. | | | | | | | |
| K-69 | Microwave Fixation System | 1 | × | | | × | |
| K-70 | Lab-Animal Exercis Set | 1 | | | | ○ | |
| K-71 | Computerized Animal Activity Monitor (with horizontal and vertical activity sensor and for 4-8 animals) | 1 | × | | | × | |
| K-72 | Convulsion Meter (4 rats) with Printer | 1 | × | | | × | |
| K-73 | Animal Tremor Monitor (for 8 rats) with Monitor Scopes, Animal Cages and Printer | 1 | × | | | × | |
| K-74 | Apparatus for Studying Rotational Behavior of Rats, (4rats) with Harnes for Rats, and Printer | 1 | × | | | × | |
| K-75 | Cardiac Output Measurements in Rats with Accessories | 1 | × | | | × | |
| K-76 | Isolated Organ Baths | 1 | | | | ○ | |
| ANMIMAL NEUROTRANSMITTERS | | | | | | | |
| K-77 | HPLC Complete Set with all the accessories Fluorescence Detector for HPLC(for amino acid analysis) | 1 | | × | | × | Common use with other department |

| No. | Equipment Name | Q'ty Requested | Evaluation Criteria | | | Final Evaluation | Remarks |
|---|---|---|---|---|---|---|---|
| | | | Priority | Quantity | Operation & Maintenance | | |
| ANIMAL UNIT | | | | | | | |
| K-78 | Animal Cages Set | 30 | | | | ○ | |
| K-79 | Animal Cages, Small size with all the accessories | 30 | × | | | × | |
| K-80 | Metabolic Cages with Special Stands | 12 | × | | | × | |
| K-81 | Racks for Solid Bottom Cages (Small Size) | 2 | × | | | × | |
| K-82 | Racks for Solid Bottom Cases (Large Size) | 2 | × | | | × | |
| K-83 | Shelf Style Racks | 2 | × | | | × | |
| K-84 | Plastic Guinea Pig Cage Rack with 5 special cages and accessories | 1 | × | | | × | |
| K-85 | Cabinet Washer (190 x 95 x 165) One door | 1 | × | | | × | |
| K-86 | Bottle Washer | 1 | × | | | × | |
| K-87 | Spring loaded Pop Up Cage Dispenser | 1 | × | | | × | |
| K-88 | Ventilated Bench | 1 | × | | | × | |
| K-89 | Filter Cabinet (114 cm high) | 1 | × | | | × | |
| K-90 | Contamination Control Unit | 1 | × | | | × | |
| K-91 | Work Station | 1 | × | | | × | |
| K-92 | Air Conditioner with strong ventilation system | 1 | | | | ○ | |

## 2-3 Basic Design

### 2-3-1 Design Concept

(1) Basic Structure

The College of Medicine, Al-Quds University has been newly established and unable to conduct practical medical education due to the lack of training and laboratory equipment. Therefore in order to resolve these issues, this Project is basically concerned with providing training and laboratory equipment that will enable practical medical education needed to foster physicians to be conducted by the said college. Specifically, the equipment will mainly consist of basic science equipment for the first and second year curriculums (pre-medical), and basic medical equipment for the third and fourth year curriculums (pre-clinical).

(2) Design Policy

The design policy pertaining to specific equipment is explained below.

1) Policy on Equipment Scope, Grade, and Quantity

a. Rationalization

Learning efficiency is the first priority factor in determining the quantity of equipment which will be provided by the Project and equipment such as the large refrigerator and ice maker that will be shared between departments and floors. In addition, a shared laboratory will be created for analysis equipment, etc. which can be commonly used by each course and only the required minimum quantity will be provided.

Moreover, the quantity of equipment whose use can be substituted by other laboratory equipment will be rationalized.

Consumables and equipment specifications will be coordinated in order to reduce the cost of spare parts; and the same type of equipment with the same specifications will be selected whenever possible.

An example of the common use of equipment between different courses is shown below.

**Table 5 Example of Common Use Equipment**

| Distillator | Common use among all department | | |
|---|---|---|---|
| Large Refrigerator, Ice Maker | Common use among Biochemistry, Pharmacology and Physiology | Common use among Histology (Pathology), Haematology, Microbiology, Immunology and Forensic Medicine | Common use among Physics, Chemistry and Biology |
| HPLC | Common use among **Chromatography**, Biology and Chemistry | Common use among **Forensic Medicine**, Microbiology / Immunology, Histology (Pathology) and Anatomy | Common use between **Pharmacology**, Biochemistry and Physiology |

Remarks : Equipment installed laboratories are underlined.

b. Establishing the Quantity

The number of students for one academic year is estimated at 60 students by the College of Medicine. In view of the number of students which can be accommodated in one lecture and the capacity of the laboratory in the new building, the optimum method is to divide the experiment and training sessions into two shifts. Therefore, 30 students in one laboratory is judged to be the most appropriate (30 students per class, with one (1) lecturer and two (2) to three (3) assistants ) in determining the quantity of equipment needed.

The criteria for determining the quantity of equipment is the effective and common use of equipment by placing students in groups during training and laboratory courses. Examples of how the equipment may be used in a lecture course have been provided below in cases A through G.

A: One unit of equipment is used in an experiment/training session in one classroom or used in a demonstration by a lecturer (manikin, electricphoresis, etc.)

One unit per classroom

B: For separate training sessions for male and female students (electrocardiograph, etc.) or in sessions where the equipment is used comparatively frequently by the entire class (analytical balance, etc.)

Two units per classroom

C: One unit of equipment which is used by groups of eight students in an experiment/training session (slide specimen microscope, etc.)

Four units per classroom

D: Two units of equipment which are used on the experiment table by groups of four students in experiment/training sessions (hemetocytomeeter, etc.)

Eight units per classroom

E: Equipment which is used jointly by groups of two students (e.g. to gain proficiency in using the microscope)

15 units per classroom

F: Equipment which can be shared between floors and courses (distillator, etc.)

One unit per floor

The specifications of equipment for the basic science curriculum which is needed in the structural system to implement one experiment or training session will be reviewed and the relevant equipment will be viewed as one general set (e.g. free fall, etc.).

It is essential that one computer per student is provided in view of the training course content. The number of computers that will be provided by the Project will be 30 units based on an estimation of 30 students per class.

one unit per one student : G

c. Determining Equipment Content

The equipment plan of this Project aims to provide equipment that will coordinate with each course within the curriculum provided by the College of Medicine, as well as to provide equipment that is

needed in training, laboratory, and lecture courses. The equipment will fundamentally consist of basic science equipment (biology, chemistry, physics, computer science) for the first and second year curriculum, basic medical equipment (pharmacology, anatomy, physiology, pathology, microbiology, immunology, haematology, forensic medicine, biochemistry, molecular biology) for the third and fourth year curriculums, and audio-visual equipment for lectures. The aim is to enable students to effectively participate in the fifth-year hospital training program by contributing to a good preliminary training curriculum during their first four years.

In addition, high grade equipment that is difficult to operate or which require high technical maintenance service will be omitted in view of the fact that the end-users of the equipment are students. Equipment that is relatively structurally simple, easy-to-operate, quickly repaired in the event of an operational error, and which do not incur high repair costs will be selected. The installation site of the equipment must be clearly defined and the personnel-in-charge of its maintenance must be designated. Furthermore, duplication with existing equipment will be avoided.

The curriculums of the College of Medicine are given in Table 6 on the following page.

The overall educational curriculum is largely divided between training and lecture courses. In particular, the lecture courses consist of organic chemistry, mathematics, English for the first year and public health, epidemiology, statistics, sociology, and psychology for the second year. The third and fourth year curriculums consist entirely of training courses and the hospital training program is the major curriculum for the fifth year and above. The specific curriculum content of training and laboratory courses given in the first to fourth years which are targeted by this Project and all the courses offered by the College of Medicine are shown in Table 6.

# Table 6 Curriculum of the College of Medicine

## 1. All the Courses Curriculum

| Grade | Subject | Unit | Note |
|---|---|---|---|
| 1 | Biology | 8 | Experiment |
| (41) | Chemistry | 8 | Experiment |
| | Organic Chemistry | 5 | Lecture |
| | Physics I | 8 | Experiment |
| | Mathematics | 6 | Lecture |
| | English for Science | 6 | Lecture |
| 2 | Biochemistry | 7 | Experiment |
| (39) | ·Human Biochemistry I | | Experiment |
| | ·Molecular Cell Biology I | | Experiment |
| | ·Endocrinology | | Experiment |
| | Phisical Chemistry | 3 | Experiment |
| | Physics II | 3 | Experiment |
| | Computer | 6 | Experiment |
| | Public Health | 3 | Lecture |
| | Epidemiology | 2 | Lecture |
| | Genetics | 3 | Lecture |
| | Statistics | 3 | Lecture |
| | Sociology | 3 | Lecture |
| | Psychology | 3 | Lecture |
| | Molecular Cell Biology II | 3 | Experiment |
| 3~4 | Anatomy | 18 | Experiment |
| (36) | ·Forensic Medicine I | | Experiment |
| | Physiology | 14 | Experiment |
| | Human Biochemistry II | 8 | Experiment |
| | Pathology | 12 | Experiment |
| | ·Histopathology | | Experiment |
| | ·Haematology | | Experiment |
| | ·Chemical Pathology | | Experiment |
| | ·Clinical Immunology | | Experiment |
| | Microbiology | 10 | Experiment |
| | Pharmacology | 8 | Experiment |
| 5 | Medicine (Junior) | 18 | Hospital Training |
| (44) | Surgery (Junior) | 18 | Hospital Training |
| | Clinical Pathology | 2 | Hospital Training |
| | Clinical Pharmacology | 2 | Hospital Training |
| | Parasitology | 1 | Hospital Training |
| | Occupational Medicine | 1 | Hospital Training |
| | Medical Genetics | 1 | Hospital Training |
| | Psychology / Medical Sociology | 1 | Hospital Training |
| 6 | Pediatrics (Junior) | 8 | Hospital Training |
| (46) | Obstetrics / Gynecology (Junior) | 8 | Hospital Training |
| | Ophthalmology | 2 | Hospital Training |
| | Ear.Nose.Throat (Otorhinolaryngology) | 2 | Hospital Training |
| | Dermatology | 2 | Hospital Training |
| | Orthopedics | 3 | Hospital Training |
| | Neurology | 2 | Hospital Training |
| | Neurosurgery | 2 | Hospital Training |
| | Urology | 2 | Hospital Training |
| | Cardiothoracic Surgery | 2 | Hospital Training |
| | Rehabilitation | 1 | Hospital Training |
| | Community Medicine | 3 | Hospital Training |
| | Epidemiology | 3 | Hospital Training |
| | Forensic Medicine II | 2 | Hospital Training |
| | Elective Training | 3 | Hospital Training |
| | Medical Ethics | 1 | Hospital Training |
| 7 | Medicine (Senior) | 12 | Hospital Training |
| (46) | Surgery (Senior) | 12 | Hospital Training |
| | Pediatrics (Senior) | 8 | Hospital Training |
| | Obstetrics / Gynecology (Senior) | 8 | Hospital Training |
| | Psychiatry | 4 | Hospital Training |
| | Medical Statistics | 2 | Hospital Training |
| Total Unit | | 286 | |

Note : Lecture - Lecture takes a leading part.
Experiment - Practice and experiment are compulsory.
Hospital Training - Practice in the hospital is compulsory.

## 2. Curriculum of Courses Targeted by the Project

| No. Subject | I. Biology | II. Chemistry | III. Physics I · II |
|---|---|---|---|
| Grade | 1 | 1 | 1 · 2 |
| Aim | Study of structure and function from DNA level to individual living creature. | Study of basic technique of measurement by statistical analysis | Confirmation and understanding of motion theory by measurement |
| Outline | Organism and individual | Structure and state of materials | Physics and measurement |
| | Variety and structure of cell | Chemical reaction | Characteristic of liquid and circumstance of solid matter |
| | Tissue and organs | Characteristic of materials | Ion statement |
| | Cell and DNA | | Alternative electricity |
| | | | Frequency |
| | | | Action and reaction |
| Contents 1 | Grouping of animal and plant | Identification of ions of silver, lead and mercury | Density, force and acceleration |
| 2 | Classification of animal cell and Plant cell | Identification of iron of aluminium and zinc | Buoyancy and Archimedes' Principle |
| 3 | Function of organs | Identification of alkaline earth and alkali-metal ions | Viscosity |
| 4 | Transmission of substance | Qualitative analysis of some common anions | Ohm's Law |
| 5 | Nucleus and DNA | Qualitative analysis of unknown | Resistance in series and in parallel |
| 6 | DNA and heredity | The enthalpy of combustion of vegetable oil | RC circuit oscilloscope |
| 7 | | The enthalpy changes in chemical reaction: Hess' Law | RLC series |
| 8 | | Chemical equilibrium: Le Chatelier's Principle | Standing waves on a string |
| 9 | | Ksp of calcium iodate: Ca(IO3)2 | Resonance |
| 10 | | The pH scale: acid base titration | Simple harmonic motion |
| 11 | | Ka of a weak acid | Laws of refraction (Image formation) and lenses |
| 12 | | Oxidation :reduction | Diffraction of waves |
| 13 | | Electrochemical cells | |
| 14 | | Rates of chemical reactions I | |
| 15 | | Rates of chemical reactions II | |
| 16 | | The chemistry of Vitamin C | |

| No. Subject | IV. Physical Chemistry | V. Biochemistry | VI. Molecular Cell Biology I·II |
|---|---|---|---|
| Grade | 2 | 2 | 2 |
| Aim | Study of the law by the chemical and dynamic analysis | Study of structures and components of vital tissues in molecular level | Study of basic molecular cell biology to integrate medical stage, and study of function of cellular ornaments |
| Outline | Figure and characteristic of materials | Introduction of biochemistry | Structure and related function of cells |
| | Vital energy | Function and structure of protein | Homeostasis |
| | Dynamics of biochemical reaction | Enzyme as functional protein and its reaction | Genetic biochemistry |
| | | Introduction of gene and cell synthesis | Biochemical analysis of animal cell |
| | | Mechanism of transcription, homeostasis and suppression | Introduction of cellular and inter-cellular |
| | | | Chemical substance for homeostasis |
| Contents 1 | Viscosity | Water, acids and bases | Cellular Evolution |
| 2 | Surface tension | Amino acid | Membranes |
| 3 | Determination of equilibrium absorption of an organic acid by activated carbon in aqueous medium | Protein | Nucleus |
| 4 | Electrical conductance | Thermodynamics and free energy of reactions | Cell surface |
| 5 | Transference numbers: Hittorf method | High and low energy compounds | Signal transaction |
| 6 | Reaction kinetics: Alkaline hydrosis of unester | Enzyme | Cytoskeleton |
| 7 | Reaction kinetics: Effect of temperature on reaction rate | Enzyme kinetics | Cell cycle regulation and cell division |
| 8 | Reaction kinetics: the bromination of acetone | Enzyme modifications | Fertilisation and activation |
| 9 | Polarimetry: Determination of specific rotation of sucrose | Protein targeting and processing | Development and differentiation |
| 10 | Determination of the order on reaction in solution | Membrane bound protein | Situmini-recognition and trans membrane |
| 11 | EMF measurements for determination of solubility product | Structural proteins | Nervous structure |
| 12 | Inversion of sucrose | Blood proteins | The eye structure |
| 13 | Solubility activity coefficient | Biochemical bases of oxidative stress | Muscle contraction |
| 14 | Hydrolysis of methyl acetate | Biochemistry of nucleic acids | |
| 15 | Phitohydrolysis of monochloroacetric acid | Transcription | |
| 16 | | Translation | |
| 17 | | Gene expression regulation | |
| 18 | | Recombinant DNA technology | |

| No. Subject | VII. Human Biology I·II | VIII. Endocrinology | IX. Microbiology |
|---|---|---|---|
| Grade | 2 · 3 | 2 | 3 |
| Aim | Study of bioenergetics cycle and role of related substance | Study for the functions of the individual hormones and to understand the mechanisms of action of the hormones. | Study of effecting for human by agent on microbiology, bacteriology and virology |
| Outline | Introduction of bioenergetics | Introduction of endocrinology | Classification of micro-organism |
| | Structure of functional protein | General principles of synthesis, storage, secretion and blood transport of hormones | Symbiosis and pathogenesis between human and micro-organism |
| | Reaction of enzyme as functional protein | Meaning of "cell and tissue specificity" and describing the organisation and function of "receptors" | Symptom of bacteria cause disease |
| | Introduction of gene and cell | Positive and negative Feed-back mechanism | Transmission and spread of micro-organism |
| | Metabolism in each organ | Classification and various assay method | Prevention and chemotherapy for micro-organism |
| | | | Bioassay and techniques |
| Contents 1 | Bio-energetic | Introduction of endocrinology | Classification of micro-organism |
| 2 | Basic concept of metabolism | Chemical classes. Synthesis and mechanisms of action of peptide hormones | Cultivation and growth micro-organism |
| 3 | Carbohydrates (CHO's) metabolism | Hypothalanus. Anterior and posterior pituitary | Bacterial genetics |
| 4 | Lipid metabolism | Endocrine pancreases | Normal flora |
| 5 | Nitrogen metabolism | Thyroid hormones and growth hormones | Transmission and spread of micro-organism |
| 6 | Organs inter relationship in metabolism | Synthesised mechanisms of action on steroid hormones | Sterilisation and dis-infection |
| 7 | Nutrition | Adrenal cortex | Bacteria cause disease |
| 8 | | Hormonal control of energy metabolism Anabolic and catabolic states | Host response to infection |
| 9 | | Parathyroid hormones, calcitonin, vitamin D | Fungi, parasitic disease |
| 10 | | | Introduction of morphology and classification of viruses |
| 11 | | | Viruses and the community |
| 12 | | | Antimicrobial agents |
| 13 | | | Antiviral agents |
| 21 | | | |

| No. Subject | X. Histopathology | XI. Haematology | XII. Chemical Pathology |
|---|---|---|---|
| Grade | 3 | 3 | 4 |
| Aim | Study for morphologic aspect of cellular degeneration in various disease | Basic pathphysiology of the blood and bone marrow | Cell injury and cell death. acute and chronic inflammation. Hearing and repair. Vascular lesions including shock. Mechanism of extracellular pathology |
| Outline | Degeneration of cell | Disorders and related blood component | Symptoms of internal medicine |
| | Adaptation and cell injury | Iron metabolism and anaemia | Functional examination for specific disease |
| | Immunisation | role of vitamin B12 and folic acid in haematological disorders during | Cardiac insufficiency |
| | | Coagulation and haemolysis | Metabolic disorder |
| | | Blood transfusion | Maignocytoma |
| Contents 1 | Cell injury and cell death as the basis of disease | Blood and blood disorders (general introduction) | Changes in proteins in plasma and other body fluids in disease |
| 2 | Acute inflammation , cells and process | Microcytic hypochromic anaemia | Patho-physiology of shock |
| 3 | Chronic inflammation , cells and process | Megaloblastic anaemia | Pathology of plasma lipids and lipoproteins in relation to disease of blood vessels |
| 4 | Granulomatous inflammation, exemplified by tuberculosis | Pancytopenia | Principles of chemical pathology of endocrine disorders |
| 5 | Chemical mediators of inflammation | Haemolytic Anaemia | Principles of chemical pathology of diabetes mellitus, including structural effects of altered |
| 6 | Tissue repair and regeneration | White blood cells: Bnign disorders | Chemical pathology of plasma enzyme, modelled on myocardial and liver disease |
| 7 | Extra cellular tissue and disease | Myeloproliferative disorders | Pathology of heam, its digression and jaundice |
| 8 | Vascular disease and disorders of the circulation | Leukaemia | Systematic chemical effects of neoplasm, including tumour |
| 9 | Neoplasm and disorders of cell growth | Lymphoid malignancies | |
| 10 | | Homeostasis: diagnostic approach | |
| 11 | | Bleeding disorders | |
| 12 | | Thrombosis and anti-thromnotic drug | |
| 13 | | Immuno-haematology | |
| 14 | | Blood transfusion I | |
| 15 | | Blood transfusion I | |
| 16 | | Haematological disorders during pregnancy | |
| 17 | | Sickle cell disease | |
| 18 | | Thalassaemia | |

| No. Subject | XIII. Clinical Immunology | XIV. Anatomy | XV. Pharmacology |
|---|---|---|---|
| Grade | 4 | 3・4 | 4 |
| Aim | Study for immunology process in cellular and molecular level those advanced medical treatment | Study for the structure of human body and its functions and relations | Study for effectiveness of pharmatherapy using main affection and considering side-affect |
| Outline | Process of immino-reaction | Systematic anatomy for phylogenesis | Determination of chemotherapy |
| | Natural and acquired immunity | systematic anatomy for organ formation | Prescription with safety, effectiveness, difficulty and |
| | Function of immune reaction | Systematic anatomy for skeleton, muscle and joint | Informed concept: information, explanation and warning |
| | Antigen and antibody | Systematic anatomy for brain and spinal cord | Therapeutic drug monitoring: steady state, side-effect |
| | Immuno-globlin | Observational analysis by microscope | Study of monitoring |
| | | | Determination for pharmacology of the autonomic nervous system |
| Contents 1 | the cellular Component its and tissue structures of the immune | Introduction to fross anatomy | Introduction of pharmacology |
| 2 | The chemical processes underlying natural and innate immunity | Introduction of histology | Introduction of pharmacology of the autonomic nervous system |
| 3 | the cellular mechanisms underlying recognition of self and non-self ,and the reactions which follow such recognition | Bones and joints | Pharmacology of the cardiovascular system |
| 4 | The major role of immune processes in initiating and perpetuating acute and chronic inflammation | Connective tissue and skin | Pharmacology of the respiratory system |
| 5 | The immuno- pathology of hypersensitivity and auto-immune disorders | Nervous system | Nonsteroidal anti-inflammatory drugs (monopioid analgesics): drugs used in gout |
| 6 | Primary and secondary immunodeficiency | Introduction of embryology | Renal pharmacology |
| 7 | Immunology of transplantation | Heart, conducting system | Agent used in treatment of hyperlipidemias |
| 8 | Immunological aspects of malignancy | Arteries of thorax | Agent used in treatment of anaemia |
| 9 | | Veins and lymphatic of thorax | Drug used in treatment of coagulation |
| 10 | | Nasal cavity and parallels sinuses | Drug used in treatment of immuno-modulation |
| 11 | | Pharynx | Drug used in treatment of gastrointestinal disease |
| 12 | | Larynx | Neuromuscular junction blockers |
| 13 | | Thoracic wall | Histamine, serotonin and their antagonists and the ergot alkaloids |
| 14 | | Mechanism of breathing | Drugs that act on the central nervous system |
| 15 | | Mediastinum | Ocular pharmacology |
| 16 | | Trachea | Endocrine pharmacology |
| 17 | | Lungs and pleura | Drugs affecting uterine motility |
| 18 | | Posterior mediastinum | Dermatological pharmacology |
| 19 | | Nervous of thorax | Chemotherapy of microbial disease |
| 20 | | Visional sensation | Chemotherapy of nepotistic disease |
| 21 | | Vestibular sensation | |

| No. Subject | XVI. Physiology | XVII. Forensic Medicine |
|---|---|---|
| Grade | 3 | 4 |
| Aim | Integration of the individual functions of all body's different cells, organs and systems with anatomy, pharmacology and biochemistry | Study for medical regulation under medial ethics and to learn skill for post-mortem examination |
| Outline | Excitability of cell | Introduction of forensic medicine |
| | Salutatory condition | Post-mortem appearance and injury |
| | Transmission | Endogenous sudden death, traffic accident, asphyxia, burn, electrothanasia, frostbite and poisoning |
| | Motion and tension | Fetus, infant |
| | Organs and system | Chemical analysis, identification, blood type and blood analysis |
| | | Medical examiner system, medical regulation , medical ethics, transplantation and brain death |
| Contents 1 | General physiology | Analysis of mineral and soils |
| 2 | Cardiovascular physiology | Analysis of drugs and poisons |
| 3 | Respiratory physiology | Analysis of documents |
| 4 | Renal physiology and body fluids | Hair analysis |
| 5 | Gastrointestional physiology | Analysis of fingerprint |
| 6 | Neuro-physiology with the special senses | Introduction to |
| 7 | Endocrine physiology | Toxicology |
| 8 | Reproductive physiology | |
| 9 | Applied physiology | |

2) Policy on Maintenance Capabilities

a. Technical Factor

The capabilities of lecturers to operate the equipment have been judged as adequate and no problems in this area are foreseen. But some equipment may require time to master or may produce confusion regarding its operation. Therefore, equipment with specifications and operational capacity that will allow lecturers to utilize it immediately will be selected. In addition, when the equipment provided by the Project is officially transferred to the PA side, technical transfer in the form of on-the-job-training (OJT) pertaining to equipment operation and maintenance will be implemented.

b. Maintenance Costs

In order to enable the uninterrupted use of the equipment, a budget to purchase parts and consumables must be secured. Therefore, it is necessary to select equipment with minimal maintenance costs, in order to avoid burdening the College of Medicine with large maintenance costs.

In addition, another important criterion in equipment selection is the availability and supply of parts from the local agencies.

3) Policy on Natural Environmental Conditions

The Project site which is located in the area of Jerusalem is located on the West Bank of the Jordan River. The climate is Mediterranean and the site is about 900m above sea level with less than 600mm of annual rainfall. The humidity is not high and adverse effects on the equipment which will be provided by the Project are not anticipated. Moreover, the classroom and the laboratory of adjacent the Faculty of Science and Technology also do not have special air conditioning facility installed. Therefore, it was judged that the equipment provided by the Project will not require air conditioning.

4) Policy on Infrastructural Conditions

a. Electricity

The electricity (230V, 50Hz ) that is supplied to the site is relatively stable. However, in preparedness for power failures and other emergencies, the possible use of an UPS (uninterruptible power supply) is under consideration for the computers and analysis equipment in order to avoid breakdowns stemming from such emergencies. In order to prevent the loss and deterioration of specimen quality and diluted samples of an experiment or long-term storage due to a power failure, an emergency back-up generator will be provided for the refrigerator on the condition that a power line will be installed specifically for the generator.

b. Water Quality

Public water service which is source from well water is piped to the site. However, the tap water is hard water containing large amounts of magnesium, calcium, etc. Therefore, it is necessary to install a water softener for the distillator and equipment that directly utilizes tap water.

c. Drainage, Wastes

Generally, the university laboratories and training facilities, unlike hospitals and research centers, generate minimal experimental/test wastes and the use of special hazardous substances is infrequent. As a result, the total volume of drainage water and wastes is low. In addition, since the specimens used in experiments and training classes are all sterilized prior to disposal, a special apparatus for disposing biohazardous wastes is not needed. Wastes and treated drugs that are generated in large amounts during the anatomy experiment will be disposed by a contracted private company.

5) Policy on Equipment Delivery

An important factor in effectively maintaining the equipment is to ensure that spare parts can be supplied locally, as well as the existence of a repair and after service system in the PA. Therefore, the existence of local suppliers

and branch sales offices as well as the existence of an after service system will be an important factor in the selection process.

6) Avoid duplication of Equipment by Other Donors

The College of Medicine is also a recipient of assistance from Kuwait for research equipment, books, etc. The amount of funds that have been committed is about US$150,000. Basically, duplication of equipment from Kuwaiti assistance and this Project is not anticipated, but careful consideration is required in formulating the equipment plan to avoid such duplication.

### 2-3-2 Basic Design

(1) Equipment that is Targeted for Each Course

The results of the review on equipment selection explained in the previous section, "2-2-3 Review of the Request", and the results of the review on equipment coordination with the curriculum given in section, "2-3-1 Design Concept", and equipment targeted for each course are shown in the Table 7 on the following page.

In addition, the method by which the quantity was established, as shown in A through G, are in accordance with the criteria outlined in section "2-3-1 Design Concept, (2) Design Policy, 1) Policy on Equipment Scope, Grade and Quantity, b. Establishing the Quantity" (pages 27 - 28).

# Table 7 Equipment Target for the Project

AUDIO-VISUAL

| No. | Equipment Name | Qty | Quantity Criteria | Computer | Spectroscopy | Chromatography | Chemistry | Physics | Biology | Microbiology/ Immunology/Haematology | Molecular Biology | Anatomy/Pathology | Pharmacology | Physiology | Forensic Medicine | Biochemistry | Halls | Class Room |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A-1a | Fixed Television set | 17 | A | | | | | 1 | | 1 | | 1 | | 1 | 1 | | | 12 |
| A-1b | Mobile TV | 5 | F | | | | | | 1 | 2 | | 1 | 1 | | | | | |
| A-2 | Video Cassette Recorder | 12 | A | | | | | | | | | | | | | | | 12 |
| A-3 | Electronic Projector | 5 | F | | | | 1 | | | | | | | | | | | 4 |
| A-4 | Over- Head Projector | 12 | A | | | | 2 | 1 | | 3 | 1 | 2 | 1 | 1 | 1 | | | |
| A-5 | Screen (for Projector) | 12 | A | | | | 2 | 1 | | 3 | 1 | 2 | 1 | 1 | 1 | | | |
| A-6 | Slides Projector | 12 | A | | | | 2 | 1 | | 3 | 1 | 2 | 1 | 1 | 1 | | | |
| A-7 | Docto- Phone | 10 | F | | | | | 1 | | 3 | 1 | 2 | 1 | 1 | 1 | | | |
| A-8 | Tape- Recorder | 5 | F | | | | | | | 1 | | 1 | 1 | 1 | 1 | | | |
| A-11 | Scanner - Color | 6 | F | 2 | | | | | | | | 2 | | 1 | 1 | | | |
| A-12 | LCD | 12 | F | 2 | | | | | | 3 | 1 | 2 | 1 | 1 | 1 | 1 | | |
| A-13 | Photocopier | 6 | F | | | | | | | | | | | | | | 6 | |
| A-27 | Software | 31 | G | 31 | | | | | | | | | | | | | | |
| A-28 | PC | 31 | G | 31 | | | | | | | | | | | | | | |
| A-29 | Laser Printer Color | 6 | F | 4 | | | | | | | | 1 | | 1 | | | | |
| A-30 | Laser Printer Black & White | 3 | F | 3 | | | | | | | | | | | | | | |
| A-34 | Video camera | 3 | F | 1 | | | | | | | | 1 | | 1 | | | | |
| A-35 | Camera with Zoom Lenses | 2 | F | 1 | | | | | | | | | | | 1 | | | |
| A-37 | Computer assisted Teaching Slide Maker | 1 | F | 1 | | | | | | | | | | | | | | |
| A-38 | Maintenance Workshop (Electro Mechanical) | 1 | F | 1 | | | | | | | | | | | | | | |

## EQUIPMENT AND TOOLS

| No. | Equipment Name | Qty | Quantity Criteria | Computer | Spectroscopy | Chromatography | Chemistry | Physics | Biology | Microbiology/ Immunology/Heamatology | Molecular Biology | Anatomy/Pathology | Pharmacology | Physiology | Forensic Medicine | Biochemistry | Halls | Special Place |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E-1 | Amino Acid Analyzer | 1 | F | | | | | | | | 1 | | | | | | | |
| E-2 | Deep Freezer | 3 | F | | | | | | | 1 | | | | | 1 | 1 | | |
| E-3 | Beta Counter | 1 | F | | | | 1 | | | | | | | | | | | |
| E-4 | Big Size Autoclave | 2 | F | | | | | | | 1 | | | | | 1 | | | |
| | Midium size Autoclave | 2 | F | | | | | | | | | 1 | | | | 1 | | |
| | Small Size Autoclave | 2 | F | | | | | | 1 | 1 | | | | | | | | |
| E-5 | HPLC | 3 | F | | | 1 | | | | | | | 1 | | 1 | | | |
| E-6 | Gas Chromatograpey | 2 | F | | | 1 | | | | | | | 1 | | | | | |
| E-7 | LC Mass Spectroscopy | 1 | F | | | 1 | | | | | | | | | | | | |
| E-8 | GC Mass Spectroscopy | 1 | F | | | 1 | | | | | | | | | | | | |
| E-9 | Double Beam Spec. | 6 | A, B | | | 1 | 2 | | | | | | 1 | | 1 | 1 | | |
| E-10 | ICE Maker | 3 | F | | | | | | | | | | | | | | 3 | |
| E-11 | Atomic Absorption | 1 | F | | 1 | | | | | | | | | | | | | |
| E-12 | Lyophilizer | 2 | A | | | | | | | 1 | | | | | | 1 | | |
| E-13 | DNA Sequencer | 1 | F | | | | | | | | | | | | | 1 | | |
| E-14 | Large Refregerator | 3 | F | | | | | | | | | | | | | | 3 | |
| E-15 | Ultra Centrifuge | 2 | F | | | | | | | | 1 | | | | | 1 | | |
| E-19 | Blood Bank Refrigerator | 1 | F | | | | | | | | 1 | | | | | | | |
| E-21 | Electron Microscope | 1 | F | | 1 | | | | | | | | | | | | | |
| E-23 | Flouro-s-Imager : Flouro Scannar | 1 | F | | | | | | | 1 | | | | | | | | |
| E-25 | Anatomical Chart | 2 | F | | | | | | | | | 1 | | 1 | | | | |
| E-30 | Ostomy Model | 1 | A | | | | | | | | | 1 | | | | | | |
| E-31 | Intubation Set | 1 | A | | | | | | | | | | | 1 | | | | |
| E-32 | Emergency Trolley | 2 | A | | | | | | | | | | 1 | | 1 | | | |
| E-33 | Ear Syringe Trainer | 1 | A | | | | | | | | | 1 | | | | | | |
| E-34 | Intramuscular Injection | 1 | A | | | | | | | | | 1 | | | | | | |
| E-35 | Pediatric Injection Head Simulator | 1 | A | | | | | | | | | 1 | | | | | | |
| E-37 | Series Showing Pregnancy | 1 | A | | | | | | | | | 1 | | | | | | |
| E-38 | Enema Administration Simulator | 1 | A | | | | | | | | | 1 | | | | | | |
| E-39 | Peritoneal Dialysis Simulator | 1 | A | | | | | | | | | 1 | | | | | | |
| E-40 | Surgical Bandaging Simulator | 1 | A | | | | | | | | | 1 | | | | | | |
| E-41 | Model of a Set of Teeth | 1 | A | | | | | | | | | 1 | | | | | | |
| E-42 | Pediatric Injection Arm Simulator | 1 | A | | | | | | | | | 1 | | | | | | |
| E-44 | FT - IR | 2 | F | | | 1 | 1 | | | | | | | | | | | |
| E-45 | Ion- Chromatography | 1 | F | | 1 | | | | | | | | | | | | | |
| E-46 | C, H, N, O, S Analyzer | 1 | F | | 1 | | | | | | | | | | | | | |
| E-47 | TGA (Thermal Gravimetric Analyzer) | 1 | A | | 1 | | | | | | | | | | | | | |
| E-48a | Analytical Balance Sensitivity - Five D.P | 8 | A, B | | 2 | 2 | 1 | | | | 1 | | | 1 | 1 | | | |
| E-48b | Analytical Balance Sensitivity -Four D.P | 10 | A, B | | 2 | 1 | 4 | | | | 1 | | | 1 | 1 | | | |
| E-49 | Heating- Cooling Circulator | 18 | A, B, C | | | 2 | 5 | | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | | |
| E-50 | Centrifuge - Low Speed Bench Top | 10 | A, B | | | 1 | 2 | | 2 | | | | 1 | 1 | 1 | 2 | | |
| E-51 | Distillator | 3 | F | | | 1 | 1 | | | | | | | | | 1 | | |
| E-52 | Sonicator | 4 | A | | | 1 | | | | 1 | 1 | | | | | 1 | | |
| E-54 | Liquid Nitrogen Maker | 1 | F | | | | | | | | | | | | | | | 1 |
| E-56 | Dry Ice Maker | 1 | F | | | | | | | | | | | | | | | 1 |
| E-57 | Top Load Balance | 10 | A, B | | | | | 2 | 1 | 3 | 1 | 2 | | | | 1 | | |
| E-59 | Ambient Air Analyzer | 2 | A | | | | | | | | | | | 1 | 1 | | | |
| E-60a | Water Bath (Regular Type) | 10 | A | | | 1 | 1 | | 1 | 2 | 1 | | 1 | 1 | 1 | 1 | | |
| E-60b | Water Bath (Shaking Type) | 2 | A | | | | | | | 1 | | | | | | 1 | | |
| E-61 | Kjeldahl Apparatus | 2 | A | | 1 | | 1 | | | | | | | | | | | |
| E-62 | Gerber Machine | 2 | A | | 1 | | 1 | | | | | | | | | | | |
| E-63 | Refractometer | 5 | C | | | | 5 | | | | | | | | | | | |
| E-64 | Polarometer | 5 | C | | | | 5 | | | | | | | | | | | |
| E-65 | Tensiometer | 5 | C | | | | 5 | | | | | | | | | | | |
| E-66 | Digital Bomb Calorimeter | 2 | B | | | | 2 | | | | | | | | | | | |
| E-67 | Laboratory Steam Boiler | 1 | A | | | | 1 | | | | | | | | | | | |
| E-68 | Rising Film Evaporator | 1 | A | | | | 1 | | | | | | | | | | | |
| E-69 | Reverse Osmosis Ultrafiltration Unit | 2 | F | | | | | | | | | | 1 | | | 1 | | |
| E-76 | Fluid Friction Apparatus | 1 | A | | | | | | | 1 | | | | | | | | |
| E-77 | Tray Drier | 1 | F | | | | | | | | | | | | | 1 | | |
| E-78a | Sonictator, Probe | 2 | A | | | | | | | | | | | 1 | | 1 | | |
| E-78b | Super Critical Fluid Extractor Unit | 1 | A | | | 1 | | | | | | | | | | | | |
| E-79 | Sound Level Meter | 4 | B | | | | | 2 | | | | | | 2 | | | | |
| E-84 | Respiratory System Model | 2 | A | | | | | | | | | 1 | | 1 | | | | |
| E-85 | Digestive System Model | 2 | A | | | | | | | | | 1 | | 1 | | | | |
| E-86 | Circulatory System Model | 2 | A | | | | | | | | | 1 | | 1 | | | | |
| E-87 | Urinary System Model | 2 | A | | | | | | | | | 1 | | 1 | | | | |
| E-88 | Adult CPR Training Manikin | 1 | A | | | | | | | | | 1 | | | | | | |
| E-89 | Child CPR Training Manikin | 1 | A | | | | | | | | | 1 | | | | | | |
| E-90 | Ear Model | 2 | A | | | | | | | | | 1 | | 1 | | | | |
| E-92 | Bunsen Burner | 100 | B,C,D,E | | 3 | 2 | 15 | 5 | 8 | 21 | 5 | 13 | 8 | 8 | 4 | 8 | | |

| No | Equipment Name | Qty | Quantity Criteria | Computer | Spectroscopy | Chromatography | Chemistry | Physics | Biology | Microbiology/ Immunology/Heamatology | Molecular Biology | Anatomy/Pathology | Pharmacology | Physiology | Forensic Medicine | Biochemistry | Halls | Special Place |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E-93 | Biological Safety Cabinet | 10 | A, B | | | | 1 | | | 3 | 1 | 2 | 1 | 1 | 1 | | | |
| E-95 | Flame Photometer | 2 | F | | | | | | | | | | 1 | | 1 | | | |
| E-96 | Incubator | 5 | A | | | | 1 | | | 1 | | | 1 | 1 | 1 | | | |
| E-97 | Dark Field Microscope | 1 | A | | | | | | | 1 | | | | | | | | |
| E-98 | Rotary Microtome | 3 | A | | | | 1 | | | | | 1 | | | 1 | | | |
| E-99 | Sledge Type Microtome | 3 | A | | | | | | 1 | | | 1 | | | 1 | | | |
| E-100 | Tissue Centrifuge | 1 | A | | | | | | | | 1 | | | | | | | |
| E-101 | Floating Out Bath for Paraffin Sections | 3 | A | | | | | | 1 | | 1 | | | | 1 | | | |
| E-102 | Tissue Processor | 3 | A | | | | | | 1 | | 1 | | | | 1 | | | |
| E-103 | Research Microscope Plan Apochromat Objectives x2; x10; x25; x100; oil with Fully Automatic Photo System | 2 | A | | | | | | | 1 | | 1 | | | | | | |
| E-104 | Embedding Center | 2 | A | | | | | | | | | 1 | | | 1 | | | |
| E-106 | Fume- Hood | 13 | A, B | | 3 | 2 | 2 | | | 1 | | 2 | 1 | 1 | 1 | | | |
| E-107 | Slide Cabinet for Slide Storage | 4 | B | | | | | | | 2 | | 2 | | | | | | |
| E-108 | Binocular Microscope for Students Plan : x2; x10; x25; x40; x100; Objectives Eye Pieces x 100, Safty Cabinet | 60 | E | | | | | | 15 | 15 | | 15 | | | | 15 | | |
| E-109 | CO. Incubator | 2 | F | | | | | | | 1 | | | | | | 1 | | |
| E-110 | Tissue Incubator | 1 | A | | | | | | 1 | | | | | | | | | |
| E-112 | Binocular Polarizing Microscope | 3 | F | | | | | | | 2 | 1 | | | | | | | |
| E-113 | Automatic Stainner | 5 | F | | | | | | | 1 | 1 | 1 | | | 1 | 1 | | |
| E-114 | Deep Freezer- Cabinet Type (large) | 3 | A | | | | | | 1 | | | | | 1 | | 1 | | |
| E-115 | Refrigerator (Home Type) | 10 | A | | | 1 | | | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | | |
| E-116 | Safety Cabinet | 16 | A, B | | 1 | 2 | 2 | | 1 | 3 | 1 | 2 | 1 | 1 | 1 | 1 | | |
| E-118 | Teaching Microscope with Television Video Output via Camera - 3CCD : Plan Apochromat Objectives Plan , x2,x10,x25,x40,x100;wide field x 100 Eyepieces, | 4 | F | | | | | | 1 | 1 | 1 | | | | | 1 | | |
| E-120 | Dissecting Microscope | 30 | B, C, D | | | | | | 4 | 8 | 2 | 6 | 2 | 2 | 2 | 4 | | |
| E-121 | pH Meter | 24 | A, B, C | | 1 | 1 | 4 | | 1 | 4 | 1 | 2 | 3 | 3 | 1 | 3 | | |
| E-125 | Basic Current Balance | 4 | C | | | | | 4 | | | | | | | | | | |
| E-126 | Induction by means of variable Magnetic Field | 4 | C | | | | | 4 | | | | | | | | | | |
| E-127 | Optical Pumping | 4 | C | | | | | 4 | | | | | | | | | | |
| E-128 | Free Fall | 4 | C | | | | | 4 | | | | | | | | | | |
| E-129 | One Dimensional Motions R Truck on the Linear Track | 4 | C | | | | | 4 | | | | | | | | | | |
| E-130 | KERR Effect | 4 | C | | | | | 4 | | | | | | | | | | |
| E-131 | Torsion Pendulum | 4 | C | | | | | 4 | | | | | | | | | | |
| E-135 | Magnetic Spectroscopy | 1 | F | | | 1 | | | | | | | | | | | | |
| E-213 | Stop Watch, Interruption Type | 30 | A, B, C | | | 1 | | 2 | 4 | 3 | 1 | 5 | 4 | 4 | 2 | 4 | | |
| E-261 | Drug Level Analyzer | 1 | F | | | | | | | | | | 1 | | | | | |
| E-262 | Glass Ware Washer | 4 | A | | | | | | | 1 | | | 1 | 1 | | 1 | | |
| E-263 | Tablet Dissolution Tester | 1 | A | | | | | | | | | | 1 | | | | | |
| E-264 | Tablet Hardness, Thickness Instrument | 1 | A | | | | | | | | | | 1 | | | | | |
| E-265 | Tablet Control System | 1 | A | | | | | | | | | | 1 | | | | | |
| E-267 | Particle Counter | 1 | A | | | | | | | | | | 1 | | | | | |
| E-268 | Nitric Oxide Detector | 1 | A | | | | | | | | | | | 1 | | | | |
| E-269 | Jacket Organ Bath | 5 | A, B | | | | | | | | | 2 | | 1 | 2 | | | |
| E-271 | Animal Operating Set | 1set | A | | | | | | | | | | | 1 | | | | |
| E-274 | Rat Holder | 2 | A | | | | | | | | | | | 2 | | | | |
| E-275 | Cat Holder | 2 | A | | | | | | | | | | | 2 | | | | |
| E-276 | Kymograph with Stimulator Set | 2 | A | | | | | | | | | | 1 | 1 | | | | |
| E-277 | I.C.P.-MS | 1 | A | | 1 | | | | | | | | | | | | | |
| E-278 | High Speed Centrifuge | 5 | A | | | | | | 1 | | | 1 | 1 | 1 | | 1 | | |
| E-281 | Gamma Counter | 1 | F | | | | 1 | | | | | | | | | | | |
| E-282 | Melting Point Apparatus | 2 | B | | | | 2 | | | | | | | | | | | |
| E-287 | Oven | 8 | A | | 1 | 1 | 1 | 1 | 1 | 1 | | | | 1 | | 1 | | |
| E-288 | Orbital Shaker | 4 | A | | | | | | 1 | | | | 1 | 1 | | 1 | | |
| E-290 | Micro Centrifuge | 8 | A | | | 1 | 1 | | 1 | 1 | | 1 | 1 | 1 | | 1 | | |
| E-291 | Blood Gas Analyzer | 1 | F | | | | | | | | | | | 1 | | | | |
| E-292 | Tissue Homogrnizer | 3 | A | | | | | | | 1 | | | 1 | 1 | | | | |
| E-293 | Calorimeter | 2 | B | | | | 2 | | | | | | | | | | | |
| E-294 | Evaporator | 6 | C | | | | 6 | | | | | | | | | | | |
| E-295 | Conductivity Meter | 4 | C | | | | 4 | | | | | | | | | | | |
| E-296 | Multi-Teaching Microscope | 4 | C | | | | | | 1 | | | 1 | 1 | | 1 | | | |
| E-297 | Slide Warmer | 2 | A | | | | | | | 1 | | 1 | | | | | | |
| E-298 | Staining Set | 10 | B, C | | | | | | | 4 | | 2 | | 2 | 2 | | | |
| E-299 | X-Ray film Illuminator | 2 | A | | | | | | | | | 1 | | | | 1 | | |

| No. | Equipment Name | Qty | Quantity Criteria | Computer | Spectroscopy | Chromatography | Chemistry | Physics | Biology | Microbiology/ Immunology/Heamatology | Molecular Biology | Anatomy/Pathology | Pharmacology | Physiology | Forensic Medicine | Biochemistry | Halls | Special Place |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E-303 | Multi Channel Recorder Electrocardiograph | 4 | C | | | | | | | | | | | 4 | | | | |
| E-305 | Resuscitation Unit | 2 | B | | | | | | | | | | | 2 | | | | |
| E-307 | Kymograph with Basic Stimulator Set | 1 | A | | | | | | | | | | | 1 | | | | |
| E-308 | Hemodynamic Measuring System | 1 | A | | | | | | | | | | | 1 | | | | |
| E-310 | Inverted Microscope | 2 | F | | | | | | | | | | | 2 | | | | |
| E-311 | Micro Manipulator | 2 | B | | | | | | | | | | | 2 | | | | |
| E-313 | Axopatch Amplifier | 3 | B | | | | | | | | | | | 3 | | | | |
| E-314 | Electrical Stimulator Set | 1 | A | | | | | | | | | | | 1 | | | | |
| E-315 | Oscilloscope | 3 | B | | | | | | | | | | | 3 | | | | |
| E-318 | Tissue Slicer (Chopper) | 2 | A | | | | | | 1 | | | | | 1 | | | | |
| E-321 | Hematocrit Centrifuge | 7 | A | | | | | | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | | |
| E-323 | Spirometer Set | 1 | A | | | | | | | | | | | 1 | | | | |
| E-324 | Cylinder Set with Outlet & Regulator | 1 | F | | | | | | | | | | | | | | | 1 |
| E-325 | Cycle Ergometer | 6 | C | | | | | | | | | | | 6 | | | | |
| E-326 | Gas (Volume) Meter | 2 | B | | | | | | | | | | | 2 | | | | |
| E-327 | CO Meter | 2 | B | | | | | | | | | | | 2 | | | | |
| E-328 | Q Meter | 2 | B | | | | | | | | | | | 2 | | | | |
| E-330 | Douglas Bag | 10 | D | | | | | | | | | | | 10 | | | | |
| E-331 | Flexible Tube | 20 | E | | | | | | | | | | | 20 | | | | |
| E-333 | Sphygmomanometer | 40 | C, G | | | | | | | | | | 5 | 35 | | | | |
| E-334 | Weighing Scale | 5 | A | | | | 1 | 1 | 1 | | | | 1 | 1 | | | | |
| E-335 | Tread Mill | 1 | A | | | | | | | | | | | 1 | | | | |
| E-336 | Recorder Multichannel | 2 | B | | | | | | | | | | | 2 | | | | |
| E-341 | Refrigerated Table Top Centifuge | 10 | A, B | | | | | | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | | |
| E-342 | Pulsed Field Gel Electrophoresis System | 2 | A | | | | | | 1 | | | | | | | 1 | | |
| E-343 | Washing Machine (Large) | 1 | F | | | | | | | | | | | | | | | 1 |
| E-344 | Distillation Unit (Large) | 1 | F | | | | | | | | | | | | | | | 1 |
| E-345 | PCR Thermal Cycler | 3 | A | | | | | | | | 1 | | | | 1 | 1 | | |
| E-347 | Laminar Flow Hood | 5 | A | | | | 1 | | 1 | | | | 1 | 1 | | 1 | | |
| E-348 | Fluorescent Microscope | 3 | F | | | | | | 1 | 1 | | 1 | | | | | | |
| E-349 | Upright Freezer | 6 | A | | | | | | 1 | 1 | | | 1 | 1 | 1 | 1 | | |
| E-350 | Eliza Reader | 4 | A | | | | | | | 1 | | | 1 | | 1 | 1 | | |
| E-351 | Chemistry Analyzer | 1 | F | | | | | | | | | | | | | | | 1 |
| E-352 | Blood Cell Counter: Automated | 3 | A | | | | | | 1 | 1 | | | | | | | | 1 |
| E-353 | Mechanical Stirrer | 20 | A, B, D | | 3 | 2 | 8 | | 2 | | | | 1 | 2 | 1 | 1 | | |
| E-354 | Sealer | 2 | A | | | | | | | 1 | | | 1 | | | | | |
| E-355 | Double Jacketed Open Kettle with Electrical Heater | 2 | B | | | | 2 | | | | | | | | | | | |
| E-356 | Titrator | 2 | A | | | 1 | 1 | | | | | | | | | | | |
| E-357 | Lovibond Tintometer | 1 | A | | | | 1 | | | | | | | | | | | |
| E-358 | Hydro Genation Autoclave | 1 | F | | | | 1 | | | | | | | | | | | |
| E-359 | Gel Documentation Reader | 2 | A | | | | | | 1 | | | | | | | 1 | | |
| E-361 | Counter: Manual White Blood Cell Differential | 20 | A, D | | | | | | | | 11 | | | 8 | 1 | | | |
| E-362 | Cryogenic Tank / Incubator | 2 | A | | | | | | 1 | | | | | | | 1 | | |
| E-363 | Culturing Millipore System | 1 | F | | | | | | 1 | | | | | | | | | |
| E-365 | Cuvette Washer | 2 | A | | | | | | 1 | | | | | | | 1 | | |
| E-366 | Densitometer: for gel | 2 | A | | | | | | 1 | | | | | | | 1 | | |
| E-367 | Dispenser | 1 | A | | | | | | | | | | | | | 1 | | |
| E-368 | Electrophoresis | 7 | A, B | | | | | | | 1 | 2 | | 1 | | 1 | 2 | | |
| E-370 | Evaporator: Using Nitrogen Gas | 1 | F | | | | 1 | | | | | | | | | | | |
| E-371 | Fibrometer | 1 | A | | | | | | | | | | | 1 | | | | |
| E-374 | Glass Head Cell Homogenizer | 2 | B | | | | | | 2 | | | | | | | | | |
| E-375 | Hematocytometer Set | 20 | A, D | | | | | | | | 11 | | | 8 | 1 | | | |
| E-376 | Hetovac Centrifuge | 3 | A | | | | | | 1 | | | | | | 1 | 1 | | |
| E-377 | Hot Plate with Magnetic Stirrer | 32 | A, B, C | | | | 5 | | 4 | 2 | 4 | 1 | 5 | 3 | 4 | 4 | | |
| E-378 | Immunoblotter | 1 | A | | | | | | | 1 | | | | | | | | |
| E-379 | Incubator: Shaking | 2 | A | | | | | | | 1 | | | | | | 1 | | |
| E-381 | Microscope: Interphased with TV screen with phase contrast adapter, double head | 2 | A | | | | | | | 1 | | 1 | | | | | | |
| E-382 | Mixer: Blood Tube | 5 | B | | | | | | | 2 | | 2 | | | 1 | | | |
| E-383 | Nephlometer | 2 | B | | | | | | | | | | | | | 2 | | |
| E-385 | Osmometer: Freezing Point | 2 | B | | | | 2 | | | | | | | | | | | |
| E-386 | Osmometer: Vapor Pressure Point | 2 | B | | | | 2 | | | | | | | | | | | |
| E-387 | Phospholipid Analyzer | 1 | A | | | | | | | | | | | | | 1 | | |
| E-388 | Pipette Cleaning System | 8 | A, B | | | | 1 | | | 2 | | 1 | 1 | 1 | 1 | 1 | | |
| E-389 | Pipette Set | 50 | B, C, D | | | 2 | 4 | | 4 | 10 | | 10 | 5 | 5 | 5 | 5 | | |
| E-391 | Plasma Extractor | 2 | B | | | | | | | 2 | | | | | | | | |
| E-393 | Power Compensation System | 1 | F | | | | | | | | | | | | | | | 1 |
| E-395 | Safety Cabinet: for Mycology | 1 | A | | | | | | | 1 | | | | | | | | |

| No. | Equipment Name | Qty | Quantity Criteria | Computer | Spectroscopy | Chromatography | Chemistry | Physics | Biology | Microbiology/ Immunology/Heamatology | Molecular Biology | Anatomy/Pathology | Pharmacology | Physiology | Forensic Medicine | Biochemistry | Halls | Special Place |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E-396 | Selective Ion Electrodes: $Na^+$, $K^+$, $NH_4$, $NO_3$, $CO_3$, CO | 12 | C | | | | 6 | | | | | | | | 6 | | | |
| E-397 | Serofuge | 2 | B | | | | | | | 2 | | | | | | | | |
| E-398 | Shaker: Slide Shaker with Semicircular Motion | 6 | A, B | | | | | | | 1 | | 1 | 1 | | 1 | 2 | | |
| E-399 | Slide Shaker | 2 | A | | | | | | | | | | | | 1 | 1 | | |
| E-403 | Thermometer | 20 | B, C | | | | 4 | | | 3 | | 4 | 3 | 2 | | 4 | | |
| E-405 | HLC System | 5 | A | | | | 1 | | 1 | 1 | | | 1 | | | 1 | | |
| E-406 | Trays: Staining | 8 | C | | | | | | | | 4 | | | | | 4 | | |
| E-407 | Conical Glass Tubes | 200 | C | | | | 40 | | 20 | 20 | | | 50 | 50 | | 20 | | |
| E-408 | Urinometer | 15 | A, E | | | | | | | | | | | 14 | 1 | | | |
| E-409 | UV Transilluminator | 4 | A | | | | | | | 1 | | | 1 | | 1 | 1 | | |
| E-410 | Vacuum Pump | 8 | A | | | | 3 | | 1 | | | | 1 | 1 | 1 | 1 | | |
| E-411 | Test Tube Mixer | 12 | A, B | | | | 1 | | 1 | | | | 3 | 3 | | 4 | | |
| E-414 | Glass Ware Set | 11 | C | | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |

## TEACHING MATERIALS

| No. | Equipment Name | Qty | Quantity Criteria | Computer | Spectroscopy | Chromatography | Chemistry | Physics | Biology | Microbiology/ Immunology/Heamatology | Molecular Biology | Anatomy/Pathology | Pharmacology | Physiology | Forensic Medicine | Biochemistry | Halls | Special Place |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T-1 | Slide Set for Microbiology | 20 | E | | | | | | | 20 | | | | | | | | |
| T-2 | Slide Set for Normal Histology | 20 | E | | | | | | | | | 20 | | | | | | |

## ANATOMIC MODELS

| No. | Equipment Name | Qty | Quantity Criteria | Computer | Spectroscopy | Chromatography | Chemistry | Physics | Biology | Microbiology/ Immunology/Heamatology | Molecular Biology | Anatomy/Pathology | Pharmacology | Physiology | Forensic Medicine | Biochemistry | Halls | Special Place |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M-1 | Thoracic Spinal Column | 1 | A | | | | | | | | | 1 | | | | | | |
| M-2 | Lumber Spinal Column | 1 | A | | | | | | | | | 1 | | | | | | |
| M-3 | 6 Vertebrae | 1 | A | | | | | | | | | 1 | | | | | | |
| M-4 | Arm Skelton | 1 | A | | | | | | | | | 1 | | | | | | |
| M-5 | Leg Skeleton | 1 | A | | | | | | | | | 1 | | | | | | |
| M-6 | Advanced Medical Torso (28 part) | 2 | A | | | | | | | | | 1 | | 1 | | | | |
| M-7 | Super Muscle Torso | 1 | A | | | | | | | | | 1 | | | | | | |
| M-8 | Disc Torso-15 Slices | 1 | A | | | | | | | | | 1 | | | | | | |
| M-9 | Median+Frontal Section of Head | 1 | A | | | | | | | | | 1 | | | | | | |
| M-10 | Relief Models | 1 | A | | | | | | | | | 1 | | | | | | |
| M-11 | Larynx | 1 | A | | | | | | | | | 1 | | | | | | |
| M-12 | Advanced Left Ear (6 parts) | 1 | A | | | | | | | | | 1 | | | | | | |
| M-13 | Eye in Orbit 4 Times Full Size | 3 | A B | | | | | | | | | 2 | | 1 | | | | |
| M-14 | Skin Section 200X | 1 | A | | | | | | | | | 1 | | | | | | |
| M-15 | Relief Model | 1 | A | | | | | | | | | 1 | | | | | | |
| M-16 | Brain - 4 parts | 2 | A | | | | | | | | | 1 | | 1 | | | | |
| M-18 | Brain with Arteries 10 parts with Base of Head | 1 | A | | | | | | | | | 1 | | | | | | |
| M-20 | Spinal Cord, 6 Times Full Size | 1 | A | | | | | | | | | 1 | | | | | | |
| M-21 | De-Luxe Heart - 7 parts | 2 | A | | | | | | | | | 1 | | 1 | | | | |
| M-22 | Basic Heart - 1 part | 2 | A | | | | | | | | | 1 | | 1 | | | | |
| M-24 | Heart with Oesophagus Aorta & Windpipe | 2 | A | | | | | | | | | 1 | | 1 | | | | |
| M-25 | Heart with Thymus - 3 parts | 1 | A | | | | | | | | | 1 | | | | | | |
| M-26 | Lung - 5 parts | 2 | A | | | | | | | | | 1 | | 1 | | | | |
| M-27 | Digistive System - 3 parts | 2 | A | | | | | | | | | 1 | | 1 | | | | |
| M-28 | Stomach with Duodenum + | 2 | A | | | | | | | | | 1 | | 1 | | | | |
| M-29 | Pancreas - 3 parts | 2 | A | | | | | | | | | 1 | | 1 | | | | |
| M-30 | Intel Pegans - 2 parts | 1 | A | | | | | | | | | 1 | | | | | | |
| M-31 | Liver with Gall Bladder | 2 | A | | | | | | | | | 1 | | 1 | | | | |
| M-32 | Kidney with Adrenal Gland - 2 | 1 | A | | | | | | | | | 1 | | | | | | |
| M-33 | Kidney section - Basic version | 1 | A | | | | | | | | | 1 | | | | | | |
| M-34 | Liver with Gall Blander Pancreas and Duodenum | 2 | A | | | | | | | | | 1 | | 1 | | | | |
| M-36 | Kidney Nephrons Blood Vessels | 2 | A | | | | | | | | | 1 | | 1 | | | | |
| M-38 | Complete Urinary System Dual Sex - 6 parts | 2 | A | | | | | | | | | 1 | | 1 | | | | |
| M-40 | Female Pelvis - 2 parts | 2 | A | | | | | | | | | 1 | | 1 | | | | |
| M-41 | Male Pelvis - 2 parts | 2 | A | | | | | | | | | 1 | | 1 | | | | |
| M-44 | Embryonic Development (12 stages) | 1 | A | | | | | | | | | 1 | | | | | | |
| M-45 | S/J. STR | 1 | A | | | | | | | | | 1 | | | | | | |
| M-46 | Pregnancy Series - 8 models | 1 | A | | | | | | | | | 1 | | | | | | |
| SCISORS | | | | | | | | | | | | | | | | | | |
| M-47 | Dressing Scissors | 2 | A | | | | | | | | | 1 | | | 1 | | | |
| M-48 | Sharp -str. 14cm | 2 | A | | | | | | | | | 1 | | | 1 | | | |
| M-49 | Sharp -str. 18cm | 2 | A | | | | | | | | | 1 | | | 1 | | | |
| M-50 | Mayo Scissors - Chamfered blades | 1 | A | | | | | | | | | 1 | | | | | | |
| M-51 | Mayo Scissors Flat blades Str. | 2 | A | | | | | | | | | 1 | | | 1 | | | |
| M-52 | Metzenbaum Scissors Str. | 2 | A | | | | | | | | | 1 | | | 1 | | | |
| M-53 | Iris Scissors Sharp Cof Heavy weight | 1 | A | | | | | | | | | 1 | | | | | | |
| FORCEPS | | | | | | | | | | | | | | | | | | |
| M-54 | Dissecting Forceps Block End | 2 | A | | | | | | | | | 1 | | | 1 | | | |
| M-55 | Dissecting Forceps Fine Points Teethed 1x2 | 1 | A | | | | | | | | | 1 | | | | | | |
| M-56 | Dissecting Forceps 2x3 Teeth | 1 | A | | | | | | | | | 1 | | | | | | |
| M-57 | Bonney Dissecting Forceps 1x2 Teeth | 2 | A | | | | | | | | | 1 | | | 1 | | | |
| M-58 | Treves dissecting Forceps 1x2 Teeth | 1 | A | | | | | | | | | 1 | | | | | | |
| M-59 | Fixation dissecting Forceps 1x2 Teeth | 1 | A | | | | | | | | | 1 | | | | | | |
| ARTERY FORCEPS | | | | | | | | | | | | | | | | | | |
| M-60 | Kilner Artery Forceps | 2 | A | | | | | | | | | 1 | | | 1 | | | |
| M-61 | Serrated B/J Cof | 2 | A | | | | | | | | | 1 | | | 1 | | | |
| M-62 | Spencer Wells Artery Forceps S/J. Serrated, S/J. STR | 2 | A | | | | | | | | | 1 | | | 1 | | | |
| M-64 | Listersinus Forceps B/J. Sarrated | 1 | A | | | | | | | | | 1 | | | | | | |
| NEEDLE HOLDERS | | | | | | | | | | | | | | | | | | |
| M-65 | Higgs Needle Holders Cross Serrated Jaws B/J | 1 | A | | | | | | | | | 1 | | | | | | |
| M-67 | Kilner Needle Holder Cross Serrated Jaws B/J | 1 | A | | | | | | | | | 1 | | | | | | |

| No. | Equipment Name | Qty | Quantity Criteria | Computer | Spectroscopy | Chromatography | Chemistry | Physics | Biology | Microbiology/ Immunology/Heamatology | Molecular Biology | Anatomy/Pathology | Pharmacology | Physiology | Forensic Medicine | Biochemistry | Halls | Special Place |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RETRACTOR | | | | | | | | | | | | | | | | | | |
| M-68 | West Retractor Self Retaining 3 x 4 Teeth Blunt Points | 1 | A | | | | | | | | | 1 | | | | | | |
| M-69 | Liston Amputation Knife | 1 | A | | | | | | | | | 1 | | | | | | |
| M-70 | B.P. Standard Scalpel Handle No.3 | 3 | A, B | | | | | | | | | 2 | | | 1 | | | |
| M-71 | B.P. Standard Scalpel Handle No.4 | 3 | A, B | | | | | | | | | 2 | | | 1 | | | |
| BLADES, ETC | | | | | | | | | | | | | | | | | | |
| M-73 | Blades 10 | 2 | A | | | | | | | | | 1 | | | 1 | | | |
| M-74 | Blades 15 | 3 | A, B | | | | | | | | | 2 | | | 1 | | | |
| M-75 | Blades 20 | 2 | A | | | | | | | | | 1 | | | 1 | | | |
| M-76 | Blades 21 | 2 | A | | | | | | | | | 1 | | | 1 | | | |
| M-77 | Blades 23 | 2 | A | | | | | | | | | 1 | | | 1 | | | |
| M-78 | Blades 24 | 2 | A | | | | | | | | | 1 | | | 1 | | | |
| M-79 | Silver Probe with eye | 1 | A | | | | | | | | | 1 | | | | | | |
| M-80 | Macdonald Dissector Double Ended | 1 | A | | | | | | | | | 1 | | | | | | |
| M-81 | Syme Dissector Double Ended Blunt/Sharp | 2 | A | | | | | | | | | 1 | | | 1 | | | |
| M-82 | Aneurysm Needle Small | 1 | A | | | | | | | | | 1 | | | | | | |
| M-83 | Syme Aneurysm Needle | 1 | A | | | | | | | | | 1 | | | | | | |
| M-84 | Iris Dissecting Forceps, 1x2 Teeth,STR | 1 | A | | | | | | | | | 1 | | | | | | |
| M-85 | Walsgrave Tubing Clamps Box Joint, Heavy Pattern | 2 | A | | | | | | | | | 1 | | | 1 | | | |
| M-86 | Gierte RIB Shears | 1 | A | | | | | | | | | 1 | | | | | | |
| M-87 | Thudicum Nasal Speculum, Size 1 | 1 | A | | | | | | | | | 1 | | | | | | |
| M-88 | Laryngel Mirror Handles | 1 | A | | | | | | | | | 1 | | | | | | |
| M-89 | Laryngeal Mirror without Handle | 3 | A | | | | | | | | | 2 | | | 1 | | | |
| M-90 | Head Mirror, Fibre Forehead Band | 1 | A | | | | | | | | | 1 | | | | | | |
| M-91 | Paton Bone Cutting Forceps | 1 | A | | | | | | | | | 1 | | | | | | |
| M-92 | Toothed Bone Rongeur | 1 | A | | | | | | | | | 1 | | | | | | |
| M-93 | Satterlee Amputation Saw | 1 | A | | | | | | | | | 1 | | | | | | |
| M-94 | Bristow Periosteal Elevator | 1 | A | | | | | | | | | 1 | | | | | | |
| M-95 | Mallet, Stainless steel | 1 | A | | | | | | | | | 1 | | | | | | |
| M-96 | Engel Saw | 1 | A | | | | | | | | | 1 | | | | | | |
| M-97 | Farabeuf Rugine, Chisel Edge Straight End | 1 | A | | | | | | | | | 1 | | | | | | |
| M-98 | Pennybacker Probe Dissector, Double Ended | 1 | A | | | | | | | | | 1 | | | | | | |
| M-99 | Meindoe Scissors | 1 | A | | | | | | | | | 1 | | | | | | |
| M-100 | Kilner Scissors | 1 | A | | | | | | | | | 1 | | | | | | |
| M-101 | Gillies Dissecting Forceps, 1x2 | 1 | A | | | | | | | | | 1 | | | | | | |
| M-102 | Sprague Bowles Stereoscope | 2 | A | | | | | | | | | 1 | | | 1 | | | |
| M-103 | National Hospital Percussion Hamer | 2 | A | | | | | | | | | 1 | | | 1 | | | |
| M-104 | Medical Saw (Rotary) | 1 | A | | | | | | | | | 1 | | | | | | |
| M-105 | Medical Jig Saw | 1 | A | | | | | | | | | 1 | | | | | | |

## PHYSIOLOGY TEACHING AND RESEARCH

| No. | Equipment Name | Qty | Quantity Criteria | Computer | Spectroscopy | Chromatography | Chemistry | Physics | Biology | Microbiology/ Immunology/Heamatology | Molecular Biology | Anatomy/Pathology | Pharmacology | Physiology | Forensic Medicine | Biochemistry | Halls | Special Place |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| K-2 | Pulmometer | 6 | C | | | | | | | | | | | 6 | | | | |
| K-3 | Reaction Timer | 6 | C | | | | | | | | | | | 6 | | | | |
| K-24 | Rats Ventilator | 2 | B | | | | | | | | | | | 2 | | | | |
| COMPLETE DISSECTING SET FOR MEDICAL STUDENTS | | | | | | | | | | | | | | | | | | |
| K-27 | Stainless Steel Instrument Case | 15 | E | | | | | | | | | | | 15 | | | | |
| K-28 | Gross Anatomy Probe | 15 | E | | | | | | | | | | | 15 | | | | |
| K-29 | Bull Dog Clamps (slight curve) | 30 | G | | | | | | | | | | | 30 | | | | |
| K-30 | Alm Retractor | 15 | E | | | | | | | | | | | 15 | | | | |
| K-31 | Fine Iris Scissors | 15 | E | | | | | | | | | | | 15 | | | | |
| K-32 | Standard Surgical Scissors | 15 | E | | | | | | | | | | | 15 | | | | |
| K-33 | Scissors | 15 | E | | | | | | | | | | | 15 | | | | |
| K-34 | Hemostatic Forceps, cur. 14cm | 15 | E | | | | | | | | | | | 15 | | | | |
| K-35 | Hemostatic Forceps, str. 14cm | 15 | E | | | | | | | | | | | 15 | | | | |
| K-36 | Michel Suture Applicator | 15 | E | | | | | | | | | | | 15 | | | | |
| K-37 | Michel Suture Clips | 15 | E | | | | | | | | | | | 15 | | | | |
| K-38 | Spatura | 15 | E | | | | | | | | | | | 15 | | | | |
| K-39 | Scalpel Handles 3 Solids | 15 | E | | | | | | | | | | | 15 | | | | |
| K-40 | Scalpel Handles 4 Solids | 15 | E | | | | | | | | | | | 15 | | | | |
| K-41 | Blades for Scalpel for 3 Solids | 15 | E | | | | | | | | | | | 15 | | | | |
| K-42 | Blades for Scalpel for 4 Solids | 15 | E | | | | | | | | | | | 15 | | | | |
| K-43 | Narrow Pattern Dressing Forceps, 12cm str. | 15 | F | | | | | | | | | | | 15 | | | | |
| K-44 | Narrow Pattern Dressing Forceps, 16cm str. | 15 | E | | | | | | | | | | | 15 | | | | |
| K-45 | Narrow Pattern Dressing Forceps, 12cm cur. | 15 | E | | | | | | | | | | | 15 | | | | |
| K-46 | Narrow Pattern Dressing Forceps, 16cm cur. | 15 | E | | | | | | | | | | | 15 | | | | |
| K-48 | Microscope Tissue Chamber with Temp. Controller | 1 | A | | | | | | | | | | | 1 | | | | |
| K-49 | Precision Stereo Zoom Microscope & Optional Boom Stand | 1 | A | | | | | | | | | | | 1 | | | | |
| ELECTROPHYSIOLOGY LAB. | | | | | | | | | | | | | | | | | | |
| K-54 | High Performance Physiograph with Different Transducers for Measuring ECG,EEG,EMG,BR,HR | 1 | A | | | | | | | | | | | 1 | | | | |
| SYSTEMATIC PHYSIOLOGY LAB. | | | | | | | | | | | | | | | | | | |
| K-70 | Lab Animal Exercis Set | 1 | A | | | | | | | | | | | 1 | | | | |
| K-76 | Isolated Organ Bath | 1 | A | | | | | | | | | | | 1 | | | | |
| ANIMAL UNIT | | | | | | | | | | | | | | | | | | |
| K-78 | Animal Cages Set | 1 | A | | | | | | | | | | | | | | | 1 |
| K-92 | Air Conditioner with strong ventilation system | 1 | A | | | | | | | | | | | | | | | 1 |

(2) Specifications of the Equipment

The quantity, a summary of the specifications, and the use of the equipment which will be provided for each course in this Project and coordinated with the curriculum are shown in Table 8 on the following page.

The "Curriculum" column in Table 8 shows the equipment and its correlation to the curriculum and the figure in the column for course content and course in "Table 6 Curriculum, 2. Curriculums of Courses Targeted by the Project" (pages 31 - 36) was used.
(Example: "I. Biology, 1. Plant and Animal Categories" → I-1)

Equipment such as glassware and thermometers that is essential to training and laboratory work, and general equipment such as shakers, water bath and refrigerator that play a vital role in the preparation, adjustment and storage of samples have been defined as "Basic Equipment". In addition, equipment such as the centrifuge that is essential in the preliminary processing and preparation of samples has also been categorized as "Basic Equipment".

In contrast, equipment such as the distiller and the ice maker which can be used jointly by courses and floors have been categorized as "Common Equipment".

## Table 8 Specifications for Equipment

### Computer

| No. | Equipment Name | Std. | Q'ty | Major Specification | Purpose | Curriculum |
|---|---|---|---|---|---|---|
| Audio Visual Equipment | | | | | | |
| A-11 | Scanner - Color | F | 2 | Flatbed (Single-pass color and monochrome desktop), Resolution 1200 dpi, Scanning Size 216x356 mm, | Loading data of sample and specimen to take into PC process | Basic |
| A-12 | LCD | F | 2 | Desktop Type, LCD Panel 8.4" (A4), Resolution :640x480 pixels | Visual efficiency for study by OHP projection of PC processing | Basic |
| A-27 | Software | G | 31 | MS Office 97 Professional, Windows 98, Media :CD | Study for operating of statistics and composition software | Basic |
| A-28 | PC | G | 31 | I. Student :IBM Compatible Desktop (233 MHz, 32 K RAM, 3.2 GB HD, 15" Color Monitor, 32 Times CD, 3.5" 1.44 MB Disk Drive) II. Teacher: IBM Compatible Desktop ( 333 MHz, 64 K RAM, 6.4 GB HD, 15" color Monitor, 32 Times CD, 3.5" 1.44 MB Disk Drive, Zip Recorder) III. Net Working Material (Cables, Hub, etc.) for above computers, Router x1 for LAN | Operating practice of PC with software | Basic |
| A-29 | Laser Printer Color | F | 4 | Color Laser Beam Printer, Resolution 600x300 dpi, Paper Size A4 | Print out of scanning pictures and processing data by PC | Basic |
| A-30 | Laser Printer Black & White | F | 3 | Laser Beam Printer, Resolution 1,200x1,200 dpi, Paper Size A4 | Printing out of documents, calculations and pictures produced by students | Basic |
| A-34 | Video Camera | F | 1 | CCD, LCD Color Monitor 3.5", Optical Zoom and Digital Zoom, DV (Digital Video) Format | Taking photos of hospital training scenes for the lecture | Common |
| A-35 | Camera with Zoom Lenses | F | 1 | 35 mm Camera, Auto-focus/manual, Shutter Speed: 30 to 1/2,000, Speed Light, 35 -105 Zoom Lens, Camera Bag, Tripod | Making a film of samples and medical treatments for experiment | Common |
| A-37 | Computer Assisted Teaching Slide Maker | F | 1 | Digital Camera Back, Film Type: 35mm, 3 1/4×4 1/4", 4×3", 4×5" | Producing slides from the data (figure & table, etc.) to project on the screen | Common |
| A-38 | Maintenance Workshop (Electro Mechanical) | F | 1 | Tool Set, Digital Multi - Mater, Tachometer, Work Bench :1,500x750xH900 mm | Initial maintenance of equipment and diagnosis machinery for long term usage | Common |

## Spectroscopy Laboratory

| No. | Equipment Name | Std. | Q'ty | Major Specification | Purpose | Curriculum |
|---|---|---|---|---|---|---|
| **Experiment and Training Equipment** | | | | | | |
| E-11 | Atomic Absorption | F | 1 | Optics: Double Beam(190 - 900 nm), Resolution: 0.1 - 5 nm | Basic operation and study for principle on 1st ~ 2nd grade. Multipurpose measuring for samples upper 3rd grade. Quantitative measurement for metals (Ca Mg Sr Fe Cu Zn Mn Se Cr Cd Hg) in the blood sample as common use. | Common, II-1, II-2, II-3, V-5 |
| E-21 | Electron Microscope | F | 1 | Magnification: x15 to 200,000, Resolution: 4 nm, Mode: Scanning | Basic operation and study for principle on 1st ~ 2nd grade. Multipurpose measuring for samples upper 3rd grade. Search for the super structure of virus, cell and tissue by higher analysability than optical microscope | Common, I-2, IX-10, |
| E-45 | Ion- Chromatography | F | 1 | Measuring Range: 0.05 - 50 $\mu$ s/cm | Basic operation and study for principle on 1st ~ 2nd grade. Multipurpose measuring for samples upper 3rd grade. Diagnostics for inorganic and organic ion | Common, II-5, IV-10 |
| E-46 | C, H, N, O, S Analyzer | F | 1 | Multiple Analysis Mode: CHN, CHNS, Oxygen, Auto- sampler | Basic operation and study for principle on 1st ~ 2nd grade. Multipurpose measuring for samples upper 3rd grade. Measurement of increasing mass of absorbed portion of element (O N C S H) by flame | Common, II-5, V-11 |
| E-47 | TGA (Thermal Gravimetric Analyzer) | A | 1 | Temperature range : Ambient to 1,500℃, Weight measuring range : 200mg | Basic operation and study for principle on 1st ~ 2nd grade. Multipurpose measuring for samples upper 3rd grade. Measurement of entropy | Common, II-6, V-5 |
| E-48a | Analytical Balance Sensitivity - Five D.P | B | 2 | Max. capacity : 200g, Readability : 0.1mg, Canopy | Measurement of micro dry chemistry and reagent for making buffer | Basic |
| E-48b | Analytical Balance Sensitivity - Four D.P | B | 2 | Max. capacity : 400g, Readability : 0.001g, Canopy | Measurement of dry chemistry and reagent for making buffer | Basic |
| E-61 | Kjeldahl Apparatus | A | 1 | Temperature range:100 ~ 400℃, Accuracy: 1deg., Test Tube: 20 pcs, Evaporating rate : 40 ml/min | Chemical analyse of nitrogen and protein in sample | II-5, V-5, XII-3 |
| E-62 | Gerber Machine | A | 1 | Fat Separate Centrifuge; 1,100 rpm, Gerber Test tubes | Extraction and analyse of lipids and protein of milk | I-2, II-5 |
| E-92 | Bunsen Burner | B | 3 | Butane gas, 120mm Height, 1 m Rubber hose and safety bands | Heating and sanitation | Basic |
| E-106 | Fume - Hood | B | 3 | Air volume : 20m³/min, Dimension : Approx.1,500(W) x 800(D) x 2,300(H)mm, Material: Chemical Proof | Ventilation of poison gas by negative pressured air | Basic |
| E-116 | Safety Cabinet | A | 1 | Chemical and solvent proof painting, Size: 850×400×800(H)mm | Preservation of reagent | Basic |

| No. | Equipment Name | Std. | Q'ty | Major Specification | Purpose | Curriculum |
|---|---|---|---|---|---|---|
| E-121 | pH Meter | A | 1 | Glass electrode method, Digital pH/mV, Temp. Display, pH:0 to 14(Accuracy: 0.01pH), mV: 0 to 1,999mV, Temp.:0 to 100℃ | pH level measurement for preparation of reagent and solution | Basic |
| E-277 | I.C.P. -MS | A | 1 | Detection Lump: Plasma Quartz Torch, Wave Length: 160~450nm, Resolution: 0.2 nm | Basic operation and study for principle on 1st~2nd grade. Multipurpose measuring for samples upper 3rd grade. Measurement of toxic metals of samples | Common, II-1, II-2, II-3 |
| E-287 | Oven | A | 1 | Forced air-circulation type, Working temperature :RT to 250℃, Capacity: 10 Litters | Sterilisation by dry heating for metal, glass, ceramic ware and dry chemistry | Basic |
| E-353 | Mechanical Stirrer | B | 3 | Speed: Max. 1,200 rpm, Stand, Blade and Paddle | Dissolution and mixing of solid body | Basic |
| E-414 | Glass Ware Set | C | 1 lot | Test tube, Flask, reagent bottle, Beaker, Glass tube, Bullet, Cylinder glass, Watch glass, Petri glass | Glass ware for experiment, measurement, preservation | Basic |