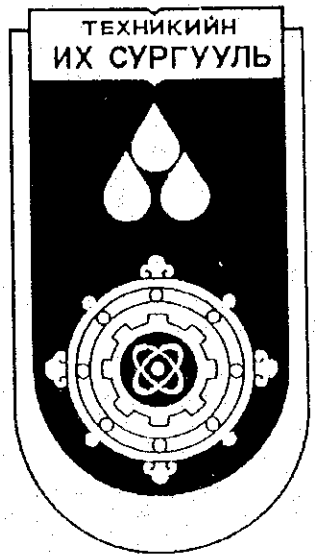
MONGOLIAN TECHNICAL UNIVERSITY



Some reference for Basic study team of JICA, Japan

Ulaanbaatar, Mongolia 1995

Introducing the Mongolian Technical University
(in brief)

The Establishment

The establishment of a Civil Engineering Department under the Mongolian State University in 1959 was the first step in conducting the training of engineers and technologists in national level.
In 1969, Polytechnic Institute was set up under the Mongolian National University then in 1982, the Polytechnic became an independent Institute.
And from 1990, it was expanded into the Mongolian Technical University (MTU).

The Aim of MTU

MTU aims at becoming a university with general academic excellence and a worldwide standard level of training the engineers,technologists and managers , also the graduated engineers for national needs through the hierarchy education system and developed academic programs leading to the award of bachelor, master or doctoral degrees.
Moreover, in accordance with the MTU leadership role in national technology development , the Mongolian Technical University is conducting the outreach activities in partnership with private and public sector institutions to meet the linkage between research and production.

Organization

The governing body of the University is the Academic Council, which controls the university's academic, finance, research activities and general affairs, including the award of degrees, enrollment and graduation.
The Mongolian Technical University is organized into the following schools and centers :

- School of Geology and Mining
- School of Light Industry Technology
- School of Food Technology
- School of Power Engineering
- School of Computer Science and Management
- School of Information Techniques
- School of Transportation
- School of Civil Engineering
- Technological Institute in Darkhan city
- Fundamental Education Center
- Foreign Language Center
- Graduate Education Center
- Distance Education Center

There are 36 departments at the schools, where focused main academic activities of the University.

Teaching staff and students

Here, more than 4500 students and 400 faculty and teaching staff at the Mongolian Technical University in 1995-1996 academic year.

Property and lab basis of MTU

The MTU asset composites about 495.8 million tugrigs (Mongolian currency) , of which a property of 120 million tugrigs is used for laboratory basis and equipment related to the academic activities.
There are around 100 labs , 50 demonstration rooms , 5 gyms and 3 field training ranges at the MTU, where the area for per student consists of 2.1-3 square meters.

Reform of Higher Technical Education in Mongolia

1. Reform of Higher Technical Education at the Mongolian Technical University began from 1992.

The reform was made in the following directions:

A.University management reform

- Refuse from the centralized management (Diagr.1)
- Reorganization of the faculties into schools and delivery of authority to decision on student distributed budget.
- Reduction of the numbers of Department , strengthening them by their extended authority on academic programs and teaching staff (Diagr.2.)
- Change the budget planning and distribution and seek additional sources of fund.
- Application of the tuition fee education system and increase the enrollment

B. Reform of The Academic Programs

- Refuse from highly specialized and focused on narrow specialization (Diagr.3)
- Development of hierarchy education system : diploma, bachelor's, master's and doctor's degrees (Diagr. 4)
-Curriculum development to apply the Credit Hour system

C. Reinforcement of laboratory basis

- Definition of the main conception for renovation of lab basis of Mongolian Technical University in the " MTU Development Master Plan " adopted by the Ministry of Science and Education
- Renovation of computer facilities by direct support of JICA (JOCV), Japan

D. Improvement of MTU foreign cooperation

- MTU became a member of International Association of Universities (IAU) October.1994
- Signed an Agreement with the Singapore Polytechnic on Mutual cooperation. October. 1992, Singapore
- Signed an Agreement of cooperation with Darmstadt Technical University, German, in July. 1995, Darmstadt
- Created an Agreement of cooperation with Miyakonojo College, Japan, in April.1995, Ulaanbaatar
- Signed the Memorandum of Understanding with Asian Institute of Technology . October.1995, Ulaanbaatar
- Continued cooperation with Russian Institutions such are: Irkutsk Technical University, Ural Technical University, Moscow Economics and Statistical Institute and Ivanov Textile Academy

E. Key problems to be solved

1. Reinforcement of laboratory facilities
2. Improvement in training and retraining of MTU teaching staff
3. Improvement in quality and standards of technical training through the reforms of curriculum development and its methodology, implementing the Credit hour system

For problems 1 and 2 , it is necessary to apply the foreign supports and assistance The MTU Academic Council was approved the following priority for reinforcement of the laboratory facilities and teaching staff development at our University, which are:

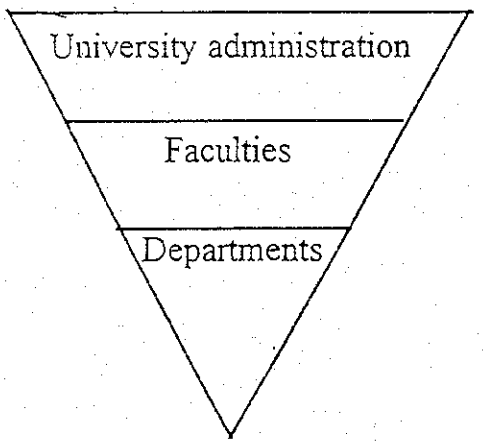
1. Food technology and processing
2. Light industry processing
3. Civil and Construction Engineering
4. Mechanical Engineering
5. Electronics and automation

For key problem 3 , University must do effort to mobilize own resources.

Diagram-1

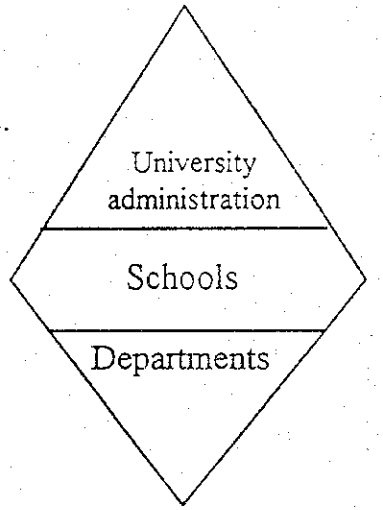
University Management Reform

1.



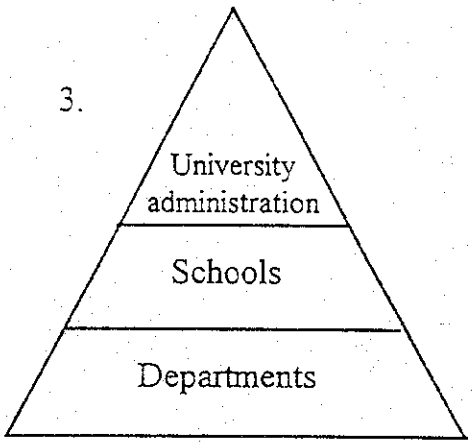
before 1992

2.



now

3.



in the near future.

Diagram-2

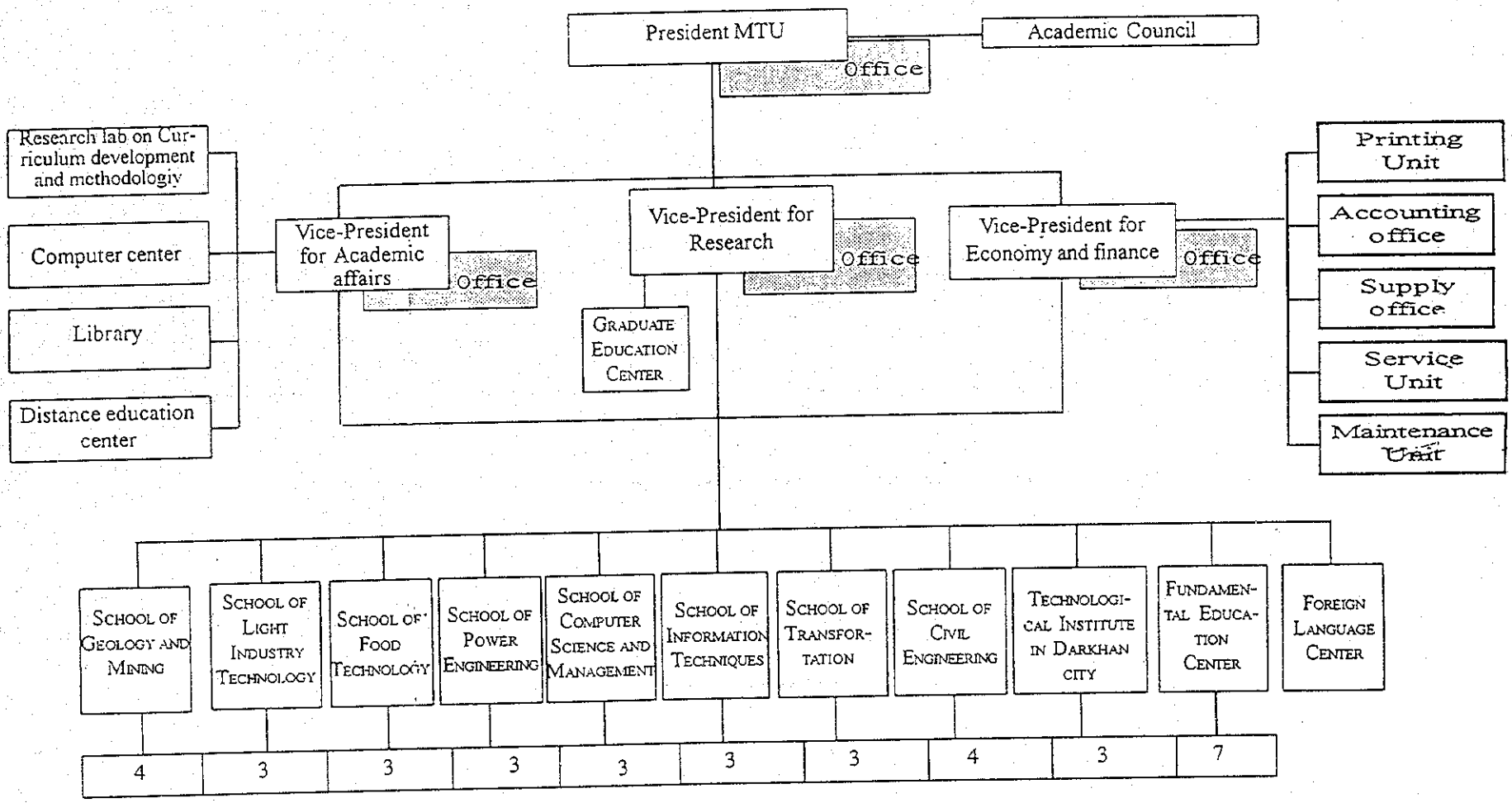

President MTU
Academic Council
Office
Research lab on Curriculum development and methodologiy
Computer center
Library
Distance education center
Vice-President for Academic affairs
Office
Vice-President for Research
Office
Graduate Education Center
Vice-President for Economy and finance
Office
Printing Unit
Accounting office
Supply office
Service Unit
Maintenance Unit
School of Geology and Mining
School of Light Industry Technology
School of Food Technology
School of Power Engineering
School of Computer Science and Management
School of Information Techniques
School of Transfortation
School of Civil Engineering
Technological Institute in Darkhan city
Fundamental Education Center
Foreign Language Center
4
3
3
3
3
3
3
4
3
7
Departments

Diagram - 2.1

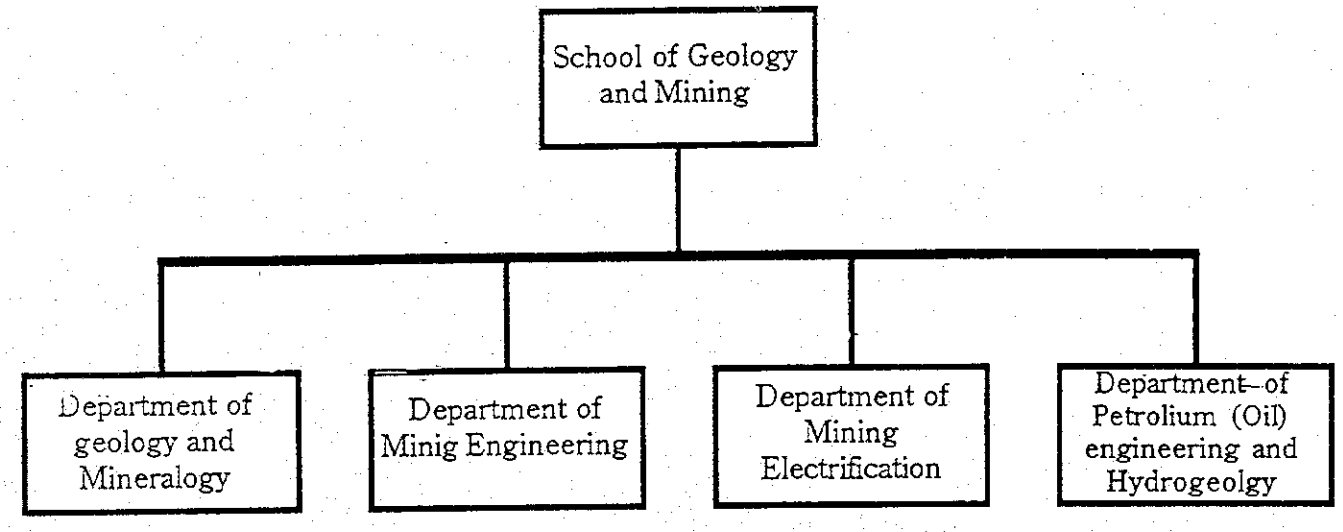

School of Geology and Mining
Department of geology and Mineralogy
Department of Minig Engineering
Department of Mining Electrification
Department of Petrolium (Oil) engineering and Hydrogeolgy

Diagram - 2.2

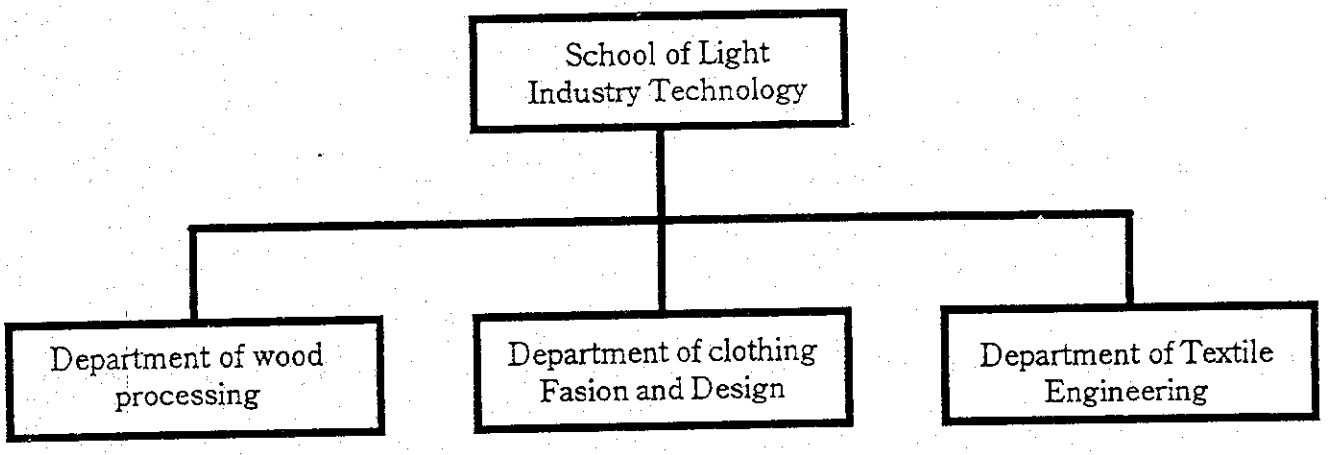

School of Light Industry Technology
Department of wood processing
Department of clothing Fasion and Design
Department of Textile Engineering

Diagram - 2.3

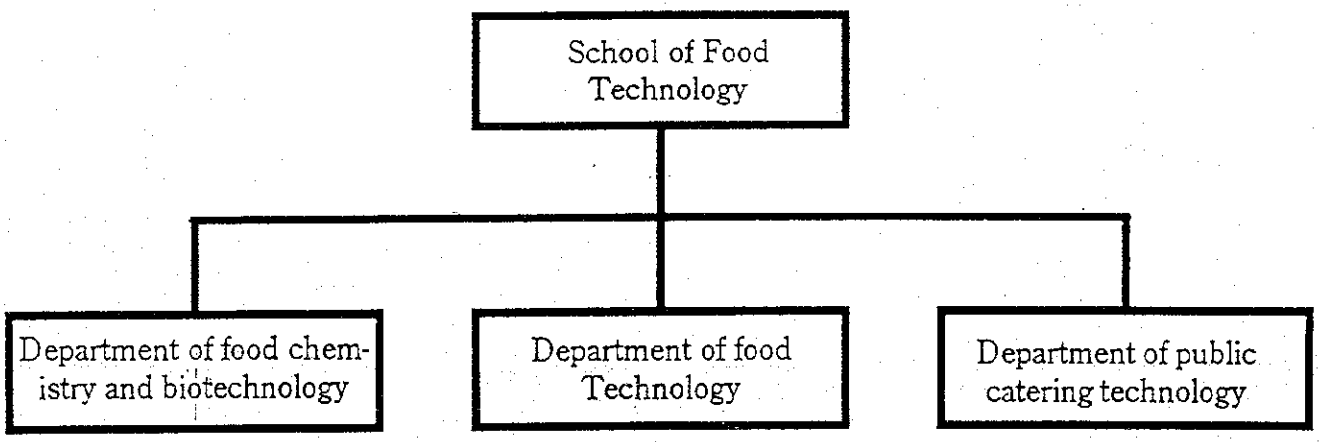

School of Food Technology
Department of food chemistry and biotechnology
Department of food Technology
Department of public catering technology

Diagram - 2.4

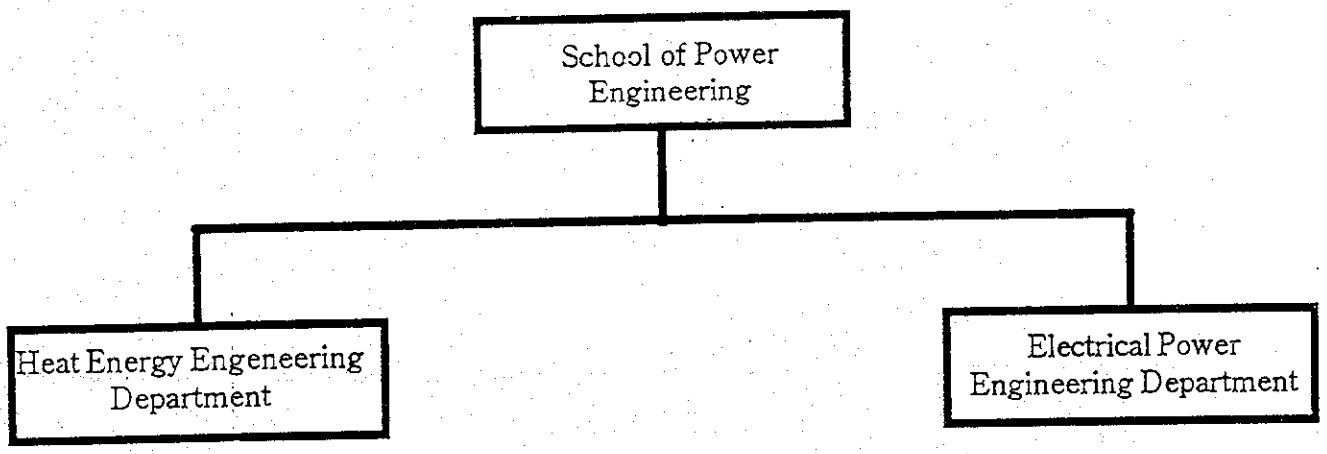

School of Power Engineering
Heat Energy Engeneering Department
Electrical Power Engineering Department

Diagram - 2.5

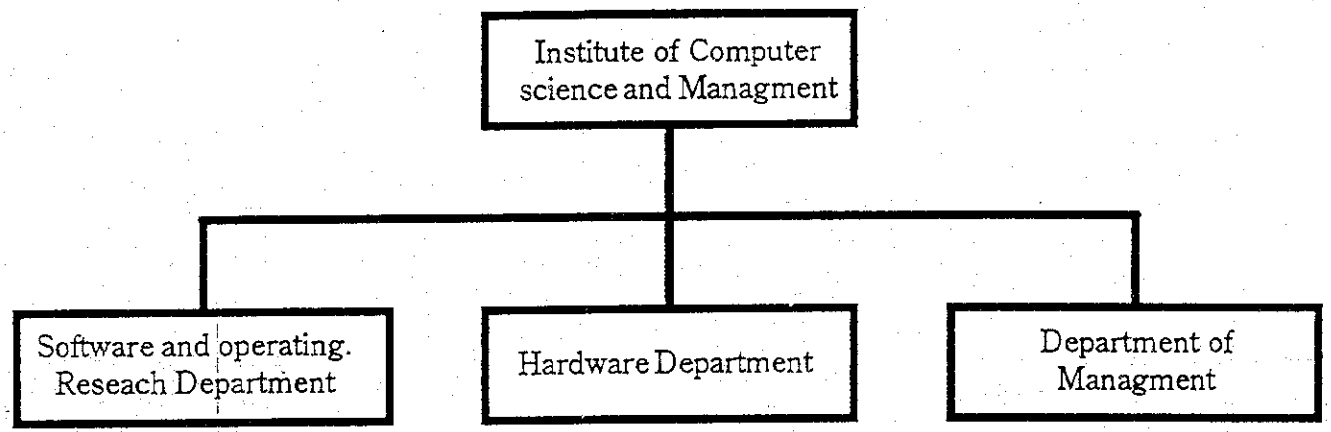

Institute of Computer science and Managment
Software and operating. Reseach Department
Hardware Department
Department of Managment

Diagram - 2.6

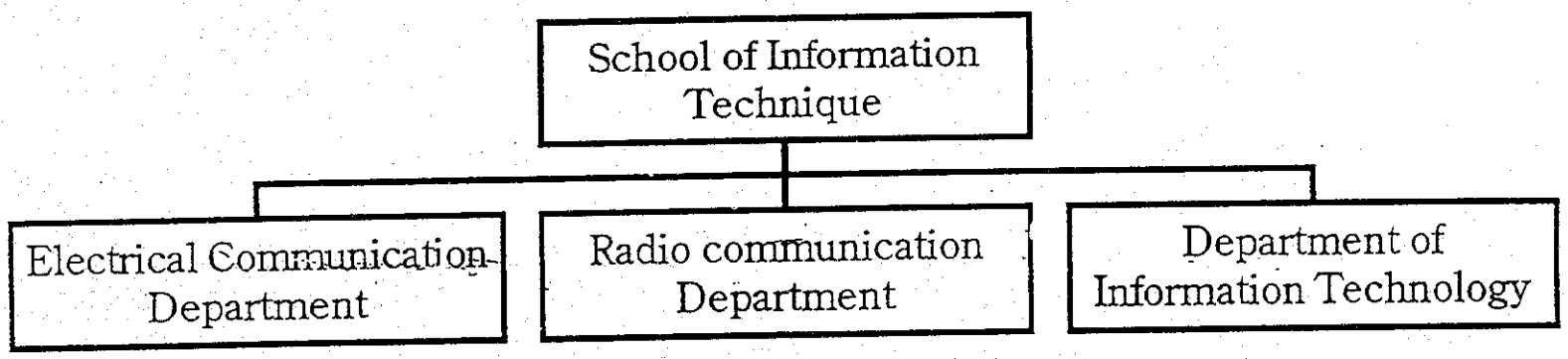

School of Information Technique
Electrical Communication Department
Radio communication Department
Department of Information Technology

Diagram - 2.7

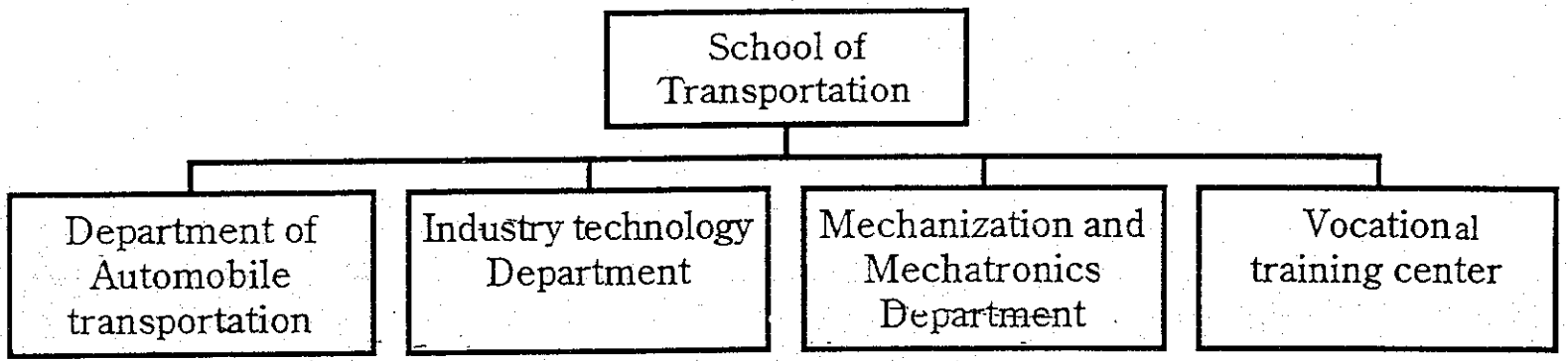

School of Transportation
Department of Automobile transportation
Industry technology Department
Mechanization and Mechatronics Department
Vocational training center

Diagram - 2.8

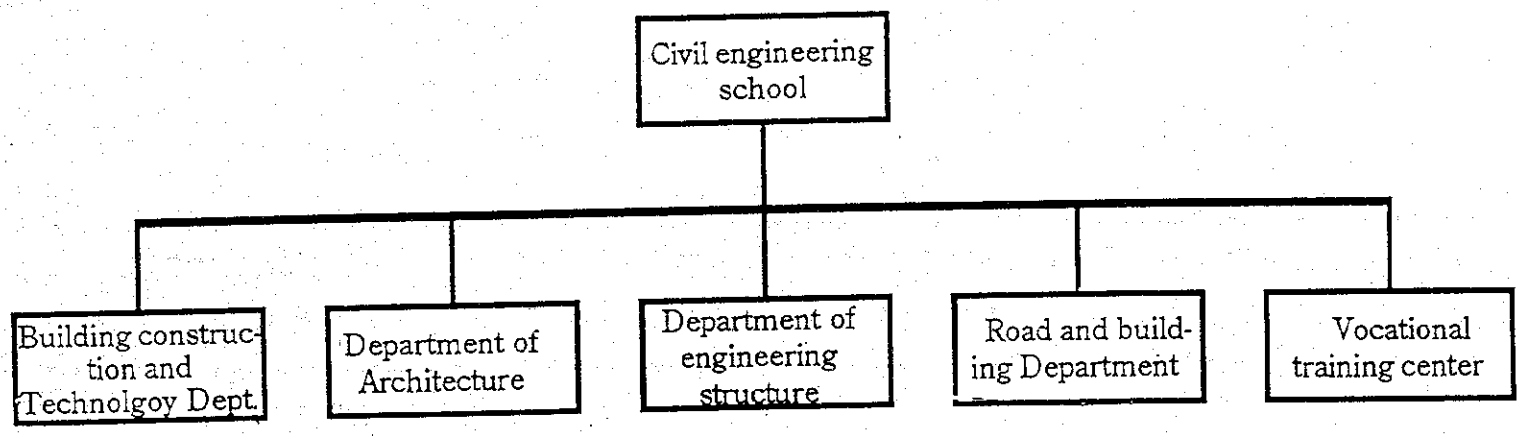

Civil engineering school
Building construction and Technolgoy Dept.
Department of Architecture
Department of engineering structure
Road and building Department
Vocational training center

Diagram - 2.9

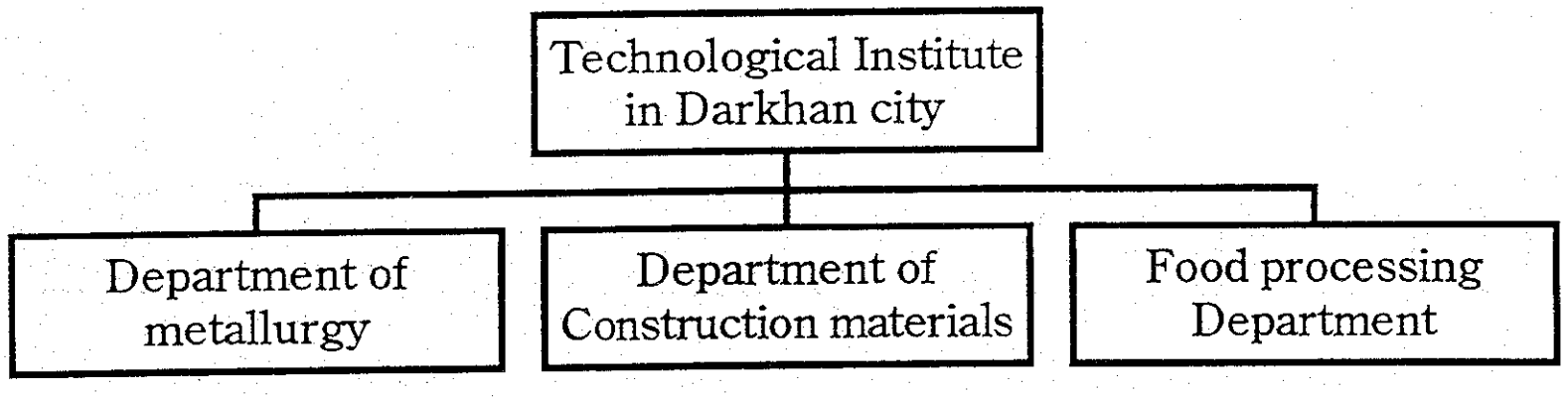

Technological Institute in Darkhan city
Department of metallurgy
Department of Construction materials
Food processing Department

Diagram - 2.10

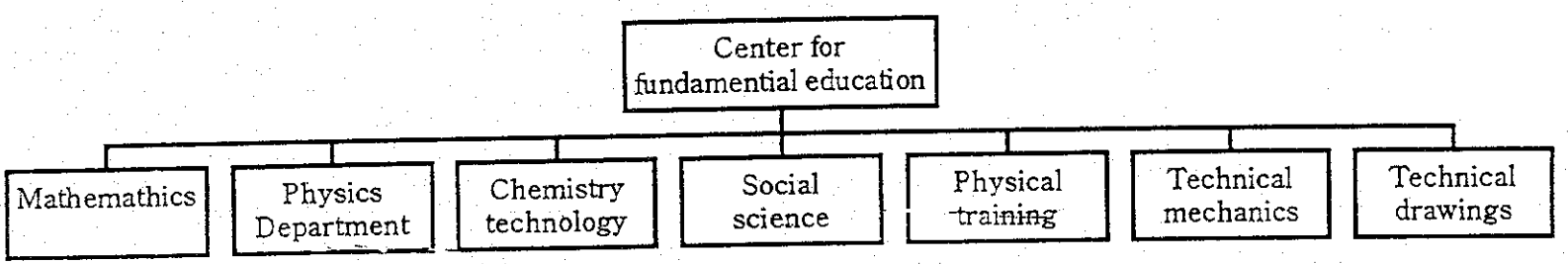
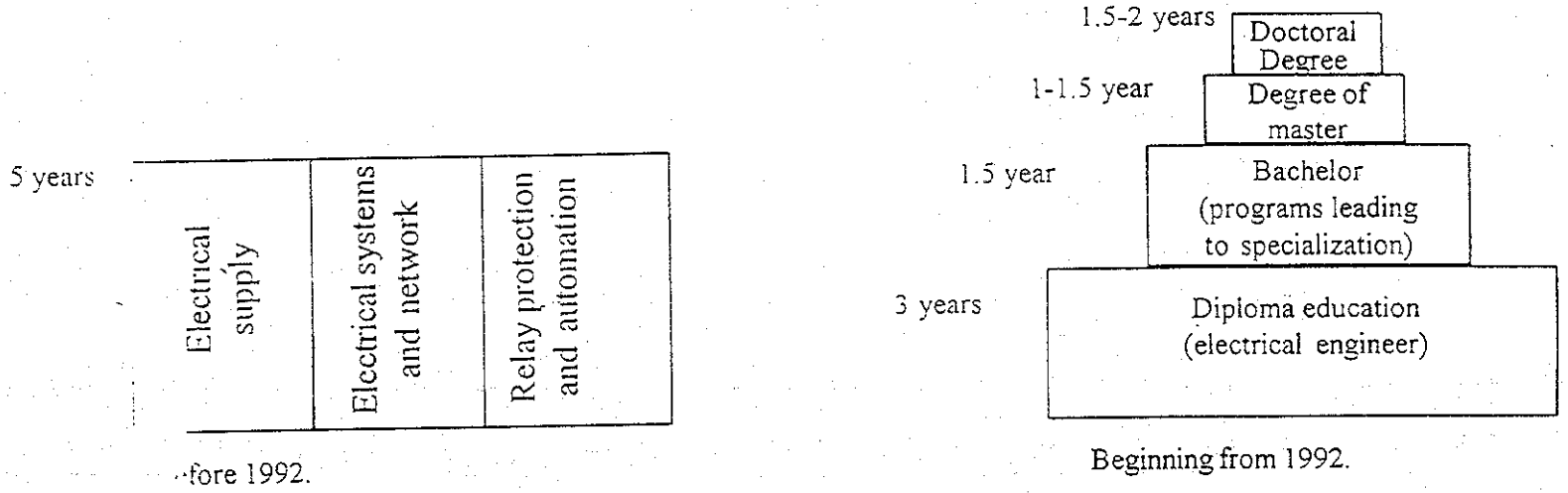
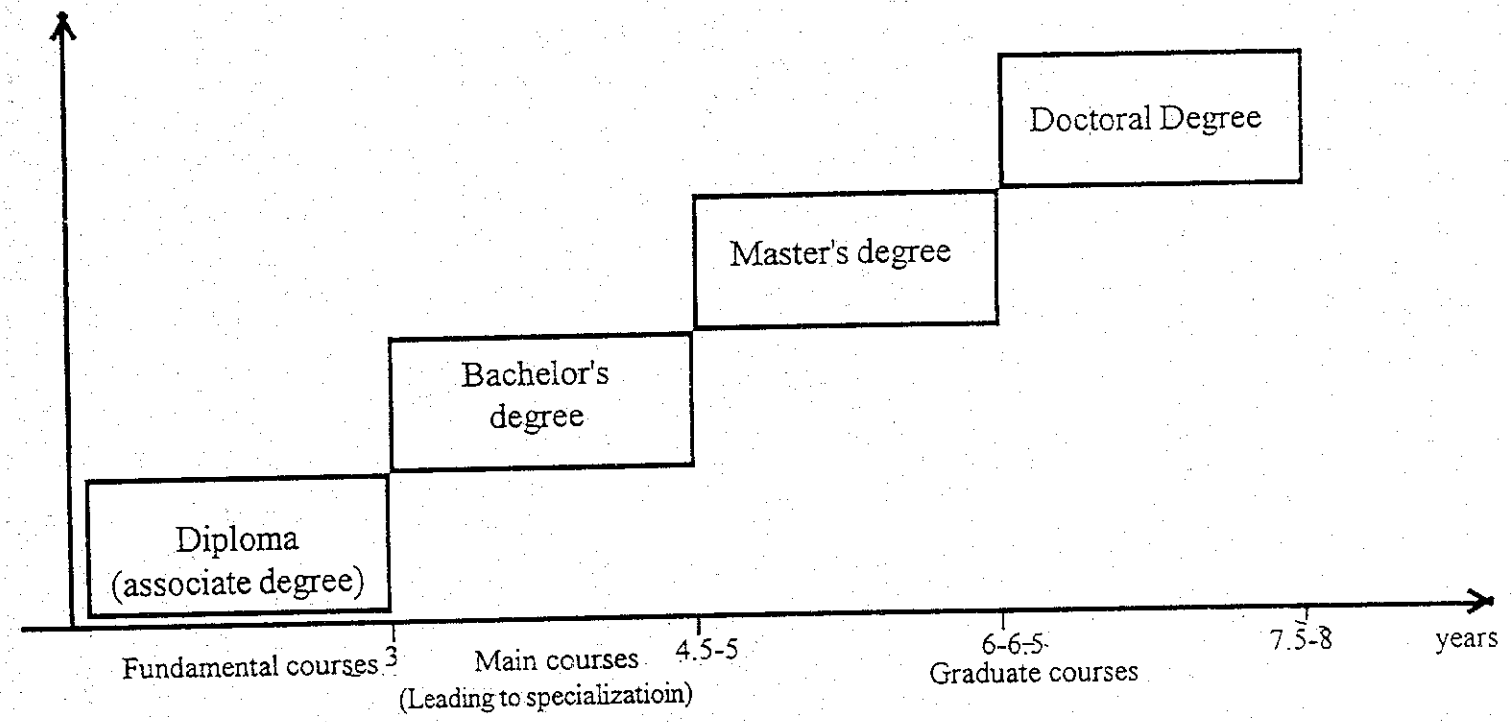

Center for fundamential education
Mathemathics
Physics Department
Chemistry technology
Social science
Physical training
Technical mechanics
Technical drawings

Diagram №3



Reform of the Academic program at the MTU
(In example of Electrical Engineering Education)

Diagram №4



Principal scheme of technical education at the MTU.

Name of the project: Light industry training laboratory.

1.Background

Mongolia has 1,5 mln sq kilometers territory and 27,5 mln piece of home animals therefore wool and cashmere processing, skin and leather processing and other livestock product processing industries were playing essential role in the economy of country.For last 60 years of development of Mongolia until 1990th main industrial capacities for above mentioned technologies had been established in this country. In that time there were many enterprises for wool processing,carpet making, knitting, waving, leather processing and sewing plants. But for last years depending on the obsolete technology,shortage of spare parts,raw materials,financial difficulties and training and managing skills of personnel their production volume had been falling down and majority of them stopped.
Now country is facing the need to renovate a technology for light industry and it's equipment also to train specialists

1.1 Current situation.

In 1970-1980th many specialists for light industry have been trained in Russia,Germany,Hungaria and Bulgaria. And also a some of them trained in the Technical University from 1979.
Today Department of the light industry of MTU has more than 20 teaching staff and 450 students specializing in wool,cashmere and leather processing ,sewing and fashion design technology.
But for last years did not have any renovation of laboratory facilities enable to introduce new technology to this industry.On the other hand need for training of specialists for light industry is increasing depending on the growth of this kind of industry in Mongolia.

1.2 What role of the department in Mongolian education and economy.

The light industry department of MTU is higher educational institute for training of specialists for this kind of industry in Mongolia.
Development of light industry in Mongolia will be one of the main sectors of economy depending on it's raw material resource.

1.2 Problems to be solved.

To introduce a training laboratory for wool, pure, hair processing technology and sewing , fashion designing industry technology.
Training of Mongolian teachers and specialists to new technology and methodology for above mentioned industries.

1.3 What problem was solved

There are a some laboratory facilities for training students , but they were installed in 1970th and obsolete. Department has a some teachers and specialist having a knowledge and working experiences in light industry they need to retrain for new technology.

1.4 Priority of the problem

-Reinforcement of training facilities and methodology for cheep and camel wool,cow and horse hair ,cashmere processing technology and waving and knitting product quality control laboratories

-Fashion design and sewing industry training laboratory

-Knitting and waving industry technological machinery design and dynamic characteristic laboratory

1.5Necessity and importance of improvement

-To study a quality and dynamic characteristics of local raw materials and introduce suitable for them technology and machinery
-To create the capacity able to evaluate the quality ,design ,color and other characteristics of industrial products and to have a consultancy and training facilities.
-Simulation of industrial technology and activities at the training laboratories and improving the practical experiences of graduate specialist

1.6 Reason why Japan's grant aid is requested.

Japan is one of the leading country for wool,cashmere processing industry .Many Japanese technology in this respect had been introduced into Mongolia .Mongolian manufacturers have a some experiences in using of Japanese technology and cooperation between two countries will be increased in the future.

1.7 Objectives

Short term: To create modern technology training facilities for above mentioned industries.
Medium term: To establish production capacity for processing local raw materials for final product manufacturing.

1.8 Outline of the project.

Equipment: To provide with necessary equipment
Training of instructors:Training of Mongolian specialists
Expert consultancy: Short term expert consultancy for each industry.

Name of the project: Civil engineering training.

1.Background

Mongolia has sharp continental climate and quite unpleasant conditions in terms of geological engineering.60 per cent of soil of Mongolian territory is covered with permafrost and 20 per cent with subsiding (loese) and swelling soils.Majority of the territory is a zone of the earthquake,which has magnitude of 7-9 with the Richter Scale.In order to solve these problems in Mongolia we need to educate students and provide them with good knowledge of the seismic design,structural construction and soil mechanics-dynamics in Civil Engineering School.

1.1 Current situation

The civil engineering school was founded in 1960. At the present time 450 students are studding in this School.After graduation they will have speciality in construction,road building and Hydrotechnical engineering.
Laboratory equipment was used for last 20-30 years and very obsolete.

1.2 What role of the Department in Mongolian education and economics.

For the future development Mongolia needs highly trained and experienced specialists in civil construction,road building and hydrotechnical studying.
Only this department should train and retrain above mentioned specialists in Mongolia.

1.2 Problem to be solved

The arrangement and renovation of the new project laboratories will provide a versatility of experiments and construction of scale models of complete structures,construction materials and soil for testing purposes.

Within the project need to reinforce the following laboratories:

-Structural engineering laboratories.
-Soil mechanics and dynamics laboratory.
-Construction materials laboratory.

They should control analytical and experimental methods for concrete technology reinforced and prestresed concrete structures and steel structure, control structural defects, to test the quality of building materials by non breaking method.
The soil engineering laboratory should have a facilities for testing and researching on the engineering behavior and fundamental properties of soil.A dynamic triaxial apparatus are studying of the cyclic behavior of soil under offshore,traffic and earthquake types of loading.

1.3 What problems were solved.

The department has construction material testing and soil mechanics and dynamics laboratory . Also,small CAD system for construction

1.4 Priority of the problem.

-Structural engineering laboratory
-Soil mechanics laboratory

1.5 Necessity and importance of improvement

There are the reasons for training of construction engineering students for designing and buildings capable to survive at the above mentioned conditions.As a result of this project the graduating specialists will be capable to deal with problems arising from specific condition of Mongolia.The students will have opportunity to conduct the research work during the training period.

1.6 Reason why Japan's grant aid is requested.

-Financial problem for renovation of laboratory
-Japan is experienced to train the specialists ,who able to build constructions in seismic and special geological-engineering conditions of soil.

1.7 Objectives.

Short term: To supply the modern laboratory facilities for improve quality of training of students.
Medium term: To develop the reliable system of retraining for specialists,graduating from Civil engineering school.

1.8 Outline of the project.

Equipment: To provide with necessary equipment
Training of instructors: Training Mongolian specialists
Expert consultancy: Short term expert consultancy.

Name of the project: Strengthening of the training base of the architectural department

1. Background

In the beginning of 1950th the first Mongolian architects began to study in former Soviet Union and a some countries of eastern Europe. This kind of training of specialist in architectural field continued until 1973.
In 1973 the architectural department was established and started to train architects. In that time teachers and lecturers came from Soviet Union and we used to curriculum and equipment of Russian university. All these consisted to develop European architecture in Mongolia and to forget the national style of architecture.

1.1 Current situation

At the present time in architecture department are study about 100 students every year .About 60 per cent of all teachers and lecturers graduated from Russia and staff of the department has an experience of 10-12 years in architecture. For last years curriculum was renovated and a some teachers has been retrained but laboratory facilities for training obsolete.

1.2 What role of the Department

The architecture department of MTU is unique in Mongolia .Now about 80 per cent of all architecture of Mongolia are graduate from architecture department of MTU they have been specialized in building architecture and urban planning architecture.

1.3 Problem to be solved.

-set up building physics study laboratory by renewing of existing training equipment.
-to introduce new technology and method of training for architecture.
-training the teaching staff in developed countries.

1.4 What problem was solved.

1.5 Necessity and importance of improvement.

For training the students and retraining of a some industrial people department needs a laboratory facilities for architecture.

1.6 Reason why Japan's grant aid is requested.

Japan has a lot of experience in architecture,building design also in determining of local feature and climate influence on the architecture design and using of available building materials in construction etc.,

Japan has a lot of experiense in architecture,building design also in determining of local feature and climate influence on the architecture design and using of available building materials in construction etc.,

1.7 Objectives.

Strengthening of the laboratory facilities for:

-Light technique study and training
-Heating technique training and study.
-Architecture acoustics and sound reducing.

1.8 Outline of the project.

Eqiupment: To provide with neccesary eqiupment
Training of instructors: Short term training of Mongolian teachers in developed countries.
Expert consultancy: Short term consultancy service for installation and set up eqiupment.

Name of the project: Laboratory of food biotechnology and food processing

1. Background

Since 1971 Mongolian State Technical University has been trained engineers for food industry. During this period had been graduated nearly 900 engineers. Most of the trained specialists are food engineer-technologists. They are qualified in the such engineering fields,

- Engineer-technologist of dairy products
- Engineer-technologist of meat industry
- Engineer-technologist of bakery and confectionery
- Engineer-technologist of food industry
- Engineer-technologist of brewing
- Public catering technologist

In the now days university`s laboratories are not meeting the present day requirements.
Special courses of food biochemistry, microbiology and basic principles of biotechnology are the most important subjects for food technologists in the current training program.

1.1. Current situation

370 students are studying the food processing technology at the Technical university.
In the third year students are specialized in above mentioned main 6 specialities. Subjects of technical and special courses of microbiology and biochemistry are carrying out in the laboratories of Food Research Institute , outside of University. Also researchers of that institution are teaching at this department.

1.2 Role of the food department in the country's education and economics

Food processing industry is occupying one of the priority place in the economic system of our country. The complex processing of agricultural origin food products is one of the main stress of country's further development.
Therefore ,food technology training should be based on the modern biotechnological and food processing technology. In realization of this purpose we should improve quality of graduate specialists. The creation of contemporary Laboratory of food biotechnology and food processing in suitable level of science and technology will render assistance in the development of food industry and relevant instruction of students.

1.3 Problems to be solved

- To establish a food biotechnology laboratory facilities as key sector of future food industry development in Mongolia and complex processing local food raw material.
-Strengthening and renovation of a some existing food technology training facilities.
-Introducing of advanced methodology for training and retraining of specialists.
-Training instructors

was solved

laboratories of food industry such as dairy product,meat and confectionery,brewing,public catering etc., But existing facilities were obsolete.
the food biotechnology laboratory had been design project

problems.

food biotechnology laboratory and training teachers for it.
above mentioned food processing laboratories

importance of improvement

development of food industry in Mongolia and increasing of the food products from local raw material Mongolian technical to train national specialists and students.

the food biotechnology laboratory should be key factor to introducing technology for food industry development.

Why Japan`s grant aid is requested

Technical University can not itself to solve the problem for creation biological laboratory, because of financial problem for laboratory

biotechnology, particularly food biotechnology is high developed. Our has a cooperation with JICA and accumulated some of experience.

objectives.

Strengthening of laboratory facilities for food industry technology

An establishing of food biotechnology laboratory
Training of the national teachers.

the project.

All necessary equipment should be provided within JICA project.

Instructor: Short term training of national specialists.

Consultancy: For installation and adapting the equipment need expert

Name of the project: Electronics equipment and device laboratory

1.Background

There is a need to train highly specialized and educated specialists ,who will work at the different kind of industries, where are introducing automatic industrial lines with more flexible managing procedure and modern technology of microelectronics.
In this respect the electronics training department of the Mongolian Technical University should play an essential role.

1.1 Present situation

Computer engineering Department has 8 teachers and 180 students in 5 courses.
In the department of Computer engineering education has been conducted two core fields of study. Electronics and computer related technology.
The course aims to provide the students with:
-the fundamental principles of the applied electronics.
-a means of developing their abilities for independent thinking so that they can more easily adapt to the rapid changes in the electronic engineering field and
-sufficient professional knowledge in the electronic engineering practice to enable them to function as engineers upon graduation.

At the present situation our training process is so difficult ,as a electronic equipment devices and measure technology are very old .
They have not correct limit and approximation.
The electronics laboratories need the reorganization at the Department.

1.2 What role of the department in Mongolian education and economics.

The Department of the Computer Engineering is conducting the courses for the students to become professional computer field service engineers.
The first course aims to provide the fundamental electrical concepts ,mathematics background and elementary analytic techniques and to introduce the students to the principles of operation of semiconductor devices and electronic circuit theory.
The great emphases is placed throughout second course on the use trainees on microprocessor system .
Firstly as a design and analytic tool and later on as signal processing components
New laboratory for the training should to enable successful demonstration in the use of modern electronics circuits and CAD & CAM principles.

1.2 Problems to be solved

The strengthening of the laboratory needs to acquire new electronic equipment and devices for training process of electronic principles ,digital and analog circuits,computer technology and programmable chips, as a logic analyzer, measurements with high correct limits and approximation.After acquiring we could be establish a some laboratory workstation for students to study the principles of operation of modern electronic device and components ,also design of electronic logic circuits

1.3 What problems was solved

There are a some laboratory facilities necessary for training of students in fundamental electronics and digital electronics but only for low integrated circuits

1.4 Priority of the problems.

-Microprocessor system laboratory
-Semiconductor device and measurement laboratory

1.5 Necessity and importance of improvement.

The wide range application of electronics and microprocessor equipment in Mongolian and necessity to use modern technology with them in factories,plants and training. Because there is need to train national specialists with high education and experiences in electronics.

1.6 Reason why Japan's grant aid is requested.

Japan is the leading country in electronics engineering development on the world. Japanese electronics industry has worldwide success in high integration, reliable functioning,approximation electronic circuits ,their industrial application and training specialists.

1.7 Objectives

Short term:
Strengthening of laboratory facilities necessary for Diploma degree training of students.

Medium and long term:
To create the training and laboratory facilities for training Bachelor and Master degree students experienced in electronics, retraining of industrial specialists.

1.8 Outline of the project:

Equipment: To provide with necessary laboratory equipment from Japan.

Training of instructors: Short term training of Mongolian instructors in Japan

Expert consultancy: To invite Japan expert in Mongolia for consultancy.

Name of the project: Telecommunications training laboratory

1. Background

The school of information Techniques Technology is only one in the country which prepares specialists for Telecommunications and Radiocommunication fields.
It has 4 departments: Telecommunications, radiocommunications, information technology and information-measurement-electronic. Faculty staff over 50, students over 520. Three volunteers of JICA work in the SIT.

1.1 Current situation.

Information-measurement electronic department has 13 instructors, over 120 students,7 laboratories. Volunteer of the JICA Iino Ryichi teaches in this department. He teaches computer-hardware. After graduating they receive bachelor degree. Measurement equipment and devices became out of date because have been obtained in 1973 on the support of UNO.
In telecommunication and radiocommunication fields are introduced new digital technology systems in the country but laboratory basis of SIT obsolete.

1.2 What role of the department in Mongolian economics and Education system?

The school of information techniques technology is the only high education authority in Mongolia for training telecommunications,radiocommunication and communication measurement technology.

1.3 Problems to be solved:

-renovation of the telecommunication laboratory basis.
-renovation of the radiocommunication laboratory basis.
-training staff for new telecom and radiocom technology

1.4 What problems was solved?

"Consulting service -training of trainers" project financed by Norwegian Government is implementing in SIT. Executive company is KTI.

1.5 Priority of the problems.

Telecommunications laboratory and training
Radiocommunication laboratory and training
Communications measurement laboratory

1.6 Necessity and Importance of Improvement.

Used measurement equipment and devices became out of date because they obtained more than 20 years ago by the assistance of UNO. Using of these old equipment and devices for training becomes impossible . A renewing of laboratory

basis will improve knowledge and skills of graduates, who will use advanced technology.

1.7 Reason why Japan's Grant Aid is requested.

There is shortage of financial resource for renovation.

1.8 Objective

Short-term objective: create and renovate Microprocessor system laboratory (new measuring equipment and devices, microprocessor training system and so on)

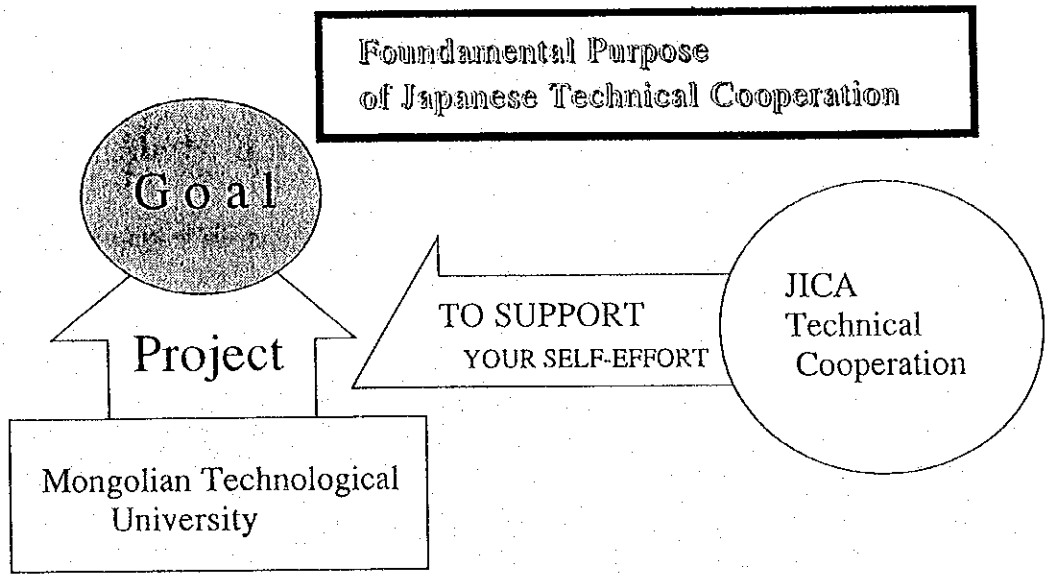
Medium and long term: create and renovate above mentioned laboratories

1.9 Outline of project:

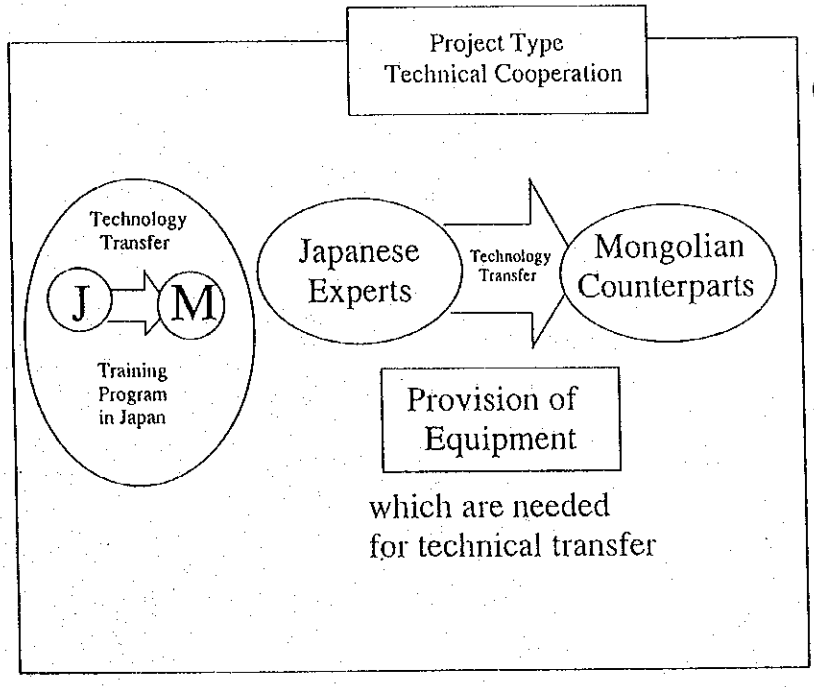
Equipment : To provide equipment and device from Japan.
Consulting instructors : Need training of Mongolian teachers and specialist.
Expert consultancy: Short term expect consultancy from Japan and involvement of JICA volunteers.

15. 技術協力の仕組みに関する説明資料

15－1　技術協力のねらい



15－2　プロジェクト方式技術協力のしくみ



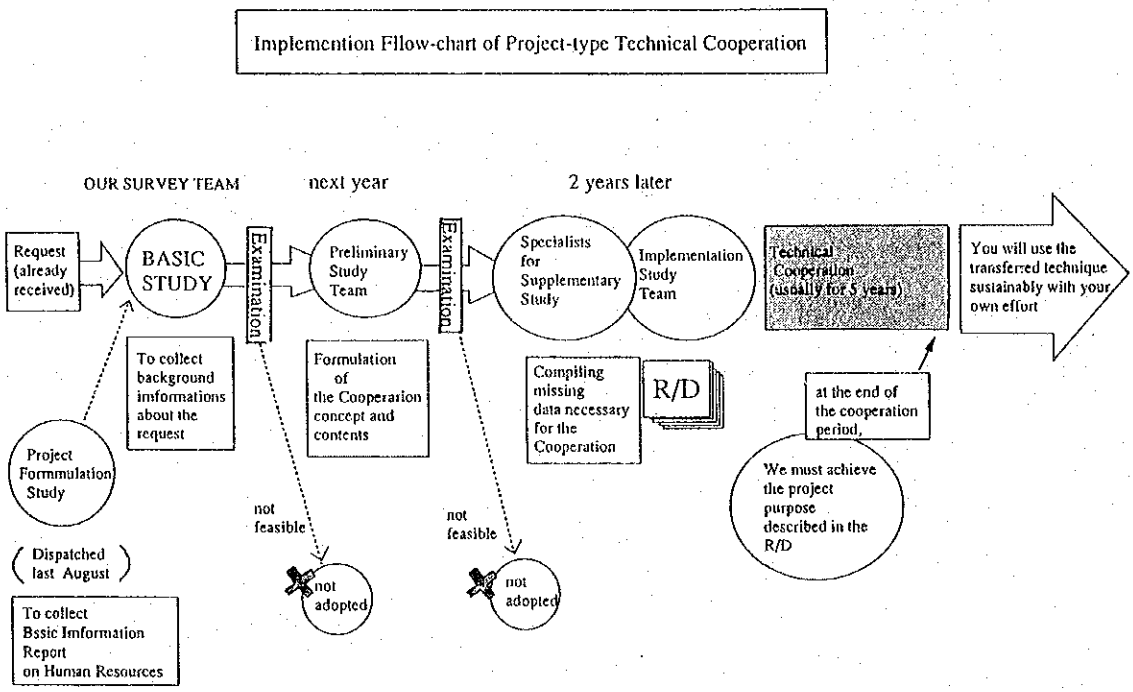
○You must allocate:
1) the buget for
the project

2) counterpart
personnels

3) facilities that
are needed for the
project.

and so on

15－3　協力までの流れ


Implemention Fllow-chart of Project-type Technical Cooperation
OUR SURVEY TEAM
next year
2 years later
Request (already received)
BASIC STUDY
Examination
Preliminary Study Team
Examination
Specialists for Supplementary Study
Implementation Study Team
Technical Cooperation (usually for 5 years)
You will use the transferred technique sustainably with your own effort
To collect background imformations about the request
Formulation of the Cooperation concept and contents
Compiling missing data necessary for the Cooperation
R/D
at the end of the cooperation period,
We must achieve the project purpose described in the R/D
Project Formmulation Study
Dispatched last August
To collect Bssic Imformation Report on Human Resources
not feasible
not adopted
not feasible
not adopted

JICA