


No. 1

**BASIC DESIGN STUDY REPORT
ON
THE PROJECT
FOR
THE DEVELOPMENT AND IMPROVEMENT
OF
THE FACULTY OF THE VETERINARY MEDICINE
OF
AL BAATH UNIVERSITY
IN
SYRIAN ARAB REPUBLIC**

OCTOBER 1999

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**JAPAN INTERNATIONAL COOPERATION AGENCY
SYSTEM SCIENCE CONSULTANTS INC.**

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PREFACE

In response to a request from the Government of Syrian Arab Republic, the Government of Japan decided to conduct a basic design study on the Project for the Development and Improvement of the Faculty of the Veterinary Medicine of Al Baath University and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Syria a study team from April 3 to May 7, 1999, held discussions with the officials concerned of the Government of Syria, 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 Syria 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 Government of Syrian Arab Republic for their close cooperation extended to the teams.

October, 1999



Kimio Fujita
President
Japan International Cooperation Agency

October, 1999

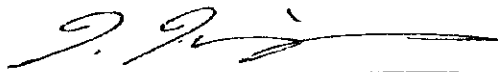
Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for the Development and Improvement of the Faculty of Veterinary Medicine of Al Baath University in Syrian Arab Republic.

This study was conducted by System Science Consultants Inc. under a contract to JICA, during the period from March 5, 1999 to November 22, 1999. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Syria and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

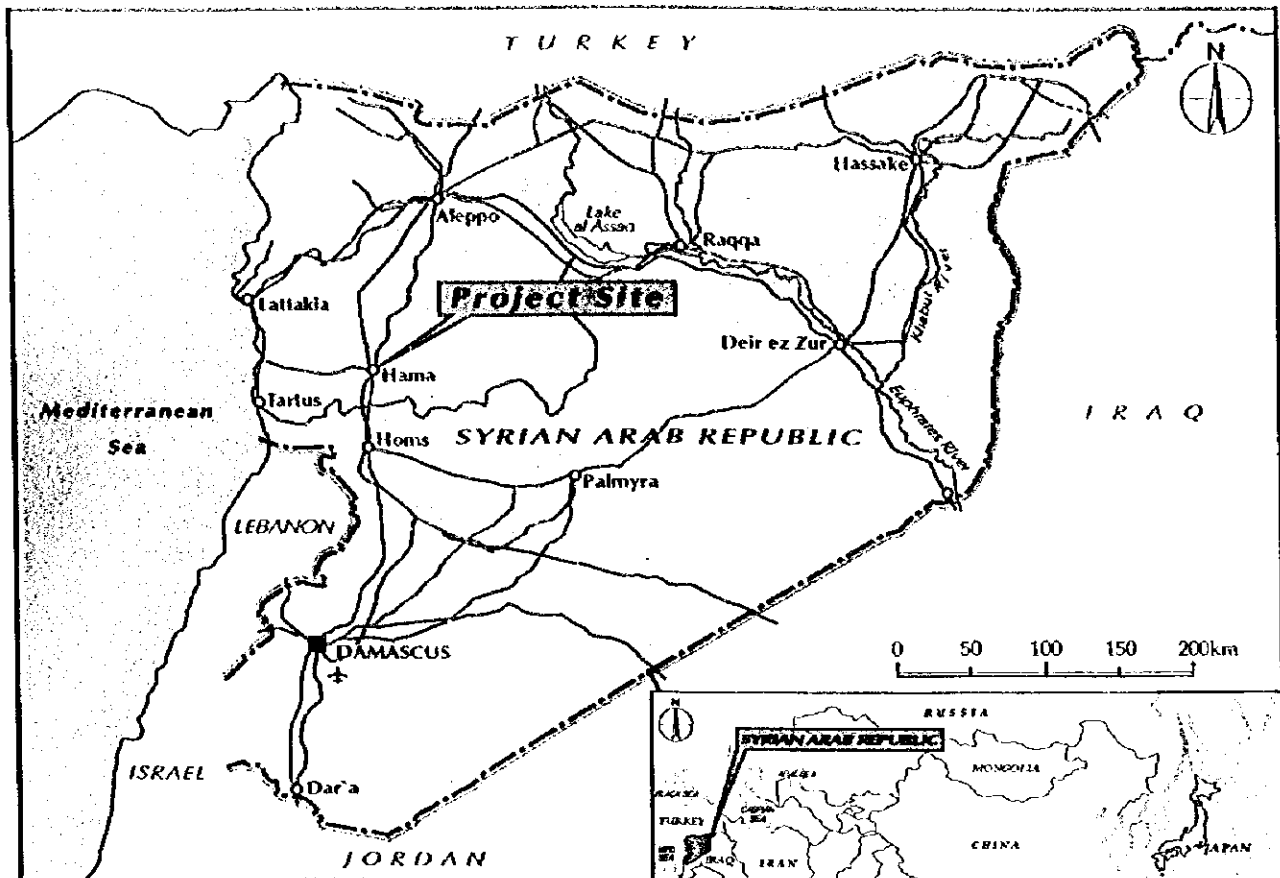
Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,



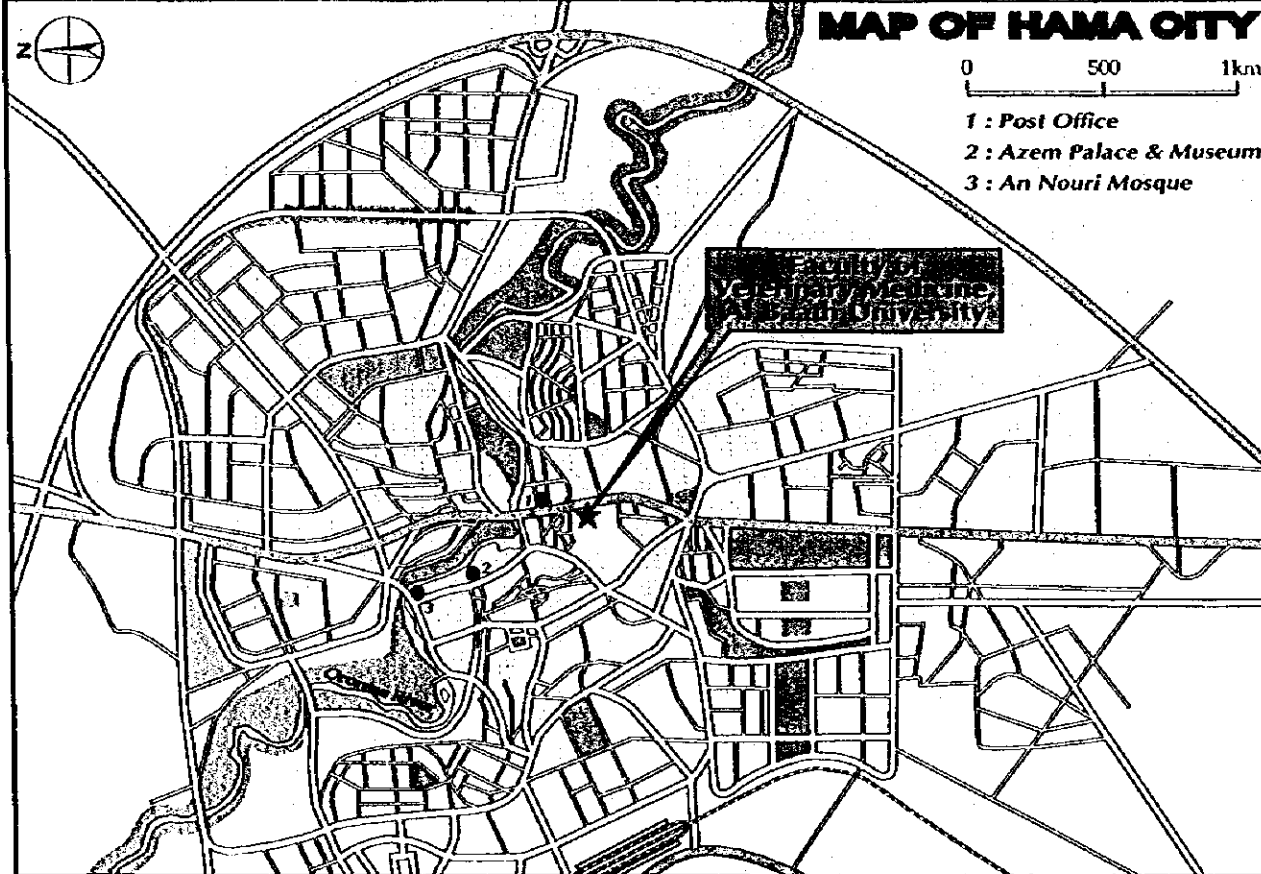
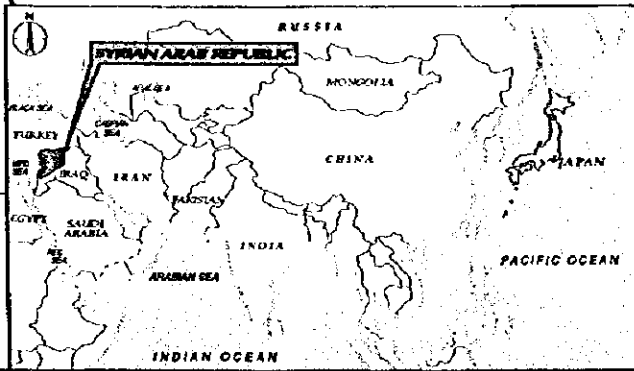
Tamotsu Tomiyama
Project Manager,
Basic Design Study Team on
the Project for the Development and Improvement of
the Faculty of Veterinary Medicine of Al Baath University

System Science Consultants Inc.

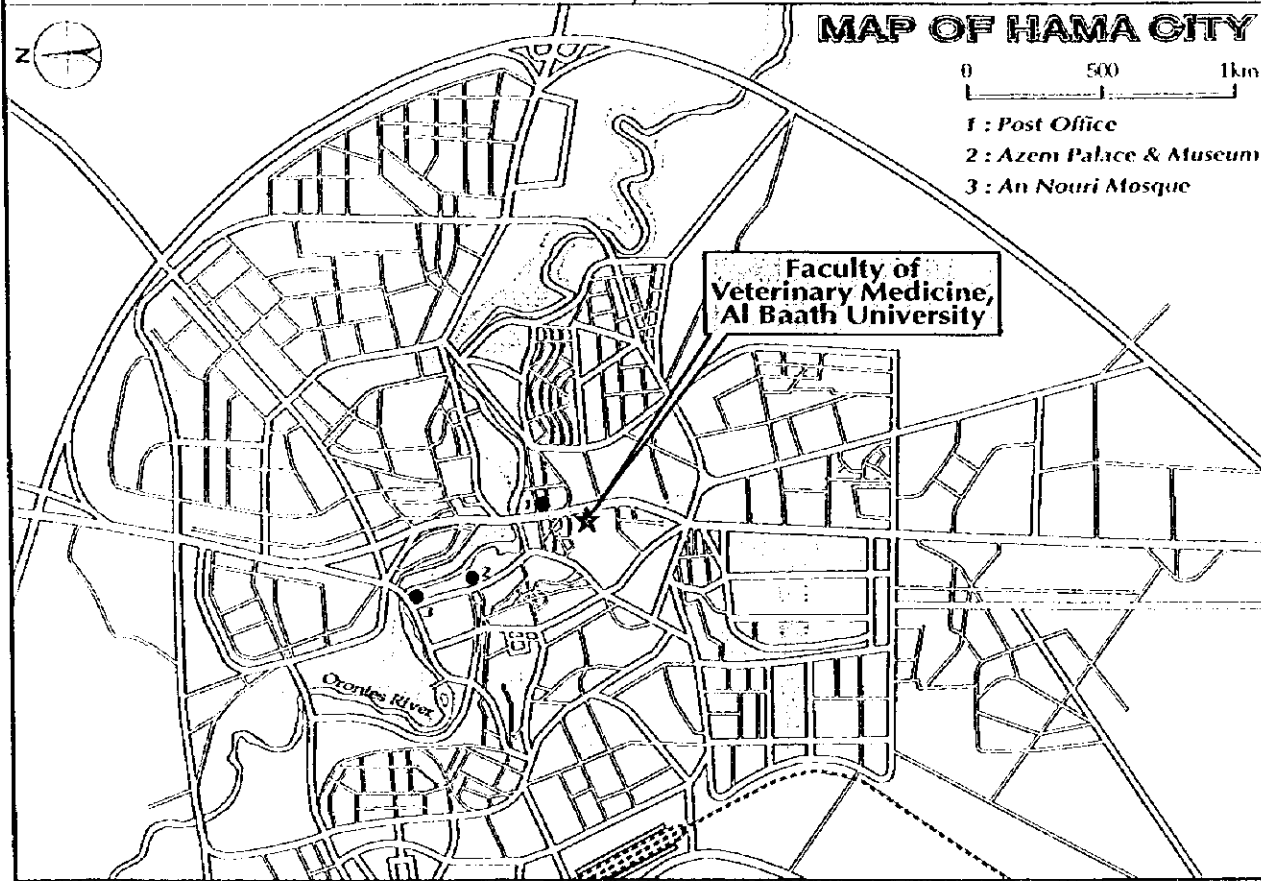
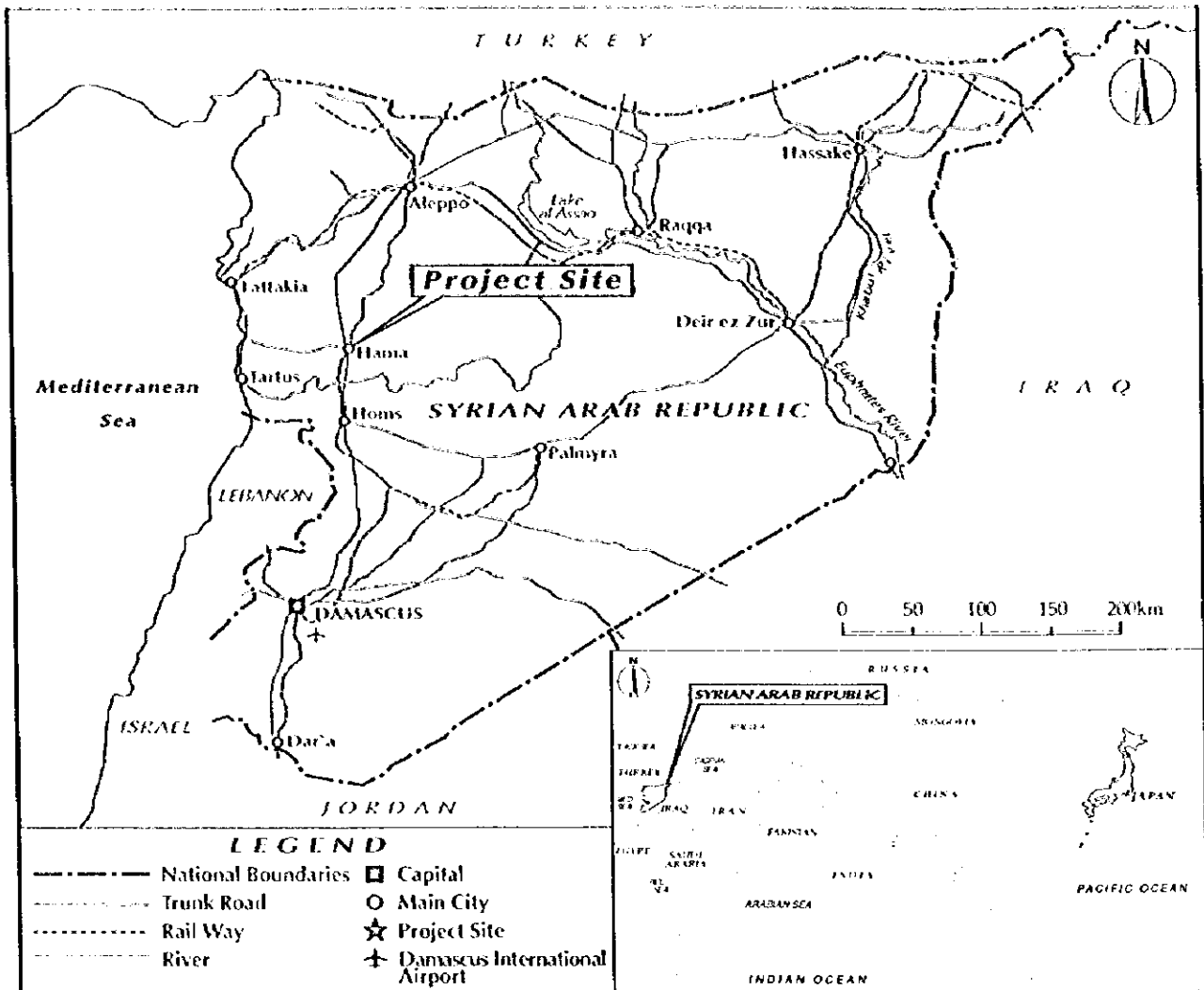


LEGEND

----- National Boundaries	■ Capital
==== Trunk Road	○ Main City
- - - - Rail Way	★ Project Site
~~~~~ River	✈ Damascus International Airport



**Location Map of the Project Site**



**Location Map of the Project Site**

## List of Abbreviations

4WD	Four-Wheel Drive (vehicle)
AVR	Automatic Voltage Regulator
B/A	Banking Arrangement
CD-ROM	Compact Disc Read-Only Memory
CPU	Central Processing Unit
DAH	Department of Animal Health
E/N	Exchange of Notes
ELISA	Enzyme-Linked ImmunoSorbent Assay
FAO	Food and Agriculture Organization of the United Nations
FID	Flame Ionization Detector
FVM	Faculty of Veterinary Medicine
GDP	Gross Domestic Product
GOC	General Organization of Cattle
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
HPLC	High Performance Liquid Chromatography
IAEA	International Atomic Energy Agency
JICA	Japan International Cooperation Agency
LPG	Liquefied Petroleum Gas
MAAR	Ministry of Agriculture and Agrarian Reform
Mb	Mega byte
MHE	Ministry of Higher Education
Mpa	Megapascal
NIR	Near Infrared Ray
OECD	Organization for Economic Cooperation and Development
OHP	OverHead Projector
O/M	Operation and Maintenance
Osm	Osmol
SP	Syrian Pound
SPC	State Planning Commission
SSVM	Secondary School of Veterinary Medicine
TCD	Thermal Conductivity Detector
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNDP	United Nations Development Program
UPS	Uninterruptible Power Supply
UV	UltraViolet
VHS	Video Home System
VIS	VISible rays

### **List of Abbreviations on Practical Training Lab. Referred in this Report**

ABR	Animal Breeding
AIN	Artificial Insemination
ANA	Anatomy
ANN	Animal Nutrition
BAC	Bacteriology
BIO	Biochemistry
BOT	Botany
CLL	Clinic Laboratory
EMB	Embryology
FID	Fish Disease
GEN	Genetics
GYN	Gynecology
HIS	Histology
INF	Informatics
INM	Internal Medicine
MEH	Meat Hygiene
MIH	Milk Hygiene
PAR	Parasitology
PAT	Pathology
POB	Poultry Breeding
PTP	Pasture and Toxic Plants
SUR	Surgery
VIR	Virology
ZOO	Zoology
CLDR	Central Laboratory for Diagnosis and Research
ZRA	Joint Use Exam. Room of CLDR
ZRB	Bacteriology Exam. Room of CLDR
ZRP	Parasitology Exam. Room of CLDR
ZRV	Virology Exam. Room of CLDR

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**Chapter 1      Background of the Project**





## **Chapter 1 Background of the Request**

### **1.1 Background History**

The population growth rate of the Syrian Arab Republic (hereinafter referred to as Syria) was a high 4 percent from 1970 to 1994 and increased rapidly from 6.3 million people to 13.8 million. Although this growth rate dropped to 3.2 percent following this period, the population has continued to increase. In order to establish a stable and self-supporting food supply, the Syrian government faces the urgent task of increasing livestock production of which expenditures occupy about one-third of an average household's income, as well as the production of major grains such as wheat, etc. However, due to the harsh climate and land conditions, measures to enlarge the extensive rearing system which is characteristic of current grazing practices are limited. Therefore, under the intensive rearing system, measures to control the high ratio of livestock diseases and to improve the production ratio are in demand. Consequently, the Syrian government has prioritized a policy to strengthen the health management of livestock, but in the production sites, the shortage of veterinarians with technical expertise in clinical diagnoses of livestock has impeded the implementation of this policy.

The Faculty of Veterinary Medicine, Al Baath University (hereinafter referred to as FVM) which is targeted by the Project is the nation's only institution of fostering veterinarians. In order to resolve the problem in the livestock sector as explained above, FVM has started strengthening basic research activities such as a livestock disease development mechanism, preparation of the database on regional livestock diseases, etc. And it has also started upgrading the practical skill of the students' clinical diagnoses for livestock through improving the existing curriculum. However, most of existing experiment and training equipment at FVM are more than 25 years old and they are depreciated and in disrepair. As a result, FVM has been unable to offer practical training and research activities in its curriculum and it has had to rely mainly on theoretical lectures. Hence it has been difficult to provide students with practical skills of clinical diagnoses.

In order to improve this situation, the Syrian government requested the Japanese government for assistance in providing the experiment and training equipment of FVM under the Japanese grant aid scheme.

## **1.2 Summary of the Request**

Equipment: Experiment and training equipment for each course (microscope, water quality checker, incubator, dissecting table, computer, etc.)  
Central Laboratory for Diagnosis and Research (microscope, spectrophotometer, gas chromatograph, HPLC, computer, wagon for disease sample collection, etc.)

Equipment for FVM (bus for field training, computer, etc.)

Facility: Training laboratory

Others: Training activities for counterparts

## **Chapter 2      Contents of the Project**



## **Chapter 2 Contents of the Projects**

### **2.1 Objectives of the Project**

The priority goal of the Project is to foster veterinarians who are experienced in clinical/laboratory diagnoses that are vital to the country's livestock health management program but that are not sufficiently being done at present.

This project aims to provide or replace the depreciated or deficient equipment and materials needed by FVM, and thereby enable practical indoor/outdoor training activities in clinical/laboratory livestock diagnoses to be conducted.

### **2.2 Basic Concept of the Project**

#### **2.2.1 Basic Framework of the Project**

FVM offers a five-year curriculum and has a student population of about 1,500 students. Although the number of students greatly drops during the first two years of the curriculum, it tends to stabilize thereafter. The average number of annual graduates in the last three years is 197. FVM organizes the curriculum of each academic year by dividing students into six groups (about 40 to 50 students/group). The first and second-year students are placed in the basic biology and science courses, and the third to fifth-year students are required to take the basic veterinary and basic clinical medical courses. During the five-year curriculum, students are required to earn 58 units in languages (Arabic and foreign languages), 244 units (116 units in lectures and 128 units in laboratory and training courses) in basic science and veterinary medicine (52 courses). FVM has about 30 laboratories to conduct the laboratory and training courses.

In addition, the students are required to undertake 120 hours in clinical field training and to submit a graduation thesis that covers about 80 subjects, about 40 subjects of which are usually focused in the field of pathological diagnoses. The students' research is mainly utilized by the Central Laboratory for Diagnosis and Research (hereinafter referred to as "CLDR"), which is responsible for investigating the cause of livestock diseases.

FVM is comprised of 59 academic lecturers with Ph. Dr's, seven veterinarians, and 27 training assistants, and there are no problems in implementing the educational curriculum of FVM. However, the experiment and training equipment In each course laboratory and CLDR, motor vehicle for conducting the clinical field training activities, etc. are lacking or are depreciated, and practical training activities in veterinary medicine have been curtailed.

Therefore, the Project proposes to provide the educational equipment and materials under the following framework, in order to resolve these issues confronting FVM.

- (1) The scope of the Project will limit only to provide experiment and training equipment, and will not include provision of a new laboratory and a counterpart training program.
- (2) Equipment that are needed or are depreciated in indoor experiment and training will be newly provided in accordance with the curriculum and syllabus of each course for all five academic years. The equipment for lecture will be out of scope of this Project because of low urgency.
- (3) The equipment required to enable the uninterrupted implementation of outdoor training conducted during the third to fifth academic years, particularly the clinical and diagnostic field training for the fifth-year students, will be provided.
- (4) The laboratory equipment for the existing CLDR that is needed or depreciated will be provided; in order to enable fifth-year students to adequately carry out experiments and graduation thesis related research in the field of pathological diagnoses. The equipment that are needed to collect and preserve various fresh livestock disease samples will be also provided.
- (5) Relatively advanced equipment requiring special maintenance care, which is needed by several of the training laboratories, will be installed at the CLDR and they will be used jointly by each training laboratory. The glassware will be placed under the management and care of CLDR and they will be distributed to the training laboratories as needed.
- (6) A one-year supply of consumables for the equipment, which cannot be purchased for the present through Al Bath University, will be provided by the Project.

### 2.2.2 Content of the Equipment Requested

Discussions were held with the dean of FVM and the head of each course based on the list of requested equipment that was submitted by the Syrian side during the field survey study; and both sides confirmed the content of the equipment requested. And the final list of requested equipment with the categorization according to the following levels of priority, was made and attached to the Minutes of Discussions. .

- A. High priority
- B. Joint use equipment
- C. Low priority
- D. Eliminated from the initially requested list

During the discussion process following the signing of the Minutes of Discussion, an addendum to the final list of equipment mentioned above that included a few items of equipment for the artificial insemination course, etc. was requested. The need for this additional equipment was reviewed by the Japanese side following the study team's return to Japan. Based on this review, it was decided that a segment of this additional equipment that would be included in the final list. The total number of equipment items that will be included in the final list is shown in Table 1 below.

Table 1 Number of Equipment Items in the Final List According to the Priority

Equipment Use	Number of Items	A	B	C	D
1) Lab/training equipment	310	266	23	18	3
2) Research equipment for graduation thesis for CLDR (including lab equipment)	227	189	0	37	2
3) Motor vehicle	2	2	0	0	0
4) Maintenance equipment for the faculty	2	0	0	0	0
5) Equipment for lectures	2	2	2	0	0
Total	543	459	25	55	5

A breakdown of the major items of equipment requested is shown in Table 2.



Table 2 Major Equipment Requested

1/3

Category	Major Equipment Items
1) Experiment/ -training equipment for each lab	Anatomy Stainless steel basin, stainless steel anatomy table, video camera, blood extracting apparatus, lifter, caster for animals, acupuncture needle, acupuncture point detector, refrigerator
	Embryology Egg hatchery, egg candler
	Histology Microscope, microscope with camera, tissue tech, microtome, microtome knife grinder, slide heat dryer
	Fish Disease Microscope, microscope with camera/monitor, stereoscopic microscope, water regulation fish tank
	Meat Hygiene Microscope, pH meter for meat, meat grinder, electronic balance, infrared moisture meter, magnetic stirrer with hot plate
	Milk Hygiene Microscope, Gerber centrifuge, water bath, automatic pipette, isotherm dryer, delvotester, refrigerator
	Pasture and Toxic Plant Microscope, microscope with camera/monitor, electronic balance, centrifuge, Neubauer blood cell counter, blood cell colony counter, gas chromatograph, rheometer, automatic Kjeldhal titration unit, viscometer, toxin checker, infrared moisture meter, micropipette, water distillation apparatus, rotary evaporator, spectrophotometer, toxin extraction apparatus, pH meter
	Clinic Laboratory Microscope with camera, fluorescent microscope, two stage distillation apparatus, blood cell counter, blood cell parameter counter, centrifuge, water distillation apparatus, spectrophotometer, OHP, ELISA reader
	Infectious Disease Centrifuge, multi-channel micropipette, micropipette, pipette aid, microplate shaker, slide projector, incubator, glassware, refrigerator, deep freezer
	Internal Medicine Microscope, stomach tube, stethoscope, catheter, spectrophotometer, blood cell counter, urometer, pH meter, centrifuge, hematocrit centrifuge, metal detector
	Poultry Disease Computer, digital camera, video projector, slide projector, EPI tube, mycotoxin detector, sensitivity test apparatus
	Bacteriology Microscope, fluorescent microscope, water distillation apparatus, hot air sterilizer, electronic balance, OHP, slide projector, centrifuge, colony counter, shaker, incubator, CO ₂ incubator, safety cabinet, sterilize box, homogenizer, water bath, micropipette, mixer
Parasitology Microscope, multi-head microscope, stereoscopic microscope, educational slide, slide projector, OHP	

Category	Major Equipment Items
2) Laboratory training equipment for each lab (cont.)	Virology Invert microscope, centrifuge, LN ₂ container, laminar flow, ELISA reader, egg hatchery, egg scanning box, test tube mixer, shaker
	Pathology Microscope, microscope with camera, multi-head microscope, slide heat dryer, incubator for paraffin wax, dissecting instrument, microtome, camera
	Animal Breeding Milking machine, video film of animal stables and breeds
	Animal Nutrition Stirrer with hot plate, colorimeter for feed, aflatoxin checker, electronic balance, hammer mill, sugar measuring device, cool water supply device, automatic Kjeldhal titration unit, mantle heater, glass utensils, metal bag container for stomach, glass filter, fat extraction apparatus, soxhlet
	Biochemistry Water distillation apparatus, centrifuge, homogenizer, water bath, electronic balance, micropipette, syringe pump, spectrophotometer, fluorescent spectrophotometer, column chromatograph, heater for laboratory, ventilator, experiment table, freezer, atomic absorption spectrophotometer
	Botany Microscope, laminar flow, water distillation apparatus, temperature and humidity control box, pH meter, stirrer
	Genetics Microscope with camera, computer
	Informatics Data projector, printer, computer, scanner, portable screen for computer, CD-ROM writer
	Pathophysiology Microscope, microscope with camera/ monitor, centrifuge, endoscope with video/ monitor, electronic balance, dissecting instruments, stomach fluid pump, water bath
	Pharmacology Kymograph, centrifuge, autoclave, electronic balance
	Physiology Microscope, microscope with camera/monitor, kymograph, centrifuge, ELISA reader, digital blood pressure meter, water distillation apparatus, spectrophotometer, computer, automatic blood cell counter, anatomy illustrations
	Poultry Breeding Large hatchery, poultry cage, yolk and albumin height measuring apparatus, egg shape measuring apparatus, egg air room measuring apparatus, egg shell thickness measuring apparatus, egg haugh calculator, refractometer
	Zoology Microscope, microscope with camera, microscope with camera/ monitor, electronic balance, microtome
	Artificial Insemination Hot air sterilizer, clean bench, osmometer, embryonic cell fusion system, micropipette grinder, micro-manipulator, CO ₂ incubator, LN ₂ container, insemination equipment, dilating boogie for cow, ultra-sound guided follicular oocyte aspiration system, automatic irrigator for collecting embryo, catheter for removing mucus, embryo collector, insemination equipment for sheep, artificial vagina for sheep, thermo-regulating cabinet for semen, semen vials, semen containers, estrous tester for cows, illumination lamp for vaginal speculum, printer for straw semen tube, infrared sterilizer for stored semen, semen examination plate, electronic sperm counter, sperm counter, electronic balance, program freezer
	Gynecology Autoclave, surgical instrument for small animals, hormone extraction apparatus, hormone analyser, microtome, video camera and TV, culture medium, ingredients for medium preparation
	Surgery X-ray device cassette for animals, stomach endoscope, ultrasonic camera, video camera

Category	Major Equipment Items	
3) Equipment for the CLDR	Joint use Exam. Room	Microscope with camera, fluorescent microscope, inverted microscope, macro photography system, hot air sterilizer, autoclave, automatic washing machine for glassware, electronic balance, top-pan balance, constant temperature water bath, shaking water bath, handy cooler, ice machine, pH meter, water purifying apparatus, 2-stage water distillation apparatus, hematocrit centrifuge, refrigerated centrifuge, power unit for the electrophoresis system, photosystem for electrophoresis, western blotting system, southern blotting system, computer, HPLC, gas chromatograph mass spectrophotometer, double beam spectrophotometer, automatic blood parameter counter, LN ₂ container, ultrasonic washer, pipette washer, ultrasonic pipette washer, shaking slide glass washer, magnetic stirrer, ultrasonic homogenizer, process homogenizer, homogenizer, hot plate, stirrer with hot plate, round hot bath, ELISA reader, micro titer system, dilutor, fraction collector system, glass column, blood counter, bench top shaker, micro dispenser, multi-channel micropipette, micropipette, compressor, diaphragm type vacuum pump, clean bench, laminar flow, desiccator, hot air sterilizer, drying shelf, lab cart, lab jack, laboratory glassware, mediums, animal cage, automatic voltage regulator, protein refractometer, anatomy kit, rapid agglutination tester, cool cabinet, freezer, deep freezer
	Bacteriology Exam. Room	Stereoscopic microscope, autoclave, electronic balance, centrifuge, photoelectric calorimeter, pH meter, turbidity meter, magnetic stirrer, bio clean bench, incubator, CO ₂ incubator, sterilize box
	Parasitology Exam. Room	Microscope, stereoscopic microscope, magnifier, centrifuge, egg counter, drain siphon for liver-fluke examination, rotator for glass heads method of liver-fluke eggs, stainless steel net for glass beads method, pH meter, electronic balance, incubator, gel punchers for agar gel, micropipette, refrigerator
	Virology Exam. Room	Inverted microscope, filtration system, laminar flow, dialysis system, Roller culture system, CO ₂ incubator, incubator, autoclave, egg hatchery, centrifuge, micro ultra-centrifuge, pH meter, multi-channel micropipette, micropipette, pipette aid, dispenser, water bath with shaker, magnetic low speed stirrer, glass culturing bottle
4) Motor Vehicle	Field Training	Bus used to transport students from the university campus to the field study area ( equipped with basic diagnostic instruments )
	Disease Sample Collection	A wagon for collecting fresh disease samples from each area (equipped with basic diagnostic instruments)
5) Equipment for Lectures		Direct projector for the large lecture hall, an interpreter's booth for the large lecture hall
6) Equipment for FVM	Equipment Maintenance	Computer for equipment maintenance purposes to be provided for each course
	Maintenance of used laboratory material	Incinerator to dispose of the materials used in the experiment and training classes

### **2.2.3 Review of the Request Content**

#### **(1) Selection Policy for the Equipment Provided by the Project**

The following factors will be considered when selecting the requested equipment, in addition to the priority level, purpose, function, and specifications of each item, which has been confirmed in deliberations with the academic staff members.

- 1) The equipment will be relevant to the practical experiment and training activities carried out by students in the field of livestock disease diagnoses, which is the objective of the Project.
- 2) The equipment will be coordinated with the educational curriculum and syllabus of the Faculty.
- 3) Duplication of equipment will be avoided and equipment, which will be provided by other donors, will not be provided by the Project.
- 4) Equipment, which is not urgently needed according to the objectives of the Project, will be excluded.
- 5) The minimum number of equipment items required for the joint use of the equipment will be provided.
- 6) Equipment that can be technically operated and maintained will be selected.
- 7) The costs required to maintain the equipment provided by the Project will be within the means of the university's budget.
- 8) Equipment essential to the operation and maintenance of the Project will be provided, although it may not have been requested.

#### **(2) Review Findings on the Content of the Request**

Based on the selection policy explained in section (1) above, the following decisions were reached based on a review of the equipment in the final request.

- 1) Equipment for laboratory and training activities in each course lab.
  - Equipment directly unrelated to student training activities which will not be provided by the Project (Example: computers for the physiology laboratory, poultry disease laboratory and genetics laboratory).

- Equipment irrelevant to the syllabus, which will not be provided by the Project (Examples: [Microscope, delvotester, etc. for the milk hygiene laboratory], [blood cell colony counter, microscope with camera/monitor, checker, etc. for the pasture and toxic plant lab], [pipette aid for the infectious disease lab], [sensitivity test apparatus, EPC tube, etc. for the poultry disease lab], [slide projector, safety cabinet, etc. for the bacteriology lab], [OHP for the parasitology lab], [test tube mixer, shaker, etc. for the virology lab], [syringe pump for the biochemistry lab], [laminar flow, water distillation apparatus, stirrer, pH meter, etc. for the botany lab], [microscope with camera for the genetics lab], [electronic balance, water bath, stomach fluid pump, etc. for the pathophysiology lab], [autoclave for the pharmacology lab], [microscope with camera/monitor, anatomy illustrations, etc. for the physiology lab], [laying cage for the poultry breeding lab], [microscope with camera/monitor, electronic balance, microtome, etc. for the zoology laboratory,], [bio clean bench, electronic balance, program freezer, straw printer, ultraviolet sterilizer for stored semen vials, etc. for the artificial insemination lab], [culture medium, ingredients for medium preparation, hormone extractor, hormone analyzer, microtome, etc. for the gynecology lab], [endoscopy apparatus, ultrasonic camera, etc. for the surgical lab], [gas chromatograph mass spectrophotometer for the joint use exam. room], [stereoscopic microscope, photoelectric calorimeter, etc. for the bacteriological lab], etc.).
- Equipment which need to be added in coordination with the syllabus (Example: [water distillation apparatus for the histology lab], [stereomicroscope with camera for the fish disease lab], [measuring pipette for the pasture and toxic plant lab], [autoclave for the clinic lab], [microscope with video/monitor for the internal medicine lab], [refrigerator for the parasitology lab], [egg candler for the virology lab], [debeaker for the animal breeding lab], [dehorn for the gynecology lab], etc.).

- Equipment, which will not be provided by the Project due to duplication (Example: Microscope, microscope with camera/monitor, centrifuge, endoscope with video/monitor, etc. for the pathophysiology lab. This laboratory will be divided and incorporated into the pathology lab and physiology lab in the near future.).
- Several similar types of equipment of which functions can be adjusted and integrated into one type of equipment by adjusting the specification settings (Example: [Microtome blade grinder for the histology lab], [automatic pipette, water bath, etc. for the milk hygiene lab], [electronic balance, centrifuge, rheometer, micropipette, etc. for the pasture and toxic plant lab], [multi-channel micropipette, etc. for the infectious disease lab], [micropipette, mixer, etc. for the bacteriology lab,], [laminar flow for the virology lab], [multi-head microscope for the pathology lab], [dishes used for dryer, soxhlet, aflatoxin detector for the animal nutrition lab,], [micropipette and centrifuge for the biochemistry lab], [printer for the informatics lab], etc.).
- Equipment, which is difficult to procure and operate that, will not be provided by the Project (Example: [acupuncture point detector for the anatomy lab], [toxin extraction apparatus for the pasture and toxic plant lab], [mycotoxin detector for the poultry disease lab], [metal bag container for stomach for the animal nutrition lab], etc.
- Equipment, which was eliminated from the Project due existing equipment or duplication (Example: lab table for the biochemistry lab, slide projector for the poultry disease lab, etc.)
- Equipment that is not appropriate for student training in view of the existing technical level (Example: Apparatus to transplant a series of fertilized eggs for the artificial insemination laboratory)
- Equipment, which should be used jointly with the other laboratories by its installation in CLDR for maintenance reasons (Example: [spectrophotometer, gas chromatograph, etc. for the pasture and toxic plant lab,], [2-stage water distillation apparatus, blood cell parameter counter, fluorescent microscope, ELISA reader for the clinic lab], [deep freezer for the infectious disease lab], [filtration system,

inverted microscope, LN₂ container, ELISA reader for the virology lab], [glasswares for the animal nutrition lab], [spectrophotometer, fluorescent spectrophotometer, atomic absorption spectrophotometer, column chromatograph, etc. for the biochemistry lab], [ELISA reader for the physiology lab].

## 2) Equipment for CLDR

- Several similar types of equipment of which functions can be adjusted and integrated into one type of equipment by adjusting the specification settings (Example: [water purifying apparatus, two-stage water distillation apparatus, magnetic stirrer, automatic UPS, clean bench, laminar flow, lab jack, desiccator, deep freezer, autoclave, hot air sterilizer, electronic balance, top pan balance, constant temperature water bath, microscope, automatic blood parameter counter for the joint use exam. room], [magnetic stirrer, incubator, centrifuge for the bacteriology exam. room], [low speed stirrer, autoclave, pipette aid for the virology exam. room])
- Equipment excluded from the Project due to existing equipment or duplication (Example: [water bath for the joint use exam. room], [incubator, CO₂ incubator for the virology exam. room].)
- Equipment not included in the Project due to maintenance problems (Ultra centrifuge for the virology exam.).
- Equipment that should be included for the operation and maintenance of the Project (Example: A copy machine for CLDR and a window-type air conditioner for each exam. room)

## 3) Motor Vehicle

### - Bus:

Under the new curriculum created in 1997, a clinical/diagnostic field-training program was developed for fifth year students. This program was incorporated into the current curriculum last year and is now under implementation. Students are taken out into the field to observe case studies of diseases by participating in actual clinical diagnosis of sheep and dairy cows during the seasonal migrations. This is the core

study program of the fifth year curriculum. A bus to transport the students has been requested as one of the items of equipment needed for this field-training program (installed with basic diagnostic pathology equipment). The existing bus which is greatly depreciated (more than 30 years old) is currently utilized to transport third and fourth year students on observation tours to livestock facilities or to field training activities during their summer vacation period. Mechanical breakdowns often occur during these field trips which have prevented the training activities to be implemented according to the curriculum. Hence the bus needs to be replaced. In view of the high frequency of use throughout the year, the appropriateness of providing a replacement of the bus under this Project is adequate. In addition, basic diagnostic pathology equipment includes a hematocrit centrifuge (to determine the presence of anemia), a portable refrigerator to store the antigenic liquids for agglutination reaction (which shows the progress of an infectious disease), a sterilizer spray, etc., which are used to diagnose and determine the animal's health in front of the students and the animal owner during the field training activities. These items of equipment will be provided by the Project since their installation on the bus greatly contributes to the effectiveness of the field training activities.

- Wagon:

Although a diverse range of livestock diseases have been observed in Syria, a systematic compilation of information on the diseases has not been completed. Presently, FVM does not have a motor vehicle to collect disease samples and it is limited to relying on a few samples brought in to FVM. In tandem with the project's aim to provide diagnostic pathology equipment, it is vital to the project's success that a system is established which will enable fresh samples (stool, blood, urine, ticks, etc.) to be collected throughout the year and which will assist graduation thesis research, and the work of graduate students and researchers. The provision of a wagon for collecting disease samples provided under this Project is considered appropriate since



about half of sheep in Hama province got some kinds of diseases or health problems in 1998. In addition, equipment such as a refrigerator to store fresh samples and carry out simple tests at sample collection points that will be loaded on the motor vehicle is needed.

#### 4) Equipment for lecture

The aim of this project is to provide equipment that will enable students to undertake practical training activities in the field of livestock diagnoses. Consequently, the direct overhead projector and the booth for simultaneous interpreters that was requested for the large lecture hall, are seen as low in priority according to this aim; and therefore, they have not been included in this project.

#### 5) Equipment for the faculty administration

- A computer was requested for each department for administrative purposes, but due to the difficulty in establishing a system of allocating responsibility for the maintenance and control of these computers, it was decided that one computer would be provided for the Faculty rather than each department, in order to enable their collective maintenance and control.
- An incinerator has been requested to dispose of used laboratory materials. Presently, the municipal incinerator is utilized to dispose of such materials. In order to avoid the spread or contamination by disease materials, they should be disposed of within the campus grounds.

### (3) Equipment Selected for the Project

The equipment which has been selected for the project in accordance with the results of the review explained in section (2), is shown in Table 3. The followings are the legend of wordings used in the Table 3.

#### 1) Priority level

The level of priority of each requested equipment item established by FVM, the implementing body of this project, is indicated below.

- A: High priority equipment
- B: Equipment to be used jointly by installing in the CLDR
- C: Low priority equipment

2) Review Results

The following categories were established for the requested equipment in accordance with the selection policy and its relevancy to the project's objectives.

- a: Equipment that will be used directly by students in their training activities
- b: Equipment needed to prepare the materials that will be used in training activities
- c: Equipment used to prepare the graduation thesis and for graduate research work
- d: Equipment unrelated to the syllabus, graduation thesis subject matter, etc.
  - Equipment, which can be substituted by other equipment
  - Equipment that is difficult to procure or to operate
  - Equipment categorized under low urgency due to duplication of existing equipment
- e: Equipment which needs integration of requested functions and/or adjustment of the requested quantity
- f: Equipment needed for the management, operations, and maintenance of the Project

3) Yes/No

Yes/No indicates whether or not the equipment will be provided by the Project using the following symbols.

- Y: Equipment that will be provided by the Project
- N: Equipment that will not be provided by the Project

4) Installation site/location

Installation site/location indicates the location where the equipment will be installed using the following symbols.

EL: The equipment will be installed at each training laboratory

DL: The equipment will be installed in the CIDR and its use will be shared.

Out of total existing equipment, only those equipment items, which meet the following conditions, were assumed and indicated as usable equipment.

Microscope : Equipment which continues to be usable irrespective of its period of use

Other lab equipment : Equipment of less than 15 years following their procurement.

Table 3 List of Selected Equipment

Anatomy Dept		Anatomy Course					4/15
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Stainless Steel Basin	8	A	ae	Y	EL	Need to adjust qty based on no. of tables
002	Stainless Steel Table with Caster	16	A	a	Y	EL	Training activities
003	TV set with Video	1	A	ab	Y	EL	Instruction in anatomy
004	Blood Extracting Apparatus from Neck	1	A	b	Y	EL	Blood extraction after slaughter
005	Air Blowing Apparatus for Stomach	1	A	b	Y	EL	For use in stomach, lungs,
006	Lifter	1	A	b	Y	EL	Lift lower large animals
007	Mat for Animals	1	A	b	Y	EL	To move heavy animals
008	Refrigerator	2	A	b	Y	EL	To store samples
009-01	Acupuncture Needle for Cattle	10	A	a	Y	EL	Acupuncture needles
009-02	Acupuncture Needle for Small Animals	10	A	a	Y	EL	Acupuncture needles
009-03	Electrical Acupuncture Stimulator	2	A	abe	Y	EL	Need to adjust quantity
009-04	Acupuncture Point Defector	2	A	d	N	-	Unreliable efficiency
Existing	Chain Block	1	-	-	-	-	To transport in/out of faculty

Anatomy Dept		Embryology Course					
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Egg Hatchery, capacity 50-60 eggs (Egg hatchery 40 eggs)	1	A	abc	Y	EL	Hatchery for exp., change to 40 eggs cap.
002	Egg Hatchery, capacity 100 eggs (Egg hatchery 80 eggs)	1	A	ab	Y	EL	Hatchery for exp., change to 80 eggs cap.
003	Egg Candler	5	A	a	Y	EL	

Anatomy Dept		Histology Course					
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Double head microscope	1	B	be	Y	EL	With camera/TV
002	Microscope with camera	1	B	be	-	-	Combined with 001
003	Tissue Tech	1	B	a	Y	EL	
004	Microtome	1	A	ae	Y	EL	Need to adjust quantity
005	Blade Sharpener	1	C	d	N	-	No need due to exchangeable blades
006	Dryer for slides	1	C	a	Y	EL	
007	Microscope	20	A	a	Y	EL	For student use, 2 persons/piece
008	Microscope with TV monitor	1	A	e	-	-	Combined with 001
009	Water distillation apparatus	1	New	ab	Y	EL	

Hygiene Dept		Fish Disease Course					
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Water regulation apparatus	1	A	be	Y	EL	Comparison of drug effect
002	Microscope	10	A	a	Y	EL	For student use, 4 persons/piece
003-01	Stereoscopic microscope	10	A	a	Y	EL	For student use, 4 persons/piece
003-02	Teaching stereoscopic microscope with cam	1	New	b	Y	EL	Preparing slides
004	Microscope with video camera For lab use with monitor	1	A	a	Y	EL	Monitor for student viewing
Existing	Water heater	1	-	-	-	-	
Existing	Refrigerator	1	-	-	-	-	

Hygiene Dept		Meat Hygiene Course					
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Hand pH meter (pH meter for meat)	2	A	a	Y	EL	
002	Meat grinder	1	A	ab	Y	EL	Student training, preparatory
003	Balance, 1000g 10mg	3	A	ae	Y	EL	Need to adjust quantity
004	Humidity measurement apparatus	1	A	a	Y	EL	
005	Microscope	10	A	a	Y	EL	For student use, 4 persons/piece
006	Magnetic stirrer with hot plate	1	A	ab	Y	EL	Students training, prep. of materials
Existing	Voltmeter	1	-	-	-	-	
Existing	Incubator	2	-	-	-	-	
Existing	Centrifuge	1	-	-	-	-	
Existing	Water bath	1	-	-	-	-	
Existing	Forced convection oven	1	-	-	-	-	
Existing	Autoclave	1	-	-	-	-	
Existing	pH meter	1	-	-	-	-	

Table 3 List of Selected Equipment

Hygiene Dept		Mdk Hygiene Course					2/16
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Gerber centrifuge with water bath	1	A	a	Y	EL	With pipette, butyrometer, heater
002-01	Water bath 40°C	1	A	a	Y	EL	Change to 100°C
	(Water bath, medium)						
002-02	Water bath 100°C	1	D	d	N	-	Combined with 002-01
	Round type, capacity 7 liters						
003	Hot air oven	2	A	bc	Y	EL	Drying instruments, need to adjust q'ty
004	Automatic pipette	40	A	d	N	-	Not needed since centrifuge w/pipette provided
005	Refrigerator	2	A	b	Y	EL	Store samples
006	pH meter	1	A	a	Y	EL	
007	Microscope	10	B	d	N	-	Not required based on syllabus
008	Delvotest	1	A	d	N	-	Not required based on syllabus
Existing:	Incubator	1	-	-	-	-	

Hygiene Dept		Pasture and Toxic Plants Course					
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001-01	Balance 200g 0.1mg	3	A	d	N	-	Not required due to high sensitivity
001-02	Balance 100g 0.1g	3	A	d	N	-	Combined with 001-04
	(Balance 300g 0.1g)						
001-03	Balance 500g 1mg	3	A	bc	Y	EL	Spec. changed, need to adjust quantity
	(Balance 400g 1mg)						
001-04	Balance 1000g 100mg	3	A	ae	Y	EL	Need to adjust quantity
002	Microscope for lab use	10	B	a	Y	EL	Students use (4 pers/unit)
003	Microscope for research use	1	A	d	N	-	Not needed in view of syllabus
004	Centrifuge 3000rpm	1	A	ab	Y	EL	Change in specification
	(Centrifuge 6000rpm)						
005	Centrifuge 6000rpm	1	A	d	N	-	Combined with 004
	(small type with angle rotor)						
006	Neubauer blood cell counter	1	A	ae	Y	EL	Student use, need to change quantity
007	Blood parameter counter	1	C	ae	Y	EL	Quantity same as above
008	Gas chromatograph	1	B	abe	-	DL	Joint use with CLDC
001	Automatic Kjeldhal titration unit	1	A	a	-	EL	
002	Magnetic stirrer	2	A	a	Y	EL	
	(Magnetic stirrer with hot plate)						
003	Viscometer	1	A	a	Y	EL	Measure toxic plants
004	Rheometer	1	C	d	N	-	Combined with 003
	(Rheometer system)						
005	Portable toxin checker	3	A	d	N	-	Not needed in view of syllabus
	(Gas detector)						
006	Thermograph moisture meter	3	A	ae	Y	EL	Need to adjust quantity
	(Infra-red moisture meter)						
007-01	Micropipette 1000 μ liter	10	A	ae	Y	EL	Change in measure range, need to adjust q'ty
	(Micropipette 100-1000 μ liter)						
007-02	Micropipette 500 μ liter	10	A	d	N	-	Combined with 007-01
007-03	Micropipette 100 μ liter	10	A	ae	Y	EL	Change in measure range, need to adjust q'ty
	(Micropipette 10-100 μ liter)						
007-04	Micropipette 50 μ liter	10	A	d	N	-	Combined with 007-03
007-05	Micropipette 20 μ liter	10	A	a	N	EL	Combined with 007-03, 007-06
	(Micropipette 2-20 μ liter)						
007-06	Micropipette 5 μ liter	10	A	de	Y	-	Change in measure range, need to adjust q'ty
	(Micropipette 0.5-10 μ liter)						
007-07	Micropipette 1 μ liter	10	A	ae	Y	EL	Change in measure range, need to adjust q'ty
	(Micropipette 0.1-2 μ liter)						
007-08	Measuring pipette 0.1ml	8	New	a	Y	EL	
007-09	Measuring pipette 1ml	8	New	a	Y	EL	
007-10	Measuring pipette 10ml	3	New	a	Y	EL	
008	Water distillation apparatus	1	A	a	Y	EL	For primary distillation
009	Rotary evaporator	1	C	b	Y	EL	
010	Spectrophotometer	1	C	abe	-	DL	Joint use with CLDR
011	Freezer	1	A	b	Y	EL	To store samples
012	Refrigerator	2	A	bc	Y	EL	To store samples
013	Fluid extraction apparatus	1	B	d	N	-	Not applicable
014	Meat mixer	2	A	a	Y	EL	To prepare ingredients
015-01	pH meter for lab use	1	A	ae	Y	EL	For liquid use
015-02	pH meter for meat	1	New	ae	Y	EL	

Table 3 List of Selected Equipment

Internal Medicine & Infectious Disease Dept		Infectious Disease Course					3-16
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Centrifuge 6000rpm	2	A	bc	Y	EL	Need to adjust quantity
002	Multi channel micropipette 5-50 $\mu$ liter	2	A	ae	Y	EL	Need to adjust quantity
003-01	Multi channel micropipette 100-500 $\mu$ liter	1	A	-	N	-	Combined with 003-02
003-02	Multi channel micropipette 40-200 $\mu$ liter	1	New	ae	Y	EL	
004	Micropipette 0.5-10 $\mu$ liter	2	A	ae	Y	EL	Need to adjust quantity
005	Micropipette 2-20 $\mu$ liter	2	A	ae	Y	EL	Combined with 004, 006
006	Micropipette 10-100 $\mu$ liter	2	A	ae	Y	EL	Need to adjust quantity
007	Micropipette 100-1000 $\mu$ liter	2	A	ae	Y	EL	Need to adjust quantity
008	Shaker for Micropipette	1	A	a	Y	EL	
009	Double action shaker	1	A	a	Y	EL	
010	OHP (Direct projector)	1	A	a	Y	EL	
011	Incubator	1	A	b	Y	EL	
012	Refrigerator	1	A	b	Y	EL	To store samples
013	Freezer -70°C	1	A	b	-	DL	Joint use with CLDR
014	Flask 20ml	20	A	a	-	DL	Joint use with CLDR
015	Flask 50ml	20	A	a	-	DL	Joint use with CLDR
016	Flask 100ml	20	A	a	-	DL	Joint use with CLDR
017	Flask 250ml	10	A	a	-	DL	Joint use with CLDR
018	Flask 500ml	10	A	a	-	DL	Joint use with CLDR
019	Beaker 200ml	10	A	a	-	DL	Joint use with CLDR
020	Beaker 500ml	10	A	a	-	DL	Joint use with CLDR
021	Petri Dish 36x15	20	A	a	-	DL	Joint use with CLDR
022	Petri Dish 45x15	20	A	a	-	DL	Joint use with CLDR
023	Petri Dish 60x15	20	A	a	-	DL	Joint use with CLDR
024	Petri Dish 75x15	20	A	a	-	DL	Joint use with CLDR
025	Petri Dish 90x20	20	A	a	-	DL	Joint use with CLDR
026	Petri Dish 94x20	20	A	a	-	DL	Joint use with CLDR
027	Test Tube 12x75	2	A	a	-	DL	Joint use with CLDR
028	Test Tube 12x90	2	A	a	-	DL	Joint use with CLDR
029	Test Tube 12x105	2	A	a	-	DL	Joint use with CLDR
030	Test Tube 12x120	2	A	a	-	DL	Joint use with CLDR
031	Pipette Aid	2	New	d	N	-	Not necessary for student training

Internal Medicine & Infectious Disease Dept		Internal Medicine Course					
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Stomach tube for Cattle	3	A	ae	Y	EL	Need to adjust quantity
002	Stomach tube for Horses	3	A	ae	Y	EL	Need to adjust quantity
003	Stethoscope	5	A	ae	Y	EL	Need to adjust quantity
004	Catheter for cattle	5	A	ae	Y	EL	Need to adjust quantity
005	Catheter for Horses	10	A	ae	Y	EL	Need to adjust quantity
006	Spectrophotometer	1	A	abe	-	DL	Joint use with CLDR
007	Blood cell counter	20	A	a	Y	EL	2 persons/piece
008	Urometer	1	A	a	Y	EL	
009	pH meter	1	A	a	Y	EL	
010	Centrifuge 6000rpm	1	A	a	Y	EL	
011	Hematocrit apparatus, Centrifuge	1	A	a	Y	EL	Blood analysis
012-01	Stereoscopic microscope	10	A	a	Y	EL	Student use
012-02	Microscope with Video and monitor	1	New	a	Y	EL	For students viewing
013	Metal detector	2	A	ae	Y	EL	Need to adjust quantity

Table 3 List of Selected Equipment

Internal Medicine & Infectious Disease Dept		Poultry Disease Course					4/16
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Computer	1	A	d	N	-	Not required based on syllabus
002	Slide Projector	1	A	d	N	-	Existing
003	Slides and Video Films for Poultry Disease	1	C	d	N	-	Low urgency
004	Sensitivity Test Apparatus	1	A	d	N	-	Not required based on syllabus
005	Antibiotic Disks	5	A	dc	N	-	Combined with drugs
006	EPC Tube Apparatus	20	A	d	N	-	Not required based on syllabus
007	Mycotoxin Diagnostic Tool	1	A	d	N	-	Not applicable
Existing	Slide Projector	1	-	-	-	-	
Existing	Water bath	1	-	-	-	-	
Existing	Centrifuge	3	-	-	-	-	
Existing	Colony counter	1	-	-	-	-	
Existing	Air cleaner	1	-	-	-	-	
Existing	ELISA reader	1	-	-	-	-	
Existing	Microscope	1	-	-	-	-	
Existing	Incubator	1	-	-	-	-	
Existing	Two step distiller	1	-	-	-	-	
Existing	Incubator for eggs	1	-	-	-	-	
Existing	Refrigerator	1	-	-	-	-	
Existing	Centrifuge with freezer	1	-	-	-	-	

Table 3 List of Selected Equipment

Microbiology Dept.		Bacteriology Course				5/16	
No	Name of Equipment	Final Re-quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Autoclave, horizontal	2	A	a	Y	FL	Changed to vertical tpe
001	Distilled water apparatus	1	A	a	Y	FL	
003	Fluorescence microscope	1	B	-	-	DL	Joint use with CLDR
004	Deep freezer	1	A	-	-	DL	Joint use with CLDR
005	Microscope	30	B	ae	Y	FL	1 unit/2persons, need to adjust qty
006	Digital balance, 1000g	1	A	a	Y	FL	
	(Digital balance 1000g 10mg)						
007	Digital balance, 500g	1	C	a	Y	EL	Scope of measurement changed
	(Digital balance 400g 1mg)						
008	Overhead projector	1	A	a	Y	EL	
009	Slide projector	1	A	d	N	-	Not required based on syllabus
010	Centrifuge 6000rpm	1	A	a	Y	EL	
011	Colony counter	2	C	a	Y	EL	
012-01	Shaker	2	A	a	Y	EL	
	(Magnetic shaker 2 liter)						
012-02	(Magnetic shaker 5 liter)	1	A	a	N	EL	Combined with 012-03
012-03	(Magnetic shaker 10 liter)	1	A	a	Y	EL	
013	Incubator medium	2	C	ae	Y	FL	Need to adjust quantity
	(Incubator)						
014	CO ₂ incubator medium	1	A	abe	-	DL	Joint use with CLDR
	(CO ₂ incubator)						
015	Biological safety cabinet	1	C	d	N	-	Not required based on syllabus
016	Set of stained smears and slides	1	B	a	Y	EL	Student training
017	Clean bench	1	A	abc	Y	EL	Joint use with CLDR
018	Opacity tube	5	A	a	Y	EL	Need to adjust quantity
018-01	Cell homogenizer	1	A	b	Y	EL	Need to adjust quantity
018-02	Micro homogenizer	1	A	b	Y	EL	Need to adjust quantity
019	Double action mixer	1	A	b	Y	EL	Need to adjust quantity
020-01	Mixer	2	A	a	Y	FL	Need to adjust quantity
020-02	(Mixer)	3	New	d	N	-	Combined with 019
021	Water bath, small	2	A	a	Y	EL	
	(Water bath small)						
022	Disposable container	8	C	a	Y	EL	2 units/group, 4 groups
023-01	Micropipette 200-1000	3	A	d	N	-	Not required based on syllabus
023-02	Micropipette 2-20	3	A	d	N	-	Not required based on syllabus
023-03	(Micropipette 5)	3	A	d	N	-	Not required based on syllabus
023-04	(Micropipette 10)	3	A	d	N	-	Not required based on syllabus
023-05	(Micropipette 20)	3	A	d	N	-	Not required based on syllabus
023-06	(Micropipette 25 $\mu$ liter)	3	A	ae	Y	EL	For agglut. reaction, need to adjust qty
023-07	(Micropipette 50)	3	A	d	N	-	Not required based on syllabus
023-08	(Micropipette 100)	3	A	d	N	-	Not required based on syllabus
023-09	(Micropipette 200)	3	A	d	N	-	Not required based on syllabus
023-10	(Micropipette 250)	3	A	d	N	-	Not required based on syllabus
023-11	(Micropipette 300)	3	A	d	N	-	Not required based on syllabus
023-12	(Micropipette 500)	3	A	d	N	-	Not required based on syllabus
023-13	(Micropipette 1000)	3	A	d	N	-	Not required based on syllabus
023-14	(Micropipette 0.5-10)	3	A	d	N	-	Not required based on syllabus
023-15	(Micropipette 10-100)	3	A	d	N	-	Not required based on syllabus
023-16	(Multi-channel micropipette 100-1000)	3	A	d	N	-	Not required based on syllabus
024-01	Multi-channel micropipette 5-50 $\mu$ liter	2	B	ab	Y	EL	
024-02	(Multi-channel micropipette 40-200 $\mu$ liter)	1	New	abe	Y	EL	Need to adjust quantity
025-01	Stainless steel box for autoclave $\phi$ 300	4	A	be	Y	EL	Need to adjust quantity
025-02	Stainless steel box for autoclave $\phi$ 120	10	New	be	Y	EL	Need to adjust quantity



Table 3 List of Selected Equipment

Microbiology Dept		Parasitology Course					6/16
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Stereoscopic microscope	10	A	a	Y	EL	1 unit/4 persons
002	Microscope	20	A	a	Y	EL	Combined with existing equipment, 1 unit/person
003	Multi-head microscope with monitor	1	A	a	Y	EL	Student use, preparation of samples
004	Educational slide for parasitology	1	A	a	Y	EL	
005	Slide	1	A	d	N	-	Frequency of use limited
006	Slide projector	1	A	d	N	-	Frequency of use limited
007	Refrigerator	1	New	ab	Y	EL	For storage of samples
Existing	Microscope	20	-	-	-	-	
Existing	Incubator	1	-	-	-	-	
Existing	Centrifuge	1	-	-	-	-	

Microbiology Dept		Virology Course					
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Ultra centrifuge	1	A	d	N	-	Not needed at present stage
002	Filtration apparatus	1	A	abe	-	DL	Joint use with CLDR
003	Inverted microscope	2	A	abe	-	DL	Joint use with CLDR
004	Container for liquid nitrogen 32 liter	1	A	abe	-	DL	Joint use with CLDR
004-02	Container for liquid nitrogen 10 liter	1	A	abe	-	DL	Joint use with CLDR
005	Luminar flow	1	A	d	N	-	Existing clean bench will suffice
006	ELISA reader	1	A	abe	-	DL	Joint use with CLDR
007-01	Egg hatchery 50 eggs	1	A	a	Y	EL	Spec. change to 40 eggs
	(Egg hatchery 40 eggs)						
007-02	Egg candler	5	New	ae	Y	EL	Used by 4 groups, need to adjust qty
008	Egg scanning box	1	A	a	Y	EL	Used by the whole
009	Mixer, tube	2	A	d	N	-	Not required based on syllabus
010	Shaker	1	A	d	N	-	Not required based on syllabus
Existing	Incubator	2	-	-	-	-	
Existing	Clean bench	1	-	-	-	-	
Existing	pH meter	1	-	-	-	-	
Existing	Refrigerator	1	-	-	-	-	
Existing	Lab blender	1	-	-	-	-	
Existing	Heater	1	-	-	-	-	

Pathology Dept		Clinic Laboratory					
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Microscope (Microscope with camera for lab)	1	A	b	Y	EL	Preparation of slide (with camera)
002	2 step distillation apparatus	1	A	abe	-	DL	Joint use with CLDR
003-01	SS box for autoclave 1 liter	5	A	b	Y	EL	
	(SS box for autoclave φ 300)						
003-02	SS box for autoclave 1.9 liter	10	A	b	Y	EL	
	(SS box for autoclave φ 120)						
003-03	SS box for autoclave 3.2 liter	2	A	b	Y	EL	
	(SS box for autoclave φ 300)						
004	Neubauer blood cell counter	10	A	ae	Y	EL	Need to adjust quantity
005	Counter	5	A	abe	Y	EL	Need to adjust quantity
006	Blood parameter counter	2	C	abe	-	DL	Joint use with CLDR
007	Centrifuge, small type	1	C	a	Y	EL	
008	Spectrophotometer	1	C	a	Y	EL	
009	Sampling tube	50	A	ae	Y	EL	
010	Water distillation apparatus	1	A	b	Y	EL	
011	OHP	1	B	ae	Y	EL	
012	Fluorescence microscope	1	A	abe	-	DL	Joint use with CLDR
013	ELISA reader	1	B	abe	-	DL	Joint use with CLDR
	Autoclave	1	New	ab	Y	EL	
Existing	Incubator	1	-	-	-	-	
Existing	Microscope	10	-	-	-	-	
Existing	Refrigerator	1	-	-	-	-	
Existing	Freezer	1	-	-	-	-	
Existing	Boiler	1	-	-	-	-	

Table 3 List of Selected Equipment

Pathology Dept.		Pathology Course						2:16
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks	
001	Slide heat dries	1	A	a	Y	EL		
002	Incubator for paraffin wax	1	A	b	Y	EL		
003	Double head microscope	3	A	d	N	-	Combined with 004	
004	Multi-head microscope	1	A	b	Y	EL	Slide preparation	
005	Microscope for lab use	30	A	a	Y	EL	Unit person incl. existing equipment	
006	Microscope with camera & macro photo sys	1	A	bc	Y	EL	Substituted with macro unit 009	
007	Autopsy kit	2	A	ab	Y	EL		
008	Microtome	1	A	abc	Y	EL	Student use, need to adjust quantity	
009	Camera	1	A	b	Y	EL	With macro lens	
010	Chain block	1	A	b	Y	EL	Used in moving in and out	
Existing	Refrigerated microtome	1	-	-	-	-		
Existing	Microscope	10	-	-	-	-		
Existing	Vacuum infiltration	1	-	-	-	-		
Existing	Rotary embedding apparatus	1	-	-	-	-		

Physiology Dept.		Animal Breeding Course					
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Milking machine	1	A	a	Y	EL	For training operation
002	Video films of animal stables & breeds	1	A	d	N	-	Low urgency

Physiology Dept.		Animal Nutrition Course					
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Magnetic stirrer with heater	2	A	a	Y	EL	
002	Calorimeter for energy measurement of feed	1	B	a	Y	EL	
003	Detecting / measurement of Aflatoxin in feed	1	B	d	N	-	Not applicable
004-01	Electric balance 200g 0.1mg	2	A	abc	Y	EL	Need to adjust quantity
004-02	Electric balance 400g 1.0mg	1	A	ab	Y	EL	
005	Dry feed hammer mill for food-stuffs	1	A	ab	Y	EL	To pulverize ingredients
006	Software for feed formulation (Cattle, Sheep)	1	A	d	N	-	Not required based on syllabus
007	Starch and sugar (in food / feed) measuring	1	C	a	Y	EL	
008	Cool water supply device	1	A	a	Y	EL	
009	Moisture measuring device, Infrared type	1	A	a	Y	EL	
010	Dishes used for dryer	100	A	ac	Y	EL	Need to adjust quantity
010-02	Dishes used for dryer 270x350	1	A	d	N	-	This size is not required
010-03	Dishes used for dryer 240x310	1	A	d	N	-	This size is not required
011	Porcelain cups to be used in oven	100	A	ac	Y	EL	Need to adjust quantity
012	Automatic Kjeldahl titration unit	1	A	a	Y	EL	
013	Safety helmet	10	A	d	N	-	Not required based on syllabus
014	Filtration unit (Draft chamber)	1	B	abc	Y	EL	Draft chamber will be used, overall ventilation impossible. Need to adjust qty
015	Auto burette	1	C	ac	Y	EL	
016	Heating mantle	4	A	a	Y	EL	
017	Soxhlet 500ml	6	A	d	N	-	Combined with 024
018	Flask 150ml	20	A	ab	-	DL	Main. & distribution by CLDR
019	Beaker 1000ml	10	A	ab	-	DL	Main. & distribution by CLDR
020	Flask 1000ml	10	A	ab	-	DL	Main. & distribution by CLDR
021	Metal bag container for stomach	1	A	d	N	-	Limited reliability of materials
022	Glass filter	15	A	ab	-	DL	Main. & distribution by CLDR
023-01	Beaker with holder 500ml	5	A	ab	-	DL	Main. & distribution by CLDR
023-02	Beaker with holder 1000ml	5	A	ab	-	DL	Main. & distribution by CLDR
024	Fat extraction apparatus	10	A	ac	Y	EL	Need to adjust quantity
Existing	Distillation unit	1	-	-	-	-	
Existing	Kjeldahl digestion apparatus	1	-	-	-	-	
Existing	Scrubber	1	-	-	-	-	
Existing	Electronic balance	1	-	-	-	-	
Existing	Vacuum pump	1	-	-	-	-	
Existing	Soxhlet fat extractor	1	-	-	-	-	
Existing	Gram analyser	1	-	-	-	-	
Existing	Ultra red nitrogen	1	-	-	-	-	
Existing	Incubator	1	-	-	-	-	
Existing	Muffle furnace	1	-	-	-	-	

Table 3 List of Selected Equipment

Physiology Dept.		Biochemistry Course						4/16
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks	
001	Water distillation apparatus	1	A	a	Y	EL		
002-01	Centrifuge 6000rpm	2	A	ae	Y	EL	Need to adjust quantity	
002-02	Centrifuge 8000rpm	2	A	d	N	-	Standardize with 002-01	
003	Homogenizer	1	A	a	Y	EL		
004	Thermostat (Water bath)	1	A	a	Y	EL		
005-01	Balance 500g 0.5g (Balance 300g 0.1g)	1	A	a	Y	EL	Change in measuring range	
005-02	Balance 200g 0.05g (Balance 1000g 10mg)	1	A	a	Y	EL	Change in measuring range	
006	Syringe pump	1	C	d	N	-	Not required based on syllabus	
007-01	Micropipette 5-50 (Micropipette 0.5-10 $\mu$ liter)	1	A	a	Y	EL	Change in measuring range	
007-02	Micropipette 10-100 $\mu$ liter	1	A	a	Y	EL	Change in measuring range	
007-03	Micropipette 50-500 (Micropipette 20-200)	1	A	d	N	-	Combine with 007-02, 06	
007-04	Micropipette 500	1	A	d	N	-	Combine with 007-02, 06	
007-05	Micropipette 1000	1	A	d	N	-	Combine with 007-02, 06	
007-06	Micropipette 100-1000 $\mu$ liter	1	A	a	Y	EL		
008	Spectrophotometer	5	A	ae	Y	EL	Need to adjust quantity	
009	Spectrophotometer	1	B	ab	-	DL	Joint use with CLDR	
010	Fluorescence spectrophotometer	1	B	ab	-	DL	Joint use with CLDR	
011	Atomic absorption spectrophotometer	1	B	ab	-	DL	Joint use with CLDR	
012	Tube chromatographic apparatus	1	B	ab	-	DL	Joint use with CLDR	
013	pH meter	1	A	a	Y	EL		
014	Electric stove (Alcohol lamp, stainless steel)	16	A	ae	Y	EL	Need to adjust quantity, change to lamp, not able to use with electric power	
015	Laboratory sample mill	1	C	a	Y	EL		
016	Freezer	1	A	b	Y	EL	To store samples (-30°C)	
017	Filtration unit (Draft chamber)	1	A	a	Y	EL	Overall ventilation not possible (Use draft chamber)	
018	Laboratory table	11	A	d	N	-	Existing table will be used	

Physiology Dept.		Botany Course					
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Microscope	40	A	ae	Y	EL	Need to adjust quantity
002	Lamina flow	1	A	d	N	-	Not required based on syllabus
003	Distillation apparatus	1	A	d	N	-	Not required based on syllabus
004	Temp. and humidity box	1	A	b	Y	EL	Culture of plants
005	Magnetic stirrer 5 liter	1	A	d	N	-	Not required based on syllabus
006	pH meter	1	A	d	N	-	Not required based on syllabus

Physiology Dept.		Genetics Course					
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Computer	2	A	d	N	-	Not required based on syllabus
002	Microscope with camera	1	A	d	N	-	Not required based on syllabus

Physiology Dept.		Informatics Course					
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Data projector	1	A	d	N	-	Low urgency
002	A3 printer	1	A	d	N	-	Low urgency
003	A4 printer	1	A	d	N	-	Low urgency
004	Computer	6	A	d	N	-	Low urgency
005	Scanner	2	A	d	N	-	Low urgency
006	UPS	6	A	d	N	-	Low urgency
007	Portable screen for computer	1	B	d	N	-	Low urgency
008	CD-ROM writer	2	A	d	N	-	Low urgency
	Existing OHP	1	-	-	-	-	
	Existing Computer	14	-	-	-	-	
	Existing Printer	1	-	-	-	-	

Table 3 List of Selected Equipment

Physiology Dept.		Pathophysiology Course					9/16
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Microscope	15	A	d	N	-	Joint use with Physiology course
002	Microscope with camera & monitor	1	A	d	N	-	Not required based on syllabus
003	Centrifuge 6000rpm	1	A	d	N	-	Joint use with Physiology course
004	Endoscope with TV monitor and video cam	1	A	d	N	-	Not required based on syllabus
005	Electric balance 400g 1mg	1	A	d	N	-	Not required based on syllabus
006	Anatomy instrument kit	10	A	a	Y	EL	
007	Water bath	1	A	d	N	-	Not required based on syllabus
008	Video film / educational pathophysiology	1	A	d	N	-	Not applicable
009	Pump for stomach fluid	1	A	d	N	-	Not required based on syllabus

Physiology Dept.		Pharmacology Course					
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Kymograph	4	A	a	Y	EL	4 groups/class room use
002	Centrifuge 6000rpm	1	A	b	Y	EL	
003	Autoclave	1	A	d	N	-	Not required based on syllabus
004	Balance 500g 1mg	4	A	a	Y	EL	Change spec. to 400g 1mg

Physiology Dept.		Physiology Course					
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Microscope	30	A	a	Y	EL	Need to adjust quantity
002	Kymograph	20	A	a	Y	EL	Need to adjust quantity
003	Centrifuge 6000rpm	1	A	a	Y	EL	Spec. differ from existing equipment
004	Microscope with camera & monitor	1	B	d	N	-	Not required based on syllabus
005	Centrifuge, small	1	A	a	Y	EL	Spec. differ from existing equipment
006	Water bath, medium	1	A	a	Y	EL	Spec. differ from existing equipment
007	ELISA reader	1	A	ab	-	DL	Joint use with CLDR
008	Digital oscillometer (Blood pressure)	8	A	a	Y	EL	4 groups/classroom use
009	Water distillation apparatus	1	A	a	Y	EL	
010	Spectrophotometer	1	A	a	Y	EL	
011	Illustrators for animal body	0	D	d	N	-	Not required based on syllabus
012	Computer	1	A	d	N	-	Not required based on syllabus
013	Automatic blood cell counter	1	B	ab	-	DL	Joint use with CLDR
Existing	Blood pressure meter	1	-	-	-	-	
Existing	pH meter	1	-	-	-	-	
Existing	Kymograph	1	-	-	-	-	
Existing	Gas heater	1	-	-	-	-	
Existing	Brain scanner	1	-	-	-	-	
Existing	Refrigerator	1	-	-	-	-	
Existing	Centrifuge	1	-	-	-	-	
Existing	Photometer	1	-	-	-	-	
Existing	Water bath	1	-	-	-	-	

Physiology Dept.		Poultry Breeding Course					
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Egg incubator (Egg incubator, 80 eggs)	1	A	a	Y	EL	Change to 40 eggs
002	Laying cage	1	A	d	N	-	Cage not necessary
003	Micrometer for measuring height	5	A	ae	Y	EL	Need to adjust quantity
004	Micrometer for measuring egg size	5	A	ae	Y	EL	Need to adjust quantity
005	Micrometer for measuring depth of air	5	A	ae	Y	EL	Need to adjust quantity
006	Micrometer for measuring egg shell	5	A	ae	Y	EL	Need to adjust quantity
007	Interior quality measuring device	5	A	ae	Y	EL	Need to adjust quantity
008	Refractometer	5	A	ae	Y	EL	Need to adjust quantity
009	De-benker	2	New	ae	Y	EL	Need to adjust quantity

Table 3 List of Selected Equipment

Physiology Dept		Zoology Course					10/16
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Microscope	30	A	ae	Y	EL	Need to adjust quantity
002	Microscope with camera	1	A	a	Y	EL	Slide preparation
003	Stereoscopic microscope with monitor and	1	A	d	N	-	Not required based on syllabus
004	Electric balance 200g 0.1mg	1	A	d	N	-	Not required based on syllabus
005	Microtome	1	A	d	N	-	Not required based on syllabus

Surgery & Gynecology Dept		Artificial Insemination Course					
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Hot Air Sterilizer	1	New	a	Y	EL	
002	Clean Bench	1	New	d	N	-	Not required based on syllabus
003	Osmometer	1	New	a	Y	EL	
004	Balance 200g 0.1 mg	1	New	d	N	-	Not required based on syllabus
005	Final Filter Unit	50	New	d	N	-	Not required based on current syllabus
006	Filtration Pump	1	New	d	N	-	Not required based on current syllabus
007	Embryonic cell fusion system	1	New	d	N	-	Not required based on current syllabus
008	Micropipette grinder	1	New	d	N	-	Not required based on current syllabus
009	Microelectrode Making Device	1	New	d	N	-	Not required based on current syllabus
010	Micro-manipulator	1	New	d	N	-	Not required based on current syllabus
011	Plate warmer	1	New	a	Y	EL	
012	CO2 incubator	1	New	d	N	-	Embryo transfer instrument
013	LN2 container, 10 liters	2	New	ae	Y	EL	Need to adjust quantity
014	Program freezer	1	New	d	N	-	Not required based on syllabus
015	ET printer	1	New	d	N	-	Not required based on current syllabus
016	Embryo transplanter	5	New	d	N	-	Not required based on current syllabus
017-01	Embryo transplanter for Cow -01	2	New	d	N	-	Not required based on current syllabus
017-02	Embryo transplanter for Cow -02	2	New	d	N	-	Not required based on current syllabus
017-03	Embryo transplanter for Cow -03	2	New	d	N	-	Not required based on current syllabus
017-04	Embryo transplanter for Cow -04	2	New	d	N	-	Not required based on current syllabus
017-05	Embryo transplanter for Cow -05	2	New	d	N	-	Not required based on current syllabus
018	Dilating boogie for cow	5	New	d	N	-	Not required based on current syllabus
019	Trans-vaginal ultrasound guided follicular	1	New	d	N	-	Not required based on current syllabus
020	Automatic irrigator for collecting embryo	1	New	d	N	-	Not required based on current syllabus
021	Catheter for removing mucus	1	New	d	N	-	Not required based on current syllabus
022	Embryo collector	1	New	d	N	-	Not required based on current syllabus
023	Air sucker for rectal palpation	1	New	d	N	-	Not required based on current syllabus
024	Insemination equipment for sheep	5	New	ae	Y	EL	Need to adjust quantity
025-01	Insemination equipment for sheep straight	5	New	ae	Y	EL	Need to adjust quantity
025-02	Insemination equipment for sheep curved	5	New	ae	Y	EL	Need to adjust quantity
026-01	Artificial Vagina for sheep	2	New	ae	Y	EL	Need to adjust quantity
026-02	Inner liner, tapered	5	New	ae	Y	EL	Need to adjust quantity
026-03	Inner liner, straight	5	New	ae	Y	EL	Need to adjust quantity
027	Catheter sterilizer	1	New	a	Y	EL	Need to adjust quantity
028	Cabinet for semen	1	New	a	Y	EL	
029	Macro tube, metal	1	New	a	Y	EL	
030-01	Semen Vials, large	2	New	ae	Y	EL	Need to adjust quantity
030-02	Semen Vials, small	2	New	ae	Y	EL	Need to adjust quantity
031	Semen container	1	New	a	Y	EL	
032	Estrous tester for cow	1	New	a	Y	EL	
033	Illumination lamp for vaginal speculum	1	New	a	Y	EL	
034	Kit box for insemination instrument	3	New	ae	Y	EL	
035	Printing machine for straw semen tube	2	New	d	N	-	Not needed due to industrial purposes
036	Ultraviolet ray sterilizer for store semen	1	New	d	N	-	Not needed due to industrial purposes
037-01	Semen examination plate	5	New	ae	Y	EL	Need to adjust quantity
037-02	Semen examination plate, 2 specimens	5	New	ae	Y	EL	Need to adjust quantity
038-01	Electric semen counter	1	New	a	Y	EL	
038-02	Microscope	4	New	a	Y	EL	
039	Semen counter	20	New	a	Y	EL	
040	Semen counter chamber	5	New	ae	Y	EL	Need to adjust quantity

Table 3 List of Selected Equipment

Surgery & Gynecology Dept.		Gynecology Course					11/16
No	Name of Equipment	Final Re- quested Q'ty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Autoclave, small	2	A	bc	Y	FL	Need to adjust quantity
002	Laparascopy for small animals	1	A	ab	Y	EL	For autopsy
003	Laparascopy for large animals	1	A	ab	Y	EL	For autopsy
004	Culture medium	1	A	d	N	-	Not required based on syllabus
005	Ingredients for medium preparation	1	A	d	N	-	Not required based on syllabus
006	Hormone extractor	1	A	d	N	-	Not required based on syllabus
007	Hormone analyzer	1	A	d	N	-	Not required based on syllabus
008	Microtome	1	A	d	N	-	Not required based on syllabus
009	Video camera and monitor	1	A	b	Y	EL	For student training

Surgery & Gynecology Dept.		Surgery Course					
No	Name of Equipment	Final Re- quested Q'ty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	X-ray device for animals	1	A	bc	Y	EL	
002	Endoscopy apparatus	1	A	d	N	-	Not required based on syllabus
003	Ultrasound diagnostic camera for animal	1	A	d	N	-	Not required based on syllabus
004	Video camera and monitor	1	A	ab	Y	EL	For student training
005	De-horn	1	New	ab	Y	EL	For student training
Existing	Trailer for animal	1	-	-	-	-	
Existing	Light	1	-	-	-	-	
Existing	Restraining stall	1	-	-	-	-	
Existing	Trailer for animal	1	-	-	-	-	
Existing	Trailer for animal, small	1	-	-	-	-	
Existing	Electric clipper	1	-	-	-	-	
Existing	TV set	1	-	-	-	-	
Existing	Repeller	1	-	-	-	-	
Existing	X ray photographer, handy type	1	-	-	-	-	

Table 3 List of Selected Equipment

CI DR (Examination Rooms for Joint Use, Bacteriology, Parasitology & Virology)							12/16
No	Name of Equipment	Final Re-quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
020	Ice machine, (flake-type ice)	1	A	c	Y	JER	JER=Joint Use Examination Room
022	Automatic distiller	1	A	c	Y	JER	
023	Automatic distiller w/softener, deionizer 2L	1	C	d	N	JER	Combined with 022
024	Water distillation apparatus	1	A	c	Y	JER	
036	Stirrer, magnetic, 2L	1	A	c	Y	JER	
037	Stirrer magnetic 10L	2	C	d	N	JER	Combined with 036
038	High power, slow stirrer w/stand	1	C	c	Y	JER	
039	Ultra-sonic homogenizer for cells	1	A	c	Y	JER	
040	Motor-driven Homogenizer	5	A	c	Y	JER	
040-01	Homogenizer 1ml	5	A	c	Y	JER	
040-02	Homogenizer 2ml	5	C	c	Y	JER	
040-03	Homogenizer 5ml	5	A	c	Y	JER	
040-04	Homogenizer 10ml	5	C	c	Y	JER	
040-05	Homogenizer 30ml	5	C	c	Y	JER	
041	Hot plate	1	A	c	Y	JER	
042	Hot plate stirrer	2	C	c	Y	JER	
043	Low temperature plate	1	A	c	Y	JER	
044	Hot bath, round	1	A	d	N	JER	Duplicated with existing equipment
055	Process Homogenizer	1	A	c	Y	JER	
055-01	Process homogenizer cup and cutter set 30	6	A	c	Y	JER	
055-02	Process homogenizer bath/cup holder 30-10	1	A	c	Y	JER	
055-03	Process homogenizer cup and cutter set 10	1	C	c	Y	JER	
055-04	Process homogenizer bath/cup holder 100-	1	C	c	Y	JER	
055-05	Process homogenizer cup and cutter 5-30 n	2	C	c	Y	JER	
055-06	Process homogenizer bath/cup holder 5-30	1	C	c	Y	JER	
059	Cork borer, electric	1	A	c	Y	JER	
066	Test tube mixer	2	A	c	Y	JER	
073	Compressor	1	A	c	Y	JER	
074	Vacuum pump	1	A	c	Y	JER	
081	Lab cart	2	A	c	Y	JER	
083	Gas burner tekra type	2	A	c	Y	JER	
084	Bunsen gas burner	2	A	c	Y	JER	
085	Gas burner for glass handicraft	2	A	c	Y	JER	
086-01	Lab jack, 25kg	1	A	c	Y	JER	
086-02	Lab jack, 8kg	1	A	c	N	JER	Combined with 086-01
87	Test tube rack	1	A	d	Y	JER	
091	Pipette case	4	A	c	Y	JER	
092	Auto-voltage regulator, 220 V 15 A	1	A	c	N	JER	To be added as needed per equipment
093	Auto voltage regulator, 220V 5A	1	A	d	N	JER	To be added as needed per equipment
094	Voltage regulator	1	A	c	Y	JER	
095-01	Personal computer	3	A	c	Y	JER	
095-02	Printer	3	A	c	Y	JER	
095-03	UPS	3	A	c	Y	JER	
105	Thermostat set for bacterial contamination	1	A	c	Y	JER	
112	2 step water distillation apparatus	1	New	d	N	JER	Combined with 024
116	Anaerobic chamber	1	New	d	N	JER	Diverted to equip. in existing virology lab
	Air conditioner	6	New	f	Y	JER	
	Lab. Table	8	New	f	Y	JER	
	Copy machine	1	New	c	Y	JER	
009	Hot plate stirrer	1	C	c	Y	BER	BER=Bacteriological Examination Room
010	Magnetic stirrer 5L	1	A	d	N	BER	Combined with 009
011	Table top-type clean bench	1	A	d	N	BER	Combined with 012
012	Bio-clean bench	1	A	c	Y	BER	
016	Anaerobic culture chamber w/gas - packs	3	A	d	N	BER	Combined with 012
017	Vacuum compressor pump, non-oil, small	1	A	c	Y	BER	
012	Hot plate stirrer, 3 liter	1	A	c	Y	PER	PER=Parasitology Examination Room
013	Multi-stirrer (6 positions)	1	A	c	Y	PER	
015-01	Gel puncher 3mm	2	A	c	Y	PER	
015-02	Gel puncher 5mm	2	A	c	Y	PER	
015-03	Gel puncher φ 3mm	2	A	c	Y	PER	
017	Bunsen burner	2	A	c	Y	PER	
018	Alcohol burner, glass	10	A	ce	Y	PER	
019-01	Alcohol burner, SS single loop	3	A	ce	Y	PER	
019-02	Alcohol burner, double loop	3	A	ce	Y	PER	

Table 3 List of Selected Equipment

CI DR (Examination Rooms for Joint Use, Bacteriology, Parasitology & Virology)

11/16

No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes No	Installation Site/Location	Remarks	
002-01	Clean bench	1	A	c	Y	VFR	VER=Virological Examination Room	
015	Test tube mixer	1	A	c	Y	VFR		
018	Lab cart	1	A	c	Y	VFR		
019	Bunsen burner	2	A	c	Y	VFR		
022	Water bath with shaker	1	C	c	Y	VER		
023	Magnetic stirrer, 5L	2	A	d	N	VER		
024	Hot plate stirrer, low speed	1	A	c	Y	VFR		
Existing	Voltage stabilizer	-	-	-	-	JER	JER=Joint use Examination Room	
Existing	Hot plate stirrer	-	-	-	-	JER		
Existing	Water bath 100°C	-	-	-	-	JER		
Existing	Thermostat	-	-	-	-	JER		
Existing	Paraffin cutter	-	-	-	-	JER		
Existing	Welder	-	-	-	-	JER		
Existing	Transformer	-	-	-	-	JER		
Existing	Computer	-	-	-	-	JER		
Existing	Mixer	-	-	-	-	JER		
Existing	Vortex mixer	-	-	-	-	JER		
Existing	Sterile chamber	-	-	-	-	VER		
101	Sample collection vehicle	2	A	c	Y	JER		Need to adjust quantity
032-01	LN2 Cell preserver 30 liter	1	A	c	Y	JER		Need to adjust quantity
032-02	LN2 Cell preserver 50 liter	1	A	c	Y	JER	Need to adjust quantity	
045	Deep freezer 80 liter -85°C	1	A	c	Y	JER	Need to adjust quantity	
046	Ultra deep freezer	1	A	d	N	JER	Combined with 045	
047	Deep freezer	2	C	c	Y	JER		
057	Cool cabinet	1	A	c	Y	JER	Combined with 063	
061	Electric desiccator	1	C	d	N	JER		
062	Desiccator, plastic w/cock	3	C	c	Y	JER		
063	Desiccator, auto type	2	C	c	Y	JER		
107	Medical refrigerator	2	A	c	Y	JER		
113	Freezer	1	New	d	N	JER	Combined with 045	
021	Refrigerator	1	A	c	Y	PER	PER=Parasitology Examination Room	
Existing	Deep freezer -120°C	-	-	-	-	PER		
Existing	Refrigerator	-	-	-	-	PER		
Existing	Deep freezer -90°C	-	-	-	-	PER		
005	Washing machine for glass wares	1	A	c	Y	JER	JER=Joint Use Examination Room	
033	Ultra-sonic cleaner	1	A	c	Y	JER		
034	Pipette washer	1	A	c	Y	JER	Need to adjust quantity	
035	Ultra-sonic pipette washer	2	A	c	Y	JER		
075-01	Test tube basket, 200 x 200 x 200 mm	10	A	c	Y	JER	Combined with 002, 004	
075-02	Test tube basket, 100 x 100 x 100 mm	10	A	c	Y	JER		
075-03	Test tube basket, 300 x 300 x 300 mm	6	A	c	Y	JER		
075-04	Test tube basket, 150 x 150 x 150 mm	10	A	c	Y	JER		
075-05	Test tube basket, 400 x 400 x 300 mm	6	A	c	Y	JER		
076-01	Test tube basket, 100 x 100 mm	6	A	c	Y	JER		
076-02	Test tube basket, 150 x 150 mm	10	A	c	Y	JER		
076-03	Test tube basket, 250 x 250 mm	6	A	c	Y	JER		
076-04	Test tube basket, 400 x 300 mm	6	A	c	Y	JER		
077-01	Washing basket, small	10	A	c	Y	JER		
077-02	Washing basket, large	10	A	c	Y	JER		
082	Vibrating slide glass washer	1	A	c	Y	JER		
001	Autoclave, horizontal, middle size	1	A	d	N	JER		
002	Autoclave, small size	1	C	c	Y	JER		
003	Autoclave, middle size	1	C	d	N	JER		
004	Autoclave, large size	1	A	c	Y	JER		
012	Dry air sterilizer, small size 90L	1	C	d	N	JER		
013	Dry air sterilizer, large size	1	A	c	Y	JER		
071-01	Pipette sterilizing container, 65 x 80 x 250	20	A	c	Y	JER	Combined with 013	
071-02	Pipette sterilizing container, 65 x 80 x 300	20	A	c	Y	JER		
071-03	Pipette sterilizing container, 65 x 80 x 450	30	A	c	Y	JER		
071-04	Pipette sterilizing container, 65 x 80 x 450	6	A	c	Y	JER		
072-01	Culture dish sterilizing container, 100 x 200	20	A	c	Y	JER		
072-02	Culture dish sterilizing container, 240 x 240	20	A	c	Y	JER		
	Microwave oven	2	New	c	Y	JER		
001-01	Autoclave, small size	1	C	c	Y	BER		
009	Autoclave, small size	1	C	c	Y	VER		



Table 3 List of Selected Equipment

CI DR (Examination Rooms for Joint Use, Bacteriology, Parasitology & Virology)

14/16

No	Name of Equipment	Final Re-quested Qty	Priority Level	Review Results	Yes of No	Installation Site/Location	Remarks
078	Drying rack for glass wares wall-type	2	A	c	Y	JER	JER=Joint use Examination Room
079	Drying shelf w/curtain	1	A	c	Y	JER	
080	Drying shelf w/out curtain	1	A	c	Y	JER	
018	Desiccator w/drying unit	1	A	c	Y	JER	
Existing	Desiccator	-	-	-	-	JER	
Existing	Desiccator	-	-	-	-	JER	
006	Electronic balance 300g 1mg (Electronic balance 400g 1mg)	1	A	c	Y	JER	
007	Electronic balance 2000g 10mg	1	C	d	N	JER	Combined with 006
008	Electronic balance 200g 0.1mg	1	A	c	Y	JER	
009	Electronic balance 200/40g 0.1/0.01mg	1	C	d	N	JER	Combined with 008
010	Scale 4kg/10g	1	A	d	N	JER	Combined with 011
011	Scale 8kg/20g	1	A	c	Y	JER	
068	Micro-dispenser w/1 pack of each size sprin	3	A	ce	Y	JER	Need to adjust quantity
069	Multi-channel micro-dispenser	4	A	ce	Y	JER	Need to adjust quantity
	Multi-channel micro-dispenser syringe	2	New	ce	Y	JER	Need to adjust quantity
070-01	Micro-pipette 0.1-2 $\mu$ liter	2	A	c	Y	JER	
070-02	Micro-pipette 0.5-10 $\mu$ liter	6	A	c	Y	JER	
070-03	Micro-pipette 10-100 $\mu$ liter	6	A	c	Y	JER	
070-04	Micro-pipette 100-1000 $\mu$ liter	3	A	ce	Y	JER	Need to adjust quantity
070-05	Micro-pipette 1000-5000 $\mu$ liter	2	A	c	Y	JER	
070-06	Micro-pipette tips	2	A	d	N	JER	To be attached to each micropipette
089-01	Safety pipette	3	A	ce	Y	JER	Need to adjust quantity
089-02	Pipette pump	2	New	c	Y	JER	
090	Pipette controller	2	A	c	Y	JER	
108	Balance for small animals	1	A	c	Y	JER	
109	Balance for medium size animals	1	A	c	Y	JER	
002	Electronic balance 2000g 10mg	2	A	ce	Y	BER	Need to adjust quantity
003	Scale 2kg 5g	2	A	ce	Y	BER	Need to adjust quantity
	Micro-pipette 0.5-10 $\mu$ liter	2	New	c	Y	BER	
	Micro-pipette 10-100 $\mu$ liter	2	New	c	Y	BER	
	Micro-pipette 100-1000 $\mu$ liter	2	New	c	Y	BER	
	Micro-pipette 1000-5000 $\mu$ liter	2	New	c	Y	BER	
	Micro-pipette tips	2	New	d	N	BER	To be attached to each micropipette
010	Scale 100g 0.1g	1	A	c	Y	PER	
011	Electronic balance 2000g 10mg	1	C	c	Y	PER	
016-01	Micro-pipette 0.5-10 $\mu$ liter	1	A	ce	Y	PER	Need to adjust quantity
016-02	Micro-pipette 10-100 $\mu$ liter	2	A	c	Y	PER	
016-03	Micro-pipette 100-1000 $\mu$ liter	1	A	ce	Y	PER	Need to adjust quantity
016-04	Micro-pipette 1000-5000 $\mu$ liter	1	A	ce	Y	PER	Need to adjust quantity
	Multi-channel micro-pipette 5-50 $\mu$ liter	1	New	d	Y	PER	
	Multi-channel micro-pipette 40-200 $\mu$ liter	1	New	c	Y	PER	
002-02	Pipette aid	1	New	c	N	VER	Combined with 007
007	Pipette controller	2	A	c	Y	VER	
017-01	Multi-channel micro-pipette 5-50 $\mu$ liter	1	A	c	Y	VER	
017-02	Multi-channel micro-pipette 40-200 $\mu$ liter	1	A	c	Y	VER	
020-01	Micro-pipette 0.5-10 $\mu$ liter	2	A	ce	Y	VER	Need to adjust quantity
020-02	Micro-pipette 10-100 $\mu$ liter	2	A	ce	Y	VER	Need to adjust quantity
020-03	Micro-pipette 100-1000 $\mu$ liter	1	A	ce	Y	VER	Need to adjust quantity
021-01	Multi-channel micro-dispenser	2	A	c	Y	VER	Variable measuring range
021-02	Multi-channel micro-dispenser syringe	1	A	c	Y	VER	Disposable syringe
Existing	Electronic balance 160g	-	-	-	-	JER	
Existing	Electronic balance 1600g 0.01g	-	-	-	-	JER	
088-01	Mouse cage, small	40	A	c	Y	JER	
088-02	Mouse cage, large	20	A	c	Y	JER	
088-03	Rat cage	20	A	c	Y	JER	
088-04	Rabbit cage	10	A	c	Y	JER	
088-05	Chicken cage	10	A	c	Y	JER	
Existing	Mouse cage	-	-	-	-	JER	

Table 3 List of Selected Equipment

CLDR (Examination Rooms for Joint Use, Bacteriology, Parasitology & Virology)							15/16	
No	Name of Equipment	First Re- quested Qty	Priority (Level)	Review Results	Yes or No	Installation Site/Location	Remarks	
014	Constant temp. water bath	1	C	c	Y	JER	Combined with 014	
015	Stainless steel tank for water bath	1	C	c	Y	JER		
016	Water bath	1	A	d	N	JER		
017	Water bath incubator	1	A	c	Y	JER		
018	Constant temp. water bath w/window	1	A	c	Y	JER		
019	Handy cooler	1	A	c	Y	JER		
064	Shaker, low speed	1	A	c	Y	JER		
065	Orbital shaker	1	C	c	Y	JER		
067	Bench top shaker	1	C	c	Y	JER		
114	CO ₂ incubator	1	New	c	Y	JER		
013	Incubator	1	C	c	Y	BER	Existing	
014	Low temperature incubator	1	A	c	Y	BER		
015	CO ₂ incubator	1	A	c	Y	BER		
014	Incubator	1	C	c	Y	PER		
005	CO ₂ incubator 160x2	1	A	d	N	VER		
006	Roller culture system	1	A	c	Y	VER		
008	Incubator	1	C	d	N	VER		
010	Egg hatchery 80 eggs	1	A	c	Y	VER		
	Anaerobic culture system	1	New	c	Y	VER		
Existing	Incubator 60°C	-	-	-	-	JER		
Existing	Incubator 60°C	-	-	-	-	VER		
Existing	CO ₂ incubator	-	-	-	-	VER		
Existing	Shaker	-	-	-	-	JER		
Existing	Water bath	-	-	-	-	BER		
025	High speed, refrigerated centrifuge	1	C	c	Y	JER	Need to adjust quantity	
026	High speed, refrigerated micro-centrifuge	1	A	c	Y	JER		
056-02	Micro-plate shaker	2	New	ce	Y	JER		
056-03	Micro-plate washer	2	New	ce	Y	JER		
058-01	Fraction collector	1	A	c	Y	JER		
058-02	Monitor for fraction collector	1	New	c	Y	JER		
058-03	Glass column	1	New	c	Y	JER		
102	Hematocrit centrifuge	1	A	c	Y	JER		
116	Ultra centrifuge	1	New	d	N	JER		
117	Column chromatography	1	New	d	N	JER		
004	Centrifuge 6000rpm	1	A	d	N	BER	Existing	
005	Centrifuge, small type	2	A	c	Y	BER	Need to adjust quantity	
004	Centrifuge 6000rpm	1	C	c	Y	PER		
005	Parasite egg counter	30	A	c	Y	PER		
006-01	Liver fluke detector	20	A	ce	Y	PER		
006-02	Waste water siphon for liver fluke	20	A	c	Y	PER		
007	Beaker stand for liver fluke egg detection	1	A	c	Y	PER		
008	Stainless steel net for glass beads method	10	A	c	Y	PER		
001-01	Filtration system	1	New	c	Y	VER		
001-02	Filtration tank 5'	1	A	d	N	VER		
001-03	Pressure filtration tank	1	A	c	Y	VER		
003-01	Filter holder 13mm	6	A	c	N	VER	Combined with 001-03	
003-02	Filter holder 25mm	6	A	c	N	VER		
003-03	Filter holder 47mm	6	A	c	Y	VER		
004	Dialysis system	1	A	c	Y	VER		
011	Refrigerated centrifuge, table top	1	A	c	Y	VER		
012	Centrifuge, small type	1	A	c	Y	VER		
028	Micro ultra centrifuge	1	A	d	N	VER		
Existing	Refrigerated centrifuge	-	-	-	-	JER		
Existing	Centrifuge	-	-	-	-	BER		
048	Fluorescent microscope	1	A	c	Y	JER		Need to adjust quantity
049	Inverted fluorescent microscope	1	A	c	Y	JER		
051	Microscope	1	C	d	N	JER		
052	Microscope w/micro photography system	1	C	c	Y	JER		
054	Stereo microscope w/photography set	1	A	c	Y	JER		
104	Surgical instrument for small animals	1	A	c	Y	JER		
106	Rapid agglutination tester	1	A	ce	Y	JER		
019	Stereo microscope	1	A	d	N	BER		
001	Stereo microscope	2	A	c	Y	PER		
002	Stereo microscope	2	A	c	Y	PER		
003	Magnifier with illumination stand	2	A	c	Y	PER	Need to adjust quantity	
013	Fluorescent microscope	1	A	c	Y	VER		
014	Inverted microscope	1	C	c	Y	VER		
							Not needed in terms of syllabus theme	

Table 3 List of Selected Equipment

CLDR (Examination Rooms for Joint Use, Bacteriology, Parasitology & Virology)							16/16
No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
Existing	Microscope with camera	-	-	-	-	JER	
Existing	Inverted microscope	-	-	-	-	JER	
Existing	Biological microscope	-	-	-	-	JER	
021-01	pH meter	1	A	d	Y	JER	
021-02	pH meter	2	New	c	Y	JER	
027-01	Electro-phoresis system for Polyacrylamide	1	A	d	N	JER	Combined with 027-04
027-02	Power unit for electrophoresis	1	A	c	Y	JER	
027-03	Photo unit for electrophoresis	1	A	c	Y	JER	
027-04	Agar gel electric phoresis system	1	A	c	Y	JER	
027-05	Power system	1	A	c	Y	JER	
027-06	Acetate film phoresis	1	A	c	Y	JER	
027-07	Programmable power source	1	New	c	Y	JER	027-05~027-06,028,029 Power source
028	Western blotting system	1	A	c	Y	JER	
029	Southern blotting system	1	A	c	Y	JER	
030-01	Spectrophotometer	1	A	c	Y	JER	
030-02	Spectrophotometer UV/VIS/NIR	1	New	c	Y	JER	
030-02	Spectrophotometer cell	10	A	c	Y	JER	
031	Spectrophotometer single beam	1	A	ce	Y	JER	Need to adjust quantity
050	ELISA Reader	1	A	c	Y	JER	
056-01	Micro titre system	2	A	c	Y	JER	
056-04	Dilator	36	A	c	Y	JER	
056-05	Dropper	3	A	c	Y	JER	
060	Blood cell counter	1	A	c	Y	JER	
099	High speed liquid chromatography	1	A	c	Y	JER	
100	Gas chromatography-mass spectrophotomet	1	A	d	N	JER	
103	Refractometer for protein	1	A	c	Y	JER	
110	Gas chromatograph	1	New	c	Y	JER	
112	Auto blood cell counter	1	New	d	N	JER	Combined with blood parameter counter
116	Fluorescence spectrophotometer	1	New	c	Y	JER	
117	Atomic absorption spectrophotometer	1	New	c	Y	JER	
006	Photoelectric colorimeter	1	A	d	N	BER	Not needed interms of syllabus theme
007	pH meter	1	A	c	Y	BER	
008	Turbidity meter	1	A	c	Y	BER	
009	pH meter	1	A	c	Y	PER	
016	pH meter	1	A	c	Y	VER	
053	Photography system	1	A	c	Y	JER	
Existing	Enlarger	-	-	-	-	JER	
096	Glass wares	1	A	c	Y	JER	
097	Plastic wares	1	A	c	Y	JER	
026	Culturing bottles, plastic wares	1	A	c	Y	VER	
098	Chemicals	1	A	c	Y	JER	
027	Culture medium	1	A	d	N	VER	

Faculty of Veterinary Medicine

Veterinary Dept

No	Name of Equipment	Final Re- quested Qty	Priority Level	Review Results	Yes or No	Installation Site/Location	Remarks
001	Field training bus	2	A	a	Y	-	Necessary for field training
002-01	Computer	7	A	be	Y	CLDR	Need to adjust quantity
002-02	A4 printer	7	A	be	Y	CLDR	Need to adjust quantity
002-03	UPS	7	A	be	Y	CLDR	Need to adjust quantity
003	Direct projector for lecture room	4	New	d	N	-	Low urgency
004	Simultaneous interpreting equip.	1	New	d	N	-	Low urgency
005	Cremator for small animals	1	New	b	Y	-	Dispose of pathological samples/specimen

Note: JER = Joint Use Examination Room, BER = Bacteriological Examination Room,  
PER = Parasitological Examination Room, VER = Virological Examination Room

## 2.3 Basic Design

### 2.3.1 Design Policy

#### (1) Policy to Cope with Natural Conditions

The climate of Hama where the project site is located, frequently surpasses 45°C during the summer months of July to August and in contrast, drops below 0°C during the winter months of December to January. Moreover, there are zero to several days a month when sand dust become airborne by the wind from desert and are carried into the buildings. Consequently, the windows should be kept constantly shut to prevent the sand from entering the CLDR where relatively high precision equipment are installed. Since the room temperature surpasses 40°C during the summer season, an air conditioner will be installed in the window of each examination room to maintain the minimum required temperature of an ideal research environment. In addition, the provision of dustproof covers, cases, etc. is to be considered for microscopes, computers, spectrophotometers, etc. that are sensitive to dust.

#### (2) Policy to Cope with Infrastructural Conditions

##### 1) Electricity

The electricity to FVM is provided by the Public Corporation for Electricity in Hama, which is under the jurisdiction of the Ministry of Electricity. The electricity specifications are 220V (single phase), 380V (three phases) 50Hz. Power failures occur once or twice a month. Moreover, the voltage supply fluctuates about 20 percent when the supply of electricity becomes unstable. Therefore, an AVR, UPS unit, etc. will be provided as a countermeasure against the loss of computerized data or damage to analysis equipment during such unstable periods of electricity supply.

##### 2) Tap water supply, drainage, wastes, gas

The tap water supply and drainage services to FVM are provided by the Public Corporation for Tap Water and Healthy Drainage in Hama which is under the jurisdiction of the Ministry of Housing and Services. Tap water in Hama is hard water that contains a large amount of calcium.

Consequently, a simple distillation system that does not utilize an ion exchanger, etc. will be utilized in the first stage water distillation. First stage-distilled water will be supplied in batches to the water purification apparatus, which utilizes an ion exchanger, etc.

Wastewater from FVM flows directly into the drainage system. Equipment, which produces a large amount of harmful wastewater, will not be provided in this Project. A small volume of such wastewater that is produced is to be stored in poly tanks. The disease samples used in the training activities are currently disposed of by the city incinerator and as a result, the danger of virus contamination exists. In order to control the negative aftereffects of this disposal method, a small scale incinerator will be provided by the Project which will enable harmful wastes to be disposed of on the campus grounds. This incinerator will be capable of disposing the above mentioned small volume of harmful wastewater.

City gas facilities are not available and LPG gas is supplied through gas cylinders. Equipment requiring the use of gas will have specifications that utilize LPG gas.

### (3) Policy to Cope with Maintenance Capabilities

#### 1) Technical aspect

The academic staff of FVM are capable of using the equipment provided by the Project and no problems are foreseen. However, some of the equipment require a certain length of time to gain proficiency in its use or it is easy to err when operating. Therefore, the grade and specifications of the equipment are to be selected to enable immediate use by these academic staff. Training and technical transfer in the operation and maintenance of the equipment are to be provided by the Japanese contractor who will be present at the time the equipment is delivered.

#### 2) Maintenance cost

A budget must be allocated by the Syrian side to purchase spare parts and consumables in order to enable the continuous use of the equipment. Therefore, the specifications and amount of equipment provided are to be determined within the scope of FVM's budget, by which spareparts and consumables are procured.

(4) Equipment Procurement Policy

In order to effectively maintain the equipment, an after service and procurement system for spare parts and consumables must be established. Therefore, in the overall review on equipment procurement, the after service system of the suppliers and sales agency in Syria are to be taken into consideration.

(5) Policy on establishing the Specifications, Grade, and Quantity of Equipment

1) Establishing the specifications/grade

As explained in section (3), 1) above, equipment with specifications which will enable immediate use by academic staff is to be selected; and in addition, the specifications and grade of the equipment will be coordinated with the syllabus to enable students to acquire practical and basic knowledge and technical skills.

2) Criteria for determining quantity

(i) Experiment and training equipment for each laboratory

The Faculty has a total of approximately 1,500 students and there were 429, 293, 255, 257, and 244 students in the first to fifth years, respectively in 1998. The drop out rate is high during the first and second years and there are about 250 students between the third and fifth years. According to a student interview survey, there were 300 students who attended classes regularly during the first year and 230 to 250 students who attended regularly for each academic year from the second year onwards.

All students of the same academic year attend the courses stipulated in the curriculum without being divided into specially designated lecture courses. Thus, all the students of the same year attend the same lectures that are held in the large lecture hall. However, the students are divided into six groups (40-50 students/group) for the experiment and training courses, and each course for a group is held six times.

The quantity of equipment items was decided on the assumption that the basic unit for one group of first year students was 50 members and one group of students in their second year and higher

was 40 members. In addition, each group was divided further into 4 to 5 subgroups (10 students/subgroup) in tandem with the training content of each course; and the quantity of equipment items was decided on the premise that the equipment would be shared. The equipment was categorized according to the type of training course and its use, based on the following case examples, which formed the policy determining the quantity of equipment that was required.

- A. If the equipment is used for demonstration purposes either by the teaching staff or student, or if it is used to assist training activities 1 unit/laboratory
- B. The equipment is used basically for demonstration purposes, but if it can be used more effectively by dividing the class (one group out of total six groups) into two subgroups (i.e. electronic balance, pH meter for meat, etc.), or in cases where the equipment is used to assist training activities, its use is made more effective and convenient by dividing the class into two subgroups due to the large number of students (i.e. draft chamber, etc.). 2 units/laboratory
- C-1 One unit is allocated for one group in a training class with five subgroups (i.e. first year course: microtome, microscope, etc.). 5 units/laboratory
- C-2 One unit is allocated for one subgroup in a training class with four subgroups (i.e. second to fifth year courses: egg candler, automatic burette, micropipette, stomach tube, etc.). 4 units/laboratory
- D. In principle one unit is used by one subgroup, but in cases where it is raises the effectiveness of the class to divide the subgroup into two (i.e. surgical pipette, blood pressure meter, etc.). 8 units/laboratory
- E. In cases where the students are not divided into subgroups but divided them based on allowable number of students per equipment.

E-1. In the case of 4 students/unit (i.e. microscopes and stereoscopic microscopes for the fish disease lab, etc.)

10 units/laboratory

E-2. In the case of 2 students/unit (microscopes for the histology laboratory, blood cell counter for the clinic lab, etc.)

20 units/laboratory

E-3. In the case of 1 student/unit (stethoscope for the internal medicine lab, microscope for the pathology lab (including the existing number of microscopes)

40 units/laboratory

E-4 Determining the number of units based on the training methods

- Fish tank: Used in five-stage drug tests together with one drug free test

6 units/laboratory

- Anatomy table: 6 students/table depending on the space available in the anatomy lab and the use of two labs to conduct the simultaneous training activities of the first and second year course according to current curriculum.

16 units/laboratory

F. The quantity is determined according to the scope of the preparatory activities for the experiment and training activities (i.e. autoclave, stainless steel cage, stainless steel can, etc.)

(ii) Equipment for CLDR

CLDR is comprised of four examination rooms of joint use, the bacteriology, parasitology, and virology. The fifth year students utilize these examination rooms to conduct the research on livestock diseases for their graduation theses. In addition, graduate students and academic staff also conduct their research at this center. Therefore, relatively high precision equipment that requires proper maintenance will be installed in the center for joint use by the entire FVM. In addition, a wagon will be provided to enable fresh disease samples to be collected for diagnostic research purposes. Furthermore, the joint use examination room will maintain glass and



plastic wares and reagents, and it will be responsible for their distribution to each training laboratory as required.

The equipment selected for each training laboratory, in accordance with the criteria explained in section "2.2.3 Review of the Request Content", was categorized and the quantity was determined according to the following case examples.

- G. In principle, one unit will be installed in its objective room  
1 unit/o.room
- H. If the equipment is relatively fragile, or simultaneous use is required (micropipette, stirrer, burner, etc.) 2 units/o.room
- I. Equipment with high frequency use (portable homogenizer, pipette case, micropipette with specific capacity, filter holder, etc.) 3-6 items/o.room
- J. Equipment which is used to carry out a large quantity of work at one time (washing cage, culture dish sterilizing container, animal cage, etc.) 10-40 units/room
- K. Quantity is determined according to specific conditions
- Air conditioner: Three units will be provided for the joint use room in accordance with the room area and each one unit will be provided for each of the other rooms for a total of 6 units
  - Computer: Each one unit will be provided for each room for data processing purposes. However, due to the existing computer in the virology room, a total of three units will be provided for the remaining three rooms. In addition, one computer for the maintenance and control of the equipment for the entire Faculty will be installed in the shared use room.
  - Laboratory table: A total of eight tables will be provided for the shared use room, based on the room area (99m²), since there is no laboratory table at the present time.
  - Spectrophotometer quartz cell: Efficiently measures the absorbed wave lengths of the samples under numerous test conditions. Five-stage test conditions have been assumed and a total of 10 units will be provided (5 measuring units, 5

spare units). The spare units are usually soaked in sulfuric chrome fluid and they are washed following organic disintegration and reused.

- Diluter: Several are used simultaneously in comparative culture experiments in virology, bacteriology, and parasitology. Centrifuged sedimentation samples are commonly used and therefore, a magnification of 6 has been set. In anticipation of its simultaneous use in three examination rooms, a total of 36 units will be provided, 6 units for measuring x 3 rooms and 18 spare units.
- Parasite egg counter: There are approximately 20 to 40 students yearly (fluctuates annually) who are engaged in research for their graduation thesis in the parasitology room. The work of counting the number of parasite eggs is carried out frequently. Therefore, 30 units will be provided to enable each student to have constant access to a counter.

(iii) Equipment for the Faculty administration

- Buses for diagnostic field training:

The fifth year students (approx.240 persons) are divided into 8 groups to engage in the field training of yearly 120 hours/student for 4 courses. Two buses with the capacity of 30 persons will be provided by the Project, in order to enable these student groups to engage in the field training alternately (refer to Appx.1 for details).

- Computer:

One computer will be provided for the management of the equipment inventory for the entire FVM.

- Incinerator for small animals:

One small scale incinerator will be provided in order to dispose used disease samples wasted from entire educational activities of FVM.

### **2.3.2 Basic Design**

#### **(1) Equipment Provided by the Project**

A summary of the specifications and the quantity of each equipment that was determined according to sections “2-2-3 Review of the Request Content” and “2.3.1(5) Policy on Establishing the Specifications, Grade, and Quantity of Equipment” is shown in Table 4 below.

Table 4 List of Planned Equipment

1/10

No	Equipment Name	Criteria for Planned	Q'ty	Specification
<b>AN Anatomy</b>				
<b>ANA Anatomy</b>				
001	Stainless steel basin and anatomy kit	E-4	16	Stainless steel bowl for anatomy works and anatomy
002	Dissecting table	E-4	16	Dissecting stainless steel table
003	Video camera and monitor	A	1	Handy video 8 mm camera, monitor and VHS video
004	Blood extracting apparatus	A	1	Liquid pump and tank
005	Air blowing apparatus	A	1	Air pump for blowing air to animal stomach
006	Lifter	A	1	Hand lifter, maximum load 400kg
007	Caster for animals	A	1	Cart for big animal with 4 or more casters, max. load more than 500kg
008	Refrigerator	B	2	400 liter capacity with freezer
009-01	Acupuncture needle for cattle	E-4	8	Needle for cattle
009-02	Acupuncture needle for small animal	E-4	8	Needles for small animal
009-03	Electrical acupuncture stimulator	A	1	0-200 Hz
<b>EMB Embryology</b>				
001	Egg hatchery, 40 eggs	A	1	40 or more eggs with automatic egg turning apparatus
002	Egg hatchery, 80 eggs	A	1	80 or more eggs with automatic egg turning apparatus
003	Egg candler	C-1	4	Holding type, light source 40W
<b>HIS Histology</b>				
001	Double head microscope	A	1	Microscope with face to face teaching head
002	Rotary tissue processor	A	1	Glass beaker 10 pcs, paraffin pot 2 pcs
003	Microtome	C-2	1	Sliding type, disposable blades
004	Slide heat dryer	A	1	Heating capacity 35 degrees C
005	Microscope for lab	E-2	20	Binocular, with 6V 20W halogen lamp, magnification
006	Water distillation apparatus	A	1	Stainless steel, 5 liters/hour
<b>HY Hygiene</b>				
<b>FID Fish Disease</b>				
001	Water regulation fish tank	E-4	6	Water regulation apparatus with heater, filtration system, air pump and UV lamp
002	Microscope for lab	E-1	10	Binocular, with 6V 20W halogen lamp, magnification
003	Stereoscopic microscope for lab	E-1	10	Binocular, with 6V 20W halogen lamp, magnification 40x
004	Stereoscopic microscope with camera for lab	A	1	Binocular, with 6V 20W halogen lamp with camera
005	Microscope with monitor for lab	A	1	Binocular, with 6V 30W halogen lamp, CCD camera, monitor, magnification 1000x
<b>MEH Meat Hygiene</b>				
001	pH meter for meat	B	2	Metal detector, digital display
002	Meat grinder	A	1	2-liter capacity
003	Electronic balance, 1000g	B	2	Weighing capacity 1000g, accuracy 10mg
004	Infrared moisture meter	A	1	Sample weight capacity 5-30g, measurement range 0-100%
005	Microscope for lab	E-1	10	Binocular, with 6V 20W halogen lamp, magnification
006	Magnetic stirrer with hot plate	A	1	3-liter capacity
<b>MIH Milk Hygiene</b>				
001	Gerber centrifuge with water bath	A	1	Gerber centrifuge with heater, hydrostatic balance
002	Water bath, middle	A	1	9-liter capacity
003	Hot air sterilizer	A	1	70-liter capacity
004	Refrigerator	A	1	400-liter capacity with freezer
005	pH meter for lab	A	1	Sensitivity 0.1 pH

Table 4 List of Planned Equipment

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No	Equipment Name	Criteria for Planned	Q'ty	Specification
<b>PTP Pasture and Toxic Plant</b>				
001-01	Electronic balance, 400g	A	1	Weighing capacity 400g, accuracy 1mg
001-02	Electronic balance, 1000g	A	1	Weighing capacity 1000g, accuracy 100mg
002	Microscope for lab	E-1	10	Binocular, with 6V 20W halogen lamp, magnification
003	Centrifuge, 6000rpm	A	1	1-liter capacity, 6000 rpm
004	Neubauer blood cell counter	E-1	10	Size 76 x 30 mm
004A	Counter, multi	E-1	10	Manual type, maximum count 9999, 6 set
005	Magnetic stirrer with hot plate	B	2	3-liter capacity
006	Viscometer	A	1	Range 15-2,000,000 mPa, accuracy 1%
007	Infrared moisture meter	A	2	Sample weight capacity 5-30g, measurement range 0-100%
008-01	Micropipette 0.1-2 $\mu$ liter	C-1	4	0.1-2 $\mu$ liter capacity, graduations of 0.01 $\mu$ liter
008-02	Micropipette 0.5-10 $\mu$ liter	C-1	4	0.5-10 $\mu$ liter capacity, graduations of 0.01 $\mu$ liter
008-03	Micropipette 10-100 $\mu$ liter	C-1	4	10-100 $\mu$ liter capacity, graduations of 0.1 $\mu$ liter
008-04	Micropipette 100-1000 $\mu$ liter	C-1	4	100-1000 $\mu$ liter capacity, graduations of 1.0 $\mu$ liter
009-01	Measuring pipette 0.1 ml	D	8	0.1 ml capacity
009-02	Measuring pipette 1ml	D	8	1 ml capacity
009-03	Measuring pipette 10ml	D	8	10 ml capacity
010	Water distillation apparatus	A	1	Stainless steel, 5 liters/hour
011	Rotary evaporator	A	1	20-180 revolutions, water temperature +5-90 degrees C, water bath capacity 7 liters
012	Freezer	A	1	400-liter capacity, -25 degrees C
013	Refrigerator	A	1	400-liter capacity with freezer
014	Meat grinder	B	2	2-liter capacity
015-01	pH meter for lab	A	1	Sensitivity 0.1 pH
015-02	pH meter for meat	A	1	Metal detector, digital display
<b>IND Infectious Disease</b>				
001	Centrifuge, 6000rpm	A	1	1 liter capacity, 6000 rpm
002-01	Multi-channel micropipette 5-50 $\mu$ liter	A	1	5-50 $\mu$ liter capacity, 12 channels
002-02	Multi-channel micropipette 40-200 $\mu$ liter	A	1	40-200 $\mu$ liter capacity, 12 channels
003	Micropipette 0.5-10 $\mu$ liter	A	1	0.5-10 $\mu$ liter capacity, graduations of 0.01 $\mu$ liter
004	Micropipette 10-100 $\mu$ liter	A	1	10-100 $\mu$ liter capacity, graduations of 0.1 $\mu$ liter
005	Micropipette 100-1000 $\mu$ liter	A	1	100-1000 $\mu$ liter capacity, graduations of 1.0 $\mu$ liter
006	Microplate shaker	A	1	Agitation type, revolution 1,100 rpm, 4 microplates
007	Shaker, double action	A	1	Double action
008	Direct projector	A	1	Object: transparency/printed
009	Incubator	A	1	150 liter capacity, 5 - 60 degreeC
010	Refrigerator	A	1	400 liter capacity with freezer
<b>INM Internal Medicine</b>				
001	Stomach tube for cattle	C-1	4	1,900mm tube length
002	Stomach tube for horse	C-1	4	Rubber tube, 2,000mm in length
003	Stethoscope	E-3	40	Ear cup: stainless steel or plastic, rubber tube
004	Catheter for cattle	C-1	4	Rubber, 900mm in length
005	Catheter for horse	C-1	4	Side hole type, 2,000mm in length
006	Neubauer blood cell counter	E-2	20	Size 76 x 30mm
007	Urometer	A	1	Measure range 1,000 ~ 1,050SGI
008	pH meter for lab	A	1	Sensitivity 0.1 pH
009	Centrifuge, 6000rpm	A	1	1 liter capacity, 6,000rpm
010	Hematocrit centrifuge	A	1	Maximum 12,000rpm, 12 tubes capacity
011-01	Microscope for lab	E-1	10	Binocular biological microscope with 6V 20W halogen
011-02	Microscope with monitor for lab	A	1	Binocular, with 6V 30W halogen lamp, magnification 1000x with CCD camera and monitor
012	Metal detector	A	1	Sensor size 30mm diameter, battery operated

Table 4 List of Planned Equipment

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No	Equipment Name	Criteria for Planned	Q'ty	Specification
<b>MI Microbiology</b>				
<b>BAC Bacteriology</b>				
001	Autoclave, small	B	2	Maximum pressure 0.2Mpa, 30 liter volume
002	Water distillation apparatus	A	1	Stainless steel, BS type, 5liters/hour
003	Microscope for lab	E-2	20	Binocular, with 6V 20W halogen lamp, magnification 1000x
004	Electronic balance, 1000g	A	1	Maximum weight 1,000g, accuracy 10mg
005	Electronic balance, 400g	A	1	Maximum weight 400g, accuracy 1mg
006	Direct projector	A	1	Object: transparency/printed
007	Centrifuge, 6000rpm	A	1	1 liter capacity, 6,000rpm
008	Colony counter	B	2	Illuminatin 15W, display 0 ~ 999
009	Magnetic stirrer, 2 liter	B	2	80-1200rpm, 2000ml capacity
011	Magnetic stirrer, 10 liter	A	1	400-1400rpm, 10,000 ml capacity
012	Incubator	A	1	150 liter capacity, temperature range +5-60 degrees C
013	Set of slides	A	1	General bacteria slides
014	Bio clean bench	A	1	With HEPA filter, effective width 1100mm
015	Cryo vials	C-1	4	Tube capacity 1.5ml, diameter 12 x 48mm
016	Cell homogenizer, motor driven	A	1	1800ml capacity, 24,000rpm
017	Micro homogenizer	A	1	100ml capacity, 24,000rpm
018	Shaker, double action	A	1	Double action, 25mm agitation width, 200rpm
019	Test tube mixer	B	2	Touch starter, adjustable rpm
020	Water bath, small	B	2	Temperature range +5 - boiling point, 4.5 liter capacity
021	Disposal container	D	8	Stainless steel, lid with pedal
022	Micropipette 25 $\mu$ liter	D	8	Capacity 25 $\mu$ liter, fixed capacity
023	Multi-channel micropipette 5-50 $\mu$ liter	B	2	5-50 $\mu$ liter capacity, 12 channels
024	Multi-channel micropipette 40-200 $\mu$ liter	B	2	40-200 $\mu$ liter capacity, 12 channels
025	Stainless steel box for autoclave, 120 dia	C	4	120 x 120mm diameter, stainless steel
026	Stainless steel basket for autoclave for 300	B	2	270 x 200mm diameter, stainless steel
<b>PAR Parasitology</b>				
001	Stereoscopic microscope for lab	E-1	10	With 6V20W halogen lamp, zoom ratio 6x
002	Microscope for lab	E-4	20	Binocular, with 6V20W halogen lamp, magnification
003	Multi-head microscope with monitor for lab	A	1	With 12V100W halogen lamp, CCD camera/monitor, teaching head for 4 persons, magnification 1000x
004	Educational slide for parasitology	A	1	Slides of animal parasites
005	Refrigerator	A	1	With freezer, total capacity 400 liters
<b>VIR Virology</b>				
001-01	Egg hatchery, 40 eggs	A	1	With automatic egg turner, more than 40 eggs
001-02	Egg candler	B	4	Hand-held type, 40W light source
002	Egg scanning box	A	1	Halogen lamp light source, 2.5m fiber cable length
<b>PA Pathology</b>				
<b>CLL Clinic Laboratory</b>				
001	Microscope with camera for lab	A	1	With 6V30W halogen lamp, camera, magnification 1000x
002-01	Stainless steel box for autoclave, 120 dia	F	8	Diameter 120 x 120mm, stainless steel
002-02	Stainless steel box for autoclave for 300 dia	F	4	Diameter 240 x 160mm, stainless steel
002-03	Stainless steel basket for autoclave for 300	F	2	Diameter 270 x 200mm, stainless steel net
003	Neubauer blood cell counter	E-2	20	Size 76 x 30mm
004	Counter	E-2	20	
005	Centrifuge, 6000rpm	A	1	1 liter capacity, 6000rpm
006	Spectrophotometer, VIS	A	1	340-1100 nm, 20W halogen lamp
007	Sampling tube	E-1	10	1.5ml capacity, diameter 11mm, polypropylene
008	Water distillation apparatus	A	1	Stainless steel, Bunsted type, 5 liter/hour
009	Over head projector	A	1	Operating distance 3m, 400W
010	Autoclave, small	A	1	Maximum pressure 0.2Mpa, 30 liter capacity

Table 4 List of Planned Equipment

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No	Equipment Name	Criteria for Planned	Q'ty	Specification
<b>PAT Pathology</b>				
001	Slide heat dryer	A	1	Temperature range: ambient-70 degrees C
002	Incubator for paraffin wax	A	1	Temperature range 40-70 degrees C, with container for melted wax and storage
003	Multi-head microscope for lab	A	1	Binocular, with 12V100W halogen lamp, teaching head for 4 persons, magnification 1000x
004	Microscope for lab	E-3	30	Binocular, with 6V20W halogen lamp, magnification
005	Microscope with camera for lab	A	1	With 6V30W halogen lamp, camera, magnification 1000x
006	Dissecting instrument	B	2	Dissecting knife, muscle cutting knife, hammer, etc.
007	Microtome	C-1	4	Sliding type, disposable blade
008	Camera	A	1	SLR camera w/built-in strobe, 50/100mm macro lens, zoom
009	Chain block	A	1	1 ton lifting capacity
<b>PH Physiology</b>				
<b>ABR Animal Breeding</b>				
001	Milking machine	A	1	4 teat cups, 400W vacuum motor
<b>ANN Animal Nutrition</b>				
001	Magnetic stirrer with hot plate	B	2	3 liter capacity
002	Calorimeter	A	1	
003-01	Electronic balance, 200g	A	1	200g scale, 0.1mg accuracy
003-02	Electronic balance, 400g	A	1	400g scale, 1mg accuracy
004	Laboratory mill	A	1	Motor-driven, sieve size 0.5mm, 1mm, 2mm, 5kg/h
006	Sugar measuring device	A	1	Brix range 0-60%, Brix minimum unit 0.1%
007	Cool water supply device	A	1	Water temperature range -5 to 20 degrees C, discharge rate 4 liter/minute
008	Infrared moisture meter	A	1	Sample weight 5-70g, measurement range 0-100%
009	Dishes used for dryer	E-3	40	Stainless steel square tray
010	Porcelain cups for oven	E-3	40	32mm diameter, 10ml capacity
011	Automatic Kjeldhal titration unit	A	1	White/brown automatic burette, 4 calcium tubes
012	Draft chamber	F	2	Effective width 1100mm, suction air volume 14m ³ /minute
013	Automatic burette	C-1	4	1ml-50ml capacity
014	Mantle heater	C-1	4	6 series heater, 100W x 6 heater capacity
015	Fat extraction apparatus	C-1	4	Cooling/extraction apparatus w/flask(150ml)
<b>BIO Biochemistry</b>				
001	Water distillation apparatus	A	1	Stainless steel, banded type, 5 liter/h
002-01	Centrifuge, 6000rpm	A	1	1 liter capacity, 6000rpm
003	Homogenizer	A	1	1000ml capacity, 18,000rpm
004	Water bath, large	A	1	10 liter capacity, +5 to boiling point
005-01	Electronic balance, 3000g	A	1	3000g scale, 100mg accuracy
005-02	Electronic balance, 1000g	A	1	1000g scale, 10mg accuracy
006-01	Micropipette 0.5-10 $\mu$ liter	A	1	0.5-10 $\mu$ liter capacity, 0.01 micro liter graduation
006-02	Micropipette 10-100 $\mu$ liter	A	1	10-100 $\mu$ liter capacity, .01 $\mu$ liter graduation
006-03	Micropipette 100-1000 $\mu$ liter	A	1	10-1000 $\mu$ liter capacity, 1 micro liter graduation
007	Spectrophotometer, VIS	C-1	4	340-1100 wave length, 20W halogen lamp
008	pH meter for lab	A	1	0.1 pH sensitivity
009	Alcohol burner, stainless, single loop	D	8	120ml alcohol volume, stainless steel, copper wick
010	Laboratory mill	A	1	Motor-driven, sieve size 0.5mm, 1mm, 2mm, 5kg/h
011	Freezer	A	1	400 liter capacity, -35 degrees C
012	Draft chamber	A	1	Effective dimension 1300mm, suction air volume 16m ³

Table 4 List of Planned Equipment

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No	Equipment Name	Criteria for Planned	Q'ty	Specification
<b>BOT Botany</b>				
001	Microscope for lab	C-2	5	Binocular, with 6V20W halogen lamp, magnification
002	Temperature and humidity control box	A	1	Temperature range 10-40 degrees C, 50-90% moisture range, 15Vx40W with illumination
<b>PAP Pathophysiology</b>				
001	Surgical instrument for small animal	E-1	10	Surgical knife, surgical scissors, abdominal scissors, etc.
<b>PIA Pharmacology</b>				
001	Kymograph	C-1	4	Speed variable type, ink printing or tin paper
002	Centrifuge, 6000rpm	A	1	1 liter capacity, 6000rpm
003	Electronic balance, 400g	C-1	4	400g scale, 1mg accuracy
<b>PIY Physiology</b>				
001	Microscope for lab	E-1	10	Binocular, 6V20W halogen lamp, magnification 1000x
002	Kymograph	E-1	10	Speed variable type, ink printing or tin paper
003	Centrifuge, 6000rpm	A	1	1 liter capacity, 6000rpm
004	Personal centrifuge	A	1	6000rpm, capacity 1.5ml x 6
005	Water bath, middle	A	1	9 liter capacity
006	Blood pressure meter	D	8	0-280mmHg measurement range, 40-150 pulse/minute
007	Water distillation apparatus	A	1	Stainless steel, bunsted type, 5 liter/h
008	Spectrophotometer, VIS	A	1	340-1100 wave length, 20W halogen lamp
<b>POB Poultry Breeding</b>				
001	Egg hatchery, 80 eggs	A	1	With automatic egg turner, 80 eggs
002	Yolk/albumin height measuring apparatus	B	2	180mm yolk height, with tripod
003	Egg shape measuring apparatus	B	2	Dimensions 240 x 280mm
004	Egg air room measuring apparatus	B	2	150mm in length, 0.01mm accuracy
005	Egg shell thickness measuring apparatus	B	2	Measuring precision, 0.01mm
006	Egg haugh calculator	B	2	With egg weight measuring apparatus
007	Refractometer	A	1	1.3000-1.7000nD range, 0.0-95% Brix
008	De-beaker	B	2	Electrical
<b>ZOO Zoology</b>				
001	Microscope for lab	C-2	5	Binocular, 6V20W halogen lamp, magnification 1000x
002	Microscope with camera for lab	A	1	With 6V30W halogen lamp, camera, magnification 1000x
<b>SG Surgery &amp; Gynecology</b>				
<b>AIN Artificial Insemination</b>				
001	Hot air sterilizer	A	1	70 liter capacity
002	Osmometer	A	1	Measurement range 0-4000 Osm/kg, 30-50 $\mu$ liter sample
003	Plate warmer	A	1	Temperature range, +50 degrees C
004	LN2 container 10 liter	A	1	10 liter capacity
005	Insemination equipment for sheep	C-1	4	Total length 330mm, pipette length 125mm
006-01	Insemination pipette for sheep, straight	C-1	4	Pipette length 230mm
006-02	Insemination pipette for sheep, curved	C-1	4	Pipette length 230mm, curved
007-01	Artificial vagina for sheep	C-1	4	Tube length 200mm
007-02	Inner liner, tapered	C-1	4	Liner length 200mm
007-03	Inner liner, straight	C-1	4	Liner length 290mm
008	Catheter sterilizer	A	1	Pipe type heater, 5kw
009	Thermo-reguratable cabinet for semen	A	1	Temp. range -10-+50 degrees C, 120 liter capacity
010	Macro tube for semen	A	1	0.25/0.5ml capacity
011-01	Semen vials, 5ml	C-1	4	5ml capacity
011-02	Semen vials, 10ml	C-1	4	10ml capacity,
012	Semen container	A	1	200ml capacity, 70mm dia



Table 4 List of Planned Equipment

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No	Equipment Name	Criteria for Planned	Q'ty	Specification
013	Estrous tester for cow	A	1	Electrode, 470mm in length
015	Kit box for insemination instrument	C-1	4	Stainless steel, 6 semen injectors applicable
016-01	Semen examination plate	C-1	4	Plate dimensions 75 x 25mm, one whole
016-02	Semen examination plate, two specimen	C-1	4	Plate dimensions 75 x 25mm, two whole
017	Microscope for lab	C-1	4	Binocular, with 6V20W halogen lamp, magnification
018	Sperm counter	E-2	20	Thoma style
019	Sperm counting plate	B	4	Thoma style
<b>GYN Gynecology</b>				
001	Autoclave, small	A	1	Maximum pressure 0.2Mpa, 30 liter capacity
002	Surgical instrument, small animal	A	1	12 kinds
003	Surgical instrument, large animal	A	1	20 kinds
004	Video camera and monitor	A	1	Video camera, monitor and VHS video system
<b>SUR Surgery</b>				
001	X-ray device cassette for animals	A	1	3 types of cassette and a holder
002	Video camera and monitor	A	1	Video camera, monitor and VHS video system
003	De-horn	A	1	Electrical
<b>ZA CLDR</b>				
<b>ZRA Joint Use Exam. Room</b>				
001	Ice machine	G	1	15kg/day capacity, ice storage volume 10kg
002	Water purifying apparatus	G	1	0.55 liter/minute capacity, tank capacity 3.5 liters
003	Water distillation apparatus	G	1	Stainless steel, Bunsted type, 5 liter/h
004	Magnetic stirrer, 2 liter	G	1	80-1200rpm, 2000ml capacity
005	Low speed stirrer	G	1	10 liter capacity, 100-1400rpm
006	Ultrasonic homogenizer	G	1	50W, 20kHz, 3mm dia probe
007	Manual homogenizer	I	5	Teflon, 5,10,20,30 and 50ml capacity
008	Hot plate	G	1	1.5kW, max. 300 degrees C
009	Magnetic stirrer with hot plate	H	2	3 liter Capacity, 250 degrees C, 400-1500 rpm
010	Cool Plate	G	1	Temperature range 0-70 degrees C
011-01	Process homogenizer	G	1	Maximum 18,000rpm, 1000ml capacity
011-02	Homogenizer cup and cutter 100-200ml	H	2	200ml capacity cup and cutter, stainless steel
011-03	Homogenizer bath/cup holder 100-200ml	G	1	200ml capacity, stainless steel
011-04	mogenizer cup and cutter 100-500ml	I	6	100-500ml capacity cup and cutter, stainless steel
011-05	Homogenizer bath/cup holder 100-500ml	G	1	100-500ml capacity bath, stainless steel
011-06	Homogenizer cup and cutter 500-1000ml	G	1	500-1000ml capacity cup and cutter, stainless steel
011-07	Homogenizer bath/cup holder 500-1000ml	G	1	500-1000ml capacity, stainless steel
012	Cork borer	G	1	Bore blade, 4.5, 6.0, 8.0, 9.0, 10.5, 12ml dia.
013	Test tube mixer	H	2	Touch starter, adjustable rpm
014	Compressor	G	1	18 liter/min air volume, 0.1kg/cm ²
015	Vacuum pump	G	1	7.6 Toor maximum vacuum, 16 liter/min exhaust air
016	Labo cart	H	2	Stainless steel, 3 shelves
017	Gas burner, tekra type	H	2	LPG gas used
018	Gas burner, Bunsen strong flame	H	2	LPG gas used
019	Gas burner, glass handicraft	H	2	LPG gas used
020	Labo jack	G	1	15kg carrying load, 140-240mm expansion height
021	Test tube rack	G	1	20 kinds
022	Pipette case	I	4	6 shelves, plastic
023	Voltage regulator	G	1	0-240V voltage adjustment range, voltage current 10A
024	Computer	K	3	CPU higher than 300Mhz, 64MB memory, 6GB hard disk, 14 inch disolav
024A	A4 printer	K	3	Laser printing, A4 max. paper size, 600 x 600 dpi
024B	UPS	K	3	5 min. back-up timer
025	Thermostat set for bacterial contamination check	G	1	Filter for measuring bacterial contamination of milk, temperature control, color chart

Table 4 List of Planned Equipment

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No	Equipment Name	Criteria for Planned	Q'ty	Specification
026	Air conditioner	K	6	Window or separate type, 3000kcal/h capacity
026A	Copy machine	G	1	Copy speed higher than 20 sheets/minute, with auto paper feed function and sorter
027	Laboratory table	K	8	Size 1800 x 1500mm
028	Disease sampling collection vehicle	G	1	4 door, 6 passengers with luggage space, 4WD wagon
029	LN2 container 30 liter	H	2	30 liter capacity
030	LN2 container 50 liter	H	2	47 liter capacity
031	Deep freezer	H	2	85 liter capacity, minimum temperature -85 degrees C
032	Freezer	H	2	400 liter capacity, -25 degrees C
033	Cool cabinet	G	1	1300 liter capacity, temperature range 2-14 degrees C
034	Desiccator	I	3	Diameter 280mm
035	Desicator, auto-type	I	3	Plastic, 35 liter capacity
036	Refrigerator	H	2	400 liter capacity with freezer
037	Automatic washing machine for glass wares	G	1	100 liter capacity, max. temp. +80 degrees C, 1kW
038	Ultrasonic washer	G	1	9 liter tank capacity, ultrasonic power 180W, 290W heater
039	Pipette washer	H	2	Pipette container, 160x 430mm in diameter
040	Ultra-sonic pipette washer	H	2	Washing capacity, 1mlx240 pcs
041	Test tube baskets	G	1	9 kinds
042	Washing basket, small	J	10	Dimensions 300 x 200 x 150mm, stainless mesh
043	Washing basket, large	J	10	Dimensions 300x260x160mm, stainless mesh
044	Ultrasonic slideglass washer with heater	G	1	10 liter capacity, temp.range +5 -70 degrees C
045	Autoclave, small	G	1	Maximum pressure 0.2Mpa, 30 liter capacity
046	Autoclave, large	G	1	Maximum pressure 0.2Mpa, 45 liter capacity
047	Hot air sterilizer, large	G	1	40-250 degrees C operating temperature range, 150 liter
048	Pipette sterilizing containers	G	1	4 kinds
049	Culture dish sterilizing container, small	J	20	Dimensions 100x200x100mm, stainless steel
050	Culture dish sterilizing container, large	J	20	Dimensions 240x240x200mm, stainless steel
050A	Microwave oven	H	2	1300W microwave, 200mm or more in inner height
051	Drying rack, wall-type	H	2	Dimensions 600x70x800mm
052	Drying shelf with curtain	G	1	Dimensions 550x250x1000
053	Drying shelf	G	1	Dimensions 550x250x1000mm, polypropylene
054	Electronic balance, 400g	G	1	400g scale, accuracy 1mg
055	Electronic balance, 200g	G	1	200g scale, 0.1mg accuracy
056	Scale 8kg	G	1	8kg scale, 20g accuracy
057	Microdispenser	I	3	0.05ml-15ml dispenser
058	Multi-channel microdispenser	H	2	8 channels
059	Multi-channel microdispenser syringe	H	2	520 $\mu$ liter and 1300 $\mu$ liter
060-01	Micropipette 0.1-2 $\mu$ liter	H	2	0.1-2 $\mu$ liter capacity, 0.01 $\mu$ liter graduation
060-02	Micropipette 0.5-10 $\mu$ liter	I	6	0.5-10 $\mu$ liter capacity, 0.01 $\mu$ liter graduation
060-03	Micropipette 10-100 $\mu$ liter	I	6	10-100 $\mu$ liter capacity, 0.1 $\mu$ liter graduation
060-04	Micropipette 100-1000 $\mu$ liter	H	2	100-1000 $\mu$ liter capacity, 1.0 $\mu$ liter graduation
060-05	Micropipette 1000-5000 $\mu$ liter	H	2	1000-5000 $\mu$ liter capacity, 10 $\mu$ liter graduation
061	Safety pipette	H	2	Rubber, 50ml capacity
062	Pipette pump	H	2	0.2-25ml capacity
063	Pipette controller	H	2	Suited pipette capacity, 0.2, 2, 10 and 20ml
064	Scale for small animal	G	1	150kg scale, 200g graduation
065	Scale for large animal	G	1	1200g scale, 1kg graduation
066	Mouse cage, small	J	40	Dimensions 220x320x140mm
067	Mouse cage, large	J	20	Dimensions 670x210x160mm
068	Rat cage	J	20	Dimensions 340x450x180mm
069	Rabbit cage	J		Dimensions 350x500x400mm
070	Chicken cage	J	10	Dimensions 400x500x600mm

Table 4 List of Planned Equipment

8.10

No	Equipment Name	Criteria for Planned	Q'ty	Specification
071	Constant temperature water bath	G	10	Temp. range -10-+80 degrees C
072	Stainless steel bath for water bath	G	1	24 liter capacity, stainless steel
073	Shaking water bath	G	1	Agitation width 40mm, 15 liter capacity
074	Constant temperature water bath with	G	1	Temp. range +5-80 degrees C, stainless steel
075	Handy cooler	G	1	Temp. range -25 to ambient, 600kcl/h cooling capacity
076	Shaker, low speed	G	1	Agitation width 25mm, 120rpm
077	Orbital shaker	G	1	40rpm, 3kg capacity
078	Bench top shaker	G	1	Agitation width 25mm, 3.5kg capacity
079	CO2 incubator	G	1	Temperature range +5-50 degrees C, 140 liter capacity
080	Refrigerated centrifuge	G	1	20,000rpm, 1500ml capacity
081	Refrigerated micro centrifuge	G	1	15,000rpm, 200ml capacity
082	Microplate shaker	G	1	1100rpm, 4 microplates
083	Microplate washer	G	1	Water pressure type, 2 plates with 96 holes
084	Fraction collector system	G	1	100 test tubes, test tube diameter 17.5 x 130mm
085	Monitor for fraction collector	G	1	D2 lamp, 280nm metal filter
086	Column chromatograph	G	1	Inner diameter 30mmx200mm
087	Hematocrit centrifuge	G	1	Maximum 12,000rpm, 20 tube capacity
089	Fluorescent microscope, trinocular	G	1	With 12V100W halogen lamp, magnification 1000x, fluorescent light source 100W mercury lamp
090	Inverted fluorescent microscope	G	1	With 2V100W halogen lamp, with fluorescent apparatus, fluorescent light source 100W mercury lamp
091	Microscope with camera	G	1	With 12V100W halogen lamp, magnification 1000x, with
092	Stereoscopic microscope with camera	G	1	With 6V30W halogen lamp, with camera
093	Surgical instrument for small animal	G	1	12 kinds
094	Rapid agglutination tester	I	3	With 20W lamp, heater 60W x 3
095	pH meter for lab	G	1	Sensitivity 0.1 pH
095A	pH meter	H	2	Measuring range 0.001/0.01pH, w/printer
096	Polyacrylamide gel electrophoresis	G	1	Cooling core, under buffer tank, etc.
097	Power unit for electrophoresis	G	1	200V power supply, number of connections 2
098	Photosystem for electrophoresis	G	1	Instant photo apparatus and trans-illumination
099	Program power supply	G	1	1000V program power supply, number of connections 3
100	Electrophoresis system, agar gel	G	1	Mini gel tank, gel maker, power supply, etc.
101	Electrophoresis system, acetate film	G	1	Film size 65x100mm and 200x100mm
102	Western blotting system	G	1	Gel size 90x100, 160x200 and 200x185mm
103	Southern blotting system	G	1	Vacuum regulator, base unit, etc.
104	Spectrophotometer, UV/VIS	G	1	190-1100nm, 0.5nm accuracy, with 50W halogen lamp
104A	Spectrophotometer UV/VIS/NIR	G	1	190-3200nm, 0.3nm accuracy, double beam type
105	Spectrophotometer quartz cell	K	10	Optical pass length 10mm, 12.5x12.5x4.5mm
106	Spectrophotometer, VIS	H	2	340-1100nm
107	ELISA reader system	G	1	Wave length 400-700nm, 4 filters, double beam type
108	Micro titer system	H	2	Micro dilution case with 11 components
109	Dilutor	K	36	0.025 ml capacity
110	Dropper	I	3	0.025 ml capacity, U plate
111	Automatic blood parameter counter	G	1	Measurement items, 11 kinds
112	HPLC	G	1	Solvent delivery unit, system controller, etc.
113	Refractometer	G	1	1.3000-1.7000 nD, 0-95% Brix
114	Gas-chromatograph	G	1	Column oven, FID, TCD detector, etc.
116	Fluorescent spectrophotometer	G	1	With 500W kisenon lamp, 220-750nm, 1.5nm accuracy
117	Atomic absorption spectrophotometer	G	1	185-870nm, 30 kinds hollow cathod lamps
118	Macro photography system	G	1	35mm SLR, 50 and 100mm macro lenses
119	Laboratory glass ware	G	1	Beaker, flask, mes-cylinder, culture bottle, test tube, etc.
120	Plastic wares	G	1	Sedimentation tube, beaker, cylinder, microplate, pipette,
121	Medium	G	1	Culture, antigens, dyeing fluid, serum, etc.

Table 4 List of Planned Equipment

9.16

No	Equipment Name	Criteria for Planned	Q'ty	Specification
<b>ZRB Bacteriology Exam. Room</b>				
001	Magnetic stirrer with hot plate	G	1	3 liter capacity
002	Bio clean bench	G	1	With HEPA filter, effective width 1100mm
004	Vacuum pump	G	1	7.6 Torr maximum degree of vacuum, 16 liter/min exhaust air volume
005	Autoclave, small	G	1	0.2 Mpa maximum pressure, 30 liter capacity
006	Desiccator, auto-type	G	1	Plastic, effective measurement 35 liters
007	Electronic balance, 2000g	G	1	2000g scale, 10mg accuracy
008	Scale 2kg	G	1	2kg scale, 5g accuracy
009-02	Micropipette 0.5-10 $\mu$ liter	H	2	0.5-10 $\mu$ liter capacity, 0.01 $\mu$ liter graduation
009-03	Micropipette 10-100 $\mu$ liter	H	2	10-100 $\mu$ liter capacity, 0.1 $\mu$ liter graduation
009-04	Micropipette 100-1000 $\mu$ liter	H	2	100-1000 $\mu$ liter capacity, 1 $\mu$ liter graduation
009-05	Micropipette 1000-5000 $\mu$ liter	H	2	1000-5000 $\mu$ liter capacity, 10 $\mu$ liter graduation
010	Low temperature incubator	G	1	Temperature range -10-+50 degrees C, 120 liter capacity
011	CO2 incubator	G	1	Temperature range +5-50 degrees C, 140 liter capacity
011A	Incubator	G	1	150 liter capacity, temperature range + 50-60 degrees C
012	Personal centrifuge	H	2	6000rpm, capacity 1.5ml x 6
013	pH meter	G	1	Graduation 0.001/0.01pH, with printer
014	Turbidity meter	G	1	0 to 1000ppm measurement range, 10ppm detection limit
<b>ZRP Parasitology Exam. Room</b>				
001	Magnetic stirrer with hot plate	G	1	3 liter capacity
002	Multi-stirrer, 6 vessels	G	1	Capacity 2000ml x 6, separate adjustments possible
003	Gel punchers for agar gel	H	2	Stainless, 7 holes
004	Gas burner, Bunsen	H	2	LPG gas used
005	Alcohol burner	H	2	70ml capacity, glass
006	Alcohol burner, single loop	H	2	120ml capacity, stainless steel, single loop
007	Alcohol burner, double loop	H	2	120ml capacity, stainless steel, double loop
008	Refrigerator	G	1	400 liter capacity with freezer
009	Balance, 100g	G	1	100g scale, 0.1g accuracy
010	Electronic balance, 2000g	G	1	2000g scale, 10mg accuracy
011-02	Micropipette 0.5-10 $\mu$ liter	H	2	0.5-10 $\mu$ liter capacity, 0.01 $\mu$ liter graduation
011-03	Micropipette 10-100 $\mu$ liter	I	4	10-100 $\mu$ liter capacity, 0.1 $\mu$ liter graduation
011-04	Micropipette 100-1000 $\mu$ liter	H	2	100-1000 $\mu$ liter capacity, 1 $\mu$ liter graduation
011-05	Micropipette 1000-5000 $\mu$ liter	H	2	1000-5000 $\mu$ liter capacity, 10 $\mu$ liter graduation
011-06	Multi-channel micropipette 5-50 $\mu$ liter	G	1	5-50 $\mu$ liter capacity, 12 channels
011-07	Multi-channel micropipette 40-200 $\mu$ liter	G	1	40-200 $\mu$ liter capacity, 12 channels
012	Incubator	G	1	150 liter capacity, temp. range + 5-60 degrees C
013	Centrifuge, 6000rpm	G	1	1 liter capacity, 6000 rpm
014	Egg counter	K	30	Macmaster type
015	Drain siphon for liver-fluke examination	H	2	Drain siphon with 18 kind instruments
016	Draining Siphon	J	20	Siphon, beaker, pipette, etc.
017	Rotator for glass beads method of liver-fluke	G	1	24 tubes
018	Stainless net for glass beads method	J	10	60 mesh
019	Microscope	H	2	Light source 12V100W halogen lamp, magnification 1000,
020	Stereoscopic microscope	H	2	10x zoom ratio, Trinocular, with 6V30 halogen lamp,
021	Magnifier with illumination stand	H	2	Lens size 85mm, magnification 8x, light source 20W
022	pH meter	G	1	Graduation 0.001/0.01pH, with printer

Table 4 List of Planned Equipment

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No	Equipment Name	Criteria for Planned	Q'ty	Specification
<b>ZRV Virology Exam. Room</b>				
001	Bio clean bench	G	1	With HEPA filter, effective width 1100mm
002	Test tube mixer	G	1	Touch start, adjustable rpm
003	Labo cart	G	1	3 shelves, stainless steel
004	Gas burner, Bunsen	H	2	LPG gas used
005	Shaking water bath	G	1	100-1200rpm, max. 250 degrees C, 10 liter capacity
005A	Magnetic stirrer wiyh hot plate, low speed	G	1	15 liter capacity, agitation width 40mm
006	Autoclave, small	G	1	0.2Mpa maximum pressure, 30 liter capacity
007	Pipette controller	H	2	Applicable pipette capacity 0.1-25ml
008	Multi-channel micropipette 5-50 $\mu$ liter	G	1	5-50 $\mu$ liter capacity, 12 channels
009	Multi-channel micropipette 40-200 $\mu$ liter	G	1	40-200 $\mu$ liter capacity, 12 channels
010-02	Micropipette 0.5-10 $\mu$ liter	I	4	0.5-10 $\mu$ liter capacity, 0.01 $\mu$ liter graduation
010-03	Micropipette 10-100 $\mu$ liter	I	4	10-100 $\mu$ liter capacity, 0.1 $\mu$ liter graduation
010-04	Micropipette 100-1000 $\mu$ liter	H	2	100-1000 $\mu$ liter capacity, 1 $\mu$ liter graduation
011-01	Multi-channel microdispenser	H	2	8 channels
011-02	Multi-channel microdispenser syringe	G	1	520 $\mu$ l ~ 1300 $\mu$ l
012	Roller culture system	G	1	Applicable with 15x150mm diameter test tubes
013	Egg hatchery, 80 eggs	G	1	With automatic egg turner, 80 eggs
014	Anaerobic bacteria culturing apparatus	G	1	Culture jar with gas pack, etc.
015	Filtration system	G	1	90mm stainless steel filter holder with variable speed pump,
017	Pressure filtration tank	G	1	90mm stainless steel filter holder with 15 liter container,
018	Filter holders	I	6	90mm funnel, bottle, etc.
019	Dialysis system	G	1	200ml buffer capacity, 28-60rpm
020	Table top centrifuge, refrigerated	G	1	5000rpm, 1000ml capacity
021	Personal centrifuge	G	1	6000rpm, capacity 1.5ml x 6
023	Inverted microscope trinocular	G	1	6V20W light source, magnification 400x, w/adapter for
024	Inverted microscope	G	1	6V30W halogen lamp, magnification 400x, with camera
025	pH meter	G	1	Graduation 0.001/0.01pH, with printer
026	Culturing bottle, plastic	G	1	50, 250, 750ml capacity
<b>ZZ Faculty of Veterinary Medicine</b>				
<b>FOV Faculty of Veterinary Medicine</b>				
001	Field training bus	H	2	30 ~ 35 passenger bus with pathology training equipment
002	Computer	G	1	CPU higher than 300Mhz, 64MB memory, 6GB hard disk, 14 inch display
002A	A4 printer	G	1	A4 paper size, laser printer, 600x600 dpi
002B	UPS	G	1	5 minute back up timer
003	Incinerator for small animal	G	1	Opening 500x700mm, 19 liters/hr for 1st burning, 10 liters/hr for 2nd burning